Jam.py documentation Documentation

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Sumário

CAPÍTULO 1

Documentação do Jam.py V7

1.1 Introdução

Bem-vindo ao Jam.py! Se você é novo no Jam.py ou no desenvolvimento de aplicações Web sem código (*no-code*), com pouco código (*low-code*) ou com mais código (*more-code*), este é o lugar para encontrar a documentação sobre o Jam.py V7.

A maior diferença em relação ao Jam.py V5 é o suporte a *routing* e o uso do Bootstrap 5, permitindo suporte moderno para dispositivos móveis. Além disso, toda a interface para dispositivos Desktop ou Móveis é orientada por uma abordagem sem código. Basta selecionar o que for necessário para qualquer dispositivo e pronto.

Objetivos

Instalar o Python e o Jam.py, escolher o banco de dados e o servidor Web, e tomar decisões sobre o Design da Aplicação.

Público-alvo

Entusiastas do desenvolvimento Web ou desenvolvedores com pouca ou nenhuma experiência em desenvolvimento ou implantação Web.

Pré-requisitos

É recomendado ter algum conhecimento de Python e JavaScript. É necessário ter conhecimento geral sobre o prompt de linha de comando e saber digitar comandos.

1.2 Como a documentação está organizada

Aqui está uma visão geral de como a documentação está organizada, para ajudá-lo a encontrar onde procurar por tópicos específicos:

Primeiros passos descreve como instalar o framework, criar um novo projeto, desenvolver uma aplicação web passo a passo e implantá-la.

Guias de programação abordam tópicos e conceitos principais em um nível mais abrangente, fornecendo informações de base e explicações úteis.

Construtor de aplicações de negócios é uma descrição detalhada do *Application Builder* usado para o desenvolvimento da aplicação e administração do banco de dados.

Guias de referência de classes contêm referência técnica das APIs das classes do Jam.py.

Perguntas frequentes cobre as dúvidas mais frequentes.

Como fazer contém exemplos de código úteis para realizar rapidamente tarefas comuns.

Ou visite o *sumário* ou até mesmo

Dicas de Design de Aplicações com Jam.py, para um passo a passo detalhado sobre como construir aplicações ou migrar do MS Access.

Para baixar este documento como um único PDF, por favor visite:

https://jampy-docs-v7.readthedocs.io/_/downloads/pt-br/latest/pdf/

O PDF é gerado instantaneamente após cada *commit* no repositório. Portanto, alguns dados neste site podem estar desatualizados em relação ao PDF.

1.3 Tutoriais em Vídeo

Se você é novo no Jam.py, recomendamos fortemente que assista a estes tutoriais em vídeo. Os vídeos se referem ao Jam.py V5. Há mudanças mínimas na interface do usuário em comparação com a versão V7.

É recomendado assistir aos vídeos em resolução 1080p.

Tutorial 1 - Trabalhando com arquivos e imagens

Tutorial 2 - Trabalhando com detalhes

Tutorial 3 - Usuários, papéis, trilha de auditoria/histórico de alterações

Tutorial 4 - Árvore de tarefas

Tutorial 5 - Formulários

Tutorial 6 - Eventos de formulário

Tutorial 7 - Controles com reconhecimento de dados

Tutorial 8 - Conjuntos de dados (Datasets)

Tutorial 9 - Conjuntos de dados - Parte 2

Tutorial 10 - Campos e filtros

Tutorial 11 - Interações cliente-servidor

Tutorial 12 - Trabalhando com dados no servidor

CAPÍTULO 2

Primeiros passos

Aqui você aprenderá como instalar o framework, criar um novo projeto, desenvolver uma aplicação web e implantá-la.

2.1 Instalação

2.1.1 Instalar o Python

O Jam.py requer o Python. Se ele não estiver instalado, você pode obter a versão mais recente do Python em https://www.python.org/download/

Você pode usar as seguintes versões do Python com o Jam.py:

Python 2:

- Python 2.7 ou superior

Python 3:

- Python 3.4 ou superior

Você pode verificar se o Python está instalado digitando `python` no seu terminal; você deverá ver algo como:

```
Python 2.7.12 (default, Nov 19 2016, 06:48:10)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Se o Python 2 e o Python 3 estiverem instalados, tente digitar `python3`:

```
Python 3.5.2 (default, Nov 17 2016, 17:05:23)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

2.1.2 Instalar o Jam.py

Instalando uma versão oficial com *pip*

Esta é a forma recomendada de instalar o Jam.py.

1. Instale o pip. A maneira mais fácil é usar o instalador standalone do pip. Se sua distribuição já tiver o `pip` instalado, talvez seja necessário atualizá-lo caso esteja desatualizado. (Se estiver desatualizado, você saberá porque a instalação não funcionará.)
2. Se você estiver usando Linux, Mac OS X ou alguma outra variante do Unix, digite o seguinte comando:

   ```
   sudo pip install jam.py-v7
   ```

   no prompt do terminal.

   Se você estiver usando Windows, inicie um prompt de comando com privilégios de administrador e execute o seguinte comando:

   ```
   ...\> python -m pip install jam.py-v7
   ```

   Isso instalará o Jam.py no diretório `site-packages` da sua instalação do Python.

Instalando uma versão oficial manualmente

1. Baixe o arquivo do pacote.
2. Crie um novo diretório e descompacte o arquivo lá.
3. Acesse o diretório e execute o comando de instalação a partir do terminal.

```
$ python setup.py install
```

Isso instalará o Jam.py no diretório *site-packages* da sua instalação do Python.

> **Nota**
>
> Em alguns sistemas do tipo Unix, pode ser necessário mudar para o usuário root ou executar o comando: sudo python setup.py install

> **Python no Windows**
>
> Se você está começando com o Jam.py e utilizando o Windows, você pode achar útil o *Como instalar o Jam.py no Windows*.

2.2 Criando um projeto

Crie um novo diretório.

Acesse o diretório e execute no terminal:

```
$ jam-project.py
```

Os seguintes arquivos e pastas serão criados no diretório:

```
/
    css/
    js/
    img/
    reports/
    static/
    admin.sqlite
    server.py
    index.html
    wsgi.py
```

Para iniciar o servidor web do Jam.py, execute o script `server.py`.

```
$ ./server.py
```

Nota

Você pode especificar uma porta como parâmetro, por exemplo:

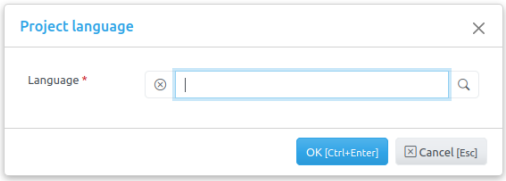
```
$ ./server.py 8081
```

Por padrão, a porta é 8080. Se você especificar outra porta, será necessário usá-la no navegador nos próximos passos.

Abra um navegador e acesse "/builder.html" no seu domínio local – por exemplo:

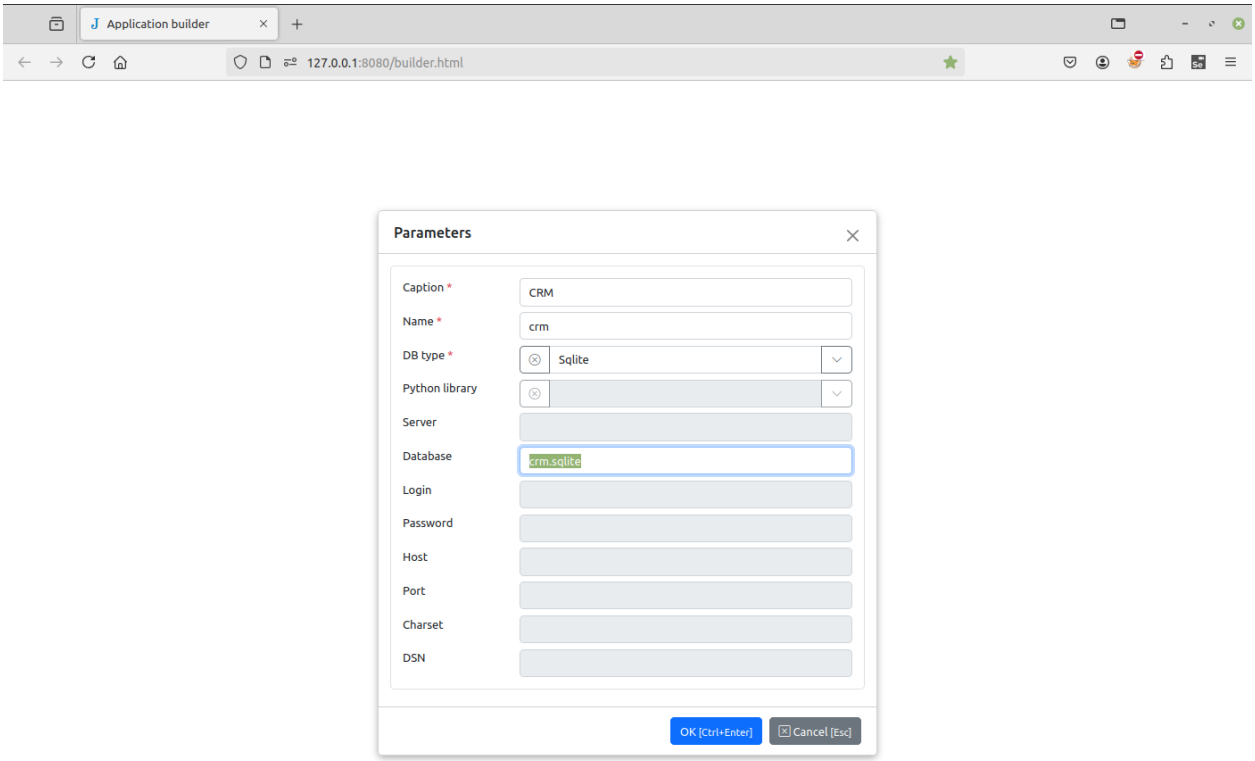
```
127.0.0.1:8080/builder.html
```

Você deverá ver o diálogo de seleção de idioma. Isso define o idioma utilizado na interface do usuário. Você pode selecionar o idioma a partir da lista de idiomas padrão, ou importar o seu próprio, usando o ícone de "pasta" à direita do campo de entrada. Consulte a página *Suporte a idiomas* para mais informações. Selecione seu idioma e pressione o botão OK.



Em seguida será exibido o diálogo de novo projeto. Preencha os seguintes campos:

- **Caption** – o nome do projeto que será exibido para os usuários.
- **Name** – o nome do projeto (tarefa) que será utilizado no código (Python ou JS) para acessar o objeto da tarefa. Deve ser um identificador válido e curto em Python. Este nome também será usado como prefixo ao criar uma tabela no banco de dados do projeto.
- **Tipo de BD** – selecione um tipo de banco de dados. Se o banco de dados não for Sqlite, ele deve ser criado previamente e seus atributos devem ser inseridos nos campos apropriados do formulário. Para ver exemplos de configuração de banco de dados, *acesse*.



Ao pressionar OK, a conexão com o banco de dados será verificada, e em caso de falha, uma mensagem de erro será exibida.

2.2.1 Exemplos de configurações de banco de dados

Adaptado de Jam.py Design Tips

O Jam.py oferece suporte a diversos servidores de banco de dados, como por exemplo: PostgreSQL, MariaDB, MySQL, MSSQL, Oracle, Firebird, IBM, SQLite e SQLite com SQLCipher.

Se você estiver desenvolvendo um projeto pequeno ou algo que não pretende implantar em um ambiente de produção, o SQLite geralmente é a melhor opção, pois não exige a execução de um servidor separado. No entanto, o SQLite possui muitas diferenças em relação a outros bancos de dados, portanto, se você estiver trabalhando em algo mais complexo, é recomendável desenvolver com o mesmo banco de dados que será utilizado em produção.

Além do backend do banco de dados, é necessário garantir que as bibliotecas de acesso ao banco estejam instaladas no Python.

- Se estiver usando PostgreSQL, é necessário o pacote `psycopg2` ou `psycopg2-binary`.
- Se estiver usando MySQL ou MariaDB, é necessário o `MySQLdb` para Python 2.x. Para Python 3.x, são necessários os pacotes `mysql-connector-python` e `mysqlclient`, além dos arquivos de desenvolvimento do cliente de banco de dados.
- Se estiver usando MSSQL, é necessário o pacote `pymssql`.
- Se estiver usando Oracle, é necessário o cx_Oracle, além dos headers (arquivos de desenvolvimento) do

Python.

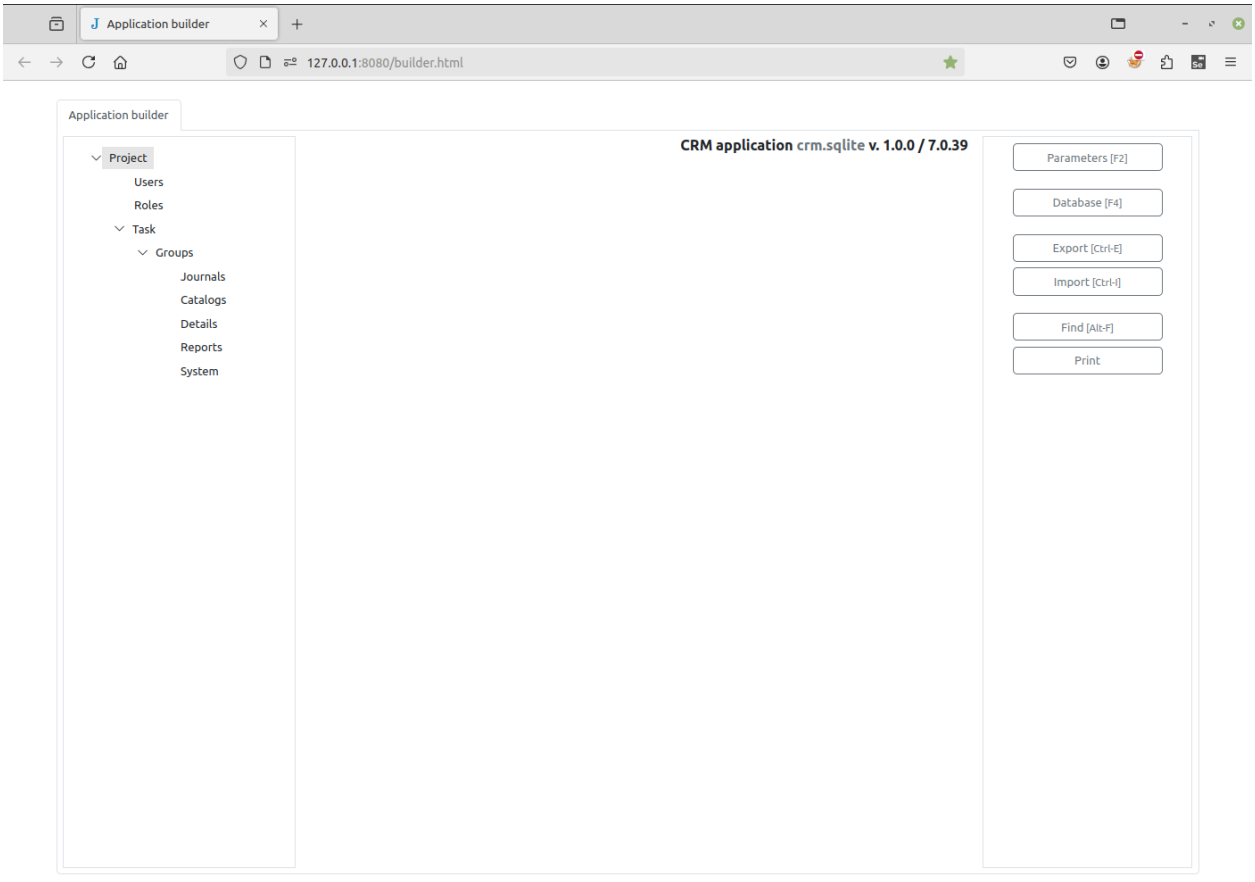
- Se estiver usando SQLCipher, é necessário o pacote `sqlcipher3-binary` para Linux. Para Windows há uma DLL standalone disponível.
- Se estiver usando IBM, são necessários os pacotes `ibm_db` e `ibm_db_dbi`.
- Se estiver usando Firebird, é necessário o pacote `fdb`.
- Para gerar relatórios, é necessário ter o **LibreOffice** instalado.

Nota

Para o banco de dados **SQLite**, quando um campo de item é excluído ou renomeado, ou uma chave estrangeira é criada, o *Construtor de Aplicações* cria uma nova tabela e copia os registros da antiga para ela.

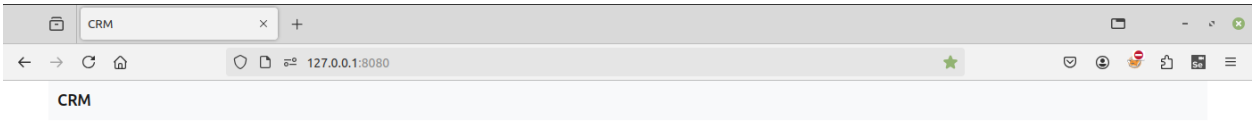
Para o banco de dados **SQLite**, o Jam.py não oferece suporte à importação de metadados em um projeto existente (um projeto com tabelas já criadas no banco de dados). Você só pode importar metadados em um projeto novo.

Se tudo correr bem, um novo projeto será criado e a árvore do projeto será exibida no Construtor de Aplicações.



Agora, para visualizar o próprio projeto, abra uma nova aba no navegador e digite na barra de endereços:

```
127.0.0.1:8080
```



2.3 Projeto de demonstração

O framework possui uma aplicação de demonstração completa que mostra as técnicas de programação utilizadas no Jam.py.

A demonstração está localizada na pasta *demo* do pacote Jam.py baixado do Github. Também há uma aplicação standalone ou portátil para Windows x64, disponível aqui.

A aplicação portátil depende apenas do LibreOffice para geração de relatórios, sem necessidade de mais nada. Basta executá-la e apontar o navegador conforme abaixo.

Para iniciar a aplicação de demonstração, vá até a pasta *demo* e execute o script *server.py*.

```
$ ./server.py
```

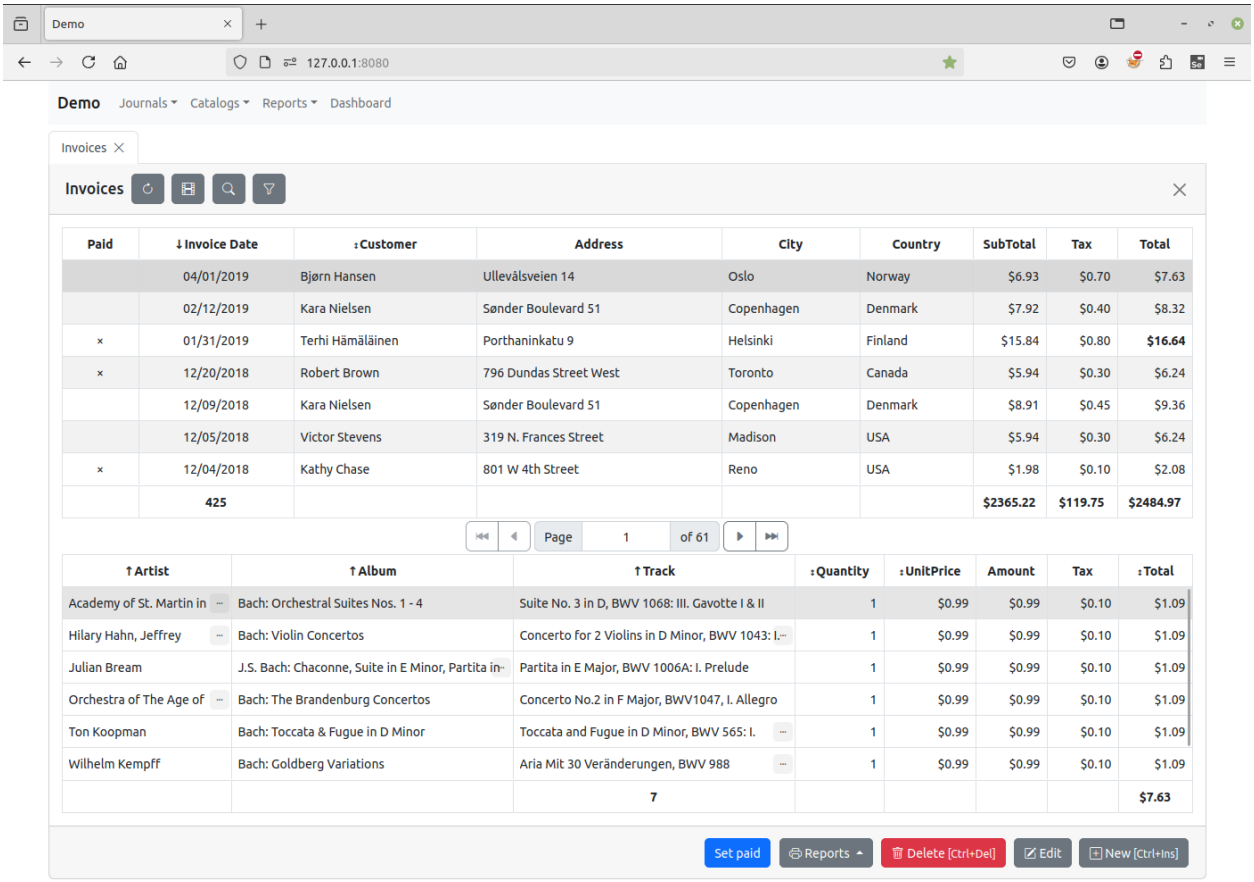
Abra um navegador e digite:

```
127.0.0.1:8080
```

na barra de endereços.

Para acessar o *Construtor de Aplicações*, abra uma nova aba no navegador e digite:

```
127.0.0.1:8080/builder.html
```


Demo
127.0.0.1:8080
Demo
Journals
Catalogs
Reports
Dashboard
Invoices
Invoices
Paid
Invoice Date
Customer
Address
City
Country
SubTotal
Tax
Total
04/01/2019 Bjørn Hansen Ullevålsveien 14 Oslo Norway $6.93 $0.70 $7.63
02/12/2019 Kara Nielsen Sønder Boulevard 51 Copenhagen Denmark $7.92 $0.40 $8.32
× 01/31/2019 Terhi Hämäläinen Porthaninkatu 9 Helsinki Finland $15.84 $0.80 $16.64
× 12/20/2018 Robert Brown 796 Dundas Street West Toronto Canada $5.94 $0.30 $6.24
12/09/2018 Kara Nielsen Sønder Boulevard 51 Copenhagen Denmark $8.91 $0.45 $9.36
12/05/2018 Victor Stevens 319 N. Frances Street Madison USA $5.94 $0.30 $6.24
× 12/04/2018 Kathy Chase 801 W 4th Street Reno USA $1.98 $0.10 $2.08
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Artist
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Academy of St. Martin in Bach: Orchestral Suites Nos. 1 - 4 Suite No. 3 in D, BWV 1068: III. Gavotte I & II 1 $0.99 $0.99 $0.10 $1.09
Hilary Hahn, Jeffrey Bach: Violin Concertos Concerto for 2 Violins in D Minor, BWV 1043: I. 1 $0.99 $0.99 $0.10 $1.09
Julian Bream J.S. Bach: Chaconne, Suite in E Minor, Partita in Partita in E Major, BWV 1006A: I. Prelude 1 $0.99 $0.99 $0.10 $1.09
Orchestra of The Age of Bach: The Brandenburg Concertos Concerto No.2 in F Major, BWV1047, I. Allegro 1 $0.99 $0.99 $0.10 $1.09
Ton Koopman Bach: Toccata & Fugue in D Minor Toccata and Fugue in D Minor, BWV 565: I. 1 $0.99 $0.99 $0.10 $1.09
Wilhelm Kempff Bach: Goldberg Variations Aria Mit 30 Veränderungen, BWV 988 1 $0.99 $0.99 $0.10 $1.09
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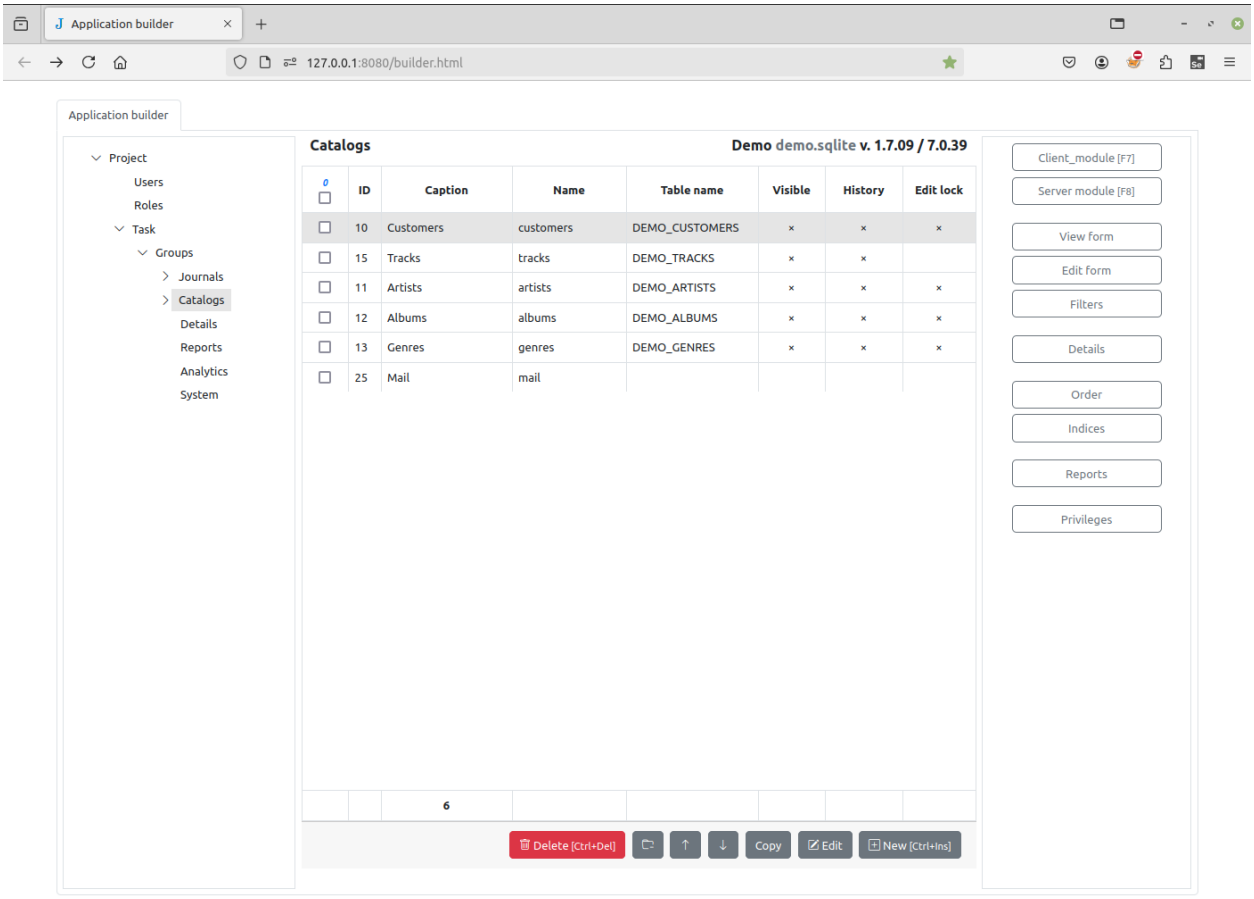


2.4 Tutorial. Parte 1. Primeiro projeto

Agora, vamos guiá-lo na criação de uma aplicação básica de Gerenciamento de Relacionamento com o Cliente (CRM). Por favor, siga os passos abaixo:

2.4.1 Novo projeto

Vamos supor que o Jam.py já esteja instalado. Se não, veja o guia de *Instalação* para saber como fazer isso.

Primeiro, crie uma pasta para o novo projeto. Dentro dessa pasta, execute o script `jam-project.py` para criar a estrutura do projeto.

```
$ jam-project.py
```

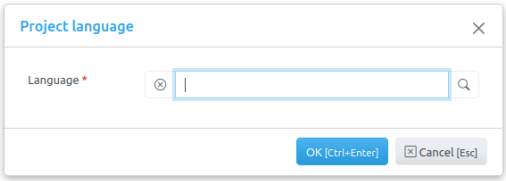
Após isso, execute o script `server.py` que o `jam-project.py` criou:

```
$ ./server.py
```

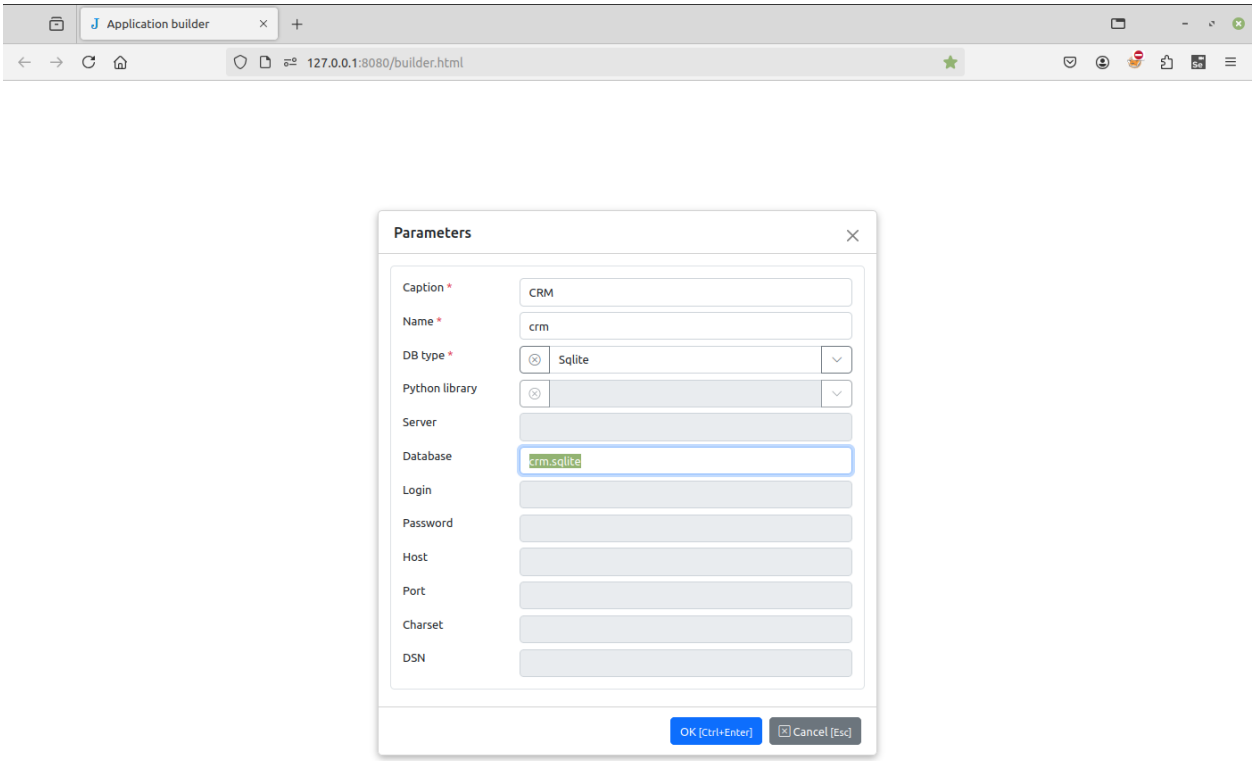
Agora, para completar a criação do projeto, abra o navegador e acesse

```
127.0.0.1:8080/builder.html
```

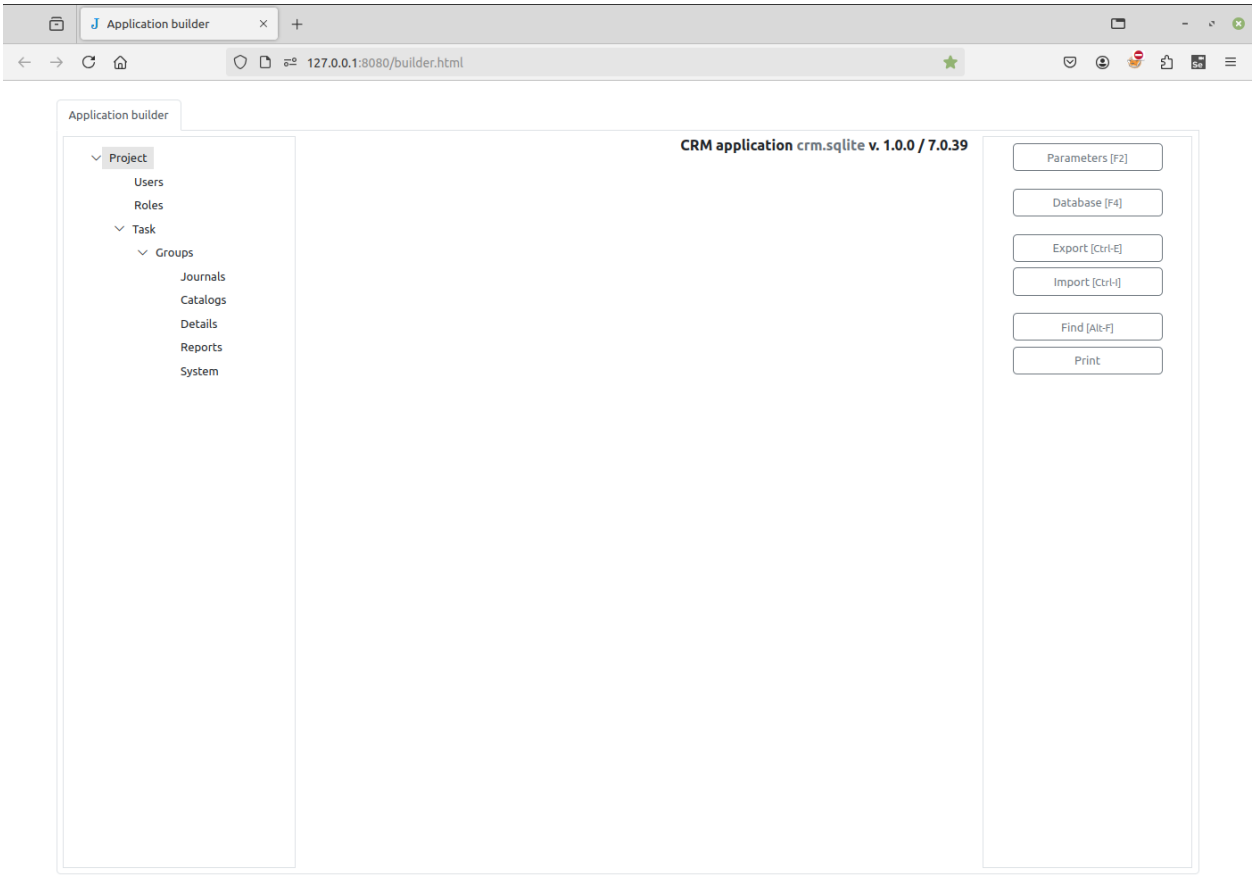
para abrir o Construtor de Aplicações. Você deverá ver o diálogo de seleção de idioma.



Use o botão de navegação para selecionar **Inglês**, ou a língua de sua preferência, e clique no botão **OK**. A caixa de diálogo de parâmetros do projeto aparecerá.



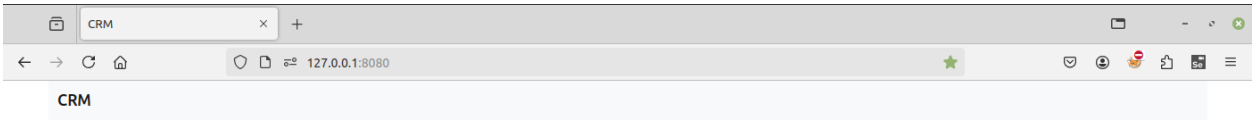
Preencha o formulário como mostrado na imagem acima e clique em **OK**. Agora, você deverá ver a árvore do projeto no painel à esquerda.



Abra uma nova página, digite

```
127.0.0.1:8080
```

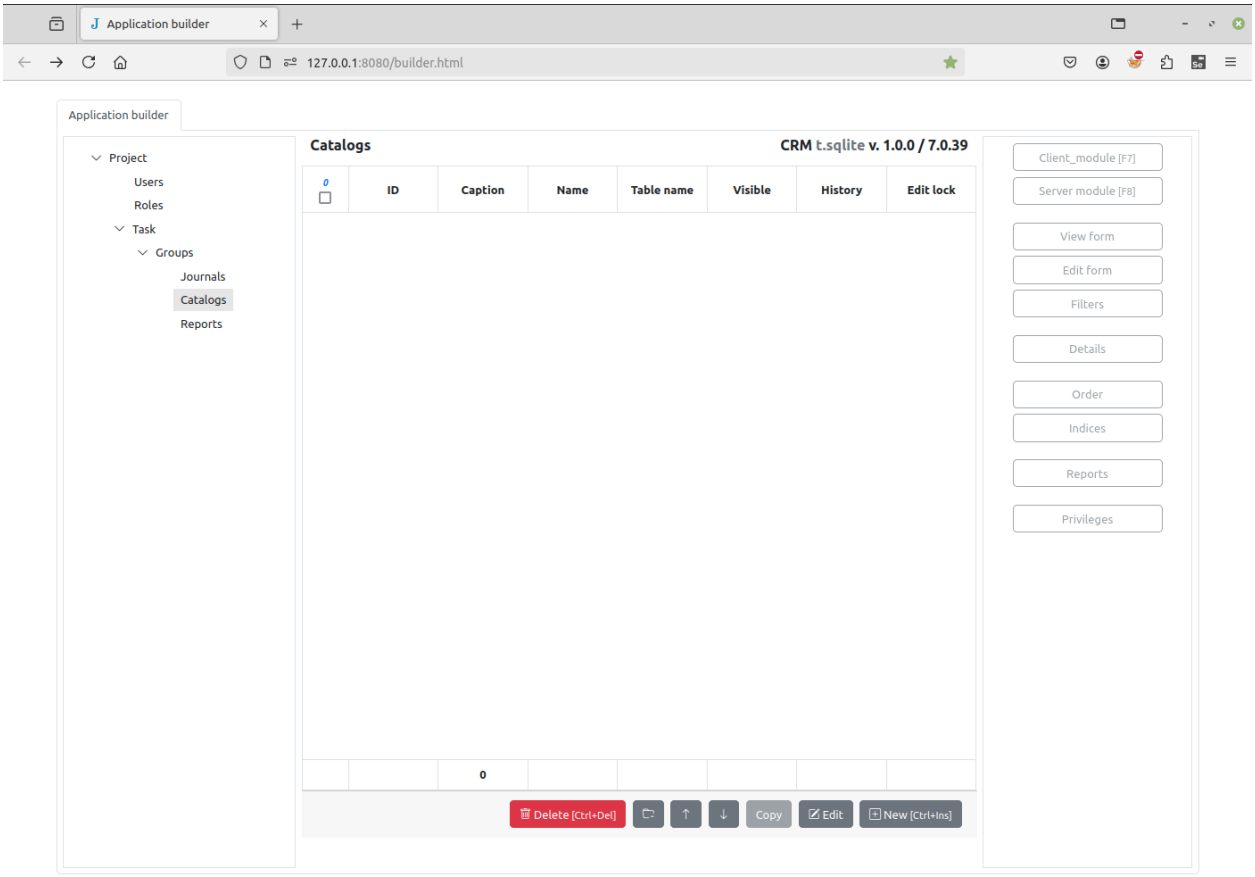
na barra de endereços e pressione Enter. Um novo projeto aparecerá com um menu vazio.



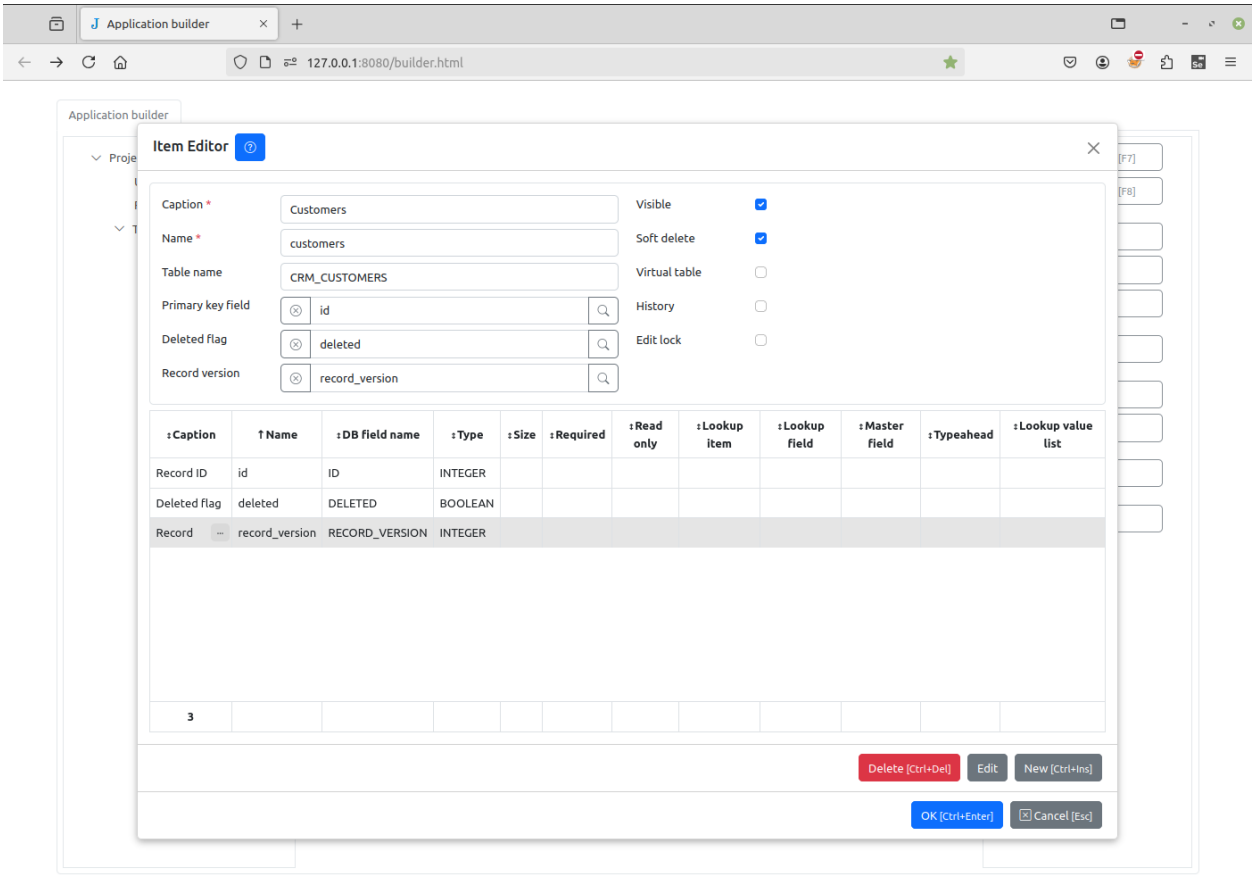
2.4.2 Novo Cadastro (Cadastros, no inglês)

Vamos voltar à página do Construtor de Aplicações e criar um Cadastro chamado “Clientes”. Um Cadastro corresponde a uma nova tabela no banco de dados.

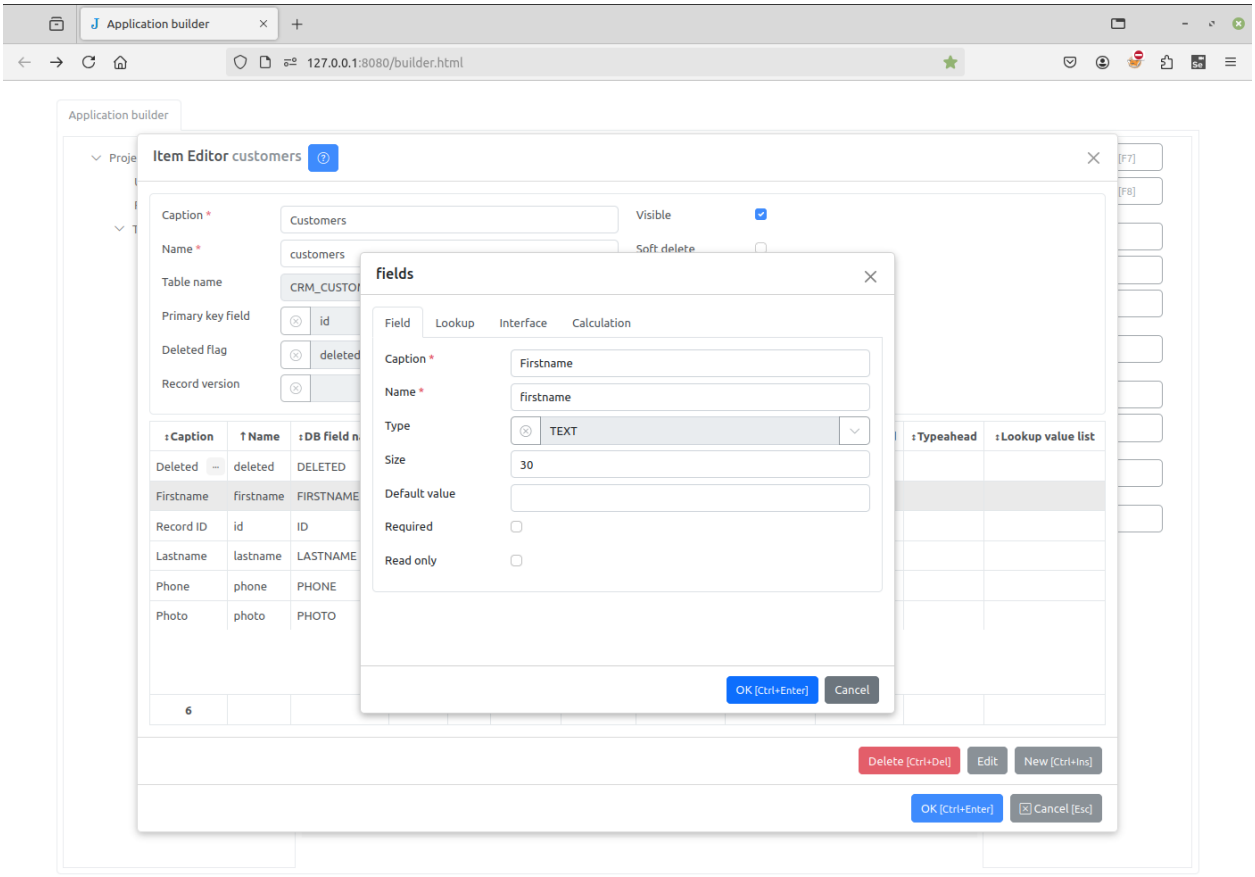
Para fazer isso, selecione o grupo “Cadastros” na árvore do projeto e clique no botão **Novo** no canto inferior direito da página.



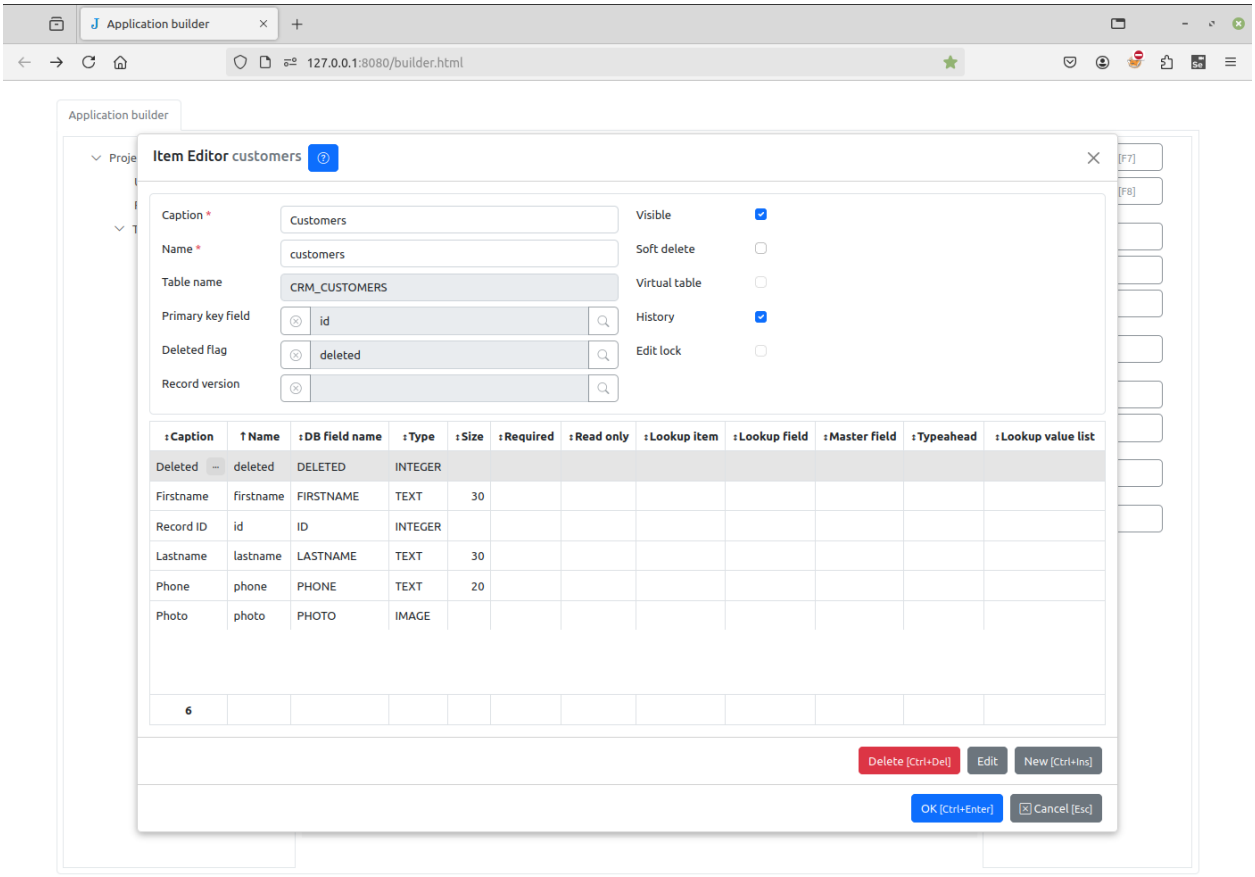
No diálogo *Editor de Itens* que aparecerá, preencha o título e o nome do novo Cadastro. O título é o nome que será exibido para os usuários, e o nome é a variável que será usada no código (Python ou JS) para se referir a este Cadastro. O nome deve ser um identificador válido do Python.



Em seguida, clique no botão **Novo** no canto inferior direito do diálogo para adicionar um novo campo. O *Editor de Campos* aparecerá. Digite o título e o nome do campo "Primeiro Nome", selecione seu tipo (aqui `TEXT` com 30 caracteres) e clique no botão **OK**.



Da mesma forma, adicione os campos “Sobrenome” e “Telefone”. Ao adicionar o campo “Sobrenome”, marque o atributo **Obrigatório**. Isso exige que o campo seja preenchido ao criar um novo item.



Agora, para salvar as alterações, clique no botão **OK**. Ao salvar, o Construtor de Aplicações criará a tabela `CRM_CUSTOMERS` no banco de dados `crm.sqlite`:

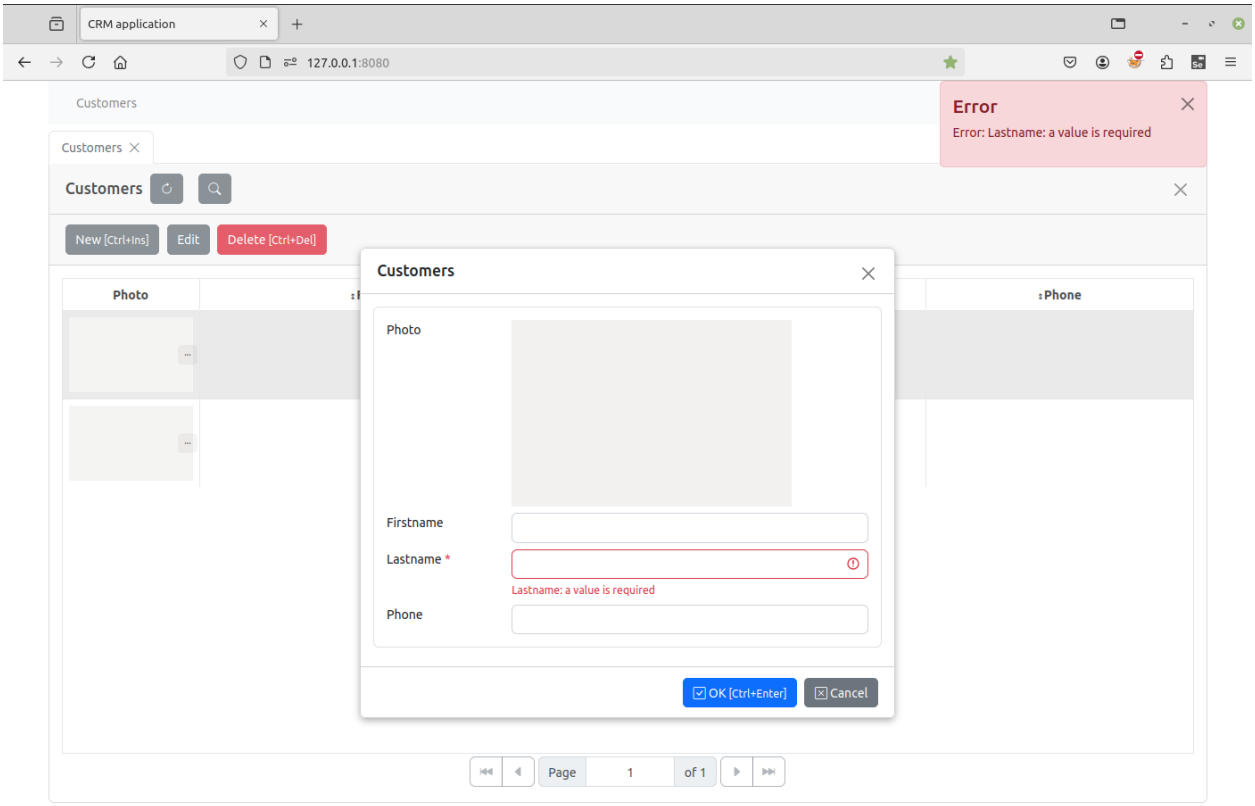
```
127.0.0.1 - - [07/Aug/2018 11:32:30] "POST /api HTTP/1.1" 200 -
CREATE TABLE "CRM_CUSTOMERS"
(
"ID" INTEGER PRIMARY KEY,
"DELETED" INTEGER,
"FIRSTNAME" TEXT,
"LASTNAME" TEXT,
"PHONE" TEXT)

127.0.0.1 - - [07/Aug/2018 11:32:30] "POST /api HTTP/1.1" 200 -
```

Vá até a página do Projeto e certifique-se de que ela foi atualizada

```
127.0.0.1:8080
```

Em seguida, clique no botão **Novo** para criar um novo cliente. Preencha o formulário, depois clique no botão **OK**:



Veja também

sanitização

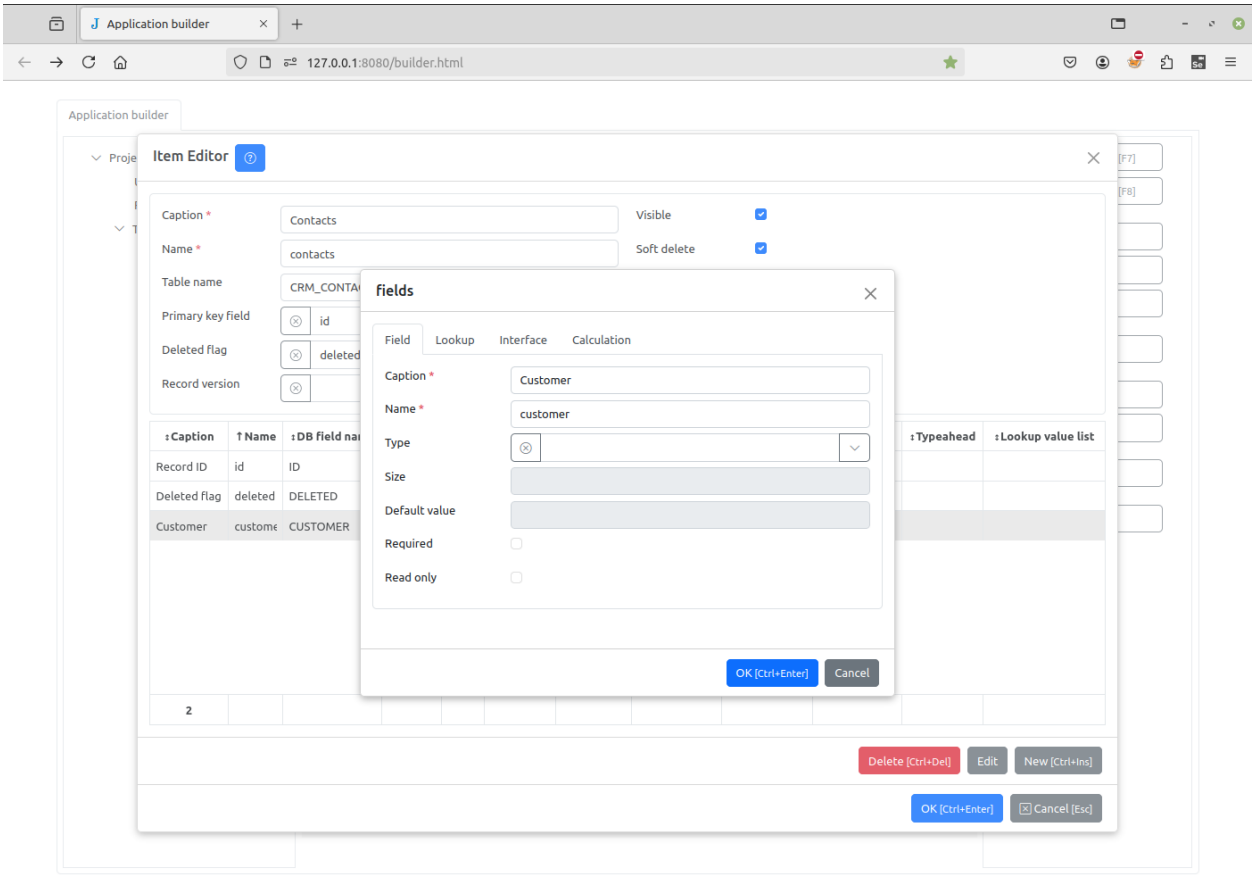
2.4.3 Campos de seleção

Agora, vamos criar o registro "Contatos" e usar campos de seleção (Lookup) para conectar contatos aos clientes. Campos de seleção (Lookup) permitem que um elemento de um item (ou seja, Cadastro ou Registro) referencie um elemento de outro item.

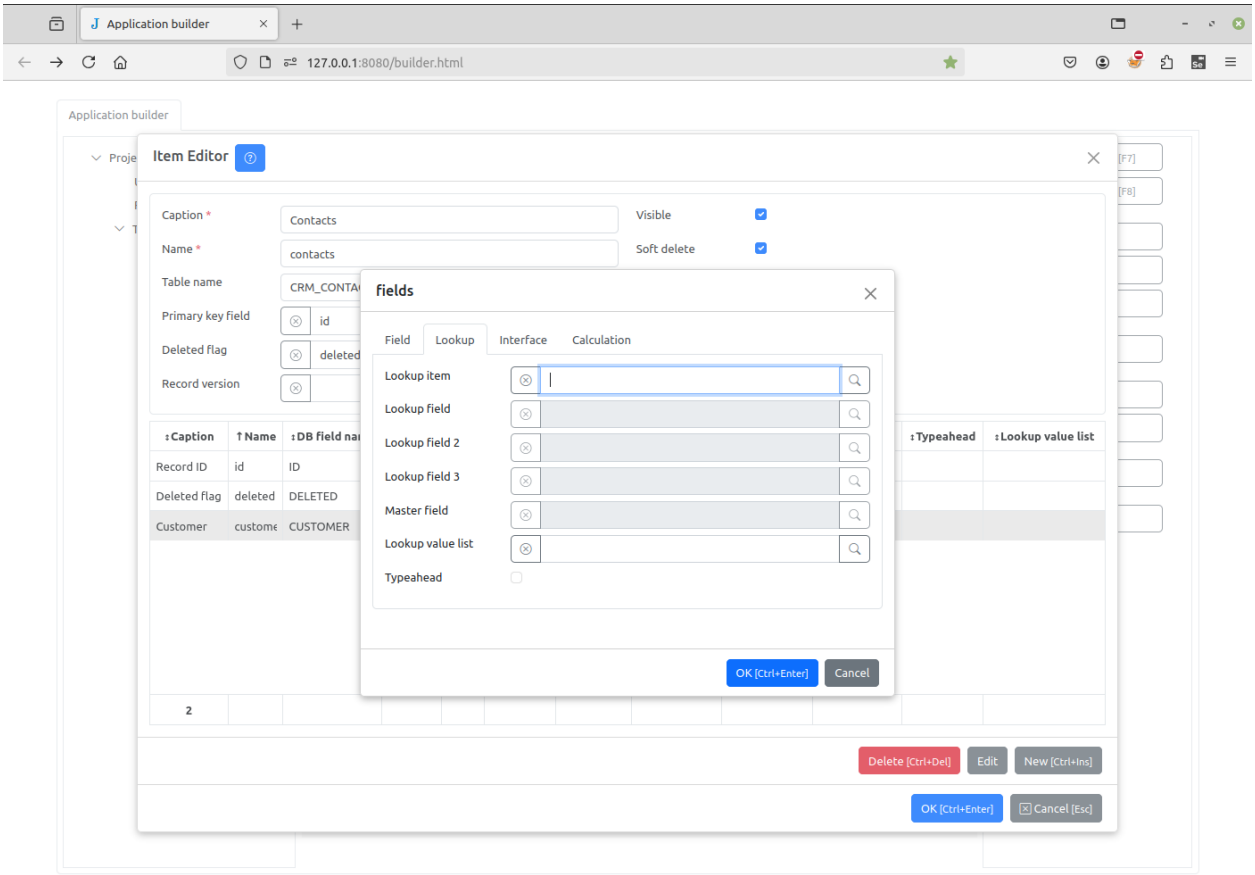
Selecione o grupo "Registros" (registros) na árvore de tarefas do projeto e adicione um novo registro (Registro) da mesma forma que criamos o cadastro "Clientes". Registros, assim como cadastros, correspondem a diferentes tabelas no banco de dados. Veja este *link* para mais informações.

Primeiro, adicione um campo "Data do contato" do tipo `DATETIME`, e um campo "Observações" do tipo `TEXT`.

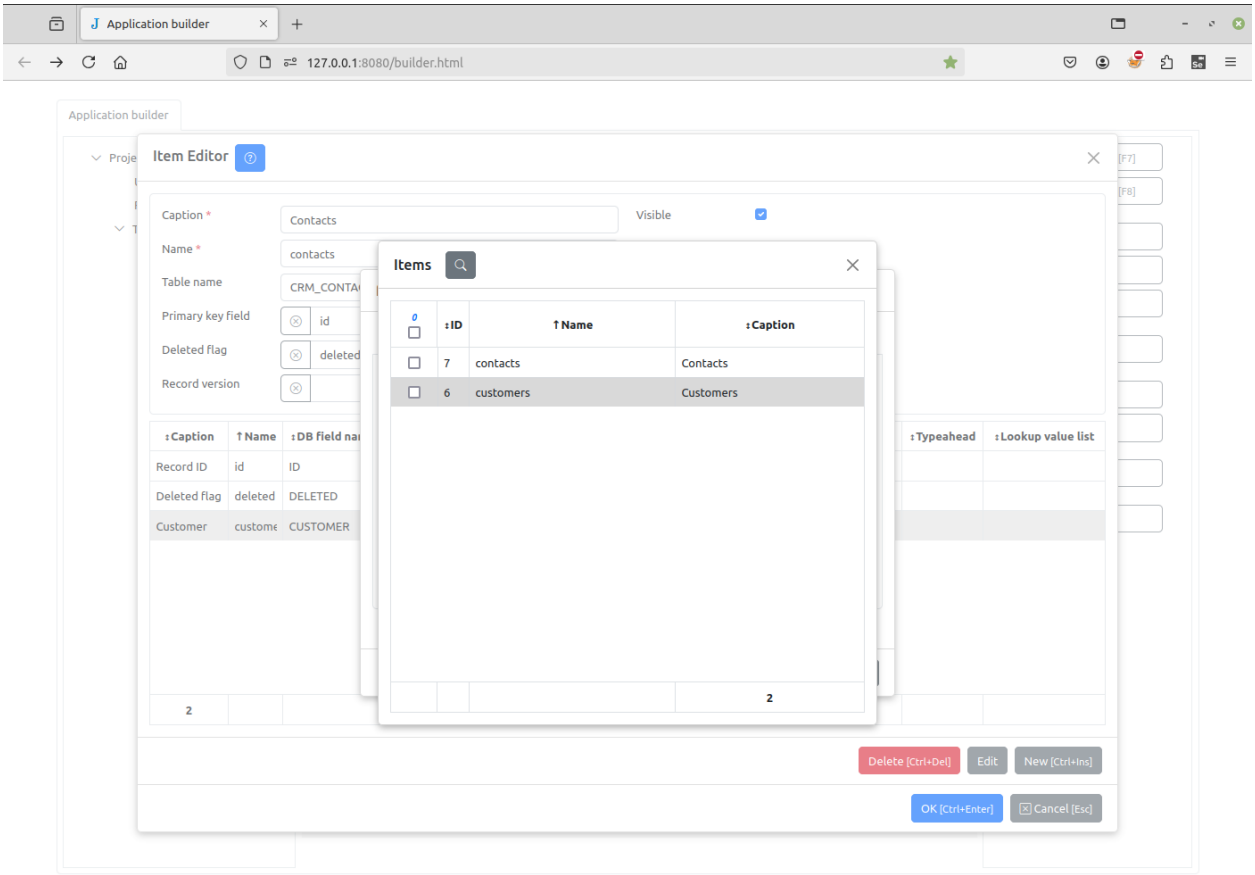
Depois, adicione o *campo de seleção* "Cliente", que armazenará uma referência a um registro no cadastro "Clientes".



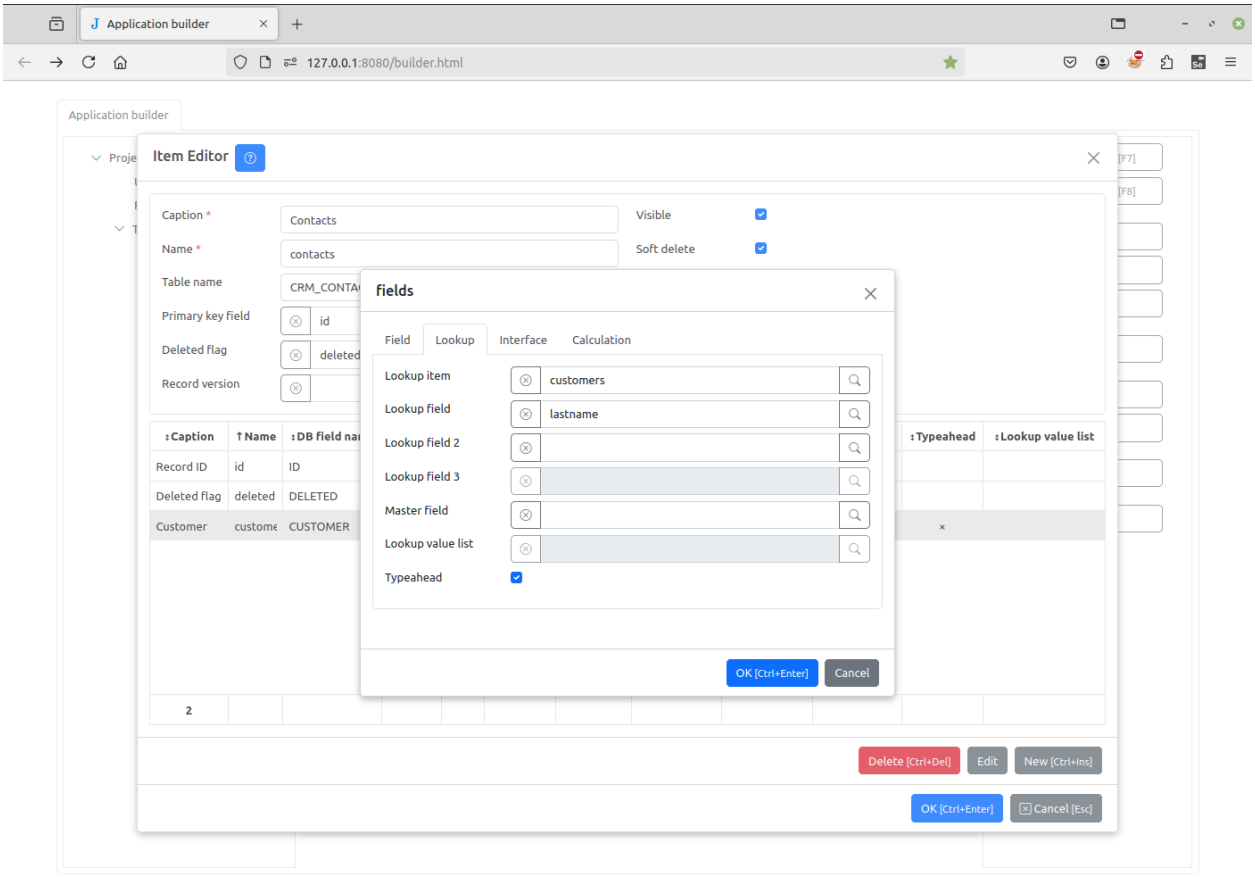
Para criar um campo de seleção, primeiro informe a legenda e o nome do campo, e deixe o tipo vazio. Em seguida, vá até a aba **Seleção** e clique no botão à direita do campo **Item de seleção**.



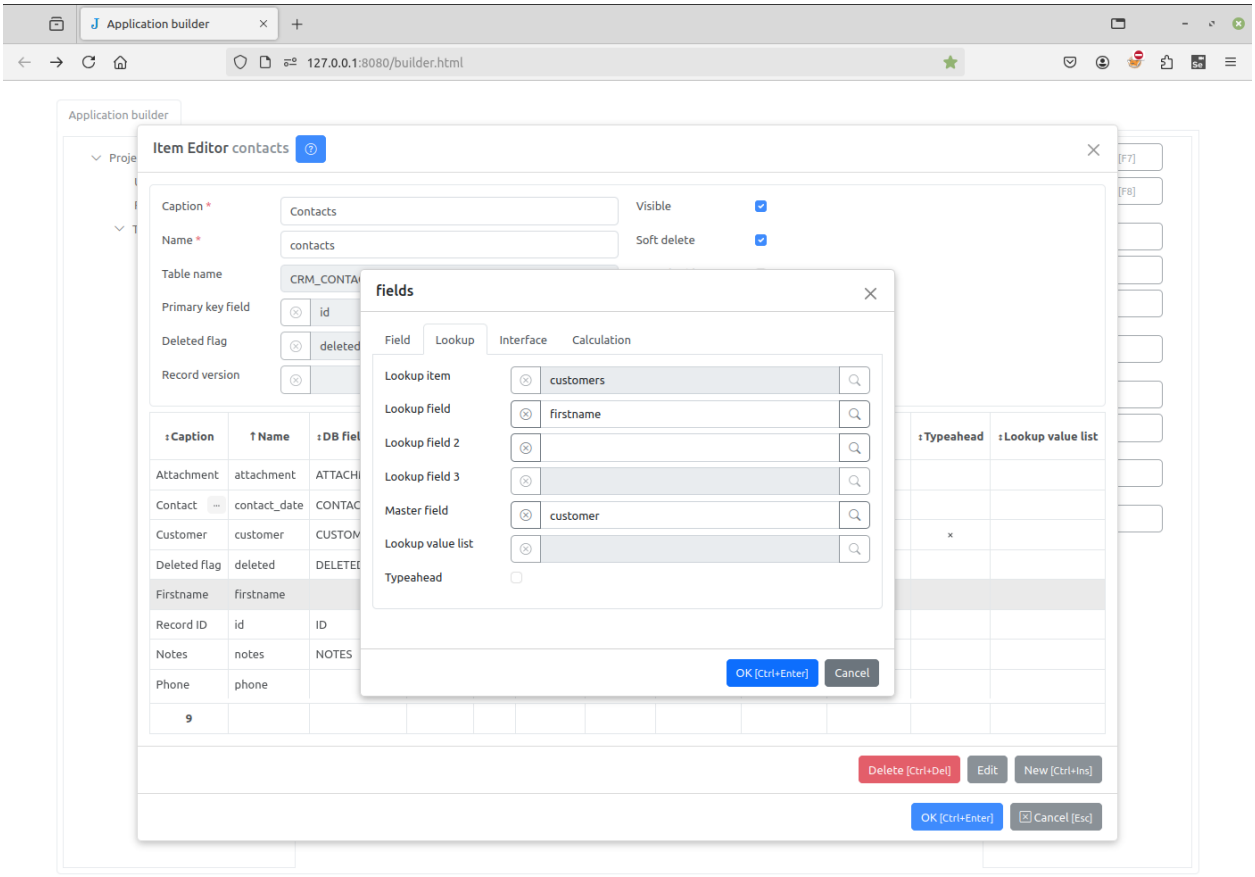
Isso abrirá uma lista de itens. Clique duas vezes no registro “Cliente” para selecioná-lo.

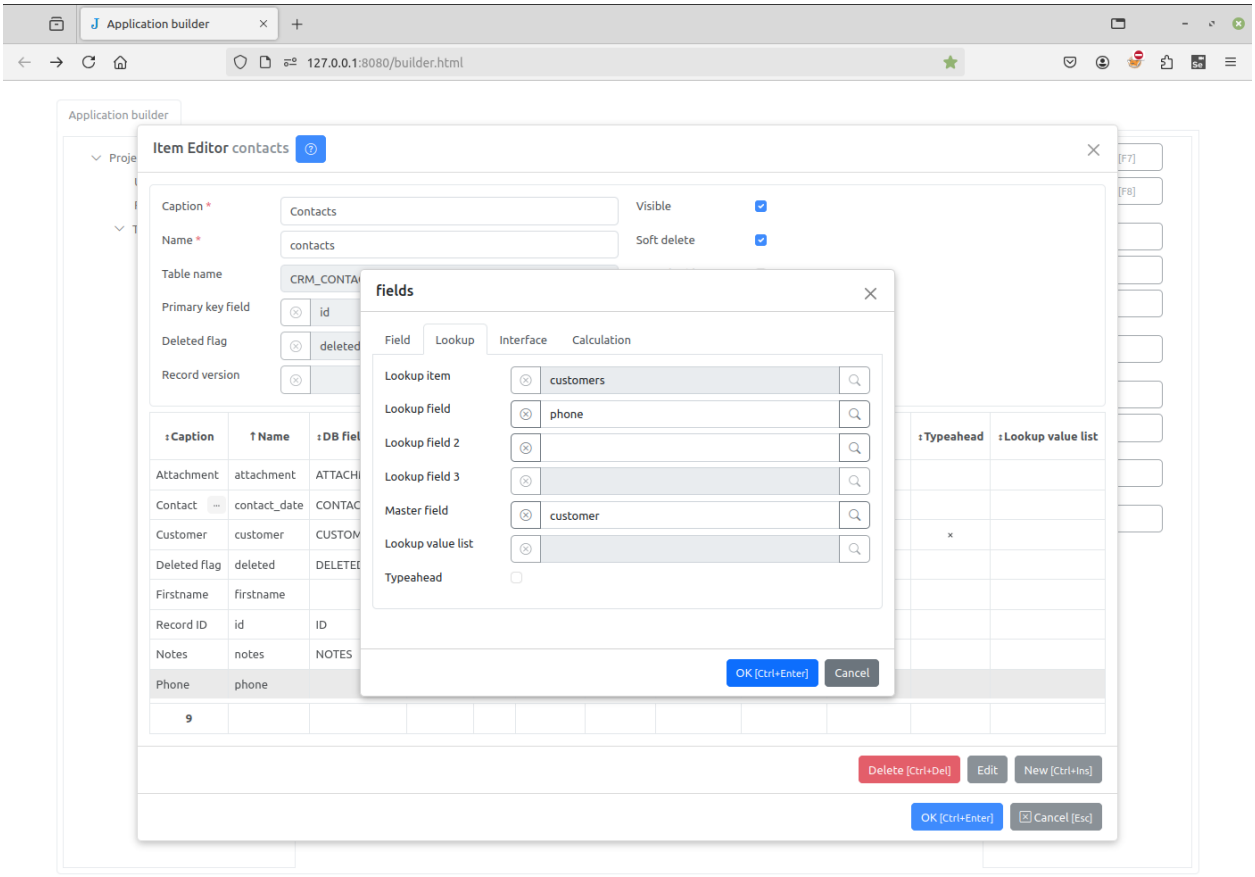


Em seguida, precisamos especificar um campo de pesquisa. É assim que o cliente será localizado. Aqui escolhemos "Sobrenome". Deixe os demais campos em branco e clique em **OK**.



Repita este procedimento para adicionar os campos de seleção “Nome” e “Telefone”. Para esses campos, especifique o campo “Cliente” como o atributo **Campo mestre**. Isso conecta esses campos ao primeiro campo de seleção “Sobrenome” que criamos, de modo que os três campos de seleção referenciam o mesmo cliente.


Application builder
127.0.0.1:8080/builder.html
Application builder
Item Editor contacts
Caption *
Contacts
Name *
contacts
Table name
Primary key field
id
Deleted flag
deleted
Record version
Visible
Soft delete
fields
Field
Lookup
Interface
Calculation
Lookup item
customers
Lookup field
firstname
Lookup field 2
Lookup field 3
Master field
customer
Lookup value list
Typeahead
OK [Ctrl+Enter]
Cancel
Caption
Name
Typeahead
Lookup value list
Attachment
attachment
Contact
contact_date
Customer
customer
Deleted flag
deleted
Firstname
firstname
Record ID
id
Notes
notes
Phone
phone
9
Delete [Ctrl+Del]
Edit
New [Ctrl+Ins]
OK [Ctrl+Enter]
Cancel [Esc]



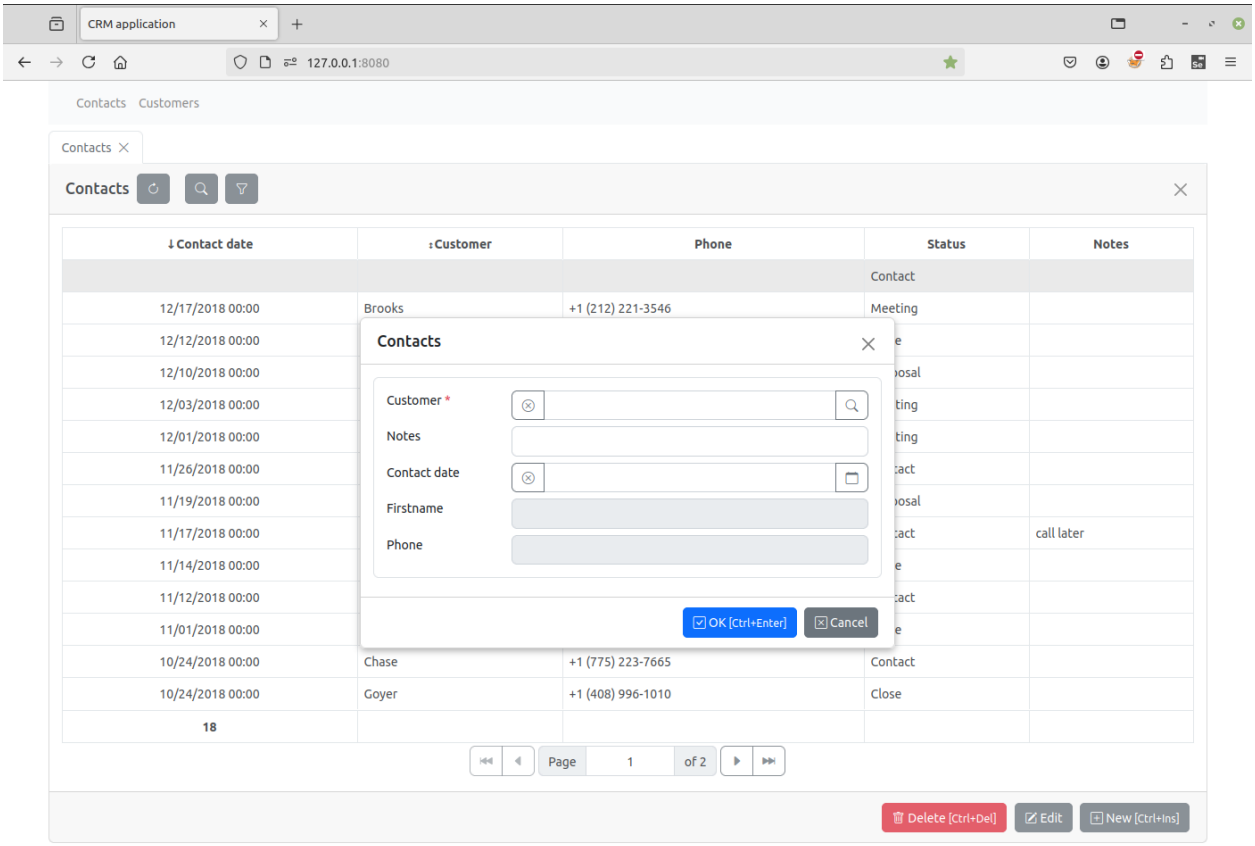
Clique no botão **OK** para salvar o item “Contatos”.

```
127.0.0.1 - - [07/Aug/2018 14:24:11] "POST /api HTTP/1.1" 200 -
CREATE TABLE "CRM_CONTACTS"
(
"ID" INTEGER PRIMARY KEY,
"DELETED" INTEGER,
"CONTACT_DATE" TEXT,
"NOTES" TEXT,
"CUSTOMER" INTEGER)

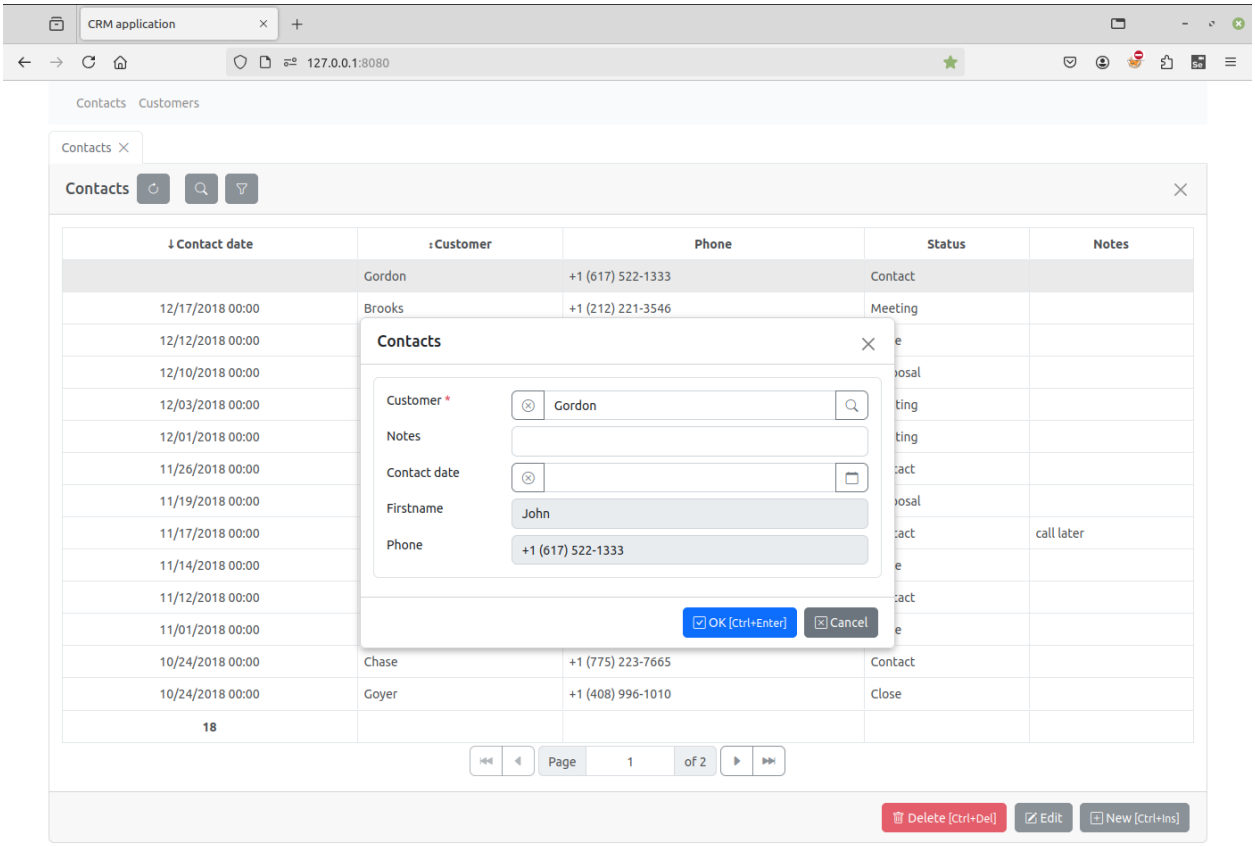
127.0.0.1 - - [07/Aug/2018 14:24:11] "POST /api HTTP/1.1" 200 -
```

Como você pode ver, não há campos “NOME” e “TELEFONE” na tabela `CRM_CONTACTS`. Isso ocorre porque definimos o atributo **Campo mestre** desses campos como “Cliente”. O campo “Cliente” armazenará uma referência a um registro no registro “Clientes”, e esse registro conterá os campos “Nome” e “Telefone”.

Atualize a página do projeto e, na página “Contatos”, clique no botão **Novo**. Você verá que há um pequeno botão à direita do campo de entrada “Cliente”.



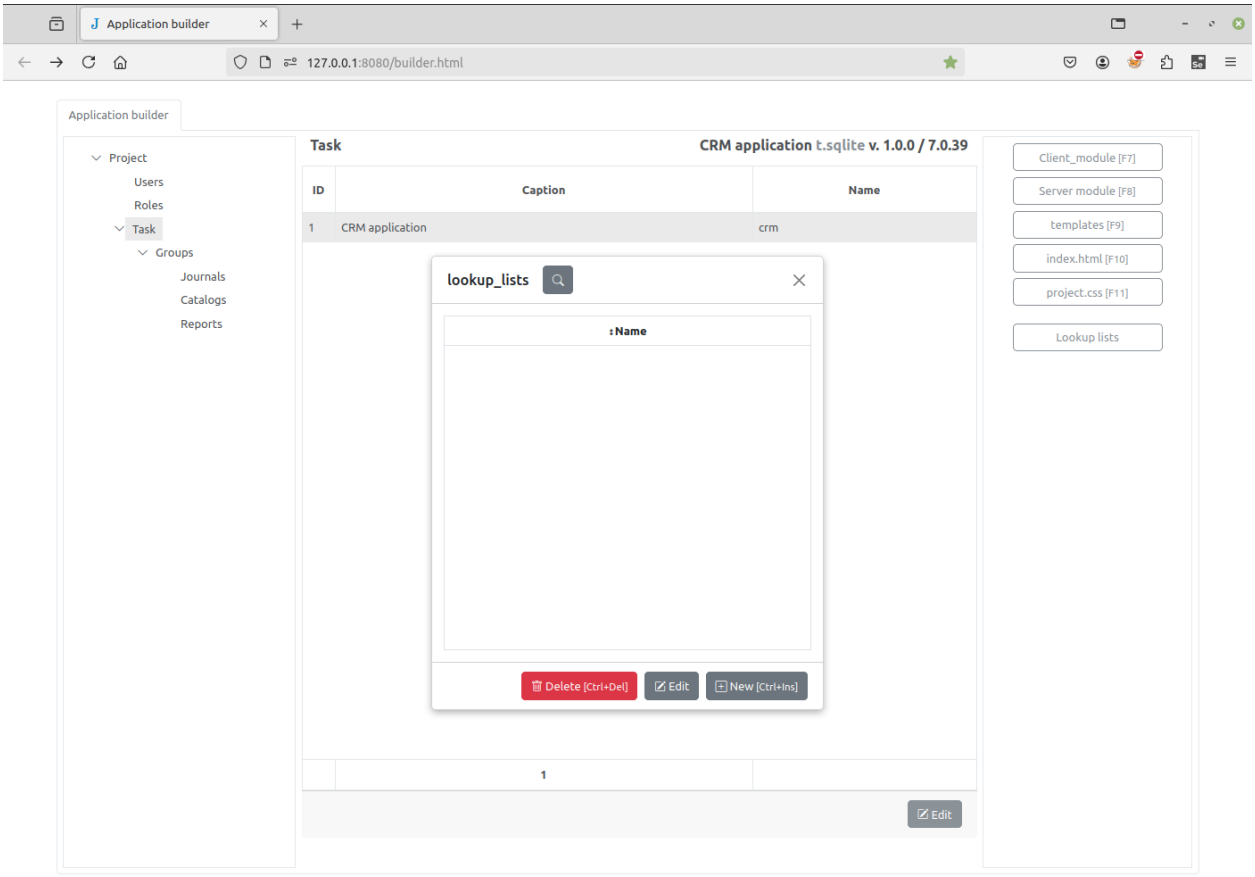
Clique nele e selecione um registro no registro “Clientes”: os campos “Cliente”, “Nome” e “Telefone” serão preenchidos automaticamente.



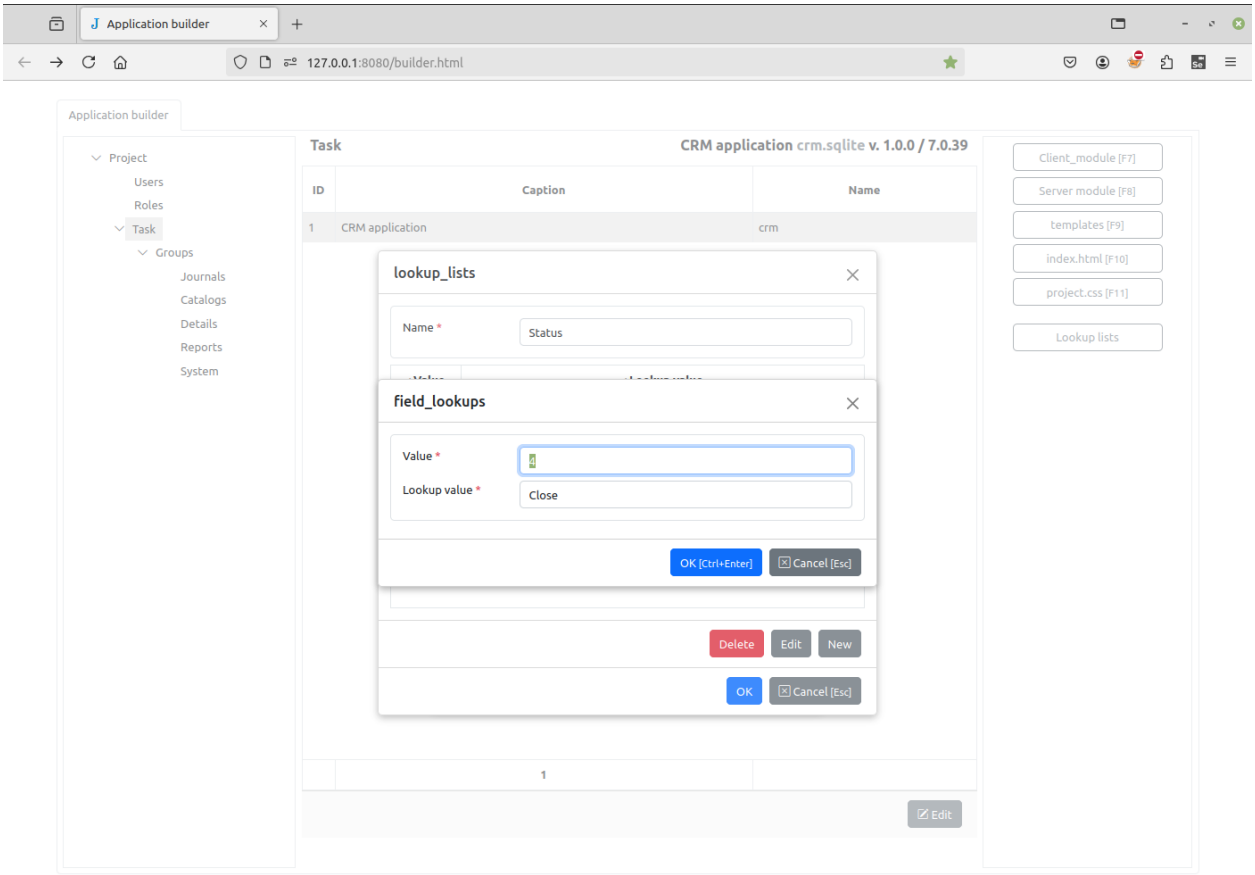
2.4.4 Listas de seleção

Agora vamos criar uma *Lista de seleção* "Status". As listas de seleção são usadas para criar campos do tipo "dropdown", com um conjunto limitado de valores possíveis.

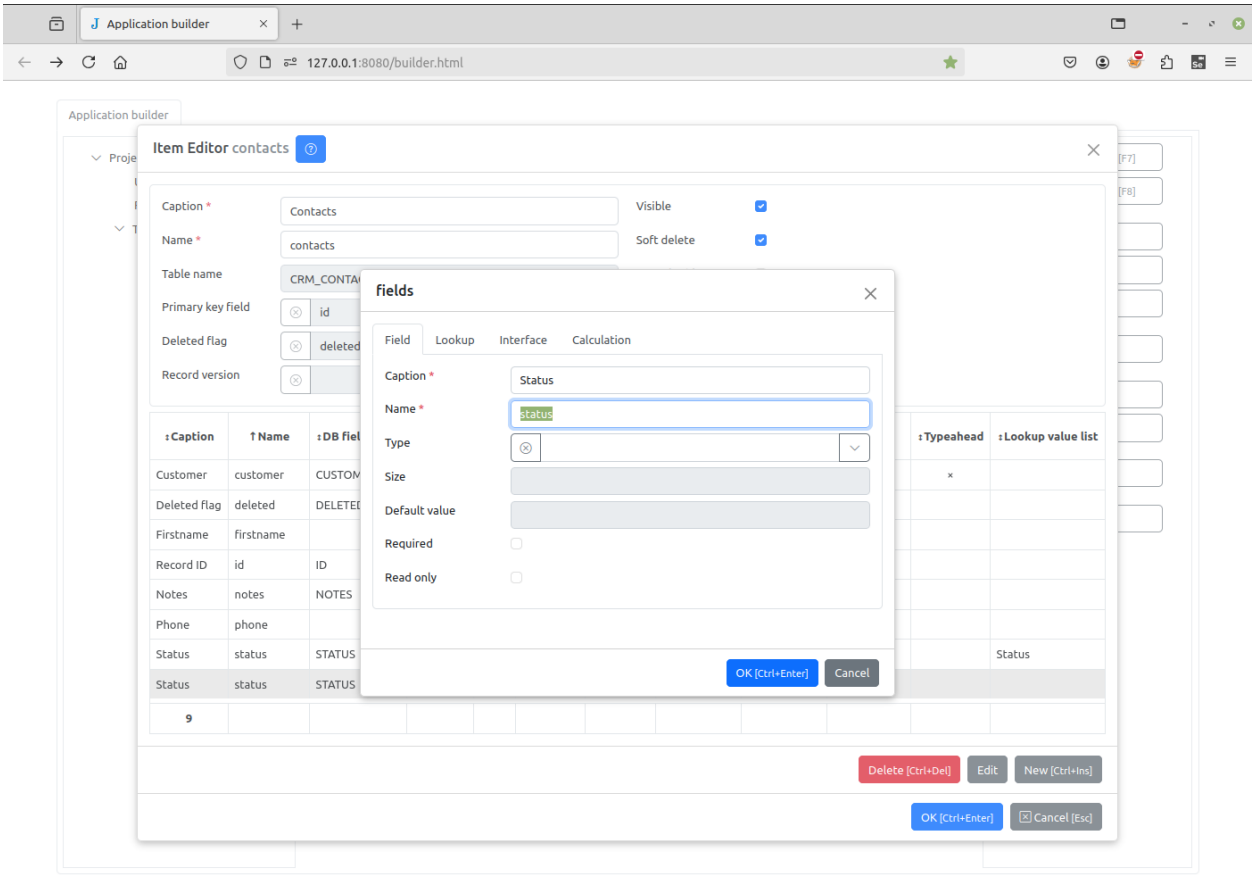
Selecione o nó "Tarefa" na árvore do projeto e clique no botão **Listas de seleção** (Lookup Lists).



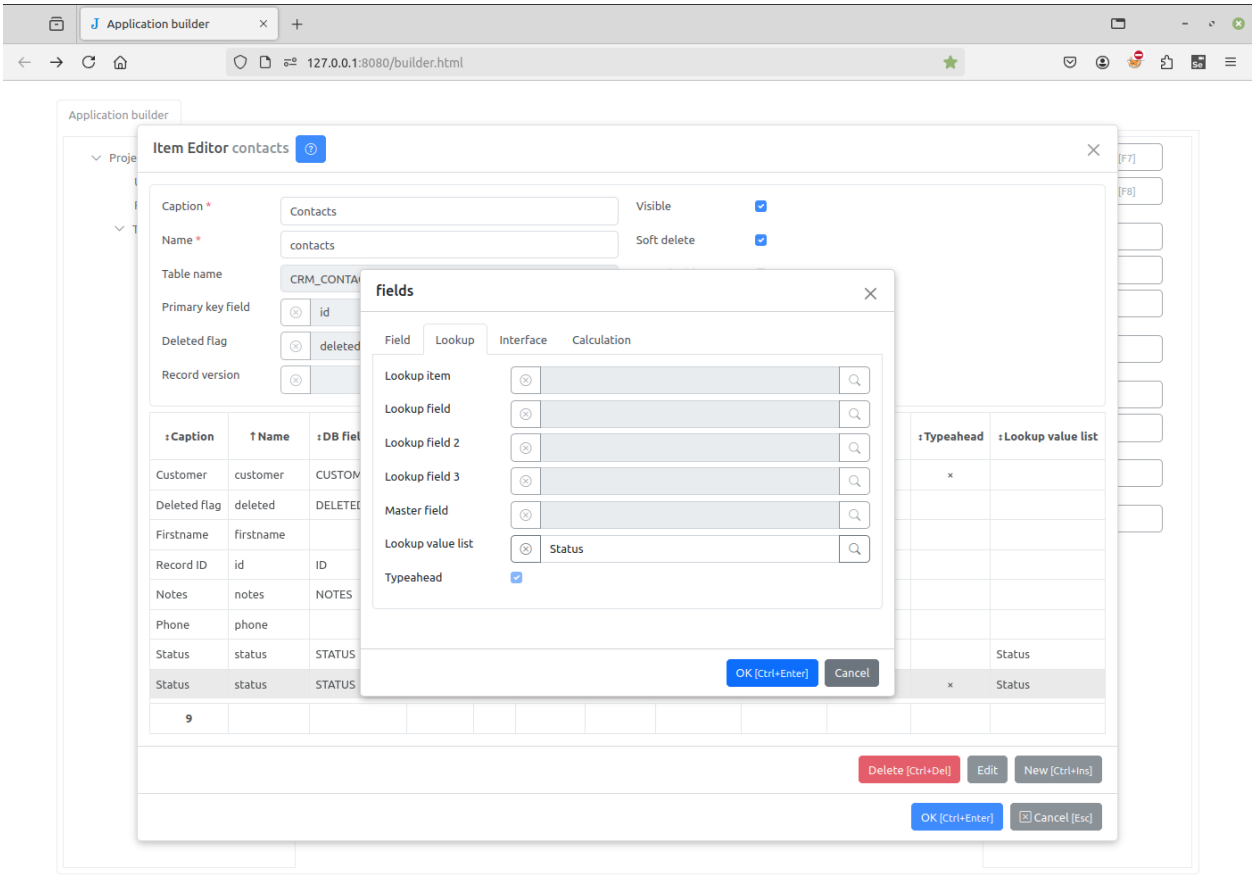
Inicialmente ela estará vazia. Clique no botão **Novo** para criar uma nova lista. Especifique o nome da nova lista de seleção e adicione uma lista de pares inteiro-texto:



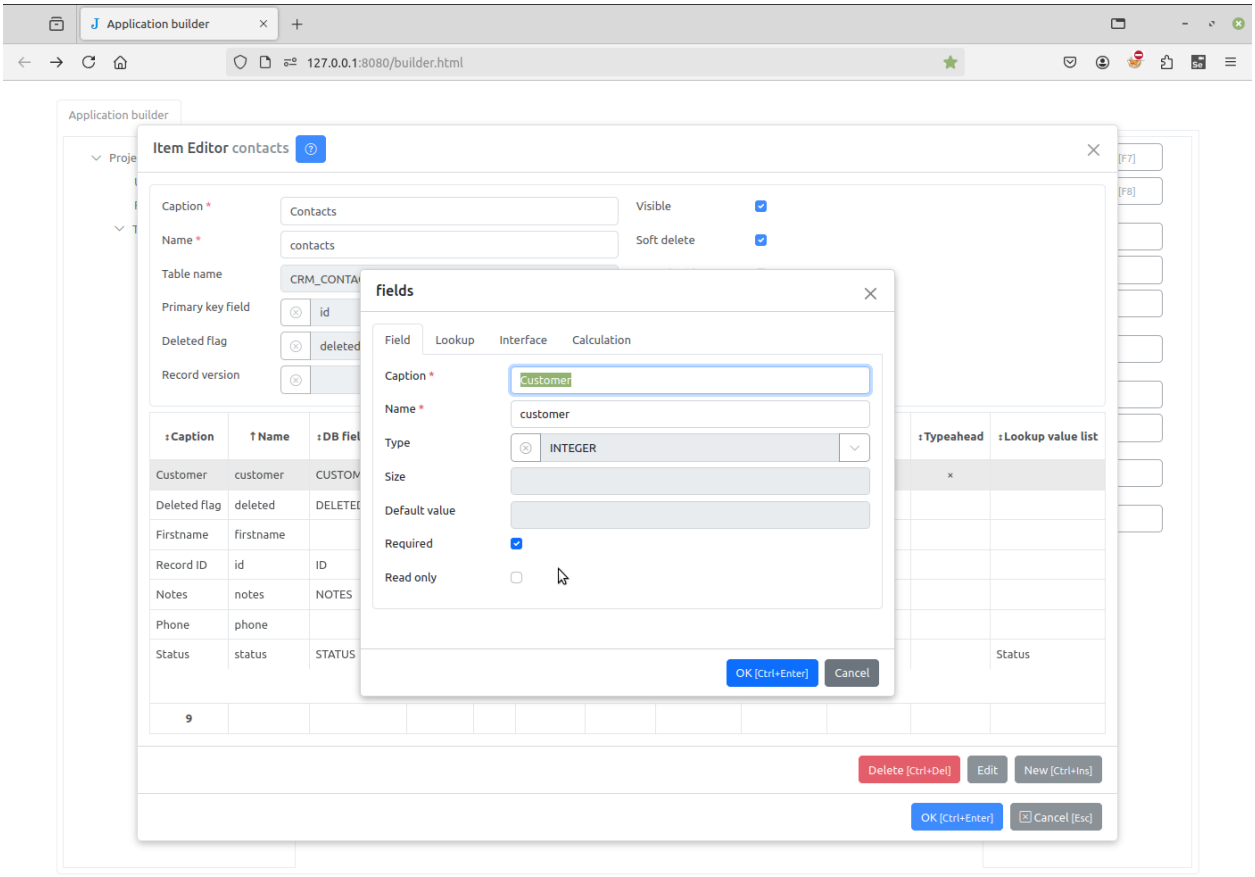
Salve as Listas de Seleção com o botão **OK**, depois edite o registro “Contatos” para adicionar o novo campo “Status”.

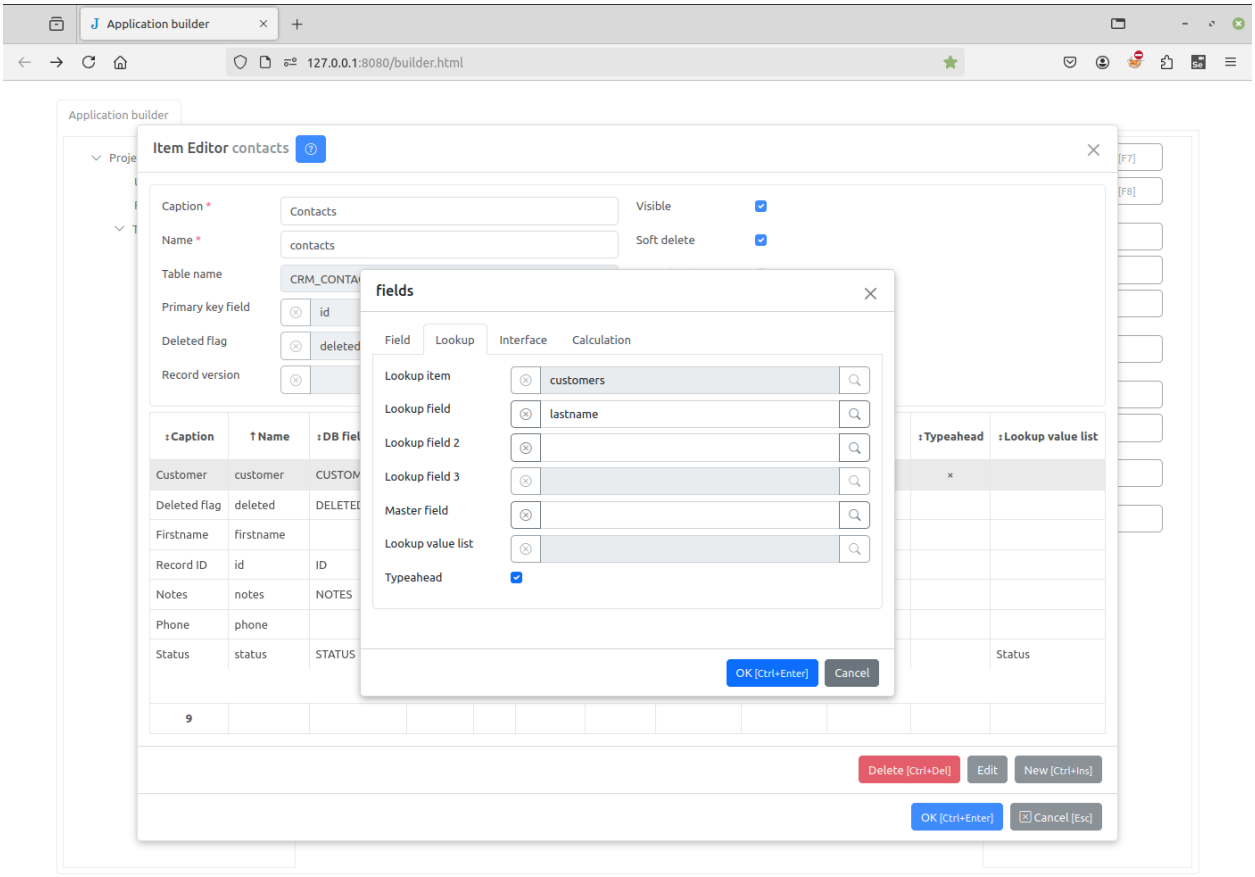


Para campos de seleção, defina a legenda e o nome, e deixe o tipo vazio. Em seguida, vá para a aba **Seleção**, e defina o atributo **Lista de valores de seleção** como a lista de seleção "Status":

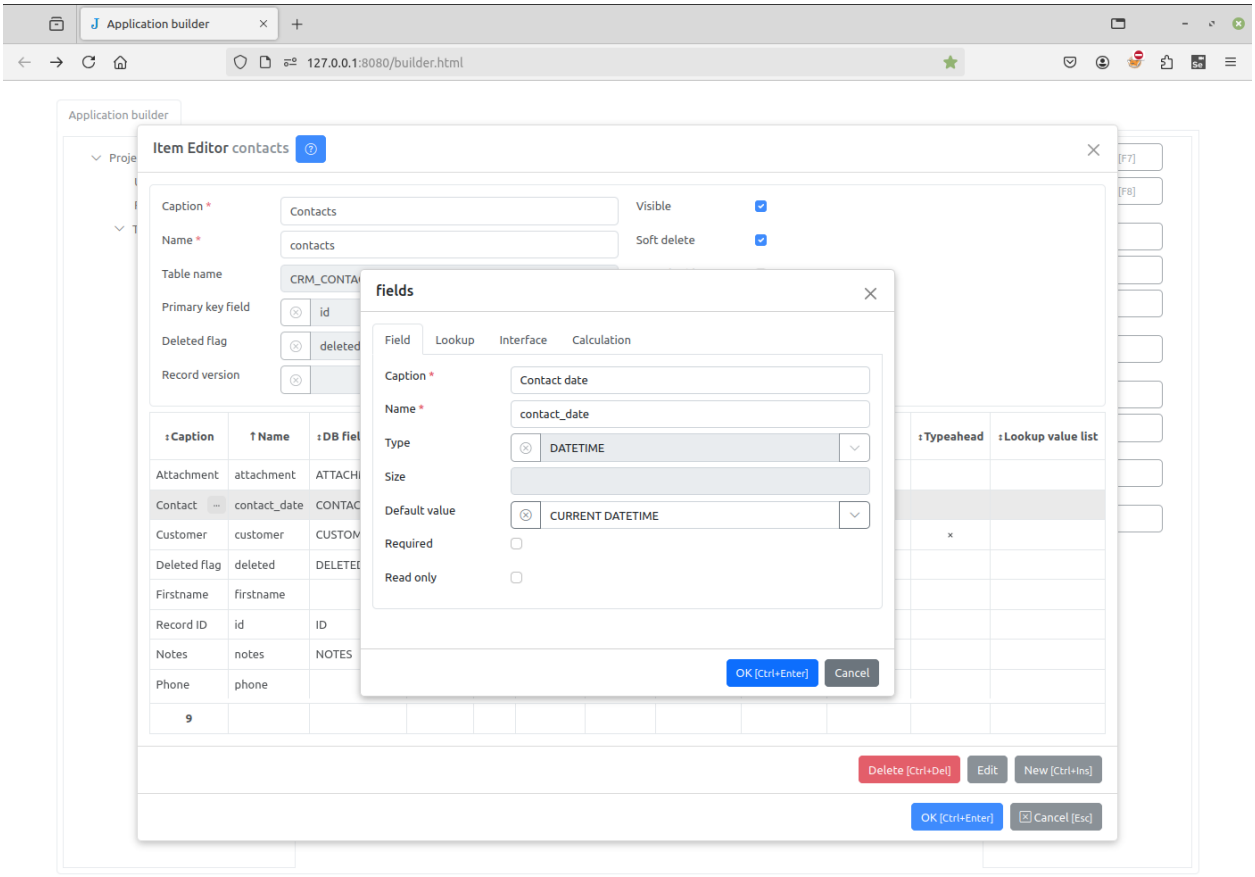


Por fim, antes de salvar, abra o campo “Cliente” que criamos anteriormente e defina o atributo **Obrigatório** (na aba “Campo”) e o atributo **Auto completar** (na aba “Seleção”). Quando **Auto completar** está marcado, a funcionalidade de autocompletar é ativada para o campo de seleção.

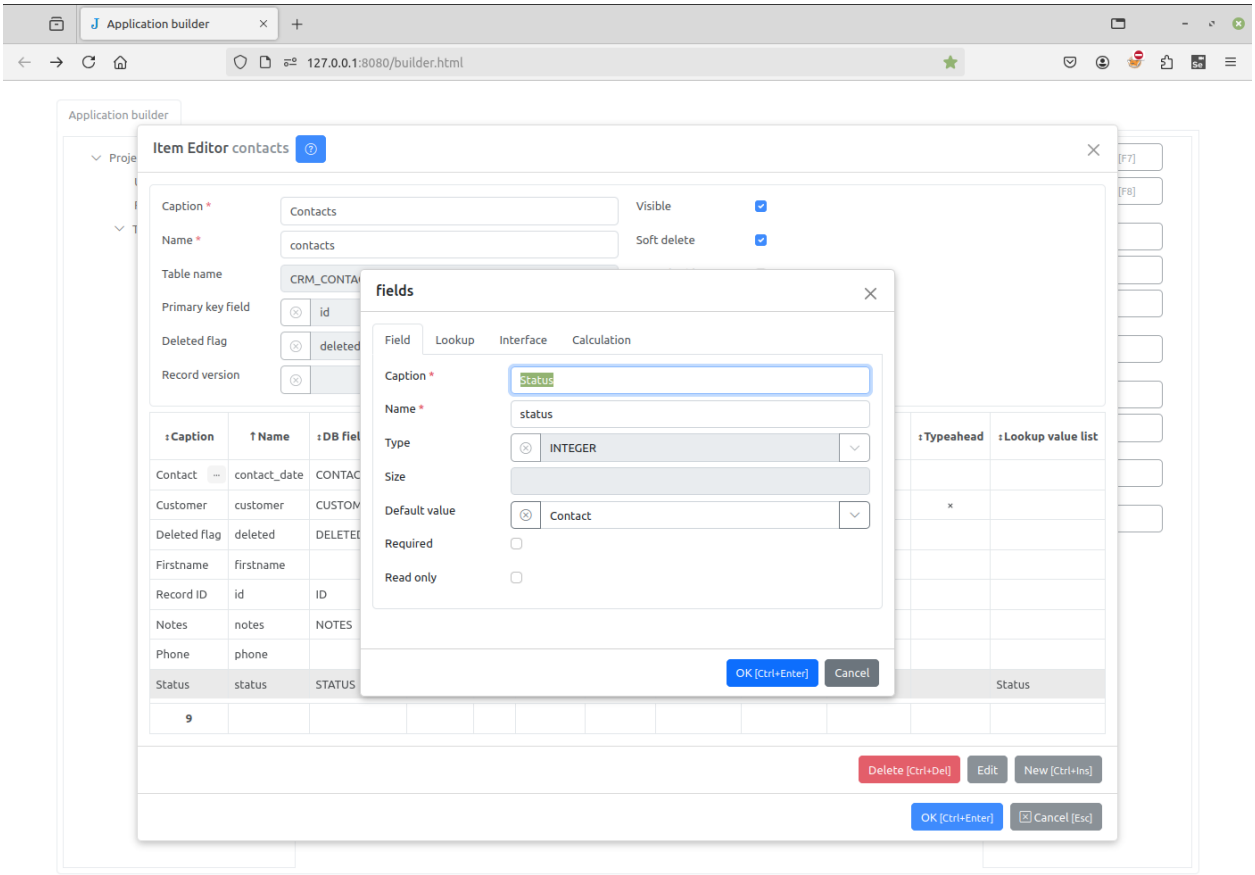

Application builder
127.0.0.1:8080/builder.html
Application builder
Item Editor contacts
Caption *
Contacts
Name *
contacts
Table name
Primary key field
id
Deleted flag
deleted
Record version
Visible
Soft delete
fields
Field
Lookup
Interface
Calculation
Caption *
Customer
Name *
customer
Type
INTEGER
Size
Default value
Required
Read only
OK [Ctrl+Enter]
Cancel
Caption
Name
Typeahead
Lookup value list
Customer
customer
Deleted flag
deleted
Firstname
firstname
Record ID
id
Notes
notes
Phone
phone
Status
status
Delete [Ctrl+Del]
Edit
New [Ctrl+Ins]
OK [Ctrl+Enter]
Cancel [Esc]



Aproveitando, defina o **Valor padrão** do campo “Data do contato” como “CURRENT DATETIME”, para que a data seja automaticamente inicializada com a data e hora atuais.

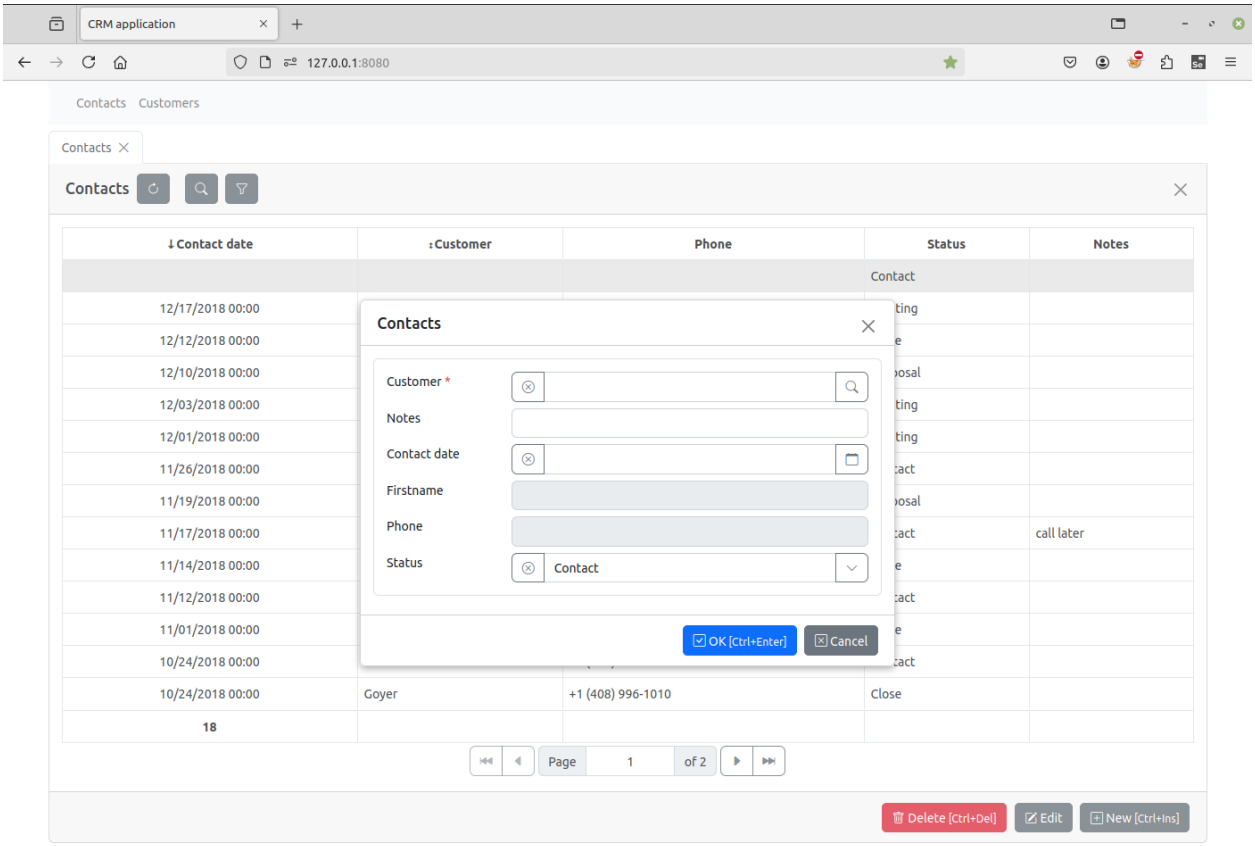


Da mesma forma, podemos selecionar um **Valor padrão** para o campo “Status”, escolhendo um valor na lista suspensa.

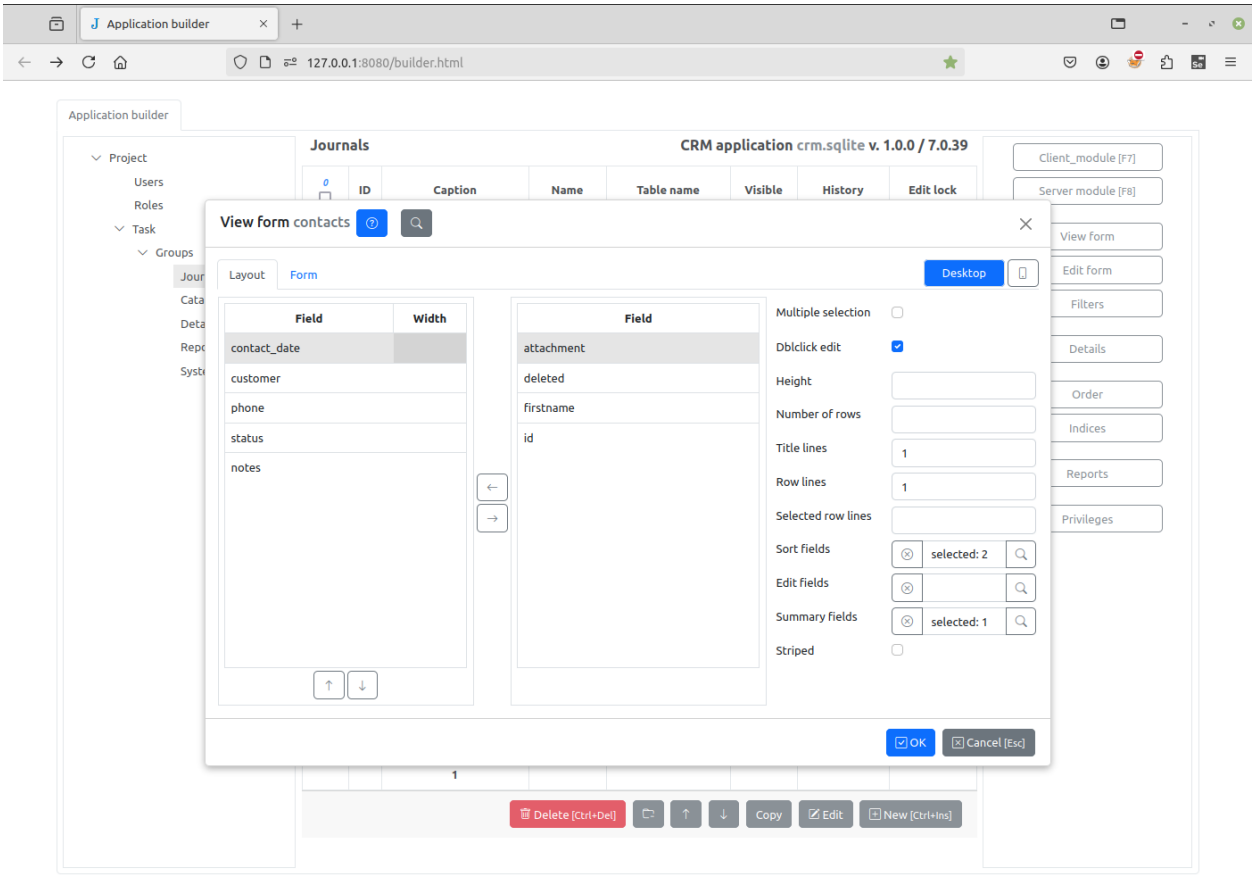


2.4.5 Personalizando Formulários

Ao atualizar a página do projeto, vemos que os campos da tabela e do formulário de edição do registro “Contatos” são exibidos na ordem em que foram criados.

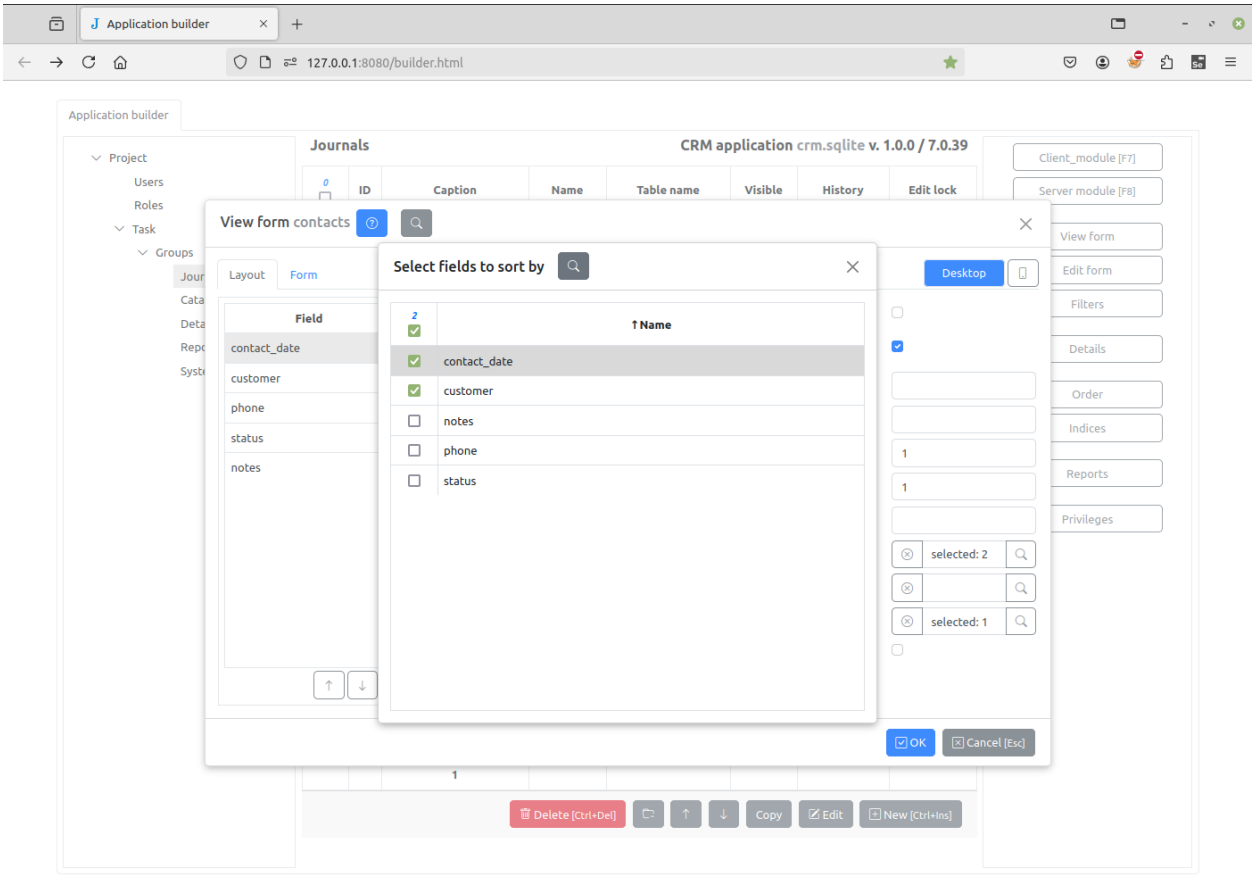


Para alterar como os campos são exibidos na tabela, clique no botão **Formulário de Visualização** para abrir o *Diálogo de Formulário de Visualização*. Vamos alterar os campos exibidos usando os botões **esquerda**, **direita**, **cima** e **baixo**.

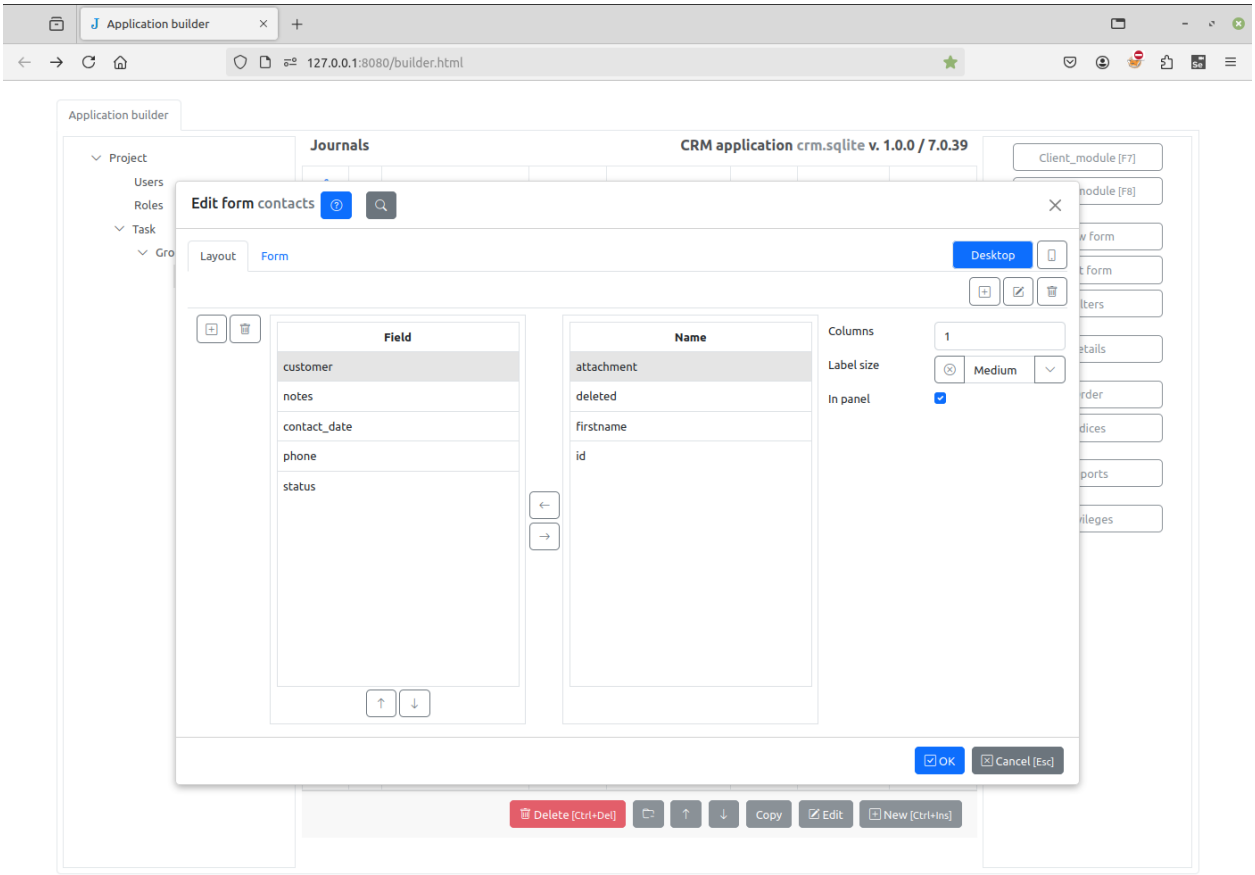


No exemplo acima, ocultamos o campo “nome” ao selecioná-lo e pressionar o botão **direita**, e movemos o campo “notas” para o final ao selecioná-lo e pressionar o botão **baixo**.

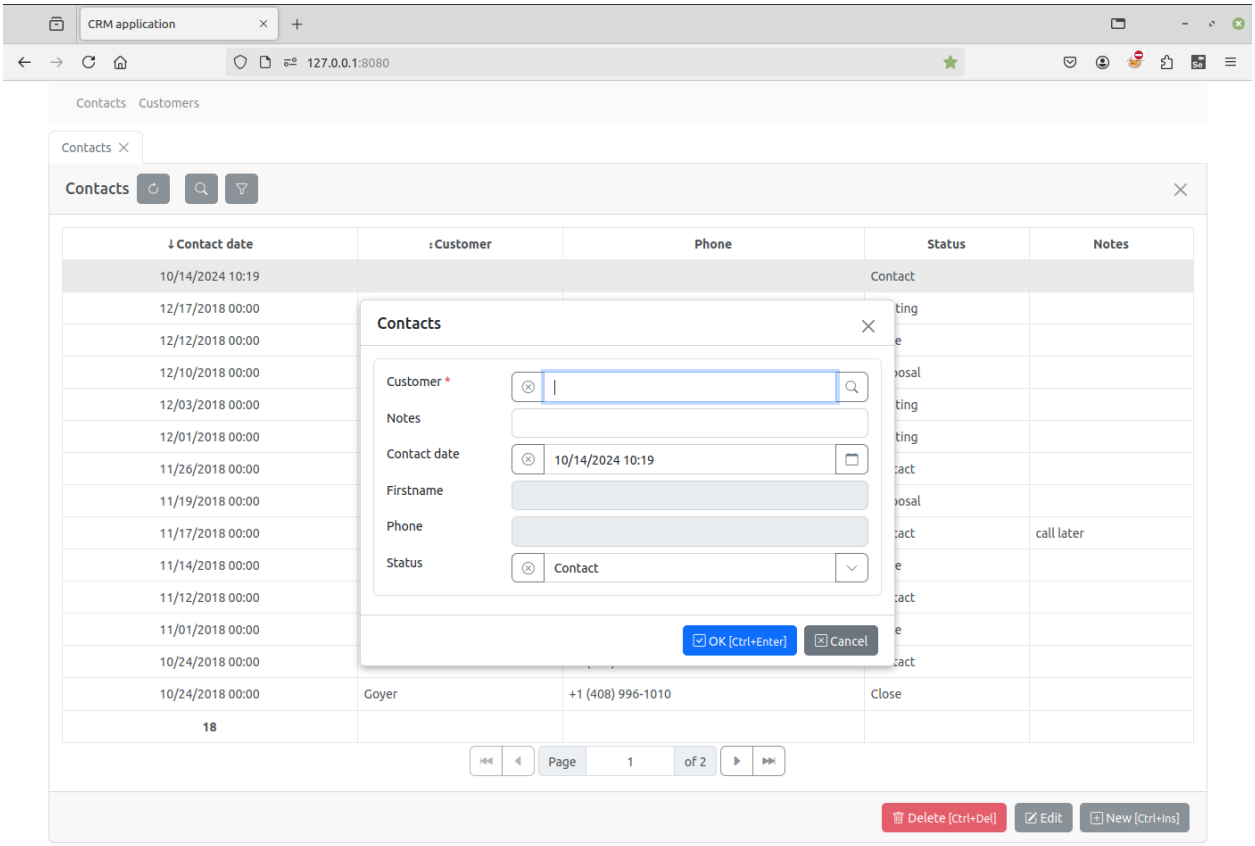
Também podemos alterar quais campos podem ser usados para ordenar a tabela. Para isso, clique no botão à direita do campo **Campos de ordenação** e selecione o cabeçalho da coluna correspondente. Depois salve todas as alterações clicando em **OK**.



Para alterar a forma como os campos são exibidos no formulário de edição (Edit Form), clique no botão **Formulário de Edição** para abrir o *Diálogo de Formulário de Edição*. Esse recurso funciona de forma muito semelhante ao **Formulário de Visualização** (View Form) descrito acima.



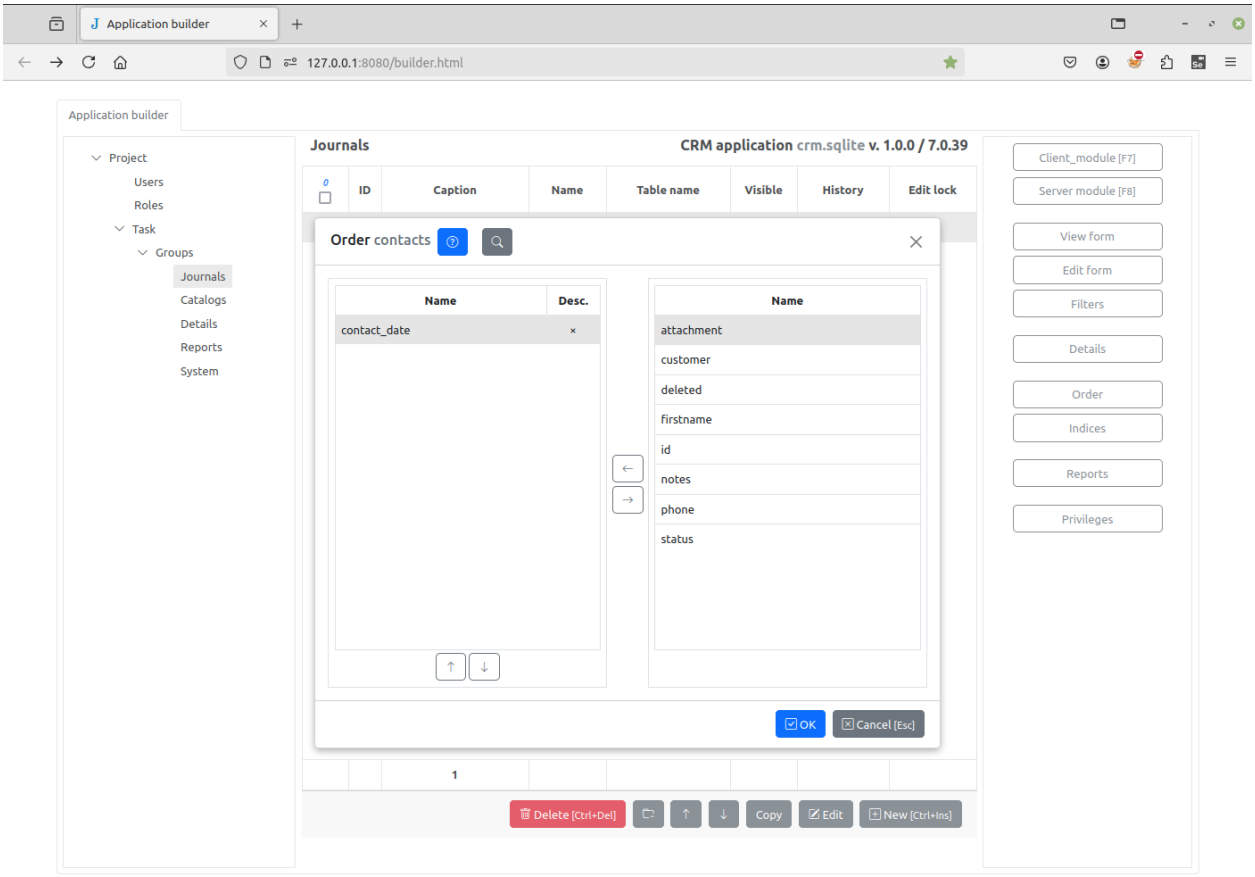
Para ver o resultado do nosso trabalho, vá até a página do projeto, atualize-a e clique no botão **Novo**.



2.4.6 Índices

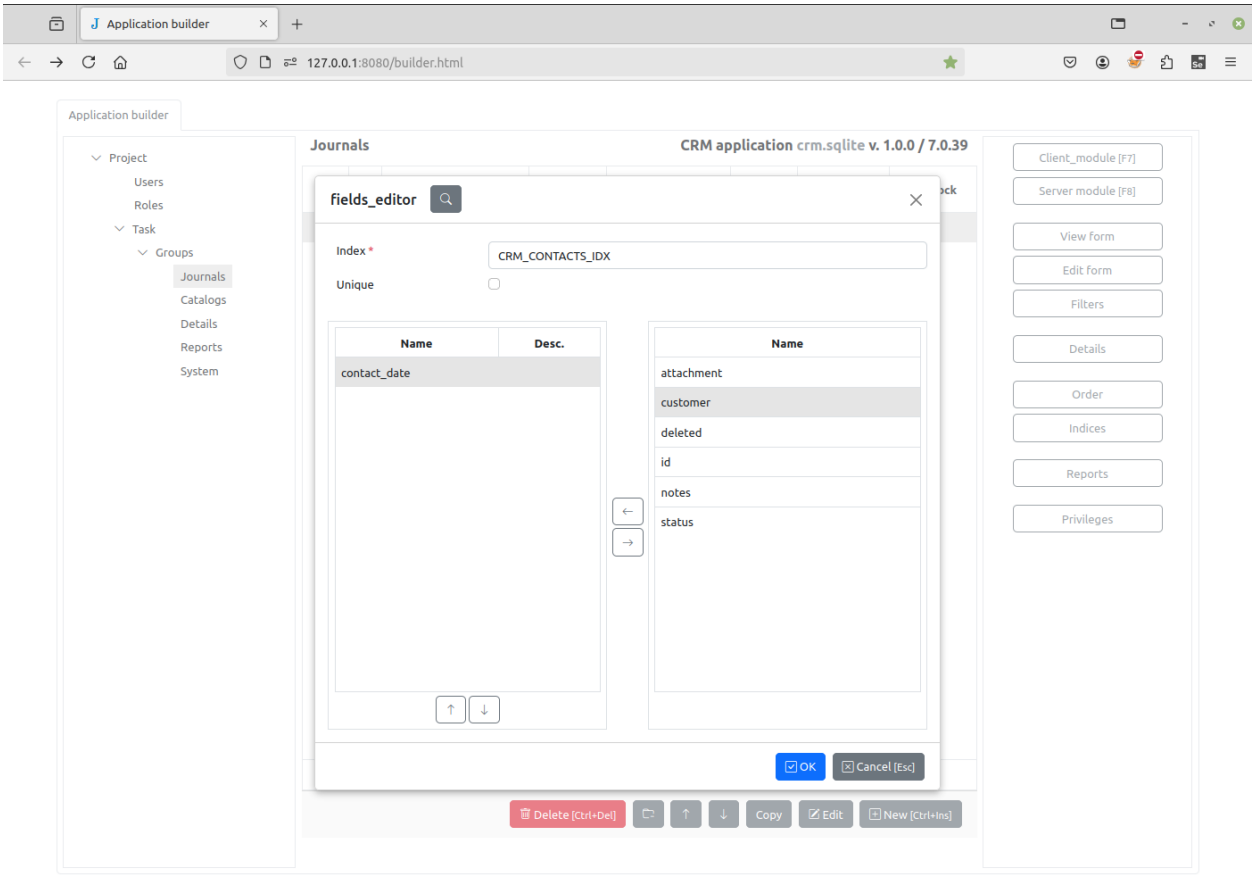
Vamos definir a ordenação padrão dos registros do registro “Contatos”. Para isso, clique no botão *Ordem*.

Por padrão, os registros são exibidos na ordem em que foram criados. Para alterar isso, mova alguns dos cabeçalhos de coluna da lista da direita para a lista da esquerda usando o botão **esquerda**, e altere sua prioridade usando os botões **cima** e **baixo** (maior prioridade no topo).



No exemplo acima, definimos a ordenação padrão como sendo por data de contato decrescente.

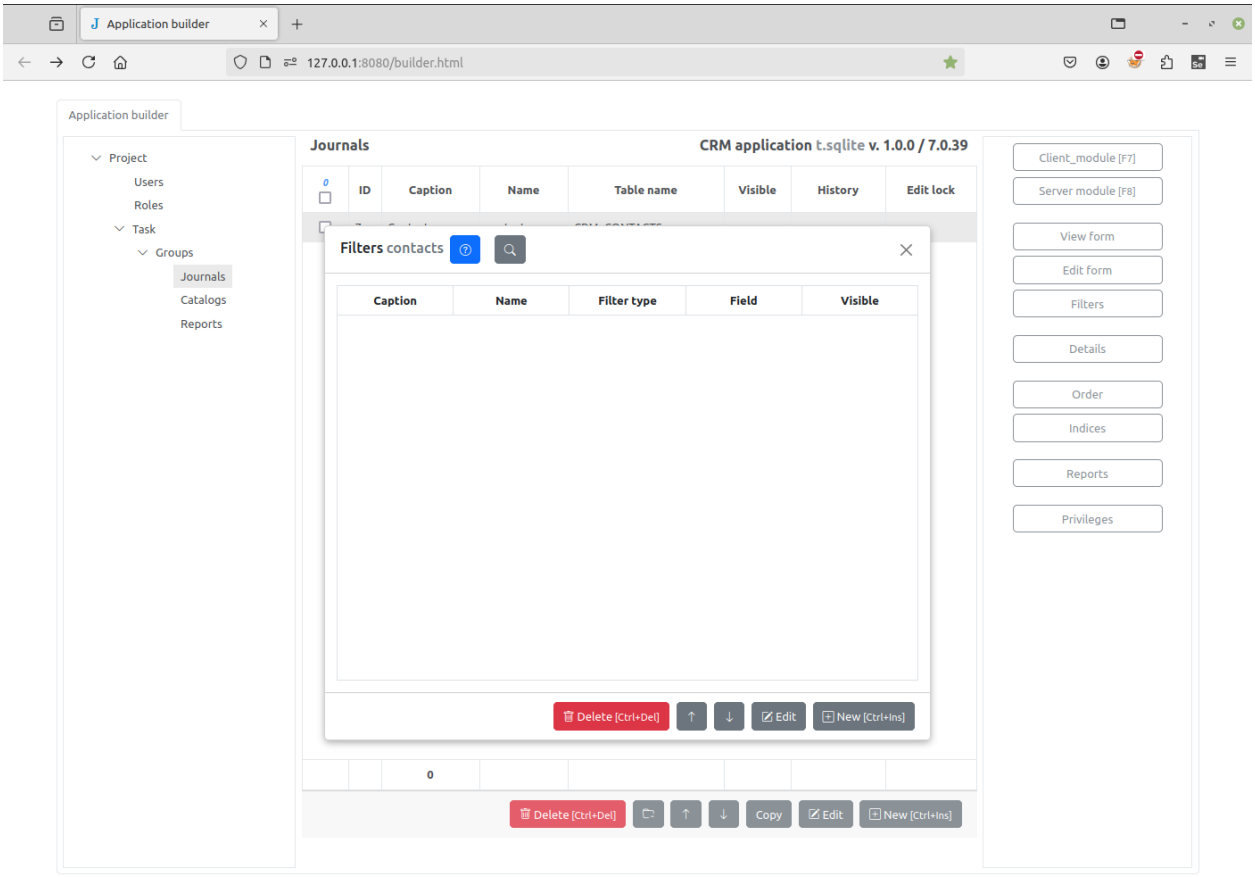
Podemos criar um índice correspondente para a tabela do banco de dados do registro “Contatos”. Clique no botão **Índices** para abrir o *Diálogo de Índices* e depois clique no botão **Novo** e especifique o índice de forma semelhante:



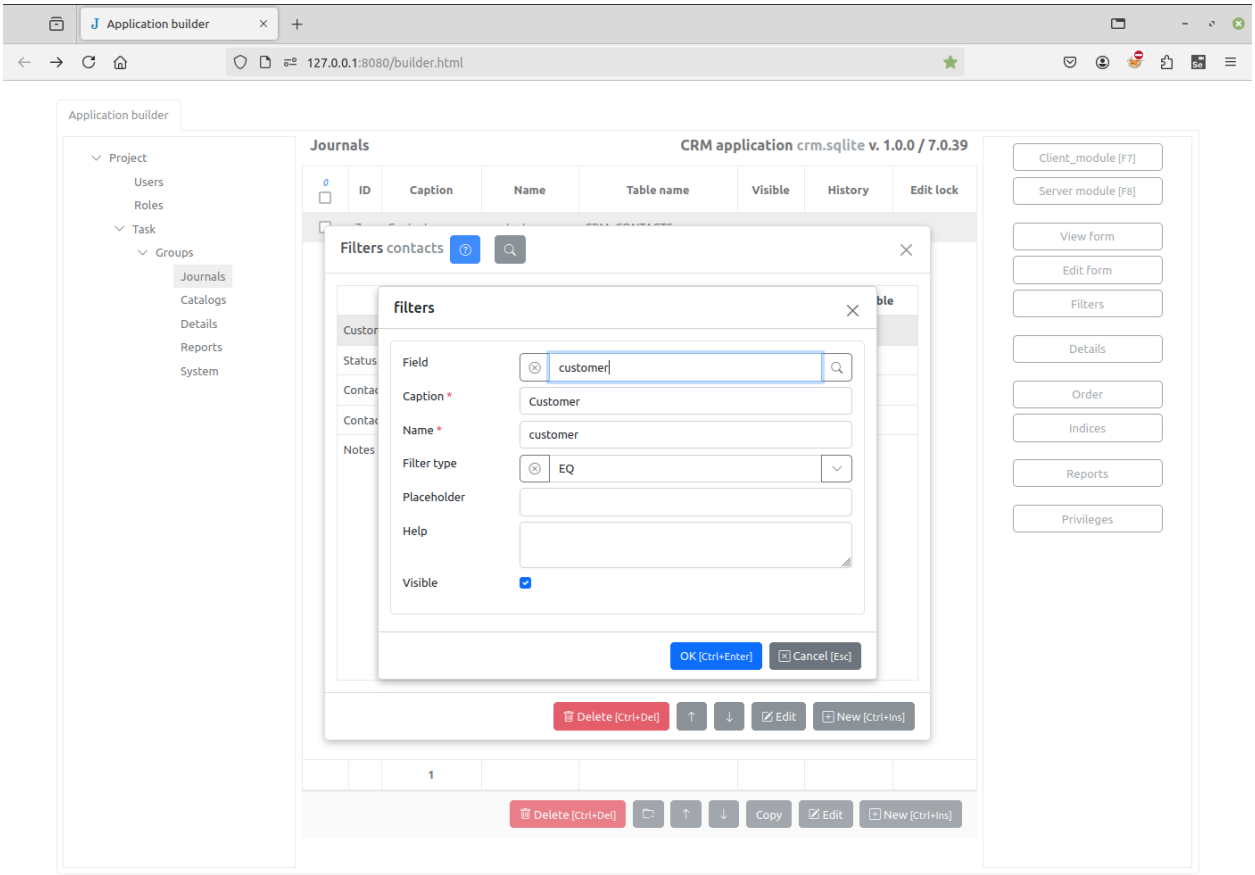
2.4.7 Filtros

Filtros são usados para selecionar registros da tabela do banco de dados de acordo com critérios especificados.

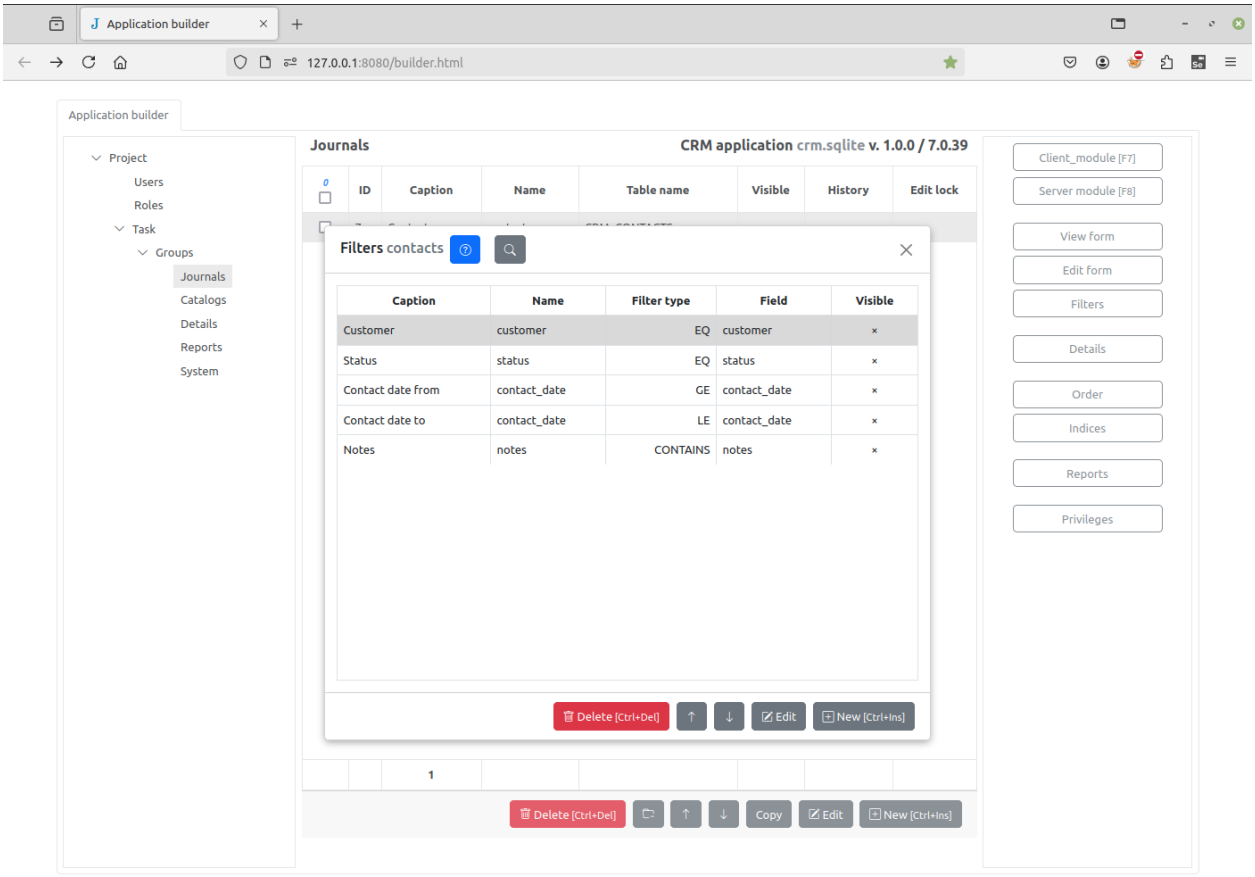
Clique no botão **Filtros** para abrir o *Diálogo de Filtros*.



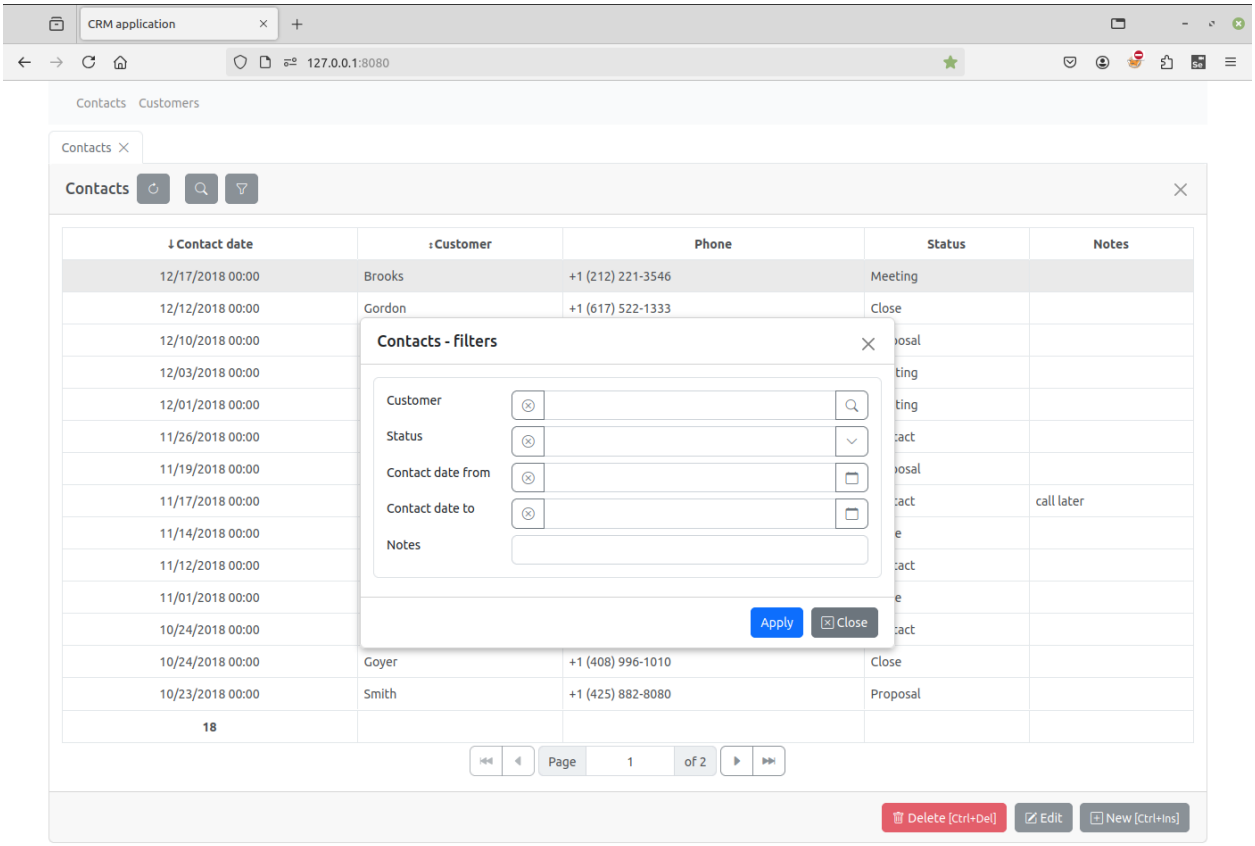
Agora clique no botão **Novo** e preencha o seguinte formulário:



Da mesma forma, crie alguns outros filtros:



Ao atualizar a página do projeto, o botão **Filtros** aparece no cabeçalho do formulário "Contatos". Clicar neste botão abre a caixa de diálogo "Filtros":

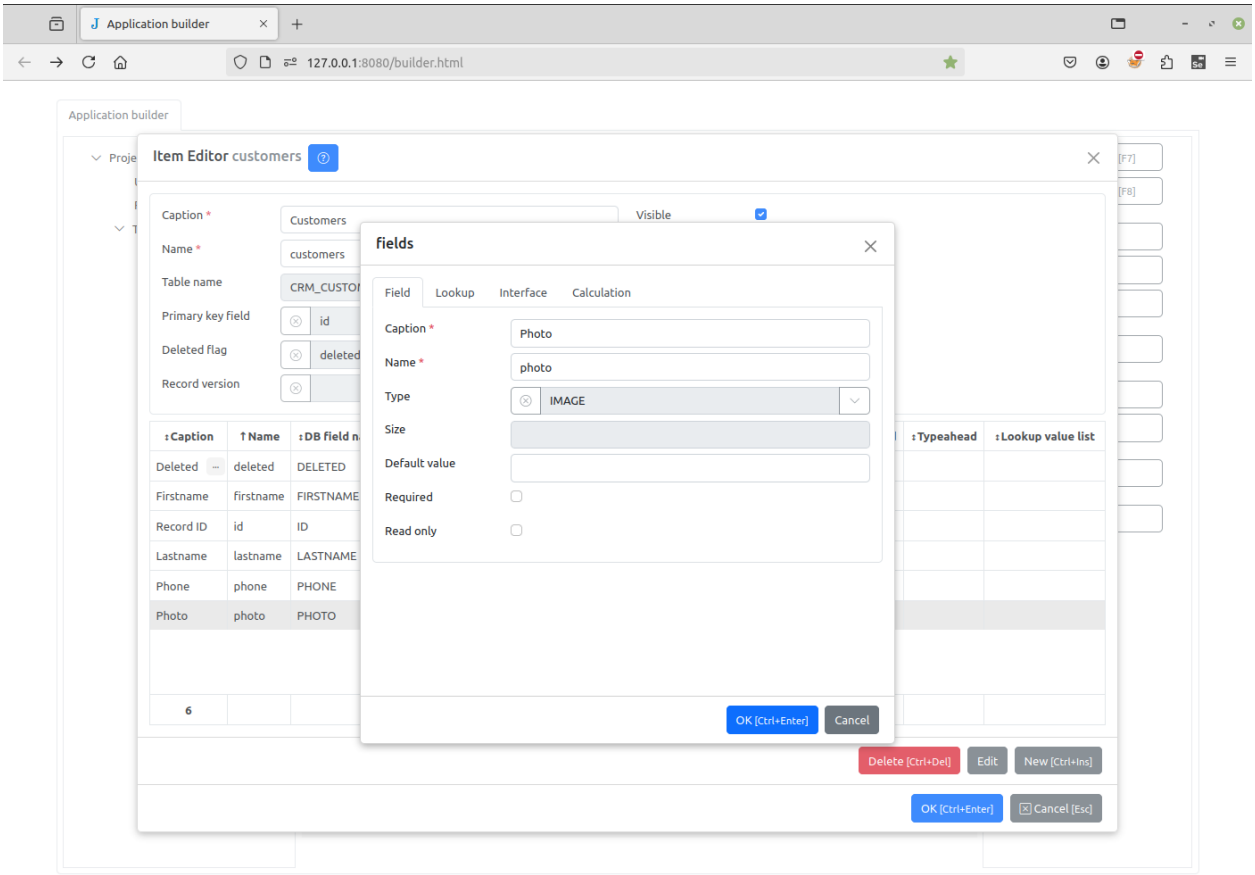


2.5 Tutorial. Parte 2. Campos de arquivo e imagem

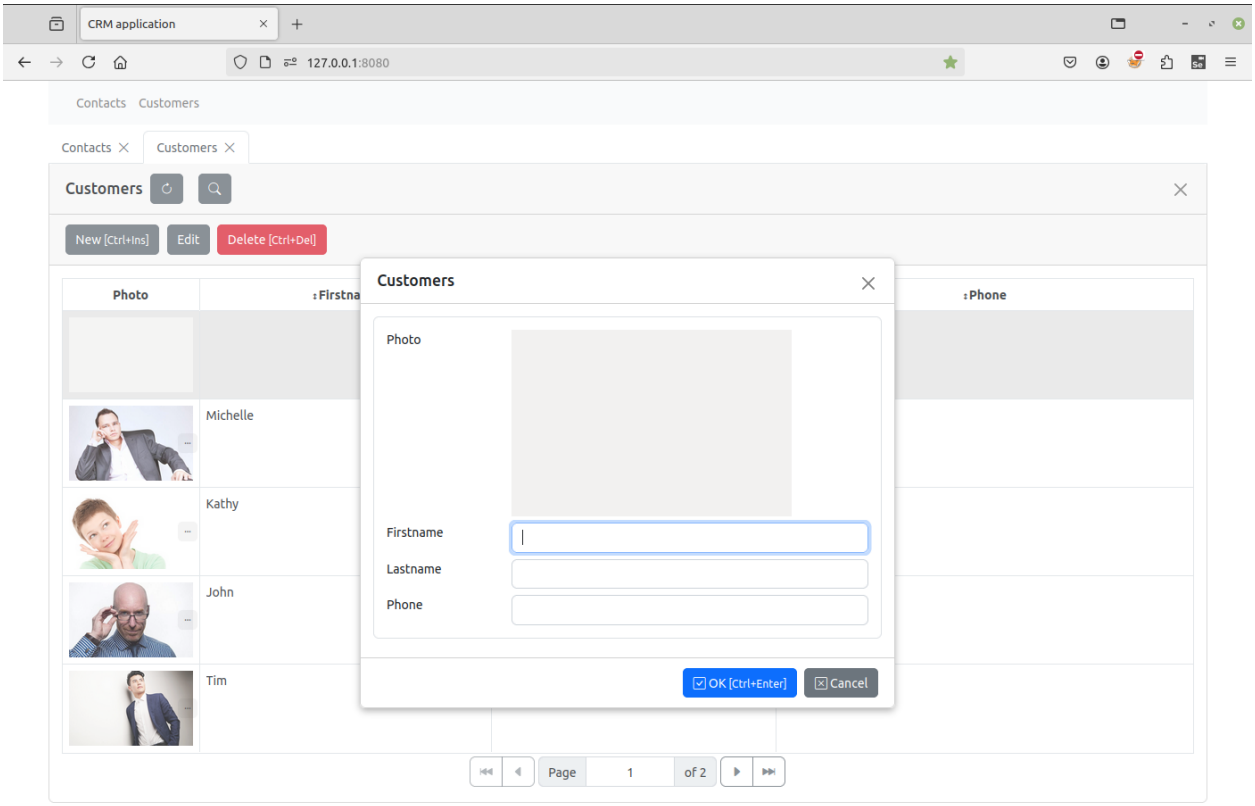
Nesta parte, vamos demonstrar como trabalhar com arquivos e imagens no Jam.py.

2.5.1 Adicionando campo de imagem

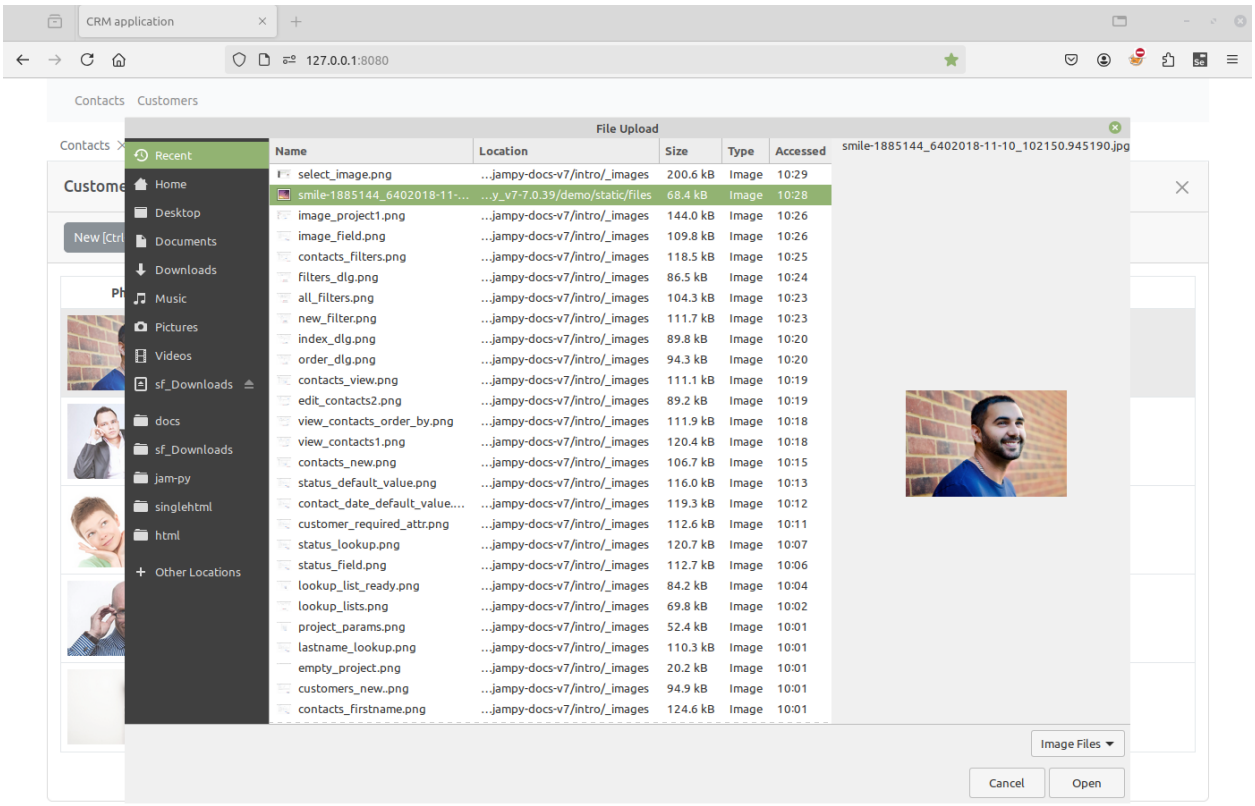
Vamos selecionar o Cadastro “Clientes”, dar um duplo clique para abrir o *Diálogo do Editor de Item* e adicionar um campo de imagem “Foto”:

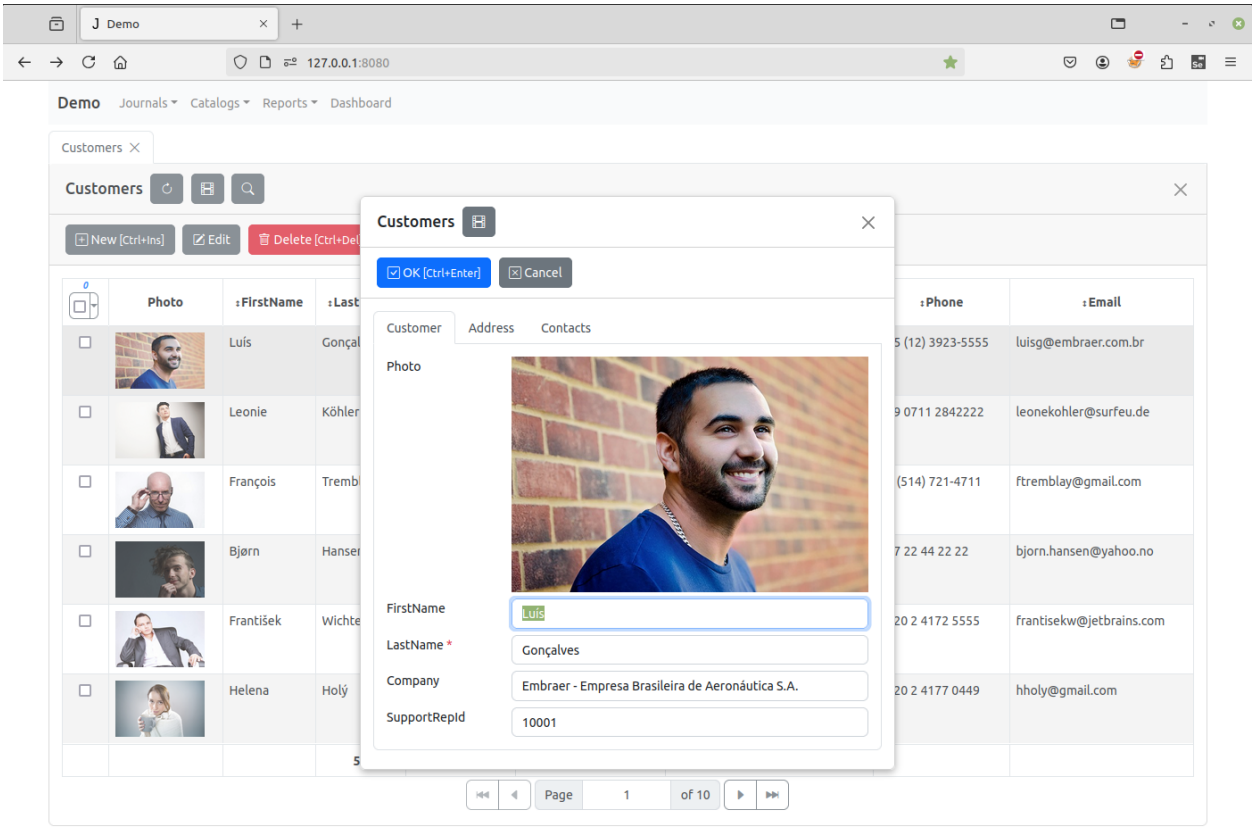


Agora atualize a página do projeto, clique no item de menu Clientes e abra o formulário de edição.



Dê um duplo clique na imagem no formulário de edição para selecionar uma imagem na caixa de diálogo Abrir Arquivo.

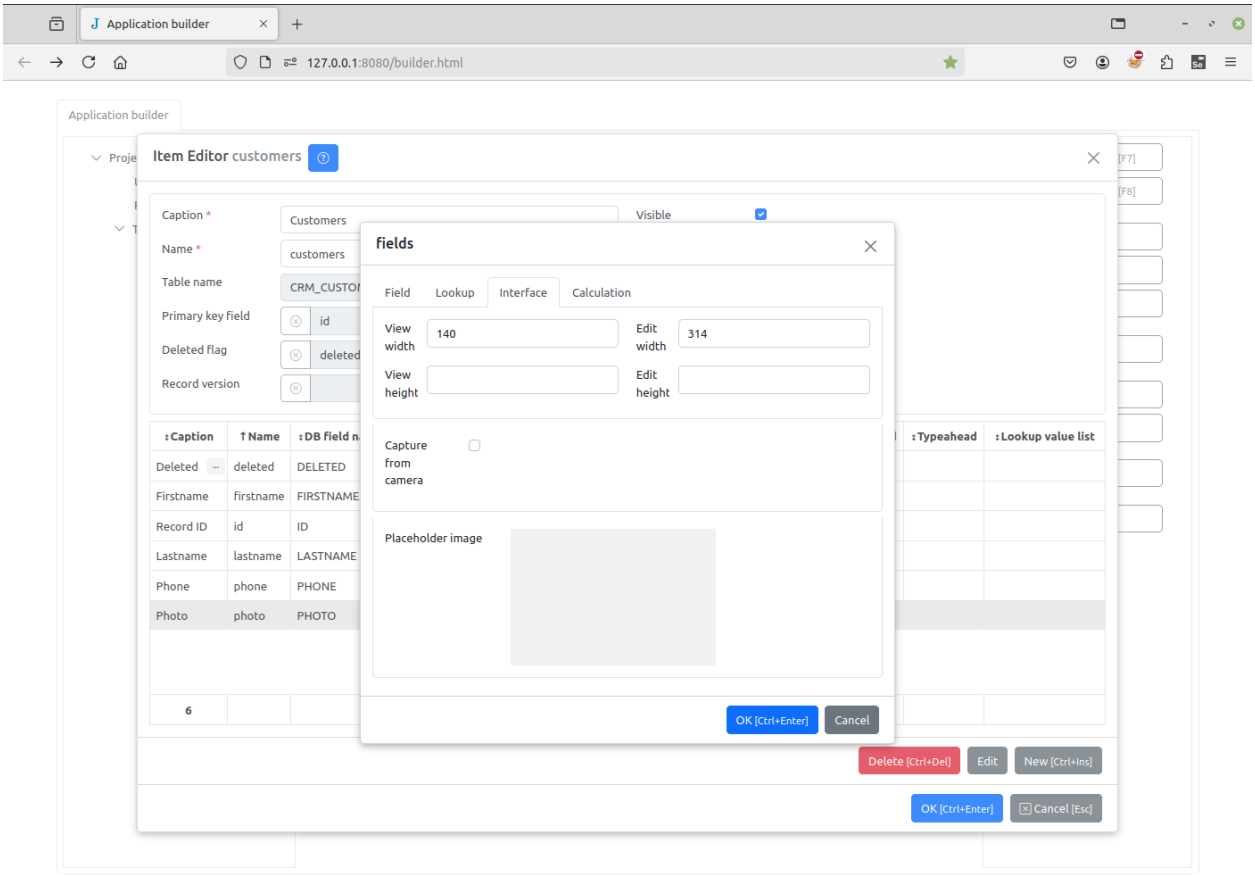

CRM application
127.0.0.1:8080
Contacts
Customers
File Upload
Recent
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
sf_Downloads
docs
sf_Downloads
jam-py
singlehtml
html
Other Locations
Name
Location
Size
Type
Accessed
select_image.png ...jampy-docs-v7/intro/_images 200.6 kB Image 10:29
smile-1885144_6402018-11-... ...y_v7-7.0.39/demo/static/files 68.4 kB Image 10:28
image_project1.png ...jampy-docs-v7/intro/_images 144.0 kB Image 10:26
image_field.png ...jampy-docs-v7/intro/_images 109.8 kB Image 10:26
contacts_filters.png ...jampy-docs-v7/intro/_images 118.5 kB Image 10:25
filters_dlg.png ...jampy-docs-v7/intro/_images 86.5 kB Image 10:24
all_filters.png ...jampy-docs-v7/intro/_images 104.3 kB Image 10:23
new_filter.png ...jampy-docs-v7/intro/_images 111.7 kB Image 10:23
index_dlg.png ...jampy-docs-v7/intro/_images 89.8 kB Image 10:20
order_dlg.png ...jampy-docs-v7/intro/_images 94.3 kB Image 10:20
contacts_view.png ...jampy-docs-v7/intro/_images 111.1 kB Image 10:19
edit_contacts2.png ...jampy-docs-v7/intro/_images 89.2 kB Image 10:19
view_contacts_order_by.png ...jampy-docs-v7/intro/_images 111.9 kB Image 10:18
view_contacts1.png ...jampy-docs-v7/intro/_images 120.4 kB Image 10:18
contacts_new.png ...jampy-docs-v7/intro/_images 106.7 kB Image 10:15
status_default_value.png ...jampy-docs-v7/intro/_images 116.0 kB Image 10:13
contact_date_default_value.... ...jampy-docs-v7/intro/_images 119.3 kB Image 10:12
customer_required_attr.png ...jampy-docs-v7/intro/_images 112.6 kB Image 10:11
status_lookup.png ...jampy-docs-v7/intro/_images 120.7 kB Image 10:07
status_field.png ...jampy-docs-v7/intro/_images 112.7 kB Image 10:06
lookup_list_ready.png ...jampy-docs-v7/intro/_images 84.2 kB Image 10:04
lookup_lists.png ...jampy-docs-v7/intro/_images 69.8 kB Image 10:02
project_params.png ...jampy-docs-v7/intro/_images 52.4 kB Image 10:01
lastname_lookup.png ...jampy-docs-v7/intro/_images 110.3 kB Image 10:01
empty_project.png ...jampy-docs-v7/intro/_images 20.2 kB Image 10:01
customers_new..png ...jampy-docs-v7/intro/_images 94.9 kB Image 10:01
contacts_firstname.png ...jampy-docs-v7/intro/_images 124.6 kB Image 10:01
smile-1885144_6402018-11-10_102150.945190.jpg
Image Files
Cancel
Open



Nota

Para limpar uma imagem, mantenha pressionada a tecla Ctrl e dê um duplo clique na imagem.

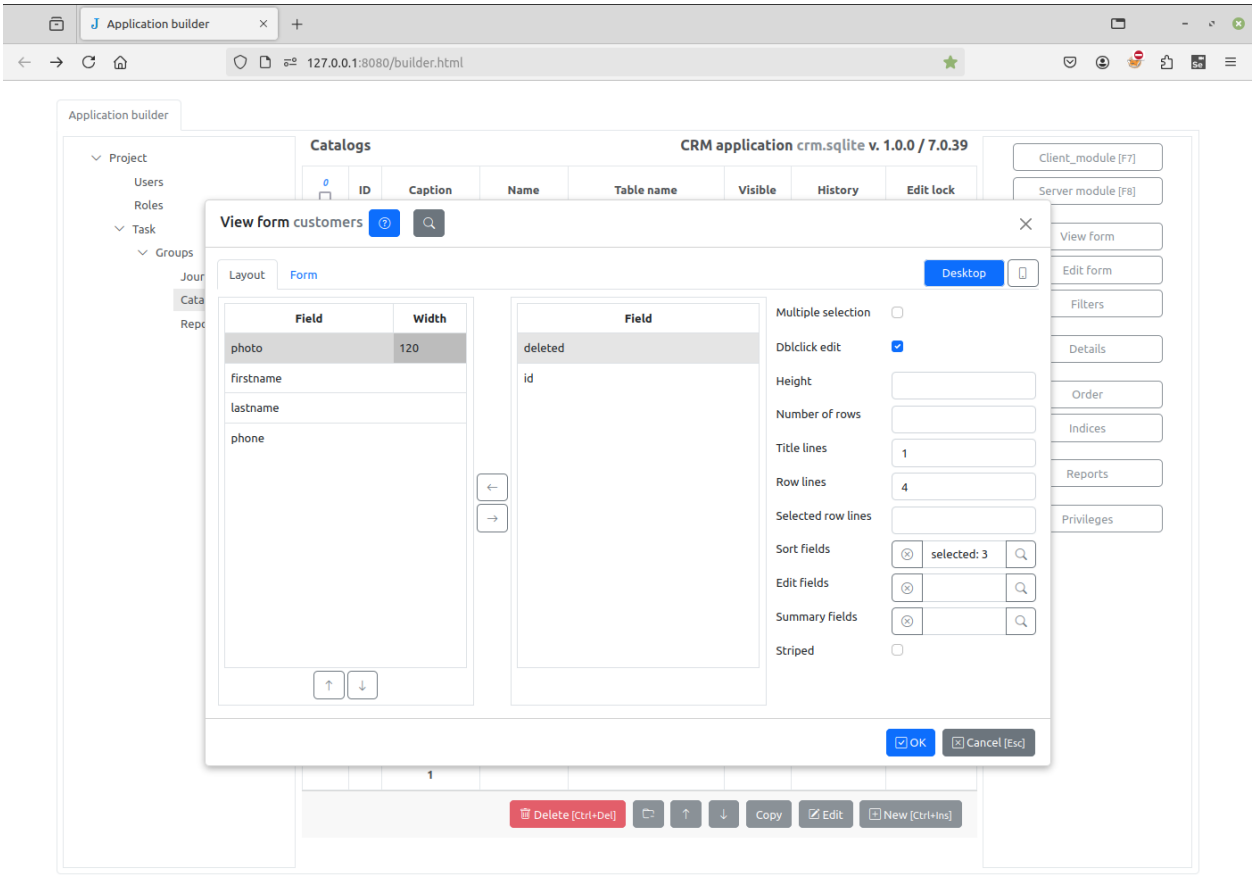
Vamos abrir o *Diálogo do Editor de Campo* no Application Builder e definir **Largura de visualização** como 120 e **Largura de edição** como 314 na aba **Interface**.



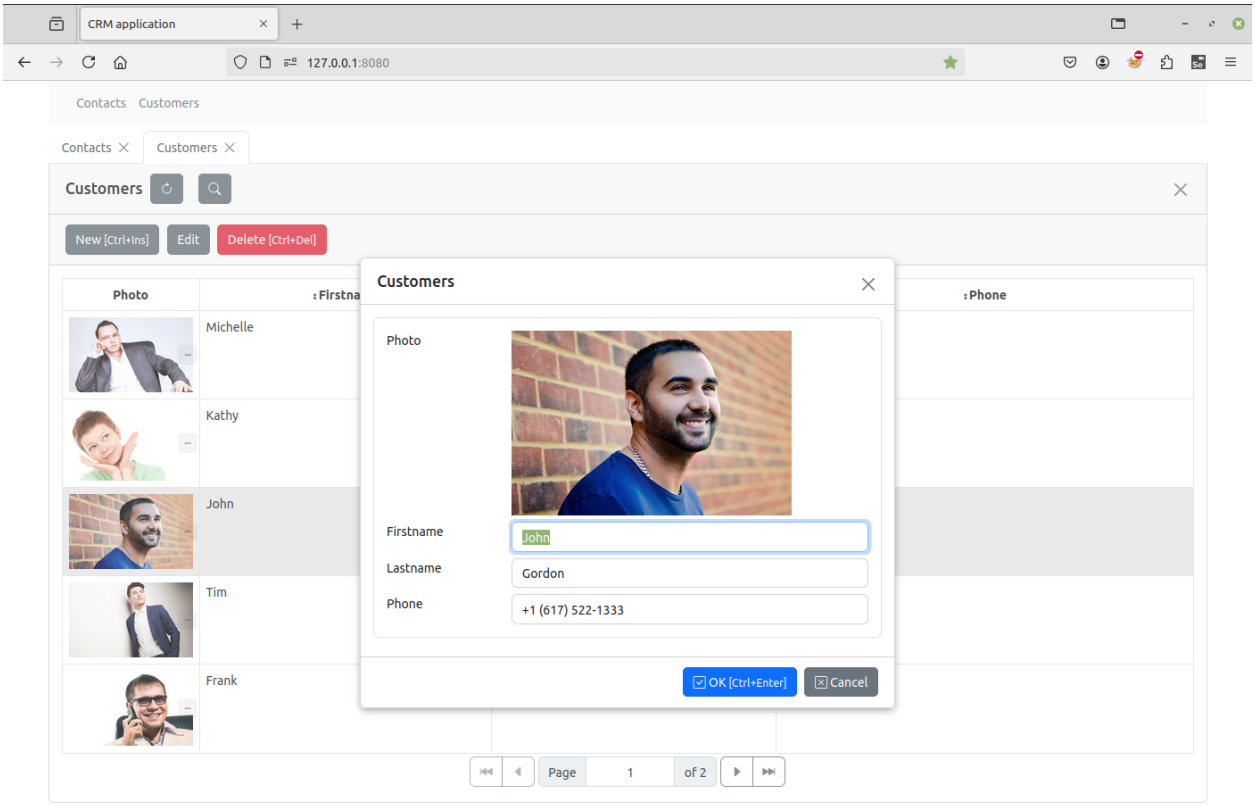
Nota

Você pode definir o espaço reservado da imagem dando um duplo clique sobre ela.

No *Diálogo do Formulário de Visualização* definimos **Linhas por linha** como 4 e a largura do campo “Foto” como 120.



Agora, na página do projeto, teremos:



2.5.2 Veja também

accept string

2.5.3 Captura de imagem pela câmera

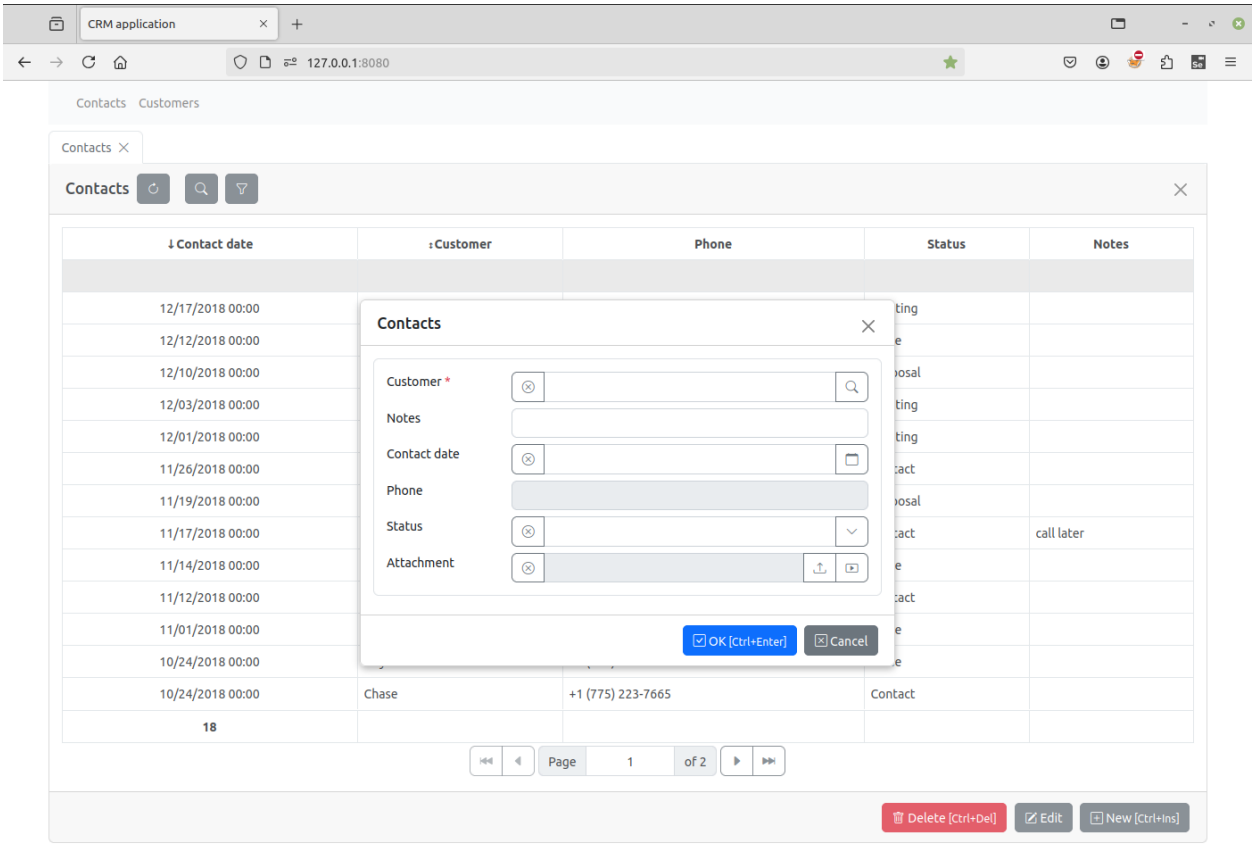
Você pode capturar a imagem pela câmera. Para isso, marque a caixa de seleção **Capturar da câmera**. Neste caso, quando a imagem não estiver definida, o vídeo da câmera será exibido no lugar do espaço reservado da imagem.

Dê um duplo clique no vídeo para capturar a imagem. Para limpar a imagem, mantenha pressionada a tecla Ctrl e dê um duplo clique na imagem — depois disso, o vídeo será exibido novamente.

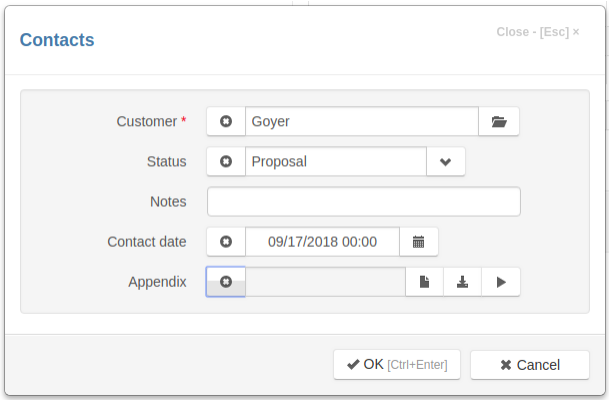
A imagem é enviada automaticamente para o servidor, desde que a extensão ".png" esteja adicionada nos *Parâmetros* da aplicação, conforme a *accept string*.

2.5.4 Adicionando campo de arquivo

Agora vamos adicionar um campo que armazenará um arquivo anexo no registro “Contatos”.



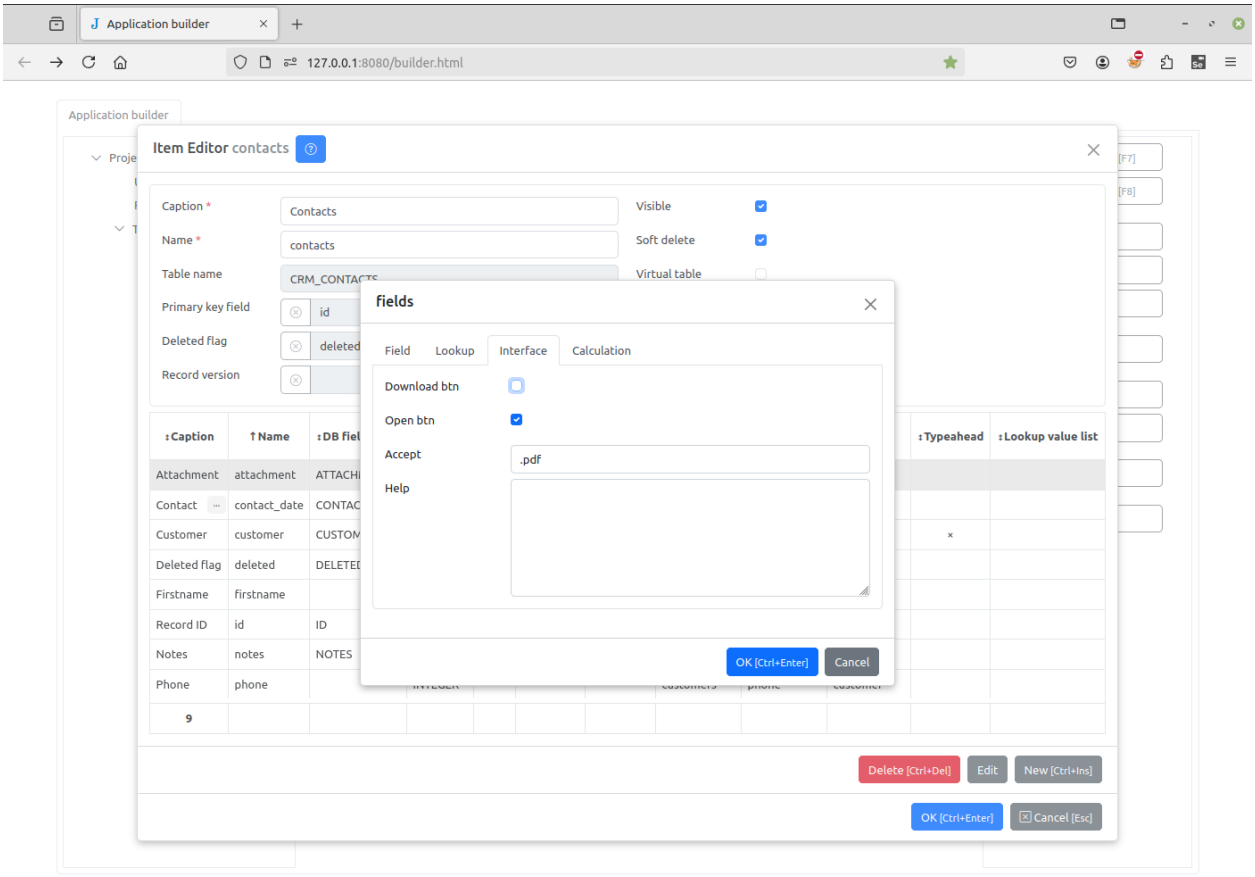
Este campo será exibido no formulário de edição da seguinte forma:



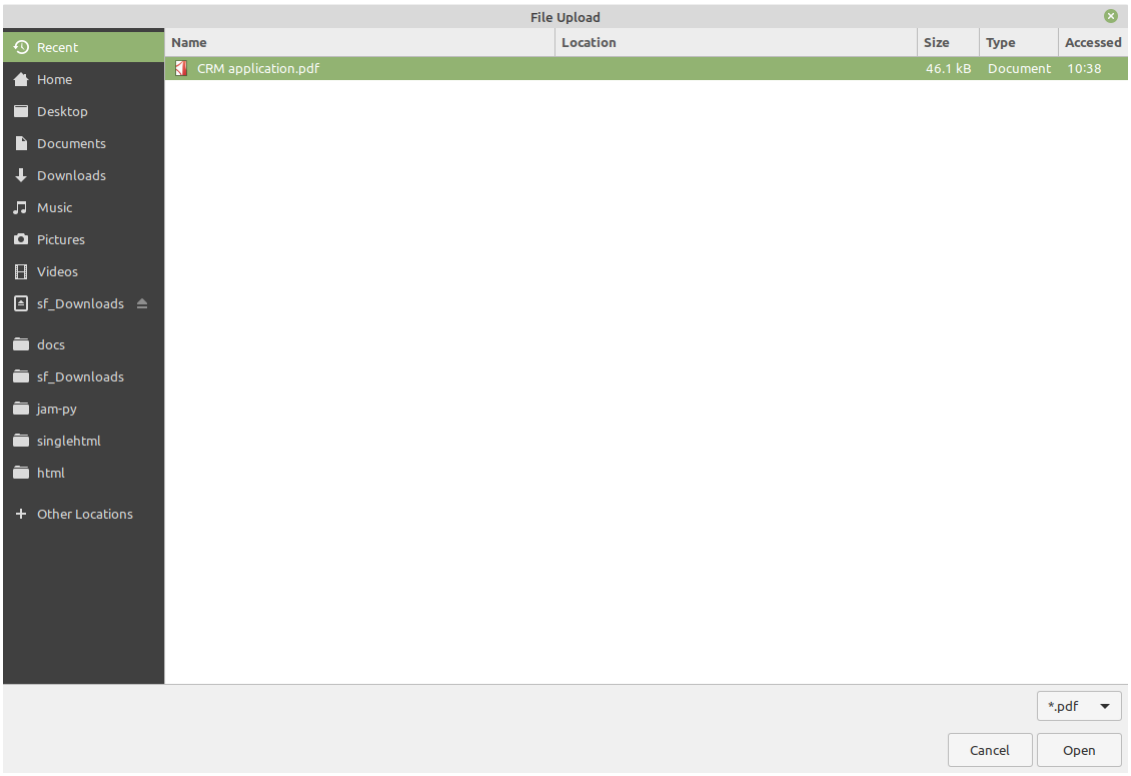
O campo possui três botões à direita — para fazer upload, download e abrir o arquivo.

Vamos abrir o *Diálogo do Editor de Campo* no Application Builder, desmarcar a opção **Botão de download** e definir o atributo **Aceitar (Accept)** como ‘.pdf’.

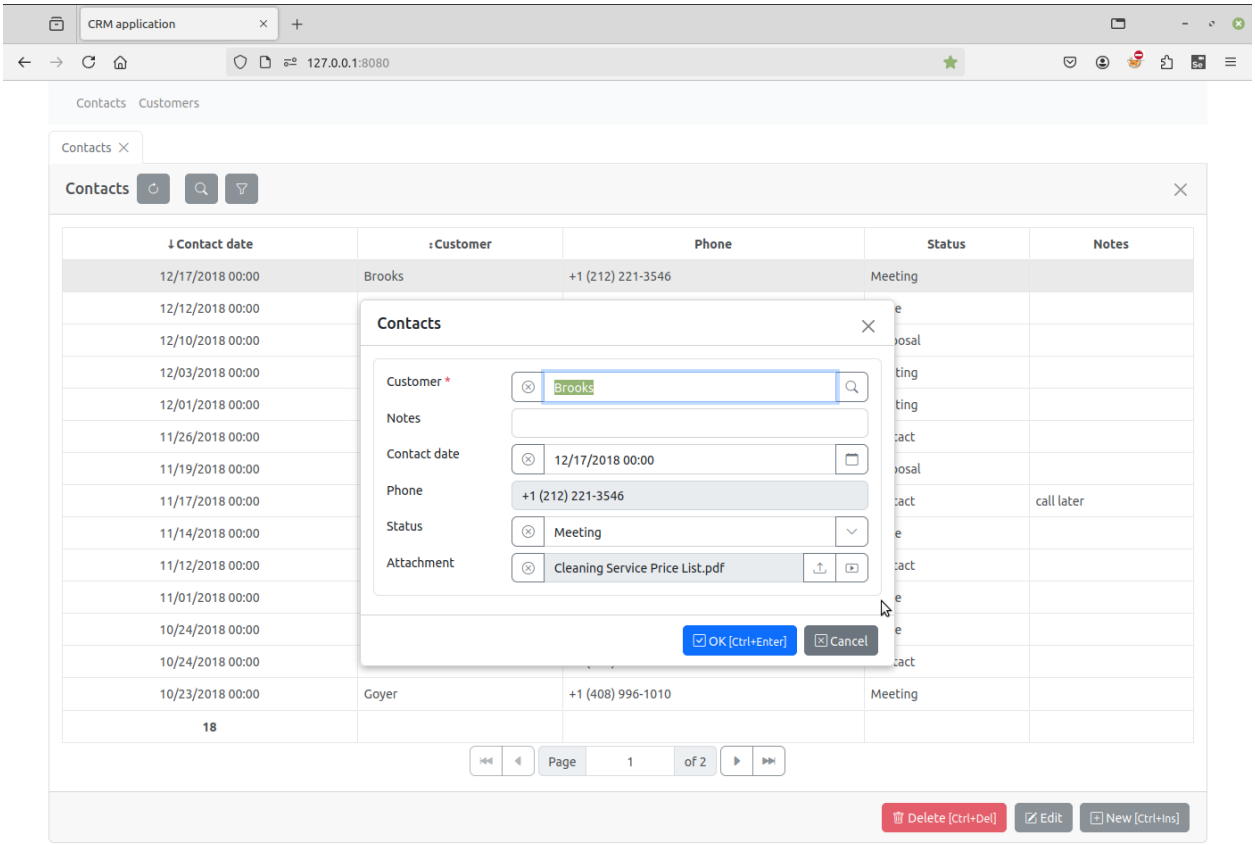
Consulte a *lista de valores aceitos* antes de adicionar os valores.

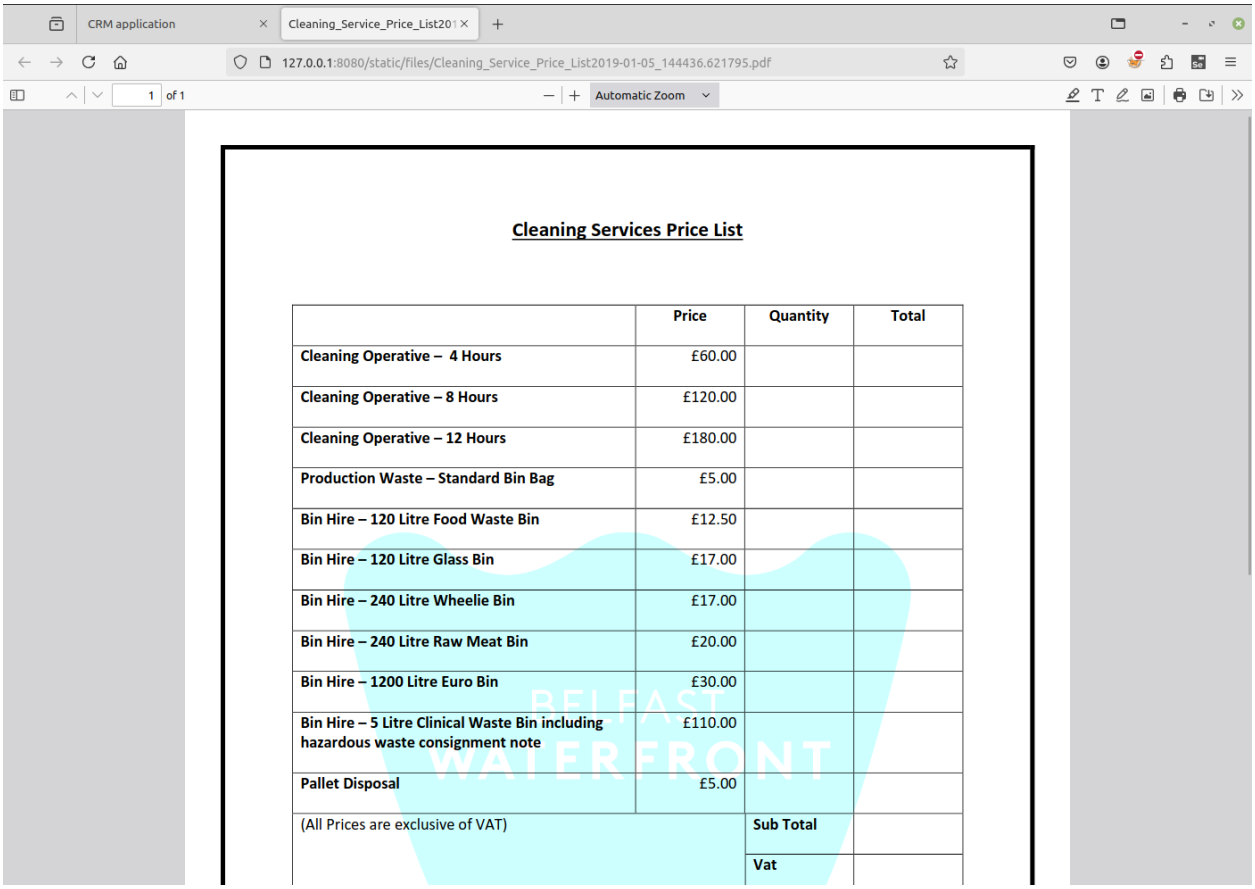


Vamos atualizar a página do projeto, abrir o formulário de edição de “Contatos” e fazer upload de um arquivo clicando no botão de upload:



Agora podemos abrir o arquivo no navegador clicando no botão de abrir.





Nota

Arquivos e imagens são armazenados na pasta *static/files* no servidor.

Você pode limitar o tamanho dos arquivos que podem ser enviados ao servidor definindo o atributo **Tamanho máximo de conteúdo (Max content length)** nos *parâmetros do projeto*.

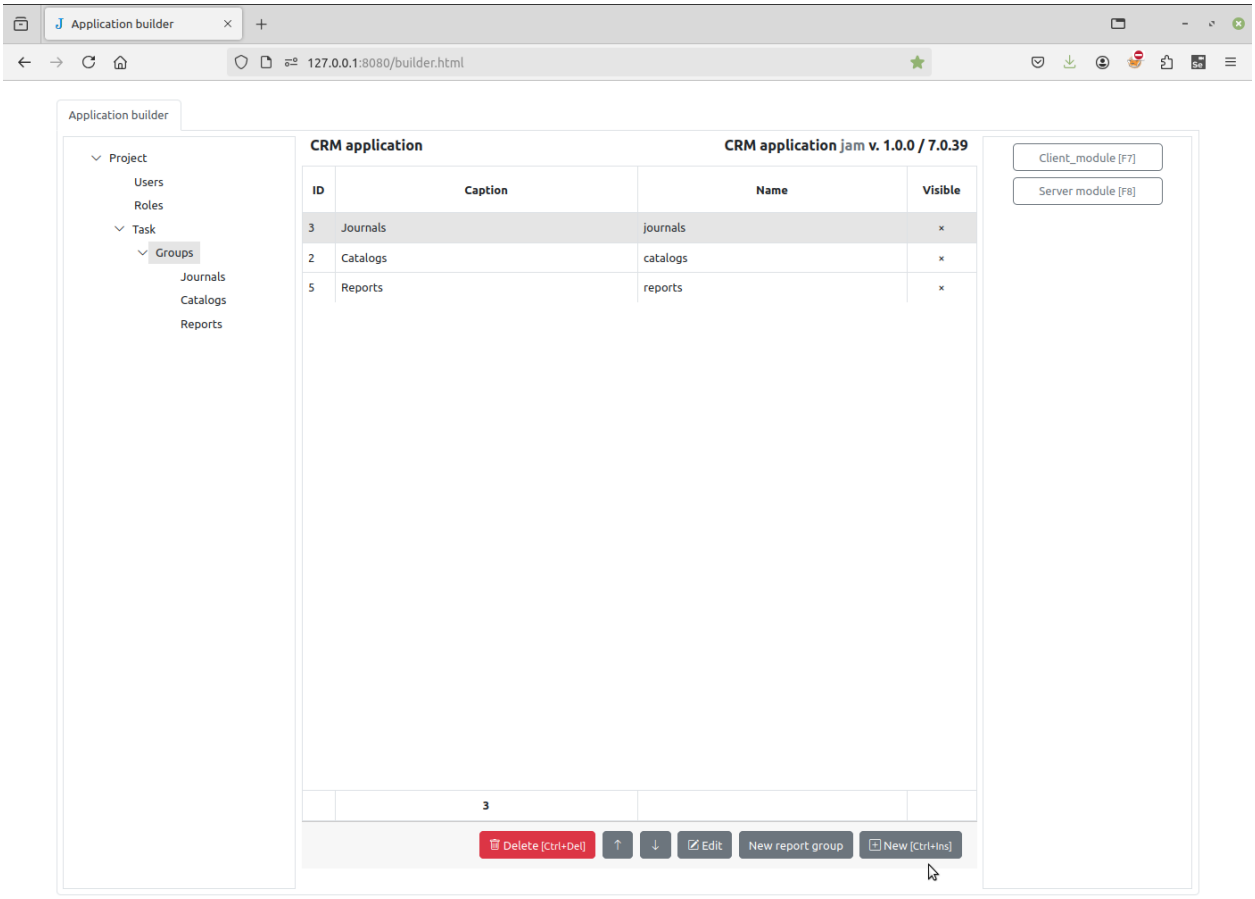
2.5.5 Veja também

accept string

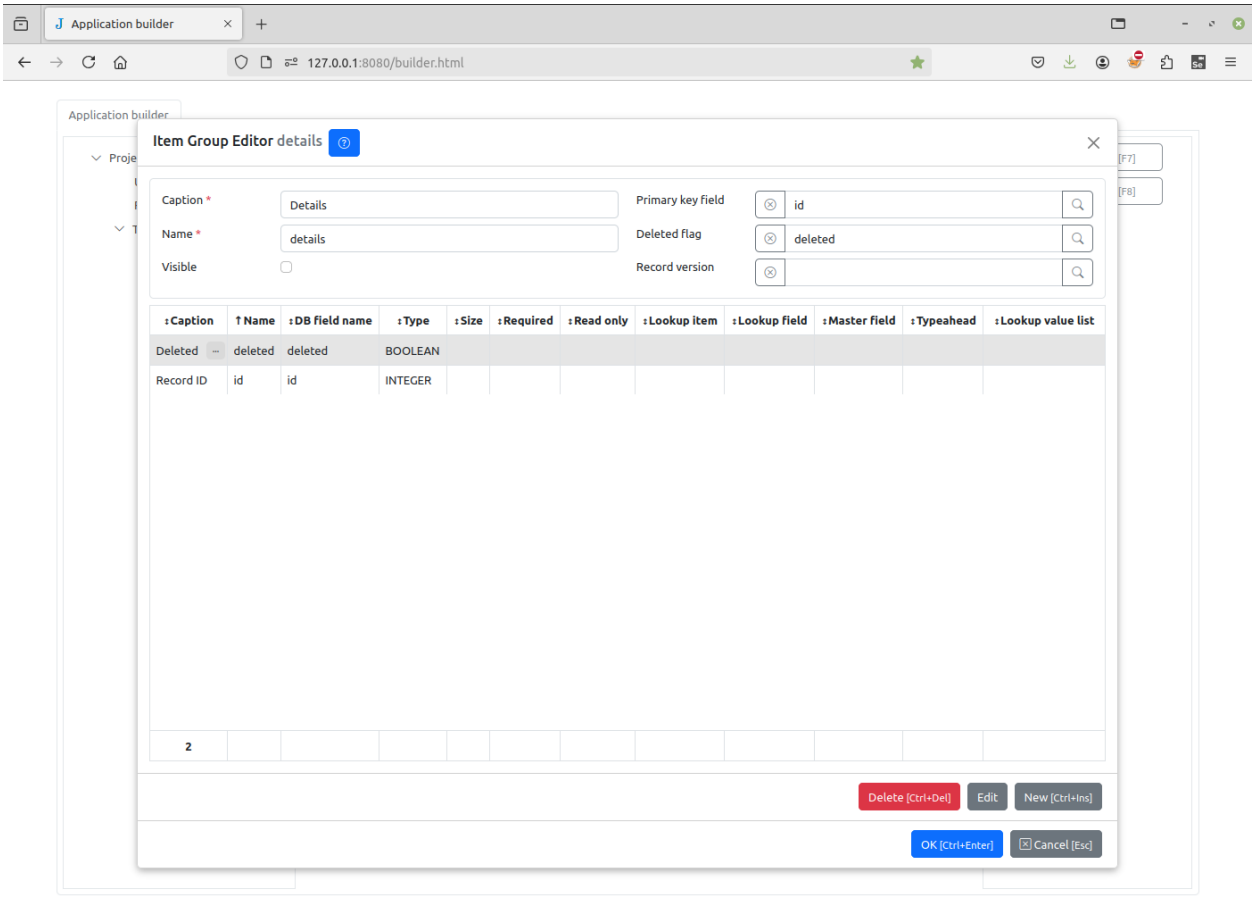
2.6 Tutorial. Parte 3. Detalhes

Nesta parte do tutorial, explicaremos como trabalhar com detalhes.

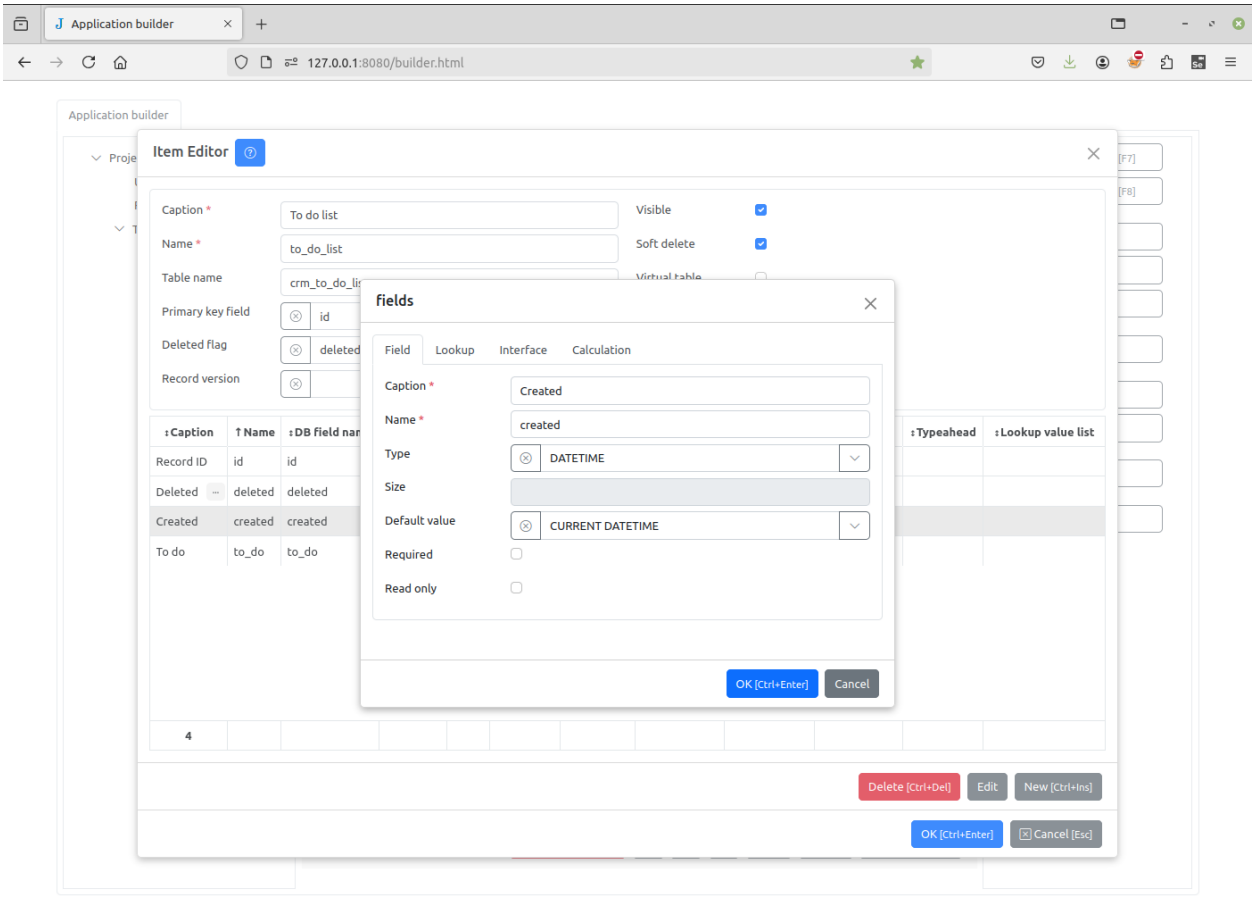
Vamos selecionar o item "Task/Groups" na árvore do projeto e clicar no botão **Novo** no canto inferior direito da página:



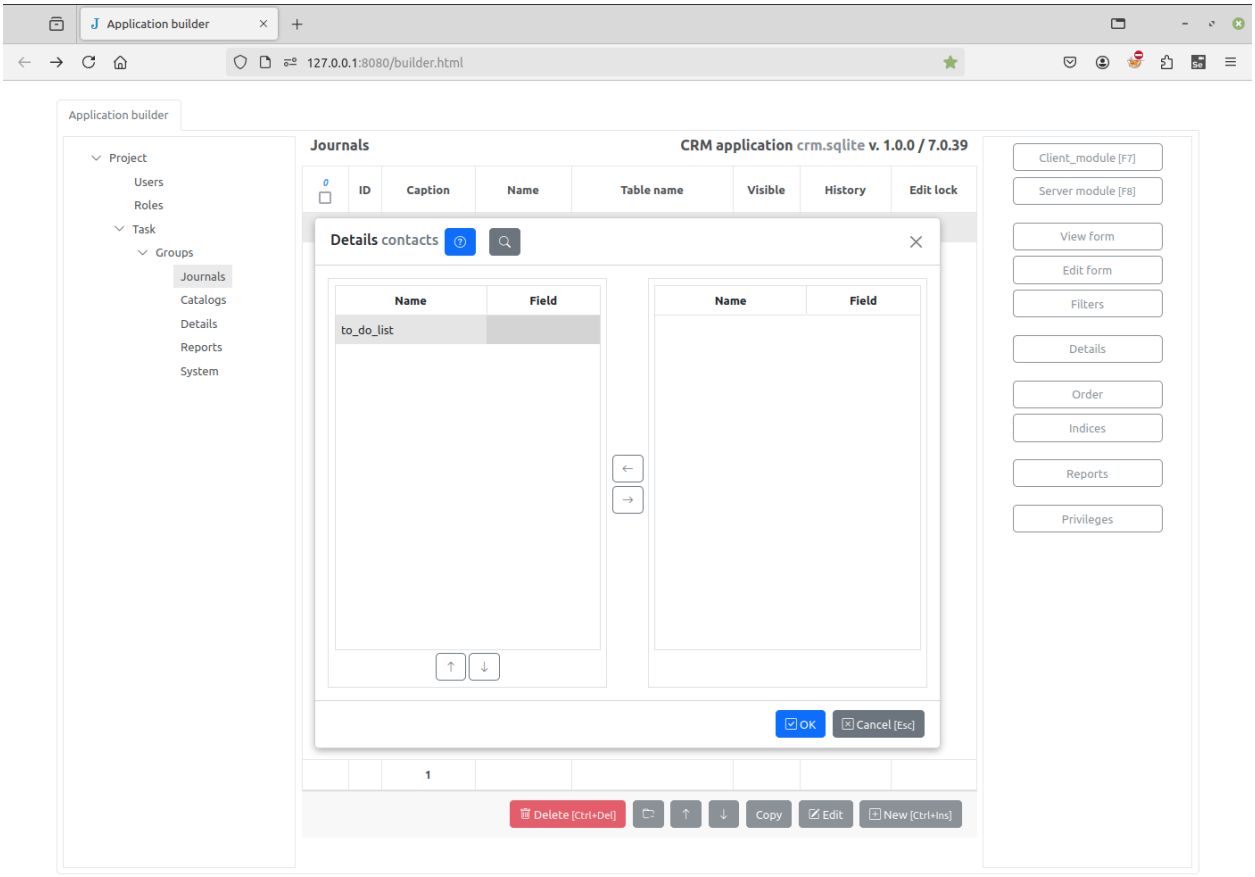
Nomeie-o como “Detalhes”:



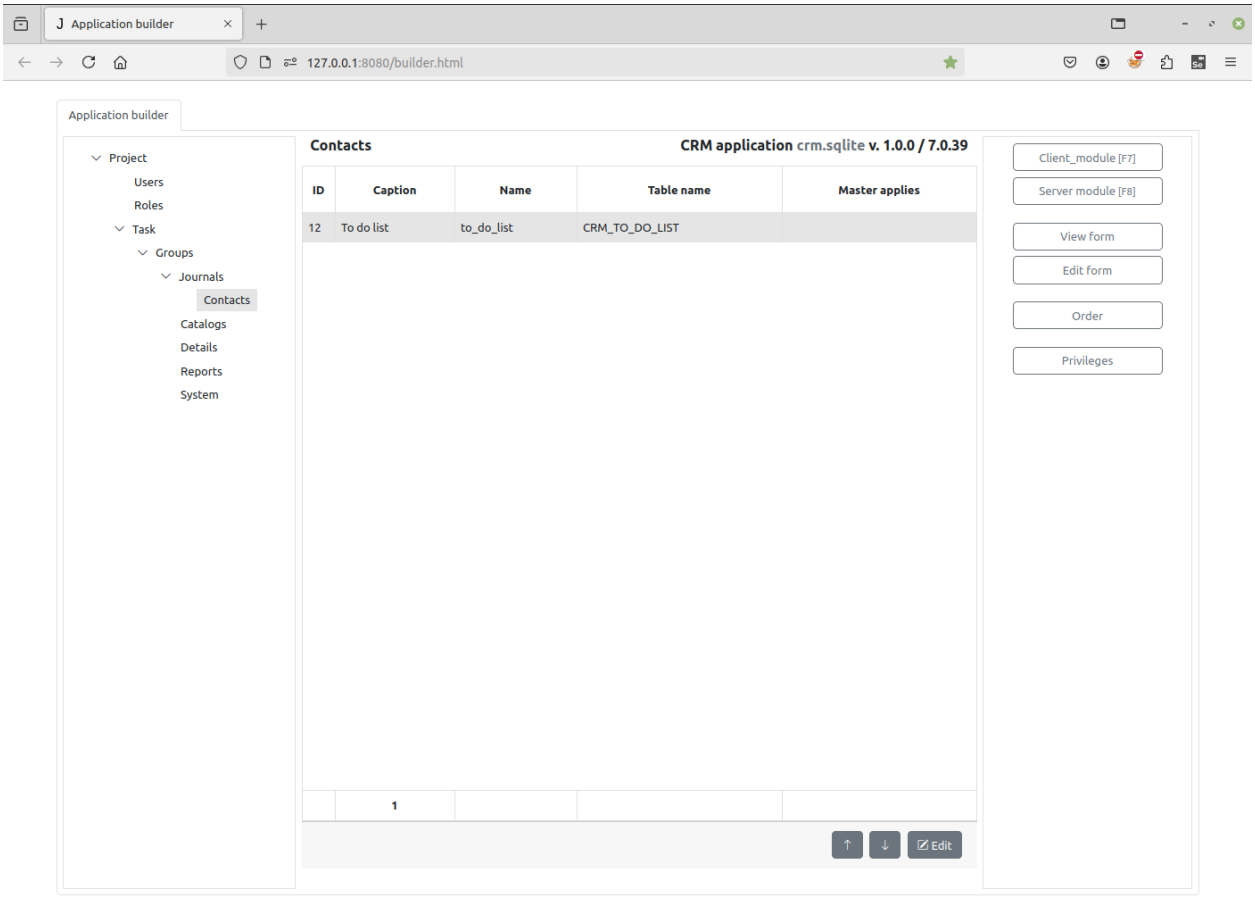
Na caixa de diálogo *Editor de Item*, nomearemos o novo item como “Lista de tarefas” e adicionaremos os dois campos “Criado em” e “Tarefa” da mesma forma como feito no tutorial anterior:



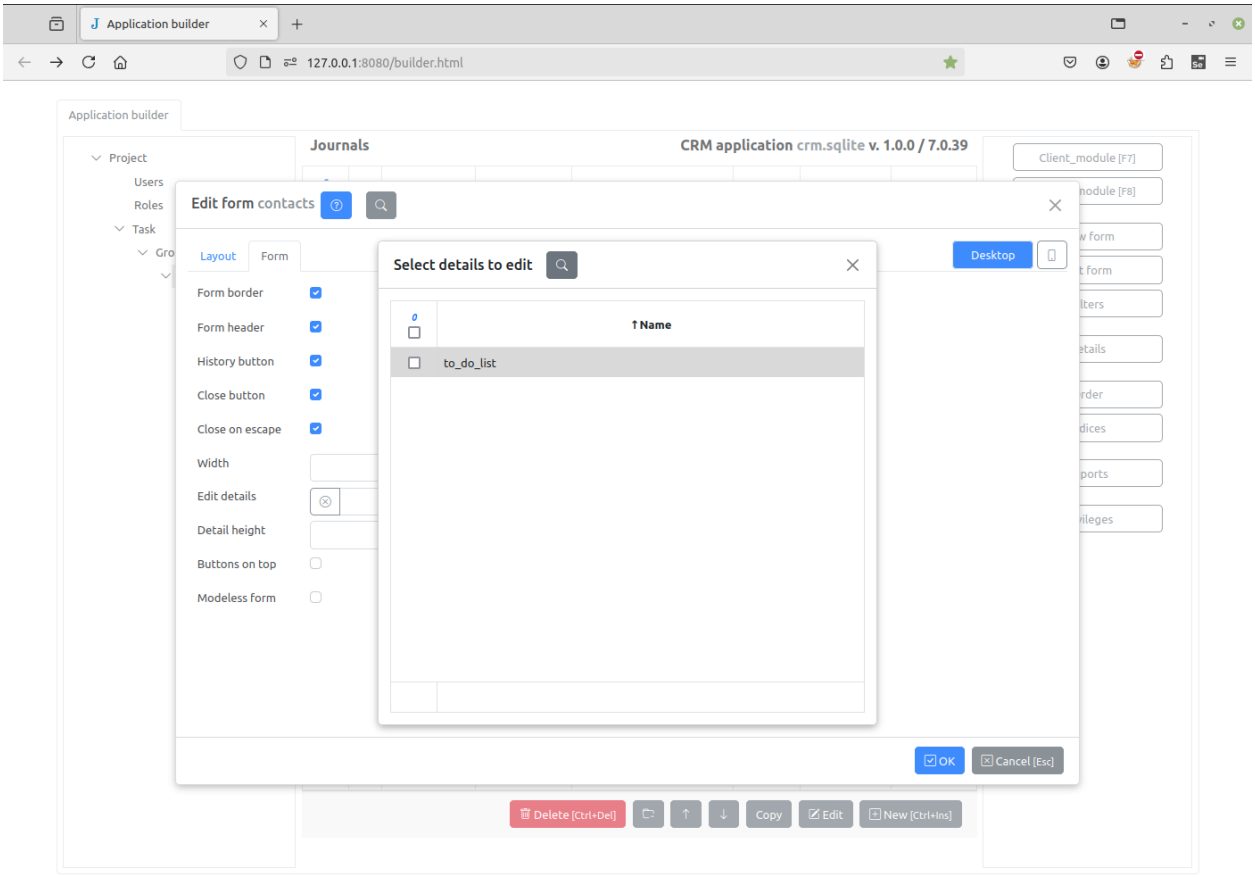
Após salvar a “Lista de tarefas”, selecione o registro “Contatos” e clique no botão **Detalhes** no painel direito para abrir o *Diálogo de Detalhes*. Clique no botão de seta para a direita para adicionar a “Lista de tarefas” aos detalhes de “Contatos” e clique no botão **OK** para salvar as alterações.



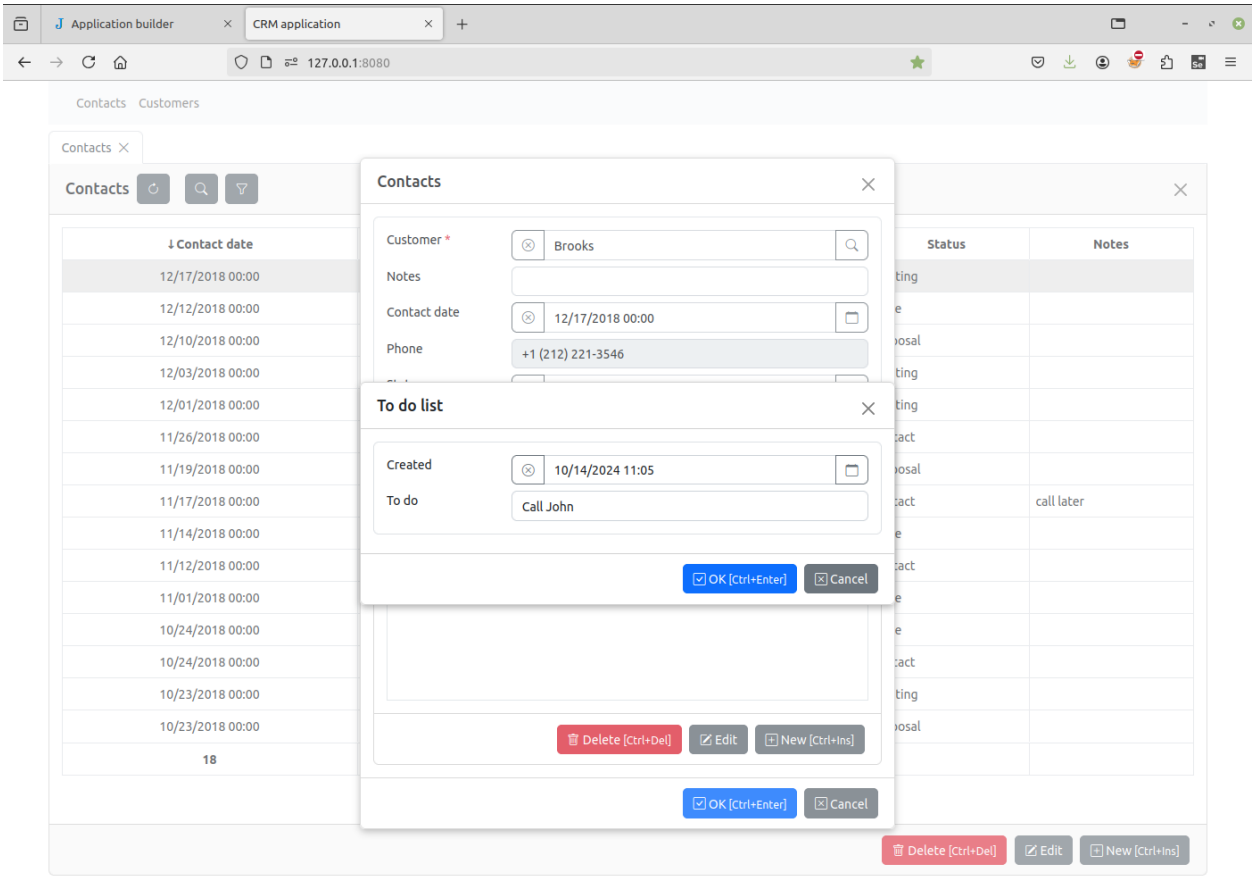
Um novo item “Lista de tarefas” será criado como filho do registro “Contatos”.



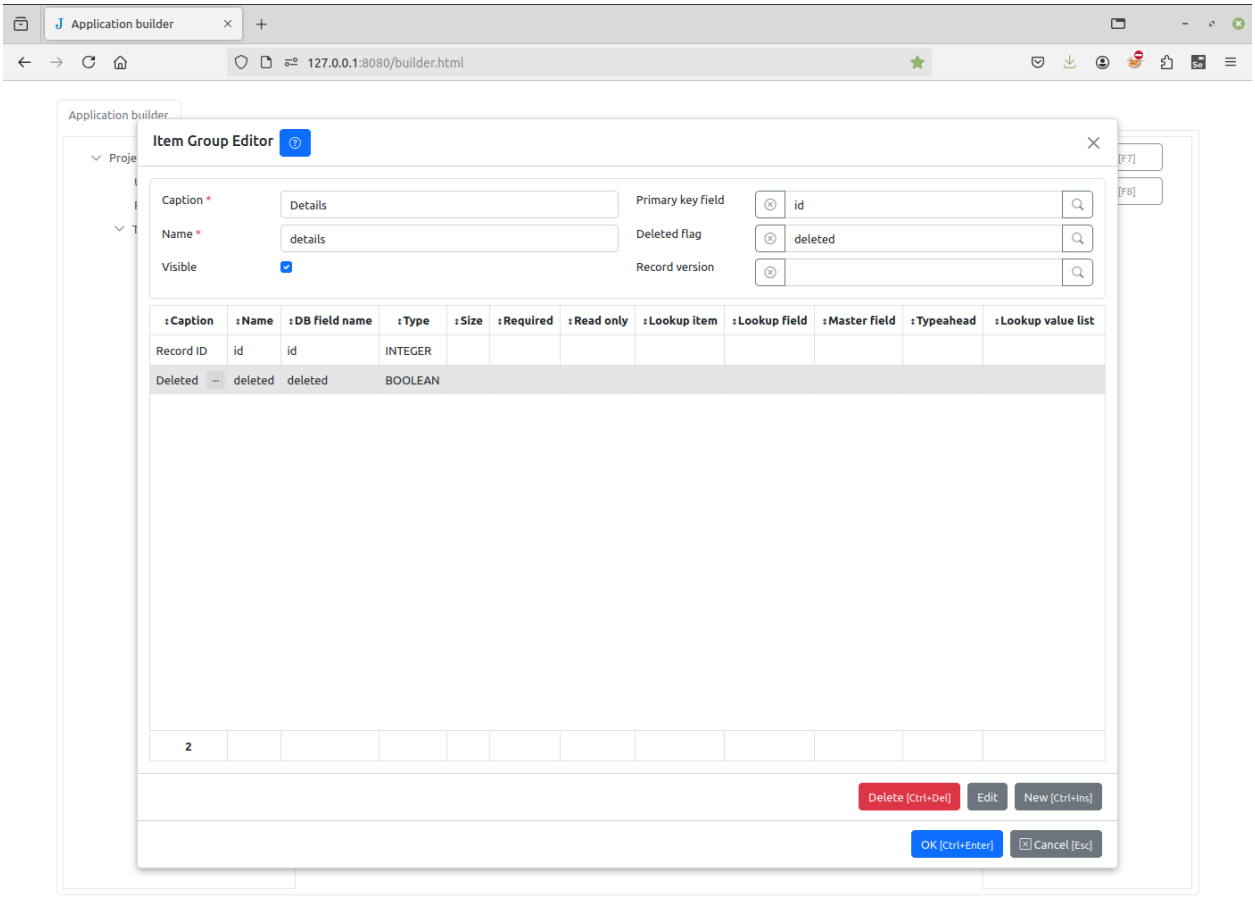
Selecione novamente o registro “Contatos” e clique no botão **Formulário de edição** para abrir o *Diálogo de Formulário de Edição*. Selecione a guia **Formulário**, clique no botão à direita do campo **Editar detalhes** e marque a caixa “Lista de tarefas”.



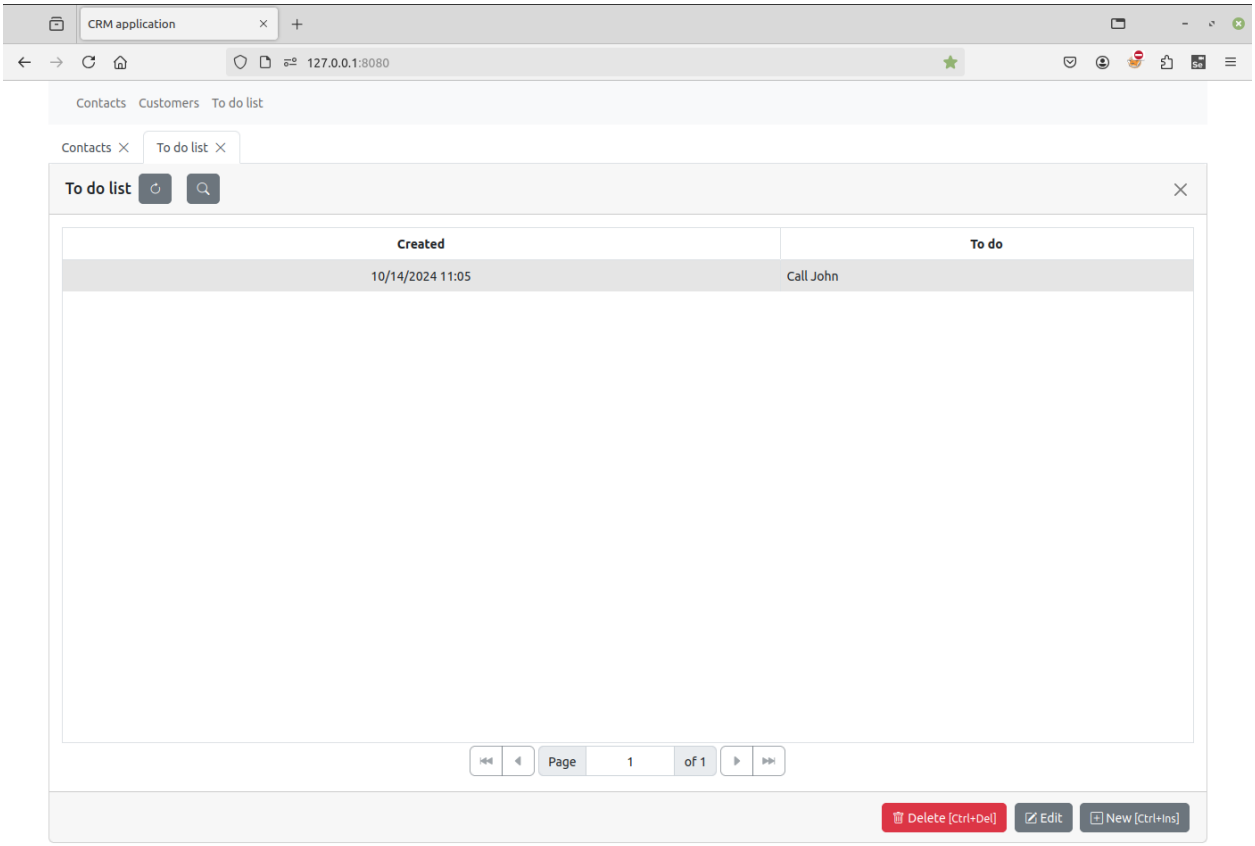
Vamos atualizar a página do projeto e dar um duplo clique no contato. Agora podemos adicionar itens à lista de tarefas do contato.



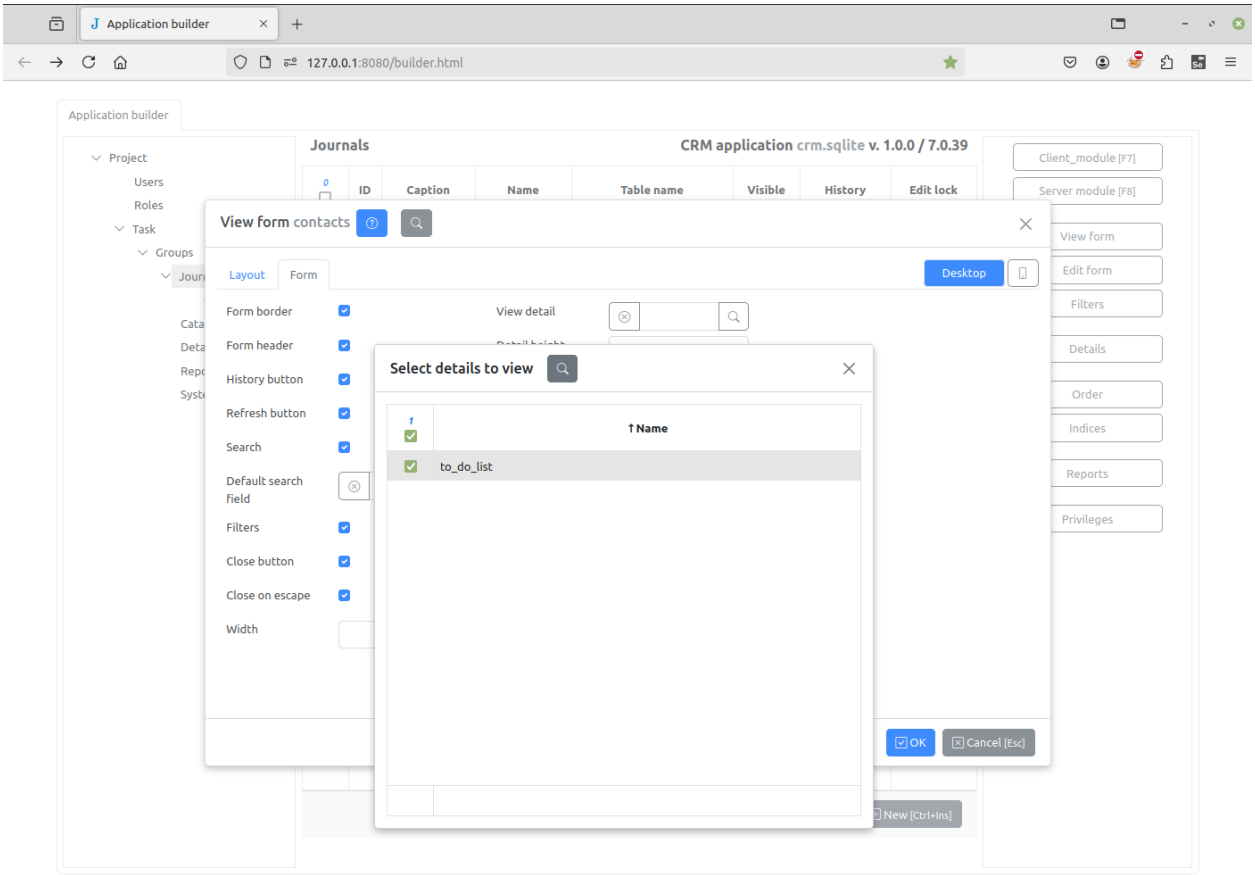
Clique no nó **Grupos** na árvore do projeto, dê um duplo clique na linha **Detalhes** e defina o atributo Visível como verdadeiro.



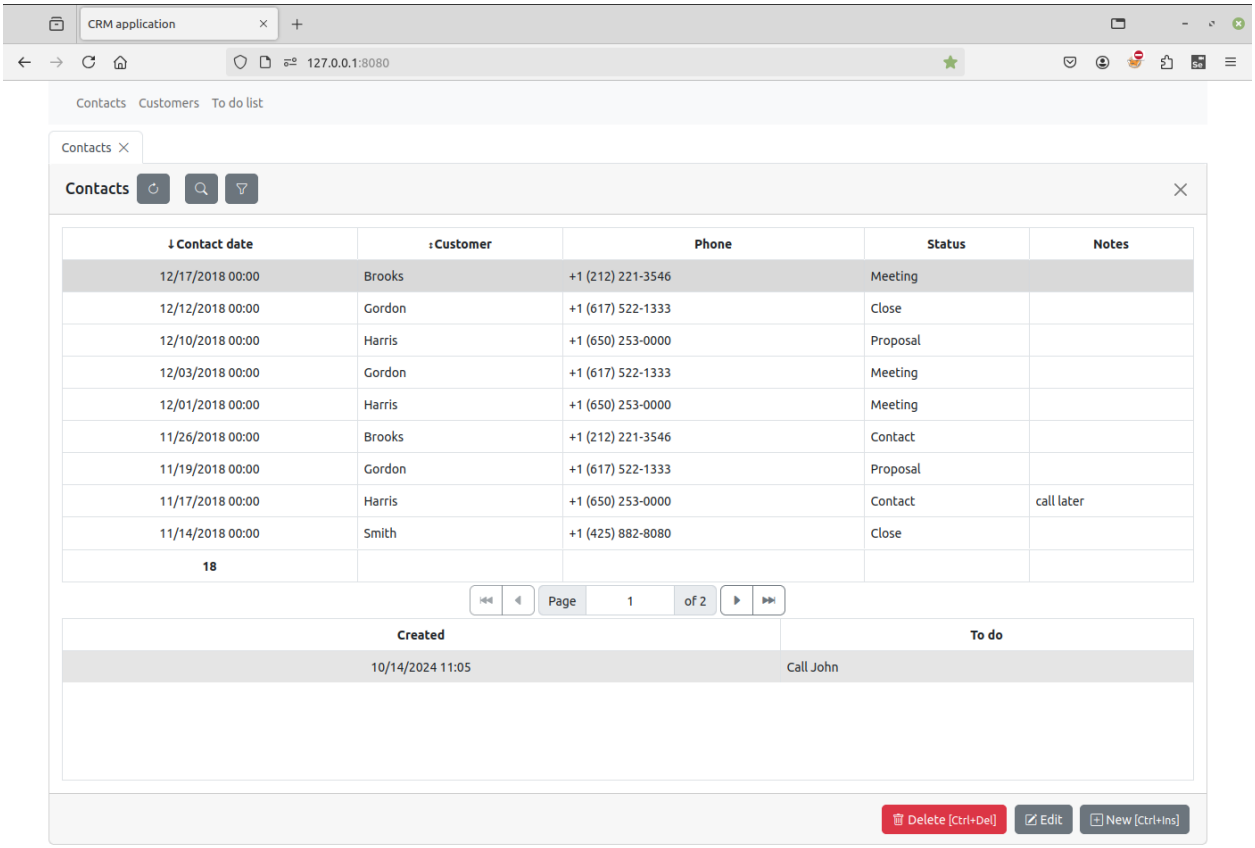
Ao atualizar a página do projeto, veremos o item “Lista de tarefas” no menu principal. Clique nele para ver a lista de tarefas de todos os contatos.



Selecione novamente o registro “Contatos” e clique no botão **Formulário de visualização** para abrir o *Diálogo de Formulário de Visualização*. Selecione a guia **Formulário**, clique no botão à direita do campo **Visualizar detalhe** e marque a caixa “Lista de tarefas”.



Na página do projeto, veremos que a lista de tarefas muda conforme o contato selecionado muda.



2.7 Implantação

2.7.1 Implantação do Jam.py com Apache e mod_wsgi

Depois de instalar e ativar o `mod_wsgi`, edite o arquivo **httpd.conf** do servidor Apache e adicione o seguinte. Se você estiver usando uma versão do Apache anterior à 2.4, substitua **Require all granted** por **Allow from all** e adicione a linha **Order deny,allow** acima dela.

```
WSGIScriptAlias / /path/to/mysite.com/mysite/wsgi.py
WSGIPythonPath /path/to/mysite.com

<Directory /path/to/mysite.com/mysite>
<Files wsgi.py>
Require all granted
</Files>
</Directory>

Alias /static/ /path/to/mysite.com/static/

<Directory /path/to/mysite.com/static>
Require all granted
</Directory>
```

A primeira parte na linha `WSGIScriptAlias` é o caminho base da URL em que você quer servir sua aplicação (`/` indica a URL raiz), e a segunda é a localização de um arquivo "WSGI" — veja abaixo — no seu sistema, geralmente

dentro do pacote do seu projeto (`meusite` neste exemplo). Isso instrui o Apache a servir qualquer requisição abaixo da URL fornecida usando a aplicação WSGI definida naquele arquivo.

A linha `WSGIPythonPath` garante que o pacote do seu projeto esteja disponível para importação no Python path; em outras palavras, que `import meusite` funcione.

O bloco <`Directory`> garante que o Apache possa acessar o arquivo `wsgi.py`.

As próximas linhas garantem que qualquer conteúdo no espaço de URL `/static/` seja explicitamente servido como arquivos estáticos.

2.7.2 Veja também

Veja informações adicionais sobre implantação em *Como implantar*

2.8 Compreendendo o admin.sqlite

O Mapa Mental (Mind Map) para o banco de dados Jam.py V7 **admin.sqlite** descreve o esquema do mecanismo de banco de dados do Jam.py. A intenção é permitir encontrar rapidamente as informações necessárias, bem como o código correspondente.

CAPÍTULO 3

Programação em Jam.py

Aqui serão explicados os conceitos básicos da programação em Jam.py.

3.1 Árvore de tarefas

Todos os objetos do framework representam uma árvore de objetos. Esses objetos são chamados de itens.

Todos os itens da árvore têm uma classe ancestral comum `AbstractItem` (*referência do cliente* / *referência do servidor*) e atributos comuns:

- `ID` - ID único do item no framework
- `owner` - pai imediato e proprietário do item
- `task` - raiz da árvore de tarefas
- `items` - lista de itens filhos
- `item_type` - tipo do item
- `item_name` - o nome do item que será usado no código de programação para acessar o item
- `item_caption` - o nome do item que aparece para os usuários

Na raiz da árvore está o item de tarefa.

A tarefa contém itens de grupo. Existem três tipos de grupos que têm os seguintes valores para o atributo `item_type`:

- "journals" - esses grupos contêm itens com `item_type` "item", que podem ter uma tabela de banco de dados associada.
- "catalogs" - esses grupos também contêm itens que podem ter tabelas de banco de dados associadas, mas podem ser usados para criar detalhes para outros itens (veja *Detalhes*).
- "reports" - esses grupos contêm relatórios – itens com `item_type` "report", que são usados para criar relatórios.

Pode haver um número ilimitado de grupos. Sugerimos usar nomes lógicos para os grupos, já que o nome é usado no menu suspenso.

Itens que podem ter uma tabela de banco de dados associada podem possuir detalhes, que são usados para armazenar registros pertencentes a um registro mestre.

Por exemplo, a árvore de tarefas do *Projeto de demonstração* é:

```
/demo/
    catalogs/
       customers
       tracks/
            invoice_table
       albums
       artists
       genres
       mail
    journals/
        invoices/
            invoice_table
        invoices_client/
            invoice_table
    details/
        invoice_table
    reports/
        invoice
        purchases_report
    analytics
    system
```

Na raiz da árvore de tarefas está uma tarefa com o `item_name` **demo**. Ela possui cinco grupos: **catalogs**, **journals**, **details**, **reports**, **analytics** e **system**. Os grupos **catalogs** e **journals** têm `item_type` "items". Os itens que eles possuem são invólucros sobre as tabelas correspondentes do banco de dados. Há um item de detalhe com `item_name` **invoice_table**, que também possui sua própria tabela de banco de dados, e três relatórios no grupo **reports**.

O journal **invoices** possui o detalhe **invoice_table**, que mantém uma lista de faixas em uma fatura do cliente. Portanto, há três itens com o mesmo nome "invoice_table": a tabela de detalhes no grupo Details, detalhes para Registro/Invoices e detalhes para Cadastros/Tracks.

Cada item é um atributo de seu proprietário e todos os itens, tabelas e relatórios também são atributos da tarefa (todos têm um `item_name` único).

Uma tarefa é um objeto global no cliente. Para acessá-la, basta digitar `task` em qualquer lugar no código.

No servidor, a tarefa não é global. O Jam.py é um ambiente orientado a eventos. Cada evento tem como parâmetro o item (ou campo) que disparou o evento. Funções definidas no módulo do servidor de um item que podem ser executadas a partir do módulo cliente usando o método *server* têm o item correspondente como o primeiro parâmetro também.

Conhecendo um item, podemos acessar qualquer outro item da árvore de tarefas. Por exemplo, para acessar o Cadastro **customers**, podemos escrever:

```
def on_apply(item, delta, params):
    customers = item.task.catalogs.customers.copy()
```

ou simplesmente

```
def on_apply(item, delta, params):
    customers = item.task.customers.copy()
```

A estrutura hierárquica do projeto é uma das bases do princípio DRY ("don't repeat yourself" – não se repita) do framework.

Por exemplo, alguns métodos dos itens, quando executados, geram eventos sucessivamente para a tarefa, grupo e o item.

Dessa forma, podemos definir um comportamento básico para todos os itens no manipulador de eventos da tarefa, que pode ser expandido no manipulador de eventos do grupo e, finalmente, se necessário, pode ser especificado no manipulador de eventos do próprio item. Para mais detalhes, veja *Eventos de formulário*

3.1.1 Vídeo

O vídeo tutorial Task tree demonstra a árvore de tarefas usando o *Projeto de demonstração*

3.2 Workflow

No framework Jam.py, duas tarefas funcionam ao mesmo tempo: o Application builder e o Project. Cada uma delas representa uma árvore de objetos – existe a árvore de tarefas do Application builder e a árvore de tarefas do Project. Portanto, antes de considerar o fluxo de trabalho do Jam.py, você precisa se familiarizar com o conceito de *task tree*.

O fluxo de trabalho do Jam.py é o seguinte:

- Quando o `server.py` é executado, ele cria uma aplicação WSGI que, por sua vez, cria a árvore de tarefas do Application builder.
- A árvore de tarefas do Project é criada no servidor pelo Application builder após o servidor receber a primeira requisição do cliente do Project. Para isso, o Application builder usa os metadados armazenados no banco de dados `admin.sqlite` na pasta raiz do projeto. Após criar a árvore de tarefas, a aplicação no servidor dispara o evento *on_created*, que pode ser usado para inicializar a árvore de tarefas do servidor.
- Quando uma aplicação no cliente (Application builder ou Project) é executada pela primeira vez no navegador (após `builder.html` ou `index.html` serem carregados), o objeto de tarefa vazio é construído e envia uma requisição ao servidor para se inicializar.
- Se o parâmetro *safe mode* do projeto estiver definido, o framework verifica se há um usuário autenticado antes de executar qualquer requisição. Caso contrário, a aplicação no cliente cria um formulário de login, e após o usuário inserir seu login e senha, a tarefa do cliente envia uma requisição ao servidor para autenticar.
- Após o login com sucesso ou se o parâmetro *safe mode* do projeto não estiver definido, o servidor envia ao cliente as informações sobre a tarefa solicitada. A tarefa no cliente constrói sua árvore com base nessas informações, atribui os manipuladores de eventos a seus objetos e executa o manipulador de evento *on_page_loaded*.
- Neste manipulador de evento, o desenvolvedor deve anexar funções manipuladoras de eventos do JQuery aos elementos HTML do DOM, definidos no arquivo `index.html`. Nessas funções, o desenvolvedor pode usar os métodos dos itens da *task tree* para executar tarefas específicas. Esses métodos, quando executados, disparam diferentes eventos nos quais outros métodos podem ser chamados e assim por diante. Veja *Client side programming*.
- Itens da árvore de tarefas que possuem tabelas de banco de dados correspondentes possuem métodos para ler e gravar dados no banco de dados do servidor. Veja *Data programming*.
- Os itens de relatório geram os relatórios no servidor com base em modelos do LibreOffice. Veja *Programming reports*.
- Todos os itens cujos métodos geram uma requisição para o servidor o fazem da seguinte forma: eles chamam o método da tarefa que envia ao servidor o *ID* da tarefa, o *ID* do item, o tipo da requisição e seus parâmetros. O servidor, ao receber a requisição, com base nos IDs recebidos, encontra a tarefa (que pode ser a tarefa do Project ou do Application builder) e o item no servidor, executa o método correspondente com os parâmetros recebidos e retorna o resultado da execução para o cliente. Esses métodos do servidor podem disparar seus próprios eventos que podem sobrescrever o comportamento padrão. Veja *Server side programming*

3.2.1 Video

Os tutoriais em vídeo Form events e Client-server interactions ilustram o fluxo de trabalho de um projeto Jam.py.

3.3 Trabalhando com módulos

Para cada item da *árvore de tarefas* do projeto, o desenvolvedor pode escrever código que será executado no cliente ou no servidor. No Application builder, para cada item há dois botões no canto superior direito: **Client module** e **Server module**. Clicando nesses botões, será aberto o *code editor*.

Cada item possui um conjunto predefinido de eventos que podem ser disparados pela aplicação. Um evento é uma função definida no módulo de um item que começa com o prefixo **on_**. Todos os eventos disponíveis estão listados na aba Events do painel de informações do *code editor*

No *code editor* o desenvolvedor pode escrever o código para esses eventos, assim como definir funções auxiliares.

Por exemplo, o código abaixo significa que, imediatamente após adicionar um novo registro ao journal Invoices do projeto Demo, o valor do campo invoicedate será igual à data atual.

```
function on_after_append(item) {
    item.invoicedate.value = new Date();
}
```

Nota

Esses eventos e funções tornam-se atributos do item e podem ser acessados de qualquer lugar no código do projeto.

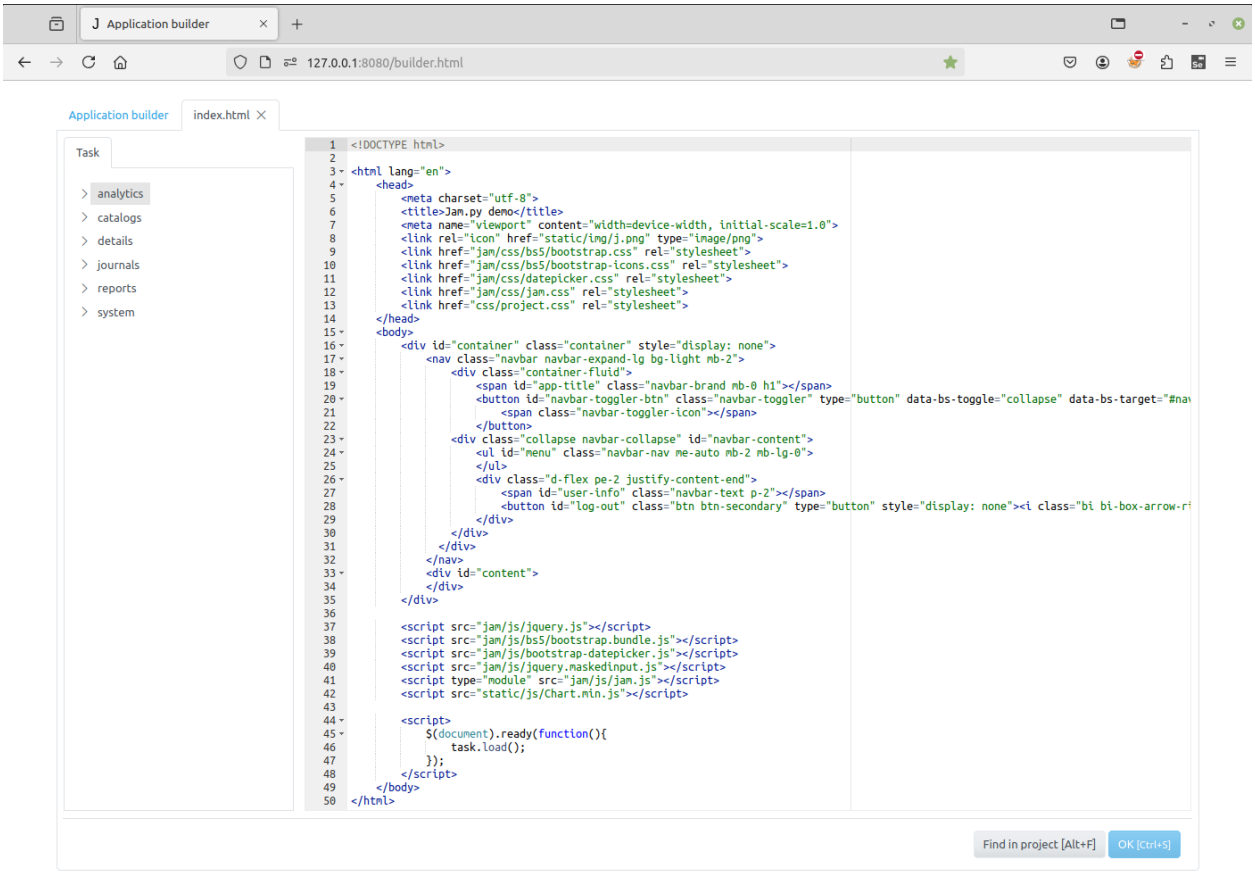
Por exemplo, o código a seguir, definido no módulo client do item, irá executar o manipulador de evento on_edit_form_created definido no item **Customers** para este item.

```
function on_edit_form_created(item) {
    task.customers.on_edit_form_created(item);
}
```

3.4 Programação do lado do cliente

3.4.1 Index.html

Quando o usuário abre uma aplicação Jam.py em um navegador Web, o navegador carrega primeiro o arquivo *index.html*. Este arquivo está localizado no diretório raiz do projeto e pode ser acessado/modificado ao clicar em `index.html [F10]` na árvore de *Tarefa*.



O arquivo HTML contém links para arquivos **css** e **js** que a aplicação cliente utiliza. Os arquivos que começam com **jam** estão localizados na pasta *jam* do diretório do pacote Jam.py no servidor.

Por exemplo:

```
<link href="jam/css/jam.css" rel="stylesheet">
```

Se necessário, outros arquivos podem ser adicionados aqui, como por exemplo uma biblioteca de gráficos. É recomendável colocá-los nas pastas *js* e *css* do diretório *static* do projeto.

Por exemplo:

```
<script src="static/js/Chart.min.js"></script>
```

Para templates de formulários, veja *Formulários* e *Templates de formulários* para mais detalhes.

Ao final do arquivo, há o seguinte script:

```
<script>
$(document).ready(function(){
    task.load()
  });
</script>
```

Neste script, o método *load* da tarefa, que foi criado quando o arquivo *jam.js* foi carregado, é chamado para carregar informações sobre a *árvore de tarefas* do servidor e, com base nessas informações, construir sua árvore, carregar os módulos, atribuir manipuladores de eventos aos seus itens e disparar o evento *on_page_loaded*. Veja *Inicializando a aplicação*

3.4.2 Inicializando a aplicação

O evento *on_page_loaded* é o primeiro evento acionado por uma aplicação no cliente.

O novo projeto utiliza o manipulador de evento *on_page_loaded* para construir dinamicamente o menu principal da aplicação e anexar o manipulador do evento de clique aos itens do menu utilizando JQuery.

```
function on_page_loaded(task) {

    $("title").text(task.item_caption);
    $("#app-title").text(task.item_caption);

    if (task.small_font) {
        $('html').css('font-size', '14px');
    }
    if (task.full_width) {
        $('#container').removeClass('container').addClass('container-fluid');
    }

    if (task.safe_mode) {
        $("#user-info").text(task.user_info.role_name + ' ' + task.user_info.user_name);
        $('#log-out')
        .show()
        .click(function(e) {
            e.preventDefault();
            task.logout();
        });
    }

    $('#container').show();

    task.create_menu($("#menu"), $("#content"), {
        splash_screen: '<h1 class="text-center">Jam.py Demo Application</h1>',
        view_first: true
    });
```

Este manipulador de evento utiliza JQuery para selecionar elementos do *index.html* para definir seus atributos e atribuir eventos.

```
<div id="container" class="container" style="display: none">
    <nav class="navbar navbar-expand-lg bg-light mb-2">
        <div class="container-fluid">
            <span id="app-title" class="navbar-brand mb-0 h1"></span>
            <button id="navbar-toggler-btn" class="navbar-toggler" type="button" data-bs-
↪toggle="collapse" data-bs-target="#navbar-content" aria-controls="navbar-content" aria-
↪expanded="false" aria-label="Toggle navigation">
                <span class="navbar-toggler-icon"></span>
            </button>
        <div class="collapse navbar-collapse" id="navbar-content">
            <ul id="menu" class="navbar-nav me-auto mb-2 mb-lg-0">
            </ul>
            <div class="d-flex pe-2 justify-content-end">
                <span id="user-info" class="navbar-text p-2"></span>
                <button id="log-out" class="btn btn-secondary" type="button" style=
↪"display: none"><i class="bi bi-box-arrow-right"></i></button>
```

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```
            </div>
        </div>
      </div>
    </nav>
    <div id="content">
    </div>
</div>
```

Por fim, o método *create_menu* da tarefa é chamado para criar dinamicamente o menu principal do projeto.

3.4.3 Formulários

Um dos conceitos-chave do framework é o conceito de formulário.

Quando o usuário clica em um item do menu principal, o método *view* do item correspondente é executado, criando o formulário de visualização.

Esse formulário de visualização pode conter os botões **Novo** e **Editar**. Ao clicar neles, os métodos *insert_record* e *edit_record* serão executados. Esses métodos criam um formulário de edição de item.

Os formulários são baseados em *templates de formulário* HTML, que determinam seu layout. Os templates de formulário são definidos no arquivo *Index.html*, localizado na pasta raiz do projeto.

A aplicação já possui templates padrão para visualização e edição de dados, para especificar filtros e parâmetros de relatórios.

Por exemplo, todos os formulários de edição do projeto Demo utilizam o seguinte template HTML:

```
<div class="default-edit">
    <div class="form-body">
        <div class="edit-body"></div>
        <div class="edit-detail"></div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-primary">
            <i class="bi bi-check-square"></i> OK<small class="muted"> [Ctrl+Enter]
↪</small>
        </button>
        <button type="button" id="cancel-btn" class="btn btn-secondary">
            <i class="bi bi-x-square"></i> Cancel
        </button>
    </div>
</div>
```

Você pode definir seus próprios templates de formulário para criar formulários personalizados. Veja *Templates de formulário*

Quando algum método cria um formulário, a aplicação localiza o template HTML correspondente.

Se o parâmetro `container` (um objeto Jquery) for especificado, o método esvazia esse container e anexa o template HTML a ele. Caso contrário, cria um formulário modal vazio e anexa o template ao formulário.

Após isso, o atributo `prefix_form` do item é atribuído ao template, os eventos `on_prefix_form_created` são disparados, o formulário é exibido e os eventos `on_prefix_form_shown` são acionados, onde *prefix* é o tipo do formulário (view, edit, filter, param). Veja *Eventos de formulário* para mais detalhes.

Abaixo está um exemplo do manipulador de evento `on_edit_form_created` da tarefa:

```
function on_edit_form_created(item) {
    item.edit_form.find("#ok-btn").on('click.task', function() { item.apply_record() });
    item.edit_form.find("#cancel-btn").on('click.task', function(e) { item.cancel_
↪edit(e) });

    if (!item.master && item.owner.on_edit_form_created) {
        item.owner.on_edit_form_created(item);
    }
    if (item.on_edit_form_created) {
        item.on_edit_form_created(item);
    }

    item.create_inputs(item.edit_form.find(".edit-body"));
    item.create_detail_views(item.edit_form.find(".edit-detail"));

    return true;
}
```

Neste exemplo, o método `find` do JQuery é utilizado para localizar elementos no formulário.

Primeiramente, atribuímos um evento `click` do JQuery aos botões **OK** e **Cancelar**, de forma que os métodos *cancel_edit* e *apply_record* serão executados quando o usuário clicar nos botões. Esses métodos cancelam ou aplicam as alterações feitas no registro, respectivamente, e chamam o método *close_edit_form* para fechar o formulário.

Em seguida, se o item não for um detalhe e tiver um manipulador de evento `on_edit_form_created` definido no módulo cliente do proprietário, esse manipulador de evento será executado.

Depois disso, se o item tiver um manipulador de evento `on_edit_form_created`, definido no módulo cliente do próprio item, esse manipulador também será executado.

Nesses manipuladores de evento, ações adicionais podem ser executadas. Por exemplo, é possível atribuir eventos de clique a botões ou outros elementos contidos no template do formulário de edição, alterar as *edit_options*, criar tabelas utilizando o método *create_table* e assim por diante.

Depois disso, o método *create_inputs* é chamado para criar os campos de entrada no elemento com a classe "edit-body".

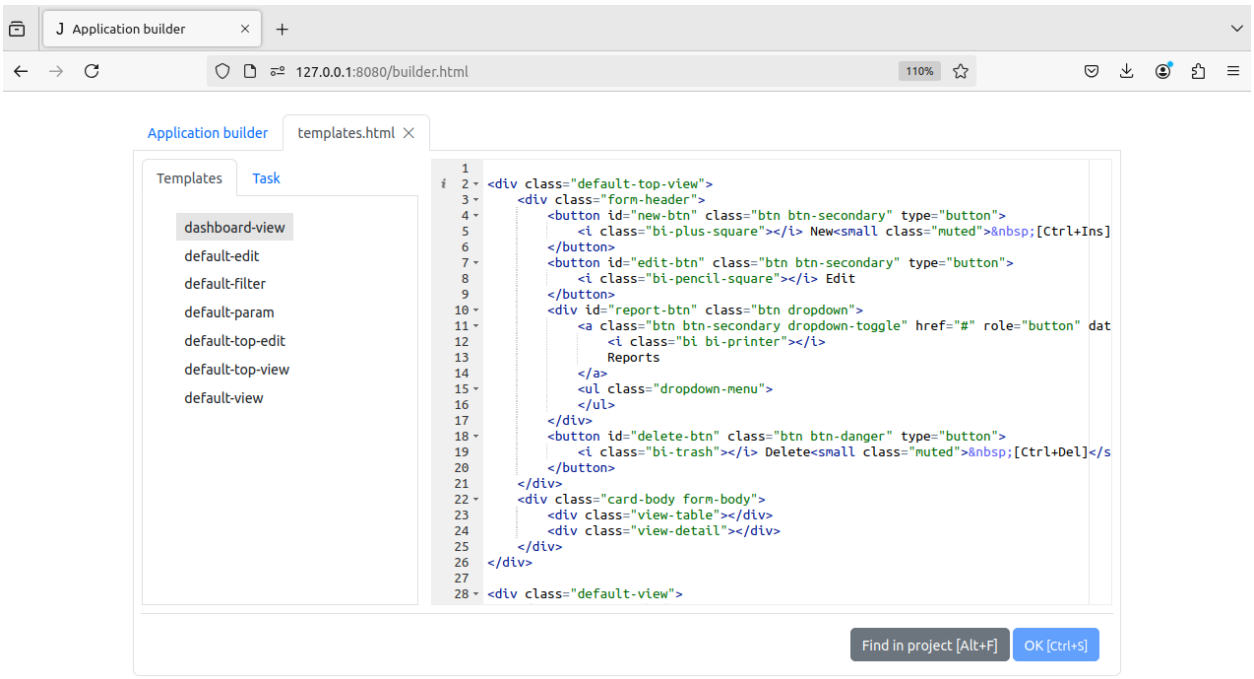
Por fim, o método *create_detail_views* é chamado para criar os detalhes no elemento com a classe "edit-detail".

> **Nota**
>
> Se alguns elementos estiverem ausentes no template do formulário, nenhuma exceção será lançada.

O método `close_prefix_form`, onde `prefix` é o tipo do formulário, fecha o formulário desse tipo. Mas antes que o formulário seja fechado, os eventos `on_prefix_form_close_query` e `on_prefix_form_closed` são disparados. Após o formulário ser fechado, ele é removido do DOM.

3.4.4 Templates de formulário

Os templates de formulário do projeto estão localizados no arquivo templates.html. Este arquivo está localizado no diretório raiz do projeto e pode ser acessado/modificado ao clicar em `templates [F9]` na árvore de *Tarefa*.



Quando o método *load* é executado, o arquivo é processado e armazenado no atributo *templates* como um objeto JQuery.

Para adicionar um template de formulário para um item, você deve adicionar uma *div* com a classe `name-suffix` dentro da *div* de templates, onde `name` é o *item_name* do item e `suffix` é o tipo do formulário: view, edit, filter, param.

Por exemplo:

```
<div class="invoices-edit">
        ...
</div>
```

é um template de formulário de edição do item **invoices**.

Para um detalhe, antes do seu nome deve estar o nome do seu mestre, separado por um hífen:

```
<div class="invoices-invoice_table-edit">
        ...
</div>
```

Se um item não tiver um template de formulário, então será usado o template de formulário do seu proprietário, se definido.

Assim, o template

```
<div class="journals-edit">
        ...
</div>
```

será usado para criar formulários de edição dos itens que pertencem ao grupo **Registros** e que não possuem seu próprio template de formulário de edição.

Se, após essa busca, nenhum template for encontrado para o item, o template com a classe `default-suffix` será usado para criar o formulário.

Portanto, o template

```
<div class="default-edit">
        ...
</div>
```

será usado para criar formulários de edição para itens que não possuem templates definidos para si nem para seus proprietários.

Quando um novo projeto é criado, o arquivo index.html já contém tais templates.

Abaixo está um exemplo de template padrão de formulário de edição retirado do arquivo index.html:

```
<div class="default-edit">
    <div class="form-body">
        <div class="edit-body"></div>
        <div class="edit-detail"></div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-primary">
            <i class="bi bi-check-square"></i> OK<small class="muted"> [Ctrl+Enter]
↪</small>
        </button>
        <button type="button" id="cancel-btn" class="btn btn-secondary">
            <i class="bi bi-x-square"></i> Cancelar
        </button>
    </div>
</div>
```

Há mais exemplos de templates na seção *Exemplos de formulário*.

3.4.5 Eventos de formulário

Após o formulário ser criado e o template HTML do formulário ser adicionado ao DOM, a aplicação dispara os seguintes eventos de formulário durante o ciclo de vida do formulário:

- `on_view_form_created` - o evento é disparado quando o formulário foi criado mas ainda não exibido
- `on_view_form_shown` - o evento é disparado quando o formulário foi exibido
- `on_view_form_close_query` - o evento é disparado quando uma tentativa de fechar o formulário é feita
- `on_view_form_closed` - o evento é disparado quando o formulário foi fechado
- `on_view_form_keydown` - o evento é disparado quando ocorre um evento de pressionar tecla no formulário
- `on_view_form_keyup` - o evento é disparado quando ocorre um evento de soltar tecla no formulário

Para outros tipos de formulário – edit, filter e param – substitua 'view' pelo tipo de formulário, por exemplo `on_edit_form_created` para formulário de edição.

Primeiro vamos explicar como usar o evento `on_view_form_created`.

Quando o usuário clica em um item do menu, a aplicação executa o método *view* do item correspondente da árvore de tarefas, este método cria um formulário usando seu template HTML e dispara primeiro o evento *on_view_form_created* da tarefa.

Quando você cria um novo projeto, o módulo client da tarefa já contém o código, incluindo o manipulador de evento *on_view_form_created*. Esse manipulador de evento é executado toda vez que um formulário de visualização é criado e define o comportamento padrão dos formulários de visualização.

Você pode abrir o módulo client da tarefa para ver este manipulador de evento. Se precisar alterar o comportamento padrão de todos os formulários de visualização do projeto, deve fazê-lo aqui.

Abaixo descrevemos as principais etapas que ele realiza:

- Inicializa o *view_form* e *table_options* que são usados por alguns métodos quando o formulário de visualização e a tabela são criados.
- Atribui manipuladores de eventos JQuery para botões padrão a métodos do item, dependendo dos direitos do usuário. No exemplo abaixo, o botão de deletar é inicializado:

```
if (item.can_delete()) {
    item.view_form.find("#delete-btn").on('click.task', function(e) {
        e.preventDefault();
        item.delete_record();
    });
}
else {
    item.view_form.find("#delete-btn").prop("disabled", true);
}
```

- Executa o *on_view_form_created* manipulador de evento do grupo do item e o *on_view_form_created* do item, caso estejam definidos:

```
if (!item.master && item.owner.on_view_form_created) {
    item.owner.on_view_form_created(item);
}

if (item.on_view_form_created) {
    item.on_view_form_created(item);
}
```

- Cria uma tabela para exibir os dados do item e tabelas para detalhes, se forem especificadas, chamando o método `create_view_tables`
- Executa o método *open*, que obtém o conjunto de dados do item do servidor.
- Finalmente, retorna verdadeiro para evitar a chamada do `on_view_form_created` do grupo proprietário e do item, pois já foram chamados, veja o método `_process_event` abaixo.

Depois de inicializar os botões e antes de criar as tabelas, chamamos o manipulador de evento `on_view_form_created` do próprio item.

Por exemplo, no módulo client do item de faixas da aplicação demo, o seguinte manipulador de evento *on_view_form_created* está definido. Nele, alteramos o atributo height de *table_options*, criamos a cópia do invoice_table, definimos seus atributos e chamamos o método *create_table* que cria uma tabela para exibir seus dados.

```
function on_view_form_created(item) {
  item.table_options.height -= 200;
  item.invoice_table = task.invoice_table.copy();
  item.invoice_table.paginate = false;
  item.invoice_table.create_table(item.view_form.find('.view-detail'), {
      height: 200,
      summary_fields: ['date', 'total'],
  });
  item.alert('Double-click the record in the bottom table to see track sales.');
}
```

O módulo também possui o *on_after_scroll* manipulador de evento, que será executado quando o usuário se mover para a outra faixa e obterá as vendas dessa faixa.

Este exemplo explica o princípio do uso de eventos de formulário.

A ordem de disparo dos eventos depende do tipo de evento.

A ordem em que os eventos são gerados depende do tipo de evento.

Eventos de consulta de fechamento

Quando o usuário tenta fechar o formulário, o evento on_close_query é primeiramente disparado (se definido) para o item.

Se o manipulador de evento retornar true, o aplicativo fecha o formulário; caso contrário, se o manipulador de evento retornar false, o aplicativo mantém o formulário aberto. Caso contrário, o evento on_close_query é disparado (se definido) da mesma forma para o grupo do item e depois para o tarefa.

Por exemplo, por padrão, existe o *on_edit_form_close_query* manipulador de evento no módulo do cliente da tarefa:

```
function on_edit_form_close_query(item) {
    var result = true;
    if (!item.virtual_table && item.is_changing()) {
        if (item.is_modified()) {
            item.yes_no_cancel(task.language.save_changes,
                function() {
                    item.apply_record();
                },
                function() {
                    item.cancel_edit();
                }
            );
            result = false;
        }
        else {
            item.cancel_edit();
        }
    }
    return result;
}
```

Este código verifica se o registro foi modificado e, em seguida, abre a caixa de diálogo “Sim Não Cancelar”.

Se quisermos fechar o formulário sem essa caixa de diálogo, podemos definir o seguinte manipulador de evento no módulo do cliente do item:

```
function on_edit_form_close_query(item) {
    item.cancel()
    return true;
}
```

Eventos Keydown, Keyup

Esses eventos são disparados da mesma maneira que os eventos de consulta de fechamento, começando pelo item, mas se o manipulador de evento retornar true, os manipuladores de evento do grupo e da tarefa não são executados.

Por exemplo, por padrão, existe o *on_edit_form_keyup* manipulador de evento no módulo do cliente da tarefa:

```
function on_edit_form_keyup(item, event) {
    if (event.keyCode === 13 && event.ctrlKey === true){
        item.edit_form.find("#ok-btn").focus();
        item.apply_record();
    }
}
```

Este código salva as alterações do registro na tabela do banco de dados quando o usuário pressiona Ctrl+Enter.

Suponha que queremos salvar as alterações quando o usuário pressiona Enter. Então, escrevemos o seguinte manipulador de evento no módulo do cliente do item:

```
function on_edit_form_keyup(item, event) {
    if (event.keyCode === 13){
        item.edit_form.find("#ok-btn").focus();
        item.apply_record();
        return true;
    }
}
```

Neste caso, o manipulador de evento da tarefa não será chamado quando o usuário pressionar Enter.

Todos os outros eventos

Para outros eventos, o manipulador de evento da tarefa é chamado primeiro; se ele não retornar true, o manipulador de evento do grupo é executado, e se este também não retornar true, o manipulador de evento do item é chamado.

Esse mecanismo é implementado no método `_process_event` da classe Item no módulo *jam.js*.

```
_process_event: function(form_type, event_type, e) {
  var event = 'on_' + form_type + '_form_' + event_type,
      can_close;
  if (event_type === 'close_query') {
      if (this[event]) {
          can_close = this[event].call(this, this);
      }
      if (!this.master && can_close === undefined && this.owner[event]) {
          can_close = this.owner[event].call(this, this);
      }
      if (can_close === undefined && this.task[event]) {
          can_close = this.task[event].call(this, this);
      }
      return can_close;
  }
  else if (event_type === 'keyup' || event_type === 'keydown') {
      if (this[event]) {
          if (this[event].call(this, this, e)) return;
      }
      if (!this.master && this.owner[event]) {
          if (this.owner[event].call(this, this, e)) return;
      }
      if (this.task[event]) {
          if (this.task[event].call(this, this, e)) return;
      }
```

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```
  }
  else {
      if (this.task[event]) {
          if (this.task[event].call(this, this)) return;
      }
      if (!this.master && this.owner[event]) {
          if (this.owner[event].call(this, this)) return;
      }
      if (this[event]) {
          if (this[event].call(this, this)) return;
      }
  }
}
```

3.4.6 Opções de formulário

Para cada tipo de formulário, um item possui um atributo que controla o comportamento do formulário modal:

- *view_options*
- *edit_options*
- *filter_options*
- *param_options*

Este é um objeto que possui os seguintes atributos, especificando parâmetros do formulário modal:

- `width` - a largura do formulário modal, o valor padrão é 560 px,
- `title` - o título do formulário modal, o valor padrão é o valor do atributo *item_caption*,
- `close_button` - se verdadeiro, o botão de fechar será criado no canto superior direito do formulário, o valor padrão é verdadeiro,
- `close_caption` - se verdadeiro e `close_button` for verdadeiro, exibirá 'Fechar - [Esc]' perto do botão,
- `close_on_escape` - se verdadeiro, pressionar a tecla Escape acionará o método correspondente `close_form`.
- `close_focusout` - se verdadeiro, o método `close_form` correspondente será chamado quando o formulário perder o foco,
- `template_class` - se especificado, a div com essa classe será buscada no atributo *templates* da tarefa e utilizada como template HTML do formulário ao criar um formulário.

O atributo *edit_options* possui um atributo `fields`, que especifica uma lista de nomes de campos que o método *create_inputs* usará. Se o atributo `fields` do parâmetro `options` não for especificado, o valor padrão é uma lista de nomes de campos definida no *Edit Form Dialog* no construtor da aplicação.

O atributo *view_options* possui um atributo `fields`, que especifica uma lista de nomes de campos que o método *create_table* usará. Se o atributo `fields` do parâmetro `options` não for especificado, o valor padrão é uma lista de nomes de campos definida no *View Form Dialog* no construtor da aplicação.

A largura do formulário modal, criada no exemplo a seguir, será de 700 px.

```
function on_edit_form_created(item) {
    item.edit_options.width = 700;
}
```

3.4.7 Exemplos de formulário

Atualmente, o Framework utiliza o Bootstrap 5 com um sistema de grid simples e fácil de usar que usa 12 colunas e permite criar qualquer tipo de layout. É responsivo e possui muitos componentes, como dropdowns, botões de dropdown, grupos de botões, navs, barras de navegação, abas, breadcrumbs, badges, barras de progresso, etc.

Template padrão de formulário de edição

Este template é usado para criar formulários de edição, caso um item e seu proprietário não tenham seus próprios templates de formulário de edição.

```
<div class="default-edit default-details-edit">
    <div class="form-body">
        <div class="edit-body"></div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-primary">
            <i class="bi bi-check-square"></i> OK<small class="muted"> [Ctrl+Enter]
↪</small>
        </button>
        <button type="button" id="cancel-btn" class="btn btn-secondary">
            <i class="bi bi-x-square"></i> Cancelar
        </button>
    </div>
</div>
```

O evento abaixo está localizado no módulo cliente da tarefa e é disparado para qualquer item cujo formulário de edição tenha sido criado.

Ele utiliza o método *create_inputs* para criar os campos de entrada na div com a classe “edit-body”. Mas antes disso, ele verifica se a função `init_inputs` está definida no módulo cliente do item, o que pode ser usado para especificar o parâmetro de opções do método.

Ele usa o método *create_inputs* para criar os controles de entrada na div com a classe “edit-body”. Mas antes disso, verifica se a função `init_inputs` está definida no módulo cliente do item, que pode ser usada para especificar as opções do método.

Em seguida, ele atribui os eventos jQuery aos botões OK e Cancelar.

```
function on_edit_form_created(item) {
    var options = {
            col_count: 1
        };

    if (item.init_inputs) {
        item.init_inputs(item, options);
    }

    item.create_inputs(item.edit_form.find(".edit-body"), options);

    item.edit_form.find("#cancel-btn").on('click.task', function(e) {
        item.cancel_edit(e)
    });
    item.edit_form.find("#ok-btn").on('click.task', function() {
        item.apply_record()
```

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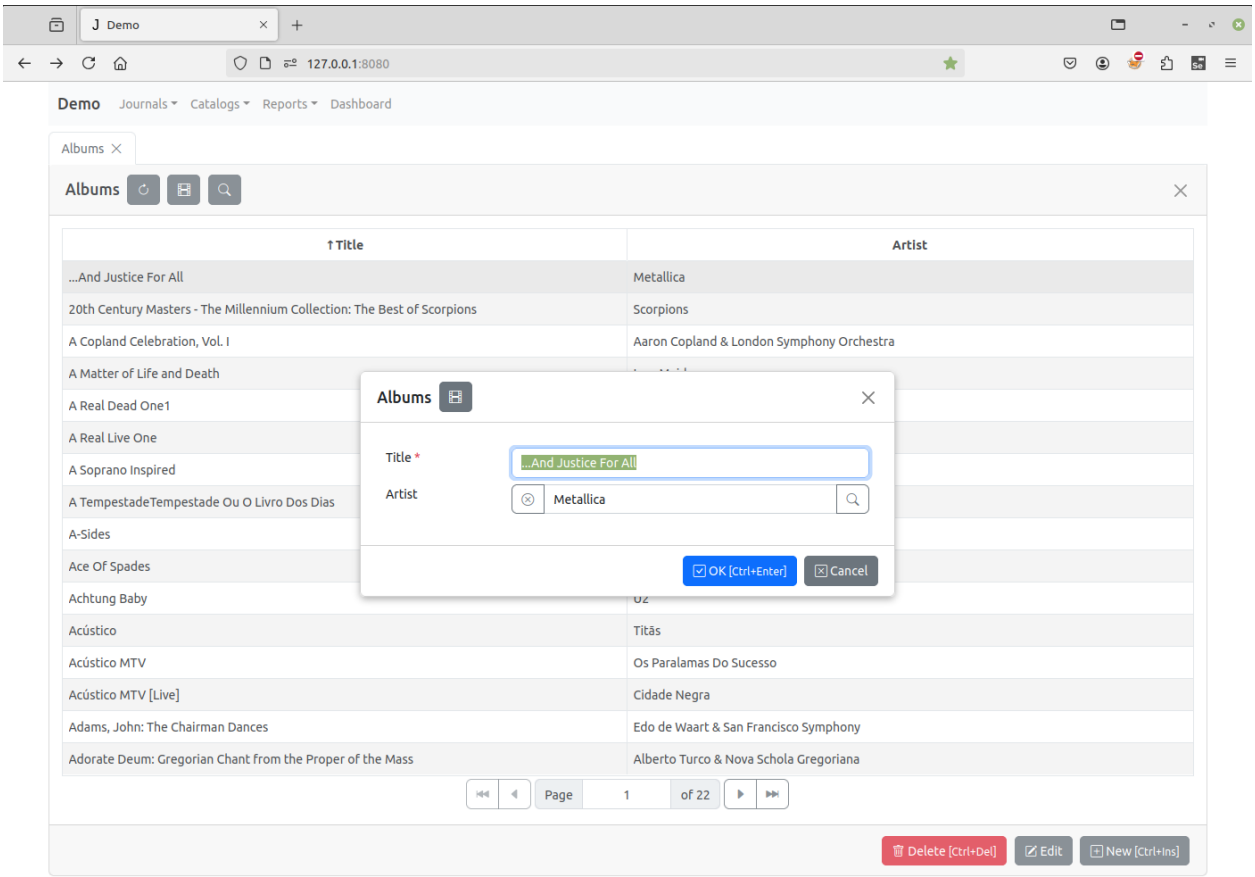
```
    });
}
```

O formulário de edição para o Cadastro **Álbuns** é o seguinte:



Nota

Se não houver botões com os ids correspondentes, o código acima não gera exceções.

Se você quiser sobrescrever os eventos jQuery para os botões declarados no módulo cliente da tarefa, no evento correspondente do módulo cliente do item, você pode fazer isso usando o método jQuery `off`:

```
item.edit_form.find("#ok-btn")
    .off('click.task')
    .on('click', function() { some_other_function(item) });
```

Se não houver o contêiner correspondente no formulário, o método `create_inputs` não fará nada.

Template de formulário de edição com abas

Este exemplo usa as abas do Bootstrap:

```
<div class="customers-edit">
    <div class="form-body">
```

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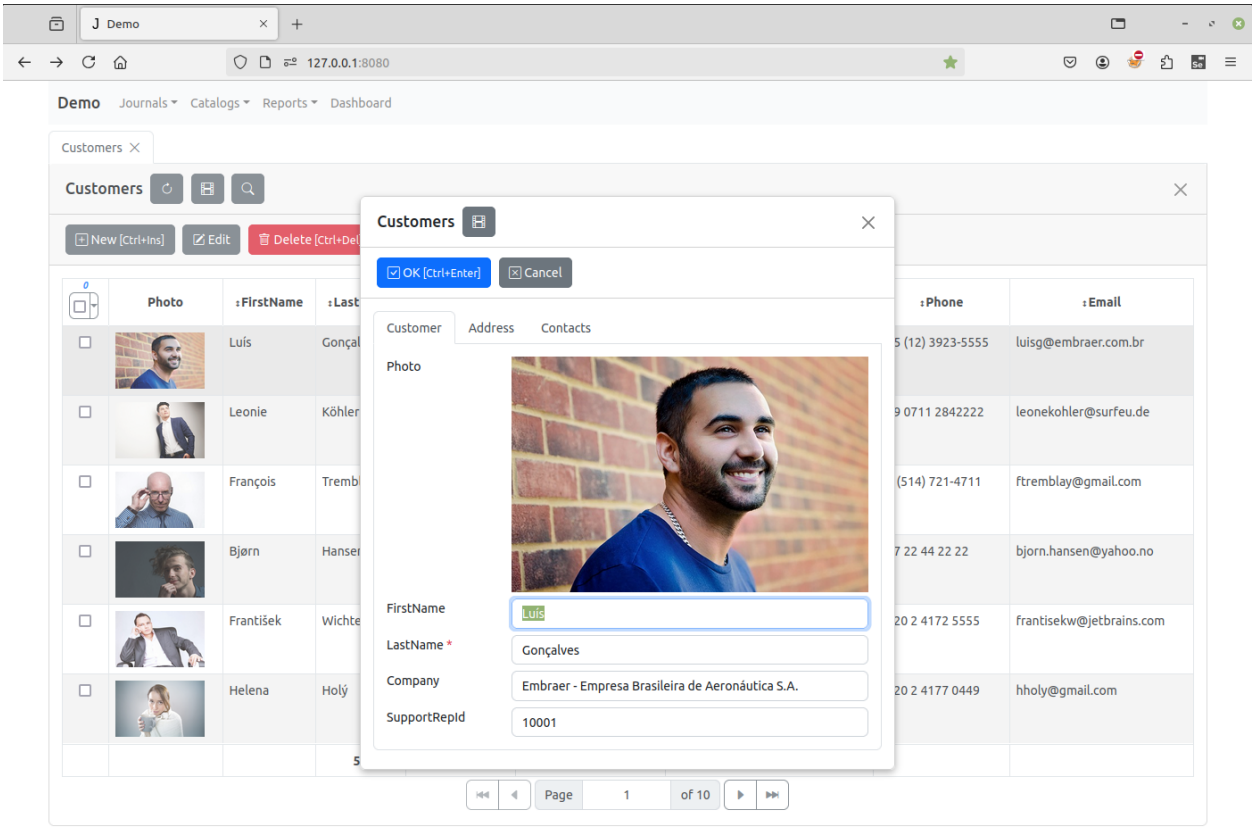
```
        <ul class="nav nav-tabs" id="customer-tabs">
            <li class="active"><a href="#cust-name">Customer</a></li>
            <li><a href="#cust-address">Address</a></li>
            <li><a href="#cust-contact">Contact</a></li>
        </ul>
        <div class="tab-content">
            <div class="tab-pane active" id="cust-name">
            </div>
            <div class="tab-pane" id="cust-address">
            </div>
            <div class="tab-pane" id="cust-contact">
            </div>
        </div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-ary expanded-btn">
            <i class="icon-ok"></i> OK<small class="muted"> [Ctrl+Enter]</small>
        </button>
        <button type="button" id="cancel-btn" class="btn expanded-btn">
            <i class="icon-remove"></i> Cancel
        </button>
    </div>
</div>
```

O seguinte manipulador de eventos é declarado no módulo cliente do item **Clientes**. Ele cria controles de entrada para os painéis, correspondentes às abas:

```
function on_edit_form_created(item) {
    item.edit_form.find('#customer-tabs a').click(function (e) {
      e.preventDefault();
      $(this).tab('show');
    });
    item.create_inputs(item.edit_form.find("#cust-name"),
        {fields: ['firstname', 'lastname', 'company', 'support_rep_id']}
    );
    item.create_inputs(item.edit_form.find("#cust-address"),
        {fields: ['country', 'state', 'address', 'postalcode']}
    );
    item.create_inputs(item.edit_form.find("#cust-contact"),
        {fields: ['phone', 'fax', 'email']}
    );
}
```

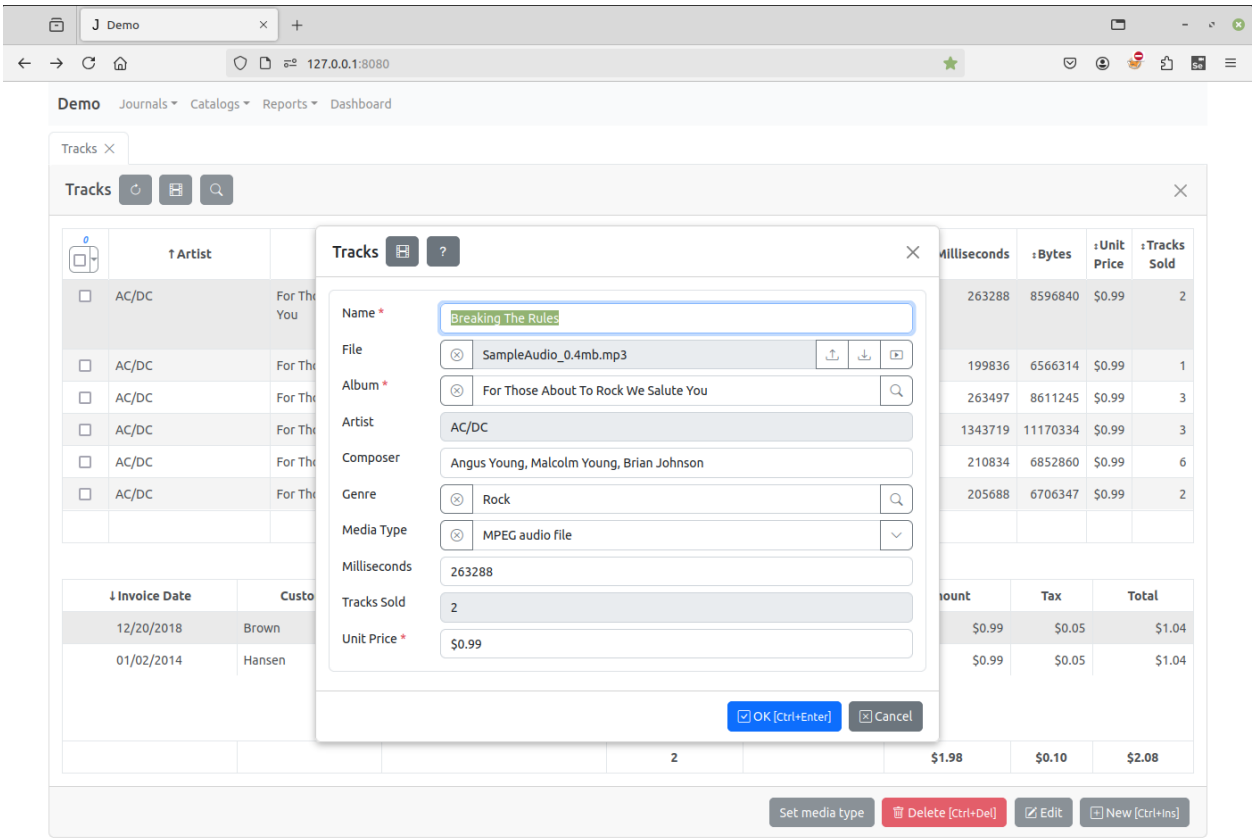


Template de formulário de edição usando layout de grid

Este exemplo usa o sistema de grid do Bootstrap:

```
<div class="tracks-edit">
    <div class="form-body">
        <div class="row-fluid">
            <div id="edit-top" class="span12 edit-border"></div>
        </div>
        <div class="row-fluid">
            <div id="edit-left" class="span6 edit-border"></div>
            <div id="edit-right" class="span6 edit-border"></div>
        </div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-ary expanded-btn">
            <i class="icon-ok"></i> OK<small class="muted"> [Ctrl+Enter]</small>
        </button>
        <button type="button" id="cancel-btn" class="btn expanded-btn">
            <i class="icon-remove"></i> Cancel
        </button>
    </div>
</div>
```

```
function on_edit_form_created(item) {
    item.edit_options.width = 900;
    item.create_inputs(item.edit_form.find("#edit-top"), {fields: ['name']});
    item.create_inputs(item.edit_form.find("#edit-left"), {
        fields: ['album', 'artist', 'composer', 'media_type'],
        label_width: 90
    });
    item.create_inputs(item.edit_form.find("#edit-right"), {
        fields: ['genre', 'milliseconds', 'bytes', 'unitprice'],
        label_width: 90
    });
}
```



Template de formulário de visualização de Cadastros

Neste exemplo, há uma div com a classe “form-header”.

O elemento com o id “form-title” é usado no *on_view_form_created* método da tarefa para exibir o título de um item e atribuir a ele um evento JQuery onclick para executar o método de visualização e recriar o formulário de visualização.

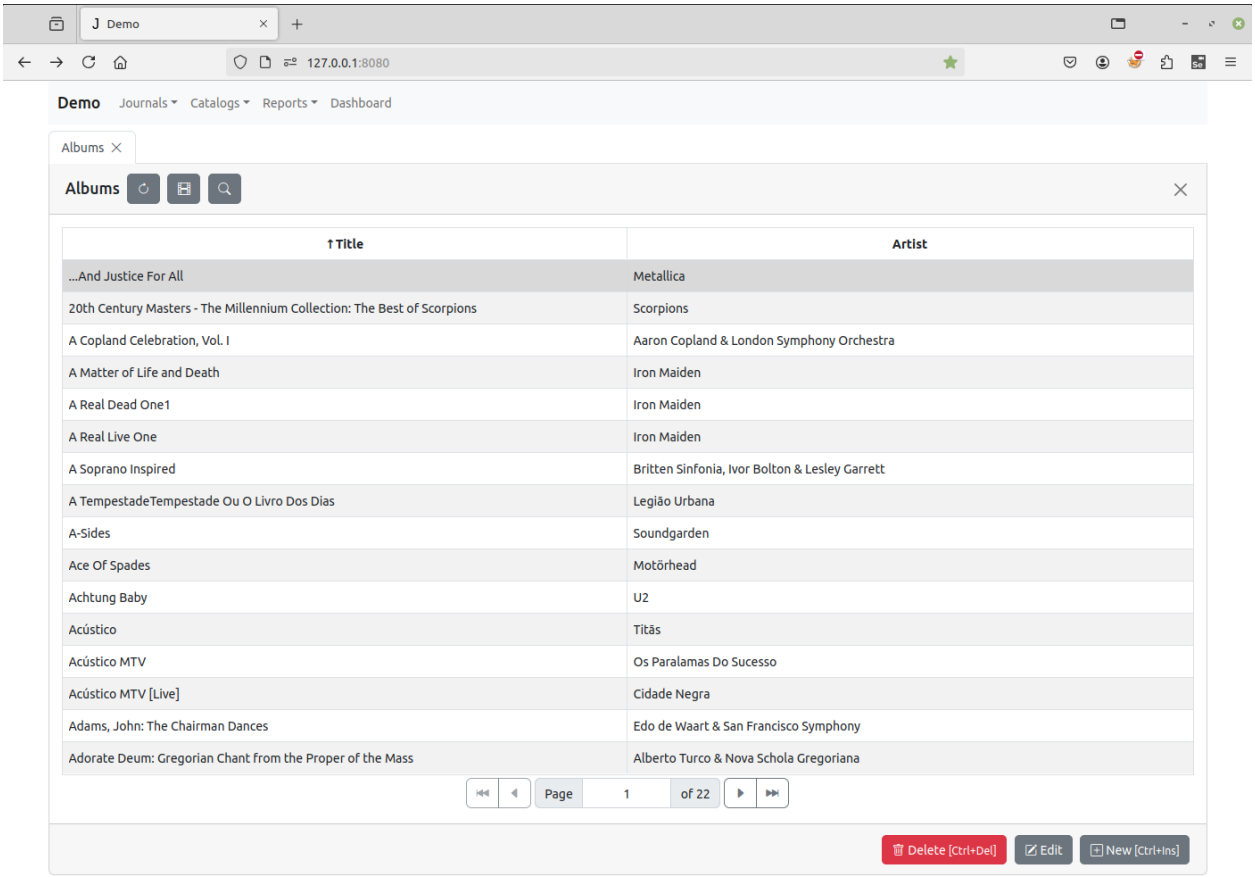
Os elementos com os ids “selected-div” e “search-form” são usados no *on_view_form_created* do grupo de Cadastros para exibir o valor atual de um campo de pesquisa quando o botão direito é clicado para selecionar um valor e para implementar a funcionalidade de pesquisa de Cadastros respectivamente.

A div com a classe “view-table” é usada no *on_view_form_created* manipulador de eventos da tarefa para criar uma tabela para exibir os dados do item usando o método *create_table*:

```
if (item.view_form.find(".view-table").length) {
    if (item.init_table) {
        item.init_table(item, table_options);
    }
    item.create_table(item.view_form.find(".view-table"), table_options);
    item.open(true);
}
```

A div com o id "report-btn" é usada no *on_view_form_created* manipulador de eventos da tarefa para preencher os itens do menu do botão dropdown com relatórios definidos no *Reports Dialog* do item (se existirem).

```
<div class="catalogs-view">
    <div class="form-body">
        <div class="form-header">
            <h4 id="form-title" class="header-text"><a href="#"></a></h4>
            <h5 id="selected-div" class="header-text" style="display: none">
                <a id="selected-value" href="#"></a>
            </h5>
            <form id="search-form" class="form-inline pull-right">
                <label  class="control-label" for="search-input">Search by
                    <span class="label" id="search-fieldname"></span>
                </label>
                <input id="search-input" type="text" class="input-medium search-query"␣
↪autocomplete="off">
                <a id="search-field-info" href="#" tabindex="-1">
                    <span class="badge">?</span>
                </a>
            </form>
        </div>
        <div class="view-table">
        </div>
    </div>
    <div class="form-footer">
        <button id="delete-btn" class="btn expanded-btn pull-left" type="button">
            <i class="icon-trash"></i> Delete<small class="muted"> [Ctrl+Del]</
↪small>
        </button>
        <div id="report-btn" class="btn-group dropup">
            <a class="btn expanded-btn dropdown-toggle" data-toggle="dropdown" href="#">
                <i class="icon-print"></i> Reports
                <span class="caret"></span>
            </a>
            <ul class="dropdown-menu bottom-up">
            </ul>
        </div>
        <button id="edit-btn" class="btn expanded-btn" type="button">
            <i class="icon-edit"></i> Edit
        </button>
        <button id="new-btn" class="btn expanded-btn" type="button">
            <i class="icon-plus"></i> New<small class="muted"> [Ctrl+Ins]</small>
        </button>
    </div>
</div>
```



Template de formulário de visualização com botões no topo

Neste exemplo, a div do rodapé do formulário é removida e os botões são colocados na div do cabeçalho do formulário. O botão dropdown **Ações** é criado. O código é o mesmo do exemplo anterior.

```
<div class="customers-view">
    <div class="form-body">
        <div class="form-header">
                <div id="action-btn" class="btn dropdown">
                    <a class="btn btn-secondary dropdown-toggle" href="#" role="button"␣
↪data-bs-toggle="dropdown">
                        <i class="bi bi-display"></i>
                        Action
                    </a>
                    <ul class="dropdown-menu">
                        <li id="new-btn"><a class="dropdown-item" href="#"><i class="bi-
↪plus-square"></i> New<small class="muted"> [Ctrl+Ins]</small></a></li>
                        <li id="edit-btn"><a class="dropdown-item" href="#"><i class="bi-
↪pencil-square"></i> Edit</a></li>
                        <li id="delete-btn"><a class="dropdown-item" href="#"><i class=
↪"bi-trash"></i> Delete<small class="muted"> [Ctrl+Del]</small></a></li>

                    </ul>
                    <p></p>
                    <button id="email-btn" class="btn btn-secondary" type="button">
```

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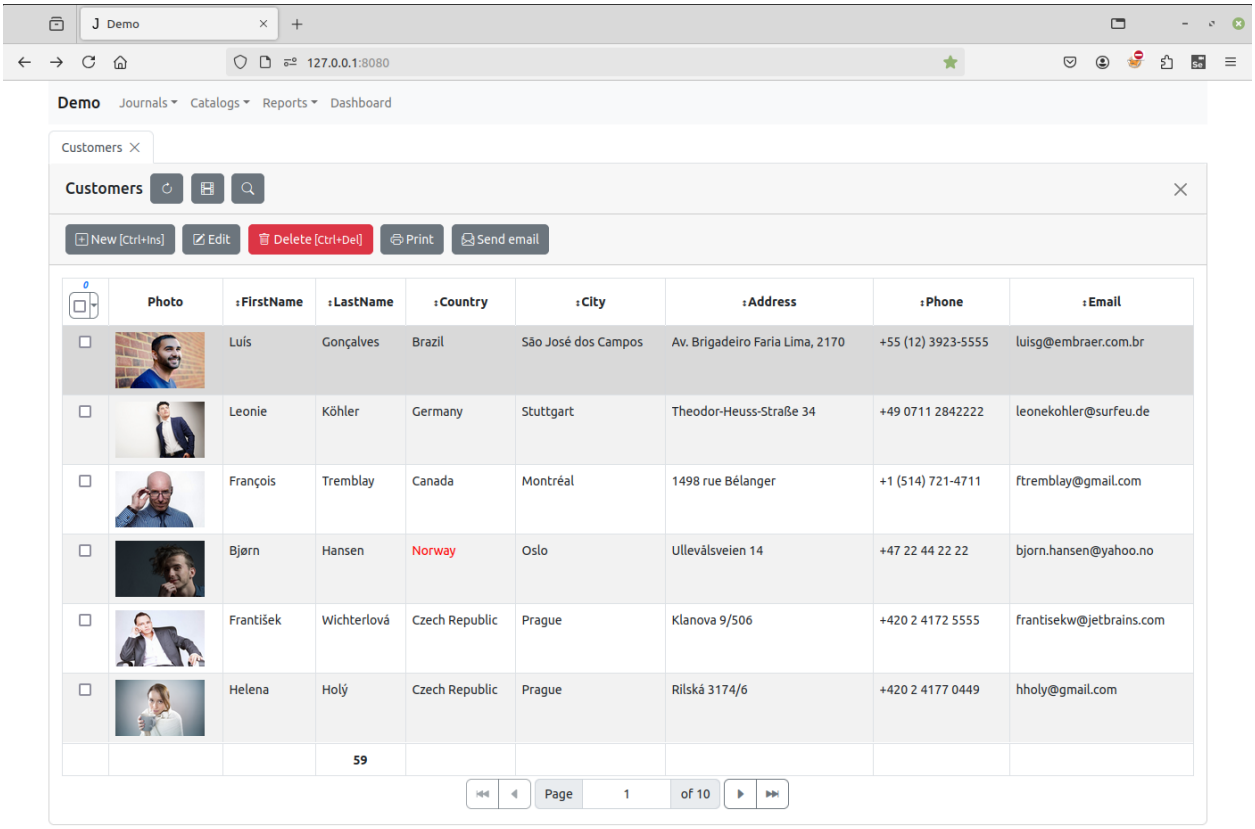
```
                    <i class="bi-pencil-square"></i> Email
                </button>
                <p></p>
                <button id="print-btn" class="btn btn-secondary" type="button">
                    <i class="bi bi-printer"></i> Print
                </button>
            </div>
        <div class="view-table">
        </div>
    </div>
</div>
```



Template de formulário de visualização com detalhes

Neste exemplo, a div com a classe "view-table" é removida e adicionadas duas divs "view-master" e "view-detail", onde tabelas para os itens mestre e detalhe são criadas no *on_view_form_created* manipulador de eventos declarado no módulo cliente do registro **Faturas**:

```
function on_view_form_created(item) {
    var height = $(window).height() - $('body').height() - 200 - 10;

    if (height < 200) {
        height = 200;
```

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```
    }

    item.filters.invoicedate1.value = new Date(new Date().setYear(new Date().
↪getFullYear() - 1));

    item.create_table(item.view_form.find(".view-master"), {
        height: height,
        sortable: true,
        show_footer: true,
        row_callback: function(row, it) {
            var font_weight = 'normal';
            if (it.total.value > 10) {
                font_weight = 'bold';
            }
            row.find('td.total').css('font-weight', font_weight);
        }
    });

    item.invoice_table.create_table(item.view_form.find(".view-detail"), {
            height: 200 - 4,
            dblclick_edit: false,
            column_width: {'track': '25%', 'album': '25%', 'artists': '10%'}
    });

    item.open(true);
}
```

```
<div class="invoices-view">
    <div class="form-body">
        <div class="form-header">
            <h4 id="form-title" class="header-text"><a href="#"></a></h4>
            <h5 id="filter-text" class="header-text pull-right"></h5>
        </div>
        <div class="view-master">
        </div>
        <div class="view-detail" style="margin-top: 4px; margin-bottom: 4px">
        </div>
    </div>
    <div class="form-footer">
        <button id="delete-btn" class="btn expanded-btn pull-left" type="button">
            <i class="icon-trash"></i> Delete<small class="muted"> [Ctrl+Del]</
↪small>
        </button>
        <div id="report-btn" class="btn-group dropup">
            <a class="btn expanded-btn dropdown-toggle" data-toggle="dropdown" href="#">
                <i class="icon-print"></i> Reports
                <span class="caret"></span>
            </a>
            <ul class="dropdown-menu bottom-up">
            </ul>
        </div>
        <button id="filter-btn" class="btn expanded-btn" type="button">
```

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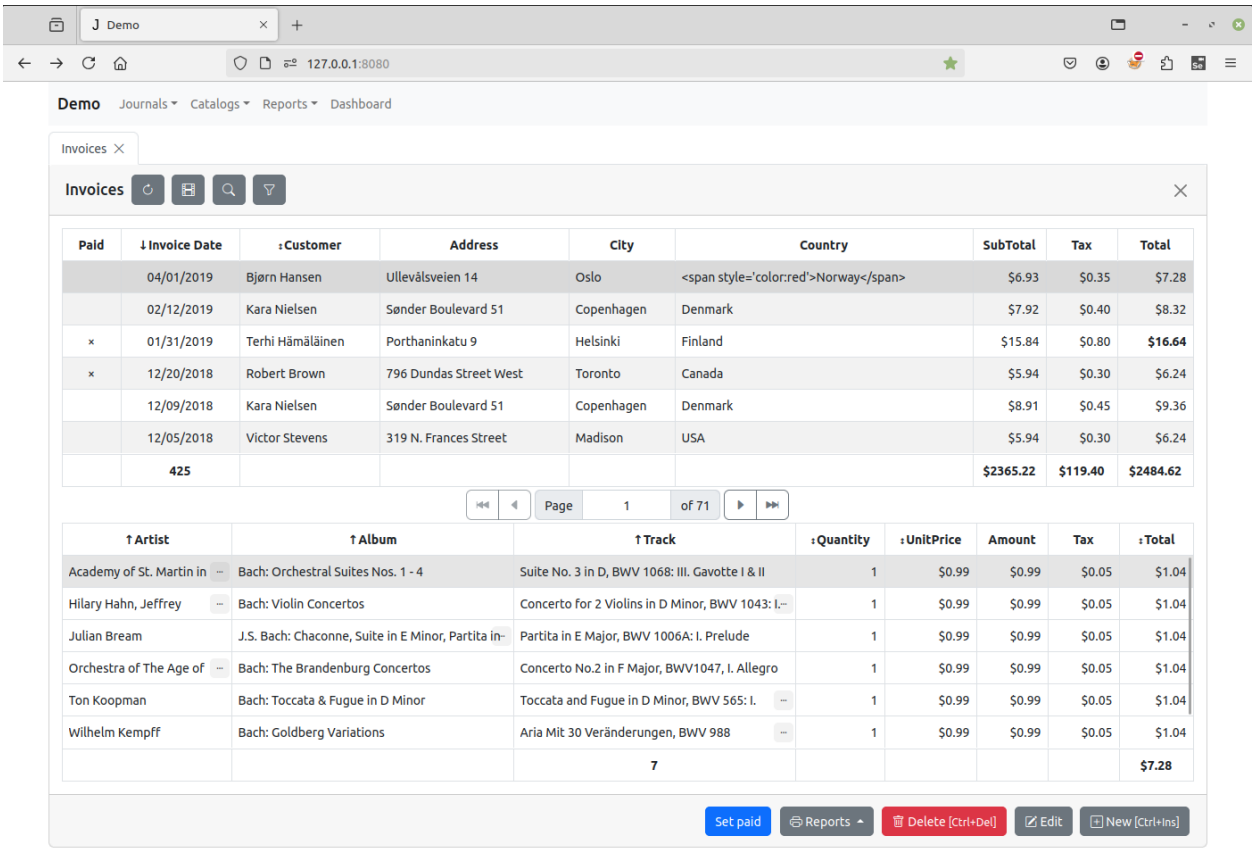
```
            <i class="icon-filter"></i> Filter
        </button>
        <button id="edit-btn" class="btn expanded-btn" type="button">
            <i class="icon-edit"></i> Edit
        </button>
        <button id="new-btn" class="btn expanded-btn" type="button">
            <i class="icon-plus"></i> New<small class="muted"> [Ctrl+Ins]</small>
        </button>
    </div>
</div>
```



3.4.8 Controles com reconhecimento de dados

Para criar uma tabela que exiba o conjunto de dados de um item, utilize o método *create_table*:

```
item.create_table(item.view_form.find(".view-table"), table_options);
```

Para criar controles de dados para editar os campos do conjunto de dados, utilize o método *create_inputs*:

```
item.create_inputs(item.edit_form.find(".edit-body"), input_options);
```

Esses métodos possuem dois parâmetros – **container** e **options**. O primeiro parâmetro é um container JQuery no qual os controles serão inseridos. O segundo são as opções que determinam a forma como os dados serão exibidos. Para informações detalhadas, consulte a referência da API.

Os métodos geralmente são utilizados nos manipuladores de evento **on_view_form_created** e **on_edit_form_created**.

Todos os controles visuais (tabelas, campos de entrada, caixas de seleção), criados por esses métodos, são sensíveis aos dados. Isso significa que eles refletem imediatamente qualquer alteração no conjunto de dados do item.

Às vezes é necessário desativar essa interação. Para isso, utilize respectivamente os métodos *disable_controls* e *enable_controls*.

Vídeos

Controles com reconhecimento de dados

3.5 Programação de dados

3.5.1 Dataset

O framework Jam.py usa o conceito de dataset que é muito próximo dos datasets do Embarcadero Delphi.

> **Nota**
>
> Existem outras formas de ler e modificar os dados do banco de dados. Você pode usar o método *connect* da tarefa para obter uma conexão do pool de conexões e usar a conexão para acessar o banco de dados utilizando a API de Banco de Dados em Python.

Todos os itens com `item_type` "item" ou "table", assim como seus detalhes (veja *Árvore de tarefas*) podem acessar dados das tabelas associadas do banco de dados do projeto e gravar alterações nelas. Todos são objetos da classe Item

- *Classe Item* (no cliente)
- *Classe Item* (no servidor)

Ambas as classes possuem os mesmos atributos, métodos e eventos associados ao tratamento de dados.

Para obter um dataset (um conjunto de registros) da tabela de datasets do projeto, use o método open. Este método, baseado nos parâmetros, gera uma consulta SQL para obter um dataset.

Após o dataset ser aberto, a aplicação pode navegar por ele, alterar seus registros ou inserir novos e gravar as alterações na tabela de banco de dados do item.

Por exemplo, as funções abaixo irão definir os valores do campo *support_rep_id* para os valores do campo *id* no cliente e servidor, respectivamente:

```
function set_support_id(customers) {
    customers.open();
    while (!customers.eof()) {
        customers.edit();
        customers.support_rep_id.value = customers.id.value;
        customers.post();
        customers.next();
    }
    customers.apply();
}
```

```
def set_support_id(customers):
    customers.open()
    while not customers.eof():
```

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```
        customers.edit()
        customers.support_rep_id.value = customers.id.value
        customers.post()
        customers.next()
    customers.apply();
```

Essas funções recebem o item **customers** como parâmetro. Em seguida, o método *open* é usado para obter uma lista de registros da tabela de clientes e cada registro é modificado. No final, as alterações são salvas na tabela do banco de dados, usando o método apply (veja *Modificando datasets*).

Nota

Existe uma forma mais curta de navegar em um dataset (veja *Navegando em datasets*). Por exemplo, em Python, os seguintes loops são equivalentes:

```
while not customers.eof():
    print customers.firstname.value
    customers.next()

for c in customers:
    print c.firstname.value
```

Videos

Datasets and Datasets Part 2 demonstram quase todos os métodos de trabalho com datasets em exemplos específicos.

3.5.2 Navegando em conjuntos de dados

Cada conjunto de dados ativo tem um cursor, ou ponteiro, para a linha atual no conjunto de dados. A linha atual em um conjunto de dados é aquela cujos valores podem ser manipulados pelos métodos `edit`, `insert` e `delete`, e a que seus valores de campo são exibidos nos controles de dados de um formulário.

Você pode alterar a linha atual movendo o cursor para apontar para uma linha diferente. A tabela a seguir lista os métodos que você pode usar no código do aplicativo para mover para diferentes registros:

Método do cliente	Método do servidor	Descrição
first	*first*	Move o cursor para a primeira linha em um conjunto de dados de item.
last	*last*	Move o cursor para a última linha em um conjunto de dados de item.
next	*next*	Move o cursor para a próxima linha em um conjunto de dados de item.
prior	*prior*	Move o cursor para a linha anterior em um conjunto de dados de item.

Além desses métodos, a tabela a seguir descreve dois métodos que fornecem informações úteis ao iterar pelos registros em um conjunto de dados:

Método do cliente	Método do servidor	Descrição
bof	*bof*	Se o método retornar verdadeiro, o cursor está na primeira linha do conjunto de dados; caso contrário, o cursor não é conhecido como estando na primeira linha do conjunto de dados.
eof	*eof*	Se o método retornar verdadeiro, o cursor está na última linha do conjunto de dados; caso contrário, o cursor não é conhecido como estando na última linha do conjunto de dados.

Cada vez que o cursor se move para outro registro no conjunto de dados, os seguintes eventos são acionados:

Evento do cliente	Evento do servidor	Descrição
on_before	on_befor	Ocorre antes de um aplicativo rolar de um registro para outro.
*on_after_*	on_after	Ocorre depois que um aplicativo rola de um registro para outro.

Usando esses métodos, podemos navegar em um conjunto de dados. Por exemplo,

no cliente:

```
function get_customers(customers) {
    customers.open();
    while (!customers.eof()) {
        console.log(customers.firstname.value, customers.lastname.value);
        customers.next();
    }
}
```

no servidor:

```
def get_customers(customers):
    customers.open()
    while not customers.eof():
        print customers.firstname.value, customers.lastname.value
        customers.next()
```

Formas mais rápidas de navegar no conjunto de dados

Existe o método *each* no cliente que pode ser usado para navegar em um conjunto de dados:

Por exemplo:

```
function get_customers(customers) {
    customers.open();
    customers.each(function(c) {
        if (c.rec_no === 10) {
            return false;
        }
        console.log(c.rec_no, c.firstname.value, c.lastname.value);
    });
}
```

no servidor:

```
def get_customers(customers):
    customers.open()
    for c in customers:
        if c.rec_no == 10:
            break
        print c.firstname.value, c.lastname.value
```

Ambas as funções irão exibir os nomes dos clientes para os primeiros 10 registros no conjunto de dados.

Em ambos os casos, **c** e **customers** são ponteiros para o mesmo objeto.

3.5.3 Modificando conjuntos de dados

Quando um aplicativo abre um conjunto de dados de item, o conjunto de dados entra automaticamente no estado *navegação*. A navegação permite que você visualize registros em um conjunto de dados, mas você não pode editar registros ou inserir novos registros. Você usa principalmente o estado *navegação* para rolar de um registro para outro em um conjunto de dados.

Para mais informações sobre como navegar entre os registros, consulte *Navegando por conjuntos de dados*.

A partir do estado *navegação*, todos os outros estados do conjunto de dados podem ser definidos. Por exemplo, chamar os métodos *insert* ou *append* altera seu estado de *navegação* para *inserir*.

Dois métodos podem retornar o conjunto de dados ao estado *navegação*. `Cancel` termina a edição atual, inserção, e retorna o conjunto de dados ao estado *navegação*. `Post` grava as alterações no conjunto de dados e, se bem-sucedido, também retorna o conjunto de dados ao estado *navegação*. Se essa operação falhar, o estado atual permanece inalterado.

Para verificar o estado do conjunto de dados de um item, use o atributo `item_state` ou os métodos `is_new`, `is_edited` ou `is_changing`:

Cliente	Servidor	Descrição
item_state	*item_state*	Indica o estado operacional atual do conjunto de dados do item.
is_new	*is_new*	Retorna verdadeiro se o conjunto de dados do item estiver no estado *inserir*.
is_edited	*is_edited*	Retorna verdadeiro se o conjunto de dados do item estiver no estado *editar*.
is_changi	*is_changi*	Retorna verdadeiro se o conjunto de dados do item estiver nos estados *inserir* ou *editar*.

Você pode usar os seguintes métodos do item para inserir, atualizar e excluir dados no conjunto de dados:

Cliente	Servidor	Descrição
edit	*edit*	Coloca o conjunto de dados do item no estado de edição.
append	*append*	Adiciona um registro ao final do conjunto de dados e coloca o conjunto de dados no estado *inserir*.
insert	*insert*	Insere um registro no início do conjunto de dados e coloca o conjunto de dados no estado *inserir*.
post	*post*	Salva o novo registro ou o registro alterado e coloca o conjunto de dados no estado *navegação*.
cancel	*cancel*	Cancela a operação atual e coloca o conjunto de dados no estado *navegação*.
delete	*delete*	Exclui o registro atual e coloca o conjunto de dados no estado *navegação*.

Todas as alterações feitas no conjunto de dados são armazenadas na memória, os registros do item são alterados no log de alterações. Assim, após todas as alterações serem feitas, elas podem ser armazenadas na tabela do banco de dados

associada chamando o método `apply`. O método `apply` gera e executa uma consulta SQL para salvar as alterações no banco de dados.

Cliente	Servidor	Descrição
log_changes	*log_changes*	Indica se as alterações de dados devem ser registradas.
apply	*apply*	Envia todos os registros atualizados, inseridos e excluídos do conjunto de dados do item para o servidor para gravação no banco de dados.

3.5.4 Campos

Todos os itens que trabalham com dados de tabelas do banco de dados possuem um atributo *fields* – uma lista de objetos de campo, que são usados para representar os campos nos registros da tabela do item.

Cada campo possui os seguintes atributos:

Cliente	Servidor	Descrição
owner	*owner*	O item que possui este campo.
field_name	*field_name*	O nome do campo que será usado no código de programação para acessar o objeto do campo.
field_captio	*field_captio*	O nome do campo exibido para os usuários.
field_type	*field_type*	Tipo do campo, um dos seguintes valores: **text**, **integer**, **float**, **currency**, **date**, **datetime**, **boolean**, **blob**.
field_size	*field_size*	Tamanho do campo com tipo **text**.
required	*required*	Especifica se um valor não vazio é obrigatório para o campo.

Para acessar os dados do dataset do item, a classe Field possui as seguintes propriedades:

Client	Server	Description
value	*value*	Use esta propriedade para obter ou definir o valor do campo do registro atual. Ao ler, o valor é convertido para o tipo do campo. Assim, para campos dos tipos integer, float e currency, se o valor no registro da tabela do banco de dados for NULL, o valor desta propriedade será 0. Para obter o valor sem conversão, use a propriedade raw_value.
text	*text*	Use esta propriedade para obter ou definir o valor do campo como texto.
lookup_value	*lookup_value*	Use esta propriedade para obter ou definir o valor de pesquisa (lookup), veja *Campos de pesquisa*.
lookup_text	*lookup_text*	Use esta propriedade para obter ou definir o valor de pesquisa do campo como texto, veja *Campos de pesquisa*.
display_text	*display_text*	Representa o valor do campo como exibido nos controles ligados a dados. Quando o campo é um campo de pesquisa, seu valor será o de lookup_text, caso contrário será o valor da propriedade text, levando em consideração os parâmetros de localidade do projeto. Esse comportamento pode ser sobrescrito pelo manipulador de evento *on_field_get_text* do item que possui o campo.
raw_value	*raw_value*	Use esta propriedade para obter o valor do campo do registro atual exatamente como está armazenado no banco de dados. Nenhuma conversão é realizada.

Além disso, cada campo é um atributo do item ao qual ele pertence. Assim, para acessar um campo de um item, utilize a seguinte sintaxe: `item.field_name`

```
invoices.total.value
```

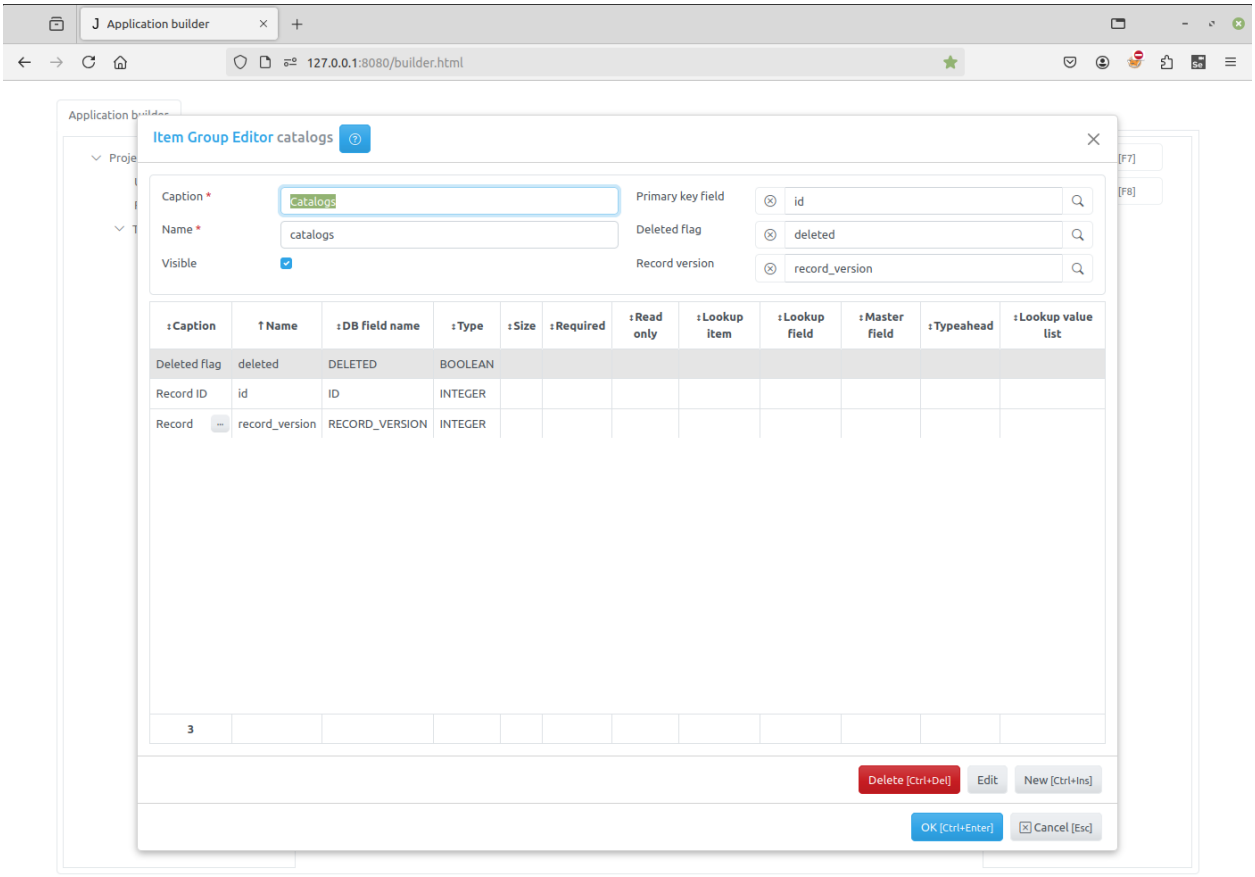
`invoices.total` é a referência ao campo **Total** do item **Invoices** e `invoices.total.value` é o valor desse campo.

Abaixo estão os valores dos atributos dos campos do item **invoices** no *Projeto de Demonstração*

```
customer integer
   value:  2
   text:  2
   lookup_value:  Köhler
   lookup_text:  Köhler
   display_text:  Leonie Köhler
firstname integer
   value:  2
   text:  2
   lookup_value:  Leonie
   lookup_text:  Leonie
   display_text:  Leonie
billing_address integer
   value:  2
   text:  2
   lookup_value:  Theodor-Heuss-Straße 34
   lookup_text:  Theodor-Heuss-Straße 34
   display_text:  Theodor-Heuss-Straße 34
id integer
   value:  1
   text:  1
   lookup_value:  None
   lookup_text:
   display_text:  1
date date
   value:  2014-01-01
   text:  01/01/2014
   lookup_value:  None
   lookup_text:
   display_text:  01/01/2014
total currency
   value:  2.08
   text:  $2.08
   lookup_value:  None
   lookup_text:
   display_text:  $2.08
```

3.5.5 Campos comuns

Itens que têm acesso aos dados do banco de dados podem ter campos comuns. Eles são definidos no grupo ao qual pertencem:



Aqui dois campos são definidos: **id** e **deleted**.

O campo **id** é definido como chave primária e armazenará um identificador único para cada registro na tabela do banco de dados. Esse valor é gerado automaticamente pelo framework ao inserir um novo registro na tabela.

O campo **deleted** é definido como uma flag de exclusão. Quando a caixa de seleção 'Soft delete' está marcada no *Item Editor Dialog*, o método de exclusão não apaga fisicamente um registro da tabela, mas usa esse campo para marcar o registro como excluído. O método open leva isso em consideração quando uma consulta SQL é gerada para obter registros da tabela do banco de dados.

O campo **Versão do registro** é usado para *Bloqueio de registros*.

3.5.6 Campos Lookup

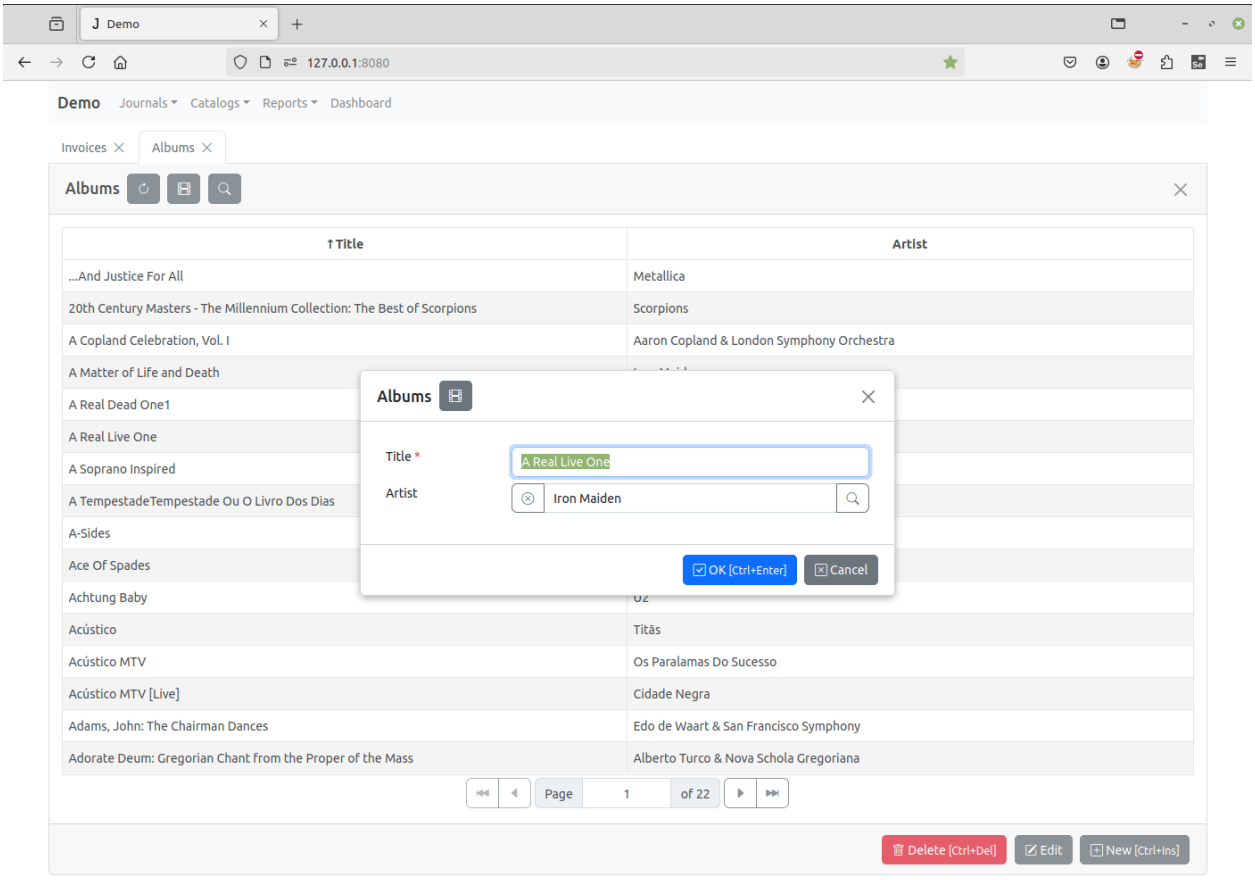
Um campo lookup pode exibir um valor amigável para o usuário que está vinculado a outro valor em outra tabela ou lista de valores. Por exemplo, o campo lookup pode exibir o nome de um cliente que está vinculado ao respectivo número de ID do cliente em uma tabela ou lista de outro item.

Ao inserir um valor no campo lookup, o usuário escolhe a partir de uma lista de valores. Isso pode tornar a entrada de dados mais rápida e precisa.

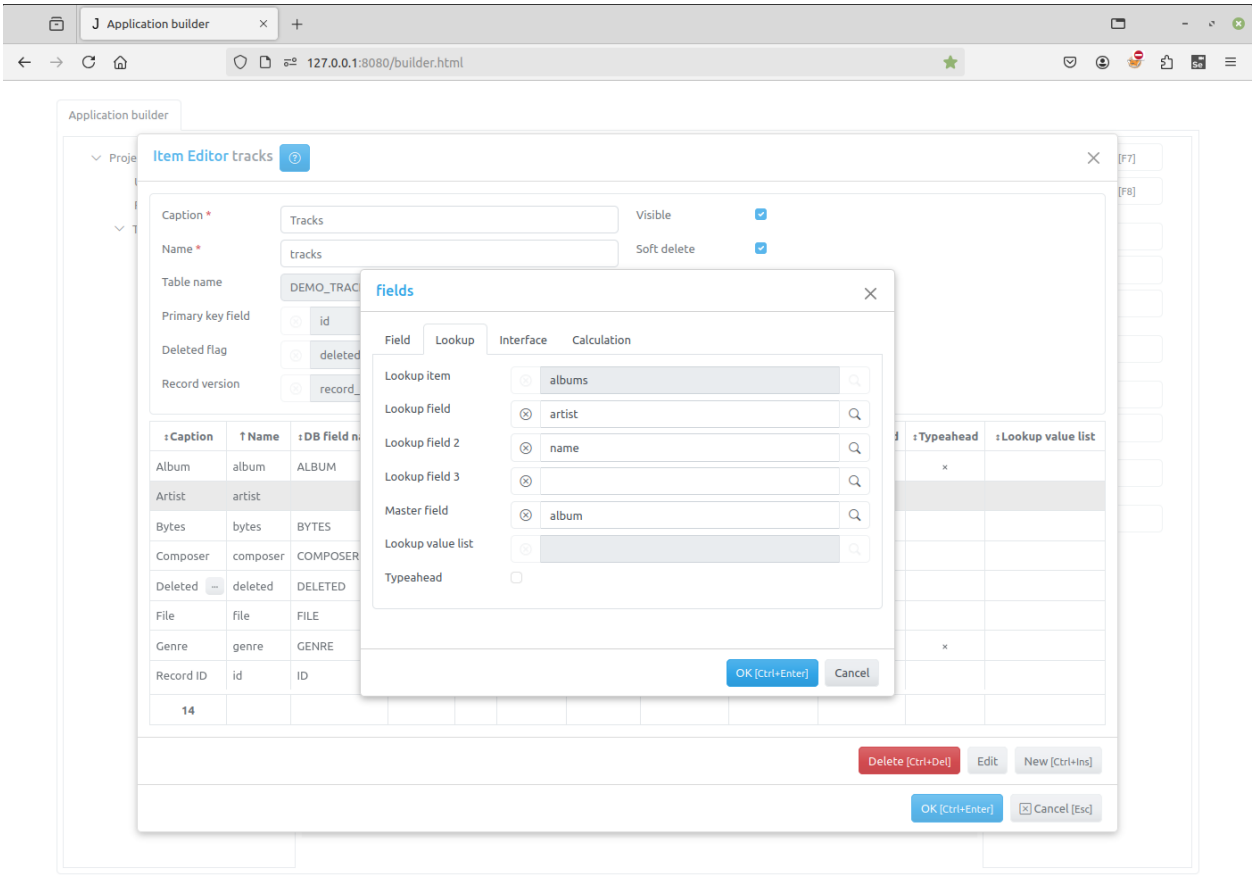
Os dois tipos de campos lookup que você pode criar são: um campo lookup baseado em item lookup e uma lista de valores.

Campo lookup baseado em item lookup

No framework, você pode adicionar um campo a um item para buscar informações na tabela de outro item. Por exemplo, no Cadastro **Álbuns** do aplicativo de demonstração existe o campo lookup **Artista**.



Para definir o valor do campo, o usuário deve clicar no botão à direita do campo de entrada e selecionar um registro do Cadastro ‘’Artistas” que será exibido. Então o valor desse campo será o ID do registro. Outra forma de definir o valor do campo é usar a digitação antecipada (typeahead), se a opção **Typeahead** estiver marcada no *Diálogo do Editor de Campo*:



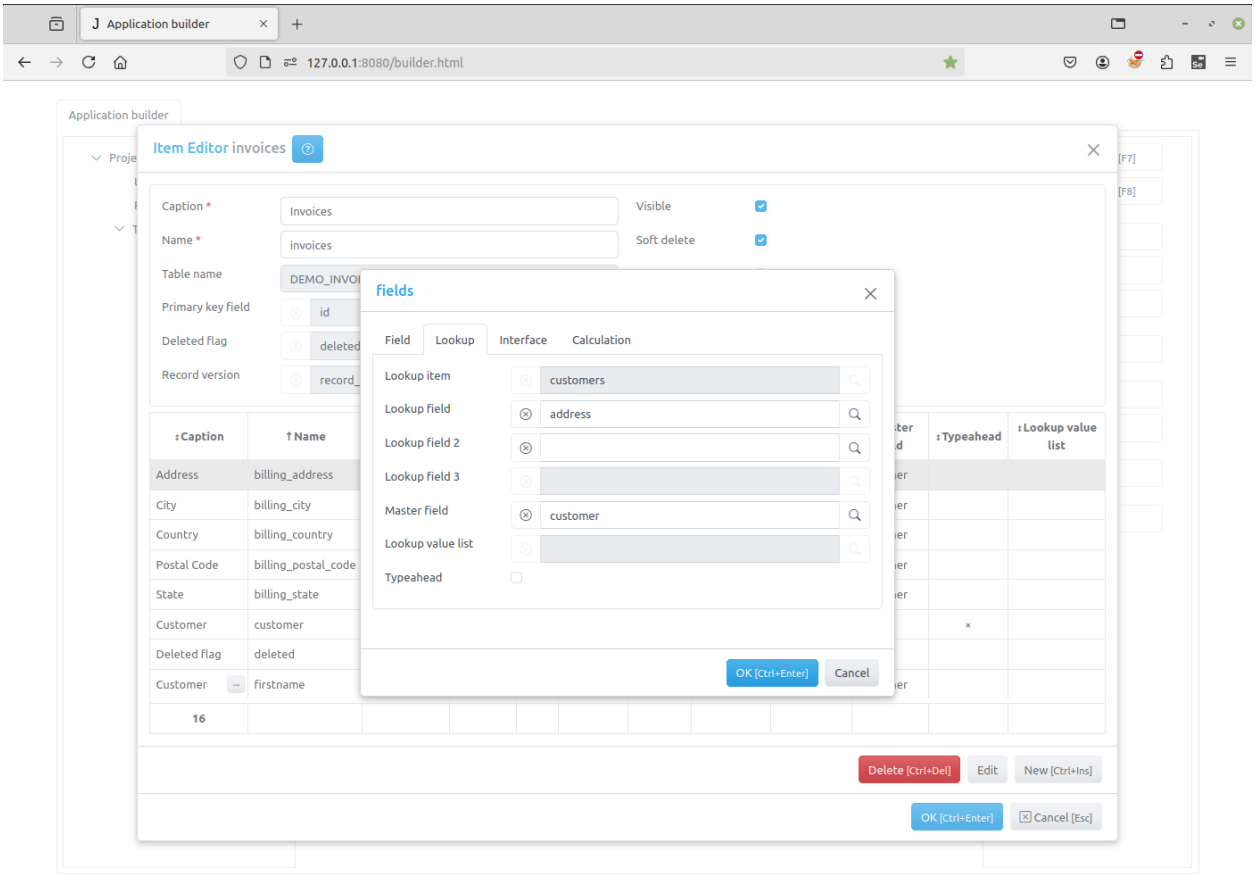
Para tais campos, **Item Lookup** e **Campo Lookup** devem ser especificados no *Diálogo do Editor de Campo*:

A consulta SQL que é gerada no servidor, quando o método `open` é chamado e o parâmetro `expanded` é definido como verdadeiro (padrão), utiliza a cláusula `JOIN` para obter os valores de lookup para tais campos. Assim, cada um desses campos tem um par de valores: o primeiro valor armazena uma referência a um registro na tabela do item de lookup (o valor do seu campo de chave primária), e o segundo valor contém o valor do campo lookup nesse registro.

Para acessar esses valores, use as seguintes propriedades dos campos lookup:

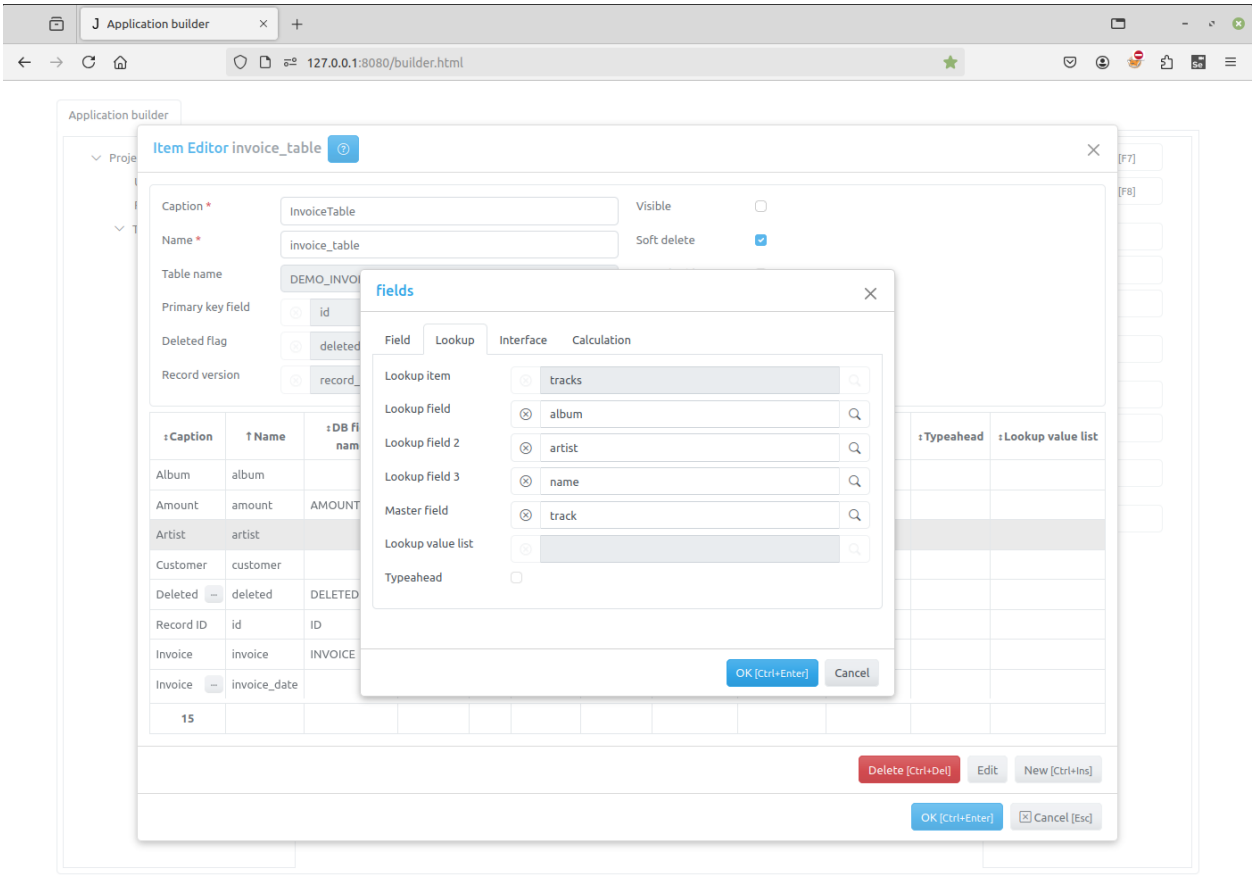
Cliente	Servidor	Descrição
value	*value*	Um valor, que é armazenado na tabela do item, que é uma referência a um registro na tabela do item de lookup.
lookup_value	*lookup_value*	Um valor do campo de lookup na tabela do item de lookup.

Às vezes, há a necessidade de ter dois ou mais valores do mesmo registro na tabela do item de lookup. Por exemplo, o registro "Faturas" no Demo tem vários campos de lookup ("Cliente", "Endereço de Cobrança", "Cidade de Cobrança", e assim por diante) que possuem informações sobre um cliente, todas armazenadas em um único registro na tabela do item "Clientes", descrevendo esse cliente. Para evitar a criação de campos desnecessários na tabela do item "Faturas", armazenando a mesma referência a um registro, e criando `JOIN` s para cada um desses campos, todos os campos de lookup exceto "Clientes" têm o valor **Campo Mestre** apontando para o campo "Clientes". Esses campos não têm campos correspondentes na tabela subjacente do banco de dados dos itens. O valor da sua propriedade de valor é sempre igual à propriedade de valor do campo mestre, e a consulta SQL gerada no servidor, quando o método `open` é chamado, utiliza uma única cláusula `JOIN` para todos esses campos.



Quando o usuário clica no botão à direita do campo de entrada ou usa o tipo de pesquisa (typeahead), o aplicativo cria uma cópia do item de lookup do campo, define o atributo *lookup_field* para o campo, e dispara o evento *on_field_select_value*. Escreva esse manipulador de evento para especificar os campos que serão exibidos, configurar filtros para o item de lookup, antes que ele seja aberto e exibido para que o usuário selecione um valor para o campo.

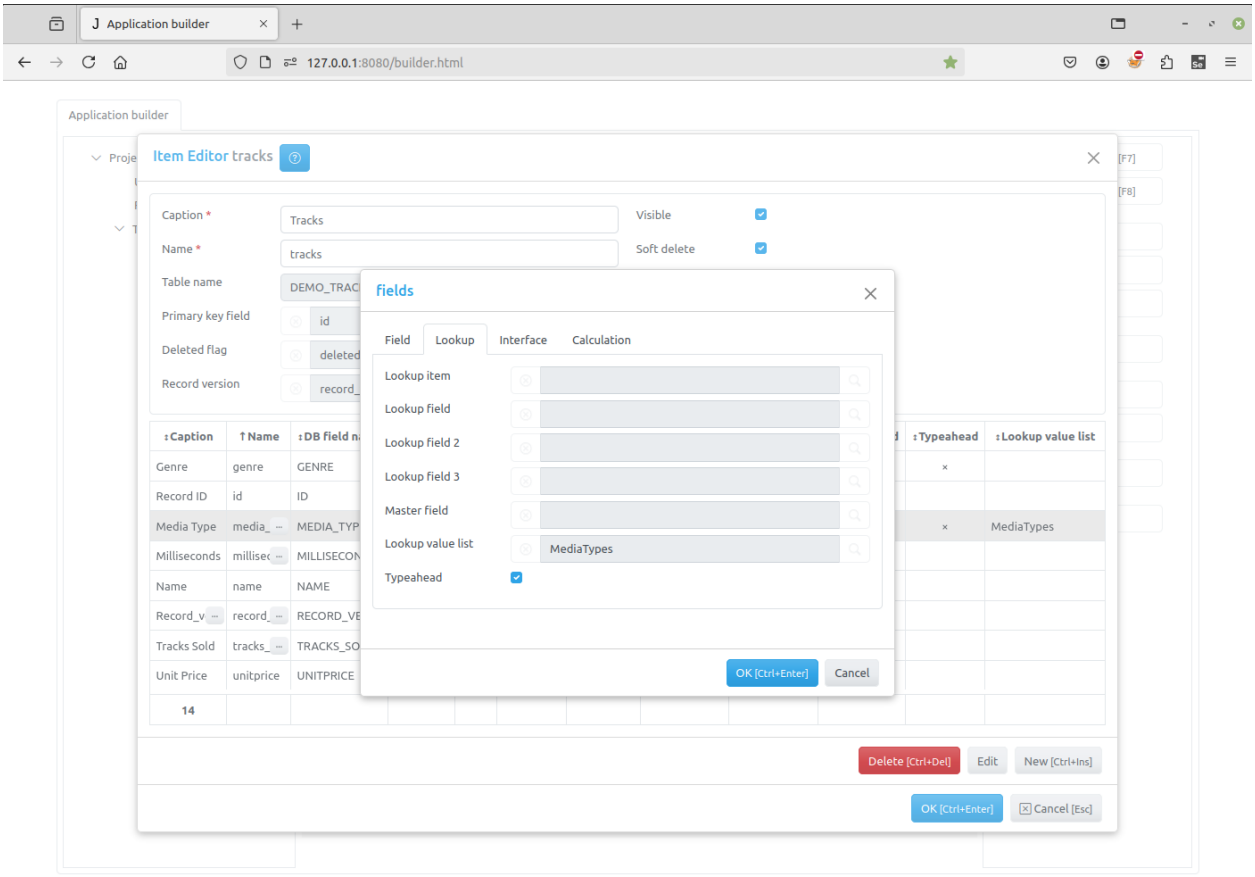
O campo de lookup no item de lookup também pode ser um campo de lookup, por exemplo:



Para configurar tal campo, use os atributos **Lookup field 2** e **Lookup field 3**.

Lista de valores

Às vezes, a fonte de um campo de lookup pode ser definida como uma lista de valores. Por exemplo, o campo **MediaType** no Cadastro **Tracks** do *Projeto Demo* tem o atributo **Lookup value list** configurado para a lista de lookup MediaTypes:



Use o *Lookup List Dialog* da tarefa para definir tais listas de lookup.

Veja também

Campos de seleção

Listas de seleção

3.5.7 Filtrando registros

Existem três maneiras de definir quais registros o *dataset* de um item irá obter da tabela do banco de dados quando o método `open` for chamado:

- especificar o parâmetro (opção) `where` do método `open`,
- chamar o método `set_where` antes de chamar o método `open`,
- ou usar *filtros*.

Quando o parâmetro `where` é especificado, ele sempre será utilizado mesmo que o método `set_where` tenha sido chamado ou que o item tenha filtros com valores definidos.

Quando o parâmetro `where` é omitido, os parâmetros passados para o método `set_where` serão utilizados.

Por exemplo, no cliente, no seguinte código, na primeira chamada do método `open` a opção `where` será usada para filtrar os registros, na segunda chamada os parâmetros passados para `set_where` e apenas na terceira vez será usado o valor do filtro `invoicedate1`.

```
function test(invoices) {
    var date = new Date(new Date().setYear(new Date().getFullYear() - 1));

    invoices.clear_filters();
    invoices.filters.invoicedate1.value = date;

    invoices.open({where: {invoicedate__ge: date}});

    invoices.set_where({invoicedate__ge: date});
    invoices.open();

    invoices.open();
}


date = datetime.datetime.now() - datetime.timedelta(days=3*365)
```

O mesmo código no servidor fica da seguinte forma:

```
from datetime import datetime

def test(invoices):
    date = datetime.now()
    date = date.replace(year=date.year-1)

    invoices.clear_filters()
    invoices.filters.invoicedate1.value = date

    invoices.open(where={'invoicedate__ge': date})

    invoices.set_where(invoicedate__ge=date)
    invoices.open()

    invoices.open()
```

No framework, os seguintes símbolos e constantes correspondentes são definidos para filtrar registros:

Filter type	Filter symbol	Constant	SQL Operator
EQ	'eq'	FILTER_	=
NE	'ne'	FILTER_	<>
LT	'lt'	FILTER_	<
LE	'le'	FILTER_	<=
GT	'gt'	FILTER_	>
GE	'ge'	FILTER_	>=
IN	'in'	FILTER_	IN
NOT IN	'not_in'	FILTER_	NOT IN
RANGE	'range'	FILTER_	BETWEEN
ISNULL	'isnull'	FILTER_	IS NULL
EXACT	'exact'	FILTER_	=
CONTAINS	'contains'	FILTER_	usa LIKE com o caractere "%" para encontrar registros onde o valor do campo contém a string de pesquisa
STARTWITH	'startwith'	FILTER_	usa LIKE com o caractere "%" para encontrar registros onde o valor do campo começa com a string de pesquisa
ENDWITH	'endwith'	FILTER_	usa LIKE com o caractere "%" para encontrar registros onde o valor do campo termina com a string de pesquisa
CONTAINS ALL	'contains_all'	FILTER_	usa LIKE com o caractere "%" para encontrar registros onde o valor do campo contém todas as palavras da string de pesquisa

O parâmetro `where` do método `open` é um dicionário cujas chaves são os nomes dos campos seguidos, após dois sublinhados, por um símbolo de filtro. Para o filtro `EQ`, o símbolo de filtro '__eq' pode ser omitido. Por exemplo, `{'id': 100}` é equivalente a `{'id__eq': 100}`.

Veja também

Dataset

Filters

Cliente

open

set_where

Servidor

open

set_where

3.5.8 Filtros

Para cada item que tem acesso a uma tabela do banco de dados, pode ser criada uma lista de objetos de filtro.

Para criar filtros, utilize o *Diálogo de Filtros* do Application Builder.

Os filtros oferecem uma maneira conveniente para os usuários especificarem visualmente os parâmetros da solicitação feita pelo aplicativo ao banco de dados do projeto.

Cada filtro possui os seguintes atributos:

- `owner` – item que possui este filtro,

- `filter_name` — o nome do filtro que pode ser usado no código de programação,
- `filter_caption` — o nome do filtro usado na representação visual no aplicativo cliente,
- `filter_type` — tipo do filtro, veja *Filtrando registros*,
- `visible` — se o valor deste atributo for `true`, uma representação visual deste filtro será criada pelo método *create_filter_inputs*, quando a opção `filters` não for especificada,
- `value` — valor do filtro,

Todos os filtros do item são atributos de `filters` do seu objeto. Usando `filter_name` podemos acessar o objeto do filtro:

```
invoices.filters.invoicedate1.value = new Date()
```

Outra forma de acessar o filtro é usar o método *filter_by_name*

```
invoices.filter_by_name('invoicedate').value = new Date()
```

Veja também

Dataset

Filtrando registros

Cliente

filters

Filter class

assign_filters

clear_filters

each_filter

filter_by_name

Servidor

filters

Filter class

clear_filters

filter_by_name

3.5.9 Detalhes

Detalhes são usados no framework para trabalhar com dados tabulares, pertencentes a um registro na tabela de um item.

Por exemplo, o **Registro de Faturas** no aplicativo de Demonstração possui o detalhe **InvoiceTable**, que mantém uma lista de itens na fatura de um cliente.

Detalhes e itens de detalhes compartilham a mesma tabela de banco de dados subjacente.

Para criar um detalhe, você deve primeiro criar um item de detalhe (selecione o grupo de Detalhes na árvore do projeto e clique no botão Novo) e depois usar o *Diálogo de Detalhes* (selecione o item na árvore do projeto e clique no botão Detalhes) para adicionar um detalhe a um item.

Por exemplo, o seguinte código:

```
def on_created(task):
    task.invoice_table.open()
    print  task.invoice_table.record_count()

    task.invoices.open(limit=1)
        task.invoices.invoice_table.open()
    print task.invoices.invoice_table.record_count()
```

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6
```

Detalhes têm dois *campos comuns* - `master_id` e `master_rec_id`, que são usados para armazenar informações sobre o `ID` do mestre (cada item tem seu próprio ID único) e o valor do campo primário do registro do seu mestre. Dessa forma, cada tabela pode ser vinculada a vários itens. Assim como cada item pode ter vários detalhes. Para acessar os detalhes de um item, use seu atributo `details`. Para acessar o mestre do detalhe, use seu atributo `master`.

A classe Detail, usada para criar detalhes, é um ancestral da classe Item e herda todos os seus atributos, métodos e eventos.

Nota

O método `apply` da classe Detail não faz nada. Para salvar as alterações feitas em um detalhe, use o método `apply` do seu mestre.

Para trabalhar com um detalhe, seu mestre deve estar ativo

Para fazer alterações em um detalhe, seu mestre deve estar em modo de edição ou inserção.

Exemplos

Neste exemplo do módulo cliente do item **Invoices** do *Demo project*, o detalhe **Invoice_table** é reaberto toda vez que o cursor do seu mestre se move para outro registro.

```
var ScrollTimeOut;

function on_after_scroll(item) {
    clearTimeout(ScrollTimeOut);
    ScrollTimeOut = setTimeout(
        function() {
            item.invoice_table.open(function() {});
        },
        100
    );
}
```

And just as an example:

```
from datetime import datetime, timedelta

def on_created(task):
    invoices = task.invoices.copy()
```

(continua na próxima página)

(continuação da página anterior)

```
    invoices.set_where(invoicedate__gt=datetime.now()-timedelta(days=1))
    invoices.open()
    for i in invoices:
        i.invoice_table.open()
        i.edit()
        for t in i.invoice_table:
            t.edit()
            t.sales_id.value = '101010'
            t.post()
        i.post()
    invoices.apply()
```

O mesmo código no cliente será o seguinte:

```
function on_page_loaded(task) {
    var date = new Date(),
        invoices = task.invoices.copy();

    invoices.set_where({invoicedate__gt: date.setDate(date.getDate() - 1)});
    invoices.open();
    invoices.each(function(i) {
        i.invoice_table.open();
        i.edit();
        i.invoice_table.each(function(t) {
            t.edit();
            t.sales_id.value = '101010';
            t.post();
        });
        i.post();
    });
    invoices.apply();
}
```

3.6 Programação do lado do servidor

Na maioria dos casos, o cliente envia uma solicitação ao servidor quando os seguintes métodos de um item são executados:

- *open*
- *apply*
- *print*
- *server*

Nesses casos, o cliente envia ao servidor o *ID* da tarefa do item, o *ID* do item, o tipo da solicitação e seus parâmetros.

Ao receber a solicitação, o servidor, com base nos IDs passados, encontra a tarefa (pode ser uma tarefa de Projeto ou uma tarefa do Construtor de Aplicações) e o item no servidor, executa o método correspondente com os parâmetros passados e retorna o resultado da execução para o cliente. O método do servidor pode disparar eventos que podem modificar seu comportamento padrão.

Cada item da árvore de tarefas possui os atributos *ambiente* e *sessão* que armazenam o contexto da solicitação atual.

Os eventos de servidor mais comuns são:

- *on_created* - O evento é disparado pela tarefa quando ela acaba de ser criada pela aplicação do servidor. Pode ser usado para inicializar o projeto.
- *eventos on_apply* - Esses eventos são disparados quando o método `apply` do item é chamado no *cliente* ou no *servidor*
- *eventos on_open* - Esses eventos são disparados quando o método `open` do item é chamado no *cliente* ou no *servidor*
- *on_generate* - O evento é disparado quando o método *print* de um relatório é chamado no cliente.

Nota

Note que a árvore de tarefas no servidor é imutável, você não pode alterar os atributos dos itens na árvore de tarefas.

Você deve usar o método *copy* para criar uma cópia de um item. Essa cópia é uma réplica exata de um item no momento da criação da árvore de tarefas. Ela não é adicionada à *árvore de tarefas* e será destruída pelo coletor de lixo do Python quando não for mais necessária.

3.6.1 on_apply evento

Quando o método `apply` de um item é chamado no *cliente* ou no *servidor*, a aplicação do servidor, por padrão, gera uma consulta SQL com base nas alterações feitas no conjunto de dados e a executa.

Esse comportamento pode ser alterado escrevendo um manipulador de evento *on_apply* no módulo do servidor do item.

Às vezes, torna-se necessário executar algum código quando as alterações são salvas, para todos os itens. Nesse caso, pode-se usar o manipulador de evento `on_apply` da tarefa (declarado no módulo do servidor da tarefa).

O código a seguir descreve como esses eventos são tratados:

```
#...
result = None
if self.task.on_apply:
    result = self.task.on_apply(self, delta, params, connection)
if result is None and self.on_apply:
    result = self.on_apply(self, delta, params, connection)
if result is None:
    result = self.apply_delta(delta, params, connection)
#...
return result
```

Ele verifica se a tarefa possui um manipulador de evento `on_apply`. Se o manipulador de evento `on_apply` estiver declarado no módulo do servidor da tarefa, ele é executado.

Se o manipulador de evento `on_apply` da tarefa não estiver declarado ou o resultado do manipulador for `None`, o método verifica se o item possui um manipulador de evento *on_apply*. Se estiver declarado no módulo do servidor do item, ele é executado.

Se o resultado retornado pelo manipulador de evento do item for `None`, o método `apply_delta` do item é chamado, que gera a consulta SQL, a executa e retorna o resultado.

Exemplo

Aqui está um exemplo de como o on_apply pode ser usado

3.6.2 on_open evento

Quando o método open de um item é chamado no *cliente* ou no *servidor*, a aplicação do servidor executa o seguinte código:

```
result = None
if self.task.on_open:
    result = self.task.on_open(self, params)
if result is None and self.on_open:
    result = self.on_open(self, params)
if result is None:
    result = self.execute_open(params)
```

Ele verifica se a tarefa possui um manipulador de evento on_open. Se o manipulador de evento on_open estiver declarado no módulo do servidor da tarefa, ele é executado.

Se o manipulador de evento on_open da tarefa não estiver declarado ou o resultado do manipulador for None, o método verifica se o item possui um manipulador de evento *on_open*. Se estiver declarado no módulo do servidor do item, ele é executado.

Se o resultado retornado pelo manipulador de evento do item for None, o método execute_open do item é chamado, que gera a consulta SQL, a executa e retorna o resultado.

Exemplo

Aqui está um exemplo de como o on_open pode ser usado

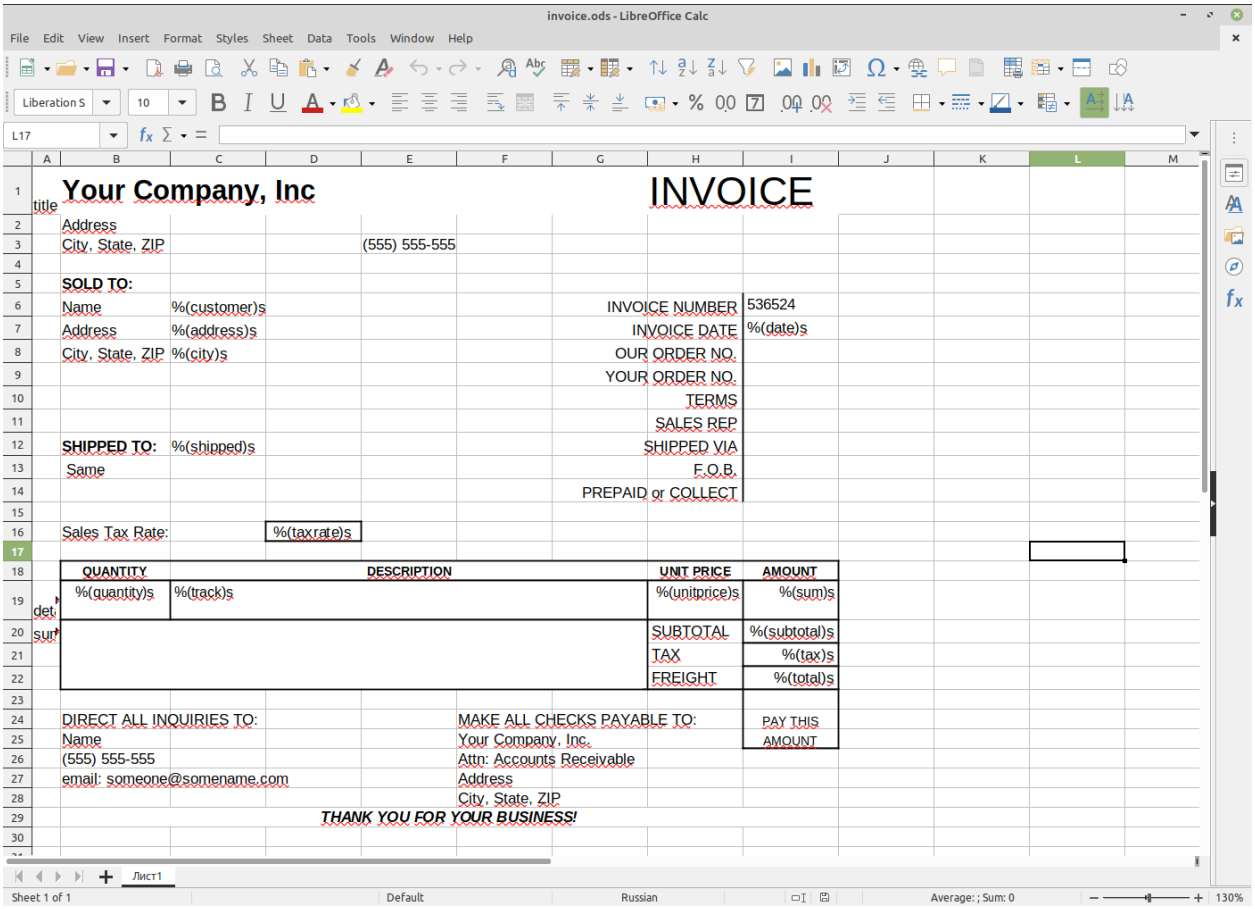
3.7 Programação de relatórios

3.7.1 Report templates

To create a report, you must first prepare a report template in LibreOffice Calc.

The template files are located in the report folder of the project directory.

The following figure shows a template of the Invoice report.



Reports in Jam.py are band-oriented.

Each report template is divided into bands. To set bands use the leftmost column of a template spreadsheet.

In the Invoice report template there are three bands: **title**, **detail** and **summary**.

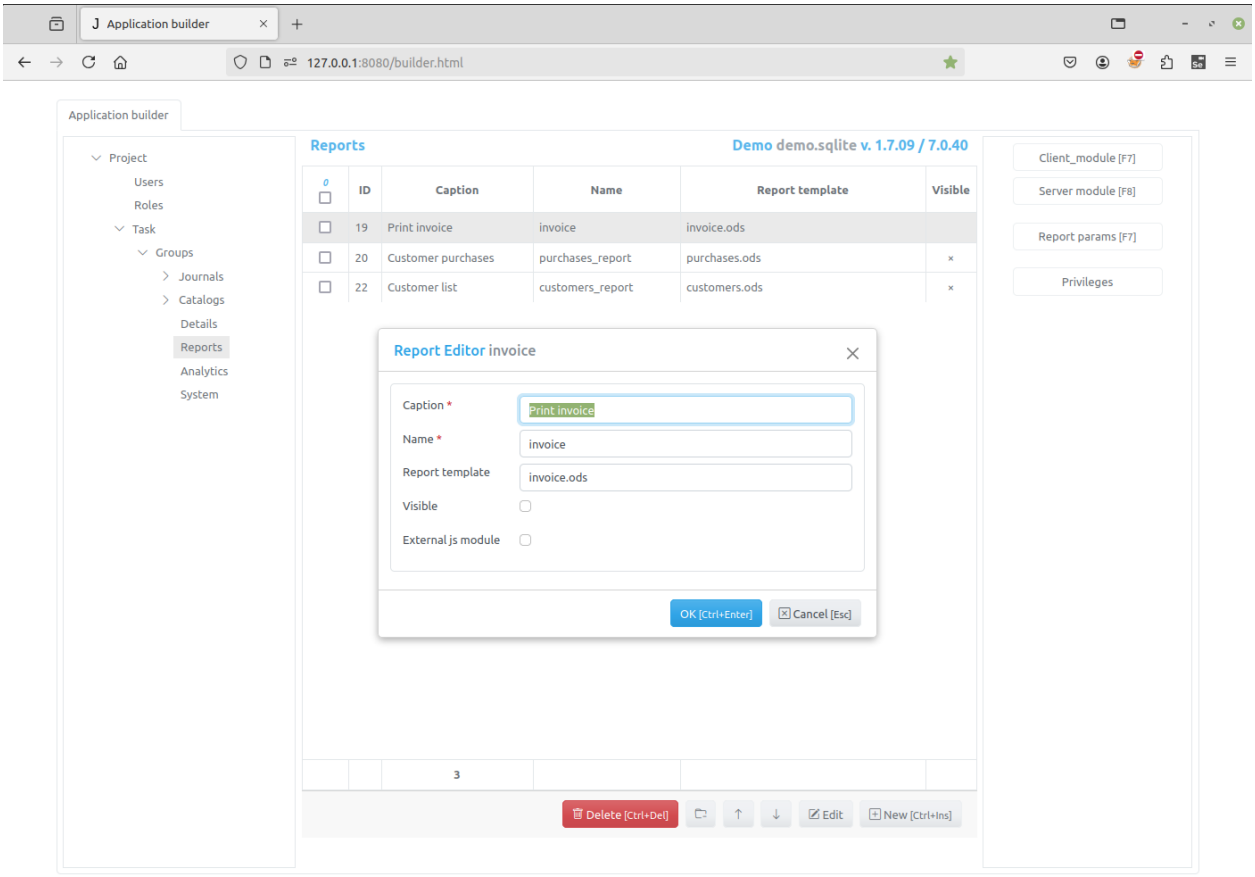
In addition, templates can have programmable cells.

For example, in the template of Invoice report the I7 cell contains the text %(date)s.

Programmable cell begins with **%**, then follows the name of the cell in the parenthesis which is followed by character **s**.

3.7.2 Criando um relatório

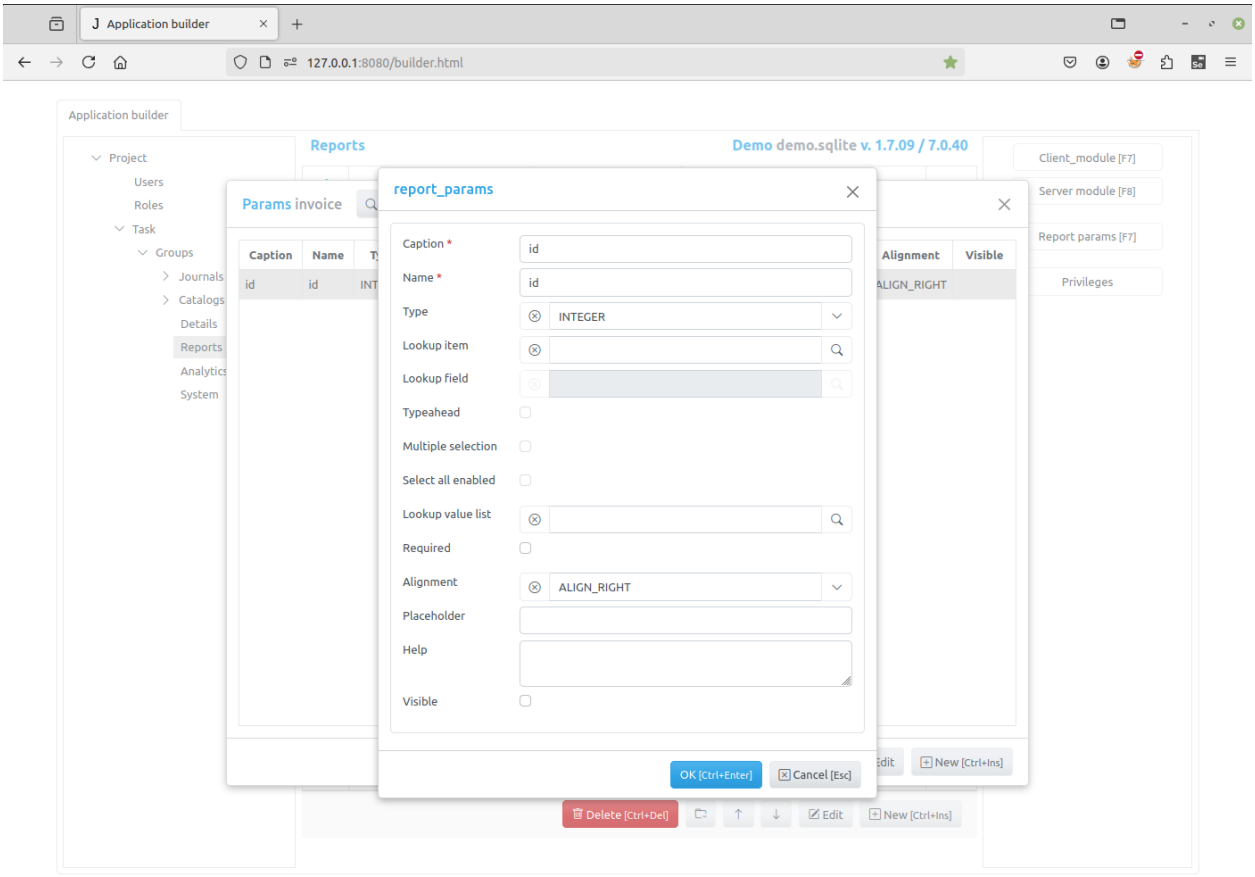
Para adicionar um novo relatório ao projeto Jam.py, selecione o nó **Relatórios** na árvore do projeto, clique no botão **Novo** e preencha o título, o nome e o nome do arquivo de template do relatório.



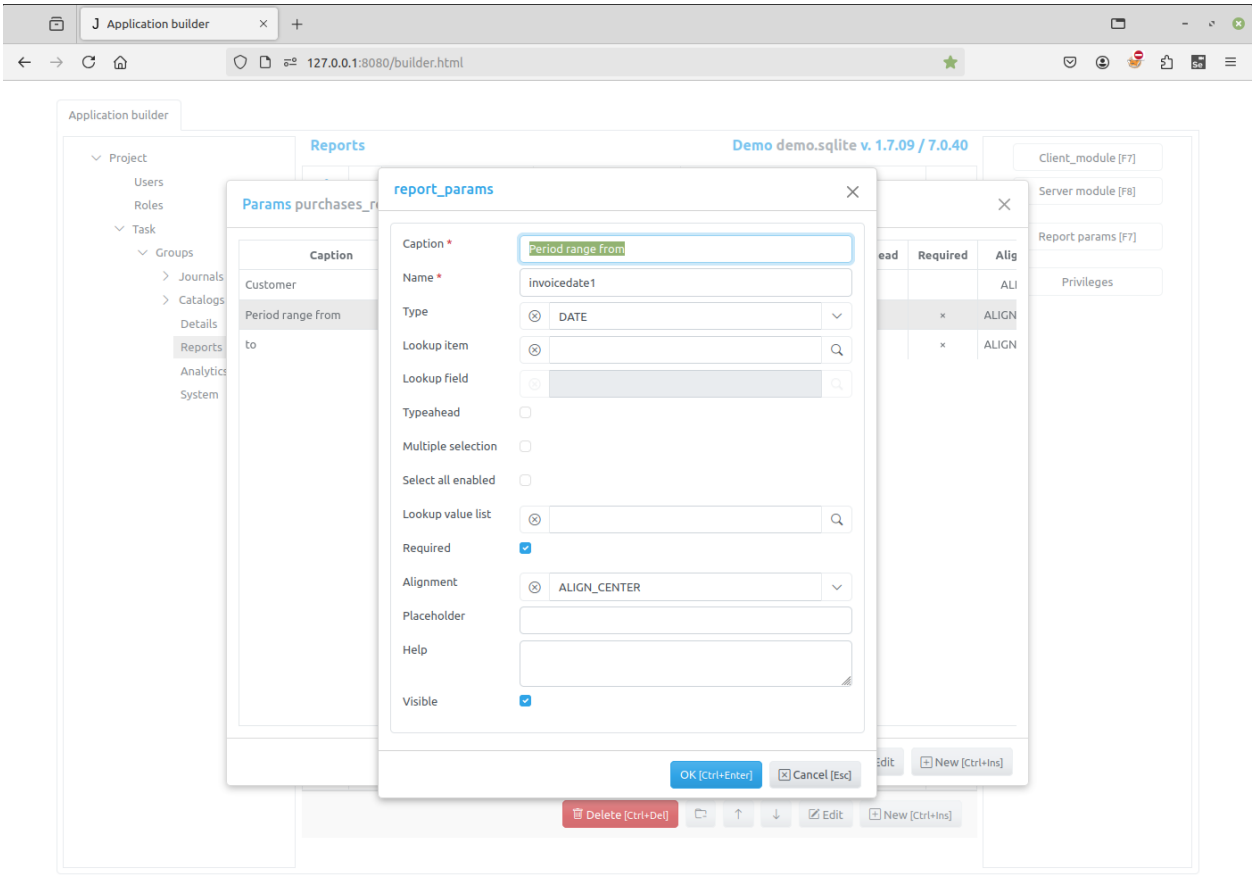
Se a caixa de seleção **visível** estiver marcada, o código padrão adiciona o relatório ao menu **Relatórios** do projeto.

3.7.3 Parâmetros do relatório

Você pode especificar os parâmetros do relatório. Por exemplo, o relatório **Customer purchases** do projeto Demo possui três parâmetros.



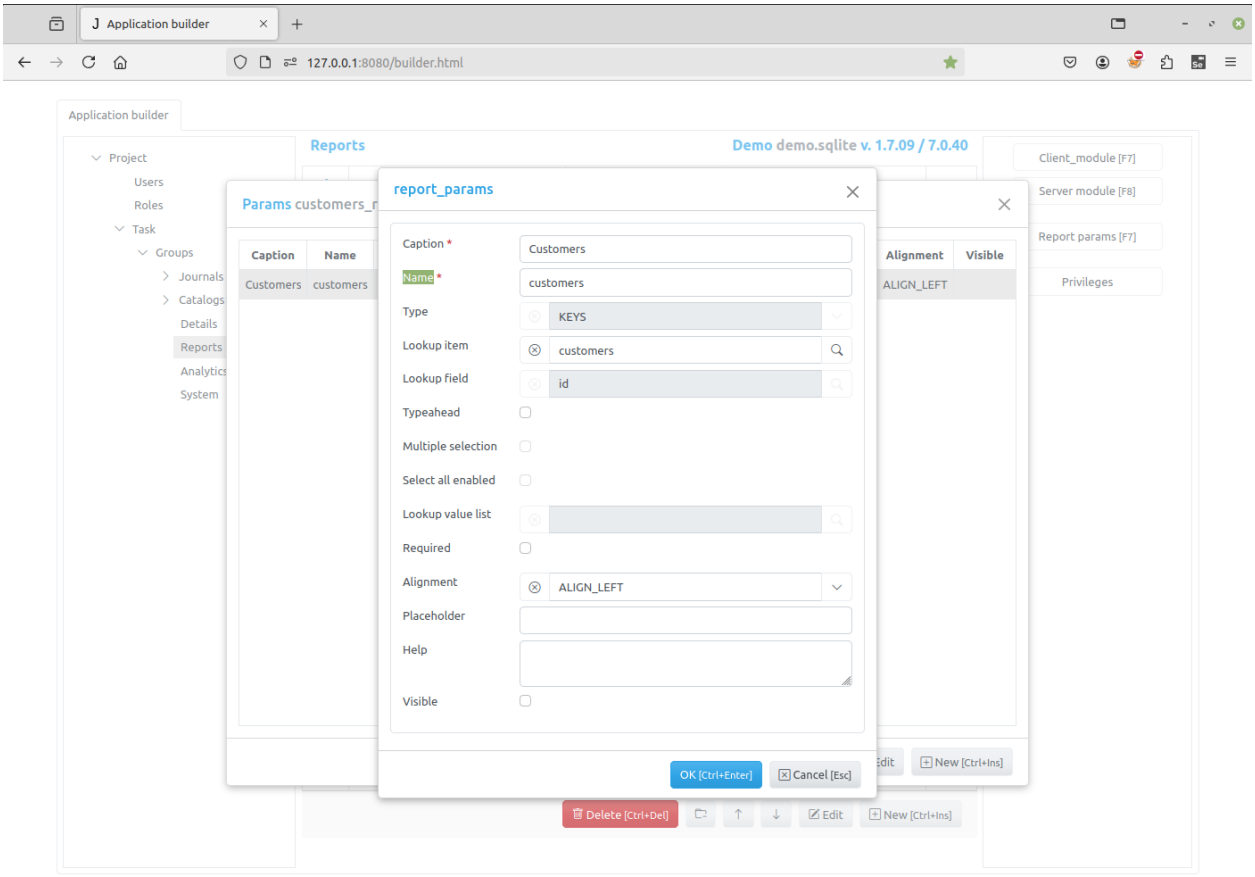
Para adicionar ou alterar um parâmetro do relatório, clique no botão **Report params** no painel esquerdo do Application Builder. Um formulário aparecerá exibindo a lista de parâmetros existentes. Em seguida, clique no botão **Novo** ou **Editar** do formulário para adicionar ou alterar o parâmetro.



Os seguintes campos podem ser especificados:

- **Caption** - o nome do parâmetro que será exibido aos usuários
- **Name** - o nome do parâmetro que será utilizado no código de programação para acessar o objeto do parâmetro
- **Type** - o tipo de dado do parâmetro
- **Lookup item** - o item de onde o valor do parâmetro será selecionado
- **Lookup field** - o campo no item de pesquisa (lookup)
- **Typeahead** - autocompletar/typeahead ativado para o campo de pesquisa
- **Multiple selection** - permite seleção múltipla
- **Select all enabled** - permite a seleção de todos os itens
- **Lookup value list** - seleção de lista de valores de pesquisa
- **Required** - se esta caixa de seleção estiver marcada e o atributo **Visible** estiver ativado, a aplicação cliente exigirá que os usuários informem o valor do parâmetro antes de imprimir o relatório.
- **Alignment** - especifica como o valor do parâmetro será alinhado no elemento de entrada.
- **Placeholder** - use este atributo para especificar o texto de placeholder que será exibido pelo campo de entrada.
- **Help** - se algum texto ou mensagem em HTML for especificado, um ponto de interrogação será exibido à direita da entrada. Quando o usuário mover o ponteiro do mouse sobre esse ícone, uma janela pop-up aparecerá com essa mensagem.
- **Visible** - a aplicação cliente cria um formulário para especificar os parâmetros antes de imprimir o relatório. Se esta caixa de seleção estiver marcada, o elemento de entrada para esse parâmetro aparecerá no formulário.

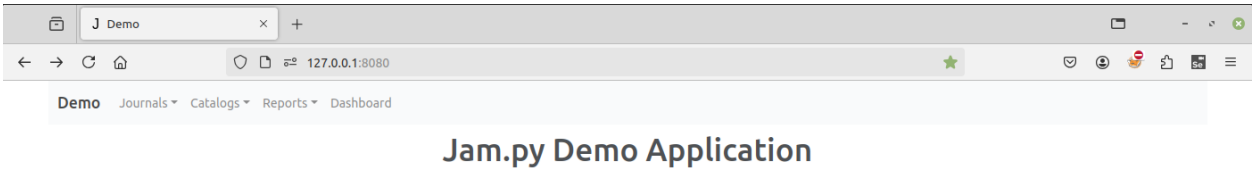
É possível criar um parâmetro de pesquisa. Por exemplo, o relatório **Customer purchases** tem um parâmetro **Customer** que pode ser selecionado a partir do Cadastro **Customers**:

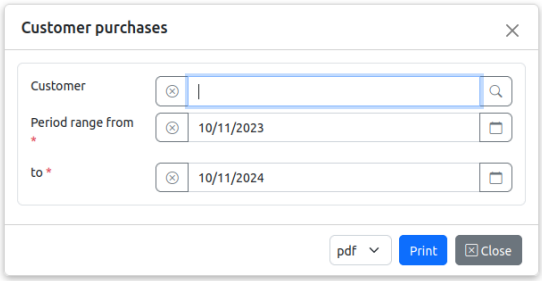


Neste caso, devemos especificar:

- **Lookup item** - o item de onde o valor do parâmetro será selecionado
- **Lookup field** - o campo no item de pesquisa

O formulário para configurar os parâmetros do relatório **Customer purchases** é o seguinte:





3.7.4 Programação de relatórios no cliente

Para imprimir um relatório no cliente, use o método *print*.

Como resultado da chamada dessa função, o cliente chama o método *create_param_form* para criar um formulário de edição dos parâmetros do relatório, com base no template HTML definido no arquivo index.html (consulte *Formulários*).

Esse método, após criar o formulário, dispara os seguintes eventos:

- *on_param_form_created* da tarefa.
- *on_param_form_created* do grupo de relatórios ao qual o relatório pertence, se definido.
- *on_param_form_created* do relatório, se definido.

O código padrão possui o manipulador de evento *on_param_form_created* definido para a tarefa. Nesse evento, o clique no botão **Imprimir** é conectado ao método *process_report* do relatório.

```
function on_param_form_created(item) {
    item.create_param_inputs(item.param_form.find(".edit-body"));
    item.param_form.find("#ok-btn").on('click.task', function() {
        item.process_report()
    });
    item.param_form.find("#cancel-btn").on('click.task', function() {
        item.close_param_form()
    });
}
```

Por sua vez, o método *process_report* dispara os seguintes manipuladores de evento:

- *on_before_print_report* do grupo de relatórios
- *on_before_print_report* do relatório

Nesses manipuladores de evento, o desenvolvedor pode definir alguns atributos comuns (no manipulador de evento do grupo de relatórios) ou específicos (no manipulador de evento do relatório) do relatório.

Por exemplo, no código padrão, há um manipulador de evento on_before_print_report do grupo de relatórios, no qual o atributo *extension* do relatório é definido:

```
function on_before_print_report(report) {
    var select;
    report.extension = 'pdf';
    if (report.param_form) {
        select = report.param_form.find('select');
        if (select && select.val()) {
            report.extension = select.val();
        }
    }
}
```

No manipulador de evento a seguir, definido no módulo do cliente do relatório **invoice** da aplicação Demo, o valor do parâmetro **id** do relatório é definido:

```
function on_before_print_report(report) {
    report.id.value = report.task.invoices.id.value;
}
```

Após isso, o método *process_report* envia uma solicitação assíncrona ao servidor para gerar o relatório (consulte *Programação do lado do servidor*).

O servidor retorna ao método uma URL para um arquivo com o relatório gerado.

Em seguida, o método verifica se o manipulador de evento *on_open_report* do grupo de relatórios está definido. Se esse manipulador estiver definido, ele é chamado; caso contrário, verifica o *on_open_report* do relatório. Se estiver definido, ele é chamado.

Se nenhum desses eventos estiver definido, o relatório é aberto no navegador ou salvo em disco, dependendo do atributo *extension* do relatório.

3.7.5 Programação de relatórios no servidor

Quando o servidor recebe uma solicitação de um cliente para gerar um relatório, ele, primeiramente, cria uma cópia do relatório e então essa cópia chama o método *generate*.

Este método dispara o evento *on_before_generate*. Neste manipulador de evento, o desenvolvedor deve escrever o código que gera o conteúdo do relatório.

Por exemplo, para o relatório **invoice** da aplicação Demo, este evento é o seguinte:

```
def on_generate(report):
    invoices = report.task.invoices.copy()
    invoices.set_where(id=report.id.value)
    invoices.open()

    customer = invoices.firstname.display_text + ' ' + invoices.customer.display_text
```

(continua na próxima página)

(continuação da página anterior)

```
    address = invoices.billing_address.display_text
    city = invoices.billing_city.display_text + ' ' + invoices.billing_state.display_
↪text + ' ' + \
        invoices.billing_country.display_text
    date = invoices.invoicedate.display_text
    shipped = invoices.billing_address.display_text + ' ' + invoices.billing_city.
↪display_text + ' ' + \
        invoices.billing_state.display_text + ' ' + invoices.billing_country.display_text
    taxrate = invoices.taxrate.display_text
    report.print_band('title', locals())

    tracks = invoices.invoice_table
    tracks.open()
    for t in tracks:
        quantity = t.quantity.display_text
        track = t.track.display_text
        unitprice = t.unitprice.display_text
        sum = t.amount.display_text
        report.print_band('detail', locals())

    subtotal = invoices.subtotal.display_text
    tax = invoices.tax.display_text
    total = invoices.total.display_text
    report.print_band('summary', locals())
```

Primeiro, usamos o método *copy* para criar uma cópia do registro de faturas.

```
invoices = report.task.invoices.copy()
```

Criamos a cópia porque múltiplos usuários podem gerar simultaneamente o mesmo relatório em threads paralelas.

Em seguida, chamamos o método *set_where* da cópia:

```
invoices.set_where(id=report.id.value)
```

onde *report.id.value* é o parâmetro de ID do relatório, cujo valor definimos no manipulador de evento *on_before_print_report* no cliente e que é igual ao valor atual do campo **id** do registro de **invoice**.

Depois, usando o método *open*, obtemos os registros no servidor. Após isso, o método *print_band* é usado para imprimir o título:

```
report.print_band('title', locals())
```

Mas antes disso, atribuímos valores a quatro variáveis locais: customer, address, city e date, que correspondem às células programáveis na faixa de título no template do relatório.

Em seguida, da mesma forma, geramos as faixas de detalhes e resumo.

Quando o relatório é gerado e o valor do atributo *extension*, definido no cliente, não é igual a 'pdf', o servidor converte o arquivo ods usando o **LibreOffice**.

Uma vez que o relatório é gerado, ele é armazenado na pasta de relatórios do diretório estático e o servidor envia ao cliente a URL do arquivo do relatório.

3.8 Palavras reservadas

Como o Jam.py é um framework que utiliza as linguagens Python e JavaScript, devem ser usados identificadores válidos de Python e JavaScript. Além disso, para todos os bancos de dados suportados, devem ser utilizados identificadores válidos de acordo com cada banco.

O arquivo que contém uma lista de exemplos é `keywords.py`, com o conteúdo abaixo:

```
keywords = [
        "BADGE",
        "LABEL",
        "HIDDEN",
        "PROGRESS",
        "TASK"
]
```

CAPÍTULO 4

Jam.py FAQ

4.1 What is the difference between catalogs and journals

When a new project is created, its *task tree* has the following groups: **Cadastros**, **Registros**, **Details** and **Reports**.

Cadastros and **Registros** belong to the Item Group type and have the same functional purpose. See *Groups*.

We created them to distinguish between two types of data items:

- data items that contain information of catalog type such as customers, organizations, tracks, etc. - **Cadastros**
- data items that store information about events recorded in some documents, such as invoices, purchase orders, etc. - **Registros**

4.2 How to upgrade an already created project to a new version of jampy?

To upgrade an existing V7 project to a new package you must update the package.

You can do it using pip.

If you're using Linux, Mac OS X or some other flavour of Unix, enter the command:

```
sudo pip install --upgrade jam.py-v7
```

If you're using Windows, start a command shell with administrator privileges and run the command

```
pip install --upgrade jam.py-v7
```

To migrate v5 project to v7 project, please see
How to migrate v5 project to v7

4.3 Can I use other libraries in my application

You can add javascript libraries to use them for programming on the client side.

It is better to place them in the *js* folders of the *static* directory of the project. And refer to them using the src attribute in the <script> tag of the *Index.html* file.

For example, *Demo project* uses Chart.js library to create a dashboard:

```
<script src="/static/js/Chart.min.js"></script>
```

On the server side you can import python libraries to your modules.

For example the mail item server module import smtplib library to send emails:

```
import smtplib
```

4.4 When printing a report I get an ods file instead of pdf

When a report is generated the server application first creates an ods file.

If *extension* attribute of the report is set to 'pdf' or any other format except 'ods', the application first creates an ods file and then uses LibreOffice in "headless" mode to convert the ods file to that format.

If LibreOffice is currently running on the server this conversion may not happen. You must close LibreOffice on the server for the conversion to take place.

CAPÍTULO 5

How to

Here is a useful code that you can use in your applications:

5.1 How to install Jam.py on Windows

Adapted from Django Docs

The below document is adopted from Django Docs.

This document will guide you through installing Python 3.x and Jam.py on Windows. It also provides instructions for setting up a virtual environment, which makes it easier to work on Python projects. This is meant as a beginner's guide for users working on Jam.py projects and does not reflect how Jam.py should be installed when developing patches for Jam.py itself.

The steps in this guide have been tested with Windows 10. In other versions, the steps would be similar. You will need to be familiar with using the Windows command prompt.

5.1.1 Install Python

Jam.py is a Python web framework, thus requiring Python to be installed on your machine. At the time of writing, Python 3.8 is the latest version.

To install Python on your machine go to https://www.python.org/downloads/. The website should offer you a download button for the latest Python version. Download the executable installer and run it. Check the boxes next to "Install launcher for all users (recommended)" then click "Install Now".

After installation, open the command prompt and check that the Python version matches the version you installed by executing:

```
...\> python --version
```

5.1.2 About pip

pip is a package manager for Python and is included by default with the Python installer. It helps to install and uninstall Python packages (such as Jam.py!). For the rest of the installation, we'll use `pip` to install Python packages from the command line.

5.1.3 Setting up a virtual environment

It is best practice to provide a dedicated environment for each Jam.py project you create. There are many options to manage environments and packages within the Python ecosystem, some of which are recommended in the Python documentation.

To create a virtual environment for your project, open a new command prompt, navigate to the folder where you want to create your project and then enter the following:

```
...\> python -m venv project-name
```

This will create a folder called 'project-name' if it does not already exist and set up the virtual environment. To activate the environment, run:

```
...\> project-name\Scripts\activate.bat
```

The virtual environment will be activated and you'll see "(project-name)" next to the command prompt to designate that. Each time you start a new command prompt, you'll need to activate the environment again.

5.1.4 Install Jam.py

Jam.py can be installed easily using `pip` within your virtual environment.

In the command prompt, ensure your virtual environment is active, and execute the following command:

```
...\> python -m pip install jam.py-v7
```

This will download and install the latest Jam.py release.

After the installation has completed, you can verify your Jam.py installation by executing `pip list` in the command prompt.

5.1.5 Common pitfalls

- If you are connecting to the internet behind a proxy, there might be problems in running the command `py -m pip install Jam.py`. Set the environment variables for proxy configuration in the command prompt as follows:

  ```
  ...\> set http_proxy=http://username:password@proxyserver:proxyport
  ...\> set https_proxy=https://username:password@proxyserver:proxyport
  ```

- If your Administrator prohibited setting up a virtual environment, it is still possible to install Jam.py as follows:

  ```
  ...\> python -m pip install jam.py-v7
  ```

  This will download and install the latest Jam.py release.

  After the installation has completed, you can verify your Jam.py installation by executing `pip list` in the command prompt.

  However, running `jam-project.py` will fail since it is not in the path. Check the installation folder:

```
...\> python -m site --user-site
```

The output might be similar to the following:

```
C:\Users\youruser\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.9_
↪qbz5n2kfra8p0\LocalCache\local-packages\Python39\site-packages
```

Replace `site-packages` at the end of above line with `Scripts`:

```
...\> dir C:\Users\youruser\AppData\Local\Packages\PythonSoftwareFoundation.Python.
↪3.9_qbz5n2kfra8p0\LocalCache\local-packages\Python39\Scripts
```

The output might be similar to the following:

```
...\> Directory of C:\Users\yourser\AppData\Local\Packages\PythonSoftwareFoundation.
↪Python.3.9_qbz5n2kfra8p0\LocalCache\local-packages\Python39\Scripts

    13/04/2023  02:59 PM    <DIR>          .
    13/04/2023  02:59 PM    <DIR>          ..
    13/04/2023  02:59 PM             1,087 jam-project.py
                   1 File(s)          1,087 bytes
                   2 Dir(s)  177,027,321,856 bytes free
```

Create the new folder somewhere and run `jam-project` from from it:

```
...\> python C:\Users\youruser\AppData\Local\Packages\PythonSoftwareFoundation.
↪Python.3.9_qbz5n2kfra8p0\LocalCache\local-packages\Python39\Scripts\jam-project.py
```

Run the new project:

```
...\> python server.py
```

5.1.6 Installing WLS

Invoking installation:

```
...\> wsl --install
```

The output might be similar to the following:

```
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Installing: Ubuntu
Ubuntu has been installed.
The requested operation is successful. Changes will not be effective until the system is␣
↪rebooted.
```

Now, we have a development environment with Ubuntu, and we can proceed with Jam.py installation as usual for Linux.

5.2 How to implement a many-to-many relationship

TBA

5.3 How to migrate development to production

Migrating development to production is very simple in Jam.py due to the ability to export and import its metadata.

To understand the concept of metadata and the process of exporting and importing metadata, please read the topic Export/import metadata. The process of importing metadata depends on the type of project database.

5.3.1 New project migration

- Create an empty database in the production environment
- Run *jam-project.py* script to create a new project
- Set up the server. See
  - *Jam.py deployment with Apache and mod_wsgi*,
  - *How to deploy*.
- In the browser start the Application Builder and finish the creation of the project with an empty database.
- open *Parameters* dialogue to set up the project. Setup the following parameters:
  - **Production** to true
  - **Safe mode**
  - **Debugging** to false
- Export the metadata of the development project to a zip file in the Application Builder by clicking the *Export* button.
- Import the metadata to the new project.

> **Nota**
>
> For projects with **SQLite** database you can simply copy the development project folder to the production environment.

5.3.2 Existing project migration

- Export the metadata of the development project to a zip file.
- Import the metadata to the production project.

> **Nota**
>
> For **SQLite** database, Jam.py doesn't support importing of metadata into an existing project (project with tables in the database). You can only import metadata into a new project.

5.3.3 Importing metadata with the http server process shutdown

Stop the http server and copy the metadata zip file to *migration* folder in the project directory. If the folder doesn't exist, create it.

Start the http server. The web application, while initializing itself, will import the metadata file. You can see the information on how the file was imported in the log file in the *logs* folder of the project directory. If the import is successful, the zip file will be deleted.

5.3.4 Importing metadata without the http server process shutdown

Click the *Import* button in the Application Builder.

Nota

By default the web application in the process that imports the metadata waits for 5 minutes or until all previous request to the application in **this process** will be processed before it starts to change the database. For projects that run on multiple processes you can set the **Import delay** parameter in the *Parameters* to delay the change the database or use Importing metadata with server shutdown.

5.4 How to migrate to another database

TBA - changed from Jam.py v5.

You can migrate your data to another database.

For example, you developed your project with SQLite database and want to move to Postgress.

To do this, follow these steps:

1. Create an empty Postgress database
2. Create a new project with this database
3. Export the metadata of the SQLite project to a zip file in the Application Builder by clicking the *Export* button.
4. Import the metadata to the new project. The web application with create database structures in the Postgress database.
5. copy data from SQlite to Postgress database using the *copy_database* method of the task:
   - within the ProjectTask create the following Server Module function (adjust the below database path with correct one):

```
from jam.db.db_modules import SQLITE

def copy_db(task):
    task.copy_database(SQLITE, '/home/work/demo/demo.sqlite')
```

   - then, execute it with the one of the following ways:
     - call this function in the *on_created* event handler:

```
from jam.db.db_modules import SQLITE

def copy_db(task):
    task.copy_database(SQLITE, '/home/work/demo/demo.sqlite')
```

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```
def on_created(task):
  copy_db(task)
```

- create a button in some form and use the task *server* method to execute it

```
function on_view_form_created(item) {
  item.add_view_button('Copy DB').click(function() {
    task.server('copy_db')
  });
}
```

- or run from from debugging console of the browser:

```
task.server('copy_db')
```

6. Remove the code that was used immediately after this procedure.

Nota

You can not migrate to SQLite database if the current database has foreign keys.

5.5 How to deploy

5.5.1 How to deploy project on PythonAnywhere

- Use pip to install Jam.py. To do this, open the bash console and run the following command (for Python 3.7):

```
pip3.7 install --user jam.py
```

- Create a zip archive of your project folder, upload the archive in the **Files** tab and unzip it.

  We assume that you are registered as *username* and your project is now located in the */home/username/project_folder* directory.

- Open the **Web** Tab. Add a new web app. In the Code section specify
  - Source code: */home/username/project_folder*
  - Working directory: */home/username/project_folder*

  In the WSGI configuration file:/var/www/username_pythonanywhere_com_wsgi.py file add the following code

```
import os
import sys

path = '/home/username/project_folder'
if path not in sys.path:
    sys.path.append(path)

from jam.wsgi import create_application
application = create_application(path)
```

- Reload the server.

5.5.2 A step-by-step guide to deploy a Jam.py on the AWS

This is adapted from https://devops.profitbricks.com/tutorials/install-and-configure-mod_wsgi-on-ubuntu-1604-1/

I hope someone finds it useful.

- Create an AWS account and login
- Go to EC2, create an instance (in this case an Ubuntu 16.04 t2.micro)
- Download the private key when prompted
- Convert pem to ppk using Puttygen (see: https://stackoverflow.com/questions/3190667/convert-pem-to-ppk-file-format)
- Get EC2 instance public DNS from AWS dashboard
- SSH into EC2 instance using Putty (pointed to the Public DNS and your ppk)
- Username is ubuntu
- Refresh package library:

```
sudo apt-get update
```

- Install pip:

```
sudo apt-get install python3-pip
```

- Install jam.py:

```
sudo pip3 install jam.py
```

- Install Apache:

```
sudo apt-get install apache2 apache2-utils libexpat1 ssl-cert
```

- Install mod-wsgi:

```
sudo apt-get install libapache2-mod-wsgi-py3
```

- Restart Apache:

```
sudo /etc/init.d/apache2 restart
```

- Move here:

```
cd /var/www/html/
```

- Create directory:

```
sudo mkdir [appname]
```

- Move here:

```
cd [appname]
```

- Create app:

```
sudo jam-project.py
```

- Check it's there:

```
ls
```

- Create the config:

```
sudo nano /etc/apache2/conf-available/wsgi.conf
```

- Paste the following

```
WSGIScriptAlias / /var/www/html/[appname]/wsgi.py
WSGIPythonPath /var/www/html/[appname]

<Directory /var/www/html/[appname]>
  <Files wsgi.py>
    Require all granted
  </Files>
</Directory>

Alias /static/ /var/www/html/[appname]/static/

<Directory /var/www/html/[appname]/static>
  Require all granted
</Directory>
```

- Exit and save
- Give file permissions to apache:

```
sudo chmod 777 /var/www/html/[appname]
```

- Give ownership to apache:

```
sudo chown -R www-data:www-data /var/www
```

- Enable wsgi:

```
sudo a2enconf wsgi
```

- Restart apache:

```
sudo /etc/init.d/apache2 restart
```

- Create security group on AWS to allow you to connect HTTP on port 80
- Assign instance to security group
- Test
- If it's not working, check the error logs to see what's going on:

```
nano /var/log/apache2/error.log
```

This was initialy published by Simon Cox on https://groups.google.com/forum/#!msg/jam-py/Zv5JfkLRFy4/22tolZ-hAQAJ

5.5.3 How to deploy jam-py app at Linux Apache http server?

So basically deploying straight into the ie an cloud server with open 22, 80 and 443 port. Prerequisite is a signed certificate for the DNS server name (YOUR_SERVER DNS entry from below). One can use a self signed, etc, not covering those. Also, Python installed and sudo access (or root for Linux). I have no idea at all about the MS Servers, sorry.

The App is in read only mode. You can access admin.html page, but can't change anything. Took me some fiddling with Google Cloud server, this is a micro Ubuntu instance, plain apache2 install with apt-get.

- Install wsgi module for Apache :

```
apt-get install libapache2-mod-wsgi
```

- Enable ssl, wsgi module for apache:

```
a2enmod ssl wsgi
```

- Create a custom file for jam-py app, ie /etc/apache2/sites-available/test.conf, for example (still wip):

```
<IfModule mod_ssl.c>
  <VirtualHost YOUR_IP:443>
    ServerName YOUR_SERVER
    ServerAlias
    ServerAdmin YOUR_EMAIL
    ErrorLog ${APACHE_LOG_DIR}/test-error-sec.log
    CustomLog ${APACHE_LOG_DIR}/test-access-sec.log combined

    #below is for cx_Oracle
    SetEnv LD_LIBRARY_PATH /u01/app/oracle/product/11.2.0/xe/lib
    SetEnv ORACLE_SID XE
    SetEnv ORACLE_HOME /u01/app/oracle/product/11.2.0/xe
    #finish cx_Oracle

    DocumentRoot /var/www/html/simpleassets

    SSLEngine on
    SSLCertificateFile  "/etc/ssl/private/your.crt"
    SSLCertificateKeyFile  "/etc/ssl/private/your.key"
    SSLCertificateChainFile "/etc/ssl/private/your_chain.crt"
    SSLCACertificateFile   "/etc/ssl/private/your_CA.crt"

    WSGIDaemonProcess  web user=www-data group=www-data processes=1 threads=5
    WSGIScriptAlias / /var/www/html/simpleassets/wsgi.py

    <Directory /var/www/html/simpleassets>
      Options +ExecCGI
      SetHandler wsgi-script
      AddHandler wsgi-script .py

      Order deny,allow
      Allow from all
      Require all granted

      <Files wsgi.py>
```

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```
        Order deny,allow
        Allow from all

        # comment the following for ubuntu <13
        Require all granted
      </Files>
    </Directory>

    <Directory /var/www/html/simpleassets/static>
      # comment the following for ubuntu < 13
      Require all granted
    </Directory>
  </VirtualHost>
</IfModule>
```

The above file is using signed certificate your.crt with your.key, and CA, chain file obtained from CA. Please review resources on the net about certificates and the dns. You'll need to obtain and copy those files in /etc/ssl/private folder. Change YOUR_xyz with your preference.

The /var/www/html is the default Ubuntu folder for serving web pages.

- Install jam-py as usual.

  I created the /var/www/html/simpleassets folder where unzipped jam-py SimpleAssets project. Follow procedure explained there how to deploy these:

  Basically, Export your project, save the zip file and copy it to your web hosting server desired folder. Copy admin.sqlite and your database as well (providing you're using sqlite3 database). If using some other database ie mysql, you'll need to export/import the database.

- Enable test.conf (the above file name with no extension):

```
a2ensite test; systemctl restart apache2
```

That is it. At the moment, I've left port 80 as is, and jam-py is running only on https port. To debug problems, I would start with SeLinux or apparmor. With Ubuntu this might help:

```
sudo /etc/init.d/apparmor stop
```

Now, here is the question of how to run TWO jam-py instances on one https server?

One possible answer to this problem is the DNS. You might decide to set your DNS to ie second_instance.YOUR_SERVER name (the above live example would be jam2.research...).

So the above test.conf file would be almost the same except YOUR_SERVER is now called second_instance.YOUR_SERVER

The /etc/apache2/sites-available/test3.conf file:

```
<IfModule mod_ssl.c>
  <VirtualHost YOUR_IP:443>
    ServerName second_instance.YOUR_SERVER
    ServerAlias
    ServerAdmin YOUR_EMAIL
    ErrorLog ${APACHE_LOG_DIR}/test3-error-sec.log
    CustomLog ${APACHE_LOG_DIR}/test3-access-sec.log combined
    #below is for cx_Oracle
```

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```
    SetEnv LD_LIBRARY_PATH /u01/app/oracle/product/11.2.0/xe/lib
    SetEnv ORACLE_SID XE
    SetEnv ORACLE_HOME /u01/app/oracle/product/11.2.0/xe
    #finish cx_Oracle
    DocumentRoot /var/www/html/simpleassets3
    SSLEngine on
    SSLCertificateFile  "/etc/ssl/private/your.crt"
    SSLCertificateKeyFile  "/etc/ssl/private/your.key"
    SSLCertificateChainFile "/etc/ssl/private/your_chain.crt"
    SSLCACertificateFile   "/etc/ssl/private/your_CA.crt"

    WSGIDaemonProcess  assets3 user=www-data group=www-data processes=1 threads=5
    WSGIScriptAlias / /var/www/html/simpleassets3/wsgi.py

    <Directory /var/www/html/simpleassets3>
      Options +ExecCGI
      SetHandler wsgi-script
      AddHandler wsgi-script .py

      Order deny,allow
      Allow from all
      Require all granted

      <Files wsgi.py>
        Order deny,allow
        Allow from all

        # comment the following for ubuntu <13
        Require all granted
      </Files>
    </Directory>

    <Directory /var/www/html/simpleassets3/static>
      # comment the following for ubuntu < 13
      Require all granted
    </Directory>
  </VirtualHost>
</IfModule>
```

The jam-py application second_instance lives now in ie /var/www/html/simpleassets3, and WSGIDaemonProcess is adjusted to new daemon, called assets3. Everything else is almost the same.

This is possible because the SSL certificate is a * (star, or wildcard) certificate, enabling you to run multiple services on one DNS domain.

This was initialy published by Dražen Babić on https://github.com/jam-py/jam-py/issues/35

5.5.4 How to do with Nginx with Gunicorn?

Green Unicorn (gunicorn) is an HTTP/WSGI server designed to serve fast clients or sleepy applications. That is to say; behind a buffering front-end server such as nginx or lighttpd.

By default, gunicorn will listen on 127.0.0.1. Navigate to jam App folder, or use (ie in scripts, cron job, etc)

```
python /usr/bin/gunicorn --chdir /path/to/jam/App wsgi
```

or from /path/to/jam/App:

```
gunicorn wsgi
[2018-04-13 15:01:44 +0000] [8650] [INFO] Starting gunicorn 19.4.5
[2018-04-13 15:01:44 +0000] [8650] [INFO] Listening at: http://127.0.0.1:8000 (8650)
[2018-04-13 15:01:44 +0000] [8650] [INFO] Using worker: sync
[2018-04-13 15:01:44 +0000] [8654] [INFO] Booting worker with pid: 8654
.
.
```

To start jam.py on all interfaces and port 8081:

```
gunicorn -b 0.0.0.0:8081 wsgi
[2018-04-13 15:03:34 +0000] [8680] [INFO] Starting gunicorn 19.4.5
[2018-04-13 15:03:34 +0000] [8680] [INFO] Listening at: http://0.0.0.0:8081 (8680)
[2018-04-13 15:03:34 +0000] [8680] [INFO] Using worker: sync
[2018-04-13 15:03:34 +0000] [8684] [INFO] Booting worker with pid: 8684
.
.
```

Spin up 5 workers if u like with –workers=5

Nginx:

comment out default location in /etc/nginx/sites-enabled/default (Linux Mint):

```
      #location / {
              # First attempt to serve request as file, then
              # as directory, then fall back to displaying a 404.
#             try_files $uri $uri/ =404;
#     }
```

and add:

```
# Proxy connections to the application servers
 # app_servers
 location / {

     proxy_pass          http://app_servers;
     proxy_redirect      off;
     proxy_set_header    Host $host;
     proxy_set_header    X-Real-IP $remote_addr;
     proxy_set_header    X-Forwarded-For $proxy_add_x_forwarded_for;
     proxy_set_header    X-Forwarded-Host $server_name;

 }
```

add in /etc/nginx/nginx.conf 127.0.0.1:8081 if this is your Gunicorn server address and port:

```
# Configuration containing list of application servers
upstream app_servers {
server 127.0.0.1:8081;
}
```

This also enables to have different App servers on different ports

```
Client Request ----> Nginx (Reverse-Proxy)
                       |
                      /|\
                     | | `-> App. Server I.   127.0.0.1:8081
                     |  `--> App. Server II.  127.0.0.1:8082
                      `----> App. Server III. 127.0.0.1:8083
```

Restart nginx and viola!

Congratulations! We can now test Nginx with Jam.py.

Now, certs:

in /etc/nginx/sites-enabled/jam we can have something like this to pass everything from http to https to 8001 port (or any other as per above):

```
server {
      listen 80;
      server_name YOUR_SERVER;

      access_log off;

      location /static/ {
              alias /path/to/jam/App/static/;
      }

      location / {
              proxy_pass http://127.0.0.1:8001;
              proxy_set_header X-Forwarded-Host $server_name;
              proxy_set_header X-Real-IP $remote_addr;
              add_header P3P 'CP="ALL DSP COR PSAa PSDa OUR NOR ONL UNI COM NAV"';
      }

      return 301 https://$server_name$request_uri;
}
server {
      listen 443;
      server_name YOUR_SERVER_FQDN;

      access_log off;

      location /static/ {
              alias /path/to/jam/App/static/;
      }

      location = /favicon.ico {
              alias /path/to/jam/App/favicon.ico;
      }


      ssl on;
      ssl_certificate /etc/nginx/ssl/YOUR_SERVER.crt;
      ssl_certificate_key /etc/nginx/ssl/YOUR_SERVER.key;
```

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```
      add_header Strict-Transport-Security "max-age=31536000";

      location / {
              client_max_body_size 10M;
              proxy_pass http://127.0.0.1:8001;
              proxy_set_header X-Forwarded-Host $server_name;
              proxy_set_header X-Real-IP $remote_addr;
              add_header P3P 'CP="ALL DSP COR PSAa PSDa OUR NOR ONL UNI COM NAV"';
}
```

That's it!

Congratulations! We can now test Nginx with Jam.py on https port!

This was initialy published by Dražen Babić on https://github.com/jam-py/jam-py/issues/67

5.6 How do I write functions which have a global scope

Each function defined in the server or client module of an item becomes an attribute of the item.

Thus, using the *task tree*, you can access any function declared in the client or server module in any project module.

For example, if we have a function `some_func` declared in the Customers client module, we can execute it in any module of the project. Note that the task is a global variable on the client.

```
task.customers.some_func()
```

On the server, the task is not global, but an item that triggered / called it is passed to each event handler and function called by the *server* method. Therefore, if the `some_func` function is declared in the Customers server module, it can be executed in a function or event handler as follows:

```
def on_apply(item, delta, params):
  item.task.customers.some_func()
```

Note that event handlers are just functions and can also be called from other modules.

5.7 How to validate field value

Write the *on_field_validate* event handler to validate field value.

For example, The event will triggered when the *post* method is called, that saves the record in memory or when the user leaves the input used to edit the unitprice field value.

```
function on_field_validate(field) {
     if (field.field_name === 'unitprice' && field.value <= 0) {
        return 'Unit price must be greater that 0';
    }
}
```

As an example, below is the code that doesn't use the *on_field_validate* method and checks the value of the unitprice field and prevents the user from leaving the input when the value is less than or equal to zero:

```
function on_edit_form_shown(item) {
    item.each_field( function(field) {
```

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```
        var input = item.edit_form.find('input.' + field.field_name);
        input.blur( function(e) {
            var err;
            if ($(e.relatedTarget).attr('id') !== "cancel-btn") {
                err = check_field_value(field);
                if (err) {
                    item.alert_error(err);
                    input.focus();
                }
            }
        });
    });
}

function check_field_value(field) {
    if (field.field_name === 'album' && !field.value) {
        return 'Album must be specified';
    }
    if (field.field_name === 'unitprice' && field.value <= 0) {
        return 'Unit price must be greater that 0';
    }
}
```

In the on_edit_form_shown event handler, we iterate through all the fields using the each_field method and find the input data for each field, if it exists.

In the *on_edit_form_shown* event handler we iterate through all the fields using the *each_field* method and find the input for each field, if it exists. Each input has a class with the name of the field (*field_name*).

Then we assign a jQuery blur event to it, in which we call the `check_field_value` function, and, if it returns text string, we warn the user and focus the input. Before calling the function, we check whether the "Cancel" button was pressed.

We declared the *on_edit_form_shown* event handler in the item's module, so it will work in this module only.

We can declare the following event handler in the task client module so we can write `check_field_value` function in any module we need to enable this field validation. The *on_edit_form_shown* of the task is called first for every item when edit form is shown. See *Form events*.

```
function on_edit_form_shown(item) {
    if (item.check_field_value) {
        item.each_field( function(field) {
            var input = item.edit_form.find('input.' + field.field_name);
            input.blur( function(e) {
                var err;
                if ($(e.relatedTarget).attr('id') !== "cancel-btn") {
                    err = item.check_field_value(field);
                    if (err) {
                        item.alert_error(err);
                        input.focus();
                    }
                }
            });
        });
```

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```
    }
}
```

In this event handler we check if the item has the `check_field_value` attribute. Each function declared in a module becomes an attribute of the item.

5.8 How to add a button to a form

The simplest way to add a button to an edit / view from is to use *add_edit_button* / *add_view_button* correspondingly. You can call this functions in the *on_edit_form_created* / *on_view_form_created* event handlers.

For example the Customers item uses this code in its client module to add buttons to a view form:

```
function on_view_form_created(item) {
    item.table_options.multiselect = false;
    if (!item.lookup_field) {
        var print_btn = item.add_view_button('Print', {image: 'icon-print'}),
            email_btn = item.add_view_button('Send email', {image: 'icon-pencil'});
        email_btn.click(function() { send_email() });
        print_btn.click(function() { print(item) });
        item.table_options.multiselect = true;
    }
}
```

In this code the item's *lookup_field* attribute is checked and if it is defined (the view form is not created to select a value for a lookup field) the two buttons are created and for them JQuery click events are assigned to `send_email` and `print` functions declared in that module.

5.9 How to execute script from client

You can use *server* method to send a request to the server to execute a function defined in the server module of an item.

In the example below we create the `btn` button that is a JQuery object. Then we use its click method to attach a function that calls the *server* method of the item to run the `calculate` function defined in the server module of the item.

The code in the client module:

```
function on_view_form_created(item) {
    var btn = item.add_view_button('Calculate', {type: 'primary'});
    btn.click(function() {
        item.server('calculate', [1, 2, 3], function(result, error) {
          if (error) {
            item.alert_error(error);
          }
          else {
            console.log(result);
          }
        })
    });
}
```

The code in the server module:

```
def calculate(item, a, b, c):
    return a + b + c
```

5.10 How to change style and attributes of form elements

You can access any DOM element on forms using jQuery.

In the following example, in the `on_edit_form_created` event handler defined the item client module we find the **OK** button, hide it, and change the text of the **Cancel** button to "Close" in the edit form:

```
function on_edit_form_created(item) {
    item.edit_form.find("#ok-btn").hide();
    item.edit_form.find("#cancel-btn").text('Close');
}
```

When an application creates input controls, it adds a class with a name that is the *field_name* attribute of the corresponding field to each input.

Thus, using the jQuery selectors, we can find the input of the customer field as follows (we select the input with the "customer" class in the edit form):

```
item.edit_form.find("input.customer")
```

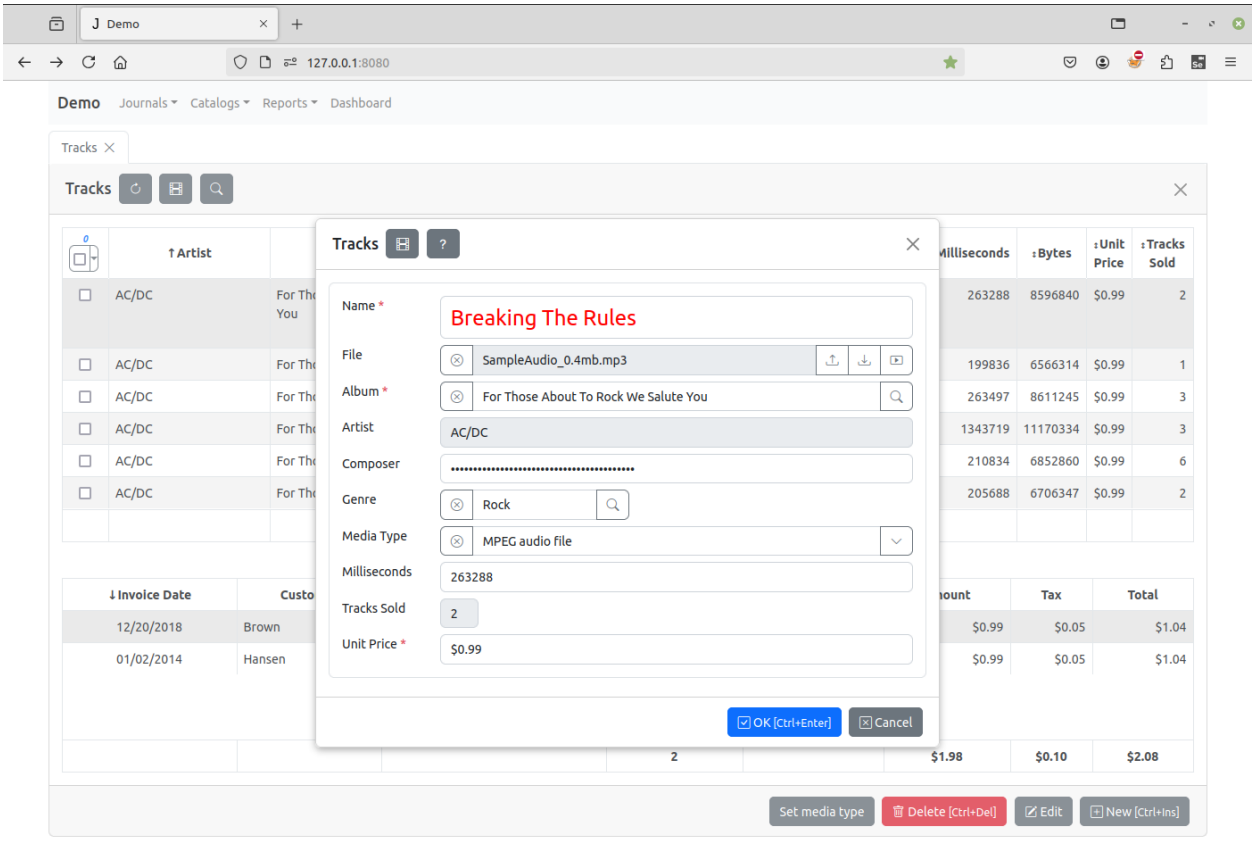
Having found the element of the form you can use JQuery methods to change it.

As the field inputs are created by *create_inputs* after the *on_edit_form_created* event have been triggered (see the `on_edit_form_created` event handler in the task client module) you must write *on_edit_form_shown* event handler to change inputs.

For example this code

```
function on_edit_form_shown(item) {
  item.edit_form.find('input.name').css('color', 'red');
  item.edit_form.find('input.name').css('font-size', '24px');
  item.edit_form.find('input.tracks_sold').width(20);
  item.edit_form.find('input.genre').parent().width('40%');
  item.edit_form.find('input.composer').prop('type', 'password');
}
```

will change form inputs this way:



Please, note that if you need to change the width of input with prepend or append buttons (inputs of date, datetime and lookup fields) set the width of the input parent:

```
item.edit_form.find('input.album').parent().width('50%');
```

Another way to change the style of DOM elements is to use CSS. When the task node is selected in the Application Builder, the "project css" button is located on the right pane. Click on it to open the *project.css* file, which is located in the project folder. You can use it to input CSS that defines the style of the DOM elements of the project.

Each item form created in the project has css classes that enable developer to identify the form.

Each form has a class identifying it's type: 'view-form', 'edit-form', 'filter-form' or 'param-form'.

For example, the following code will remove the images in the buttons at the bottom of the form:

```
.view-form .form-footer .btn i {
    display: none;
}
```

More edit form examples:

```
.edit-form #ok-btn {
    font-weight: bold;
    background-color: lightblue;
}

.edit-form.invoices input.total {
```

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```
    color: red;
}
```

Also each form has a class with a name that is the *item_name* attribute of the item.

The following code will remove images in the buttons only in the **Invoices** view form:

```
.view-form.invoices .form-footer .btn i {
    display: none;
}
```

You can change the way tables are displayed. The tables that are created by the *create_table* method have a css class "dbtable" and a class with a name that is the *item_name* attribute of the item. Each column of the table also has a class with a name that is the *field_name* attribute of the corresponding field.

The example, the following code will display cells of the **Invoices** table **Customer** column bold:

```
.dbtable.invoices td.customer {
    font-weight: bold;
}
```

One more way to change the way the field column is displayed is to write the *on_field_get_html* event handler.

For example:

```
function on_field_get_html(field) {
    if (field.field_name === 'total') {
        if (field.value > 10) {
            return '<strong>' + field.display_text + '</strong>';
        }
    }
}
```

5.11 How to create a custom menu

To create a custom menu you must specify a custom_menu option for the task's *create_menu* method in the task's client module.

5.12 How to append a record using an edit form without opening a view form?

You must first call the *open* method of the item to initiate its dataset. For example, if you want to add a new record to invoices in the Demo application, you can do so as follows:

```
var invoices = task.invoices.copy();
invoices.open({ open_empty: true });
invoices.append_record();
```

In this code, we create a copy of the item using the *copy* method so that this operation does not affect the Invoices view form if it is open in a tab.

You can also change the record, but before you do this, you must get it from the server. Below is the code that modifies the record with id 411. We check that the record exists using the rec_count property, otherwise we display a warning.

```
var invoices = task.invoices.copy();
invoices.open({ where: {id: 411} });
if (invoices.rec_count) {
    invoices.edit_record();
}
else {
    invoices.alert_error('Invoices: record not found.');
}
```

In the example above the open method is not executed synchronously.

The code below does it asynchronously:

```
var invoices = task.invoices.copy();
invoices.open({ where: {id: 411} }, function() {
    if (invoices.rec_count) {
        invoices.edit_record();
    }
    else {
        invoices.alert_error('Invoices: record not found.');
    }
});
```

Invoices has the Modeless attribute set in the Edit form dialog, so the the edit form with be opened in a tab. You can change it by setting modeless attribute of *edit_options* to make the edit form modal:

```
var invoices = task.invoices.copy();
invoices.edit_options.modeless = false;
```

5.13 How to prohibit changing record

Let's assume that we have an item with a boolean field "posted", and if the value of the field is true, we must prohibit changing or deleting the record.

We can do this by writing the *on_after_scroll* event handler and using *permissions* property:

```
function on_after_scroll(item) {
    if (item.rec_count) {
        item.permissions.can_edit = !item.posted.value;
        item.permissions.can_delete = !item.posted.value;
        if (item.view_form) {
            item.view_form.find("#delete-btn").prop("disabled", item.posted.value);
        }
    }
}
```

In this event handler we check the value of the "posted" field and set the *permissions* property attributes to true.

We can also write the *on_apply* event handler in the server module of the item:

```
def on_apply(item, delta, params, connection):
  for d in delta:
      if d.posted.old_value:
          raise Exception('Document posted. No change allowed')
```

5.14 How to link two tables

The below procedure was valid for Jam.py V5, for the scenario when the two database tables were not directly linked by a Master/Detail relationship within the Builder (see *Tutorial. Part 3. Detail*).

In Jam.py V7, the database table Tracks is directly linked to the detail table invoicetable, hence the below procedure is not needed. If the tables were not directly linked within the Builder, we could still use the procedure with Jam.py V7.

We'll explain how to link two items on example of the tracks and invoicetable items from the demo application. We'll link the record of tracks with the corresponding list of sold tracks from invoicetable that contains all sold tracks from invoices.

The default behaviour of *view_form* is defined in the *on_view_form_created* event handler declared in the task client module.

We will change it in the *on_view_form_created* event handler in the tracks client module

```
function on_view_form_created(item) {
  item.table_options.height -= 200;
  item.invoice_table = task.invoice_table.copy();
  item.invoice_table.paginate = false;
  item.invoice_table.create_table(item.view_form.find('.view-detail'), {
      height: 200,
      summary_fields: ['date', 'total'],
  });
}
```

Then we reduce height of the table that displays tracks data by 200 pixels

```
item.table_options.height -= 200;
```

create a *copy* of invoice_table, set its *paginate* attribute to false and call the *create_table* method to create a table that will display the sold tracks

```
item.invoice_table = task.invoice_table.copy();
item.invoice_table.paginate = false;
item.invoice_table.create_table(item.view_form.find('.view-detail'), {
    height: 200,
    summary_fields: ['date', 'total'],
});
```

For this table we set the height to 200 pixels and define to summary fields.

This table will always be empty if we won't define the following *on_after_scroll* event handler:

```
function on_after_scroll(item) {
    if (item.view_form.length) {
      if (item.rec_count) {
          item.invoice_table.set_where({track: item.id.value});
          item.invoice_table.set_order_by(['-invoice_date']);
          item.invoice_table.open(true);
      }
      else {
          item.invoice_table.close();
      }
    }
}
```

The *on_after_scroll* event is triggered whenever the current record is changed. So when the track is changed we call *open* method, pre-setting the filter and order

```
item.invoice_table.set_where({track: item.id.value});
item.invoice_table.set_order_by(['-invoice_date']);
item.invoice_table.open(true);
```

This method sends a request to the server, that generates sql query, executes it and returns a dataset that contains sold records of this track ordered in descending order of invoice_date field.

If the tracks dataset is empty we clear the sold records dataset by calling the *close* method.

Because controls in Jam.py are data-aware every change of sold records dataset will be displayed in the table that we created in the *on_view_form_created* event handler.

Now every time the track has changed the application send request to the server to renew the sold tracks. This is not effective and sometimes can lead to delays. To avoid this we use the JavaScript setTimeout function:

```
var scroll_timeout;

function on_after_scroll(item) {
    if (!item.lookup_field && item.view_form.length) {
        clearTimeout(scroll_timeout);
        scroll_timeout = setTimeout(
            function() {
                if (item.rec_count) {
                    item.invoice_table.set_where({track: item.id.value});
                    item.invoice_table.set_order_by(['-invoice_date']);
                    item.invoice_table.open(true);
                }
                else {
                    item.invoice_table.close();
                }
            },
            100
        );
    }
}
```

This function guarantees that the data will be updated no more than once every 100 milliseconds.

Since the invoicetable is a *detail* it has the **invoice** field that stores a reference to invoice that has this record, we can show the user an invoice that contains the current sold record. To do so we pass to the *create_table* method the function that will be executed when user double click the record:

```
item.invoice_table.create_table(item.view_form.find('.view-detail'), {
    height: 200,
    summary_fields: ['date', 'total'],
    on_dblclick: function() {
        show_invoice(item.invoice_table);
    }
});
```

and define the function as follows:

```
function show_invoice(invoice_table) {
    var invoices = task.invoices.copy();
    invoices.set_where({id: invoice_table.invoice.value});
    invoices.open(function(i) {
        i.edit_options.modeless = false;
        i.can_modify = false;
        i.invoice_table.on_after_open = function(t) {
            t.locate('id', invoice_table.id.value);
        };
        i.edit_record();
    });
}
```

In this function we create a copy of the invoices journal and find the invoice. When the open method is executed we will show the invoice by calling its *edit_record* method. But before calling it we set its attributes so that it will be modal and the user won't be able to modify it.

Besides we dynamically assign *on_after_open* event handler to the invoice_table detail of the invoice we get. In this event handler we will find the current record in the sold records by calling the *locate* method.

Finally we will check the *lookup_field* attribute of tracks. This attribute is true if the item was created to select a value for the lookup field when a user clicks on the button to the right of lookup field input. We will make so that the sold tracks are not shown when the user selects the value for the lookup field.

In addition, we add an alert informing the user about the possibility of seeing the invoice.

Finally the code of the *on_view_form_created* will be as follows:

```
function on_view_form_created(item) {
    if (!item.lookup_field) {
        item.table_options.height -= 200;
        item.invoice_table = task.invoice_table.copy();
        item.invoice_table.paginate = false;
        item.invoice_table.create_table(item.view_form.find('.view-detail'), {
            height: 200,
            summary_fields: ['date', 'total'],
            on_dblclick: function() {
                show_invoice(item.invoice_table);
            }
        });
        item.alert('Double-click the record in the bottom table ' +
          'to see the invoice in which the track was sold.');
    }
}

var scroll_timeout;

function on_after_scroll(item) {
    if (!item.lookup_field && item.view_form.length) {
        clearTimeout(scroll_timeout);
        scroll_timeout = setTimeout(
            function() {
                if (item.rec_count) {
                    item.invoice_table.set_where({track: item.id.value});
                    item.invoice_table.set_order_by(['-invoice_date']);
```

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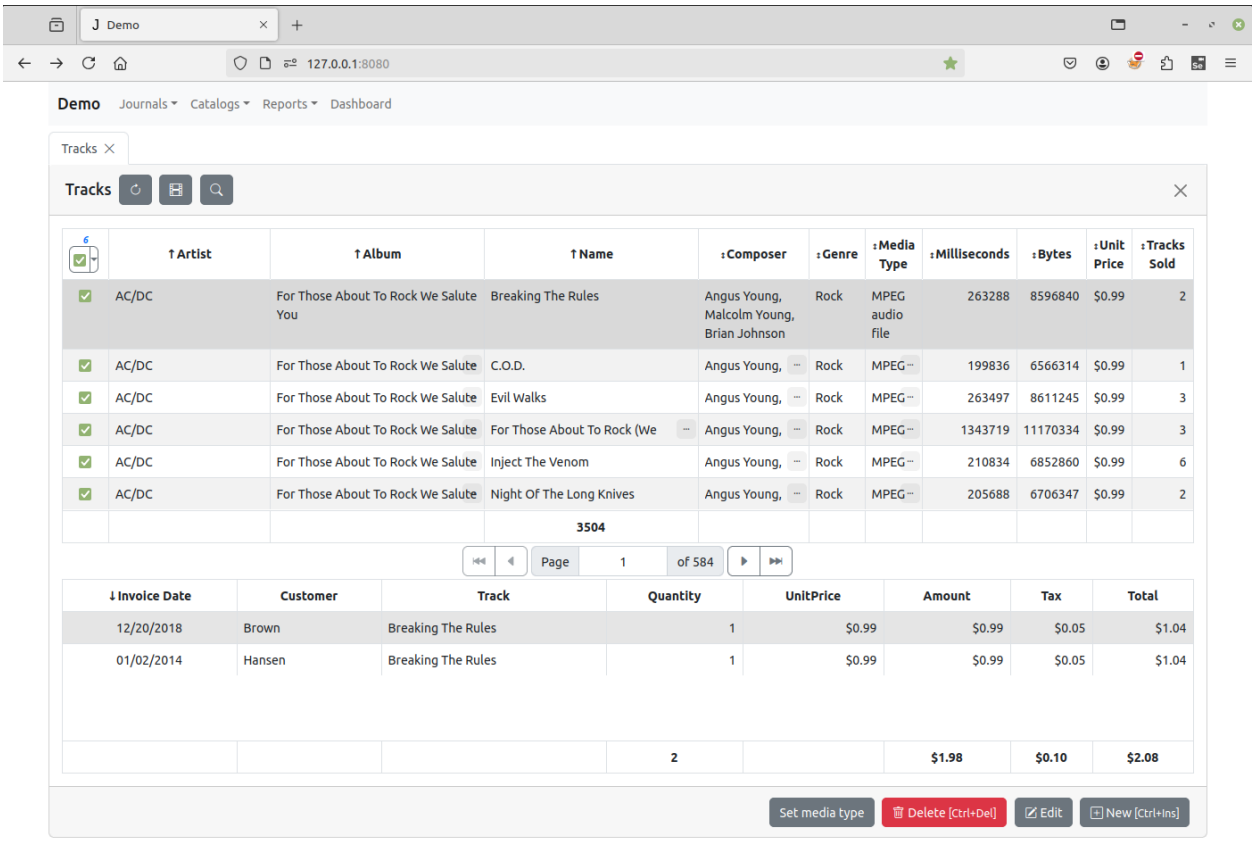
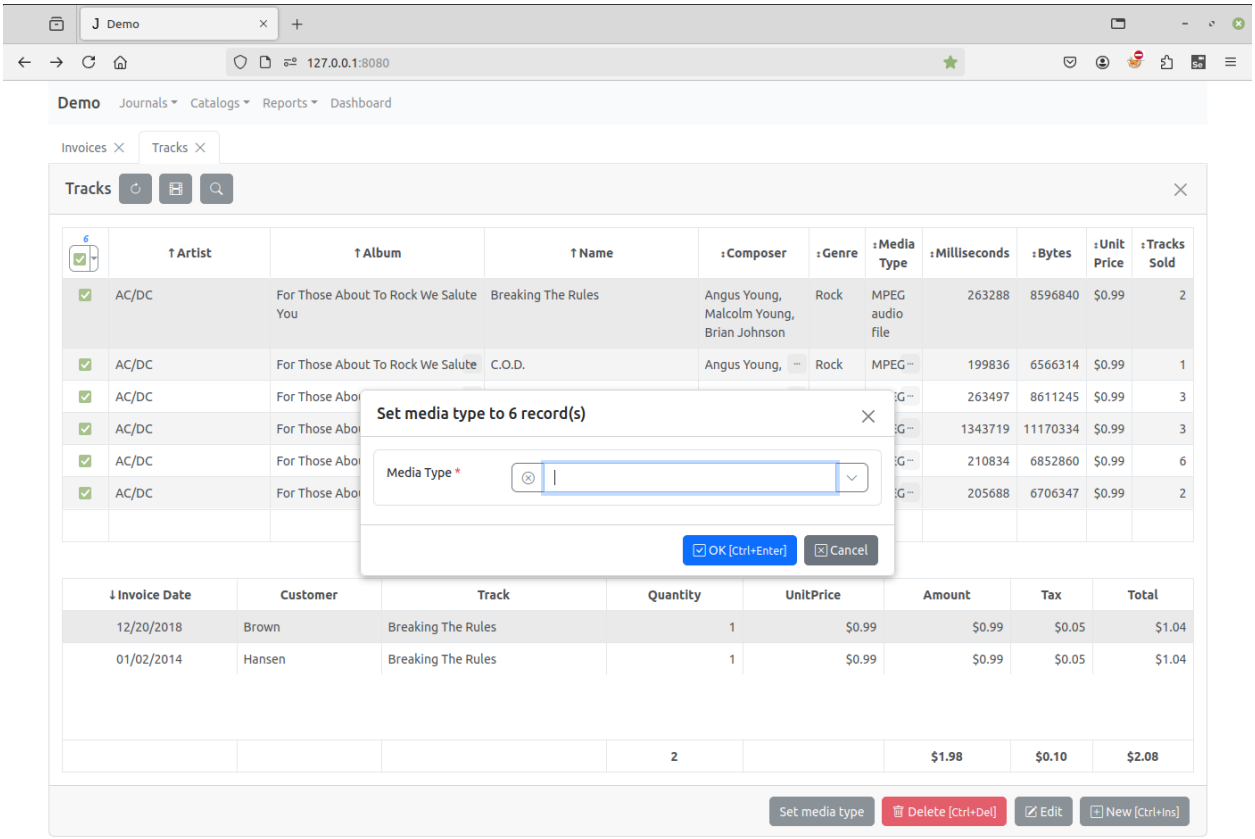
```
                    item.invoice_table.open(true);
                }
                else {
                    item.invoice_table.close();
                }
            },
            100
        );
    }
}

function show_invoice(invoice_table) {
    var invoices = task.invoices.copy();
    invoices.set_where({id: invoice_table.invoice.value});
    invoices.open(function(i) {
        i.edit_options.modeless = false;
        i.can_modify = false;
        i.invoice_table.on_after_open = function(t) {
            t.locate('id', invoice_table.id.value);
        };
        i.edit_record();
    });
}
```



5.15 How change field value of selected records

In this example, we will show how to change the "Media Type" field of the "Tracks" catalog to the same value for the selected records.



First we set the multiselect attribute of the *table_options* to true to display the check box in the leftmost column of the "Tracks" table for the user to select the records and create the **Set media type** button in the *on_view_form_created* event handler in the client module of "Tracks".

```
function on_view_form_created(item) {
  item.table_options.multiselect = true;
  item.add_view_button('Set media type').click(function() {
      set_media_type(item);
  });
}
```

When this button is pressed, the `set_media_type` function defined in the module is executed.

In this function we create a copy of the "Tracks" item. We pass to the *copy* method the handlers option equal to false. It means that all the settings to the item made in the Form Dialogs in the Application Builder and all the functions and events defined in the client module of the item will be unavailable to the copy.

Then we analyze the *selections* attribute that is the array of the values of primary key field of the records, selected by the user.

After it we initialize the dataset of the copy by calling the *open* method with open_empty option. We also set the fields options so that the dataset will have only one field media_type. We set the required attribute of that field to true.

And finally, before calling the *append_record* method, we dynamically assign the *on_edit_form_created* event handler to change the on click event of the **OK** button, that was defined in the client module of the task.

In the new on click event handler we, first, call the *post* method to check that the media type value is set, if exception is raised we call *edit* method to allow the user to set it.

```
function set_media_type(item) {
    var copy = item.copy({handlers: false}),
        selections = item.selections;
    if (selections.length > 1000) {
        item.alert('Too many records selected.');
    }
    else if (selections.length || item.rec_count) {
        if (selections.length === 0) {
            selections = [item.id.value];
        }

        copy.open({fields: ['media_type'], open_empty: true});

        copy.edit_options.title = 'Set media type to ' + selections.length +
          ' record(s)';
        copy.edit_options.history_button = false;
        copy.media_type.required = true;

        copy.on_edit_form_created = function(c) {
            c.edit_form.find('#ok-btn').off('click.task').on('click', function() {
                try {
                    c.post();
                    item.server('set_media_type', [c.media_type.value, selections],
                      function(res, error) {
                        if (error) {
                            item.alert_error(error);
                        }
                        if (res) {
                            item.selections = [];
                            item.refresh_page(true);
                            c.cancel_edit();
                            item.alert(selections.length + '
                              record(s) have been modified.');
                        }
                      }
                    );
                }
                finally {
                    c.edit();
                }
            });
        };
        copy.append_record();
    }
}
```

When the user clicks the **OK** button, the item's *server* method executes the `set_media_type` function on the server, which changes the field value of the selected records.

After changing the records on the server we, on the client, unselect the records, refresh the data of the page, cancel editing by calling the *cancel_edit* method and inform the user of the results.

```
def set_media_type(item, media_type, selections):
    copy = item.copy()
    copy.set_where(id__in=selections)
    copy.open(fields=['id', 'media_type'])
    for c in copy:
        c.edit()
        c.media_type.value = media_type
        c.post()
    c.apply()
    return True
```

5.16 How to save edit form without closing it

You can do it by adding a button that will save the record without closing the edit form.

Below is examples for synchronous and asynchronous cases.

```
function on_edit_form_created(item) {
    var save_btn = item.add_edit_button('Save and continue');
    save_btn.click(function() {
        if (item.is_changing()) {
            item.post();
            try {
              item.apply();
            }
            catch (e) {
              item.alert_error(error);
            }
            item.edit();
        }
    });
}
```

```
function on_edit_form_created(item) {
    var save_btn = item.add_edit_button('Save and continue');
    save_btn.click(function() {
        if (item.is_changing()) {
            item.disable_edit_form();
            item.post();
            item.apply(function(error){
                if (error) {
                    item.alert_error(error);
                }
                item.edit();
                item.enable_edit_form();
            });
        }
    });
}
```

5.17 How to save changes to two tables in same transaction on the server

Below are two examples.

In the first example each *apply* method gets its own connection from connection pool and commits it after saving changes to the database.

In the second example the connection is received from connection pool and passed to each *apply* method so changes are committed at the end.

```
import datetime

def change_invoice_date(item, invoice_id):
    now = datetime.datetime.now()

    invoices = item.task.invoices.copy(handlers=False)
    invoices.set_where(id=invoice_id)
    invoices.open()
    invoices.edit()
    invoices.invoice_date.value = now
    invoices.post()
    invoices.apply()

    customer_id = invoices.customer.value
    customers = item.task.customers.copy(handlers=False)
    customers.set_where(id=customer_id)
    customers.open()
    customers.edit()
    customers.last_modified.value = now
    customers.post()
    customers.apply()
```

```
import datetime

def change_invoice_date(item, invoice_id):
    now = datetime.datetime.now()

    con = item.task.connect()
    try:
        invoices = item.task.invoices.copy(handlers=False)
        invoices.set_where(id=invoice_id)
        invoices.open()
        invoices.edit()
        invoices.invoice_date.value = now
        invoices.post()
        invoices.apply(con)

        customer_id = invoices.customer.value
        customers = item.task.customers.copy(handlers=False)
        customers.set_where(id=customer_id)
        customers.open()
        customers.edit()
```

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```
        customers.last_modified.value = now
        customers.post()
        customers.apply(con)

        con.commit()
    finally:
        con.close()
```

5.18 How to prevent duplicate values in a table field

One of the ways to do it is to write the *on_apply* event handler.

In the example below, the delta parameter is a dataset that contains the changes that will be stored in the users table.

We go through the records of changes and if the record was not deleted or the login field didn't change we look for a record in the table with the same login and if it exists raise the exception. If the user is editing the record on the client using an edit form he won't be able to save it and will see the corresponding alert message.

```
def on_apply(item, delta, params, connection):
    for d in delta:
        if not (d.rec_deleted() or d.rec_modified() and d.login.value == d.login.old_
↪value):
            users = d.task.users.copy(handlers=False)
            users.set_where(login=d.login.value)
            users.open(fields=['login'])
            if users.rec_count:
                raise Exception('There is a user with this login - %s' % d.login.value)
```

5.19 How to implement some sort of basic multi-tenancy? For example, to have users with separate data.

You can implement a multi-tenancy using Jam.py.

For example, if some item have a user_id field, the following code in the server module of the item will do the job:

```
def on_open(item, params):
    if item.session:
        user_id = item.session['user_info']['user_id']
        if user_id:
            params['__filters'].append(['user_id', item.task.consts.FILTER_EQ, user_id])

def on_apply(item, delta, params, connection):
    if item.session:
        user_id = item.session['user_info']['user_id']
        if user_id:
            for d in delta:
                if d.rec_inserted():
                    d.edit()
                    d.user_id.value = user_id
                    d.post()
                elif d.rec_modified():
```

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```
                    if d.user_id.old_value != user_id:
                        raise Exception('You are not allowed to change record.')
                elif d.rec_deleted():
                    if d.user_id.old_value != user_id:
                        raise Exception('You are not allowed to delete record.')
```

It uses a *session* attribute of the item to get a unique user id and *on_open* and *on_apply* event handlers.

The *on_open* event handler ensures that the sql select statement that applications generates will return only records where the user_id field will be the same as the ID of the user that sends the request.

And the *on_apply* event handler sets the user_id to the ID of the user that appended or modified the records.

You can use a more general approach and add the following code to the server module of the task. Then a multi-tenancy will be applied to every item that have a user_id field:

```
def on_open(item, params):
    if item.field_by_name('user_id'):
        if item.session:
            user_id = item.session['user_info']['user_id']
            if user_id:
                params['__filters'].append(['user_id', item.task.consts.FILTER_EQ, user_
↪id])

def on_apply(item, delta, params, connection):
    if item.field_by_name('user_id'):
        if item.session:
            user_id = item.session['user_info']['user_id']
            if user_id:
                for d in delta:
                    if d.rec_inserted():
                        d.edit()
                        d.user_id.value = user_id
                        d.post()
                    elif d.rec_modified():
                        if d.user_id.old_value != user_id:
                            raise Exception('You are not allowed to change record.')
                    elif d.rec_deleted():
                        if d.user_id.old_value != user_id:
                            raise Exception('You are not allowed to delete record.')
```

5.20 Can I use Jam.py with existing database

Please read this: *Integration with existing database*

5.21 How can I use data from other database tables

You can use data from other database tables.

First you must specify table name and fields information. You can do it the following way:

- Select project node in the task tree and click **Database** button.
- Set DB manual mode and specify the database connection attributes.

- Import tables information as described in the *Integration with existing database*
- Select project node in the task tree, click **Database** button restore previous values.

Then in the server module of the new items you must add code to read and write the data to the database

Below is the code for MySQL database (auto incremented primary field):

```
import MySQLdb
from jam.db import mysql

def on_open(item, params):
    connection = item.task.create_connection_ex(mysql, database='demo', \
        user='root', password='111', host='localhost', encoding='UTF8')
    try:
        sql = item.get_select_query(params, mysql)
        rows = item.task.select(sql, connection, mysql)
    finally:
        connection.close()
    return rows, ''

def on_apply(item, delta, params):
    connection = item.task.create_connection_ex(mysql, database='demo', \
        user='root', password='111', host='localhost', encoding='UTF8')
    try:
        sql = delta.apply_sql(params, mysql)
        result = item.task.execute(sql, None, connection, mysql)
    finally:
        connection.close()
    return result
```

If database use generators to get primary field values you must specify them for new records (Firebird):

```
import fdb
from jam.db import firebird

def on_open(item, params):
    connection = item.task.create_connection_ex(firebird, database='demo.fdb', \
        user='SYSDBA', password='masterkey', encoding='UTF8')
    try:
        sql = item.get_select_query(params, firebird)
        rows = item.task.select(sql, connection, firebird)
    finally:
        connection.close()
    return rows, ''

def get_id(table_name, connection):
    cursor = connection.cursor()
    cursor.execute('SELECT NEXT VALUE FOR "%s" FROM RDB$DATABASE' % (table_name + '_SEQ
↪'))
    r = cursor.fetchall()
    return r[0][0]

def on_apply(item, delta, params):
    connection = item.task.create_connection_ex(firebird, database='demo.fdb', \
```

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```
        user='SYSDBA', password='masterkey', encoding='UTF8')
    for d in delta:
        if not d.id.value:
            d.edit()
            d.id.value = get_id(item.table_name, connection)
            for detail in d.details:
                for r in detail:
                    if not r.id.value:
                        r.edit()
                        r.id.value = get_id(r.table_name, connection)
                        r.post()
            d.post()
    try:
        sql = delta.apply_sql(params, firebird)
        result = item.task.execute(sql, None, connection, firebird)
    finally:
        connection.close()
    return result
```

You can use the task on_open and on_apply events. Below is the code from task client module:

```
import MySQLdb
from jam.db import mysql

def on_open(item, params):
    if item.item_name in ['table1', 'table2']: # or
    #if item.table_name in ['table1', 'table2']:
      connection = item.task.create_connection_ex(mysql, database='demo', \
          user='root', password='111', host='localhost', encoding='UTF8')
      try:
          sql = item.get_select_query(params, mysql)
          rows = item.task.select(sql, connection, mysql)
      finally:
          connection.close()
      return rows, ''

def on_apply(item, delta, params):
    if item.item_name in ['table1', 'table2']:
      connection = item.task.create_connection_ex(mysql, database='demo', \
          user='root', password='111', host='localhost', encoding='UTF8')
      try:
          sql = delta.apply_sql(params, mysql)
          result = item.task.execute(sql, None, connection, mysql)
      finally:
          connection.close()
      return result
```

Nota

Do not set History attribute to True for this tables. If you do so you'll get the exception. History table must be one for all databases that you use in the project. You can try to create the history table in the other database and write

the on_open and on_apply event handlers for it.

5.22 How I can process a request or get some data from other application or service

You can access the data of your application for reading and writing by sending a post request that has 'ext' added to url. For example:

```
http://your_jampy_app.com/ext/something
```

When an web app on the server receives such request, it generates the *on_ext_request* event

For example, Jam.py application table `account_transactions` has a field `actual_amount`. The application Task Module has:

```
def on_ext_request(task, request, params):
    reqs = request.split('/')
    if reqs[2] == 'expenses':
        result = task.account_transactions.expenses(task, params)
        return result
```

The table `account_transactions` Task Server Module has:

```
from jam.common import cur_to_str

def expenses(item, params):
    inv = item.task.account_transactions.copy()
    inv.open()
    total = 0
    for i in inv:
        total += i.actual_amount.value

    total = cur_to_str(total)
    return(total)
```

Accessing the application with Curl command will reply with the result:

```
...\> curl -k https://your_jampy_app.com/ext/expenses -d "[]" -H  "Content-Type:␣
↪application/json"
{"result": {"status": 9, "data": "-$2590.01", "modification": 99}, "error": null}
```

5.22.1 Using variables with Curl

On Demo application, if we add to Task Server Module:

```
def on_ext_request(task, request, params):
    print(request, params)
    reqs = request.split('/')
    if reqs[2] == 'bla':
        users = task.customers.copy(handlers=False)
        users.set_where(id=params['id'])
        users.open()
```

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```
        if users.rec_count == 1:
                return {
                    'id': users.firstname.value,
                    'firstname': users.firstname.value,
                }
```

Passing parameters with Curl will reply with the result:

```
...\> curl  http://localhost:8080/ext/bla -d '{"id": "2", "firstname": "Leonie"}' -H
↪"Content-Type: application/json"
{"result": {"status": 9, "data": {"id": "Leonie", "firstname": "Leonie"}, "modification
↪": 2014}, "error": null}
```

5.22.2 Consuming data from the request

The same application from above can be accessed from some other Jam.py app with Server Module:

```
try:
    # For Python 3.0 and later
    from urllib.request import urlopen
except ImportError:
    # Fall back to Python 2's urllib2
    from urllib2 import urlopen
import json
import time

params = []

def api_fetch(url, request, params):
    try:
        a = urlopen(url + '/' + request, data=str.encode(json.dumps(params)))
        r = json.loads(a.read().decode())
        return r['result']['data']
    except:
        return False


def send(item):
    result= ''
    res = []
    request = 'expenses';
    endpoint = 'https://your_jampy_app.com/ext';

    try:
        # print('Req: ' + request)
        result = api_fetch(endpoint, request, [])
    except:
        return False
    if result:
        # print(result)
        res.append(
            {
```

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```
                # 'id': 1,
                'request': request,
                'endpoint': endpoint,
                'value': result,
            }
        )
        return res
    else:
        raise Exception('Could not connect!')
```

Client Module for some virtual table with fields `request`, `endpoint`, and `value`:

```
function on_view_form_created(item) {
    item.view_options.open_item = false;
    item.view_options.form_header = false;
    item.open({open_empty: true});
    item.paginate = false;
    item.view_form.find("#edit-btn").hide();
    item.view_form.find("#delete-btn").hide();
    item.view_form.find("#new-btn").hide();
    item.alert('Fetching!');
    item.server('send', function(records, err) {
        item.disable_controls();
        if (err) {
            item.warning('Failed to fetch data: ' + err);
        }
        else {
            if (records.length > 0) {
                records.forEach(function(rec) {
                    item.append();
                    // item.id.value = rec.id;
                    item.request.value = rec.request;
                    item.endpoint.value = rec.endpoint;
                    item.value.value = rec.value;
                    item.post();
                });
                item.first();
                item.enable_controls();
                item.alert('Successfully fetched from API!');
            }
        }
    });
}
```

The result will be displayed table with fetched `value` from `endpoint` with the `request`.

5.23 How can I perform calculations in the background

You can use this code in the task server module to run a background thread in the web application once a 3 minutes (can be changed by setting interval) to perform some calculations:

```
import threading
import time
import traceback

def background(task):
    interval = 3 * 60
    time.sleep(interval)
    while True:
        if not time:
            return
        with task.lock('background'):
            try:
                print('background')
                # some code to execute in background for example:
                # tracks = task.tracks.copy()
                # tracks.open()
                # for t in tracks:
                #     t.edit()
                #     t.sold.value = #some value
                #     t.post()
                # tracks.apply()
            except Exception as e:
                traceback.print_exc()
        time.sleep(interval)

def on_created(task):
    bg = threading.Thread(target=background, args=(task,))
    bg.daemon = True
    bg.start()
```

Nota

When multiple web applications are running in parallel processes, the background function will be executed in each process. To prevent simultaneous execution of this function, we use the lock method of the task.

Nota

The Jam.py V7 introduced the calculated field. It is now possible to use the server side functions (SUM, COUNT, MIN, MAX, AVG), for the lookup to some other table field in a Master/Detail scenario. The Users might review the server side calculations code and replace it with a calculated fields, if appropriate.

5.24 Is it supported to have details inside details?

Yes, you can have details inside details.

Suppose we have three objects - “Polls”, “Questions” and “Answers.” “Answers” is a detail of “Questions”. We will make “Questions” a detail of “Polls”.

One way to do this is to add an integer field “poll” to the “Questions” and the following code to the “Poll” client module:

```
function on_edit_form_created(item) {
    item.edit_options.form_header = false;
    var q = task.questions.copy();
    q.set_where({pool: item.id.value});
    q.view(item.edit_form.find('.edit-detail'));

    q.view_options.form_header = false;

    q.on_view_form_created = function(quest) {
        quest.paginate = false;
        quest.view_options.form_header = false;

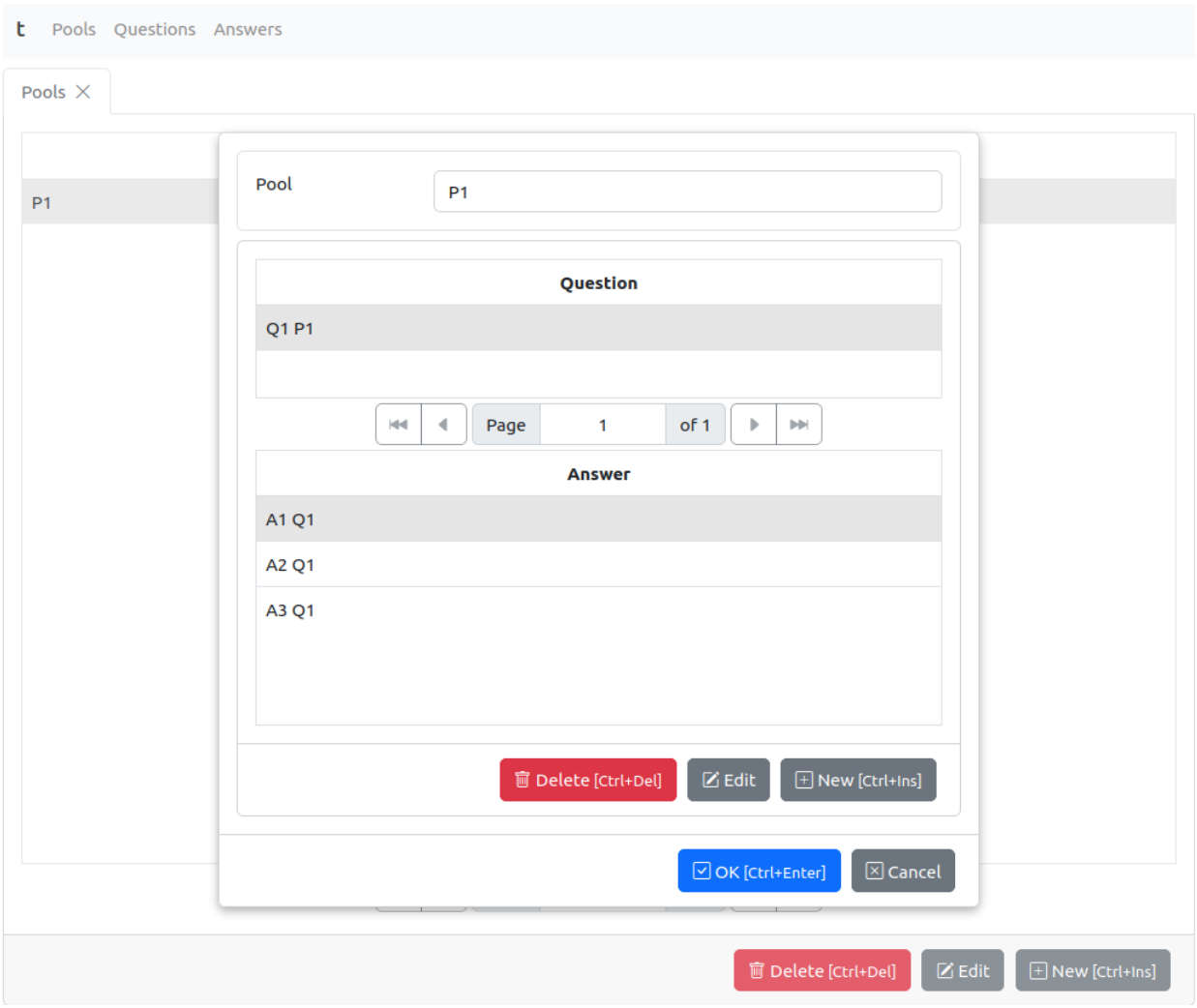
    };

    q.on_before_append = function(quest) {
        if (!item.id.value) {
            quest.alert_error('Poll is not specified.');
            quest.abort();
        }
    };

    q.on_before_post = function(quest) {
        q.pool.value = item.id.value;
    };
}

function on_field_changed(field, lookup_item) {
    var item = field.owner;
    item.apply();
    item.edit();
}


function on_before_delete(item) {
    var q = task.questions.copy();
    q.set_where({id: item.id.value});
    q.open();
    while (!q.eof()) {
        q.delete();
    }
    q.apply();
}
```



5.25 Export to / import from csv files

First, in the client module of the item we create two buttons that execute the corresponding functions when you click on them:

```
function on_view_form_created(item) {
  var csv_import_btn = item.add_view_button('Import csv file'),
      csv_export_btn = item.add_view_button('Export csv file');
  csv_import_btn.click(function() { csv_import(item) });
  csv_export_btn.click(function() { csv_export(item) });
}

function  csv_export(item) {
    item.server('export_scv', function(file_name, error) {
        if (error) {
            item.alert_error(error);
        }
        else {
            var url = [location.protocol, '//', location.host, location.pathname].join('
```

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```
↪');
            url += 'static/files/' + file_name;
            window.open(encodeURI(url));
        }
    });
}

function csv_import(item) {
    task.upload('static/files', {accept: '.csv', callback: function(file_name) {
        item.server('import_scv', [file_name], function(error) {
            if (error) {
                item.warning(error);
            }
            item.refresh_page(true);
        });
    }});
}
```

These functions execute the following functions defined in the server module. In this module we use the Python csv module. We do not export system fields - primary key field and deletion flag field.

Below is the code for Python 3:

```
import os
import csv

def export_scv(item):
    copy = item.copy()
    copy.open()
    file_name = item.item_name + '.csv'
    path = os.path.join(item.task.work_dir, 'static', 'files', file_name)
    with open(path, 'w', encoding='utf-8') as csvfile:
        fieldnames = []
        for field in copy.fields:
            if not field.system_field():
                fieldnames.append(field.field_name)
        writer = csv.DictWriter(csvfile, fieldnames=fieldnames)
        writer.writeheader()
        for c in copy:
            dic = {}
            for field in copy.fields:
                if not field.system_field():
                    dic[field.field_name] = field.text
            writer.writerow(dic)
    return file_name

def import_scv(item, file_name):
    copy = item.copy()
    path = os.path.join(item.task.work_dir, 'static', 'files', file_name)
    with open(path, 'r', encoding='utf-8') as csvfile:
        copy.open(open_empty=True)
        reader = csv.DictReader(csvfile)
        for row in reader:
```

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```
            print(row)
            copy.append()
            for field in copy.fields:
                if not field.system_field():
                    field.text = row[field.field_name]
            copy.post()
        copy.apply()
```

For Python 2, this code looks like this:

```
import os
import csv

def export_scv2(item):
    copy = item.copy()
    copy.open()
    file_name = item.item_name + '.csv'
    path = os.path.join(item.task.work_dir, 'static', 'files', file_name)
    with open(path, 'wb') as csvfile:
        fieldnames = []
        for field in copy.fields:
            if not field.system_field():
                fieldnames.append(field.field_name.encode('utf8'))
        writer = csv.DictWriter(csvfile, fieldnames=fieldnames)
        writer.writeheader()
        for c in copy:
            dic = {}
            for field in copy.fields:
                if not field.system_field():
                    dic[field.field_name.encode('utf8')] = field.text.encode('utf8')
            writer.writerow(dic)
    return file_name

def import_scv2(item, file_name):
    copy = item.copy()
    path = os.path.join(item.task.work_dir, 'static', 'files', file_name)
    with open(path, 'rb') as csvfile:
        item.task.execute('delete from %s' % item.table_name)
        copy.open(open_empty=True)
        reader = csv.DictReader(csvfile)
        for row in reader:
            print(row)
            copy.append()
            for field in copy.fields:
                if not field.system_field():
                    field.text = row[field.field_name.encode('utf8')].decode('utf8')
            copy.post()
        copy.apply()
```

5.26 Authentication

In the Jam.py repository there is the "Authentication" project *export* file. This project demonstrates the first three topics of this section.

https://jam-py.com/repository/auth.zip

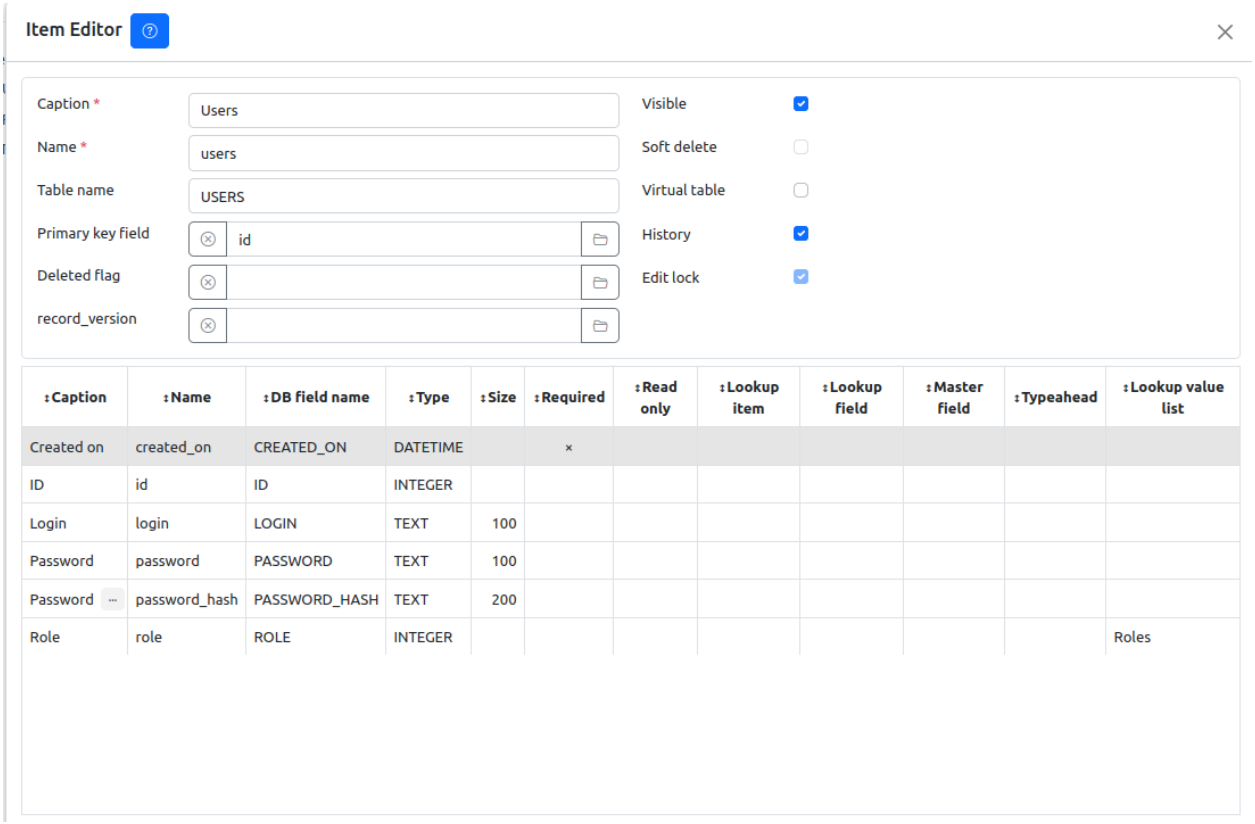
You can download it, create a new project and *import* this file.

5.26.1 How to authenticate from custom users table

By default, all user information is stored in a table in the admin.sqlite database. This table has a fixed structure that cannot be changed.

In this section, we describe how to authenticate a user using data from the custom users table.

First, we create an item group **Authentication** select it and add an item **Users** that has the following fields:

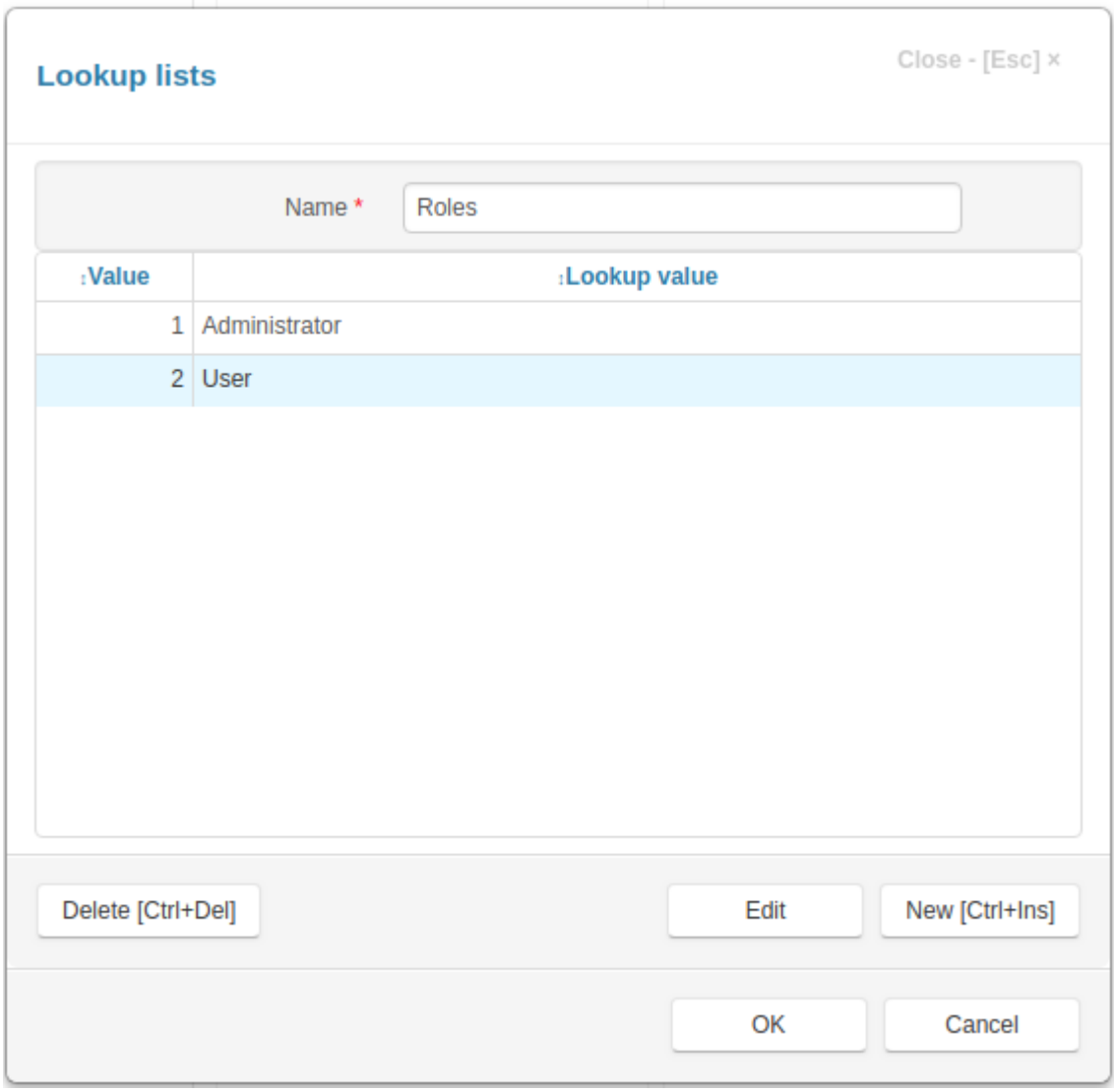


Caption	Name	DB field name	Type	Size	Required	Read only	Lookup item	Lookup field	Master field	Typeahead	Lookup value list
Created on	created_on	CREATED_ON	DATETIME		×						
ID	id	ID	INTEGER								
Login	login	LOGIN	TEXT	100							
Password	password	PASSWORD	TEXT	100							
Password	password_hash	PASSWORD_HASH	TEXT	200							
Role	role	ROLE	INTEGER								Roles

We won't store in the table the user password and use this field in the interface. We will store the password salted hash in the password_hash field.

We also created the *lookup list* "Roles" that we used in the "Roles" field definition.

We added to it the same roles (ids and names) as in the table *Roles* We 'll have to sycronize this roles in the future.



In the *Roles* it is necessary to allow view the **Users** item only people that will be responsible for it

We removed password_hash field from field lists in the *View Form Dialog* and *Edit Form Dialog*

In the User server module we define the following *on_apply* event handler:

```
def on_apply(item, delta, params, connection):
    for d in delta:
        if not (d.rec_deleted() or d.rec_modified() and d.login.value == d.login.old_
↪value):
            users = d.task.users.copy(handlers=False)
            users.set_where(login=d.login.value)
            users.open(fields=['login'])
            if users.rec_count:
                raise Exception('There is a user with this login - %s' % d.login.value)
        if d.password.value:
            d.edit();
            d.password_hash.value = delta.task.generate_password_hash(d.password.value)
            d.password.value = None
```

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```
            d.post();
```

In this event handler we check if there is a users with the same login and raise the exception if such user exists, otherwise we generate hash using the *generate_password_hash* method of the task and set the password value to None.

In the client module we defined the following on_field_get_text event handler. It displays '******' string instead of the password.

```
function on_field_get_text(field) {
    var item = field.owner;
    if (field.field_name === 'password') {
        if (item.id.value || field.value) {
            return '**********';
        }
    }
}
```

Finally, we define the *on_login* event handler in the task server module:

```
def on_login(task, form_data, info):
    users = task.users.copy(handlers=False)
    users.set_where(login=form_data['login'])
    users.open()
    if users.rec_count == 1:
        if task.check_password_hash(users.password_hash.value, form_data['password']):
            return {
                'user_id': users.id.value,
                'user_name': users.name.value,
                'role_id': users.role.value,
                'role_name': users.role.display_text
            }
```

Now we must add an admin to **Users** that has rights to work with users. After that we can set Safe mode in the project *Parameters*

5.26.2 How to create registration form

In this topic we'll assume that you have created a *users* item from the previous topic.

Now we create a *register.html* file.

It contains a registration form:

```
<form id="login-form" target="dummy" class="form-horizontal" style="margin: 0;">
    <div class="control-group">
        <label class="control-label" for="name">Name</label>
        <div class="controls">
            <input type="text" id="name" placeholder="Login">
        </div>
    </div>
    <div class="control-group">
        <label class="control-label" for="login">Login</label>
        <div class="controls">
            <input type="text" id="login" placeholder="Login">
```

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```
        </div>
    </div>
    <div class="control-group">
        <label class="control-label" for="password1">Password</label>
        <div class="controls">
            <input type="password" id="password1"
            placeholder="Password" autocomplete="on">
        </div>
    </div>
    <div class="control-group">
        <label class="control-label" for="password2">Repeat password</label>
        <div class="controls">
            <input type="password" id="password2"
            placeholder="Repeat password" autocomplete="on">
        </div>
    </div>
    <div class="alert alert-success" style="margin: 0; display: none">
        You have been successfuly registered.
    </div>
    <div class="alert alert-error" style="margin: 0; display: none">
    </div>
    <div class="form-footer">
        <input type="button" class="btn expanded-btn pull-right"
        id="register-btn" value="OK" tabindex="3">
    </div>
</form>
```

and a javascript code:

```
$(document).ready(function(){

    function register(name, login, password) {
        $.ajax({
            url: "ext/register",
            type: "POST",
            contentType: "application/json;charset=utf-8",
            data: JSON.stringify([name, login, password]),
            success: function(response, textStatus, jQxhr) {
                if (response.result.data) {
                    show_alert(response.result.data);
                }
                else {
                    $("div.alert-success").show();
                    setTimeout(
                        function() {
                            window.location.href = "index.html";
                        },
                        1000
                    );
                }
            },
            error: function(jqXhr, textStatus, errorThrown) {
```

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```
                console.log(errorThrown);
            }
        });
    }
    function show_alert(message) {
        $("div.alert-error")
            .text(message)
            .show();
    }

    $('input').focus(function() {
        $("div.alert").hide();
    });

    $("#register-btn").click(function() {
        var name = $("#name").val(),
            login = $("#login").val(),
            password1 = $("#password1").val(),
            password2 = $("#password2").val();
        if (!name) {
            show_alert('Name is not specified');
        }
        else if (!login) {
            show_alert('Login is not specified');
        }
        else if (!password1) {
            show_alert('Password is not specified');
        }
        else if (password1 !== password2) {
            show_alert('Passwords do not match');
        }
        else {
            register(name, login, password1)
        }
    })
})
```

When the user clicks on the **OK** button, the javascript will send to the server the ajax post request with url "ext/register" and parameters "name, login, password".

When server receives the request starting with 'ext/' it triggers the *on_ext_request* event.

The task server module has the following `on_ext_request` event handler:

```
def on_ext_request(task, request, params):
    reqs = request.split('/')
    if reqs[2] == 'register':
        name, login, password = params
        users = task.users.copy(handlers=False)
        users.set_where(login=login)
        users.open()
        if users.rec_count:
            return 'Existing login, please use different login'
```

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```
        users.append()
        users.name.value = name
        users.login.value = login
        users.password_hash.value = task.generate_password_hash(password)
        users.role.value = 2
        users.post()
        users.apply()
```

It checks if there is 'register' in url and then looks if there is no user with the login and then register the user.

5.26.3 How to give user ability to change the password

First we create a "Change password" item. While creating it we set the "Virtual table" and "Visible" attributes to false in the *Item Editor Dialog*. And we add to it two fields: "Old password", "New password"

We'll use this item for displaying "Change password" dialog.

To open this dialog we add a "Change password" menu item with id "pass" in the index.html:

```
<div class="container">
    <div id="taskmenu" class="navbar">
        <div class="navbar-inner">
            <ul id="menu" class="nav">
            </ul>
            <ul id="menu-right" class="nav pull-right">
                <li id="pass"><a href="#">Change password</a></li>
            </ul>
        </div>
    </div>
</div>
```

and in the task client module *on_page_loaded* event handler add the following code:

```
if (task.change_password.can_view()) {
    $("#menu-right #pass a").click(function(e) {
        e.preventDefault();
        task.change_password.open({open_empty: true});
        task.change_password.append_record();
    });
}
else {
    $("#menu-right #pass a").hide();
}
```

It will check if the user has the right to view item and then opens an empty dataset and creates an edit form, otherwise it hides this menu item.

In the "Change password" client module we add the following code:

```
function on_edit_form_created(item) {
    item.edit_form.find("#ok-btn")
        .off('click.task')
        .on('click', function() {
            change_password(item);
```

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```
        });
    item.edit_form.find("#cancel-btn")
        .off('click.task')
        .on('click', function() {
            item.close_edit_form();
        });
}

function change_password(item) {
    item.post();
    item.server('change_password', [item.old_password.value, item.new_password.value],␣
↪function(res) {
        if (res) {
            item.warning('Password has been changed. <br> The application will be␣
↪reloaded.',
              function() {
                  task.logout();
                  location.reload();
              });
        }
        else {
            item.alert_error("Can't change the password.");
            item.edit();
        }
    });
}

function on_field_changed(field, lookup_item) {
    var item = field.owner;
    if (field.field_name === 'old_password') {
        item.server('check_old_password', [field.value], function(error) {
            if (error) {
                item.alert_error(error);
            }
        });
    }
}

function on_edit_form_close_query(item) {
    return true;
}
```

In it we reassign **OK** and **Cancel** button click events. By default they are defined in the task client module to save record changes to the database and cancel editing. In the `on_edit_form_close_query` even handler we return true so the `on_edit_form_close_query` declared in the task client module, that shows "Yes No Cancel" dialog won't be executed.

The `on_field_changed` event handler will check if old password is correct. It and the `change_password` function send requests to the server to execute functions defined in the item server module:

```
def change_password(item, old_password, new_password):
    user_id = item.session['user_info']['user_id']
    users = item.task.users.copy(handlers=False)
```

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```
    users.set_where(id=user_id)
    users.open()
    same_password = item.task.check_password_hash(users.password_hash.value, old_
↪password)
    if users.rec_count== 1 and same_password:
        users.edit()
        users.password_hash.value = item.task.generate_password_hash(new_password)
        users.post()
        users.apply()
        return True
    else:
        return False

def check_old_password(item, old_password):
    user_id = item.session['user_info']['user_id']
    users = item.task.users.copy(handlers=False)
    users.set_where(id=user_id)
    users.open()
    same_password = item.task.check_password_hash(users.password_hash.value, old_
↪password)
    if users.rec_count == 1 and same_password:
        return
    else:
        return 'Invalid password'
```

They use session to get id of the current user.

After changing the password the client reloads.

5.27 How to migrate v5 project to v7

For any v5 project, backup index.html file first and copy index.html and template.html from v7 Jam.py Demo into the application folder.

Uninstall the v5 Jam.py and install the v7.

Start the application as usual.

Address the following:

1. The biggest obstacle to move a Jam.py v5 application is the "Edit Lock" (record locking), enabled on the table(s). The Jam.py v7 is expecting a *record_version* (INT) field for every table with the Edit Lock.

   There are two options when migrating to V7. One is to disable the "Edit Lock" before migration, and the second option is to add the *record_version* field to affected tables before the migration.

   After the field is added to the database structure, we need to add it to the Application Builder manually, with "DB Manual Mode" turned ON for every table with "Edit Lock" enabled. The "record version" option should be set with *record_version* field.

   Obviously, disabling the "Edit Lock" does not need anything. There is no option on project Parameters to create the "Lock Item".

2. The next issue is templates. The Jam.py v7 is expecting the template.html file within the application folder. Due to Bootstrap 5 usage, some minor differences will arise with moving the existing templates from Jam.py v5 index.html file to template.html file.

3. Foreign Key support is dropped at v7. This means if there are any Foreign Keys created at V5, there will be no option to manage it at v7.
4. The Jam.py V7 introduced the calculated field. It is now possible to use the server side functions (SUM, COUNT, MIN, MAX, AVG), for the lookup to a table field in a Master/Detail scenario. The Users might review the server side calculations code and replace it with a calculated fields, if appropriate.
5. Jam.py V7 is now utilising the Python dependencies and will automatically install needed libraries with the initial install. This is different to v5, where all dependencies were "locked in" with the Jam.py distribution, enabling a single `jam` folder for deployment with the application.
6. For applications with Jam.py version 5.x or below, replace the Task/Client module code with Task/Client module code from Demo application or the new v7 project. Than, add a custom the code from v5 Task/Client module, if there was any.

CAPÍTULO 6

Business application builder

Application builder - is a Jam.py web application intended for application development and database administration.

To run the Application builder go to a Web browser and type in the browser address bar

```
127.0.0.1:8080/builder.html
```

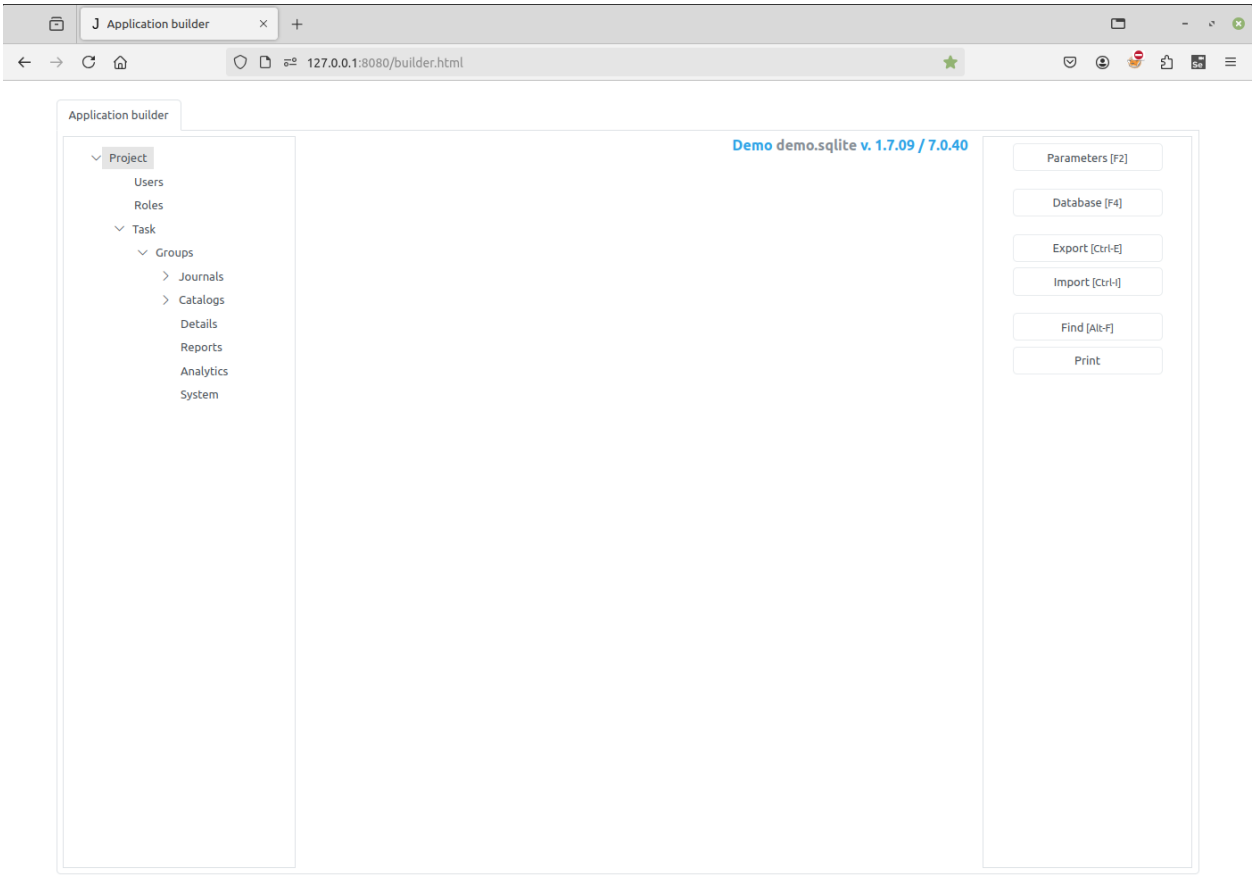
> **Nota**
>
> Please note that *server.py* must be running

On the left side of the Application builder page there is a panel that contains the project tree. When you select any node of the project tree, as a rule, its content will be opened in the central part of the page, and the bottom and right side of the page may have buttons that allow you to modify the content.

To see the changes made in Application builder go to the Project page and reload it.

6.1 Project management

After the Application builder is first run or when the **Project** node is selected in the project tree, the Application builder page will look as follows:

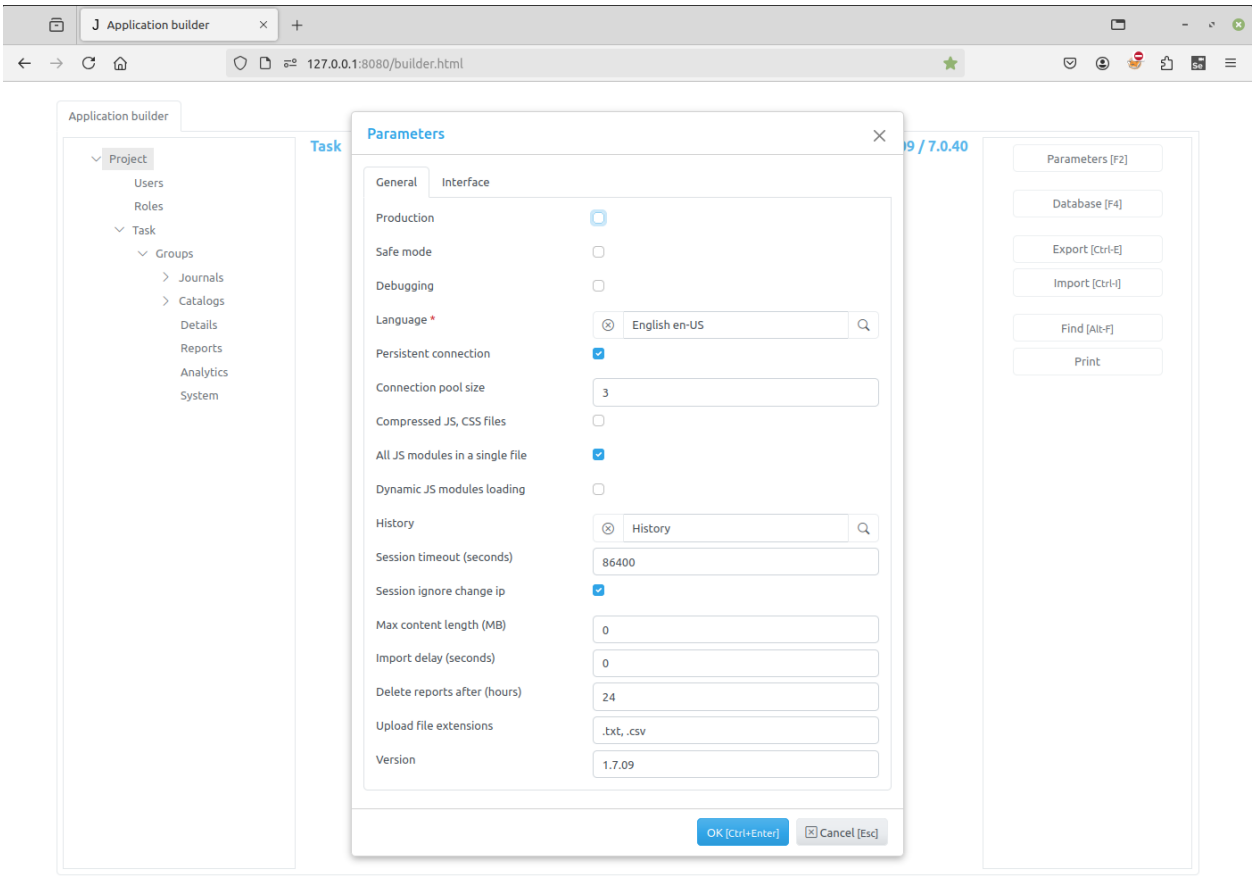


Click on the links below to see the purpose of the buttons in the right panel of the page.

6.1.1 Parameters

After clicking on the **Parameters** button the Parameters Dialog will appear. It has two tabs **General** and **Interface**.

General tab



On the General tab, you can specify general parameters of the project:

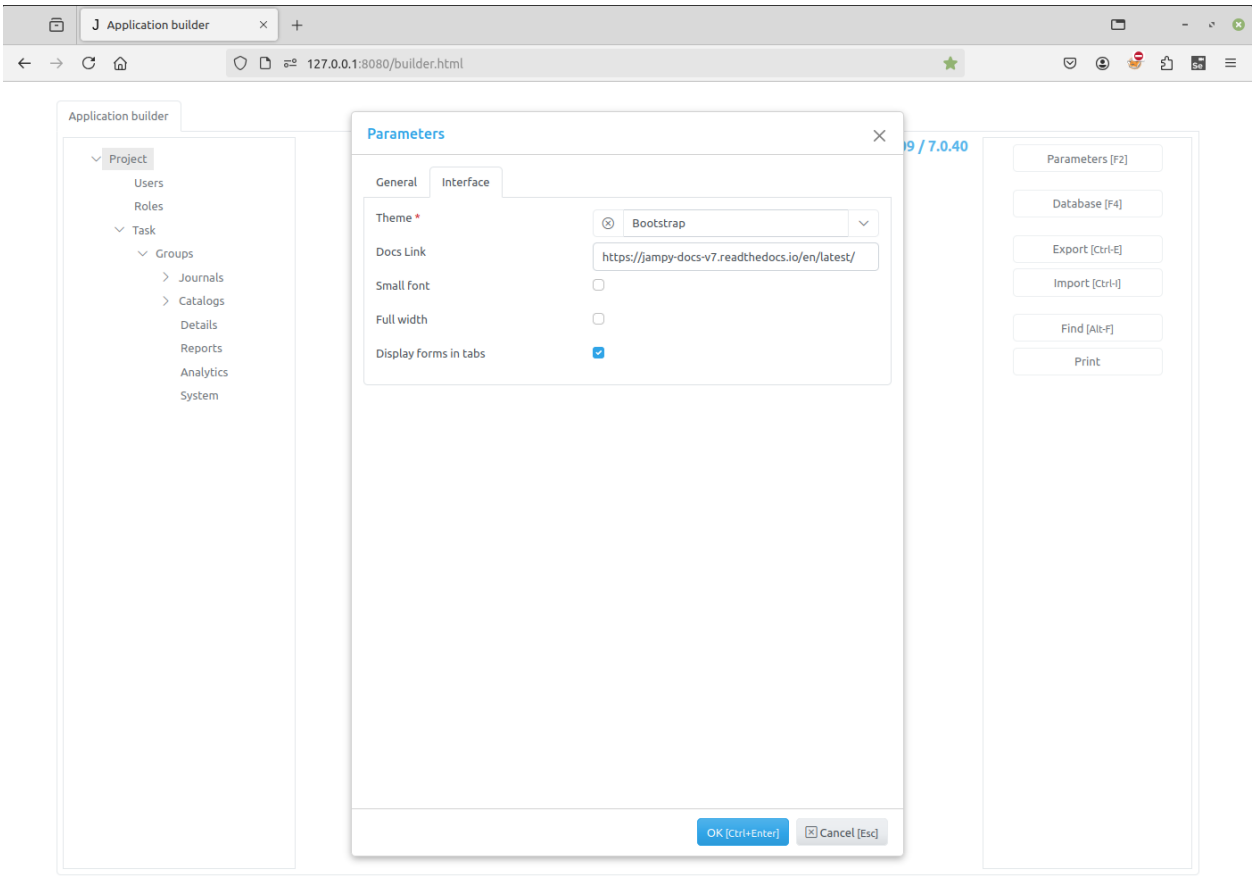
- **Production** - if this checkbox is checked, you will not be able to change the project database in Application Builder.
- **Safe mode** - if safe mode is enabled, authentication is needed for user to work in the system (See *Users* and *Roles*).
- **Debugging** - if this checkbox is checked, the Werkzeug library debugger will be invoked when an error on the server occurs.
- **Language** - use it to open Language Dialog. See *Language support*
- **Persistent connection** - if this checkbox is checked the application creates a connection pool otherwise a connection is created before executing the sql query.
- **Connection pool size** — the size of the server database connection pool.
- **Compressed JS, CSS files** - If this button is checked the server returns compressed *js* and *css* files when *index.html* page is loaded.
- **All JS modules in a single file** - If this checkbox is unchecked, the application will generate a javascript file in the project *js* folder for every item in the *task tree*, that has code in its Client module, with the name *item_name.js*, where *item_name* is the name of an item. Otherwise, the application will generate a javascript file with the name *task_name.js*, where *task_name* is the name of the project *task* (for example *demo.js*), that will contain javascript code of all items, except items, whose **External js module** checkbox in the *Item Editor Dialog* is checked (separate files will be created for them).

- **Dynamic JS modules loading** - If this checkbox is unchecked and the application generates more than one javascript file, only file named *task_name.js* will be loaded when application is run. All other files must be loaded dynamically. See *Working with modules*.
- **History item** - to specify item, that will store change history, see *Saving audit trail/change history made by users*
- **Session timeout (seconds)** - number of second of inactivity that is allowed before the session expires.
- **Session ignore change ip** - if false, the session is only valid when it is accessed from the same ip address that created the session.
- **Max content length (MB)** - use it to limit the total content length of the request to the server, in megabytes.
- **Import delay (seconds)** - if set the application will wait the number of seconds set in the parameter before changing the project dataset while importing project metadata , otherwise it waits for 5 minutes or until all previous request to the server in the current process will be processed.
- **Delete reports after (hours)** - if a value is specified the generated reports that are located in the static/reports folder will be deleted after specified number of hours have passed.
- **Upload file extensions** - is an *Accept string* that defines the types of files that could be uploaded to the server by the task *upload* method. Uploading files that do not match these types is prohibited.
- **Version** — specify the version of the project here.

Nota

When **Connection pool size** or **Persistent connection** parameters are changed, the server application must be restarted for changes to take effect.

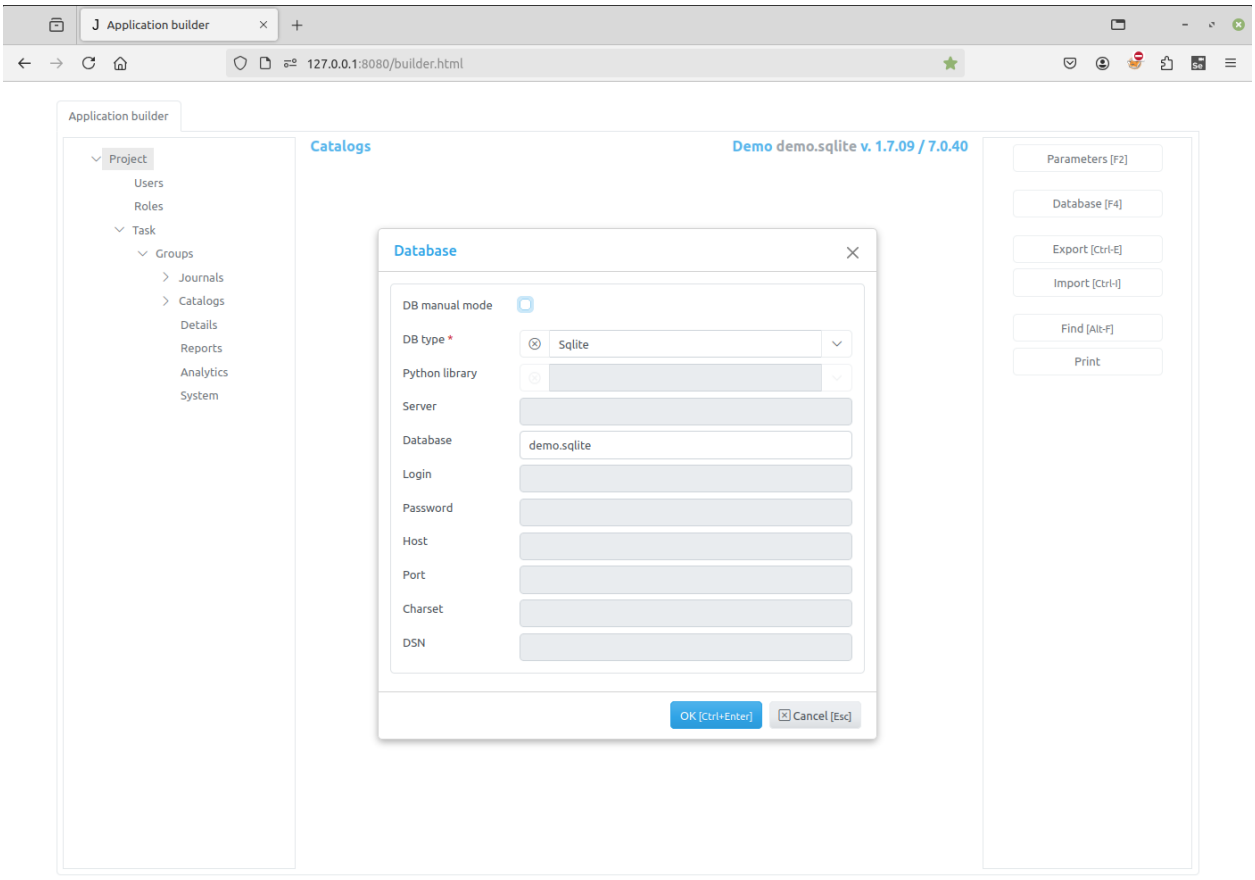
Interface tab



On the Interface tab, you can specify interface parameters of the project:

- **Theme** - use this parameter to select the theme of the project from one of predefined themes
- **Docs Link** - use this parameter to specify the Docs location (TBA)
- **Small font** - if this button is checked, the default font size will be 12px, otherwise it is 14px
- **Full width** - if this button is checked the project will fill the page width, without left and right margins
- **Display forms in tabs** - if this button is checked, the forms will be opened tabs

6.1.2 Database



In this dialog project database parameters are displayed. When they have been changed and OK button is clicked, the Application builder will check connection to the database and if it failed to connect an error will be displayed.

> **Nota**
>
> When any **Database** parameter is changed, except **DB manual update**, the server application must be restarted for changes to take effect.

If **DB manual update** checkbox is unchecked (default), then when changes to an item, that have an associated database table, are saved, this database table is automatically modified. For example, if we add a new field to some item in the *Item Editor Dialog* , the new field will be added to the associated database table. If this checkbox is checked, no modifications to the database tables are made.

The **DB manual update** was renamed to **DB manual mode** in more recent version.

> **Nota**
>
> Please be very careful when using this option.

Examples of database setups

Adapted from Jam.py Design Tips

Jam.py supports many different database servers. For example PostgreSQL, MariaDB, MySQL, MSSQL, Oracle, Firebird, IBM, SQLite and SQLite with SQLCipher.

If you are developing a small project or something you don't plan to deploy in a production environment, SQLite is generally the best option as it doesn't require running a separate server. However, SQLite has many differences from other databases, so if you are working on something substantial, it's recommended to develop with the same database that you plan on using in production.

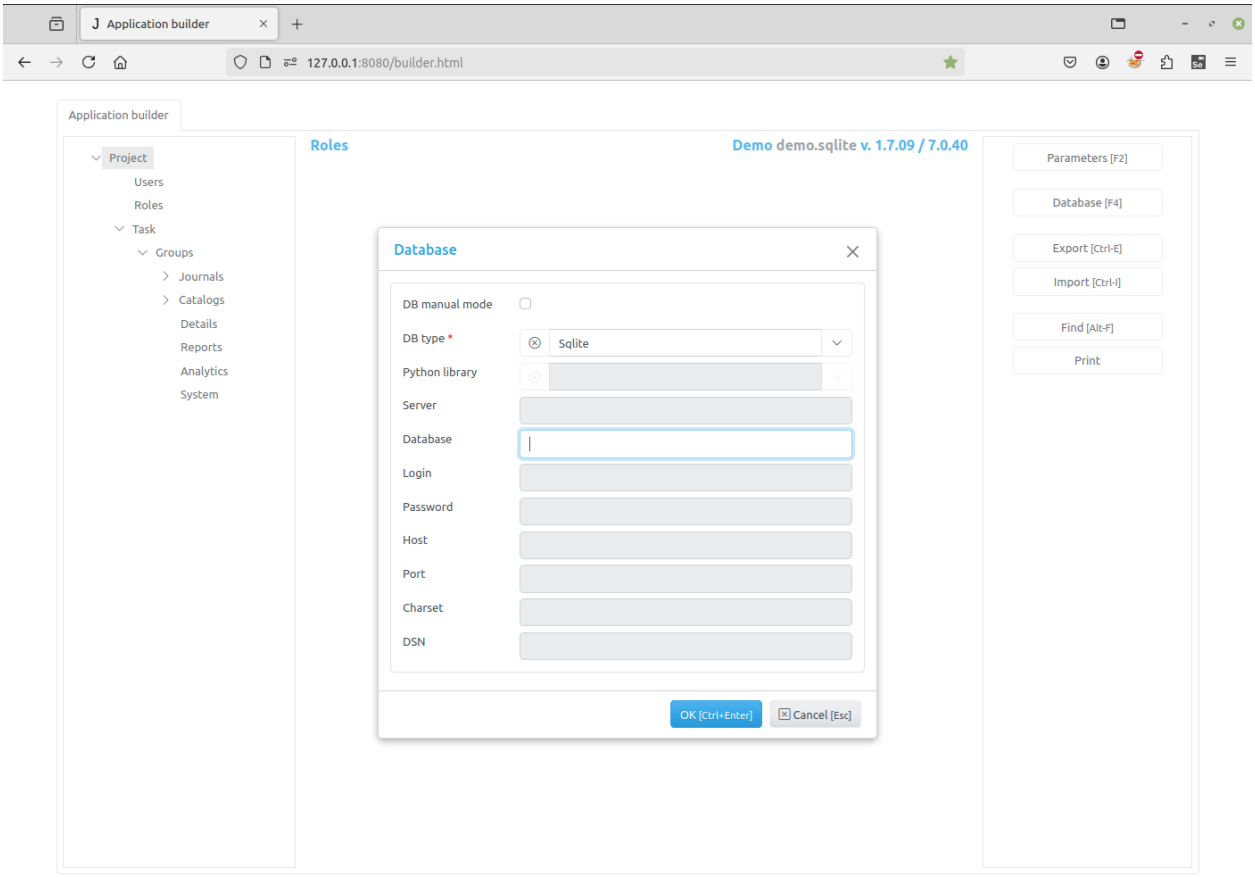
In addition to a database backend, we need to make sure the Python database bindings are installed.

- If using PostgreSQL, the `psycopg2` or `psycopg2-binary` package is needed.
- If using MySQL or MariaDB, the `MySQLdb` for Python 2.x is needed. For Python 3.x, the `mysql-connector-python` and `mysqlclient` package is needed, as well as database client development files.
- If using MSSQL, the `pymssql` is needed.
- If using Oracle, the cx_Oracle is needed, as well as Python headers (development files).
- If using SQLCipher, `sqlcipher3-binary` package is needed for Linux. There is a standalone DLL for Windows available.
- If using IBM, `ibm_db` and `ibm_db_dbi` package is needed.
- If using Firebird, `fdb` package is needed.

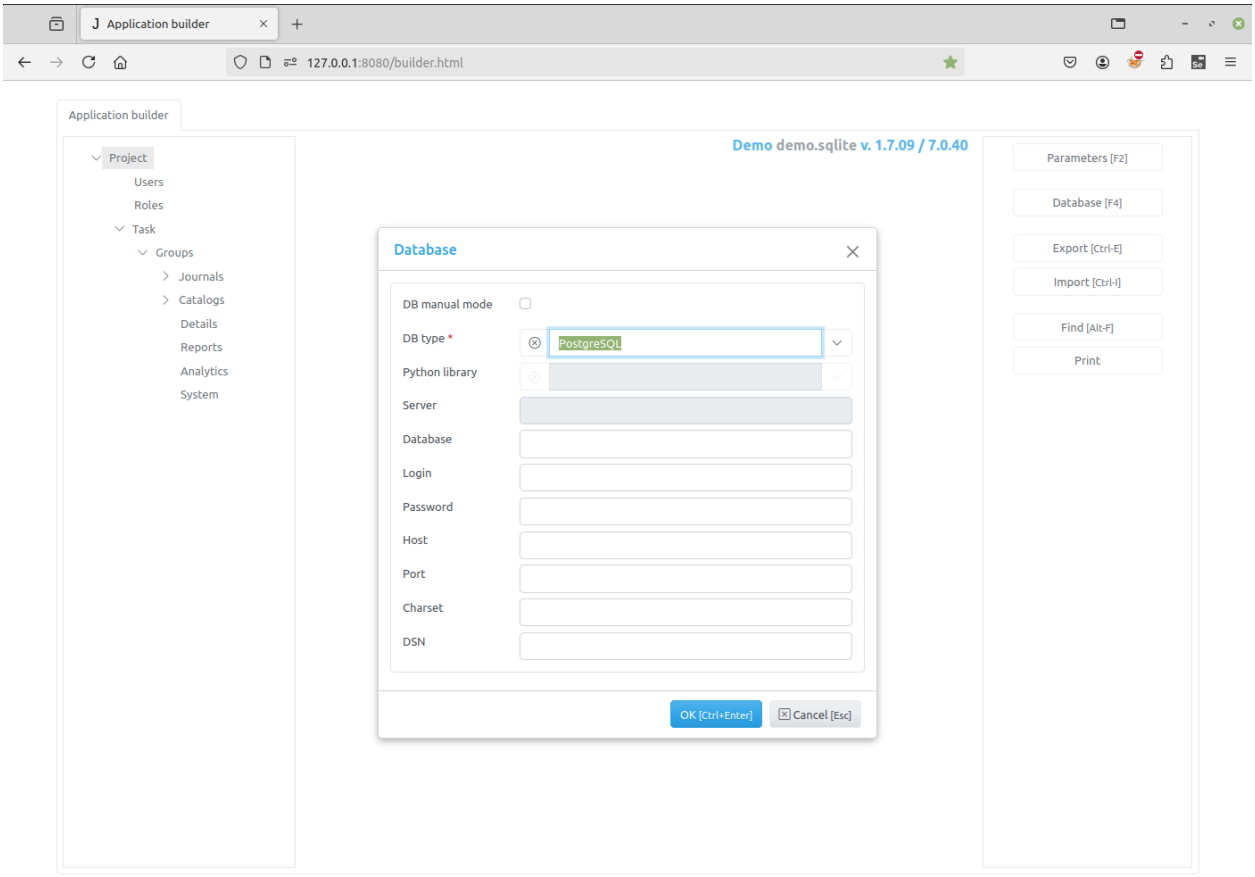
Using MySQL on Windows is supported, please visit MySQL deployment on Windows.

Even though Jam.py supports all databases from the above, there is no guarantee that some specific and/or propriety database functionality is supported. Here we name a few tested databases:

SQLite


Application builder
127.0.0.1:8080/builder.html
Application builder
Project
Users
Roles
Task
Groups
Journals
Catalogs
Details
Reports
Analytics
System
Roles
Demo demo.sqlite v. 1.7.09 / 7.0.40
Parameters [F2]
Database [F4]
Export [Ctrl-E]
Import [Ctrl-I]
Find [Alt-F]
Print
Database
DB manual mode
DB type *
Sqlite
Python library
Server
Database
Login
Password
Host
Port
Charset
DSN
OK [Ctrl+Enter]
Cancel [Esc]

PostgreSQL


Application builder
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Application builder
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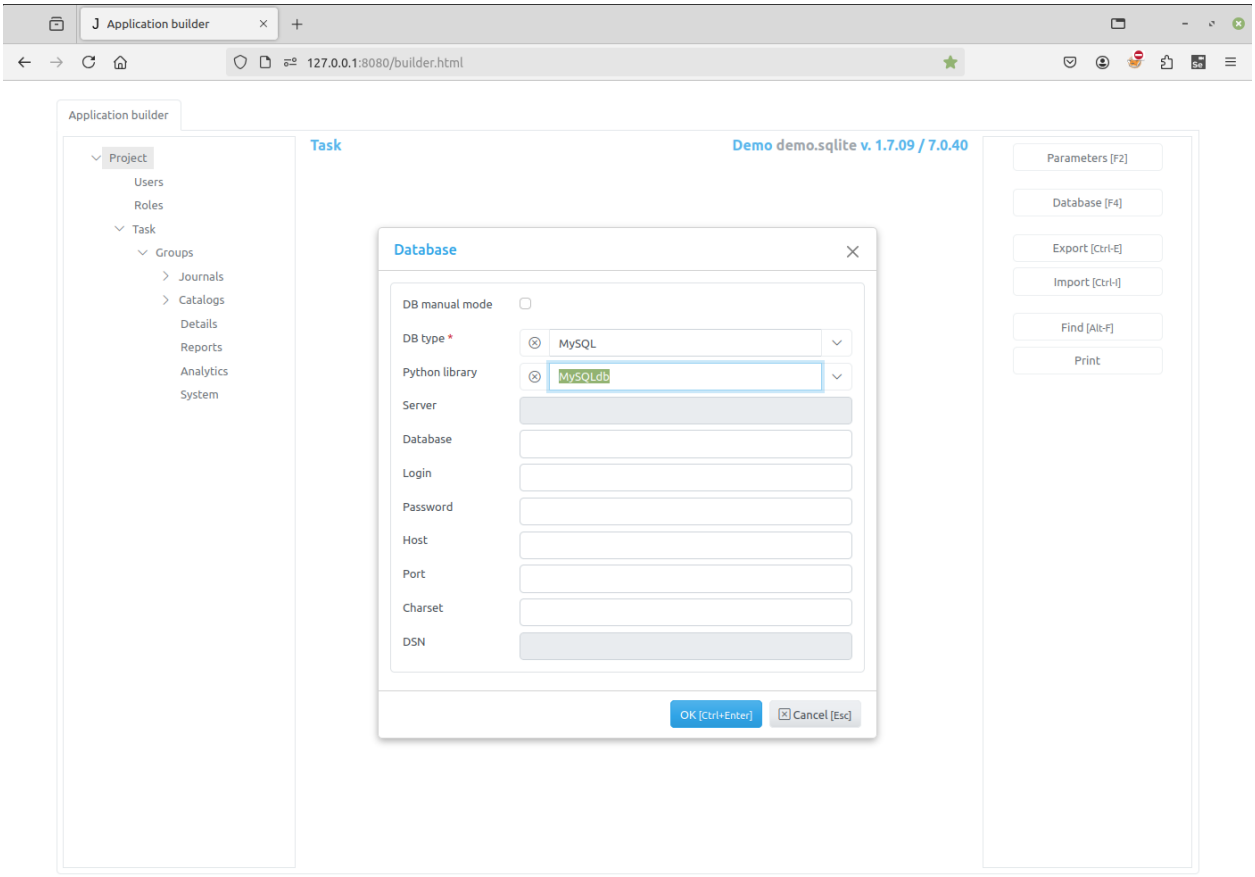
Roles
Task
Groups
Journals
Catalogs
Details
Reports
Analytics
System
Demo demo.sqlite v. 1.7.09 / 7.0.40
Parameters [F2]
Database [F4]
Export [Ctrl-E]
Import [Ctrl-I]
Find [Alt-F]
Print
Database
DB manual mode
DB type *
PostgreSQL
Python library
Server
Database
Login
Password
Host
Port
Charset
DSN
OK [Ctrl+Enter]
Cancel [Esc]

MySql


Application builder
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Application builder
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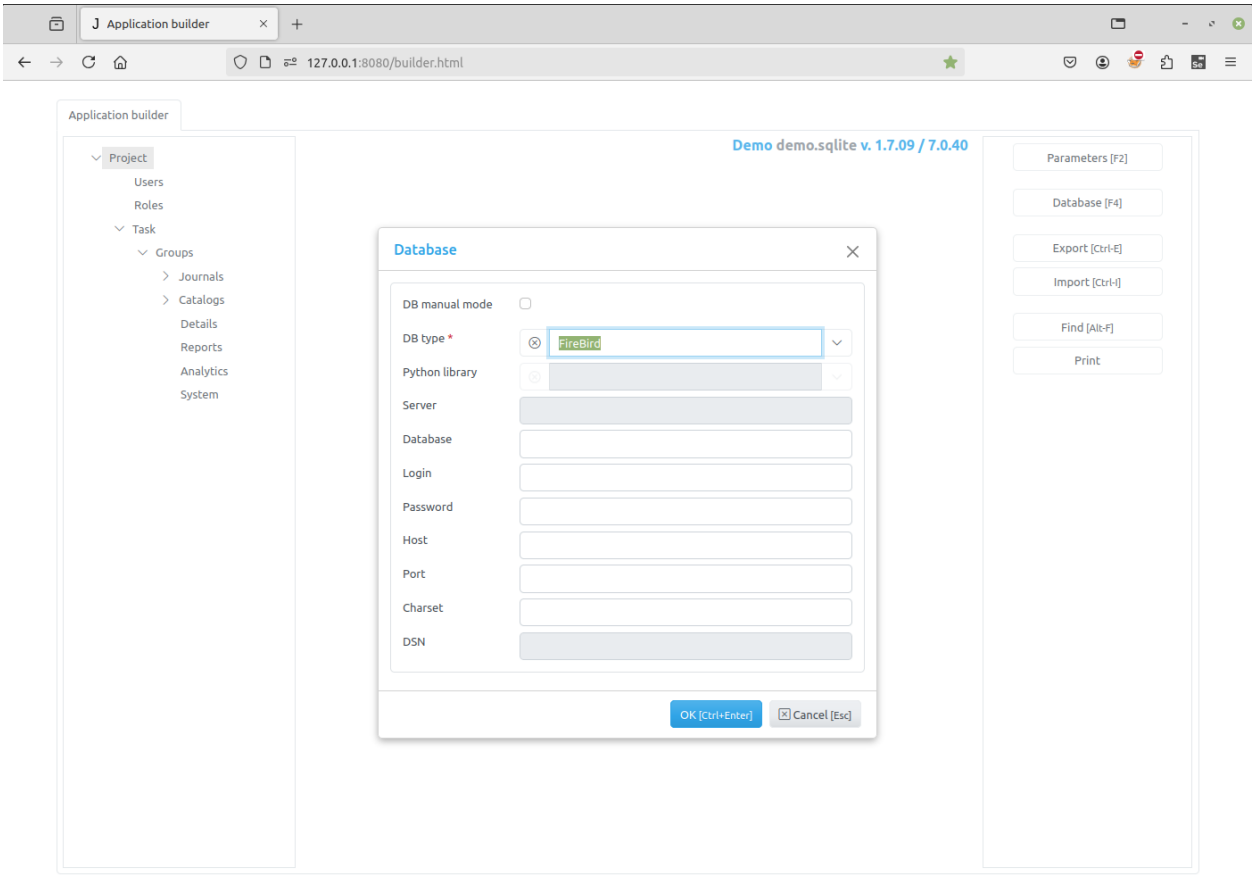
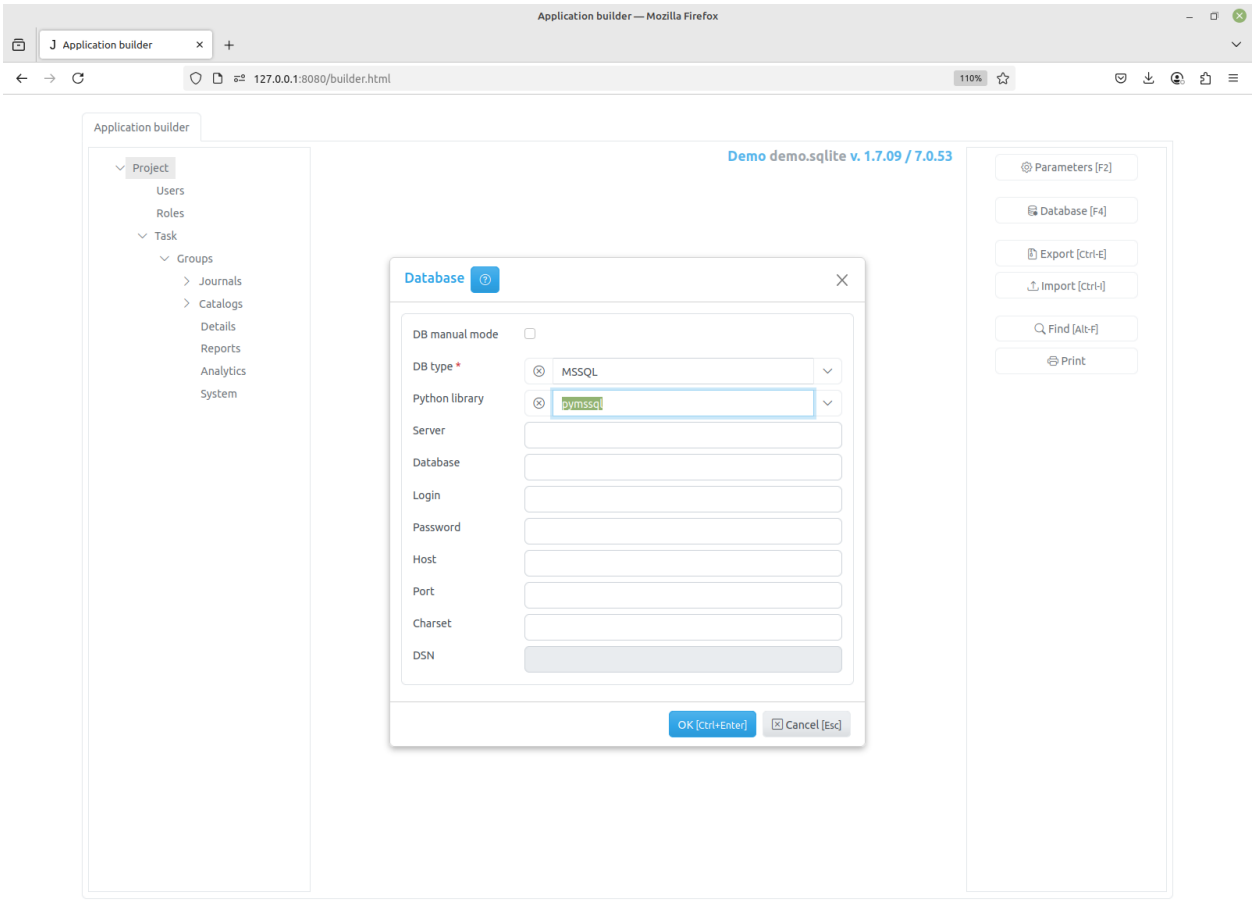
Task
Demo demo.sqlite v. 1.7.09 / 7.0.40
Parameters [F2]
Database [F4]
Export [Ctrl-E]
Import [Ctrl-I]
Find [Alt-F]
Print
Database
DB manual mode
DB type *
MySQL
Python library
MySQLdb
Server
Database
Login
Password
Host
Port
Charset
DSN
OK [Ctrl+Enter]
Cancel [Esc]

FireBird


Application builder
127.0.0.1:8080/builder.html
Application builder
Demo demo.sqlite v. 1.7.09 / 7.0.40
Project
Users
Roles
Task
Groups
Journals
Catalogs
Details
Reports
Analytics
System
Parameters [F2]
Database [F4]
Export [Ctrl-E]
Import [Ctrl-I]
Find [Alt-F]
Print
Database
DB manual mode
DB type *
FireBird
Python library
Server
Database
Login
Password
Host
Port
Charset
DSN
OK [Ctrl+Enter]
Cancel [Esc]

MSSQL


Application builder — Mozilla Firefox
Application builder
127.0.0.1:8080/builder.html
110%
Application builder
Project
Users
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Task
Groups
Journals
Catalogs
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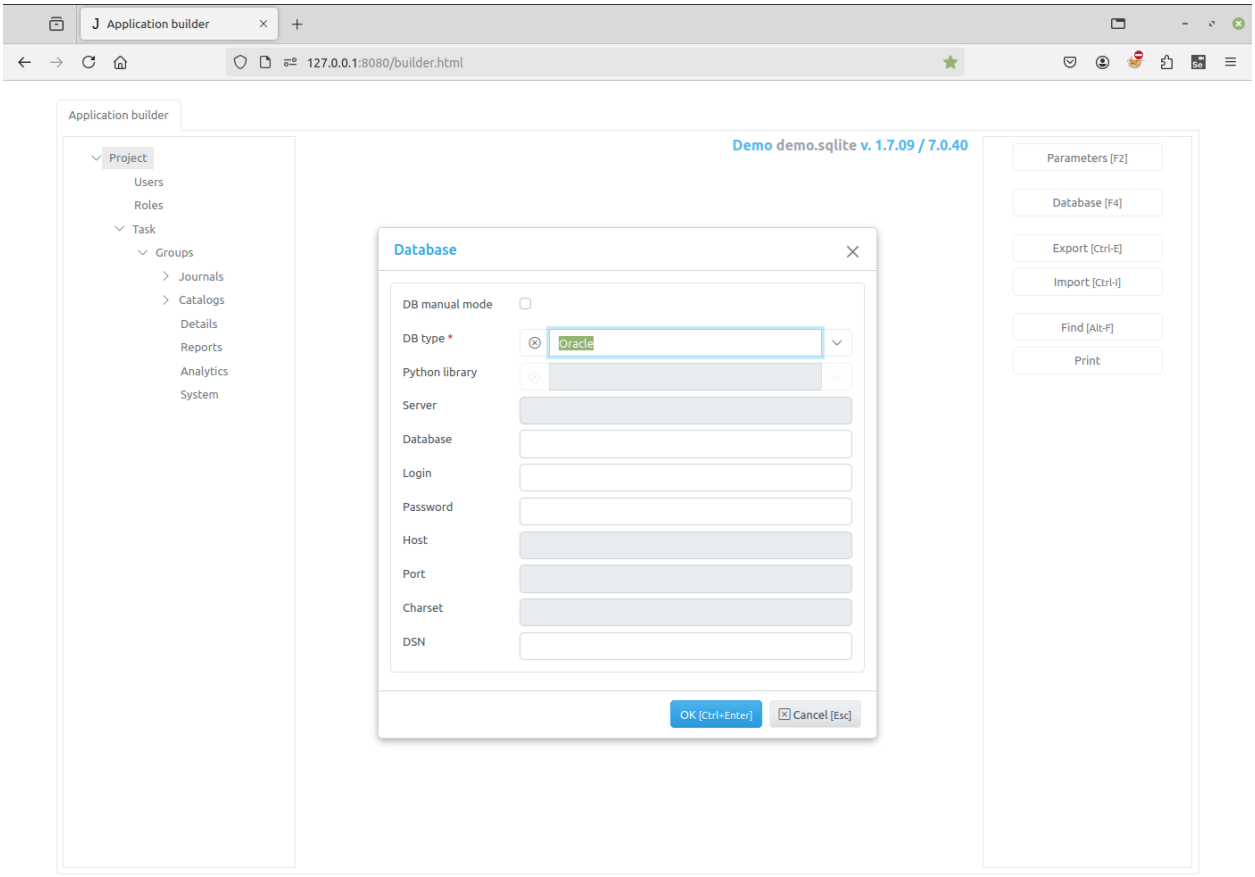
Demo demo.sqlite v. 1.7.09 / 7.0.53
Parameters [F2]
Database [F4]
Export [Ctrl-E]
Import [Ctrl-I]
Find [Alt-F]
Print
Database
DB manual mode
DB type *
MSSQL
Python library
pymssql
Server
Database
Login
Password
Host
Port
Charset
DSN
OK [Ctrl+Enter]
Cancel [Esc]

Oracle



6.1.3 Export

Press this button to export project metadata to zip file.

See also

Import

Metadata file

How to migrate development to production

6.1.4 Import

Use this button to import project metadata from zip file.

See also

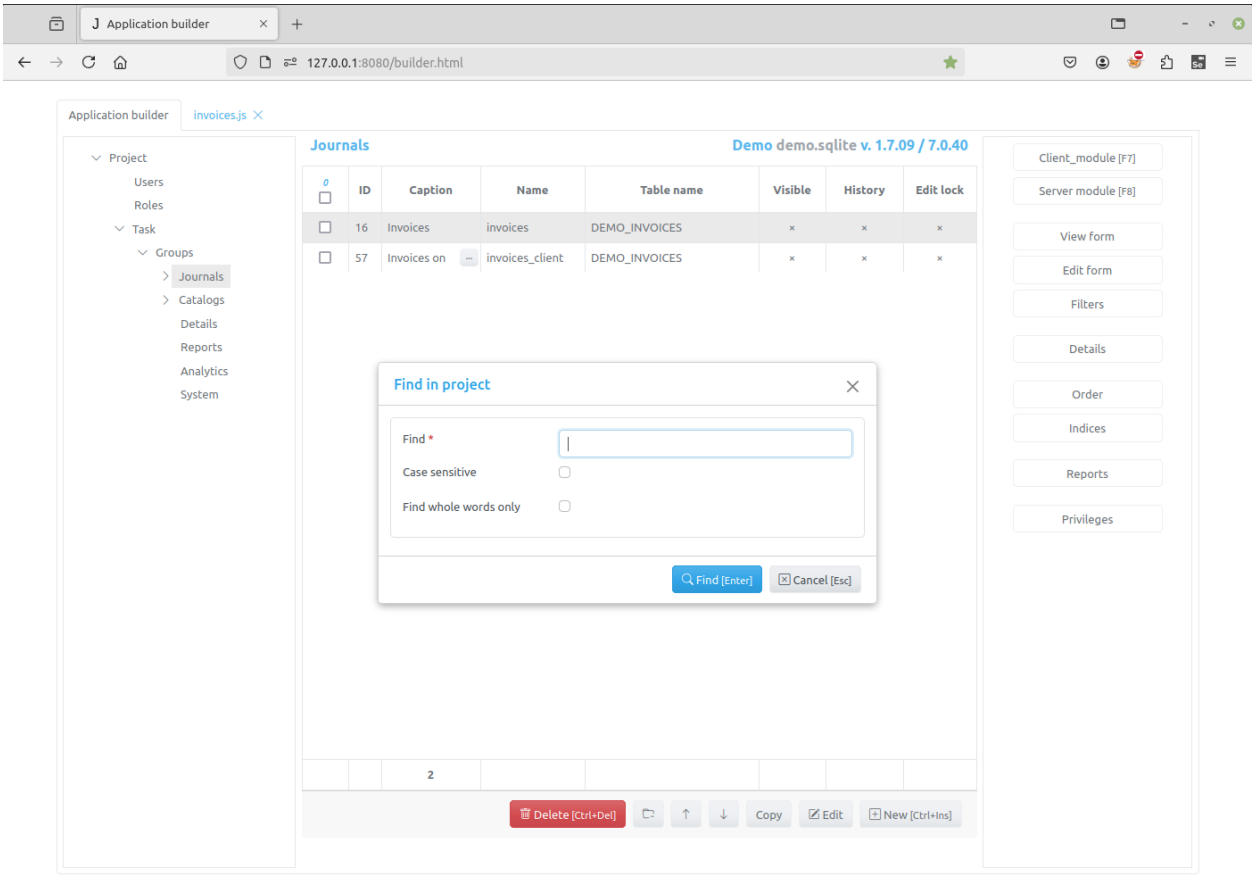
Export

Metadata file

How to migrate development to production

6.1.5 Find

Press this button to to search for the character string in all modules of the project.



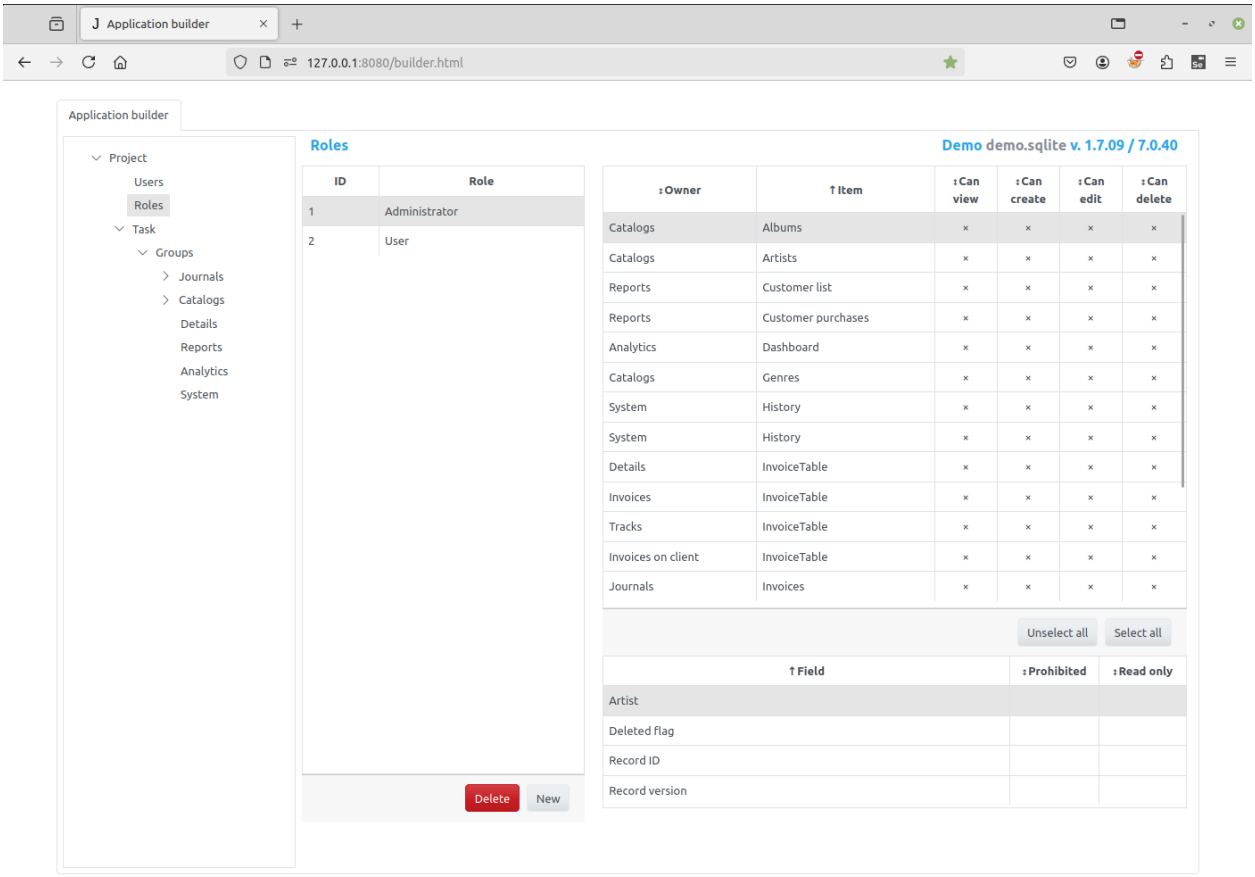
6.1.6 Print

Press this button to print all modules of the project.

6.2 Roles

Select Roles node in the project tree to create and modify roles that defined users privileges. Each user must be assigned to one of roles defined in the project. A role defines the user's rights to view, create, modify, and delete data.

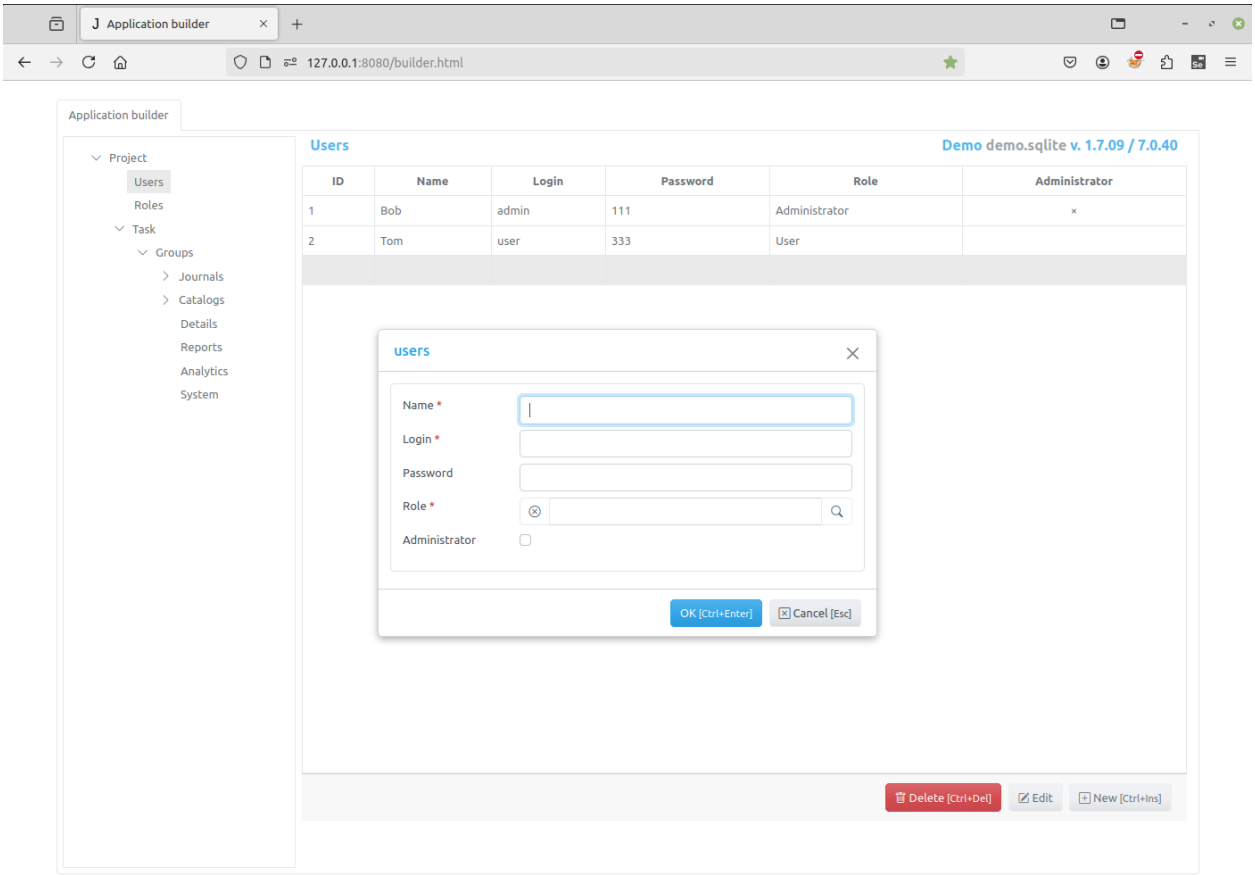
To add or delete a role, use New and Delete buttons. To set permissions for a role, select the role in a role list and put or remove a check mark next to the appropriate column by clicking on it with the mouse: View, Create, Edit, Delete (allowed to view, create, modify and delete, respectively).



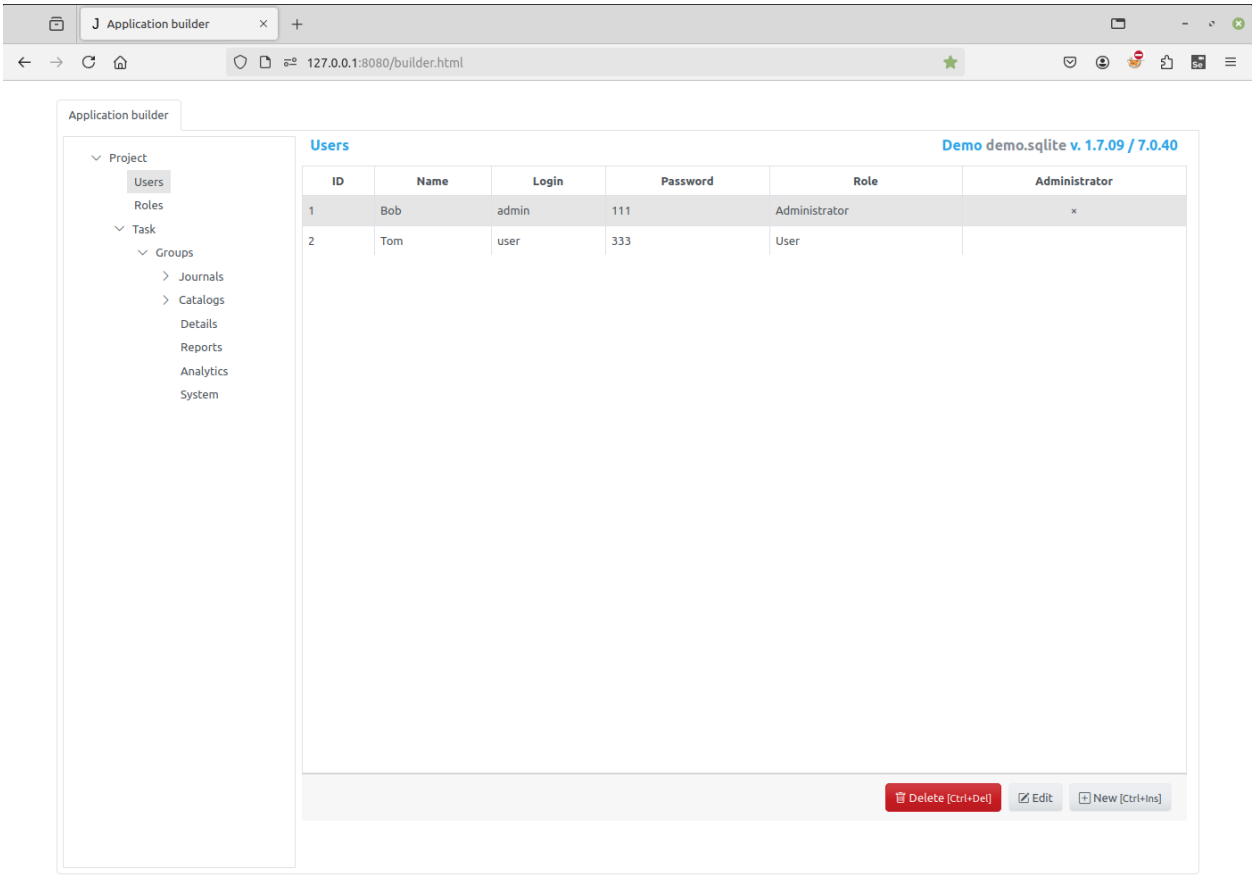
6.3 Users

If the **Safe mode** checkbox in the *project parameters* is checked, authentication is needed for a user to work in the system.

But before that, the user must be registered in the framework. To register a user select Users node, click New and fill in the form that appears:



- **Name** – user name
- **Login** - login
- **Password** - password
- **Role** – user role
- **Information** - some additional information
- **Admin** - if this flag is set, the user has the right to work in the Application builder.

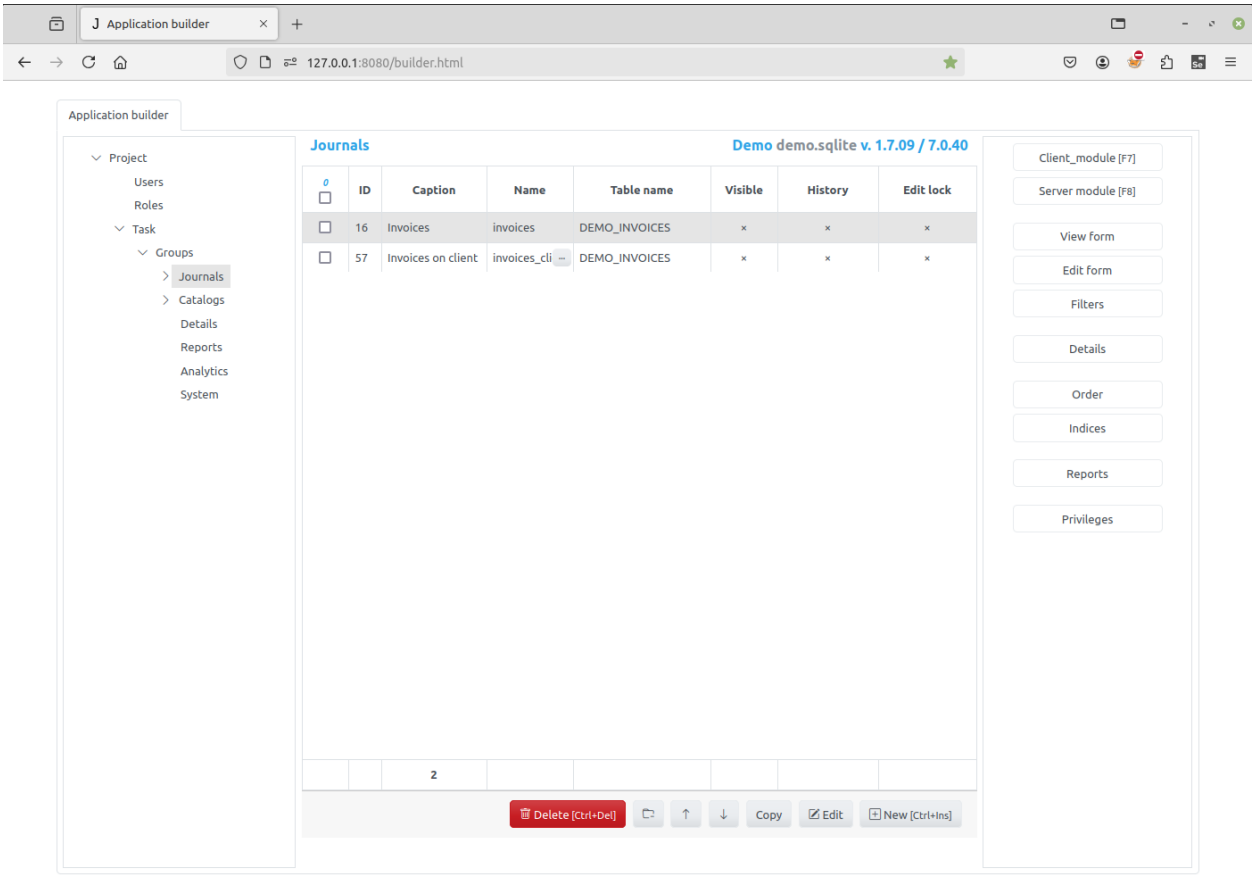


6.3.1 See also

on_login event

6.4 Code editor

For every item of the project *task tree* there are two buttons in the upper-right corner of the *Application builder* : `Client module [F7]` and `Server module[F8]`.



By clicking on these buttons the Code Editor for the client or server module of the item will be opened. (See *Working with modules*)

To the left of the **Editor** there is an information pane with four tabs:

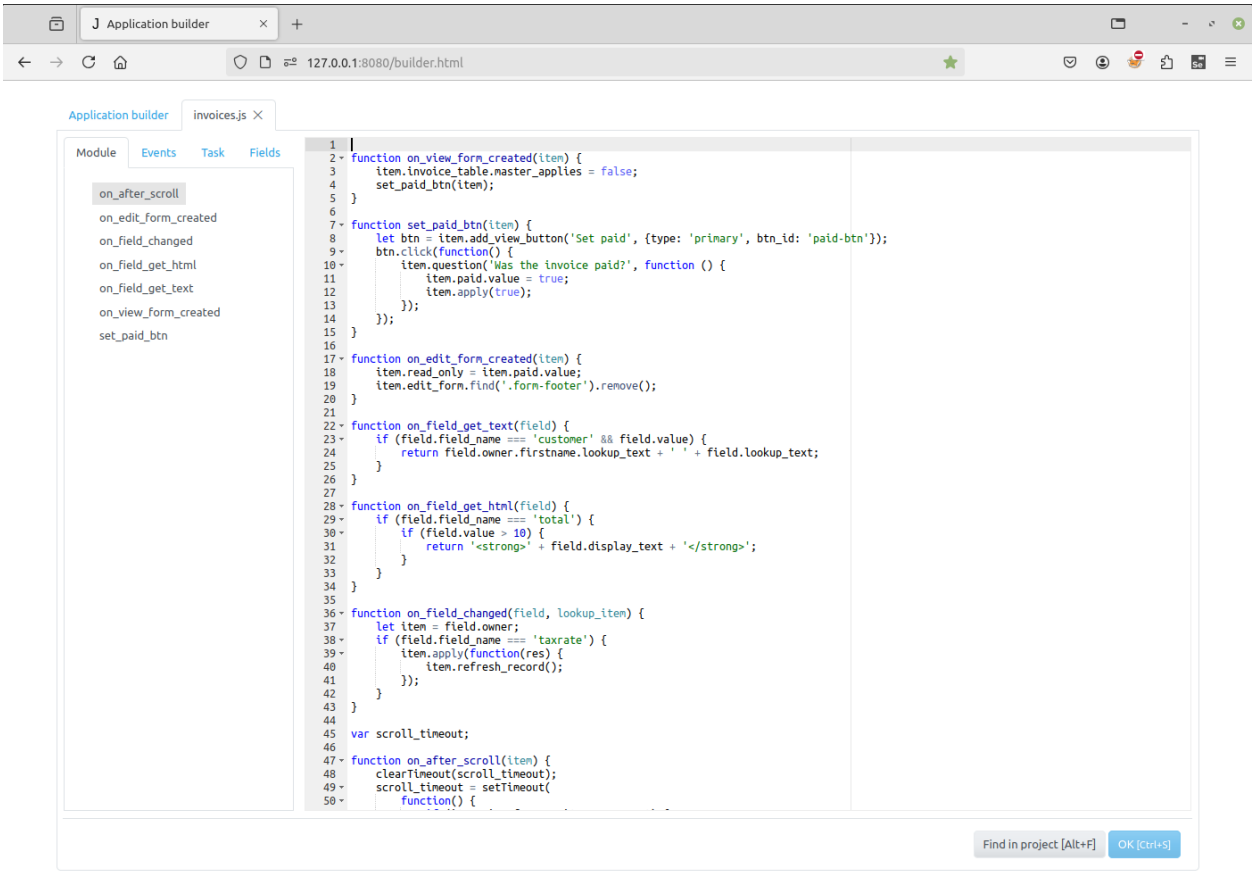
- **Module** - this tab displays all events and functions defined in the editor, double-click on one of them to move the cursor to the proper function.
- **Events** - displays all the published event of the item, double-click to add a wrapper for the event at the current cursor position (see the on_before_post event on the figure above).
- **Task** - the *task tree*, double-click on the node to enter the item_name at the current cursor position.
- **Fields** - the field list of the current item, double-click on one of the fields to enter the field_name at the current cursor position.

To save changes click the **OK** button or press Ctrl-S.

To search the project modules, click the **Find in project** button or press Alt-F to display the *Find in project Dialog*

Jam.py uses the ace editor editor to implement its code editor.

Here are keyboard shortcuts for the ace editor.



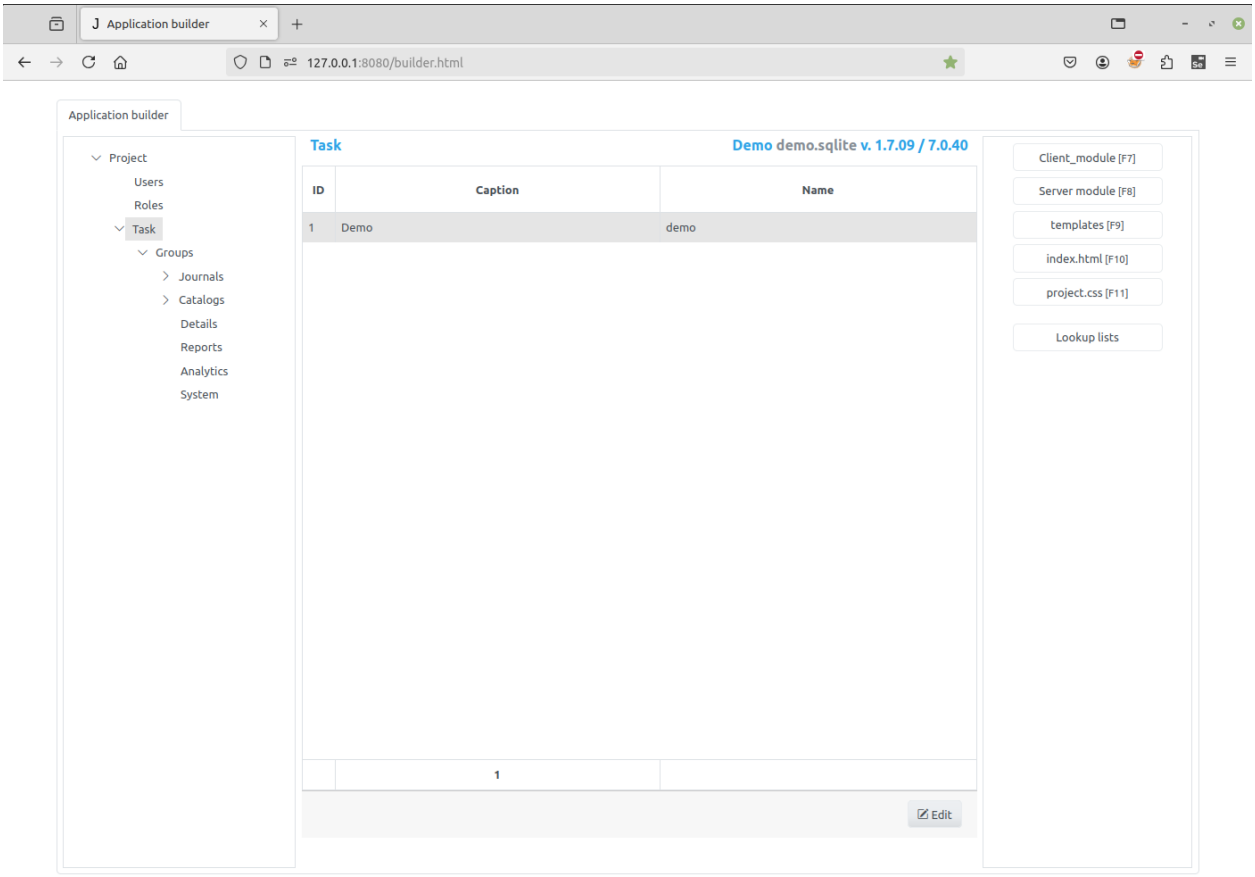
6.5 Task

Select **Task** node to get to the root of the project *task tree*.

Press the **Edit** button in the bottom of the page to change the name and caption of the task.

Use buttons in the right panel of the page to edit

- `Client Module [F7]` and `Server Module [F8]` of the task, see *Working with modules* and *Code editor*
- `index.html [F10]` file from the project root folder that contains project page
- `templates [F9]` html file for the forms, see *Forms* and *Code editor*
- `project.css [F11]` file from **css** directory the project root folder, see *Code editor*
- `Lookup lists` - click on the button to open *Lookup lists* Dialog

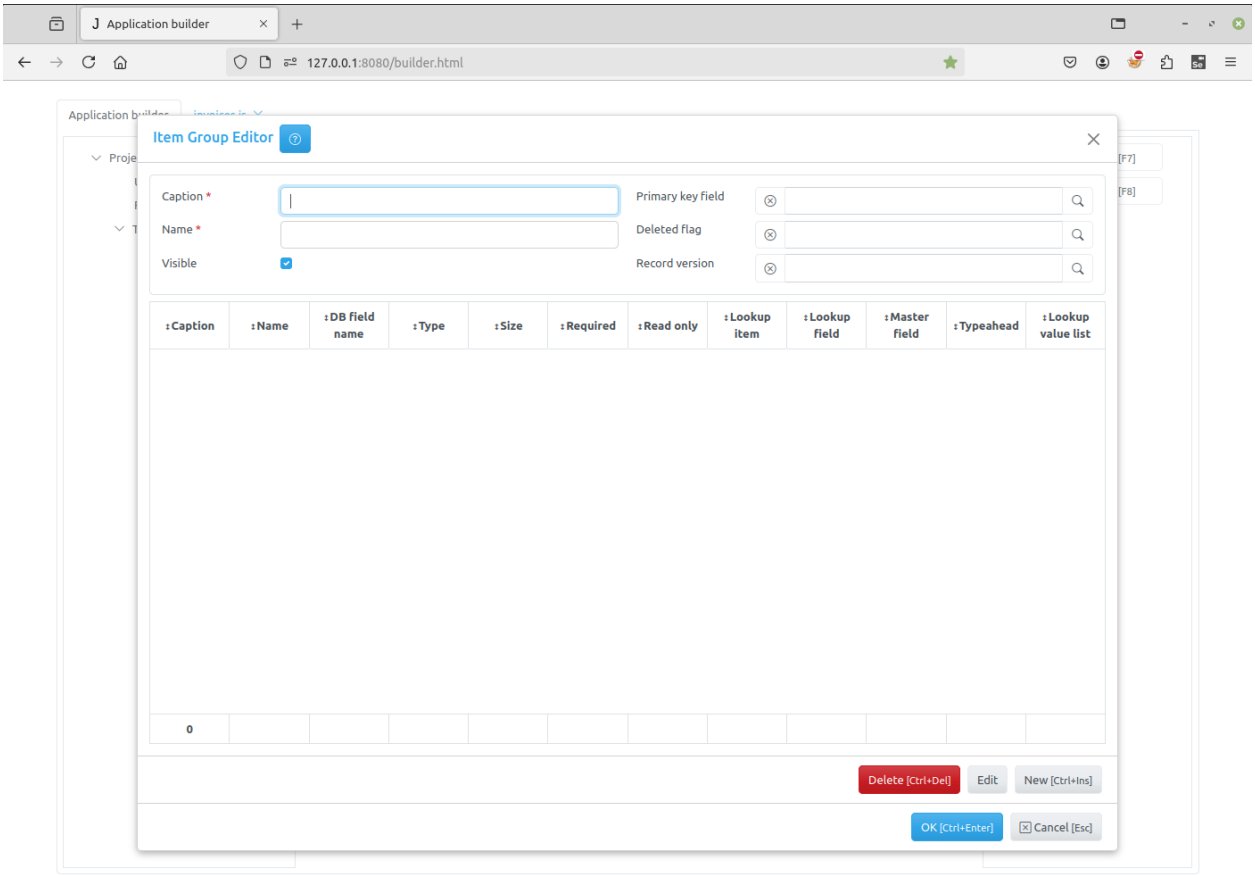


6.6 Groups

Select the node with the name of the task to get to the groups of the project *task tree*.

At the bottom of the page there are 3 buttons:

- **Delete** - click the button to delete an empty group.
- **Edit** - click this button to modify the selected group, the corresponding Group Editor will appear.
- **New** - use this button to create a new item.
- **New Report Group** - use this button to create a new report group.



For each of the group, its own editor will be shown:

6.6.1 Item Group Editor

Item Group Editor opens when a developer wants to create a new item group or modify an existing one. See *Task tree*

The upper part of the **Item Group Editor** have the following fields:

- **Caption** - the item name that appears to users.
- **Name** - the name of the item that will be used in programming code to get access to the item object. It should be unique in the project and should be a valid python identifier.
- **Primary key field** - by clicking on the button to the right of this attribute you can specify the primary key field for the item. If the primary key field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.
- **Deleted flag field** - by clicking on the button to the right of this attribute you can specify the field that will serve as a deleted flag for the item. If the deleted flag field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.
- **Record version** - by clicking on the button to the right of this attribute you can specify the field that will serve as *record locking* field for the item.
- **Visible** - use this checkbox to set item's visible attribute. The value of this attribute can be used in code on the client to create menu items and so on.

In the center part of the **Item Group Editor** dialog there is a table containing a list of fields, defined for the item. These fields are *common* to all items the group will own.

To add, modify or delete a field use the following buttons:

- **New** - click the button to invoke the *Field Editor Dialog* to create a new field.
- **Edit** - click the button to invoke the *Field Editor Dialog* to modify a selected field.
- **Delete** - click the button to delete a field selected in in the field list.

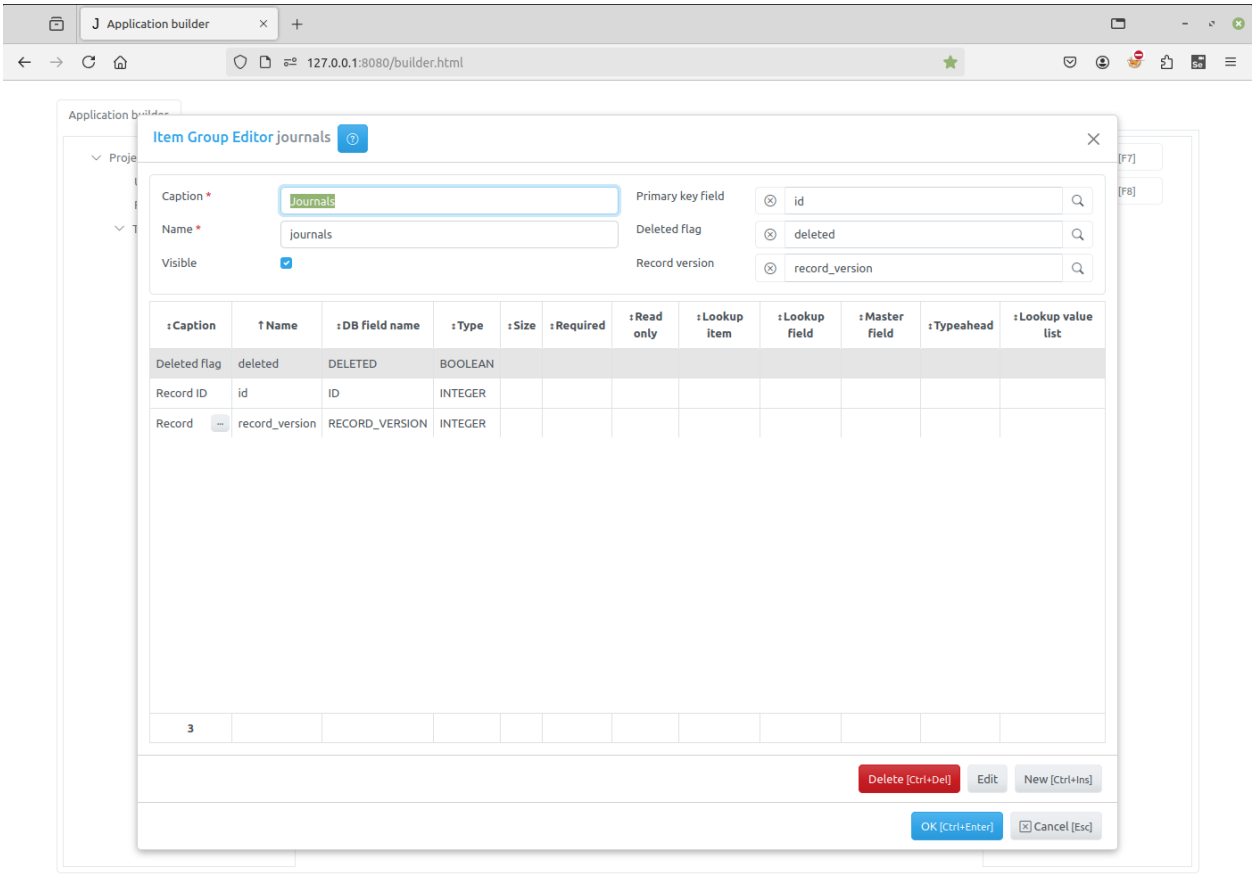
In the bottom-right corner of the Dialog form there are two buttons:

- **OK** - click the button to save change you made.
- **Cancel** - click the buttons to cancel the operation.

Nota

You can create new or modify existing fields and set **Primary key field** and **Deleted flag field** attributes only when creating a new group or editing an empty one.

For existing item groups, that already own items you can only change **Caption**, **Name** and **Visible** attributes.



6.6.2 Report Group Editor

Report Group Editor opens when the developer wants to create a new report group or change an existing report group.

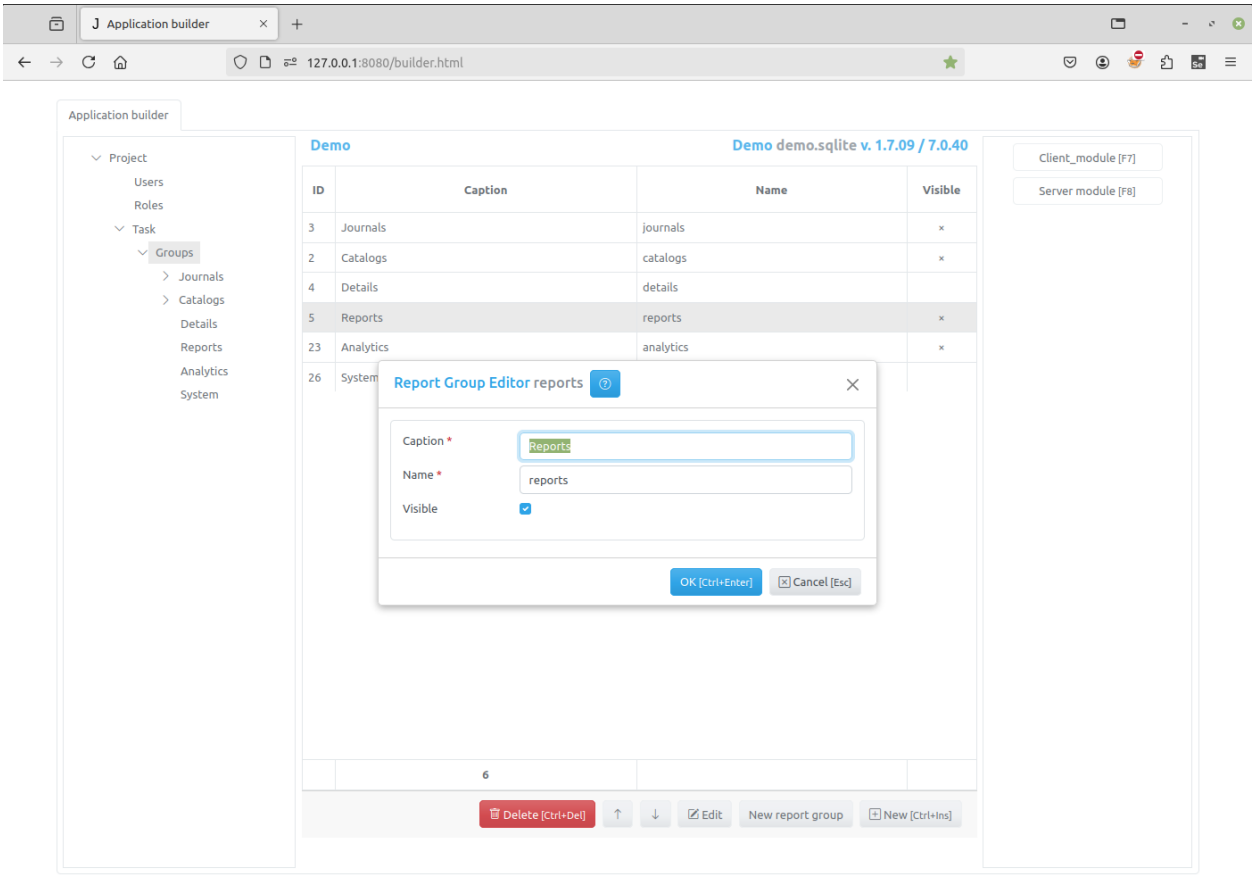
The upper part of the **Report Group Editor** have the following fields:

- **Caption** - the group name that appears to users.

- **Name** - the name of the group that will be used in programming code to get access to the group object. It should be unique in the project and should be a valid python identifier.
- **Visible** - use this checkbox to set group's visible attribute. The value of this attribute can be used in code on the client to create menu items and so on.

In the bottom-right corner of the Dialog form there are two buttons:

- **OK** - click the button to save change you made.
- **Cancel** - click the buttons to cancel the operation.



6.6.3 Detail Group Editor

Detail Group Editor opens when a developer wants to create a new detail group or modify an existing one. See *Task tree*

The upper part of the **Detail Group Editor** have the following fields:

- **Caption** - the item name that appears to users.
- **Name** - the name of the item that will be used in programming code to get access to the item object. It should be unique in the project and should be a valid python identifier.
- **Table** - the name of the table that will be created in the project database. This name is specified when creating an item, and can not be changed later.
- **Primary key field** - by clicking on the button to the right of this attribute you can specify the primary key field for the item. If the primary key field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.

- **Deleted flag field** - by clicking on the button to the right of this attribute you can specify the field that will serve as a deleted flag for the item. If the deleted flag field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.
- **Record version** - by clicking on the button to the right of this attribute you can specify the field that will serve as *record locking* field for the item.
- **Visible** - use this checkbox to set item's visible attribute. The value of this attribute can be used in code on the client to create menu items and so on.
- **Soft delete** - when this check-box is checked, the delete method does not erase a record physically from the table, but uses this field to mark the record as deleted. See *Common fields*, *delete* method (server), *delete* method (client).
- **Virtual table** - if this checkbox is checked, no database table will be created. Use this options to create an item with in-memory dataset or to use its modules to write code. This checkbox must be set when creating an item and can not be changed later.
- **History** - if this checkbox is checked, the application will saving for this item audit trail/change history made by users, see *Saving audit trail/change history made by users*
- **Edit lock** - if this checkbox is checked, the application will use record locking while users concurrently edit a record, see *Record locking*

In the center part of the **Detail Group Editor** dialog there is a table containing a list of fields, defined for the item. These fields are *common* to all items the group will own.

To add, modify or delete a field use the following buttons:

- **New** - click this button to invoke the *Field Editor Dialog* to create a new field.
- **Edit** - click this button to invoke the *Field Editor Dialog* to modify a selected field.
- **Delete** - click the button to delete a field selected in in the field list.

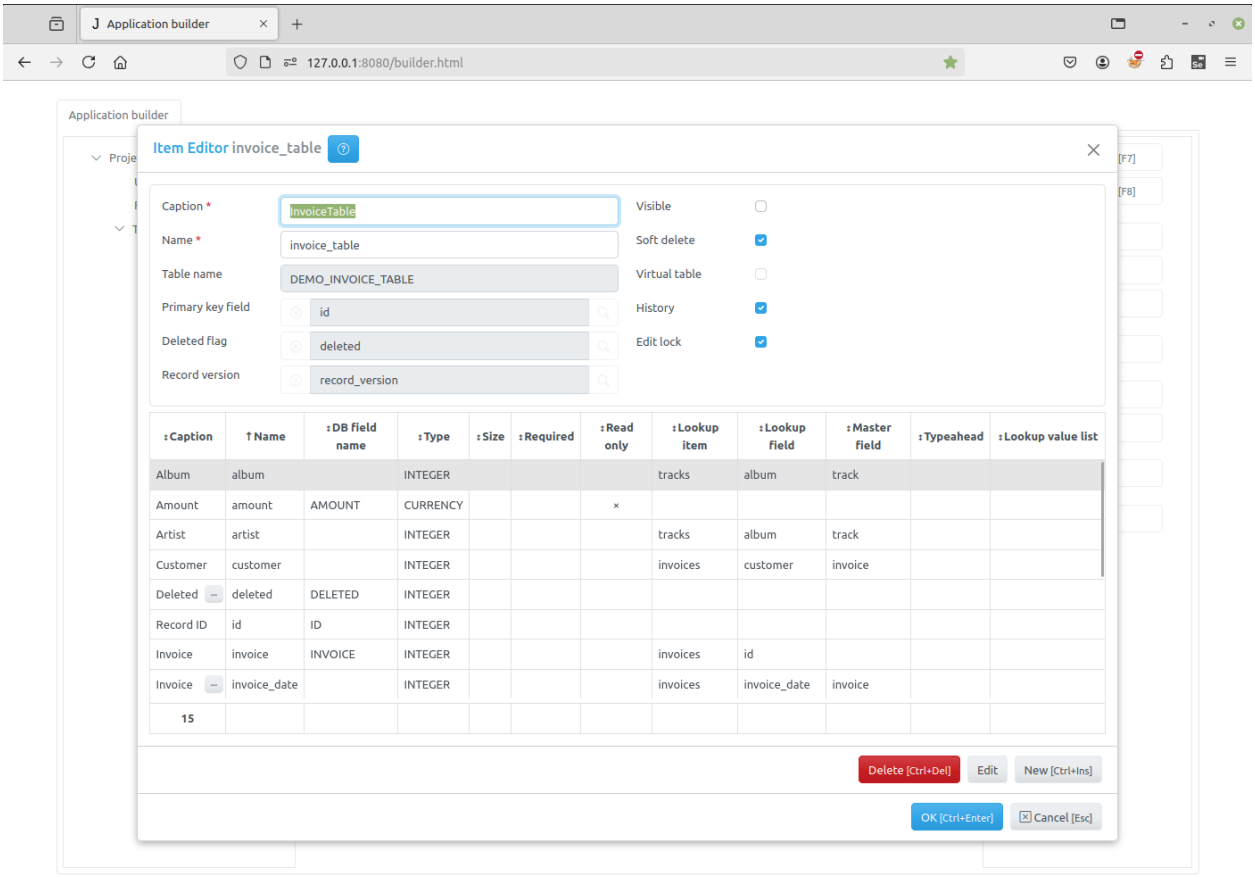
In the bottom-right corner of the Dialog form there are two buttons:

- **OK** - click the button to save change you made.
- **Cancel** - click the buttons to cancel the operation.

Nota

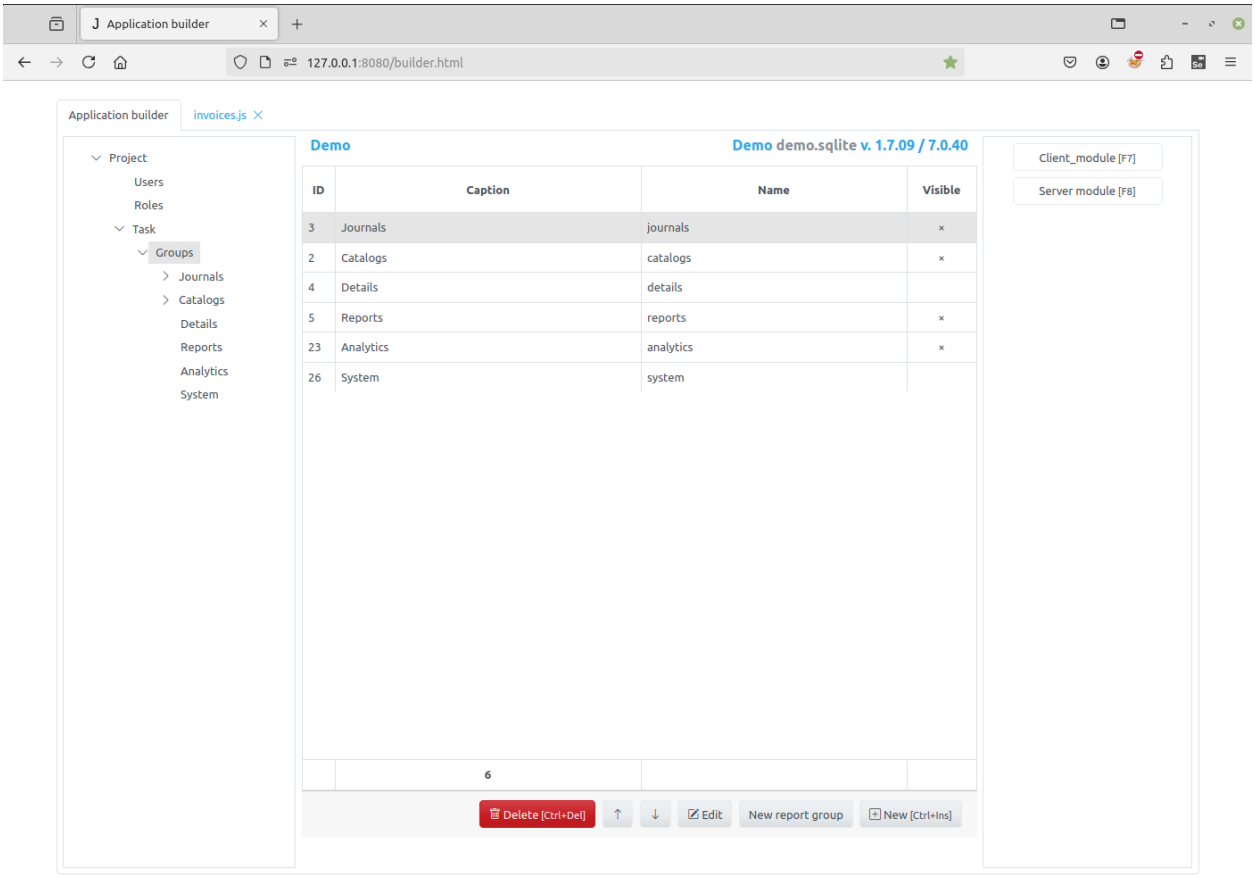
You can create new or modify existing fields and set **Primary key field** and **Deleted flag field** attributes only when creating a new group or editing an empty one.

For existing detail groups, that already own items you can only change **Caption**, **Name** and **Visible** attributes.



Use buttons in the right panel of the page to edit Client and Server modules of a selected group, see

- *Working with modules*,
- *Code editor*



6.7 Items

Select a group node in the project tree to get access to items that this group owns, see *Task tree*.

At the bottom of the page there are 3 buttons:

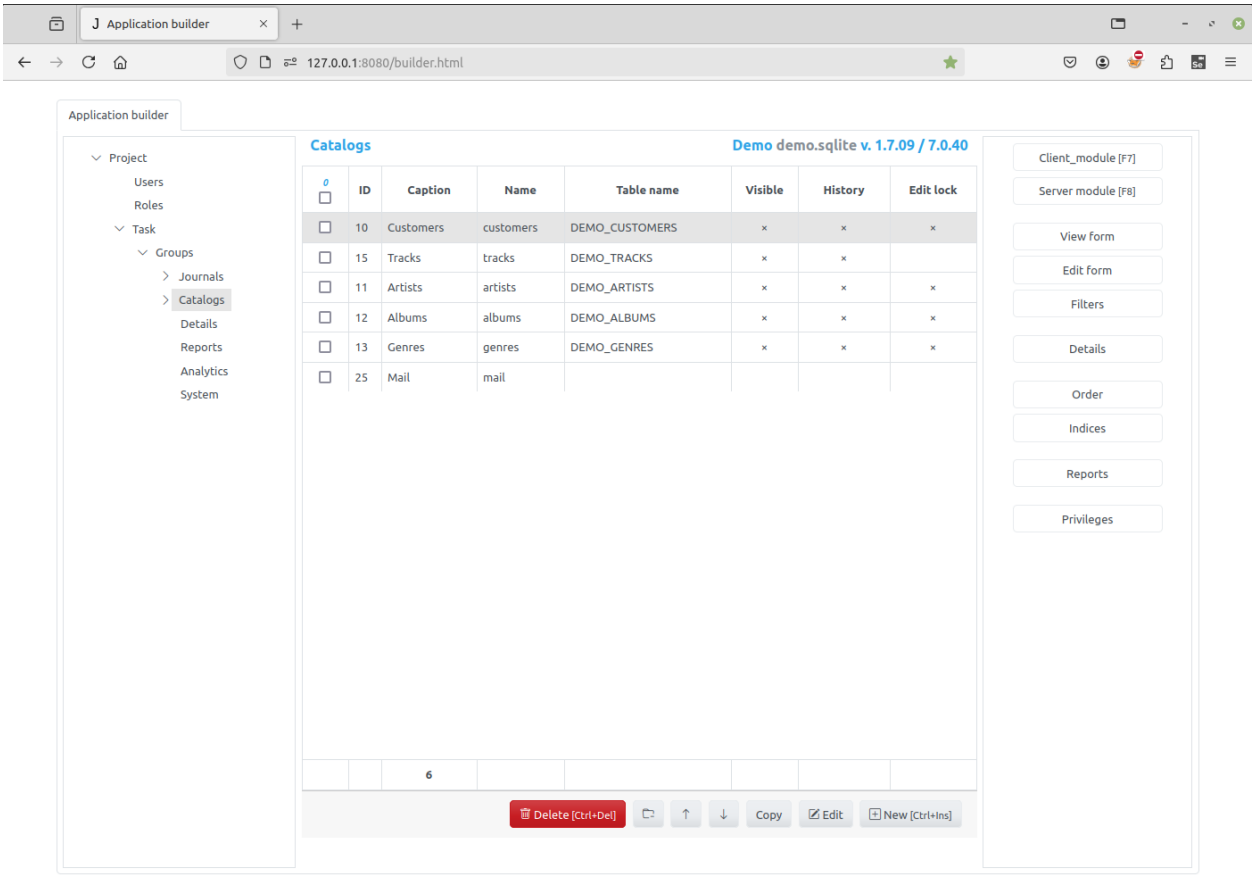
- **New** - click on New to create a new item in the *Item Editor Dialog*
- **Edit** - use this button to modify item's attributes as well to add, change or delete fields in the *Item Editor Dialog*
- **Delete** - click on the button to delete an item and its underlying database table.

You can use the up and down arrows to arrange the items in the list. This may be useful for creating a menu or display it in some way on the web page.

The right panel of the page have following buttons:

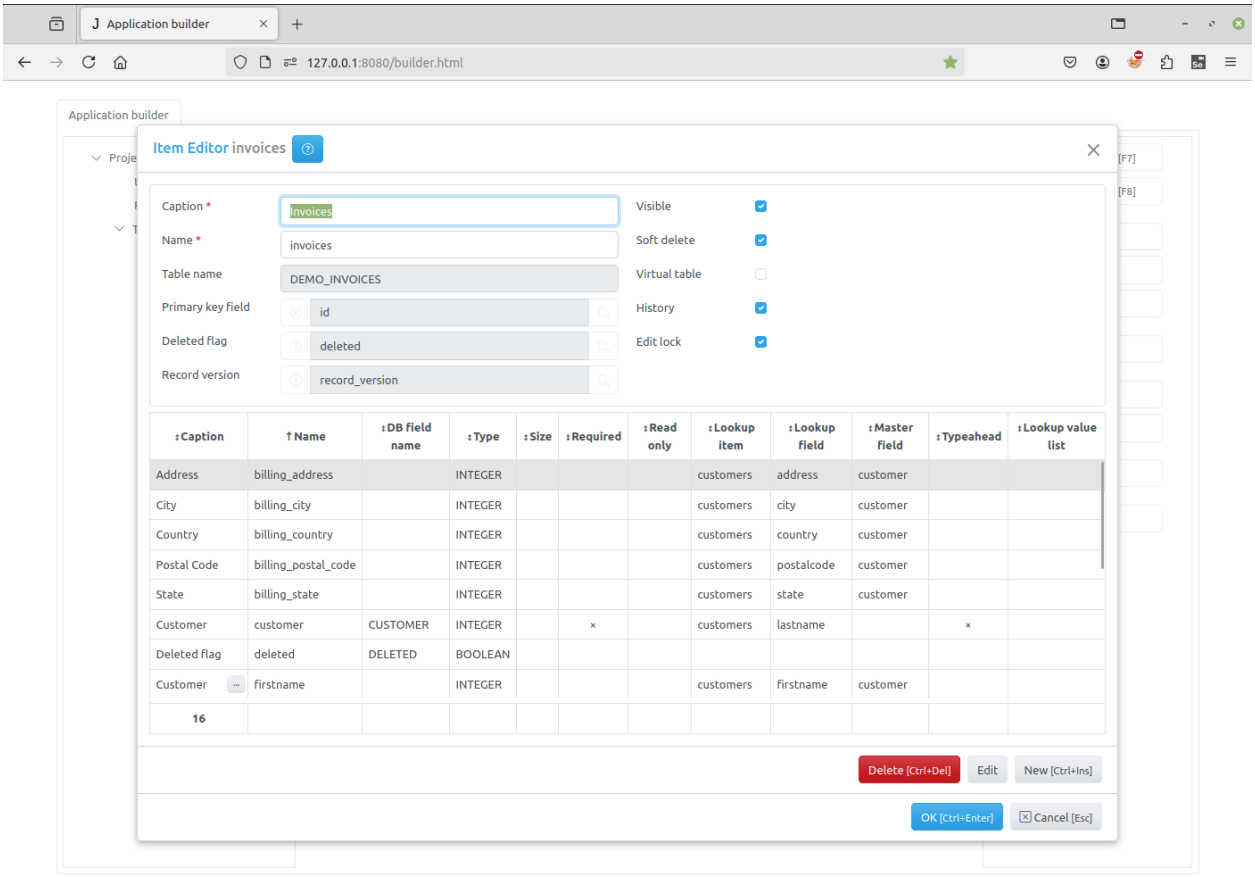
- **Client module** - click on this button to open the *Code editor* to edit client module of an item, see *Working with modules*.
- **Server module** - click on this button to open the *Code editor* to edit server module of an item, see *Working with modules*.
- **View Form** - use this button to invoke the *View Form Dialog* to set how the view form will be displayed.
- **Edit Form** - use this button to invoke the *Edit Form Dialog* to set how the edit form will be displayed.
- **Filters** - use this button to invoke the *Filters Dialog* to create, modify and delete item filters. See *Filters*.
- **Details** - use this button to invoke the *Details Dialog* to add or remove details linked to the item.

- **Order** - use this button to invoke the *Order Dialog* to specify how records will be ordered by default. See *open* method
- **Indices** - lick this button to open the *Indices Dialog* to create and delete indices for the item database table.
- **Reports** - lick this button to open the *Reports Dialog* to specify reports that could printed for the item. A new project has a function that can be used to create a drop-up button to print the reports.
- **Privileges** - click this button to open a dialog to configure the privileges assigned to user roles for this item.



6.7.1 Item Editor Dialog

Item Editor dialog opens when a developer selects a Group node in the project tree of the Application builder and click on the **New** or **Edit** button to create a new item or modify a selected one. See *Items*.



The upper part of the **Item Editor dialog** have the following fields:

- **Caption** - the item name that appears to users.
- **Name** - the name of the item that will be used in programming code to get access to the item object. It should be unique in the project and should be a valid python identifier.
- **Table** - the name of the table that will be created in the project database. This name is specified when creating an item, and can not be changed later.
- **Primary key field** - by clicking on the button to the right of this attribute you can specify the primary key field for the item. If the primary key field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.
- **Deleted flag field** - by clicking on the button to the right of this attribute you can specify the field that will serve as a deleted flag for the item. If the deleted flag field was defined for the group that owns the item it will be displayed there by default, otherwise you have to create this field first.
- **Record version** - by clicking on the button to the right of this attribute you can specify the field that will serve as *record locking* field for the item.
- **Visible** - use this checkbox to set item's visible attribute. The value of this attribute can be used in code on the client to create menu items and so on.
- **Soft delete** - when this check-box is checked, the delete method does not erase a record physically from the table, but uses this field to mark the record as deleted. See *Common fields*, *delete* method (server), *delete* method (client).
- **Virtual table** - if this checkbox is checked, no database table will be created. Use this options to create an item with in-memory dataset or to use its modules to write code. This checkbox must be set when creating an item

and can not be changed later.

- **History** - if this checkbox is checked, the application will saving for this item audit trail/change history made by users, see *Saving audit trail/change history made by users*
- **Edit lock** - if this checkbox is checked, the application will use record locking while users concurrently edit a record, see *Record locking*

In the center part of the **Item Editor dialog** there is a table containing a list of fields, defined for the item. To add, modify or delete a field use the following buttons:

- **New** - click this button to invoke the *Field Editor Dialog* to create a new field.
- **Edit** - click this button to invoke the *Field Editor Dialog* to modify a selected field.
- **Delete** - click this button to delete a field selected in in the field list.

In the bottom-right corner of the Dialog form there are two buttons:

- **OK** - click this button to save change you made. If the **Virtual table** checkbox is not checked and **DB manual update** parameter in the project *Database Dialog* is not set, the application will generate and execute SQL query to update the item table in the project Database (changes made to the fields will be applied to the table).
- **Cancel** - click this buttons to cancel the operation.

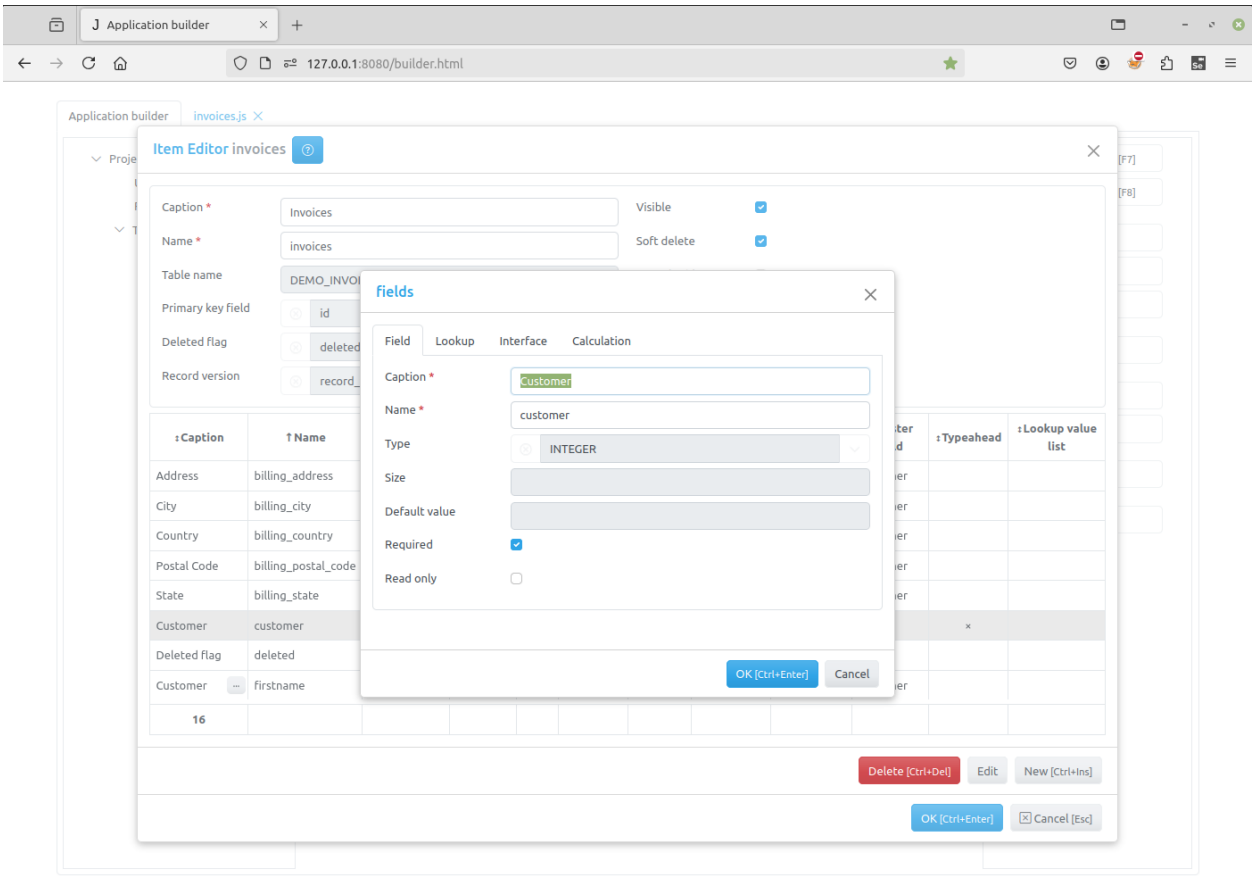
6.7.2 Field Editor Dialog

Use the **Field Editor Dialog** to create a new or modify an existing field.

> **Nota**
>
> For some operations, the *DB manual mode* must be set to true. For example, changing the field type. Since the database is in "Manual Mode", changing the type will not reflect within the database structure. Use this with caution.

The dialog has following tabs: **Field**, **Lookup**, **Interface** and **Calculation**.

Field tab

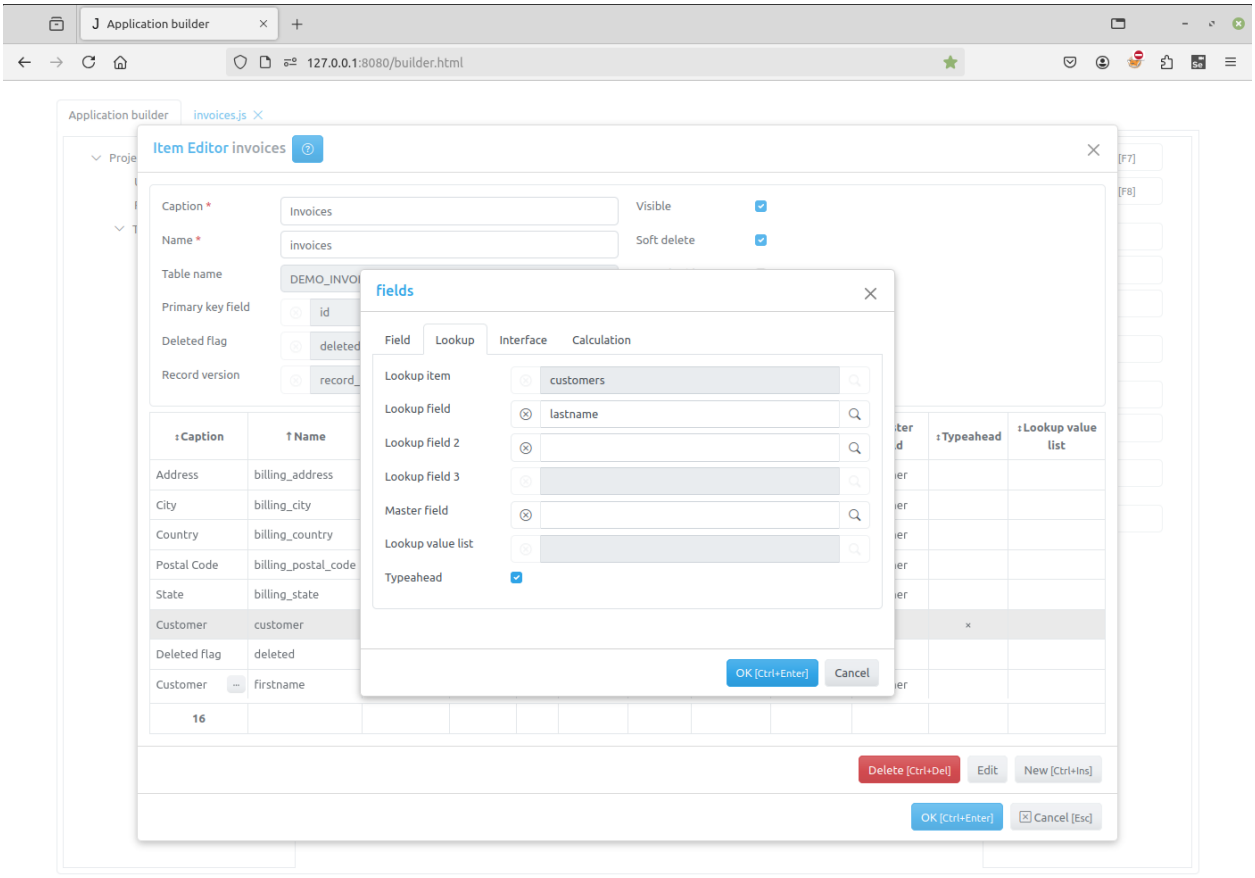


The **Field** tab have the following fields:

- **Caption** - the field name that appears to users.
- **Name** - the name of the field that will be used in programming code to get access to the field object. It should be a valid python identifier.
- **Type** - type of the field — one of the following values:
  - **TEXT**
  - **INTEGER**
  - **FLOAT**
  - **CURRENCY**
  - **DATE**
  - **DATETIME**
  - **BOOLEAN**
  - **LONGTEXT**
  - **FILE**
  - **IMAGE**
- **Size** - the size of the field for text fields.

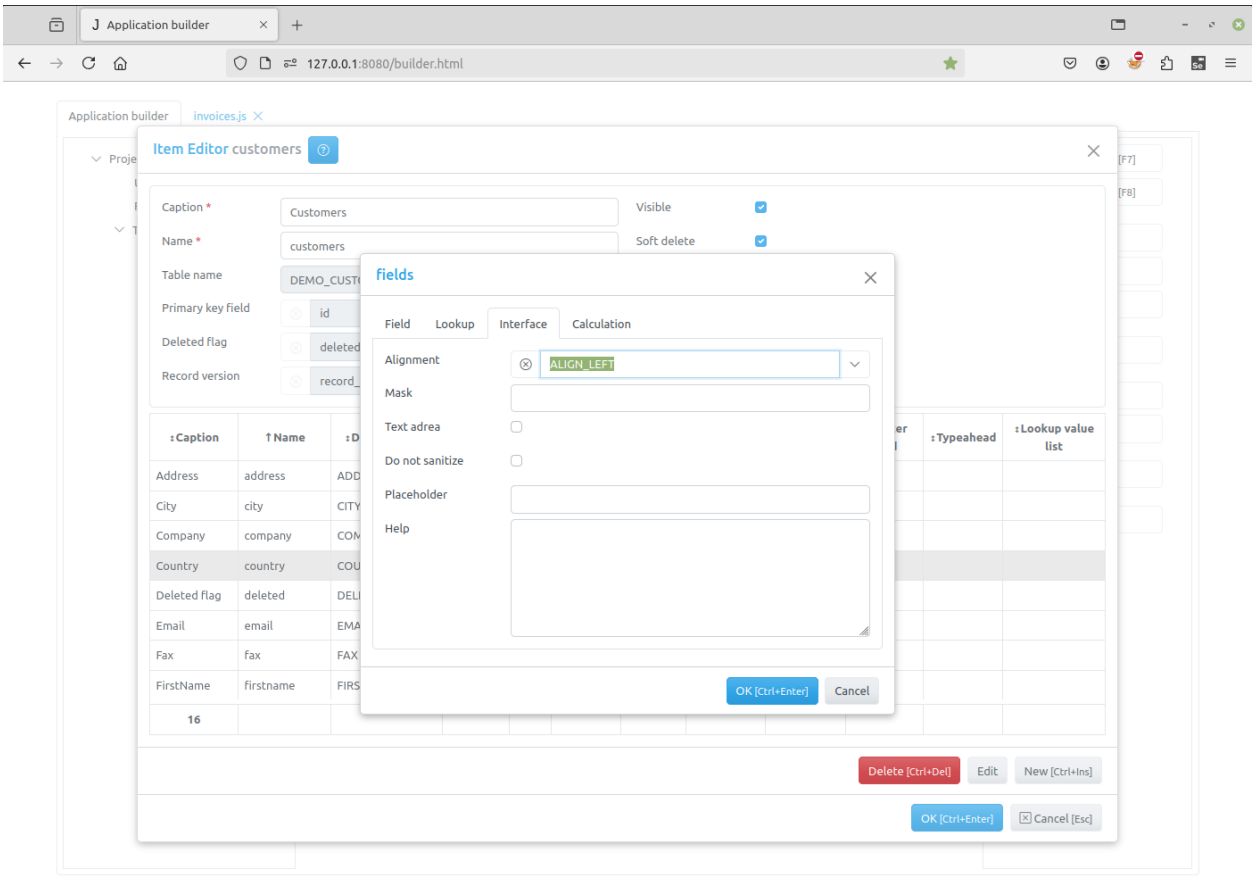
- **Default value** - the default value of the field, for boolean fields use 0 or 1
- **Required** - if this checkbox is checked, the post method will raise an exception if this field is empty. See *Modifying datasets*.
- **Read only** - this checkbox is checked, the field value can not be changed in the interface controls created by the *create_inputs* method on the client.

Lookup tab



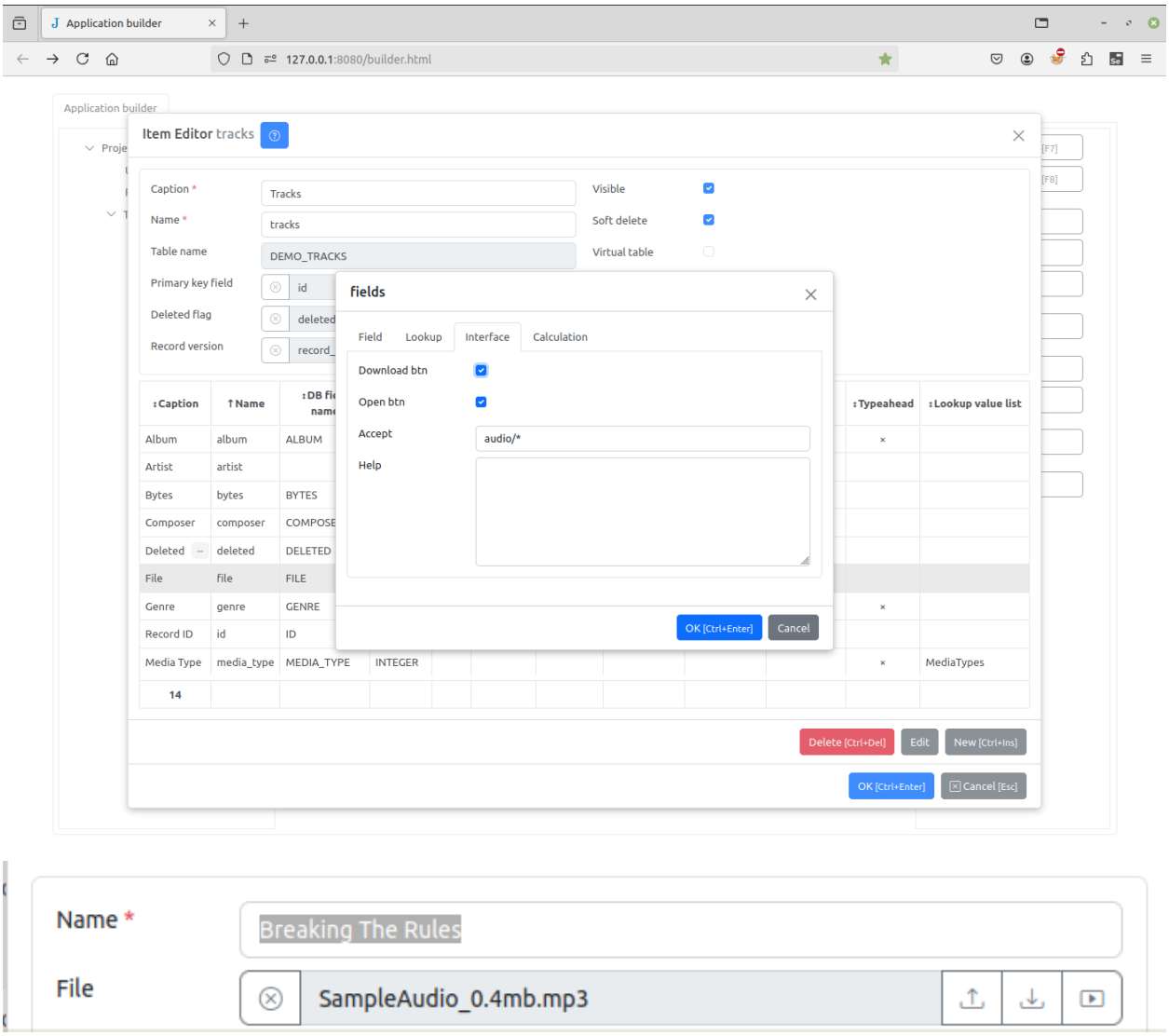
- **Lookup item** - the lookup item for *Lookup fields*
- **Lookup field** - the lookup field for *Lookup fields*
- **Lookup field 2** - the lookup field 2 for *Lookup fields*
- **Lookup field 3** - the lookup field 3 for *Lookup fields*
- **Master field** - the master field for *Lookup fields*
- **Typeahead** - if this checkbox is checked, typeahead is enabled for the lookup field
- **Lookup value list** - use it to specify a *lookup list* for an integer field

Interface tab



- **Mask** - use this attribute to specify the *field_mask*
- **TextArea** - for text fields if this attribute is set the textarea element will be created for these fields in the *Edit Form Dialog*
- **Do not sanitize** - set this attribute to prevent default sanitizing of the field value, see *Sanitizing*
- **Alignment** - determines the alignment of text in the controls that display this field.
- **Placeholder** - use this attribute to specify the placeholder that will be displayed by the field input.
- **Help** - if any text / html-message is specified, a question mark will be displayed to the right of the input, so when the user moves the mouse pointer over this mark, a pop-up window appears displaying this message.

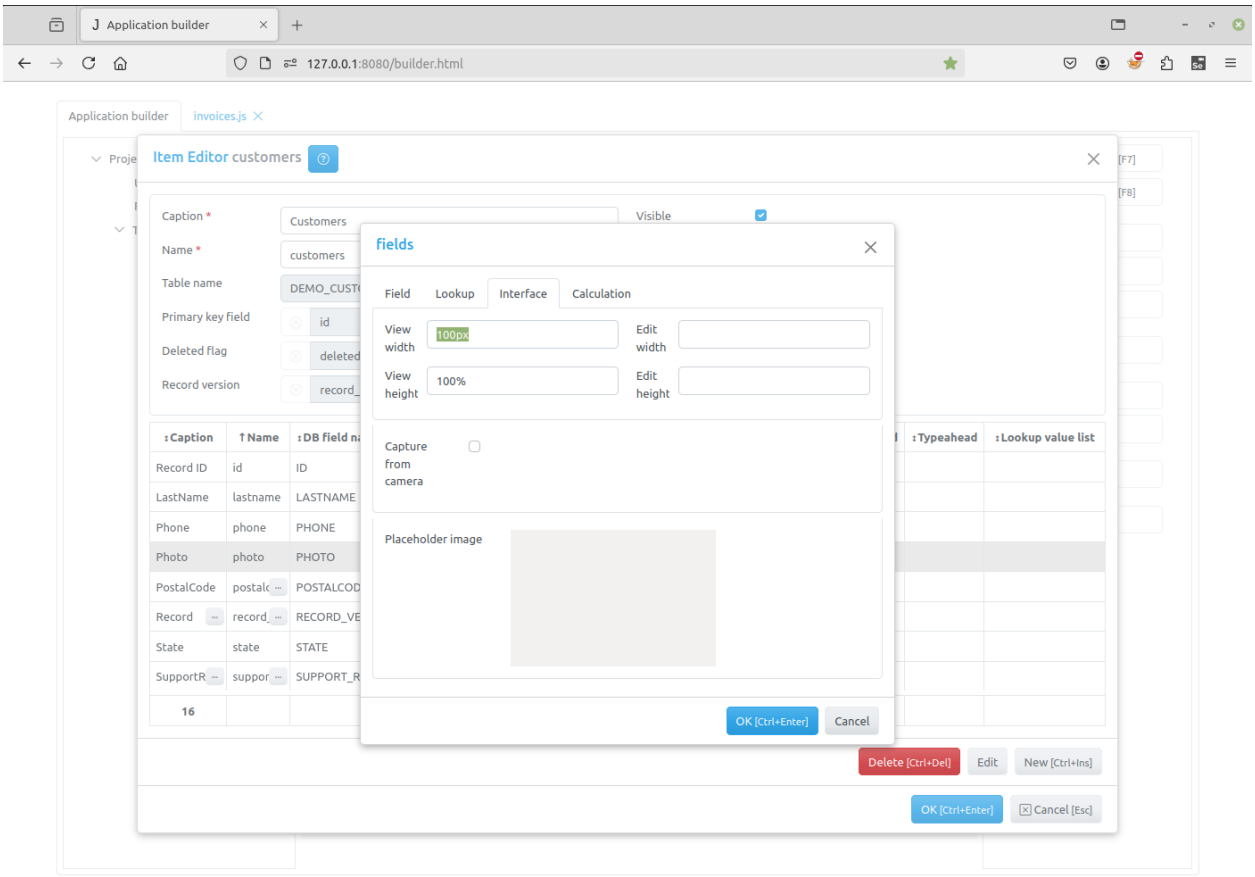
Interface tab for FILE field



- **Download btn** - uncheck the box to hide the download button (middle)
- **Open btn** - uncheck the box to hide the open button (right)
- **Accept** - the attribute specifies the types of files that can be loaded. This is an *Accept string*.

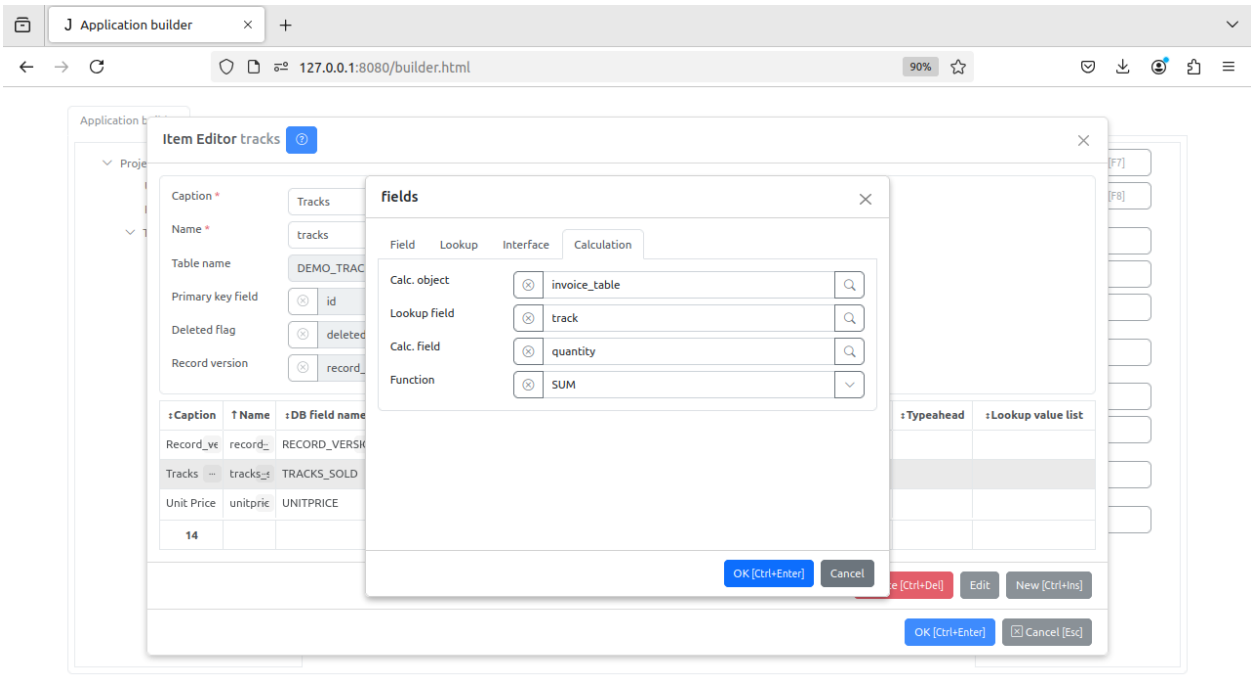
> **Nota**
>
> Please note that **Accept** attribute is required. Uploaded files are checked on the server against this attribute.

Interface tab for Image field



- **View width** - specifies the width of an image in pixels when it is displayed in the table of the view form. If it not specified, the width is auto
- **View height** - specifies the height of an image in pixels when it is displayed in the table of the view form. If it not specified, the height is auto
- **Edit width** - specifies the width of an image in pixels when it is displayed in the edit form. If it not specified, the width is auto
- **Edit height** - specifies the height of an image in pixels when it is displayed in the edit form. If it not specified, the height is auto
- **Capture from camera** - if this checkbox is set, the user will be able to capture image from cameraby double-click. The image is automatically uploded to the server, providing the ".png" is added on Parameters *Accept string*.
- **Placeholder image** - double-click the image to set the placeholder image, that will be displayed when field image is not set. Hold Ctrl key and double-click the image to clear the placeholder image.

Calculation tab



- **Calc. object** - specifies the *Details* table.
- **Lookup field** - specifies the *Lookup field*. For example, the Details table *invoice_table*, *tracks* field, which is a lookup field to *Name* field on table *Tracks*.
- **Calc. field** - specifies on which field the calculation is performing on.
- **Function** - specifies the server side functions (SUM, COUNT, MIN, MAX, AVG).

6.7.3 Edit Form Dialog

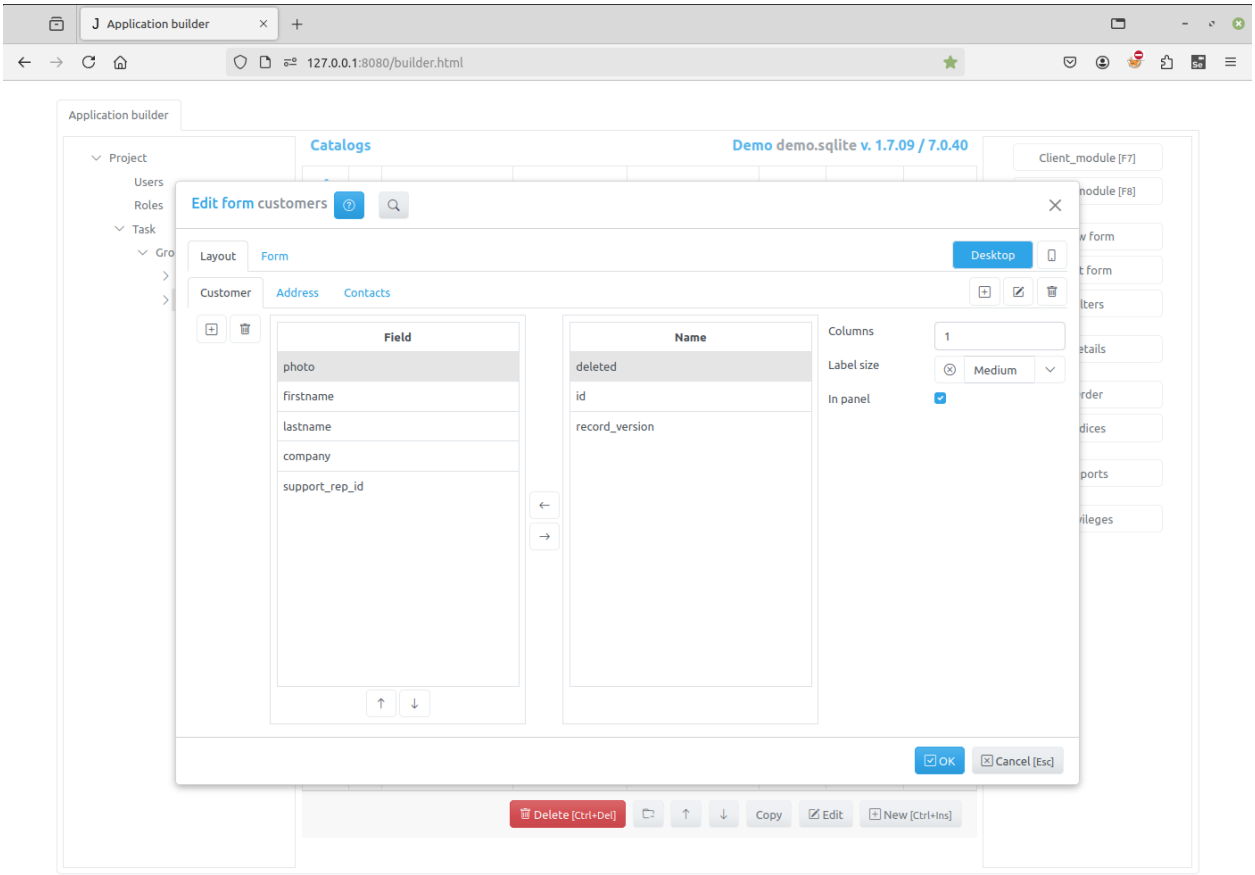
The **Edit Fields Dialog** opens when a developer selects the item in the Application builder and clicks the **Edit Form** button.

It has two tabs **Layout** and **Form**, as well as button `Desktop` and `device`.

The button `Desktop` is a default and `device` can be used for **tablet** and/or **mobile phone** inclusion. Each option is independent to each other.

Layout tab

On the **Layout** tab, you can specify the fields that the user can edit, their order, create tabs and bands for grouping field inputs.



The **Layout** tab has two lists of fields. The left list contains the fields that were selected for editing. In the right list there are available fields that you can select.

To select a field, select it in the right list and use the **Left arrow** button in the center or press **Space** key on a keyboard.

To unselect a field, select it in the left list and use the **Right arrow** button in the center or press **Space** key on a keyboard.

To order the selected fields use the buttons that located below left list.

On the right side of the "Layout" tab are the controls that you can use to specify the display options for the fields selected for editing on the form.

- **Columns** - the number of columns that will be created for field inputs
- **Label size** - select a value that determines the size of the labels displayed to the right of the field input:
  - xSmall
  - Small
  - Medium
  - Large
  - xLarge
- **In panel** - if set, the div containing the inputs will have an inset effect

You can create tabs and bands and customize fields that you can edit on each tab or band.

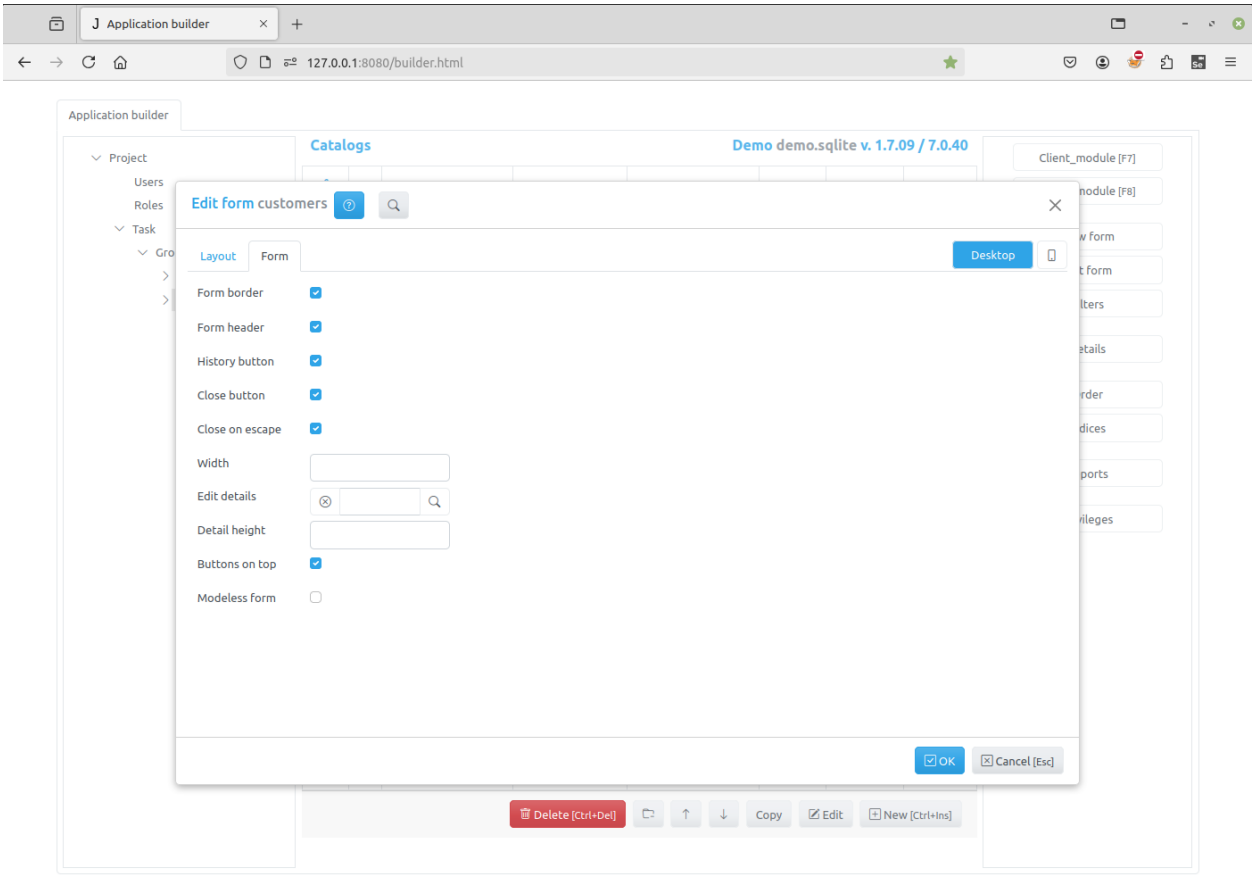
On the right side of the tab there are three buttons for adding, editing or deleting tabs of the edit form.

On the left side of the tab there are two buttons for adding and deleting of bands.

Each tab can have several bands.

After creating tabs and bands, you can use field lists and controls on the right to customize the fields that will be edited on each tab and band.

Form tab



On this tab are the controls that you can use to specify the options of the edit form

- **Form border** - if set, the border will be displayed around the form
- **Form header** - if set, the form header will be created and displayed containing form title and various buttons
- **History** - if set and *saving change history is enabled*, the history button will be displayed in the form header
- **Close button** - if set, the close button will be created in the upper-right corner of the form
- **Close on escape** - - if set, pressing on the Escape key will close the form
- **Width** - an integer, the width of the modal form, if not set the value is 600 px
- **Edit details** - click the button to the right of the input field to select details, that will be available for editing in the edit form
- **Detail height** - an integer, the height of the details displayed in the edit form, if not set, the height of the detail table is 262px
- **Buttons on top** - if this check box is checked the buttons are displayed on the top of the view form, when form has a default form template
- **Modeless form** - if this check box is checked the form will be modeless, otherwise - modal.

Click the **OK** button to save to result or **Cancel** to cancel the operation.

After saving, you can see the changes by refreshing the project page.

6.7.4 View Form Dialog

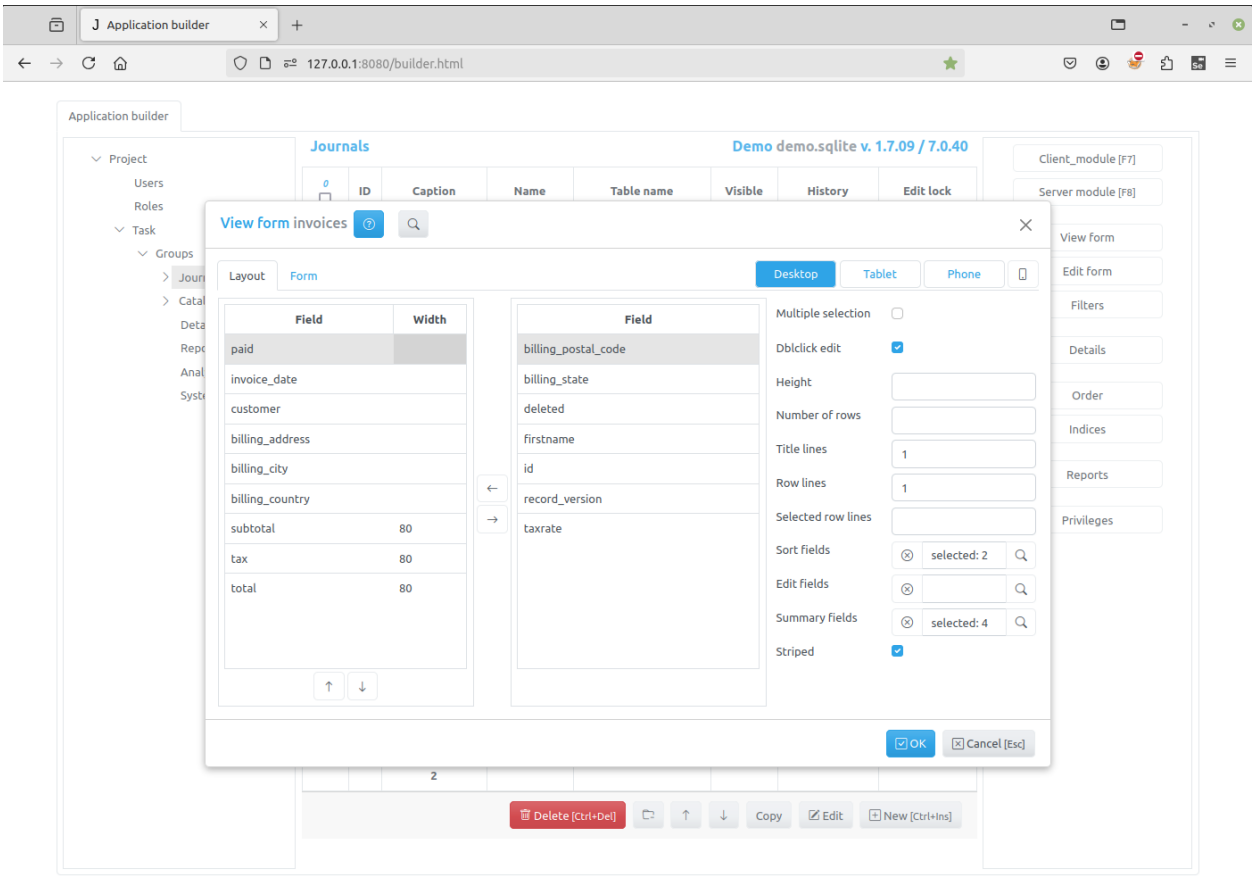
The **View Form Dialog** opens when a developer selects the item in the Application builder and clicks the **View Form** button.

It has two tabs **Layout** and **Form**, as well as button `Desktop` and `device`.

The button `Desktop` is a default and a `device` can be used for **tablet** and/or **mobile phone** inclusion. Each option is independent to each other.

Layout tab

On the Layout tab, you can specify how the table is displayed in the view form of the item.



Setting table fields

The **Layout** tab has two lists of fields. The left list contains the fields that were selected be displayed in the table. In the right list there are available fields that you can select.

To select a field, select it in the right list and use the **Left arrow** button in the center or press **Space** key on a keyboard.

To unselect a field, select it in the left list and use the **Right arrow** button in the center or press **Space** key on a keyboard.

To order the selected fields use the buttons that located below left list.

You can specify the width of the selected columns. To do this, select the field and enter its width in the Width column. The value can be specified in any supported CSS unit, for example, in pixels - `px`, in percentage, relative to the parent element - `%`. The width specified as an integer value is interpreted as the width specified in pixels.

Examples of column width values:

- 100px
- 100
- 50%
- 2cm

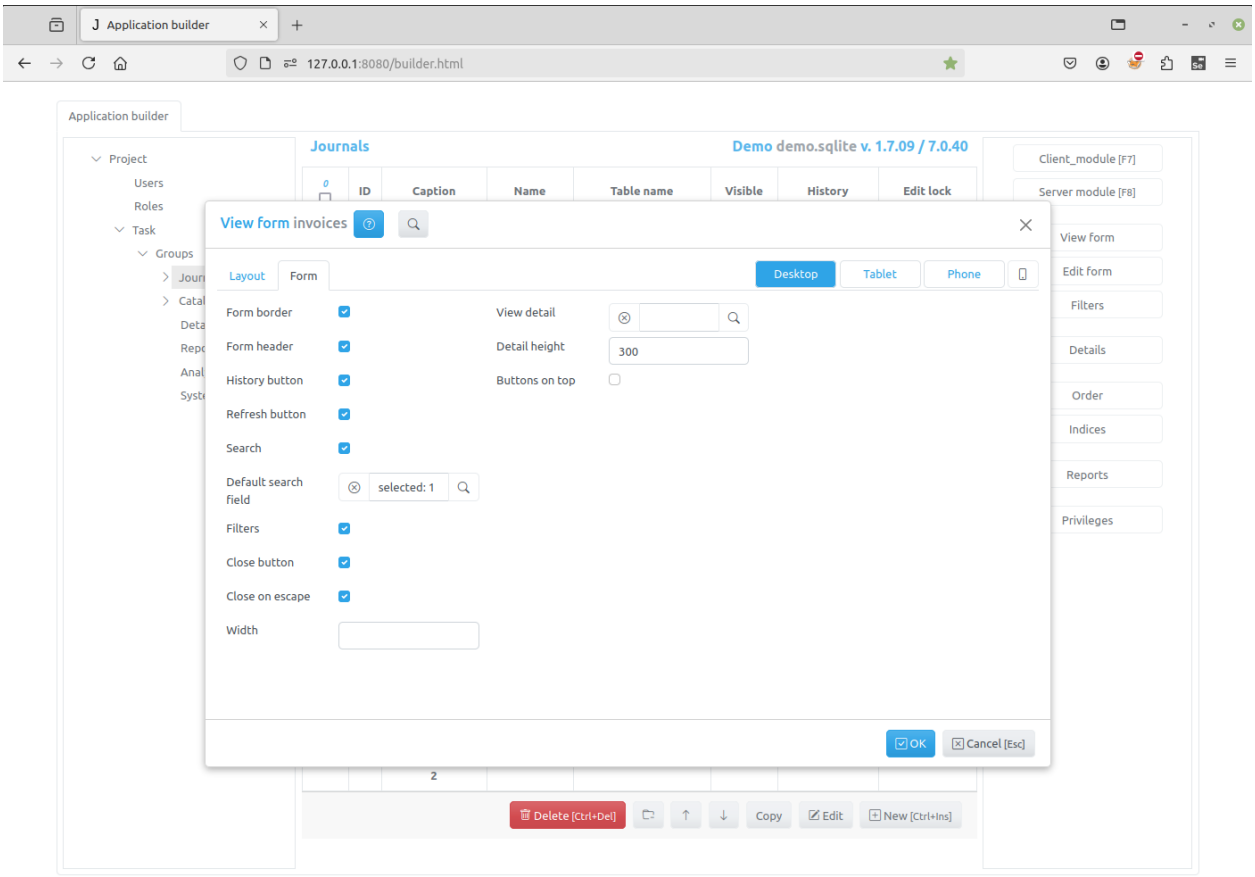
Setting table options

On the right side of the "Layout" tab are the controls that you can use to specify the options of the table displayed in the view form:

- **Multiple selection** - if set, a leftmost column with check-boxes will be created to select records. So, that when a user clicks on the check-box, the value of the primary key field of the record will be added to or deleted from the *selections* attribute.
- **Dblclick edit** - if set, the edit form will be displayed when the user double-clicks on the table row.
- **Number of rows** - an integer number, if set, specifies the number of rows displayed by the table, otherwise, if **Height** is not specified, the application calculates the height of the table, based on the page height
- **Height** - an integer number, if set, specifies the height of the table in pixels, otherwise , if **Number of rows** is not specified, the application calculates the height of the table, based on the page height
- **Row lines** - an integer, specifying the number of lines of text displayed in a table row, if it is 0, the height of the row is determined by the contents of the row cells
- **Selected row lines** - an integer value, if **Row lines** is set and this value is greater that 0, it specifies the minimal number of lines of text displayed in the selected row of the table
- **Freeze columns** - an integer, if it is greater than 0, it specifies number of first columns that become frozen - they will not scroll when the table is scrolled horizontally. This option for V7 is an attribute of the item.
- **Sort fields** - click the button to the right of the input field to open the list of fields and select the fields by which you can sort the contents of the table by clicking in the corresponding column header of the table.
- **Summary fields** - click the button to the right of the input field to open the list of fields and the fields for which the summary will be calculated and displayed in the corresponding column footer. For for numeric fields sums will be calculated, for not numeric fields - the number of records.

You can get or change these values programmatically on the client by using the *table_options* attribute of the item.

Form tab



On this tab are the controls that you can use to specify the options of the view form

- **Form border** - if set, the border will be displayed around the form
- **Form header** - if set, the form header will be created and displayed containing form title and various buttons
- **History** - if set and *saving change history is enabled*, the history button will be displayed in the form header
- **Refresh button** - if set, the refresh button will be created in the form header, that will allow users to refresh the page
- **Search** - if set, the search input will be created in the form header
- **Default search field** - click the button to the right of the input field to select a default search field
- **Filters** - if set and there are visible filters, the filter button will be created in the form header
- **Close button** - if set, the close button will be created in the upper-right corner of the form
- **Close on escape** - - if set, pressing on the Escape key will close the form
- **Width** - an integer, the width of the modal form, if not set the value is 600 px
- **View details** - click the button to the right of the input field to select details, that will be displayed in the view form
- **Detail height** - an integer, the height of the details displayed in the view form, if not set, the height of the detail table is 232px

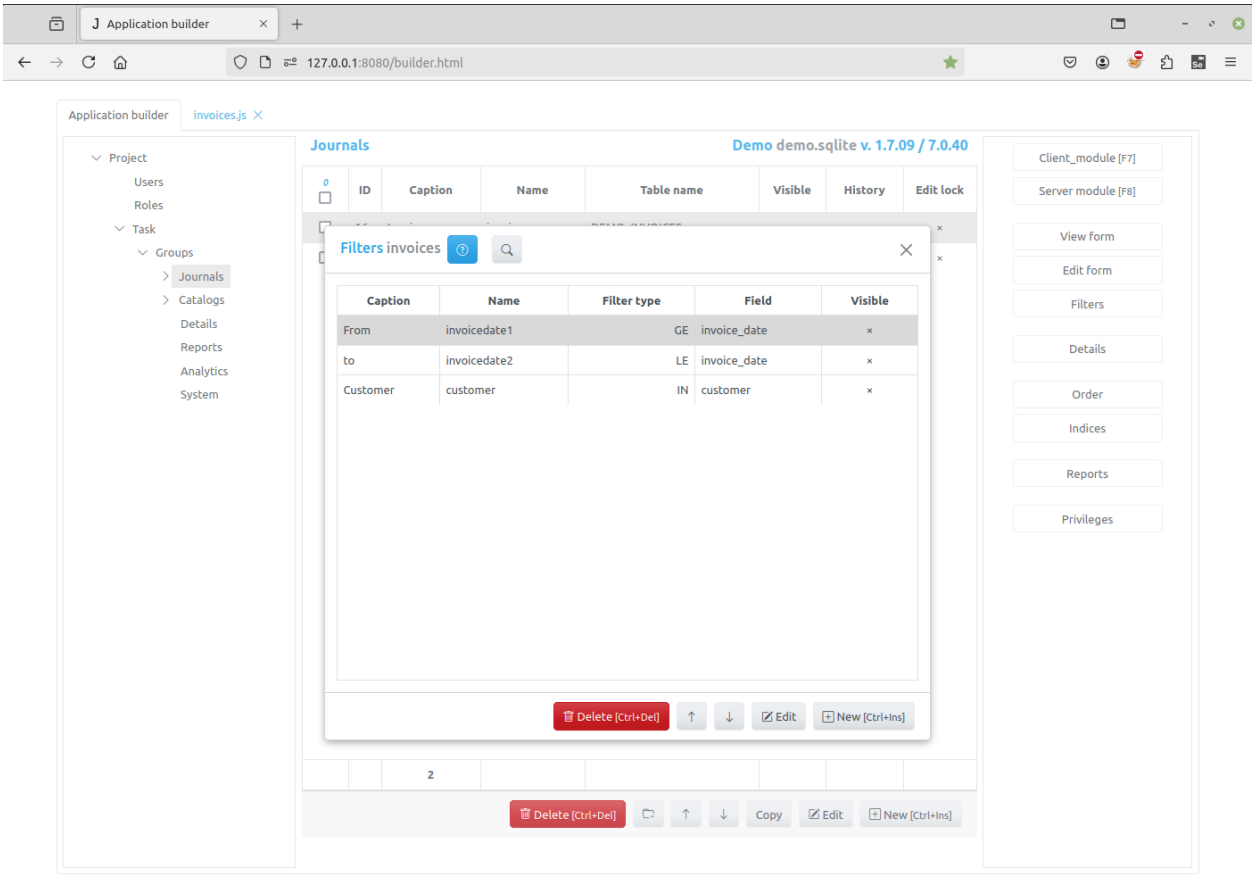
- **Buttons on top** - if this check box is checked the buttons are displayed on the top of the view form, when form has a default form template

You can get or change these values programmatically on the client by using the *view_options* attribute of the item

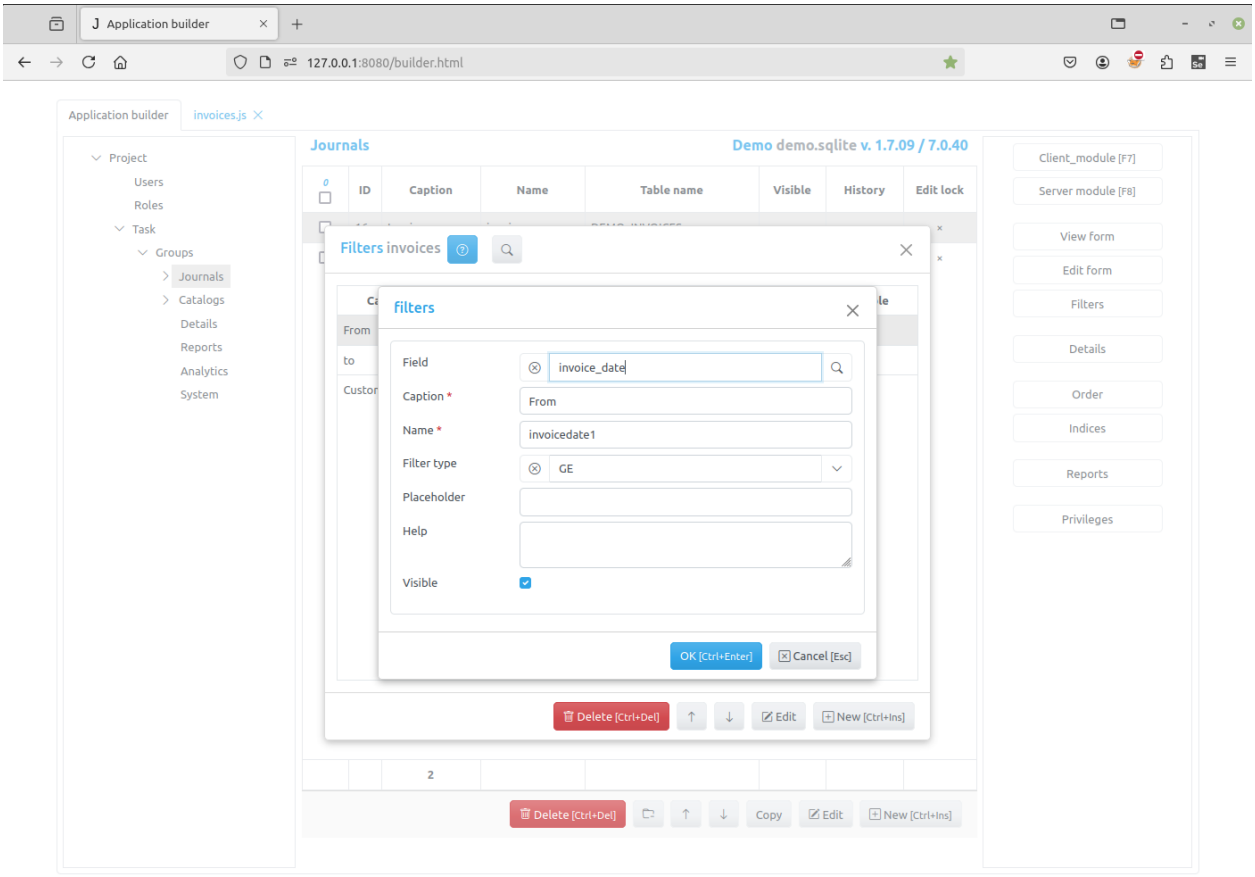
Click the **OK** button to save to result or **Cancel** to cancel the operation. After saving, you can see the changes by refreshing the project page.

6.7.5 Filters Dialog

Use **Filters Dialog** to create and modify item filters. See *Filters*



To add or edit a filter click on the appropriate button on the form. The following form will appear:



Fill in the following fields:

- **Field** - the field which will be used to filter records.
- **Caption** - the filter name that appears to users.
- **Name** - the name of the filter that will be used in programming code to get access to the filter object. It should be a valid python identifier.
- **Filter type** - select filter type.
- **Placeholder** - use this attribute to specify the placeholder that will be displayed by the field input.
- **Help** - if any text / html-message is specified, a question mark will be displayed to the right of the input, so when the user moves the mouse pointer over this mark, a pop-up window appears displaying this message.

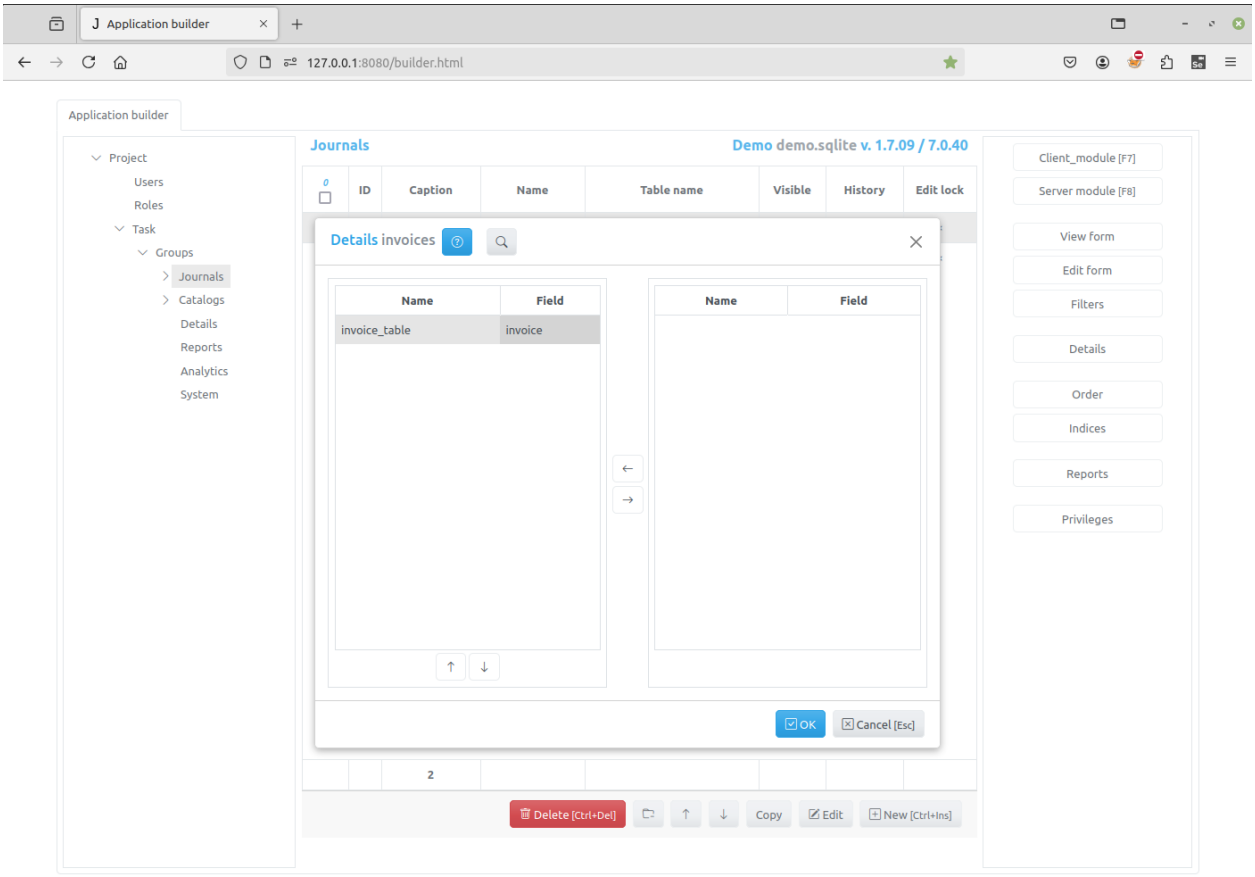
Help - if any text / html-message is specified, a question mark will be displayed to the right of the input, so when the user moves the mouse pointer over this label, a pop-up window appears displaying this message.

- **Visible** - if this checkbox is not checked, this filter will not be displayed in the item Filters dialog.

Use the up and down arrows to place the filters in the order in which they will be displayed. See *create_filter_inputs*

6.7.6 Details Dialog

Use this dialog to setup details of an item. See *Details*.



The **Details Dialog** has two panels. The left panel lists details that have been added. The right panel havs available detail items that could be added as details.

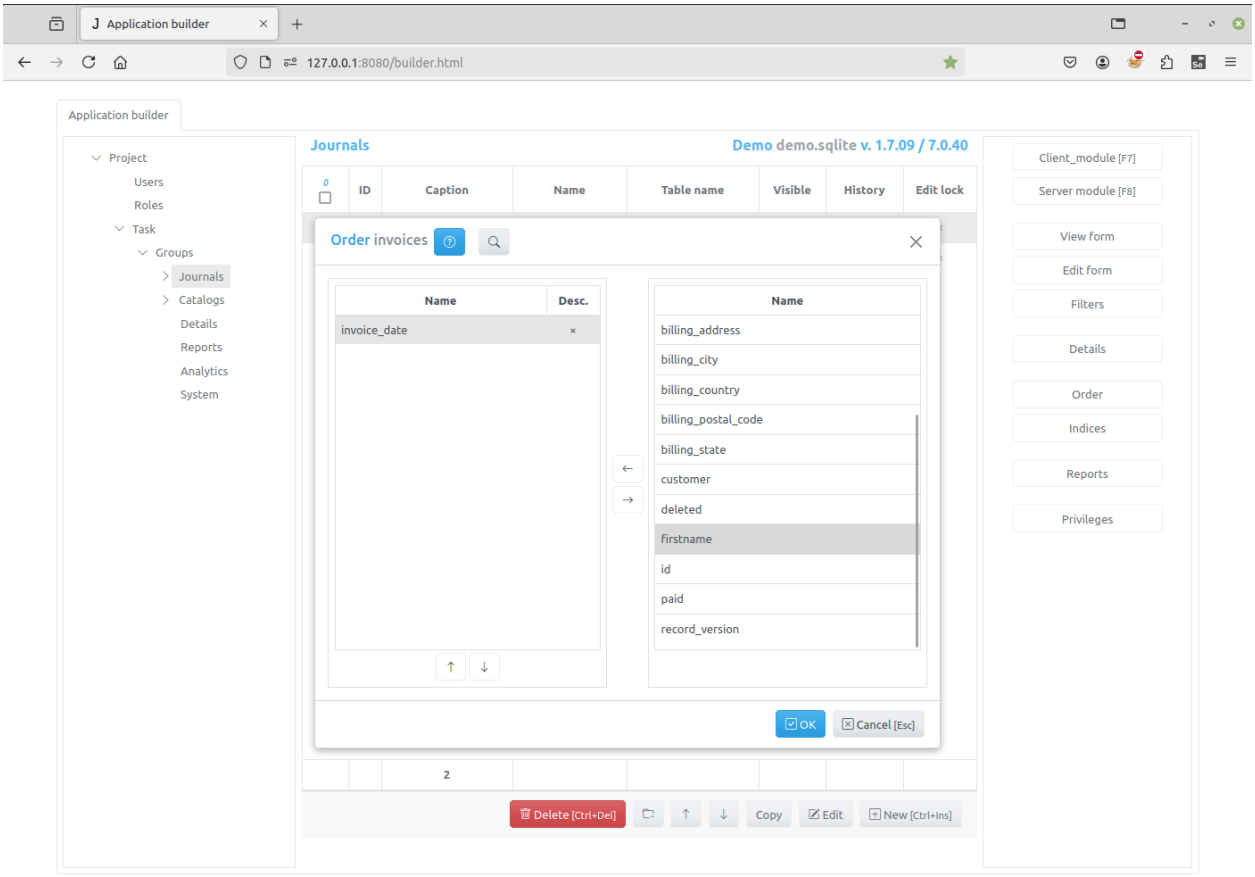
To add a detail item as detail, select it in the right panel and use the **Left arrow** button in the center or press **Space** key on a keyboard.

To remove a detail, select it in the left panel and use the **Right arrow** button in the center or press **Space** key on a keyboard.

Click the **OK** button to save to result or **Cancel** to cancel the operation.

6.7.7 Order Dialog

The **Order Dialog** opens when a developer selects the item in the Application builder (see *Items*) and clicks on the **Order** button to specify how records will be ordered by default. See *open* method



The **Order Dialog** has two panels. The left panel lists the fields that have been selected. The right panel have available fields that could be selected.

To select a field, select it in the right panel and use the **Left arrow** button in the center or press **Space** key on a keyboard.

To unselect a field, select it in the left panel and use the **Right arrow** button in the center or press **Space** key on a keyboard.

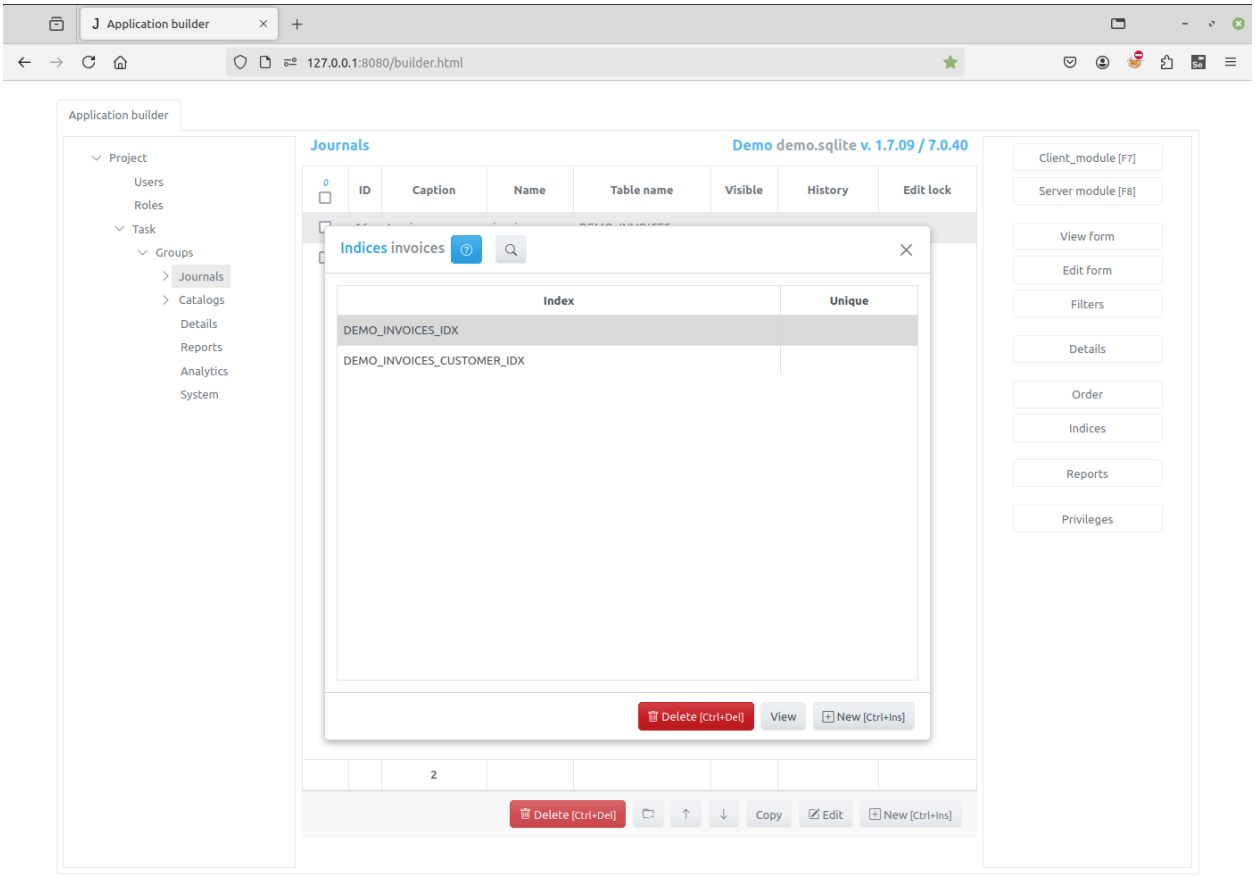
To order the selected fields use the buttons that located below left panel.

Click the **Desc** column to set descending/ascending sorting order for the field.

Click the **OK** button to save to result or **Cancel** to cancel the operation.

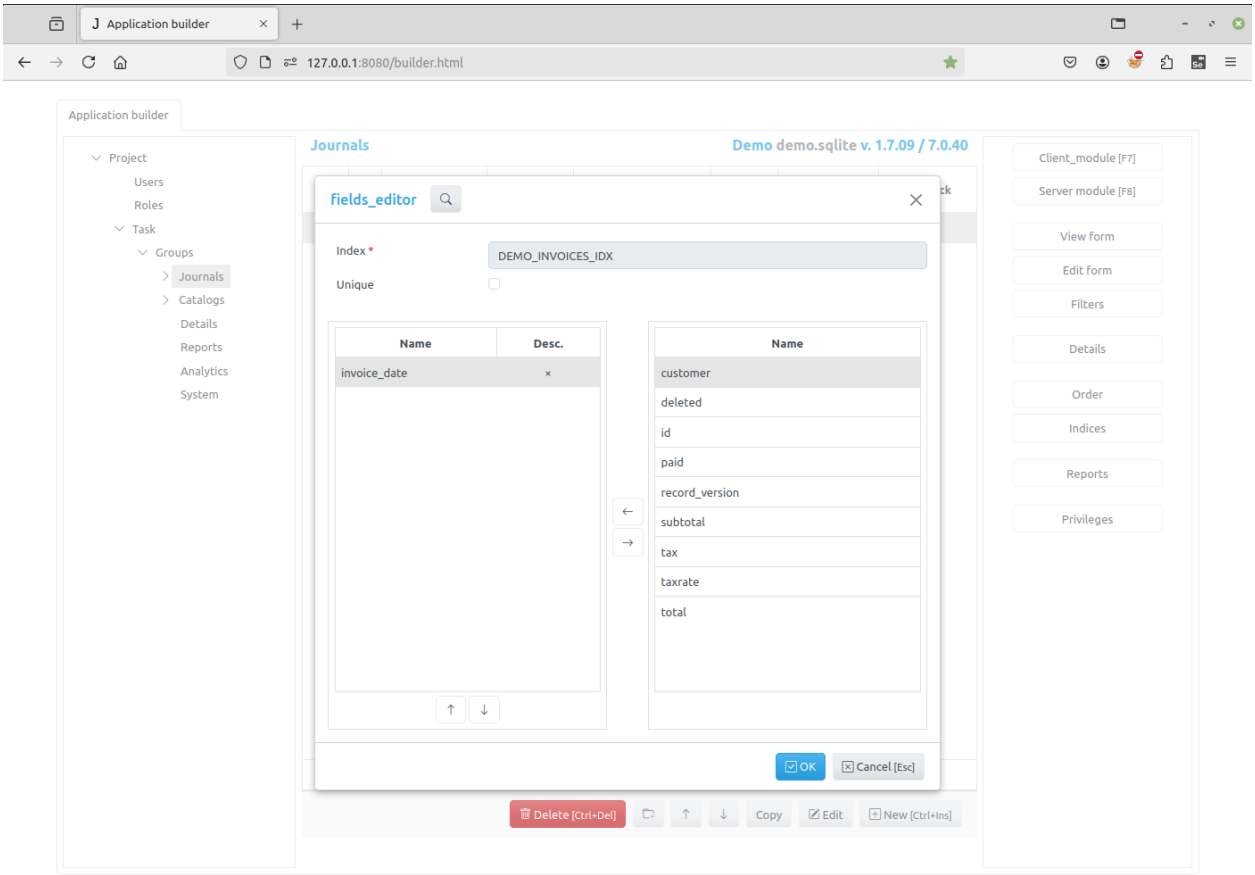
6.7.8 Indices Dialog

The **Indices Dialog** lists the indices that were created for the item table in the project database.



To delete an index click the **Delete** button. The application will generate the SQL query to drop the index and execute it on the server.

To create a new index click the **New** button. The following dialog will appear:



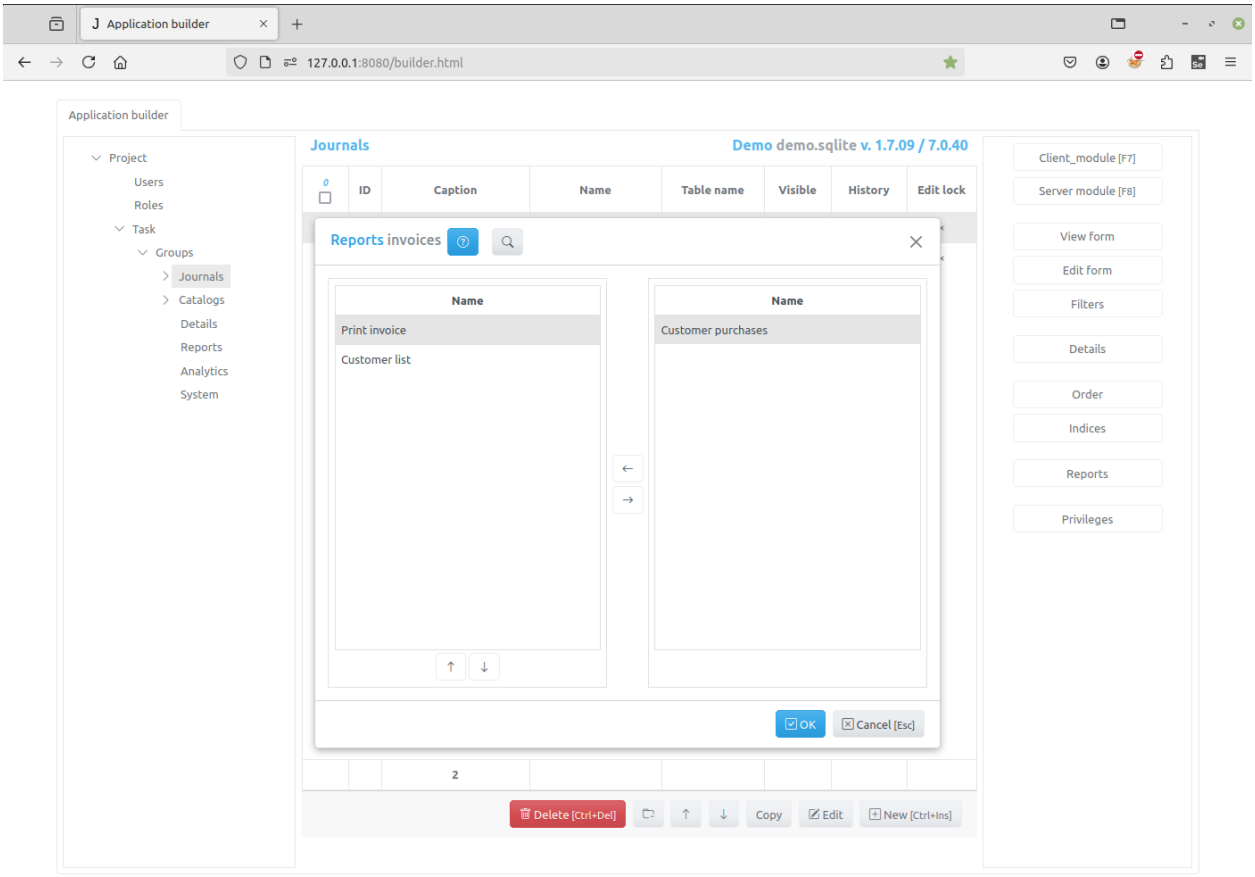
Specify the fields to create an index on, by using left and right arrow buttons. Check the **Descending** checkbox if you want to create a descending index. If necessary, change the name of the index.

Click the **OK** button to create the index. The application will generate the SQL query to create the index and execute it on the server.

Click **Cancel** button to cancel the operation.

6.7.9 Reports Dialog

The **Reports Dialog** opens when a developer selects the item in the Application builder (see *Items*) and clicks on the **Order** button to specify reports that could printed for the item. A new project code has a function that can be used to print the reports.



The **Reports Dialog** has two panels. The left panel lists the reports that have been selected. The right panel have available reports that could be selected.

To select a report, select it in the right panel and use the **Left arrow** button in the center or press **Space** key on a keyboard.

To unselect a report, select it in the left panel and use the **Right arrow** button in the center or press **Space** key on a keyboard.

To order the selected reports use the buttons that located below left panel.

Click the **OK** button to save to result or **Cancel** to cancel the operation.

6.8 Details

The Detail in Jam.py V7 is any database table linked in a way of Master/Details relationship. To group the database tables logically, we might use the Details Group to "store" a detail of an item, as seen on below screenshot.

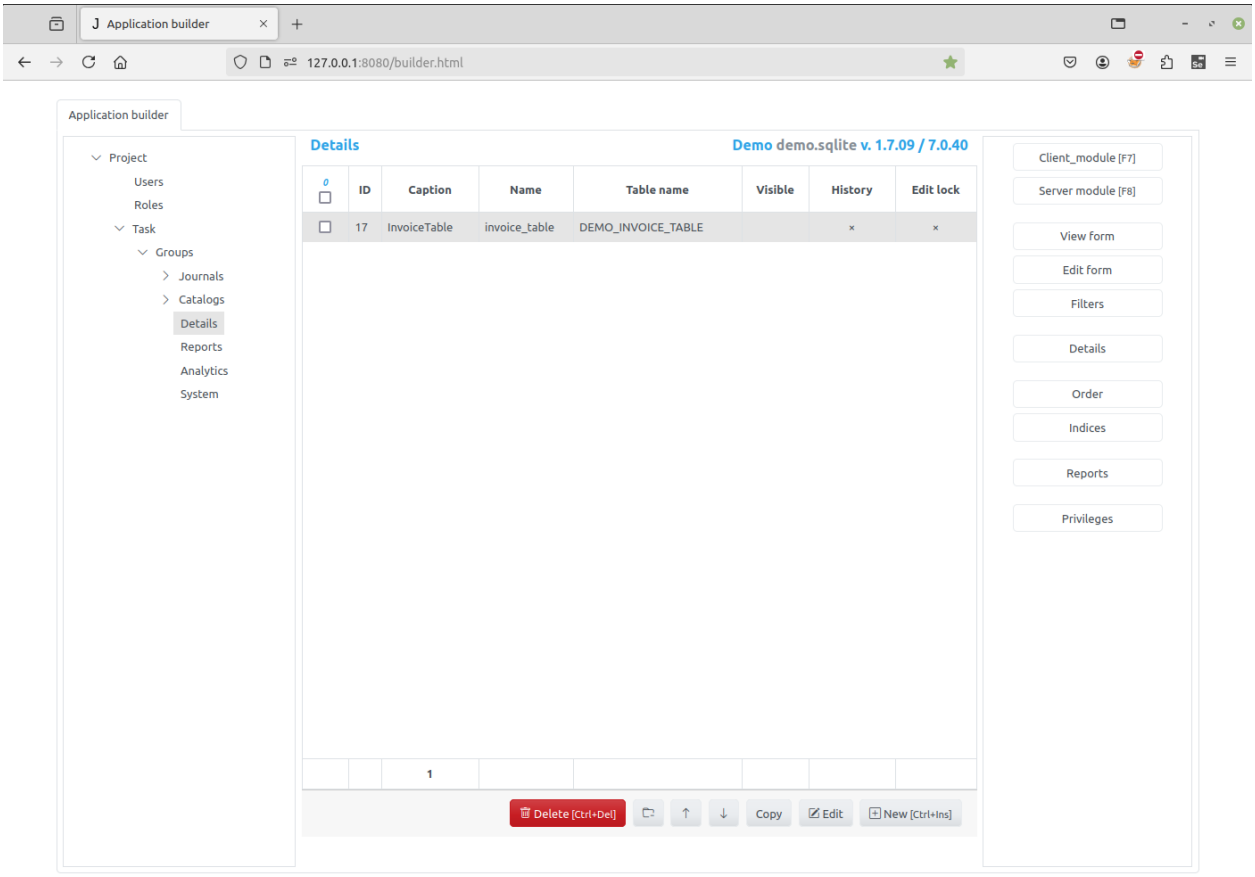
To work with a detail of an item, expand a group node that owns the item and select that item in the tree. In the center of the Application builder all details of this item will be displayed.

The right panel of the page have following buttons:

- **Client module** - click on this button to open the *Code editor* to edit client module of a detail, see *Working with modules*.
- **Server module** - click on this button to open the *Code editor* to edit server module of a detail, see *Working with modules*.

- **View Form** - use this button to invoke the *View Form Dialog* to set the fields to be displayed in tables on the client and their order, by default. See *create_table* method
- **Edit Form** - use this button to invoke the *Edit Form Dialog* to set the fields to be displayed in edit forms on the client and their order, by default. See *create_inputs* method.
- **Filters** - use this button to invoke the *Filters Dialog* to create, modify and delete item filters. See *Filters*.
- **Details** - use this button to invoke the *Details Dialog* to add or remove details linked to the item.
- **Order** - use this button to invoke the *Order Dialog* to specify how records will be ordered by default. See *open* method
- **Indices** - lick this button to open the *Indices Dialog* to create and delete indices for the item database table.
- **Reports** - lick this button to open the *Reports Dialog* to specify reports that could printed for the item. A new project has a function that can be used to create a drop-up button to print the reports.
- **Privileges** - click this button to open a dialog to configure the privileges assigned to user roles for this item.

Use **Edit** button at the bottom of the page to change `item_name` or `caption` of a *detail*.

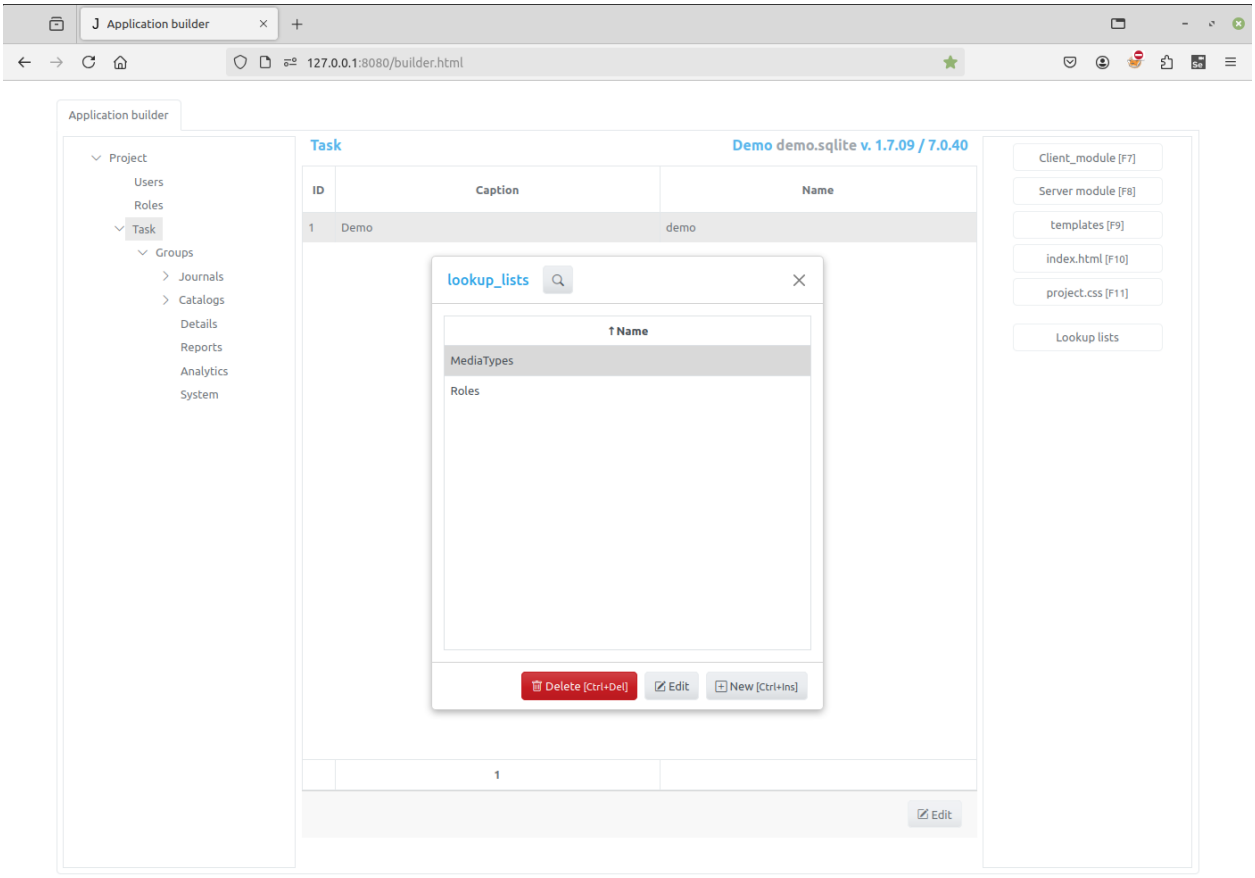


6.9 Lookup List Dialog

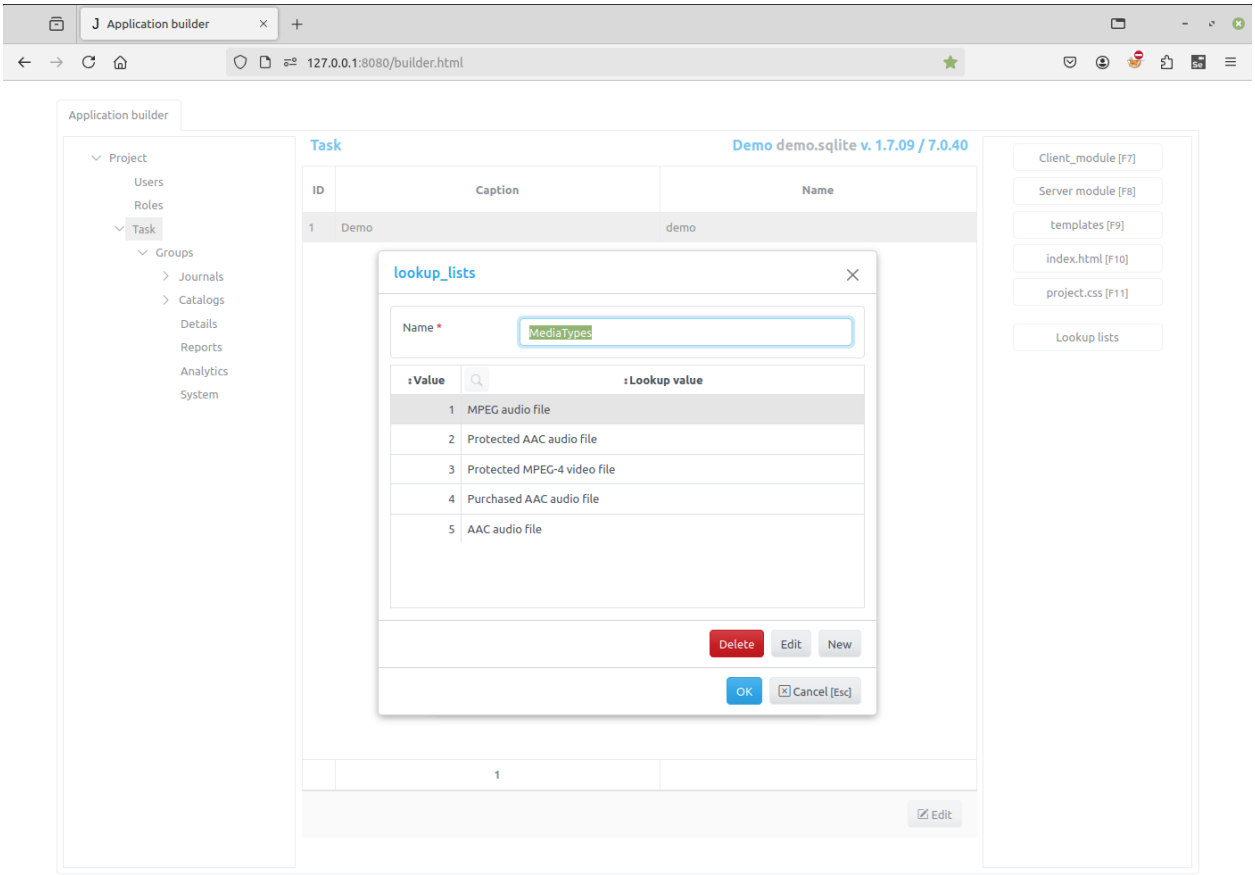
Lookup list is a list of integer-text pairs that can used as a datasource for *lookup fields*.

Nota

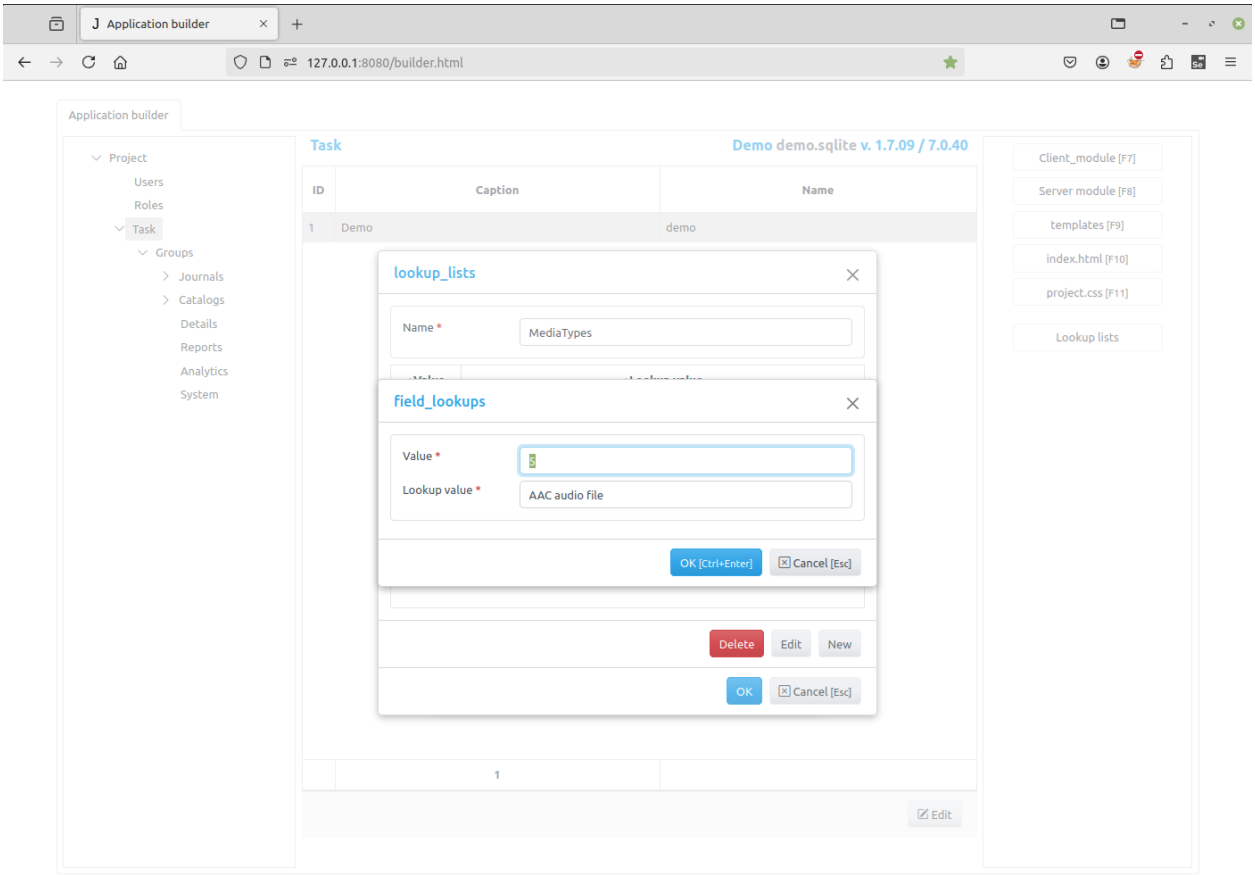
The length of the lookup list should not exceed 10



Click on the **Edit/New** buttons to edit/create a lookup list.



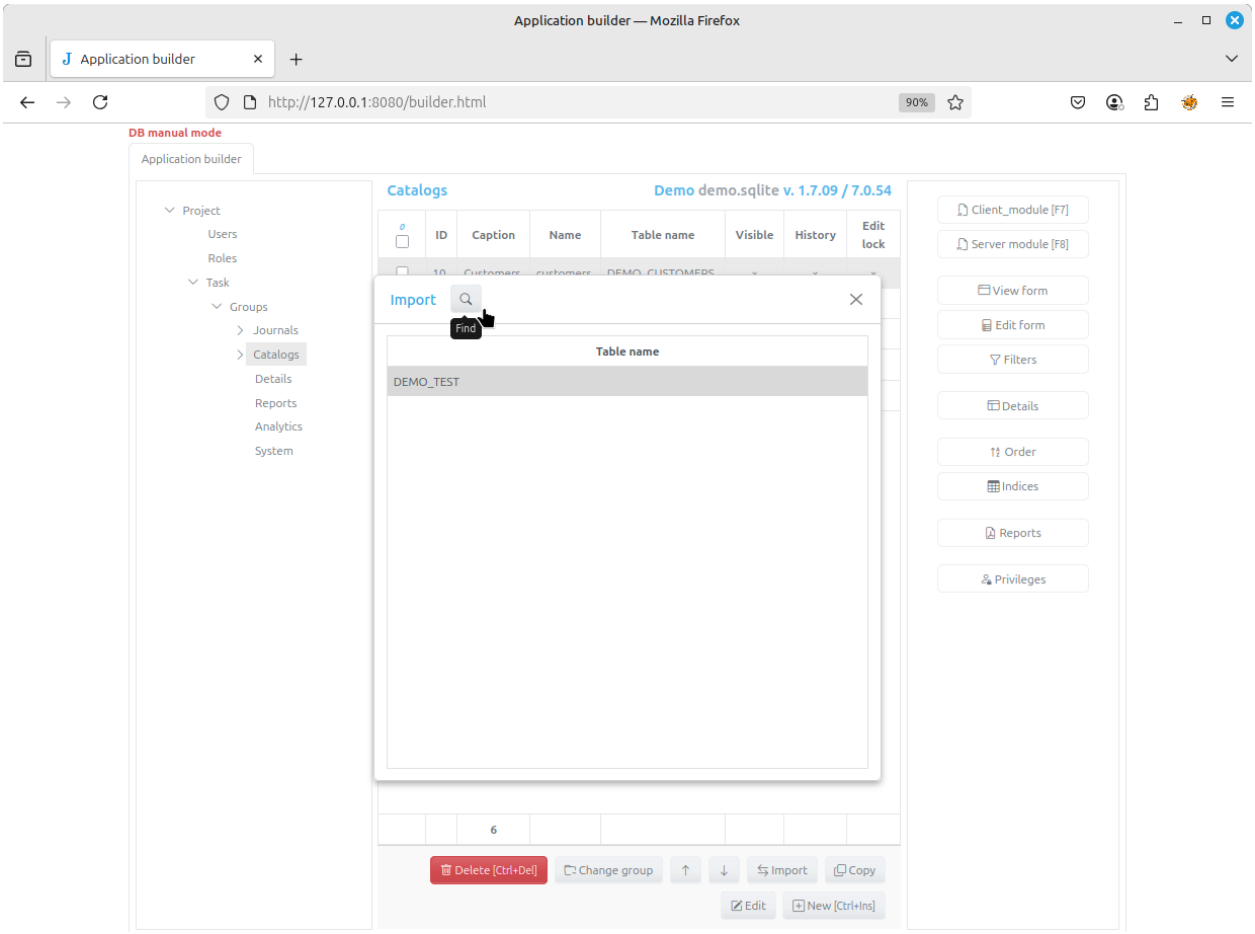
Then use the **Edit/New** buttons to edit/add a lookup pairs to the list.



6.10 Integração com banco de dados existente

Você pode usar o Jam.py com um banco de dados existente, desde que seja suportado pelo framework.

- Crie um novo projeto com o banco de dados existente.
- Select Project node and click Database button. Set *DB manual mode* to true.
- Select group you want to import a table to and click Import button.



- In the form that will appear dbl click on the table to import it.
- In the *Item Editor Dialog* check that all fields have valid types. If field type is displayed in the red, try to select appropriate type.

  You can import a subset of fields in the table.

  Before saving, specify the primary key field for the item and generator name, if necessary.
- After saving the imported item, go to the project page and check how it is displayed.
- After importing several tables, you can specify lookup fields (in DB manual mode).

Nota

Please, do be very careful when performing this operations.

When DB manual mode is removed any changes to the item will be reflected in the corresponding DB table. If you delete the item, the table will be dropped from the database.

Nota

The database table to be imported must have a primary key with one field.

Nota

Binary fields must not be imported.

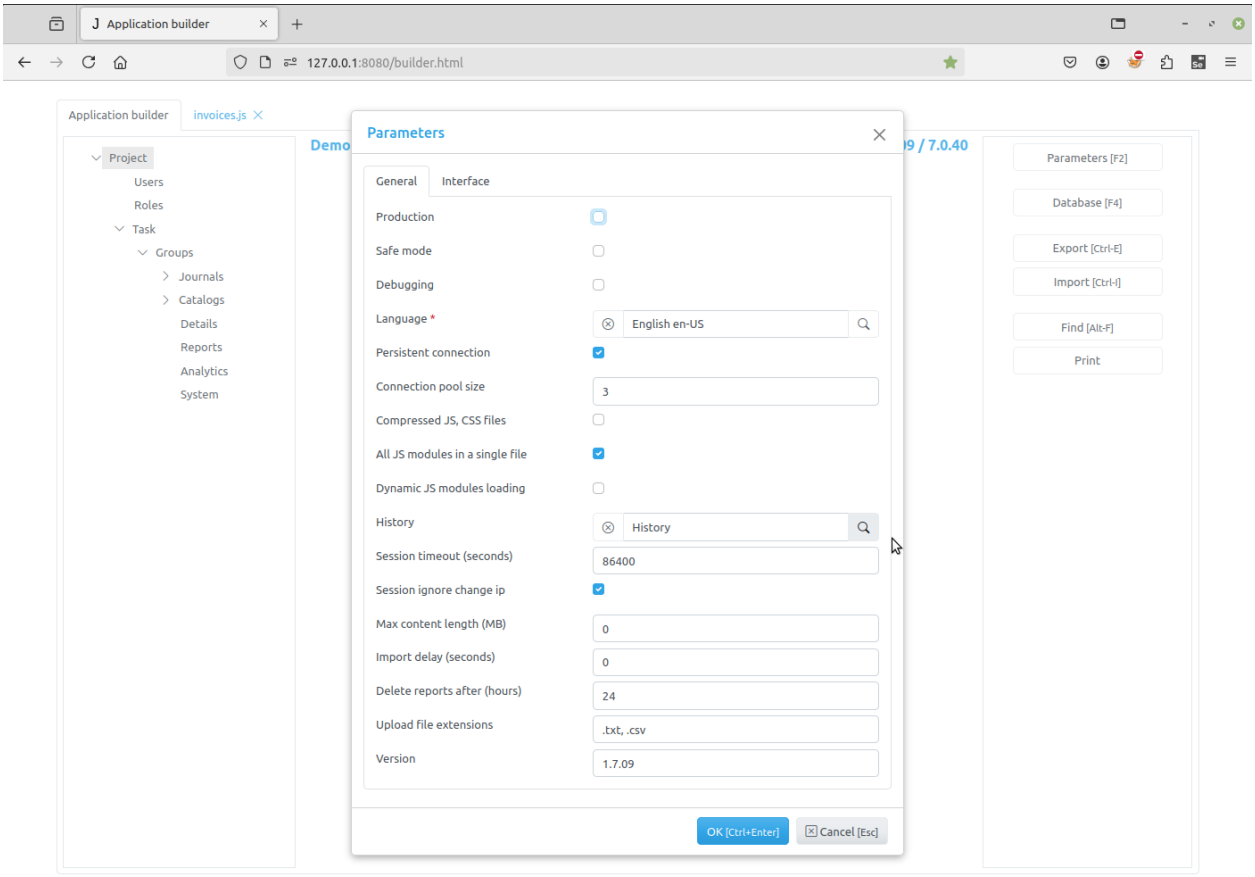
Nota

This is a new feature, so if you have some comments, suggestions or found some bugs please send a message.

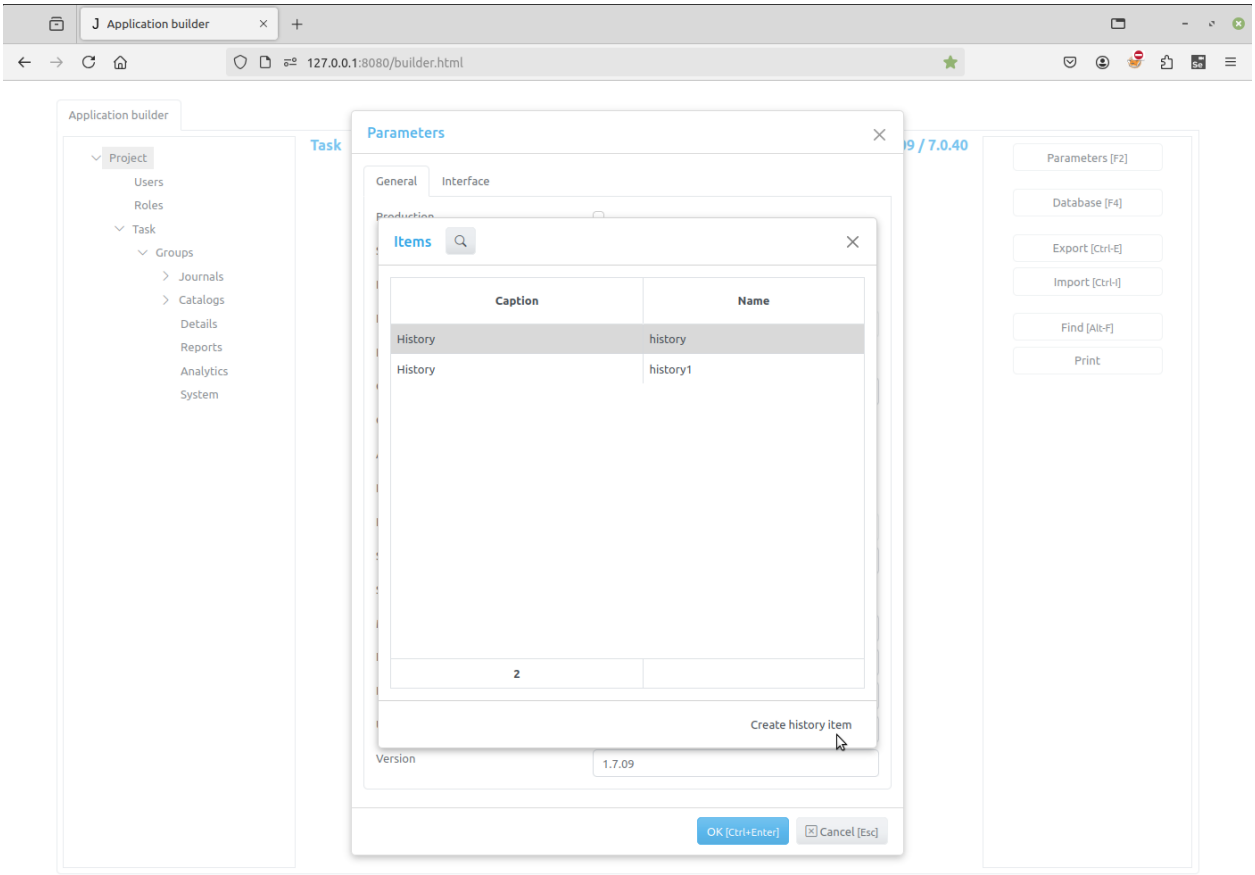
6.11 Saving audit trail/change history made by users

To save change history made by users to must specify the item that will store them.

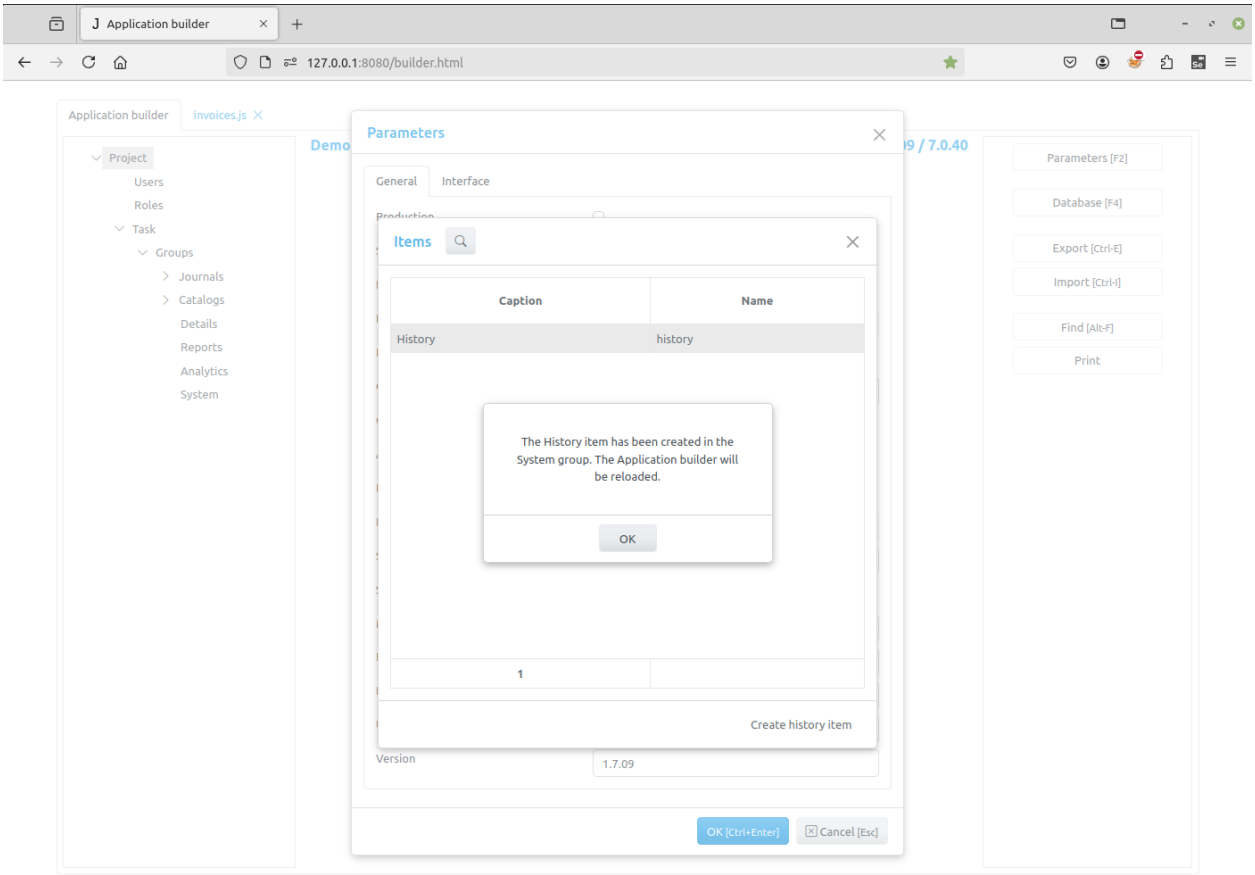
To do so, open project parameters and click the button to the right of the History item input:



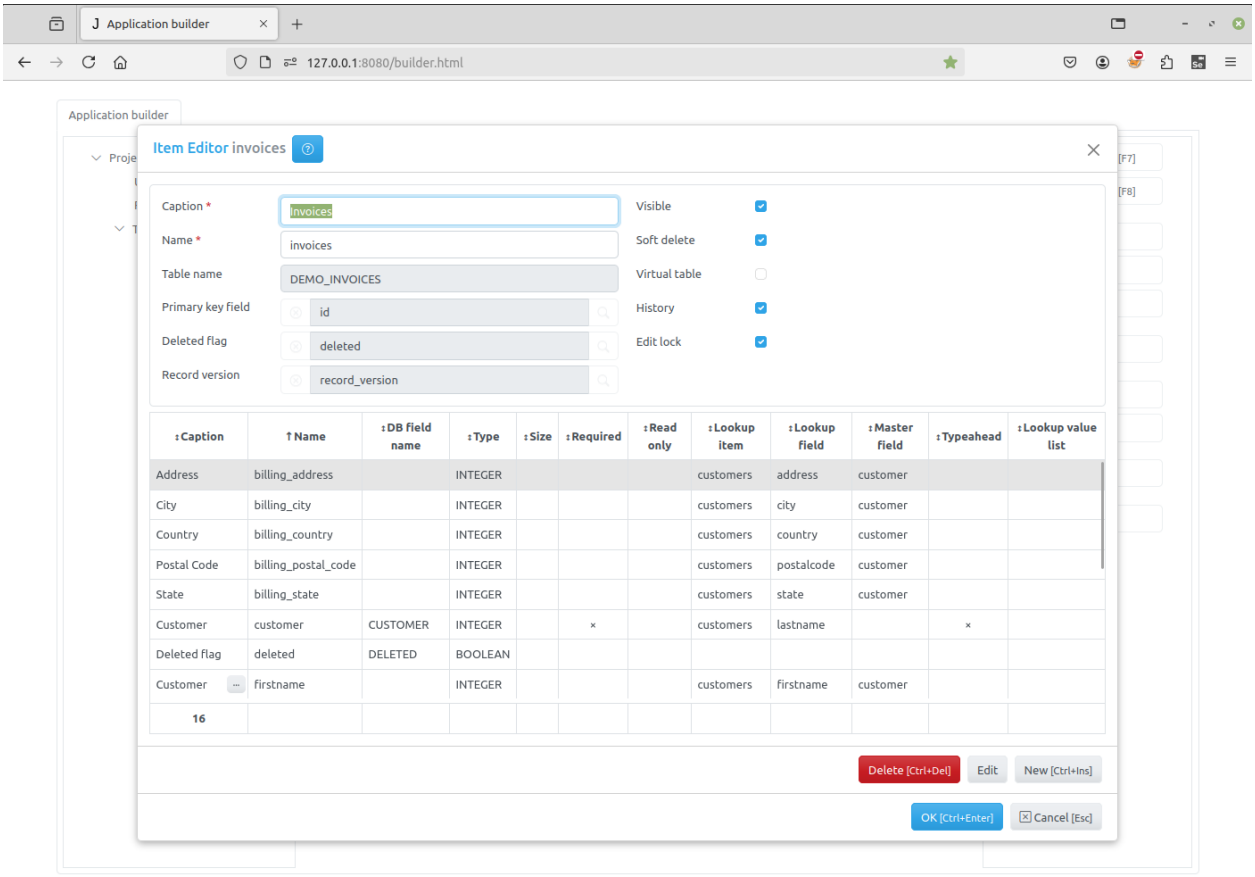
In the dialog that will appear click on the Create history item button



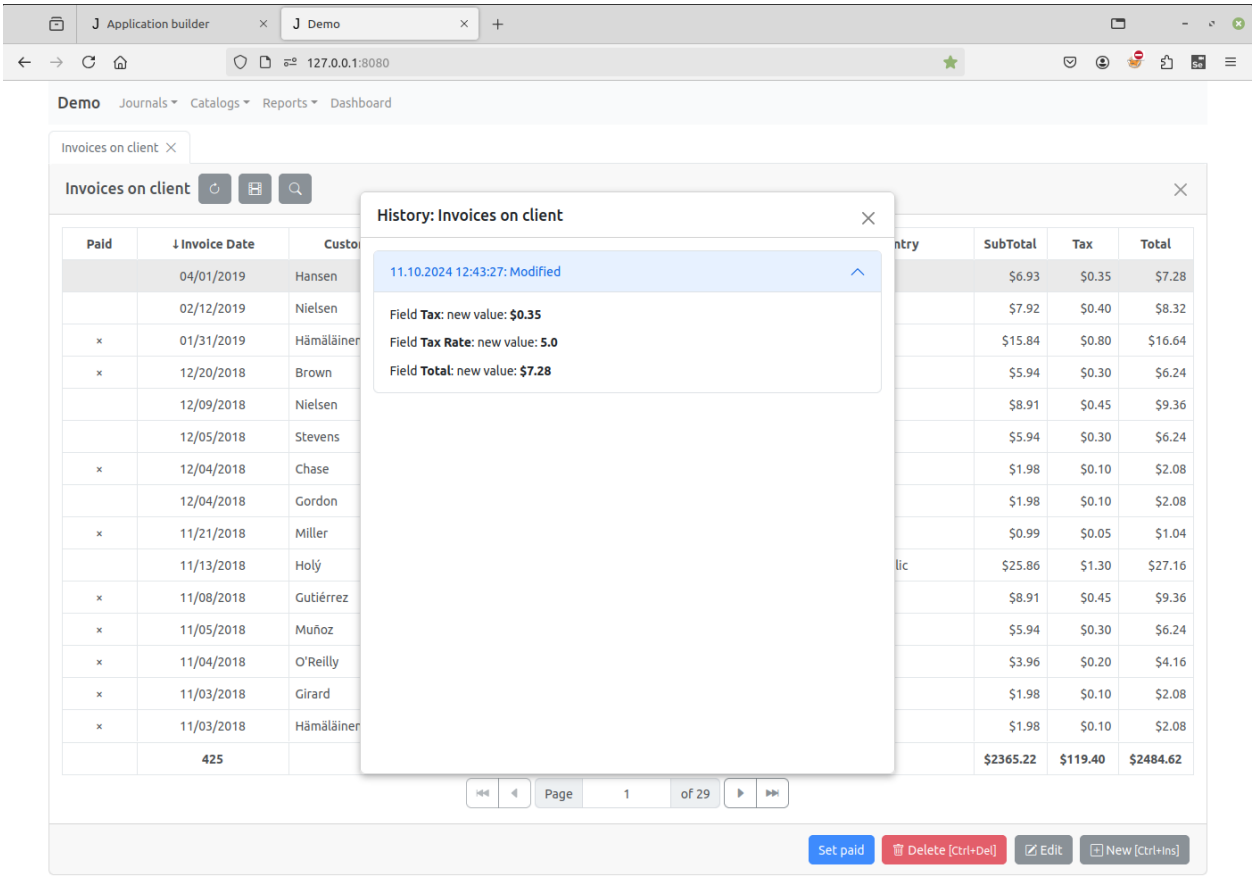
The following message will appear when the item will be created:



After that you have to set **Keep history** attribute of an item to save the history its changes:



To see the history of changes of a record click the icon to the left of the close button on the right part of the header of the edit form.



Or you can do it using the *show_history* method

Nota

Changes are saved when dataset changes are applied to the database using apply method (*client*/*server*). Changes to database made with custom SQL requests are not saved in the history.

Nota

These changes can significantly increase the size of the database. Please be careful.

6.12 Record locking

In Jam.py application you can implement a record locking while users concurrently edit a record.

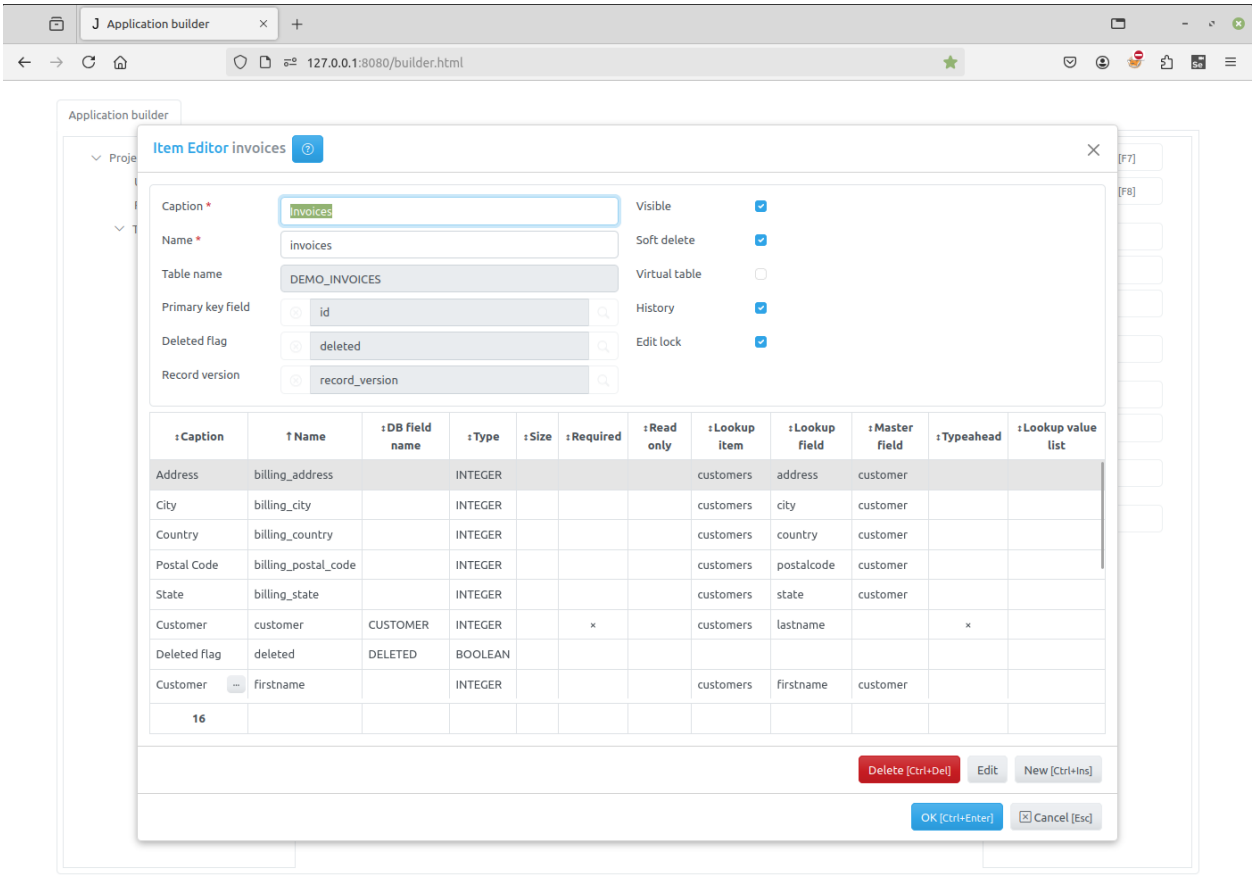
Jam.py uses optimistic locking model, also referred to as optimistic concurrency control.

When an application executes the *edit_record* method, it receives the current version of the record from the server and saves it. When the user starts saving the record, the server application checks the current version of the record. If it differs from the stored value (another user changed it while the record were being edited), the application warns the user and prohibits saving.

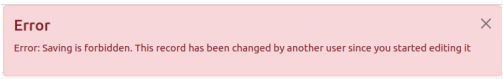
This record locking mechanism is very easy to implement.

To do so create an table field that will store record version. The field type is `integer`.

After that we can set **Edit lock** attribute in the *Item Editor Dialog*:

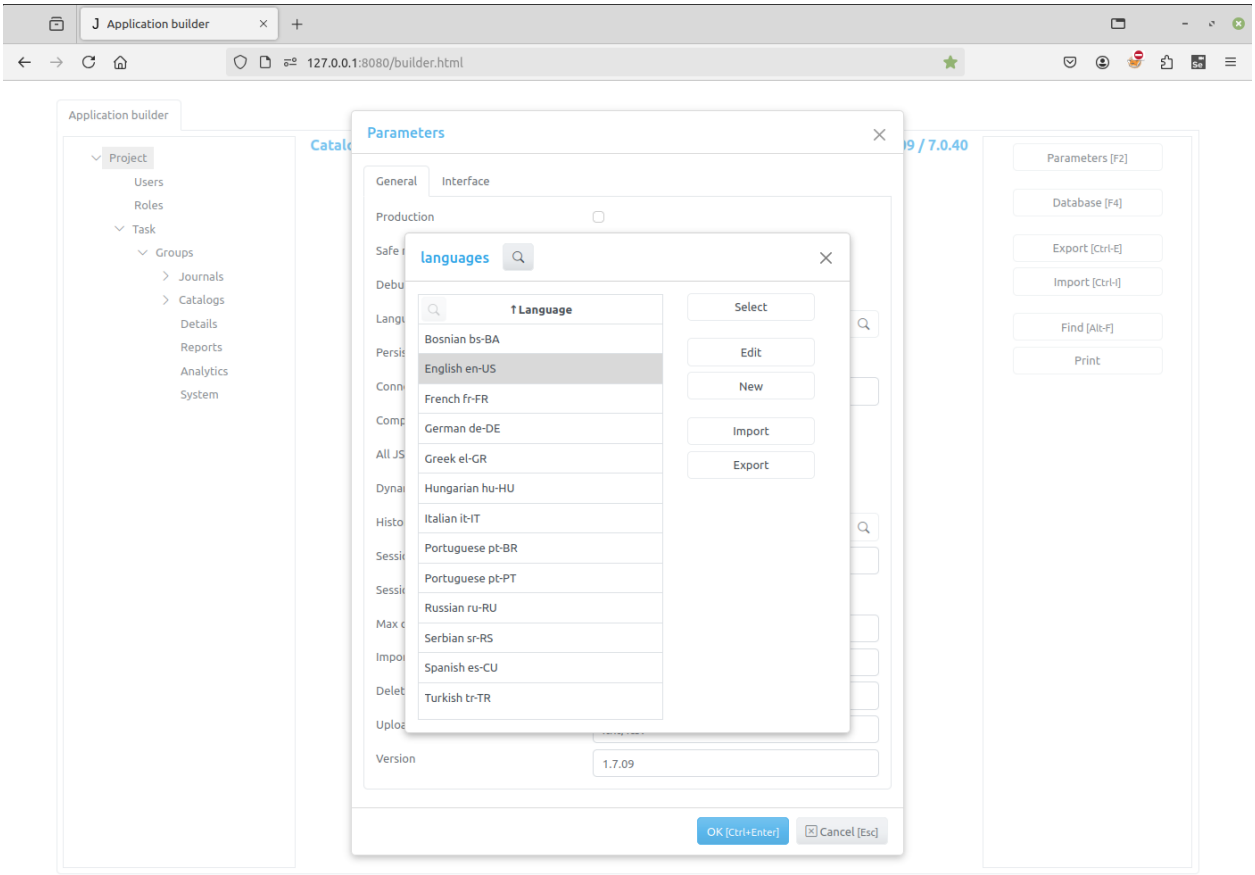


The message displayed for the locked record:



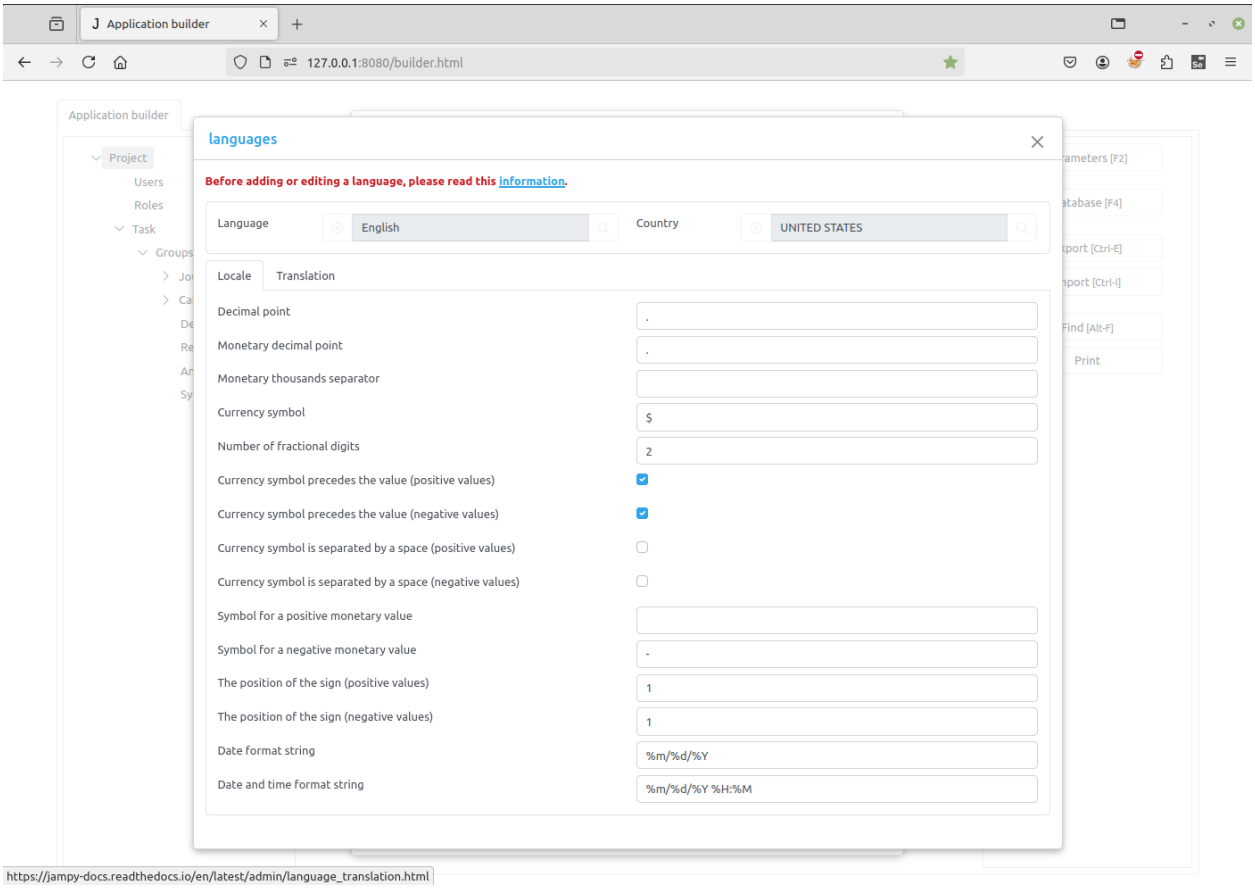
6.13 Language support

Use Language Dialog to add, select and change your language.



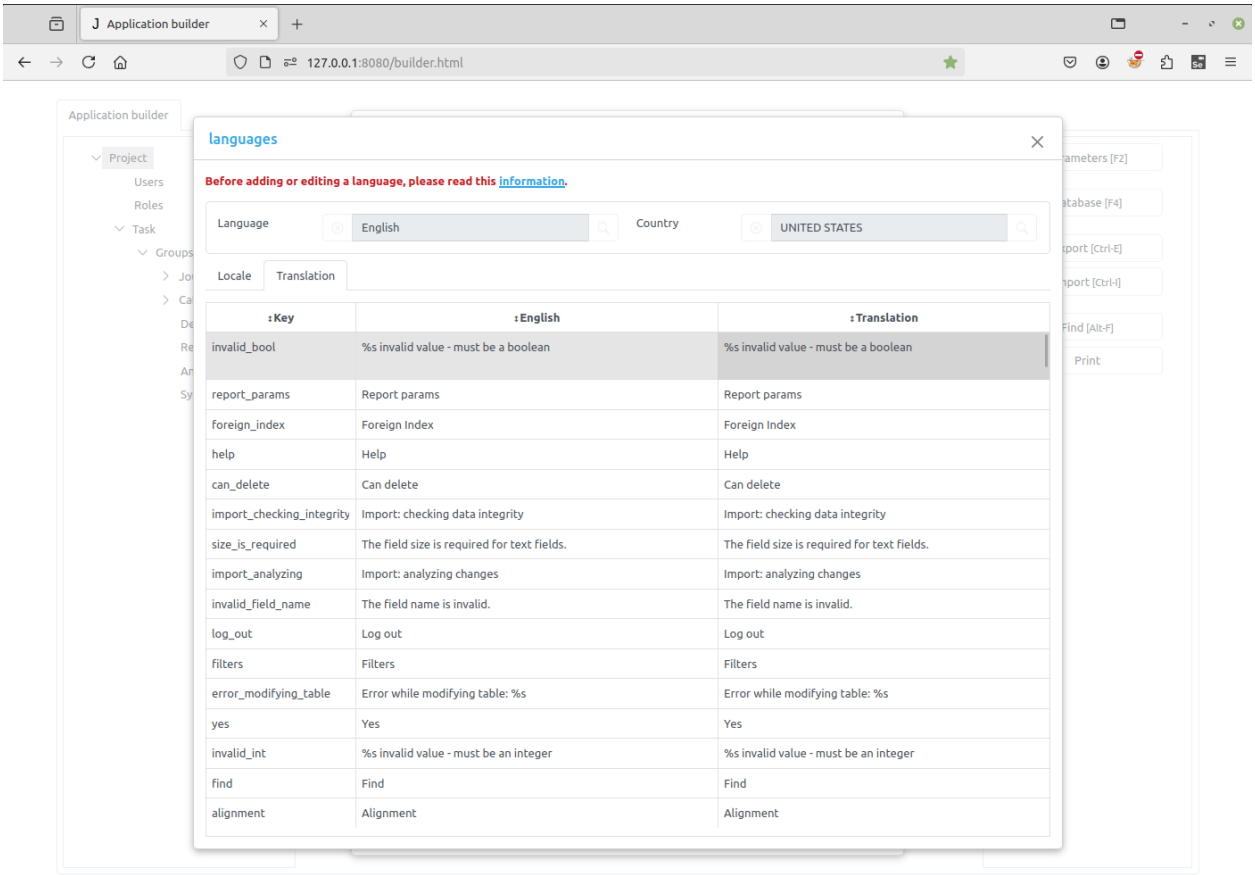
6.13.1 Language locale

Use language locale to set up how the field value will be displayed. See *display_text*



6.13.2 Language translation

See *Language translation*



6.14 Language translation

All language translations are stored in the langs.sqlite database in the "jam" folder in the package.

> **Nota**
>
> Therefore, if you made some changes to the translation database and installed a new version of the package, you will use the translation database of this package where **there will be no changes made by you**.
>
> **Please, export your translation to a file!!!**

If you want your language translation to be included to Jam.py package, export it to a file and contact the package maintainer on GitHub to include it.

Please note that Jam.py is constantly evolving and by submitting your translation you might need to make the necessary changes in the future. If you don't mind you will be included to the contributors list.

> **Nota**
>
> Do not change the following symbols **%, %(item)s, %(field)s, %(filters)s**
>
> For example
>
> **english**:

Can't delete the field %(field)s. It's used in field definitions:%(fields)s

Kazakhstan translation:

%(field)s. :%(fields)s

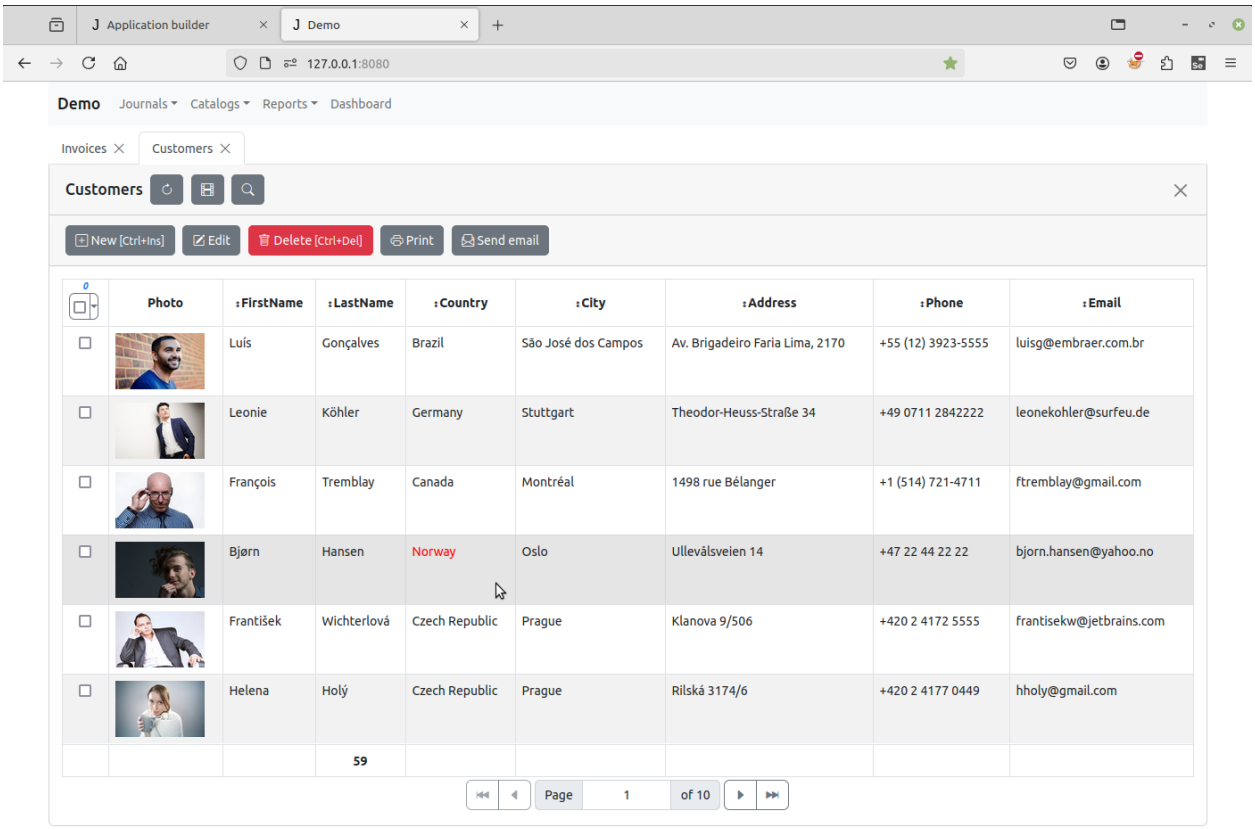
6.15 Sanitizing

To prevent Cross Site Scripting (XSS) attacks, Jam.py sanitizes field values displayed in the table columns.

For example, if field contains the following text:

```
<span style='color: red'>Norway</span>
```

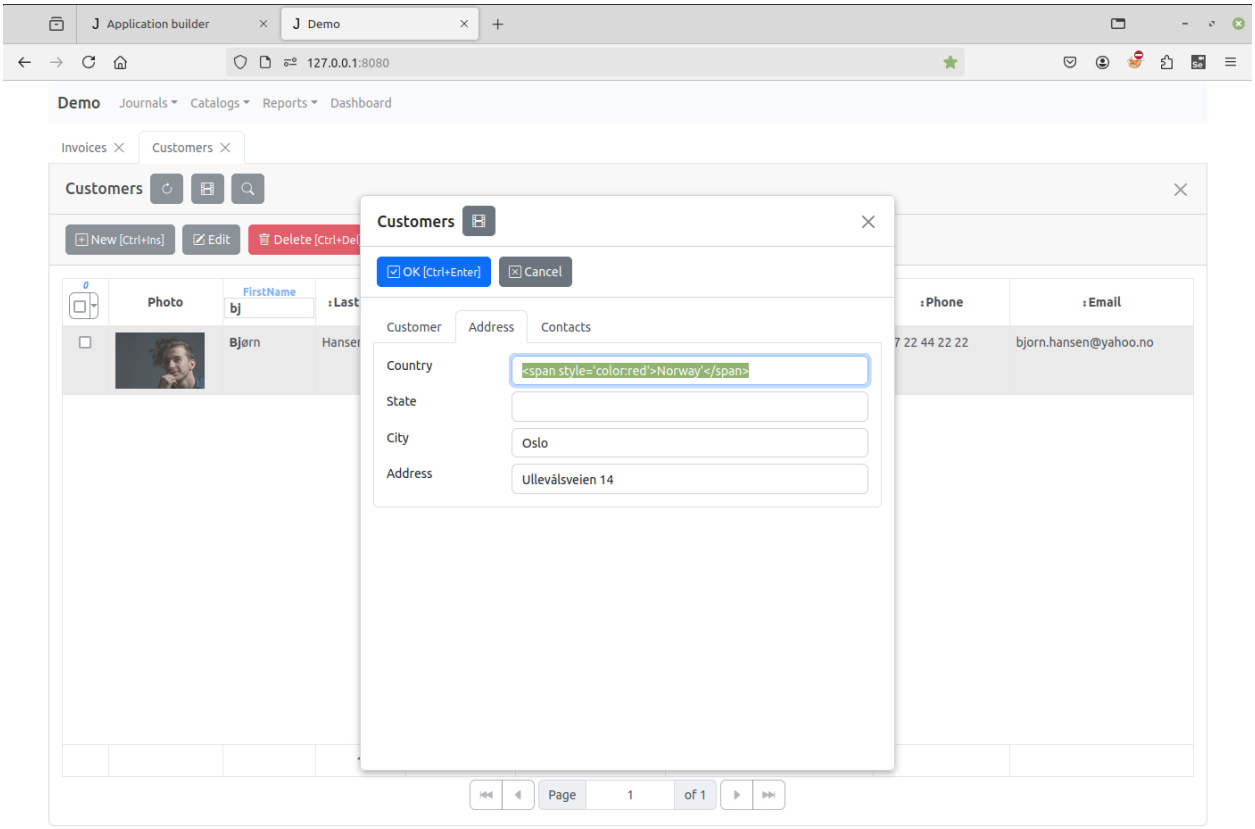
when un-sanitized, it will be displayed in the table column as follows:



When the field text is sanitized, it is transformed to the following:

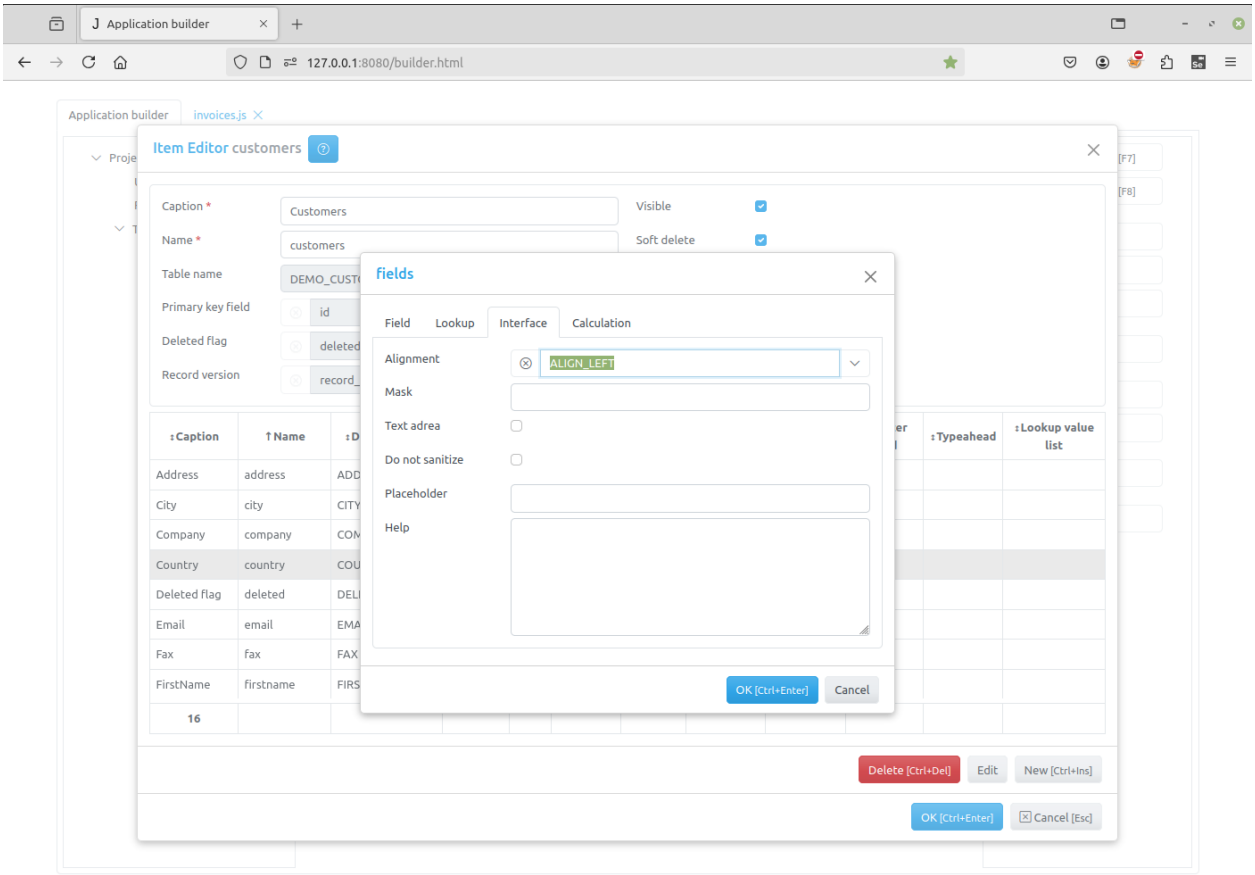
```
"&lt;span style='color: red'&gt;Norway&lt;/span&gt;"
```

as you can see symbols '<' and '>' are replaced with '<' and '>' and the table column will be displayed this way:



There are two ways to prevent sanitizing.

First is to set **Do not sanitize** attribute in the Interface tab in the *Field Editor Dialog*



Second is to write the *on_field_get_html* event handler. If the this event handler returns a value it is not sanitized.

6.16 Accept string

An accept string can be a combination of the following values, separated by comma.

Value	Description
file_extension	Specify the file extension(s) (e.g: .gif, .jpg, .png, .doc)
audio/*	All sound files
video/*	All video files
image/*	All image files

For example:

```
.pdf,.xls

image/*,.pdf,.xls

audio/*

audio/*,video/*
```

6.17 Routing

The Jam.py v7 introduced routing. As Jam.py v5 is a SPA (Single Page Application), there was no need for routing. On the other hand, there was a need to implement, for example, the User registration page with Jam.py v5.

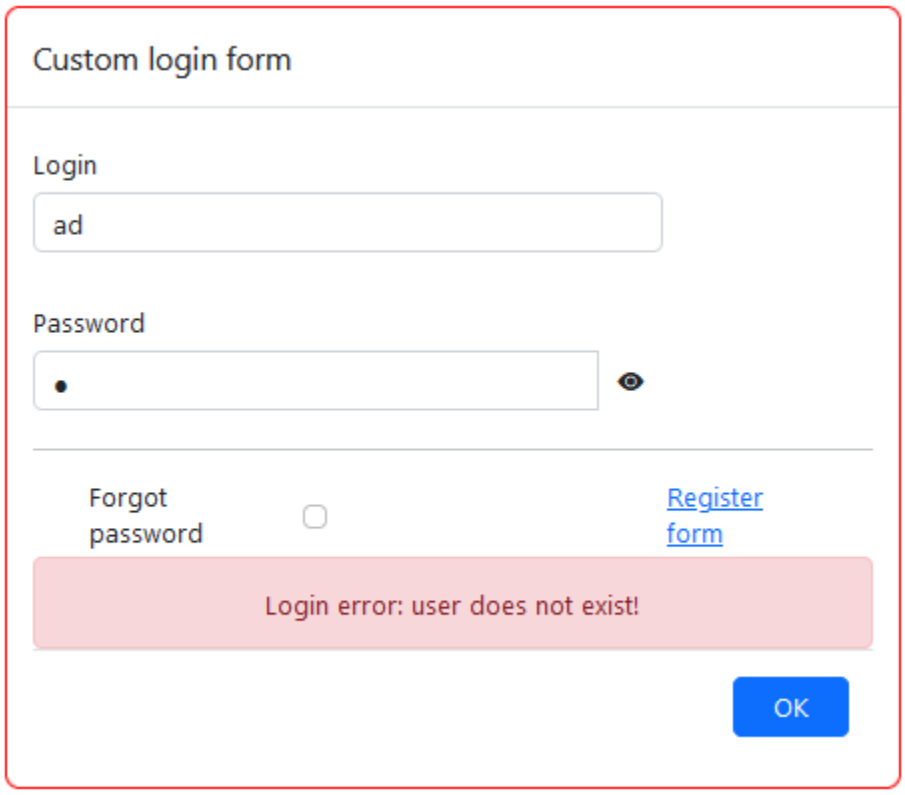
The solution for this problem was similar to *creating a registration form*.

As seen, the **register.html** file is using JavaScript AJAX code. Hence, any additional page would need a similar approach, if interacting with the database.

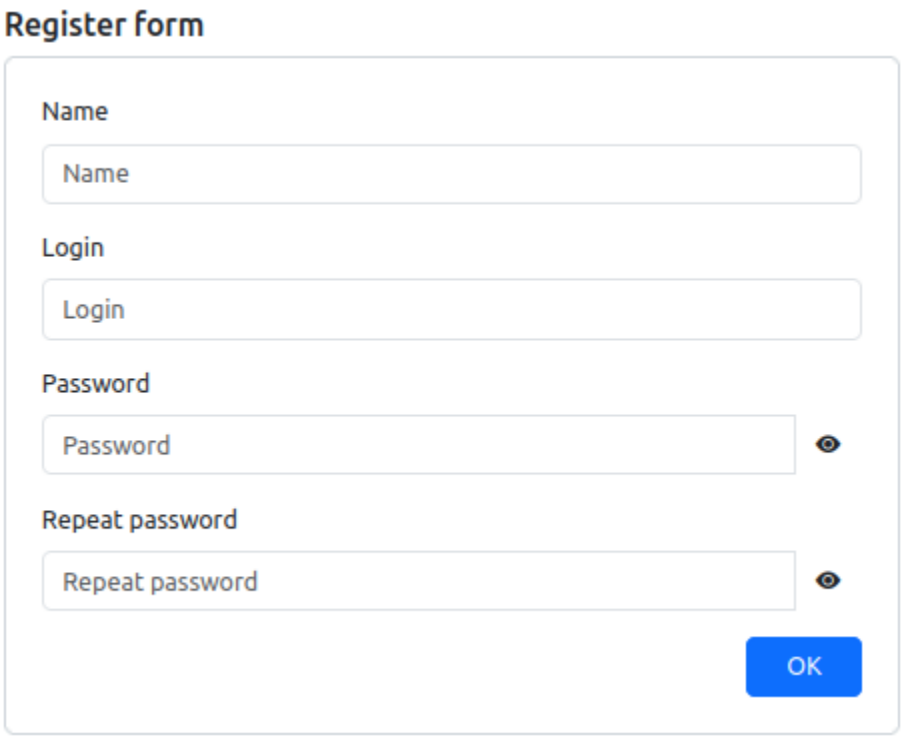
In Jam.py v7, the solution is to process every request in the `on_request` event handler and defining a response on a valid request.

This enables us to do a custom login and registration forms, where custom errors can be created. For example: "User does not exist!", "Wrong password", etc.

The new **login.html** page with the error message:



The new **register.html** page (no AJAX):



6.17.1 Routing code

As mentioned, the `on_request` is used.

The below code should exist on "Task/Server Module". No Python logic is included below to make it simple to read:

```
def on_request(task, request):
        parts = request.path.strip('/').split('/')
        if not parts[0]:
            if task.logged_in(request):
                return task.serve_page('index.html')
            else:
                return task.redirect('/login.html')
        elif parts[0] == 'login.html':
                                .
                                .

        elif parts[0] == 'register.html':
                                .
                                .
                    return task.serve_page('register.html')
                                .
                                .

                    return task.redirect('/login.html')
```

The working example for serving robots.txt file:

```
def on_request(task, request):
    parts = request.path.strip('/').split('/')
```

(continua na próxima página)

(continuação da página anterior)

```
    if not parts[0]:
        if task.logged_in(request):
            return task.serve_page('index.html')
        else:
            return task.redirect('/login.html')
    elif parts[0] == 'robots.txt':
            return task.serve_page(os.path.join(task.work_dir, 'robots.txt'))
```

The `robots.txt` file exist within the application folder.

6.17.2 See also

serve_page

redirect

CAPÍTULO 7

Jam.py class reference

Server side is implemented in Python and uses Werkzeug library, the client side in JavaScript and uses JQuery and Bootstrap

7.1 Client side (javascript) class reference

All objects of the framework represent a *task tree*. Bellow is classes for each kind of task tree objects:

7.1.1 AbstractItem class

`class AbstractItem()`

domain: client

language: javascript

AbstractItem class is the ancestor for all item objects of the *task tree*

Below the attributes and methods of the class are listed.

Attributes

ID

`ID`

domain: client

language: javascript

class *AbstractItem*

Description

The ID attribute is the unique in the framework id of the item

The ID attribute is most useful when referring to the item by number rather than name. It is also used internally.

item_caption

`item_caption`

domain: client

language: javascript

class *AbstractItem*

Description

Item_caption attribute specifies the name of the item that appears to users

item_name

`item_name`

domain: client

language: javascript

class *AbstractItem*

Description

Specifies the name of the item as referenced in code. Use item_name to refer to the item in code.

item_type

`item_type`

domain: client

language: javascript

class *AbstractItem*

Description

Specifies the type of the item.

Use the type attribute to get the type of the item. It can have one of the following values:

- “task”,
- “items”,
- “details”,
- “reports”,
- “item”,
- “detail_item”,

- "report",
- "detail"

items

items

domain: client

language: javascript

class *AbstractItem*

Description

Lists all items owned by the item.

Use items to access any of the item owned by this object.

owner

Indicates the item that owns this item.

owner

domain: client

language: javascript

class *AbstractItem*

Description

Use owner to find the owner of an item.

task

Indicates the root of the *task tree* that owns this item.

task

domain: client

language: javascript

class *AbstractItem*

Description

Use task attribute to find the root of the *task tree* of which the item is a member.

Methods

abort

abort(*message*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **abort** method to throw exception.

It can be useful when you need to abort execution of some 'on_before' events.

Example

The following code will throw exception with the text:

execution aborted: invoice_table - a quantity value is required

```
function on_before_post(item) {
    if (item.quantity.value === 0) {
        item.abort('a quantity value is required');
    }
}
```

alert

alert(*mess*, *options*)

domain: client

language: javascript

class *AbstractItem*

Description

Use the `alert` method to create a pop-up message in the upper-right corner application that disappears after the first click on the page.

The `mess` parameter specifies the text that will be displayed.

The `options` parameter is an object with the following attributes:

- `type` - indicates the type of the message - its font, background color and header text, if it is not specified in the header parameters. This must be one of the following:
  - 'info',
  - 'error',
  - 'success'

  default value is 'info'
- `header` - specifies the header of the alert
- `pulsate` - if true, the header will pulsate, the default value is true
- `show_header` - if false, the header will not be displayed.

The methods `alert_error` and `alert_success` are the same as `alert` with the corresponding `type` options.

Example

```
item.alert_error('Failed to send the mail: ' + err);
item.alert('Successfully sent the mail');
```

can_view

can_view()

domain: client

language: javascript

class *AbstractItem*

Description

Use **can_view** method to determine if a user have a right to get access to an *item* dataset or to see report generated by *report* when the project *Safe mode parameter* is set. If the project *Safe mode parameter* is not set the method always returns true.

The user privileges are set in the *roles node* of the project tree.

Example

```
if (item.visible && item.can_view()) {
    $("#submenu")
        .append($('<li></li>')
        .append(
            $('<a href=""></a>')
                .text(item.item_caption)
                .data('item', item);
        )
    );
}
```

each_item

each_item(*function(item)*)

domain: client

language: javascript

class *AbstractItem*

Description

Use each_item method to iterate over *items* owned by this object.

The each_item() method specifies a function to run for each child item (child item is passed as a parameter).

You can break the each_item loop at a particular iteration by making the callback function return false.

Example

The following code will output all catalogs of the project in a browser console:

```
function on_page_loaded(task) {
    task.catalogs.each_item(function(item) {
        console.log(item.item_name);
    })
}
```

hide_message

hide_message(*form*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **hide_message** method to close a modal form created by *message* method

The **form** parameter is a JQuery object returned by *message* method.

item_by_ID

item_by_ID(*ID*)

domain: client

language: javascript

class *AbstractItem*

Description

item_by_ID searches among all items of the project *task tree*, starting with the current item, for an item whose *ID* attribute is equal to the ID parameter.

load_module

load_module(*callback*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **load_module** method to dynamically load javascript file of an item module, before executing callback.

The method checks whether the module has been loaded, if not, loads the module from the server, initializes the item and then executes the **callback** function, otherwise just the **callback** function is executed. The item is passed to the callback function as a parameter.

The request to the sever is executed asynchronously.

Example

Bellow, the do_some_work function is executed only when an item module has been loaded:

```
function some_work(item) {
    item.load_module(do_some_work);
}

function do_some_work(item) {
    // some code
}
```

See also

Working with modules

load_modules

load_script

load_modules

load_modules(*module_array*, *callback*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **load_modules** method to dynamically load specified modules before executing the **callback**.

The method works the same way as *load_module*, only loads and initializes all modules of items specified in the **module_array**.

Example

Bellow, the do_some_work function is executed only when modules of the item and its owner has been loaded:

```
function some_work(item) {
    item.load_modules([item, item.owner], do_some_work);
}

function do_some_work(item) {
    // some code
}
```

See also

Working with modules

load_module

load_script

load_script

load_script(*js_filename*, *callback*, *onload*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **load_script** method to load javascript file from the server, before executing callback.

The method checks whether the file has been loaded, if not, loads it from the server, executes (if specified) onload function and then executes the **callback**, otherwise just the **callback** function is executed. The item is passed to the callback function as a parameter.

The **js_filename** should specify the path to javascript file relative to the server directory.

The request to the sever is executed asynchronously.

Example

Bellow, the do_some_work function is executed only when *lib.js* file from server *js* directory has been loaded.

loaded:

```
function some_work(item) {
    item.load_script('js/lib.js', do_some_work);
}

function do_some_work(item) {
    // some code
}
```

See also

Working with modules

load_module

load_modules

message

message(*mess*, *options*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **message** method to create a modal form.

The **mess** parameter specifies the text or html content that will appear in the body of the form.

The **options** parameter is an object with the following attributes:

- **title** - the title of the form,
- **width** - the width of the form, the default width is 400px
- **height** - the height of the form,
- **margin** - use the margin attribute to define margins of the form body
- **text_center** - if true, the body tags will be centered, the default value is false,
- **buttons** - an object that define buttons that will be created in the footer of the form, keys of the object are button names, values - functions, that will be executed when button clicked,
- **button_min_width** - the min width of the buttons, the default value is 100px,
- **center_buttons** - if true, the buttons will be centered, the default value is false,
- **close_button** - if this value is true, an application will create a close button in the upper-right corner of the form, the default value is true,
- **close_on_escape** - if true, the form will be closed, when user press Escape, the default value is true,
- **print** - if this value is true, an application will create a print button in the upper-right corner of the form to print the body of the form, the default value is false

The method returns a jquery object of the form. To programmatically close the form pass this object to *hide_message* method.

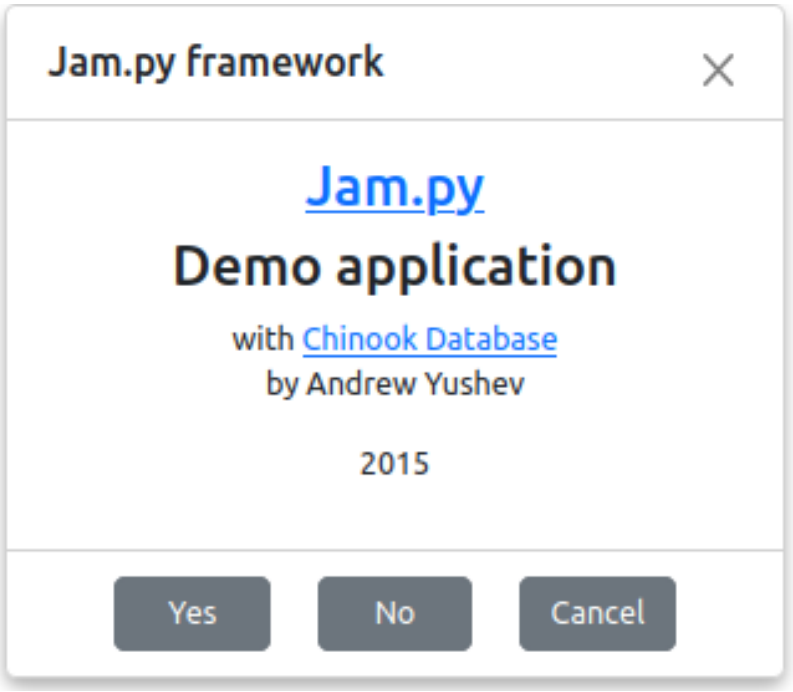
Examples

The following code will create a yes-no-cancel dialog:

```
function yes_no_cancel(item, mess, yesCallback, noCallback, cancelCallback) {
    var buttons = {
        Yes: yesCallback,
        No: noCallback,
        Cancel: cancelCallback
    };
    item.message(mess, {buttons: buttons, margin: "20px",
        text_center: true, width: 500, center_buttons: true});
}
```

```
task.message(
    '<a href="http://jam-py.com/" target="_blank"><h3>Jam.py</h3></a>' +
    '<h3>Demo application</h3>' +
    ' with <a href="http://chinookdatabase.codeplex.com/" target="_blank">Chinook␣
↪Database</a>' +
    '<p>by Andrew Yushev</p>' +
    '<p>2015</p>',
    {title: 'Jam.py framework', margin: 0, text_center: true, buttons: {"Yes": undefined,
↪ "No": undefined, "Cancel": undefined},
        center_buttons: true}
);
```

The result of the code above will be:



question

Creates a modal form with **Yes**, **No** buttons

question(*mess*, *yes_callback*, *no_callback*, *options*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **question** to create a modal form with **Yes** and **No** buttons.

The **mess** parameter specifies the text or html content that will appear in the body of the form.

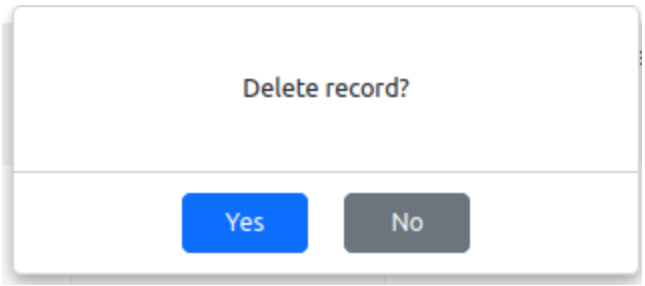
If **yes_callback**, **no_callback** functions are specified they will be executed when user clicks on the **Yes** or **No** button, respectively, and then the form will be closed.

Example

The following code creates a modal form, and delete selected record record when the user clicks the Yes button:

```
item.question('Delete record?',
    function() {
        item.delete();
    }
);
```

The result of the code above will be:



server

server(*func_name*, *params*, *callback*)

domain: client

language: javascript

class *AbstractItem*

Description

Use `sever` method to execute a function defined in the server module of an item.

`Sever` method executes a function with a name `func_name` defined in the server module of an item with parameters specified in `params`.

If callback is specified, the function on the server is executed asynchronously, after which the `callback` is executed with parameter that is the result of the server function execution, otherwise the function is executed synchronously and returns the result of the server function.

If exception was raised during the operation on the server and the callback parameter is not passed (synchronous execution), the client throws an exception. If the callback parameter is present, it is passed to the callback as parameter.

When exception is raised during the server function execution, the application on the client throws exception with the server exception text.

The first parameter of the function on the server must be `item`, it must be followed by the parameters specified in the function on the client.

`params` is a list of parameters. If there are not parameters, the `params` can be omitted.

Example

The function defined in the **Invoices** journal server module:

```
def get_total(item, id_value):
    result = 0;
    copy = item.copy()
    copy.set_where(id=id_value)
    copy.open()
    if copy.record_count():
        result = copy.total.value
    else:
        raise Exception, 'Registro "invoices" does not have a record with id  %s' % id_
↪value
    return result;
```

the following code in the **Invoices** journal client module will execute this server function:

```
task.invoices.server('get_total', [17], function(total, err) {
    if (err) {
        throw err;
    }
    else {
        console.log(total);
    }
});
```

warning

warning(*mess*, *callback*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **warning** to create a modal form with the **Ok** button.

The **mess** parameter specifies the text or html content that will appear in the body of the form.

If **callback** function are specified it will be executed when user clicks the button and then the form will be closed.

Example

```
item.warning('No record selected.');
```

yes_no_cancel

yes_no_cancel(*mess*, *yes_callback*, *no_callback*, *cancel_callback*)

domain: client

language: javascript

class *AbstractItem*

Description

Use **yes_no_cancel** to create a modal form with **Yes No**, **Cancel** buttons.

The **mess** parameter specifies the text or html content that will appear in the body of the form.

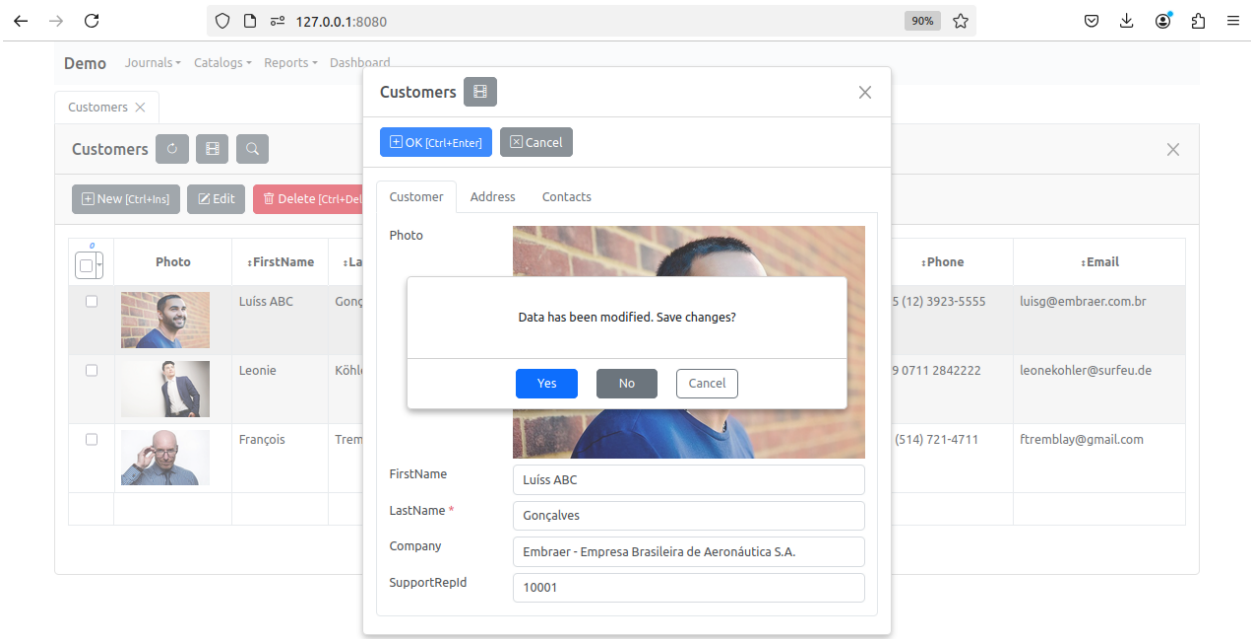
If **yes_callback**, **no_callback**, **cancel_callback** functions are specified they will be executed when user clicks on the **Yes**, **No** or **Cancel** button, respectively, and then the form will be closed.

Example

The following code is executed when user clicks on the close button in the upper right corner of an item edit form.

```
function on_edit_form_close_query(item) {
    var result = true;
    if (item.is_changing()) {
        if (item.is_modified()) {
            item.yes_no_cancel('Data has been modified. Save changes?',
                function() {
                    item.apply_record();
                },
                function() {
                    item.cancel_edit();
                }
            );
            result = false;
        }
        else {
            item.cancel();
        }
    }
    return result;
}
```

The result of the code above will be:



7.1.2 Task class

class Task()

domain: client

language: javascript

Task class is used to create the root of the *Task tree* of the project.

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes

forms_container

forms_container

domain: client

language: javascript

class *Task*

Description

The `forms_container` is a JQuery object in which the application will create forms.

To initialize `forms_container` use the *set_forms_container* method or the *create_menu* method.

The default code uses the *create_menu* method.

See also

forms_in_tabs

create_menu

set_forms_container

forms_in_tabs

forms_in_tabs

domain: client

language: javascript

class *Task*

Description

If the `forms_in_tabs` attribute is set and *forms_container* is specified the application will create forms in tabs.

This attribute can be set in the **Interface** tab of *Parameters*.

safe_mode

safe_mode

domain: client

language: javascript

class *Task*

Description

Check the `safe_mode` attribute to determine if the *safe mode* parameter of the project is set.

Example

```
function on_page_loaded(task) {

    $("#title").html(task.item_caption);
    if (task.safe_mode) {
        $("#user-info").text(task.user_info.role_name + ' ' + task.user_info.user_name);
        $('#log-out')
        .show()
        .click(function(e) {
            e.preventDefault();
            task.logout();
        });
    }

    task.tasks.view($("#content"));
}
```

See also

Parameters

user_info

on_page_loaded

templates

templates

domain: client

language: javascript

class *Task*

Description

The `templates` attribute stores the form templates of the project.

See also

Form templates

Forms

user_info

user_info

domain: client

language: javascript

class *Task*

Description

Use `user_info` attribute to get user information when project *Safe mode parameter* is set.

`user_info` is an object that has the following attributes:

- `user_id` - the user id
- `user_name` - the user name
- `role_id` - user role id
- `role_name` - the role assigned to the user
- `admin` - if true the user can work in the Application builder

If safe mode is false the `user_info` attribute is an empty object.

Example

```
function on_page_loaded(task) {
    $("#title").html('Jam.py demo application');
    if (task.safe_mode) {
        $("#user-info").text(task.user_info.role_name + ' ' + task.user_info.user_name);
        $('#log-out')
        .show()
        .click(function(e) {
            e.preventDefault();
            task.logout();
        });
    }
    // some initalization code
}
```

See also

load

login

logout

Users

Roles

Methods

add_tab

add_tab(*container*, *tab_name*, *options*)

domain: client

language: javascript

class *Task*

Description

The `add_tab` method creates a tab for a container.

The `container` is JQuery object for a container element.

The `tab_name` is the name of the tab.

Use can use the `options` to specify optional parameters. It is the object that can have the following attributes:

- `tab_id` - a unique string identifying the tab
- `show_close_btn` - if it is set to `true` the close tab button will appear that can be used to close the tab
- `set_active` - if it is set to `true` the new tab will became active
- `on_close` - a callback function that will be called when the close tab button is clicked

The function returns the JQuery object of the div with `tab-pane` class that will be displayed when tab became active.

Example

The following code will create tabs for editing Customers catalog. It uses *create_inputs* method:

```
function on_edit_form_created(item) {
    var container = item.edit_form.find('.tabs');
    task.init_tabs(container);
    item.create_inputs(task.add_tab(container, 'Customer'),
        {fields: ['firstname', 'lastname', 'company', 'support_rep_id']}
    );
    item.create_inputs(task.add_tab(container, 'Address'),
        {fields: ['country', 'state', 'address', 'postalcode']}
    );
    item.create_inputs(task.add_tab(container, 'Contact'),
        {fields: ['phone', 'fax', 'email']}
    );
}
```

Below is the edit html template for Customers catalog:

```
<div class="customers-edit">
    <div class="form-body">
        <div class="tabs">
        </div>
    </div>
    <div class="form-footer">
        <button type="button" id="ok-btn" class="btn btn-ary expanded-btn">
            <i class="icon-ok"></i> OK<small class="muted"> [Ctrl+Enter]</small>
        </button>
        <button type="button" id="cancel-btn" class="btn expanded-btn">
            <i class="icon-remove"></i> Cancel
        </button>
    </div>
</div>
```

See also

init_tabs

close_tab

close_tab

close_tab(*container*, *tab_id*)

domain: client

language: javascript

class *Task*

Description

Use the `close_tab` method to close tab in the `container` identified by `tab_id`.

See also

init_tabs

add_tab

create_menu

create_menu: function(*menu*, *forms_container*, *options*)

domain: client

language: javascript

class *Task*

Description

The `create_menu` method created a menu based on the project *task tree*.

If display forms in tabs attribute of the *project parameters* is set, initializes tabs that will be created to display forms.

It iterates through the items of the *task tree* and adds items to the menu for which the visible attribute is set to true, and the user has the right to view them.

The method uses to assign on click event to the menu items so that for reports the *print* method will be executed when a user clicks it and the *view* method will be executed for other items.

The following parameters could be passed to the method:

- `menu` - a JQuery object of the menu element from index.html file
- `forms_container` a JQuery object of the element that will contain the forms created by the *view* method
- `options` - an object that can have the following attributes:
  - `custom_menu` - use this option to create a custom menu, see below for details
  - `view_first` - if it is true the view form of the first item in the menu will be displayed after menu is created, the default value is `false`

- `create_single_group` - if it is true and only one group in the task tree has items the menu item for the group will be created that have a drop down menu for group items, otherwise the menu items for each item will be created, the default value is `false`
- `splash_screen` - an html that will be displayed in the forms_container when all tabs are closed

Custom menu option

To create your own custom menu you must set a custom_menu option.

This option is a list of menu objects, each object can be:

- Jam.py item or item group
- array: the first element of the array is the name of the menu item, and the second is the list of menu objects
- object with one attribute: the key of the attribute is the name of menu item and the value - a list of menu objects
- object with one attribute: the key of the attribute is the name of menu item and the value - function to be executed when the menu item is clicked

To add a separator, an empty string (‘’) can be added to the list of menu objects

Example

```
task.create_menu($("#menu"), $("#content"), {
    splash_screen: '<h1 class="text-center">Jam.py Demo Application</h1>',
    view_first: true
});
```

An example with custom menu:

```
let menu = [
        ['First',  [task.invoices, task.customers]],
        {'Second': [task.catalogs, '', task.reports]},
        {Third: [task.tracks, {Params: function() {alert('params clicked')}}]},
        {Fourth: [task.task.analytics, {'Artists list': [task.artists]}]},
        task.reports,
        {Params: function() {alert('params clicked')}},
    ];
task.create_menu($("#menu"), $("#content"), {
    custom_menu: menu,
    splash_screen: '<h1 class="text-center">Jam.py Demo Application</h1>',
    view_first: true
});
```

init_tabs

init_tabs(*container*, *tabs_position*)

domain: client

language: javascript

class *Task*

Description

The `init_tabs` method initializes tabs for a container.

The `container` is JQuery object for a container element.

The `tabs_position` parameter specifies where tabs, created by the *add_tab* method will be positioned. It is string that can be one of the following values:

- tabs-below
- tabs-left
- tabs-right

If this parameter is omitted tabs will be positioned at the top of the container.

After this method is called you can use the *add_tab* method to create tabs.

See also

add_tab

close_tab

load

load(*callback*)

domain: client

language: javascript

class *Task*

Description

`Load` method loads the project *task tree* from the server and initilizes it.

When a Web browser loads the jam.js library in index.html file, jam.js creates an empty task object. The `load` method loads the project *task tree* from the server and initilizes it (see *workflow*). After that the application triggers *on_page_loaded* event.

Example

The following code is from the project index.html file.

```
<script src="/jam/js/jam.js"></script>
<script src="/js/events.js"></script>

<script>
$(document).ready(function(){
    task.load();
  });
</script>
```

See also

login

logout

user_info

Users

Roles

login

login(*callback*)

domain: client

language: javascript

class *Task*

Description

The `login` method creates a login form using the login form div defined in the templates of the index.html file. It is called by the *load* method when the project *Safe mode parameter*

See also

load

logout

user_info

Users

Roles

logout

logout()

domain: client

language: javascript

class *Task*

Description

Call `logout` to logout a user.

Example

```
function on_page_loaded(task) {
    $("#title").html('Jam.py demo application');
    if (task.safe_mode) {
        $("#user-info").text(task.user_info.role_name + ' ' + task.user_info.user_name);
        $('#log-out')
```

(continua na próxima página)

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```
        .show()
        .click(function(e) {
            e.preventDefault();
            task.logout();
        });
    }
    // some initalization code
}
```

See also

load

login

user_info

Users

Roles

set_forms_container

set_forms_container(*container*, *options*)

domain: client

language: javascript

class *Task*

Description

The `set_forms_container` can be used to initialize the *forms_container* attribute that will contain forms of the application.

If the *forms_in_tabs* attribute is set the applications also initializes the tabs that will be used to display forms.

The `container` is JQuery object that will be used as a container for the application forms.

The `options` parameter can have the following attribute:

- `splash_screen` - an html that will be displayed in the forms_container when all tabs are closed

Example

```
task.set_forms_container($("#content"), {
    splash_screen: '<h1 class="text-center">Jam.py Demo Application</h1>'
});
```

See also

forms_container

forms_in_tabs

create_menu

upload

`upload`(*options*)

domain: client

language: javascript

class *Task*

Description

Use the `upload` method to select a file in the File open dialog box and upload it to the *static/files* directory in the server folder.

When saving the file on the server, the file name is changed by the Werkzeug secure_filename function and then the current date is added to it. See http://werkzeug.pocoo.org/docs/0.14/utils/

The `options` parameter is an object that may have the following attributes:

- `callback` - is a callback function that is executed when the file is downloaded. It is passed, as parameters, the name of the file stored on the server, the name of the downloaded file and the path to the folder where the file was saved.
- `show_progress` - if true and the uploaded file is large, the progress bar will be displayed. the default value is true
- `accept` - the attribute specifies the types of files that can be submitted through a file upload, see *Accept string*

Nota

Please note that the `accept` attribute specifies only types of files that can be picked up by the user in the browser.

The server checks all uploaded files for compliance with the **Upload file extensions** attribute of the *Project parameters*.

Events

on_edit_form_close_query

on_edit_form_created(item)

domain: client

language: javascript

class *Task class*

Description

The `on_edit_form_close_query` event is triggered by the *close_edit_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

close_edit_form

on_edit_form_created

on_edit_form_created(item)

domain: client

language: javascript

class *Task class*

Description

The `on_edit_form_created` event is triggered by the *create_edit_form* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *create_edit_form* method has been called.

See also

Forms

create_edit_form

on_edit_form_keydown

on_edit_form_keydown(item, event)

domain: client

language: javascript

class *Task class*

Description

The `on_edit_form_keydown` event is triggered when the keydown event occurs for the *edit_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

on_edit_form_keyup

on_edit_form_keyup(item, event)

domain: client

language: javascript

class *Task class*

Description

The `on_edit_form_keyup` event is triggered when the keyup event occurs for the *edit_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

on_edit_form_shown

on_edit_form_shown(item)

domain: client

language: javascript

class *Task class*

Description

The `on_edit_form_shown` event is triggered by the *create_edit_form* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *create_edit_form* method has been called.

See also

Forms

create_edit_form

on_filter_form_close_query

on_filter_form_close_query(item)

domain: client

language: javascript

class *Task class*

Description

The `on_filter_form_close_query` event is triggered by the *close_filter_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

create_filter_form

close_filter_form

on_filter_form_created

on_filter_form_created(item)

domain: client

language: javascript

class *Task class*

Description

The `on_filter_form_created` event is triggered by the *create_filter_form* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *create_filter_form* method has been called.

See also

Forms

create_filter_form

on_filter_form_shown

on_filter_form_shown(item)

domain: client

language: javascript

class *Task class*

Description

The `on_filter_form_shown` event is triggered by the *create_filter_form* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *create_filter_form* method has been called.

See also

Forms

create_filter_form

on_page_loaded

on_page_loaded(task)

domain: client

language: javascript

class *Task class*

Description

The `on_page_loaded` event is the first event triggered on the client. See *Workflow*.

Use it to initialize the client.

The `task` parameter is the root of the client *task tree*.

See also

Workflow

Task tree

on_param_form_close_query

on_param_form_close_query(item)

domain: client

language: javascript

class *Task class*

Description

The `on_param_form_close_query` event is triggered by the *close_param_form* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

close_param_form

on_param_form_created

on_param_form_created(item)

domain: client

language: javascript

class *Task class*

Description

The `on_param_form_created` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

on_param_form_shown

on_param_form_shown(item)

domain: client

language: javascript

class *Task class*

Description

The `on_param_form_shown` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

on_view_form_close_query

on_view_form_close_query(item)

domain: client

language: javascript

class *Task class*

Description

The `on_view_form_close_query` event is triggered by the *close_view_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

close_view_form

on_view_form_created

on_view_form_created(item)

domain: client

language: javascript

class *Task class*

Description

The `on_view_form_created` event is triggered by the *view* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *view* method has been called.

See also

Forms

view

on_view_form_keydown

on_view_form_keydown(item, event)

domain: client

language: javascript

class *Task class*

Description

The `on_view_form_keydown` event is triggered when the keydown event occurs for the *view_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

on_view_form_keyup

on_view_form_keyup(item, event)

domain: client

language: javascript

class *Task class*

Description

The `on_view_form_keyup` event is triggered when the keyup event occurs for the *view_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

on_view_form_shown

on_view_form_shown(item)

domain: client

language: javascript

class *Task class*

Description

The `on_view_form_shown` event is triggered by the *view* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the task, whose *view* method has been called.

See also

Forms

view

7.1.3 Group class

`class Group()`

domain: client

language: javascript

Group class is used to create group objects of the *task tree*

Below the events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Events

on_edit_form_close_query

on_edit_form_close_query(item)

domain: client

language: javascript

class *Group class*

Description

The `on_edit_form_close_query` event is triggered by the *close_edit_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

close_edit_form

on_edit_form_created

on_edit_form_created(item)

domain: client

language: javascript

class *Group class*

Description

The `on_edit_form_created` event is triggered by the *create_edit_form* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *create_edit_form* method has been called.

See also

Forms

create_edit_form

on_edit_form_keydown

on_edit_form_keydown(item, event)

domain: client

language: javascript

class *Group class*

Description

The `on_edit_form_keydown` event is triggered when the keydown event occurs for the *edit_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

on_edit_form_keyup

on_edit_form_keyup(item, event)

domain: client

language: javascript

class *Group class*

Description

The `on_edit_form_keyup` event is triggered when the keyup event occurs for the *edit_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

on_edit_form_shown

on_edit_form_shown(item)

domain: client

language: javascript

class *Group class*

Description

The `on_edit_form_shown` event is triggered by the *create_edit_form* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *create_edit_form* method has been called.

See also

Forms

create_edit_form

on_filter_form_close_query

on_filter_form_close_query(item)

domain: client

language: javascript

class *Group class*

Description

The `on_filter_form_close_query` event is triggered by the *close_filter_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

close_filter_form

on_filter_form_created

on_filter_form_created(item)

domain: client

language: javascript

class *Group class*

Description

The `on_filter_form_created` event is triggered by the *create_filter_form* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *create_filter_form* method has been called.

See also

Forms

create_filter_form

on_filter_form_shown

on_filter_form_shown(item)

domain: client

language: javascript

class *Group class*

Description

The `on_filter_form_shown` event is triggered by the *create_filter_form* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *create_filter_form* method has been called.

See also

Forms

create_filter_form

on_view_form_close_query

on_view_form_close_query(item)

domain: client

language: javascript

class *Group class*

Description

The `on_view_form_close_query` event is triggered by the *close_view_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

close_view_form

on_view_form_created

on_view_form_created(item)

domain: client

language: javascript

class *Group class*

Description

The `on_view_form_created` event is triggered by the *view* method of the item when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *view* method has been called.

See also

Forms

view

on_view_form_keydown

on_view_form_keydown(item, event)

domain: client

language: javascript

class *Group class*

Description

The `on_view_form_keydown` event is triggered when the keydown event occurs for the *view_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

on_view_form_keyup

on_view_form_keyup(item, event)

domain: client

language: javascript

class *Group class*

Description

The `on_view_form_keyup` event is triggered when the keyup event occurs for the *view_form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

on_view_form_shown

on_view_form_shown(item)

domain: client

language: javascript

class *Group class*

Description

The `on_view_form_shown` event is triggered by the *view* method of the item when the form has been shown.

The `item` parameter is the item that triggered the event.

This event, if defined, is triggered for every item of the group, whose *view* method has been called.

See also

Forms

view

7.1.4 Item class

`class Item()`

domain: client

language: javascript

Item class is used to create item objects of the *task tree* that may have an associated database table.

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes and properties

active

`active`

domain: client

language: javascript

class *Item class*

Description

Specifies whether or not an item dataset is open.

Use `active` read only property to determine whether an item dataset is open.

The *open* method changes the value of `active` to `true`. The *close* method sets it to `false`.

When the dataset is open its records can be navigated and its data can be modified and the changes saved in the item database table.

See also

Dataset

Navigating datasets

Modifying datasets

can_modify

`active`

domain: client

language: javascript

class *Item class*

Description

Set the `can_modify` property to false if you need to prohibit changing of the item in the visual controls.

When `can_modify` is true the *can_create*, *can_edit*, *can_delete* methods return false.

By default the `can_modify` property is true.

details

details

domain: client

language: javascript

class *Item class*

Description

Lists all *detail* objects of the item.

See also

Details

each_detail

edit_form

edit_form

domain: client

language: javascript

class *Item class*

Description

Use `edit_form` attribute to get access to a Jquery object representing the edit form of the item.

It is created by the *create_edit_form* method.

The *close_edit_form* method sets the `edit_form` value to undefined.

Example

In the following example the button defined in the item edit html template is assigned a click event:

```
item.edit_form.find("#ok-btn").on('click.task',
    function() {
        item.apply_record();
    }
);
```

See also

Forms

create_edit_form

close_edit_form

edit_options

edit_options

domain: client

language: javascript

class *Item class*

Description

The `edit_options` attribute is a set of options that determine how the edit form will be displayed on the browser page.

These options are set in the *Edit Form Dialog* in Application Builder.

You can change `edit options` in the *on_edit_form_created* event handler of the item. See example.

`edit_options` is an object that has the following attributes:

Option	Description
width	the width of the modal form, the default value is 600 px,
title	the title of the form, the default value is the value of a *item_caption* attribute,
form_bord	if true, the border will be displayed around the form
form_head	if true, the form header will be created and displayed containing form title and various buttons
history_butto	if true and *saving change history is enabled*, the history button will be displayed in the form header
close_butt	if true, the close button will be created in the upper-right corner of the form
close_on_e	if true, pressing on the Escape key will execute the *close_edit_form* method to close the form
edit_detail	the list of the detail names, that will be available for editing in the edit form, if edit form template contains the div with class 'edit-detail' (the default edit form template have this div)
detail_height	the height of the detail displayed in the view form, if not specified the height of the detail table is 200px
fields	specify the list of field names that the *create_inputs* method will use, if fields attribute of its options parameter is not specified
template_class	if specified, the div with this class will be searched in the task *templates* attribute and used as a form html template when creating a form. This attribute must be set before creating the form
modeless	if set the edit forms will be created modeless, otherwise - modal

Example

```
function on_edit_form_created(item) {
    item.edit_options.width = 800;
    item.edit_options.close_on_escape = false;
}
```

See also

Forms

create_edit_form

close_edit_form

fields

fields

domain: client

language: javascript

class *Item class*

Description

Lists all *field* objects of the item.

Example

```
function customer_fields(customers) {
    customers.open({limit: 1});
    for (var i = 0; i < customers.fields.length; i++) {
        console.log(customers.fields[i].field_caption, customers.fields[i].display_text);
    }
}
```

See also

Fields

Field class

each_field

filter_form

filter_form

domain: client

language: javascript

class *Item class*

Description

Use `filter_form` attribute to get access to a Jquery object representing the filter form of the item.

It is created by the *create_filter_form* method.

The *close_filter_form* method sets the `filter_form` value to undefined.

Example

In the following example the button defined in the item filter html template is assigned a click event:

```
item.filter_form.find("#cancel-btn").on('click',
    function() {
        item.close_filter()
    }
);
```

See also

Forms

create_filter_form

close_filter_form

filter_options

filter_options

domain: client

language: javascript

class *Item class*

Description

Use the `filter_options` attribute to specify parameters of the modal filter form.

`filter_options` is an object that has the following attributes:

- `width` - the width of the modal form, the default value is 560 px,
- `title` - use it to get or set the title of the filter form,
- `close_button` - if true, the close button will be created in the upper-right corner of the form, the default value is true,
- `close_caption` - if true and close_button is true, will display 'Close - [Esc]' near the button
- `close_on_escape` - if true, pressing on the Escape key will trigger the *close_filter_form* method.
- `close_focusout` - if true, the *close_filter_form* method will be called when a form loses focus
- `template_class` - if specified, the div with this class will be searched in the task *templates* attribute and used as a form html template when creating a form

Example

```
function on_filter_form_created(item) {
    item.filter_options.width = 700;
}
```

See also

Forms

create_filter_form

close_filter_form

Filtered

filtered

domain: client

language: javascript

class *Item class*

Description

Specifies whether or not filtering is active for a dataset.

Check `filtered` to determine whether or not local dataset filtering is in effect. If `filtered` is `true`, then filtering is active. To apply filter conditions specified in the *on_filter_record* event handler, set `filtered` to `true`.

See also

on_filter_record

filters

`filters`

domain: client

language: javascript

class *Item class*

Description

Lists all *filter* objects of the item.

Example

```
function invoices_filters(invoices) {
    for (var i = 0; i < invoices.filters.length; i++) {
        console.log(invoices.filters[i].filter_caption, invoices.filters[i].value);
    }
}
```

See also

Filters

Filter class

each_filter

item_state

`item_state`

domain: client

language: javascript

class *Item*

Description

Examine `item_state` to determine the current operating mode of the item. Item_state determines what can be done with data in an item dataset, such as editing existing records or inserting new ones. The `item_state` constantly changes as an application processes data.

Opening a item changes state from inactive to browse. An application can call *edit* to put an item into edit state, or call *insert* or *append* to put an item into insert state.

Posting or canceling edits, insertions, or deletions, changes `item_state` from its current state to browse. Closing a dataset changes its state to inactive.

To check item_state value use the following methods:

- *is_new* - indicates whether the item is in insert state
- *is_edited* - indicates whether the item is in edit state
- *is_changing* - indicates whether the item is in edit or insert state

item_state value can be:

- 0 - inactive state,
- 1 - browse state,
- 2 - insert state,
- 3 - edit state,
- 4 - delete state

item *task* attribute have consts object that defines following attributes:

- "STATE_INACTIVE": 0,
- "STATE_BROWSE": 1,
- "STATE_INSERT": 2,
- "STATE_EDIT": 3,
- "STATE_DELETE": 4

so if the item is in edit state can be checked the following way:

```
item.item_state === 2
```

or:

```
item.item_state === item.task.consts.STATE_INSERT
```

or:

```
item.is_new()
```

See also

Modifying datasets

log_changes

log_changes

domain: client

language: javascript

class *Item class*

Description

Indicates whether to log data changes.

Use `log_changes` to control whether or not changes made to the data in an item dataset are recorded. When `log_changes` is `true` (the default), all changes are recorded. They can later be applied to an application server by calling the *apply* method. When `log_changes` is false, data changes are not recorded and cannot be applied to an application server.

See also

Modifying datasets

apply

lookup_field

lookup_field

domain: client

language: javascript

class *Item class*

Description

Use `lookup_field` to check if the item was created to select a value for the lookup field. See *Lookup fields*

Example

```
function on_view_form_created(item) {
    item.table_options.multiselect = false;
    if (!item.lookup_field) {
        var print_btn = item.add_view_button('Print', {image: 'icon-print'}),
            email_btn = item.add_view_button('Send email', {image: 'icon-pencil'});
        email_btn.click(function() { send_email() });
        print_btn.click(function() { print(item) });
        item.table_options.multiselect = true;
    }
}
```

paginate

paginate

domain: client

language: javascript

class *Item class*

Description

The `paginate` attribute determines the behaviour of a table created by the *create_table* method

When `paginate` is set to `true`, a paginator is created, and the table calculates the number of the rows displayed, based on its height. The table will internally manipulate the `limit` and `offset` parameters of the *open* method, depending on its height and current page, reopening the dataset when page changes.

If `paginate` value is `false`, the table will displays all available records of the dataset.

See also

create_table

open

permissions

permissions

domain: client

language: javascript

class *Item class*

Description

Set the `permissions` property attributes to prohibit changing of the item in the visual controls.

The `permissions` property is an object that has the following attributes:

- can_create
- can_edit
- can_delete

By default theses attributes are set to true.

When these attributes are set to false the corresponding

- *can_create*,
- *can_edit*,
- *can_delete*

methods return false.

See also

How to prohibit changing record

read_only

read_only

domain: client

language: javascript

class *Item class*

Description

Read the `read_only` property to determines whether the data can be modified in data-aware controls.

Set `read_only` property to `true` to prevent data from being modified in data-aware controls.

When you assign a value to the read_only property, the application sets the read_only property of all the details and the *read_only* property of each field to that value.

If the user role prohibits editing of the record, `read_only` always returns `true`.

See also

read_only

Example

In this example we first set `read_only` attribute of the invoices item to `true`. It makes all fields and invoice_table detail read only. After that we allow a user to edit customer field and invoice_table detail.

```
function on_edit_form_created(item) {
    item.read_only = true;
    item.customer.read_only = false;
    item.invoice_table.read_only = false;
}
```

rec_count

rec_count

domain: client

language: javascript

class *Item class*

Description

Read the `rec_count` property to get the number of records owned by the item's dataset.

If the module declares an *on_filter_record* event handler and the *Filtered* attribute is set, this property calculates the number of records that satisfy this filter, otherwise the *record_count* method is used to calculate the number of records.

See also

record_count

Example

```
function edit_invoice(invoice_id) {
    var invoices = task.invoices.copy();
    invoices.open({ where: {id: invoice_id} }, function() {
        if (invoices.rec_count) {
            invoices.edit_record();
        }
        else {
            invoices.alert_error('Invoices: record not found.');
        }
    });
}
```

rec_no

rec_no

domain: client

language: javascript

class *Item class*

Description

Examine the `rec_no` property to determine the record number of the current record in the item dataset. `rec_no` can be set to a specific record number to position the cursor on that record.

Example

```
function calculate(item) {
    var subtotal,
        tax,
        total,
        rec;
    if (!item.calculating) {
        item.calculating = true;
        try {
            subtotal = 0;
            tax = 0;
            total = 0;
            item.invoice_table.disable_controls();
            rec = item.invoice_table.rec_no;
            try {
                item.invoice_table.each(function(d) {
                    subtotal += d.amount.value;
                    tax += d.tax.value;
                    total += d.total.value;
                });
            }
            finally {
                item.invoice_table.rec_no = rec;
                item.invoice_table.enable_controls();
```

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```
            }
            item.subtotal.value = subtotal;
            item.tax.value = tax;
            item.total.value = total;
        }
        finally {
            item.calculating = false;
        }
    }
}
```

See also

Dataset

Navigating datasets

selections

selections

domain: client

language: javascript

class *Item class*

Description

The `selections` attribute stores a list of a primary key field values.

When a **Multiple selection** check box is checked on the **Layout** tab in the *View Form Dialog* or multiselect attribute of the *table_options* is set programmatically, the check box in the leftmost column of the table appears and each time a user clicks on the check box, the `selections` attrubute changes.

It can also be changed programmatically by using `add` or `remove` methods or assigning an array.

Example

In this example, the `send_email` function, on the client, uses **Customers** selection attribute to get array of primary key field values selected by users and send them to the `send_email` function defined in the server module of the item using the *server* method

```
function send_email(subject, message) {
    var selected = task.customers.selections;
    if (!selected.length) {
        selected.add(task.customers.id.value);
    }

    item.server('send_email', [selected, subject, message],
        function(result, err) {
            if (err) {
                item.alert('Failed to send the mail: ' + err);
            }
```

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```
            else {
                item.alert('Successfully sent the mail');
            }
        }
    );
}
```

On the server, this array is used to retrieve information about selected customers using *open* method

```
import smtplib

def send_email(item, selected, subject, mess):
    cust = item.task.customers.copy()
    cust.set_where(id__in=selected)
    cust.open()
    to = []
    for c in cust:
        to.append(c.email.value)

    # code that sends email
```

table_options

table_options

domain: client

language: javascript

class *Item class*

Description

The `table_options` attribute is a set of options that determine how the table of the view form of will be displayed. Options defined in it are used by the *create_table* method if its options parameter don't override corresponding option.

These options are set in the **Layout** tab of the *View Form Dialog* in Application Builder.

You can change `table_options` in the *on_view_form_created* event handler of the item. See example.

The `table_options` parameter is an object that may have the following attributes:

Option	Description
row_cou	specifies the number of rows displayed by the table
height	if row_count is not specified, it determines the height of the table, the default value is 480. The table at creation calculates the number of rows displayed (row_count), based on the value of this parameter.
fields	a list of field names. If specified, a column will be created for each field whose name is in this list, if not specified (the default) then the fields attribute of an *view_options* will be used
title_line_	specifies the number of lines of text displayed in a title row, if it is 0, the height of the row is determined by the contents of the title cells
row_line	specifies the number of lines of text displayed in a table row, if it is 0, the height of the row is determined by the contents of the cells
expand_sel	if row_line_count is set and expand_selected_row is greater that 0, it specifies the minimal number of lines of text displayed in the selected row of the table
title_word	specifies if the column title text can be wrapped.
column_wi	the width of the columns are calulated by a Web Browser. You can use this option to force the width of columns. The option is an object, key values of which are field names, the values are column widths as CSS units
editable_field	the list of field names could be edited in the table.
selected_field	if editable_fields are set, specifies the name of the field whose column will be selected, when the selected row is changed.
sortable	if this option is specified, it is possible to sort the records by clicking on the table column header. When a sort_fields option is not specified (default), a user can sort records on any field, otherwise, only on the fields whose names are listed in this option.
sort_fiel	the list of field names on which the table can be sorted, by clicking on the corresponding table column header. If an item is a detail the operation is performed on the client, otherwise sorting is performed on the server (the *open* method is used internally).
summary_fie	a list of field names. When it is specified, the table calculates sums for numeric fields and displays them in the table footer, for not numeric fields it displays the number of records.
freeze_cou	an integer value. If it is greater than 0, it specifies number of first columns that become frozen - they will not scroll when the table is scrolled horizontally.
show_hi	if true, the tooltip will be displayed when the user hovers the mouse over a table cell, and the cell text does not fit in the cell size. The default value is true.
hint_fiel	a list of field names. If it is specified, the tooltip will be displayed only for fields from this list, regardless of the value of show_hints option value.
on_click	specifies the function, that will be executed when a user click on a table row. The item will be passed as a parameter to the function.
on_dblcl	specifies the function, that will be executed when a user double click on a table row. The item will be passed as a parameter to the function.
dblclick_ed	if the value of the option is set to true and the on_dblclick option is not set, the edit form will be shown when a user double click on a table row.
multiselect	if this option is set, a leftmost column with check-boxes will be created to select records. So, that when a user clicks on the check-box, the value of the primary key field of the record will be added to or deleted from the *selections* attribute.
select_all	if true, the menu will appear in the leftmost column of the table header, which will allow the user selects all records that match the current filters and the search value.
row_call	the callback functions called each time fields of the record are changed. Two parameters are passed to the function - item, whose record has changed and JQuery object of the corresponding row of the table. Please be careful - the item passed to the function can be not item itself, but its clone that share the same dataset.

Example

```
function on_view_form_created(item) {
    item.table_options.row_line_count = 2;
    item.table_options.expand_selected_row = 3;
}
```

The code in the following two examples does the same:

```
item.invoice_table.create_table(item.view_form.find('.view-detail'), {
    height: 200,
    summary_fields: ['date', 'total'],
});
```

```
item.invoice_table.table_options.height = 200;
item.invoice_table.table_options.summary_fields = ['date', 'total'];
item.invoice_table.create_table(item.view_form.find('.view-detail'));
```

See also

View Form Dialog

on_view_form_created

create_table

view_form

view_form

domain: client

language: javascript

class *Item class*

Description

Use `view_form` attribute to get access to a Jquery object representing the view form of the item.

It is created by the *view* method.

The *close_view_form* method sets the `view_form` value to undefined.

Example

In the following example the button defined in the item html template is assigned a click event:

```
item.view_form.find("#new-btn").on('click',
    function() {
        item.insert_record();
    }
);
```

See also

Forms

view

create_view_form

close_view_form

view_options

view_options

domain: client

language: javascript

class *Item class*

Description

The `view_options` attribute is a set of options that determine how the view form of will be displayed on the browser page.

These options are set in the *View Form Dialog* in Application Builder.

You can change view options in the *on_view_form_created* event handler of the item. See example.

`view_options` is an object that has the following attributes:

Option	Description
width	the width of the modal form, the default value is 600 px
title	the title of the form, the default value is the value of a *item_caption* attribute,
form_bord	if true, the border will be displayed around the form
form_head	if true, the form header will be created and displayed containing form title and various buttons
history_butto	if true and *saving change history is enabled*, the history button will be displayed in the form header
refresh_butt	if true, the refresh button will be created in the form header, that will allow users to refresh the page by sending request to the server
enable_search	if true, the search input will be created in the form header
search_field	the name of the field that will be the default search field
enable_filters	if true and there are visible filters, the filter button will be created in the form header
close_butt	if true, the close button will be created in the upper-right corner of the form
close_on_	if true, pressing on the Escape key will execute the *close_view_form* method to close the form
view_detai	the list of detail names, that will be displayed in the view form, if view form template contains the div with class 'view-detail' (the default view form template have this div)
detail_height	the height of the details displayed in the view form, if not specified the height of the detail table is 200px
modeless	if true, the form will be displayed as modeless
template_class	if specified, the div with this class will be searched in the task *templates* attribute and used as a form html template when creating a form. This attribute must be set before the form is created

Example

```
function on_view_form_created(item) {
    item.view_options.width = 800;
    item.view_options.close_button = false;
    item.view_options.close_on_escape = false;
}
```

See also

Forms

view

virtual_table

virtual_table

domain: client

language: javascript

class *Item class*

Description

Use the read-only `virtual_table` property to find out if the item has a corresponding table in the project database.

If `virtual_table` is `True` there is no corresponding table in the project database. You can use these items to work with in-memory dataset or use its modules to write code. Calling the *open* method creates an empty data set, and calling the *apply* method does nothing.

Methods

add_edit_button

add_edit_button(*text*, *options*)

domain: client

language: javascript

Description

Use `add_edit_button` to dynamically add a button in the edit form.

This method have the same parameters as the *add_view_button* method

add_view_button

add_view_button(*text*, *options*)

domain: client

language: javascript

Description

Use `add_view_button` to dynamically add a button in the view form.

This method is usually used in the `on_view_form_created` events.

The following parameters are passed to the method:

- `text` - the text that will be displayed on the button
- `options` - options that specify additional properties of the button

The `options` parameter is an object that may have following attributes:

- `parent_class_name` is a class name of the parent element, the default value is 'form-footer'
- `btn_id` - the id attribute of the button
- `btn_class` - the class of the button
- `type` - specifies the type (color) of the button, it can be one of the following text values:
  - primary
  - success
  - info
  - warning
  - danger
- `image` - an icon class, one of the icons by Glyphicons from http://getbootstrap.com/2.3.2/base-css.html
- `secondary`: if this attribute is set to true, the button will be right aligned if **Buttons on top** attribute of the *View Form Dialog* is set, otherwise left aligned.
- `expanded` - if set to true the button will have class 'expanded-btn' and that defines its min-width to 120px, default true

The method returns a JQuery object of the button.

Examples

```
function on_view_form_created(item) {
    var btn = item.add_view_button('Select', {type: 'primary'});
    btn.click(function() {
        item.select_records('track');
    });
}

function on_view_form_created(item) {
    if (!item.view_form.hasClass('modal')) {
        var print_btn = item.add_view_button('Print', {image: 'icon-print'}),
            email_btn = item.add_view_button('Send email', {image: 'icon-pencil'});
        email_btn.click(function() { send_email() });
        print_btn.click(function() { print(item) });
    }
}
```

append

append()

domain: client

language: javascript

class *Item class*

Description

Open a new, empty record at the end of the dataset.

After a call to append, an application can enable users to enter data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to the item database table, using *apply* method.

The append method

- checks if item dataset is *active* , otherwise raises exception
- if the item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if the item is not a *detail* checks if it is in browse *state* , otherwise raises exception
- triggers the *on_before_append* event handler if one is defined for the item
- open a new, empty record at the end of the dataset
- puts the item into insert *state*
- triggers the *on_after_append* event handler if one is defined for the item.
- updates *data-aware controls*

See also

Modifying datasets

append_record

append_record(*container*)

domain: client

language: javascript

class *Item class*

Description

Open a new, empty record at the end of the dataset and creates an *edit_form* for visual editing of the record.

If container parameter (Jquery object of the DOM element) is specified the edit form html template is inserted in the container.

If container parameter is not specified but **Modeless form** attribute is set in the *Edit Form Dialog* or modeless attribute of the *edit_options* is set programmatically and task has the *forms_in_tabs* attribute set and the application doesn't have modal forms, the modeless edit form will be created in the new tab of the *forms_container* object of the task.

In all other cases the modal form will be created.

If adding of a record is allowed in modeless mode, the application calls the *copy* method to create a copy of the item. This copy will be used to append the record.

The `append_record` method

- calls the *can_create* method to check whether a user have a right to append a record, and if not, returns
- checks whether the item is in edit or insert *state* , and if not, calls the *append* method to append a record
- calls the *create_edit_form* method to create a form for visual editing of the record

See also

Modifying datasets

append

can_create

apply

apply(*callback*, *params*, *async*)

domain: client

language: javascript

class *Item class*

Description

Sends all updated, inserted, and deleted records from the item dataset to the application server for writing to the database.

The `apply` method can have the following parameters:

- `callback`: if the parameter is not present and `async` parameter is `false` or `undefined`, the request to the server is sent synchronously, otherwise, the request is executed asynchronously and after the response is received, the callback is executed
- `params` - an object specifying user defined params, that can be used on the server in the *on_apply* event handler for some additional processing
- `async`: if its value is true, and callback parameter is missing, the request is executed asynchronously

The order of parameters doesn't matter.

The `apply` method

- checks whether the item is a detail, and if it is, returns (the master saves the details changes)
- checks whether the item is in edit or insert *state* , and if so, posts the record
- checks if the change log has changes, and if not, executes callback if it is passed and then returns
- triggers the *on_before_apply* event handler if one is defined for the item
- sends changes to the server
- server on receiving the request checks whether *on_apply* event handler is defined for the item, and if it is, executes it, otherwise generates and executes SQL query to write changes to the database, see also *on_apply events* topic
- when generating an SQL query, checks whether a user, that send the request, has rights to make these changes, if not raises an exception

- writes changes to the database
- after writing changes to the database, server sends to the client results of the execution
- if exception was raised during the operation on the server the client throws an exception, before throwing exception, if the callback parameter is passed, it is called and the error is passed as the callback function parameter
- the client, based on the results, updates the change log
- triggers the *on_after_apply* event handler if one is defined for the item
- if the callback parameter is passed, it is called.

Nota

The server, before writing new records to the database table, generates values for the primary fields. The client updates these fields, based on information received from the server. If you change values of some other fields in the *on_apply* event handler, these changes will not be reflected on the client. You can update them yourself using, for example, *refresh_record* method

Example

```
var self = this;
this.apply(function(err) {
    if (err) {
        self.alert_error(err);
    }
    else {
        //some code to execute after appling changes
    }
});
```

See also

Modifying datasets

apply_record

apply_record()

domain: client

language: javascript

class *Item class*

Description

Writes changes to the application dataset.

The `apply_record` method

- calls the *apply* to writes changes to the dataset.
- calls the *close_edit_form* method to destroy the edit_form

See also

Modifying datasets

close_edit_form

apply

assign_filters

assign_filters(*item*)

domain: client

language: javascript

class *Item class*

Description

Use `assign_filters` to set filter values of the item to values of filters of the `item` parameter.

Example

```
function calc_footer(item) {
    var copy = item.copy({handlers: false, details: false});
    copy.assign_filters(item);
    copy.open(
        {fields: ['subtotal', 'tax', 'total'],
        funcs: {subtotal: 'sum', tax: 'sum', total: 'sum'}},
        function() {
            var footer = item.view_form.find('.dbtable.' + item.item_name + ' tfoot');
            copy.each_field(function(f) {
                footer.find('div.' + f.field_name)
                    .css('text-align', 'right')
                    .css('color', 'black')
                    .text(f.display_text);
            });
        }
    );
}
```

See also

Filtering records

Filters

bof

bof()

domain: client

language: javascript

class *Item class*

Description

Test `bof` (beginning of file) method to determine if the cursor is positioned at the first record in an item dataset.

If bof returns true, the cursor is unequivocally on the first row in the dataset. bof returns true when an application

- Opens an item dataset.
- Calls an item's *first* method.
- Call an item's *prior* method, and the method fails (because the cursor is already on the first row in the dataset).

bof returns false in all other cases.

> **Nota**
>
> If both *eof* and bof return true, the item dataset is empty.

See also

Dataset

Navigating datasets

calc_summary

calc_summary(*detail*, *fields*)

domain: client

language: javascript

class *Item class*

Description

Use the calc_summary method to calculate sums for fields of a detail and save these values in fields of its master in the on_detail_changed event handler.

The `detail` parameter is the detail for the fields of which the sums are calculated.

The `fields` parameter is an object that defines the correspondence between the master and detail fields. The keys of this object are the master fields, the values are the corresponding details fields. If the detail field is a numeric field, its sum is calculated, otherwise the resulting value will be the number of records. The value of this object can be a function that returns the result of the calculation for a record of the detail.

Example

```
function on_detail_changed(item, detail) {
    var fields = [
        {"total": "total"},
        {"tax": "tax"},
        {"subtotal": function(d) {return d.quantity.value * d.unitprice.value}}
    ];
    item.calc_summary(detail, fields);
}
```

See also

on_detail_changed Details

can_create

can_create()

domain: client

language: javascript

class *Item*

Description

Use `can_create` method to determine if a user have a right to create a new record.

This method takes into account the user permissions set in the *roles node* in the Application Builder when the project *safe mode parameter* is set as well as the values of the *permissions* attribute and the value of *can_modify* attribute.

Example

```
if (item.can_create()) {
    item.view_form.find("#new-btn").on('click',
        function() {
            item.append_record();
        }
    );
}
else {
    item.view_form.find("#new-btn").prop("disabled", true);
}
```

See also

Parameters

can_delete

can_delete()

domain: client

language: javascript

class *Item*

Description

Use `can_delete` method to determine if a user have a right to delete a record of an item dataset.

This method takes into account the user permissions set in the *roles node* in the Application Builder when the project *safe mode parameter* is set as well as the values of the *permissions* attribute and the value of *can_modify* attribute.

Example

```
if (item.can_delete()) {
    item.view_form.find("#delete-btn").on('click',
        function() {
            item.delete_record();
        }
    );
}
else {
    item.view_form.find("#delete-btn").prop("disabled", true);
}
```

can_edit

can_edit()

domain: client

language: javascript

class *Item*

Description

Use `can_edit` method to determine if a user have a right to edit a record of an item dataset.

This method takes into account the user permissions set in the *roles node* in the Application Builder when the project *safe mode parameter* is set as well as the values of the *permissions* attribute and the value of *can_modify* attribute.

Example

```
if (item.can_edit()) {
    item.view_form.find("#edit-btn").on('click',
        function() {
            item.edit_record();
        }
    );
}
else {
    item.view_form.find("#edit-btn").prop("disabled", true);
}
```

cancel

cancel()

domain: client

language: javascript

class *Item class*

Description

Call `cancel` to undo modifications made to one or more fields belonging to the current record, as long as those changes are not already posted to the item dataset.

Cancel

- triggers the *on_before_cancel* event handler if one is defined for the item.
- to undo modifications made to the current record and its details if the record has been edited or removes the new record if one was appended or inserted.
- puts the item into browse *state*
- triggers the *on_after_cancel* event handler if one is defined for the item.
- updates *data-aware controls*

See also

Modifying datasets

cancel_edit

`cancel_edit()`

domain: client

language: javascript

class *Item class*

Description

Cancel visual editing on the record

The `cancel_edit` method

- calls the *close_edit_form* method to destroy the edit_form
- calls the *cancel* method to undo modifications made to the record

See also

Modifying datasets

close_edit_form

cancel

clear_filters

`clear_filters()`

domain: client

language: javascript

class *Item class*

Description

Use `clear_filters` to set filter values of the item to `null`.

See also

Filtering records

Filters

clone

clone(*keep_filtered*)

domain: client

language: javascript

class *Item class*

Description

Use the clone method to create a copy of an item that shares with it its dataset. The clone item has its own cursor, so you can navigate it and the cursor position of the item doesn't change.

Set the `keep_filtered` parameter to true if you want the clone to have the same local filter as the item.

Example

```
function calc_sum(item) {
    var clone = item.clone(),
        result = 0;
    clone.each(function(c) {
        result += c.sum.value;
    })
    return result;
}
```

See also

on_filter_record

close

close()

domain: client

language: javascript

class *Item class*

Description

Call `lose` to close an item dataset. After dataset is closed the *active* property is `false`.

See also

Dataset

open

close_edit_form

`close_edit_form()`

domain: client

language: javascript

class *Item class*

Description

Use `close_edit_form` method to close the edit form of the item.

The `close_edit_form` method triggers the *on_edit_form_close_query* event handler of the item, if one is defined. If the event handler is defined and

- returns `true` - the form is destroyed, the item's *edit_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_edit_form_close_query* of the group that owners the item, if one is defined for the group. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *edit_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_edit_form_close_query* of the task. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *edit_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If no event handler is defined or none of these event handlers return `false`, the form is destroyed and the item's *edit_form* attribute is set to undefined.

See also

Forms

create_edit_form

edit_form

close_filter_form

`close_filter_form()`

domain: client

language: javascript

class *Item class*

Description

Use `close_filter_form` method to close the filter form of the item.

The `close_filter_form` method triggers the *on_filter_form_close_query* event handler of the item, if one is defined. If the event handler is defined and

- returns ``false`` - the form is destroyed, the item's *filter_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_filter_form_close_query* of the group that owners the item, if one is defined for the group. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *filter_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_filter_form_close_query* of the task. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *filter_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If no event handler is defined or none of these event handlers return `false`, the form is destroyed and the item's *filter_form* attribute is set to undefined.

See also

Forms

create_filter_form

filter_form

close_view_form

close_view_form()

domain: client

language: javascript

class *Item class*

Description

Use `close_view_form` method to close the view form of the item.

The `close_view_form` method triggers the *on_view_form_close_query* event handler of the item, if one is defined. If the event handler is defined and

- returns `true` - the form is destroyed, the item's *view_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_view_form_close_query* of the group that owners the item, if one is defined for the group. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *view_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_view_form_close_query* of the task. If this event handler is defined and

- returns `true` - the form is destroyed, the item's *view_form* attribute is set to undefined and the methods exits
- return `false` - the operation is aborted and the methods exits,

If no event handler is defined or none of these event handlers return `false`, the form is destroyed and the item's *view_form* attribute is set to undefined.

See also

Forms

view

view_form

copy

copy(*options*)

domain: client

language: javascript

class *Item class*

Description

Use copy to create a copy of an item. The created copy is not added to the *task tree* and will be destroyed by JavaScript garbage collection process when no longer needed.

All attributes of the copy object are defined as they were at the time of loading of the task tree when application started. See *Workflow*

`Options` parameter further specifies the created copy. It can have the following attributes:

- `handlers` - if the value of this attribute is `true`, all the settings to the item made in the Form Dialogs in the Application Builder and all the functions and events defined in the client module of the item will also be available in the copy. The default value is `true`.
- `filters` - if the value of this attribute is `true`, the filters will be created for the copy, otherwise there will be no filters. The default value is `true`.
- `details` - if the value of this attribute is `true`, the details will be created for the copy, otherwise there will be no details. The default value is `true`.

Example

The following code is used in the *Demo project* to asynchronously calculate total values of the fields, displayed at the foot of the **Invoice** journal table:

```
function on_filter_applied(item) {
    var copy = item.copy({handlers: false, details: false});
    copy.assign_filters(item);
    copy.open(
        {fields: ['subtotal', 'tax', 'total'],
        funcs: {subtotal: 'sum', tax: 'sum', total: 'sum'}},
        function() {
```

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```
            var footer = item.view_form.find('.dbtable.' + item.item_name + ' tfoot');
            copy.each_field(function(f) {
                footer.find('div.' + f.field_name)
                    .css('text-align', 'right')
                    .css('color', 'black')
                    .text(f.display_text);
            });
        }
    );
}
```

See also

Task tree

Workflow

create_detail_views

create_detail_views(*container*)

domain: client

language: javascript

Description

Use `create_detail_views` to create view froms of the details of the item. These details can be specified in the **Edit details** attribute of the *Edit Form Dialog* or set in the `edit_details` attribute of the *edit_options*.

This method is usually used in the `on_edit_form_created` event handler.

The following parameters are passed to the method:

- `container` - a JQuery object that will contain view form of the details, if there is no container, the method returns.

If there is more than one detail, the method creates view forms in tabs.

If details are not *active* , the method calls their *open* method.

Example

```
function on_edit_form_created(item) {
    item.edit_form.find("#cancel-btn").on('click.task', function(e) { item.cancel_
↪edit(e) });
    item.edit_form.find("#ok-btn").on('click.task', function() { item.apply_record() });

    if (!item.master && item.owner.on_edit_form_created) {
        item.owner.on_edit_form_created(item);
    }

    if (item.on_edit_form_created) {
        item.on_edit_form_created(item);
    }
```

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```
    item.create_inputs(item.edit_form.find(".edit-body"));
    item.create_detail_views(item.edit_form.find(".edit-detail"));

    return true;
}
```

create_edit_form

create_edit_form(*container*)

domain: client

language: javascript

class *Item class*

Description

Use `create_edit_form` method to create an edit form of the item for visual editing of a record.

The method searches for an item html template in the task *templates* attribute (See *Forms*), creates a clone of the template and assigns it to the item *edit_form* attribute.

If `container` parameter is specified the method empties it and appends the html template to it. Otherwise it creates a modal form and appends the html to it.

Triggers the *on_edit_form_created* of the task.

Triggers the *on_edit_form_created* of the group that owners the item, if one is defined for the group.

Triggers the *on_edit_form_created* of the item, if one is defined.

Assigns the JQuery keyup and keydown events to the edit_form so that when an JQuery event of the window occurs, the `on_edit_form_keyup` and `on_edit_form_keydown` events are triggered. They are triggered (if defined) in the same way: first the task event handler, the group event handler and then the event handler of the item itself. After that the JQuery stopPropagation method of the event is called.

If the form is modal, shows it. Before showing the form the method applies options specified in the *edit_options* attribute.

Triggers the *on_edit_form_shown* of the task.

Triggers the *on_edit_form_shown* of the group that owners the item, if one is defined for the group.

Triggers the *on_edit_form_shown* of the item, if one is defined.

See also

Forms

edit_form

edit_options

create_edit_form

close_edit_form

create_filter_form

create_filter_form(*container*)

domain: client

language: javascript

class *Item class*

Description

Use `create_filter_form` method to create an filter form of the item for visual editing item filters.

The method searches for an item html template in the task *templates* attribute (See *Forms*), creates a clone of the template and assigns it to the item *filter_form* attribute.

If `container` parameter is specified the method empties it and appends the html template to it. Otherwise it creates a modal form and appends the html to it.

Triggers the *on_filter_form_created* of the task.

Triggers the *on_filter_form_created* of the group that owners the item, if one is defined for the group.

Triggers the *on_filter_form_created* of the item, if one is defined.

Assigns the JQuery keyup and keydown events to the filter_form so that when an JQuery event of the window occurs, the `on_filter_form_keyup` and `on_filter_form_keydown` events are triggered. They are triggered (if defined) in the same way: first the task event handler, the group event handler and then the event handler of the item itself. After that the JQuery stopPropagation method of the event is called.

If the form is modal, shows it. Before showing the form the method applies options specified in the *filter_options* attribute.

Triggers the *on_filter_form_shown* of the task.

Triggers the *on_filter_form_shown* of the group that owners the item, if one is defined for the group.

Triggers the *on_filter_form_shown* of the item, if one is defined.

See also

Forms

filter_form

filter_options

close_filter_form

create_filter_inputs

create_filter_inputs(*container*, *options*)

domain: client

language: javascript

Description

Use `create_filter_inputs` to create data-aware visual controls (inputs, checkboxes) for editing *filters* of an item.

This method is usually used in `on_filter_form_created` events triggered by *create_filter_form* method.

The following parameters are passed to the method:

- `container` - a JQuery object that will contain visual controls, if container length is 0 (no container), the method returns.
- `options` - options that specify how controls are displayed

The `options` parameter is an object that may have following attributes:

- `filters` - a list of filter names. If specified, a visual control will be created for each filter whose name is in this list, if not specified (the default) then the fields attribute of an *filter_options* will be used (by default it lists all visible filters specified in the Application builder),
- `col_count` - the number of columns that will be created for visual controls, the default value is 1.
- `label_on_top`: the default value is false. If this value is false, the labels are placed to the left of controls, otherwise the are created above the controls
- `tabindex` - if tabindex is specified, it will the tabindex of the first visual control, tabindex of all subsequent controls will be increased by 1.
- `autocomplete` - the default value is false. If this attribute is set to true, the autocomplete attribute of controls is set to "on"

Before creating controls the application empties the container.

Example

```
function on_filter_form_created(item) {
    item.filter_options.title = item.item_caption + ' - filter';
    item.create_filter_inputs(item.filter_form.find(".edit-body"));
    item.filter_form.find("#cancel-btn").on('click.task', function() {
        item.close_filter()
    });
    item.filter_form.find("#ok-btn").on('click.task', function() {
        item.apply_filter()
    });
}
```

See also

filters

create_filter_form

filter_form

filter_options

create_inputs

create_inputs(*container*, *options*)

domain: client

language: javascript

Description

Use `create_inputs` to create data-aware visual controls (inputs, checkboxes) for editing *fields* of the item.

This method is usually used in the `on_edit_form_created` events.

The following parameters are passed to the method:

- `container` - a JQuery object that will contain visual controls, if container length is 0 (no container), the method returns.
- `options` - options that specify how controls are displayed

The `options` parameter is an object that may have following attributes:

- `fields` - a list of field names. If specified, a visual control will be create for each field whose name is in this list, if not specified then the `fields` attribute of *edit_options* will be used (if defined), otherwise the layout, created in the *Edit Form Dialog* of Application builder, will be created
- `col_count` - the number of columns that will be created for visual controls, the default value is 1,

Before creating controls the application empties the container.

Example

```
function on_edit_form_created(item) {
    item.create_inputs(item.edit_form.find(".left-div"),
        {fields: ['firstname', 'lastname', 'company', 'support_rep_id']}
    );
}
```

See also

fields

Data-aware controls

create_edit_form

create_table

create_table(*container*, *options*)

domain: client

language: javascript

Description

Use `create_table` method to create a table that displays records of the item dataset.

The behaviour of the table is determined by the *paginate* attribute of the item.

When *paginate* is true, a paginator will be created, that will internally update the item dataset when the page is changed.

If the value of *paginate* is false, all available records of the item dataset will be displayed in the table.

The table, created by this method is data aware, when you change the dataset, these changes are immediately reflected in the table. So you can create a table and then call the *open* method.

The following parameters could be passed to the method:

- `container` - a JQuery object that will contain the table, if container length is 0 (no container), the method returns. Before creating the table the application empties the container.
- `options` - options that specify the way the table will be displayed. By default, the method uses the *table_options* that are set in the *View Form Dialog* in Application Builder when creating the table. The `options` attributes take precedence over the *table_options* attributes.

The `options` parameter is an object that may have the same attributes as *table_options*.

Examples

```
function on_edit_form_created(item) {
    item.edit_options.width = 1050;
    item.invoice_table.create_table(item.edit_form.find(".edit-detail"),
        {
            height: 400,
            editable_fields: ['quantity'],
            column_width: {"track": "60%"}
        });
}
```

See also

Forms

Data-aware controls

create_view_form

create_view_form(*container*)

domain: client

language: javascript

class *Item class*

Description

Use `create_view_form` method to create a view form of the item.

Then it searches for an item html template in the task *templates* attribute (See *Forms*) and creates a clone of the template and assigns it to the item *view_form* attribute.

If `container` parameter is specified the method empties it and appends the html template to it. Otherwise it creates a modal form and appends the html to it.

Triggers the *on_view_form_created* of the task.

Triggers the *on_view_form_created* of the group that owners the item, if one is defined for the group.

Triggers the *on_view_form_created* of the item, if one is defined.

Assigns the JQuery keyup and keydown events to the view_form so that when an JQuery event of the window occurs, the `on_view_form_keyup` and `on_view_form_keydown` events are triggered. They are triggered (if defined) in the

same way: first the task event handler, the group event handler and then the event handler of the item itself. After that the JQuery stopPropagation method of the event is called.

If the form is modal, shows it. Before showing the form the method applies options specified in the *view_options* attribute.

Triggers the *on_view_form_shown* of the task.

Triggers the *on_view_form_shown* of the group that owners the item, if one is defined for the group.

Triggers the *on_view_form_shown* of the item, if one is defined.

Forms

view_form

view_options

close_view_form

delete

delete()

domain: client

language: javascript

class *Item class*

Description

Deletes the active record and positions the cursor on the next record.

The `delete` method

- checks if item dataset is *active*, otherwise raises exception
- checks if item dataset is not empty, otherwise raises exception
- if item is a *detail* , checks if the master item is in edit or insert *state*, otherwise raises exception.
- if item is not a *detail* , checks if it is in browse *state*, otherwise raises exception.
- triggers the *on_before_delete* event handler if one is defined for the item.
- puts the item into delete *state*
- deletes the active record and positions the cursor on the next record
- puts the item into browse *state*
- triggers the *on_after_delete* event handler if one is defined for the item
- updates *data-aware controls*

See also

Modifying datasets

delete_record

delete_record()

domain: client

language: javascript

class *Item class*

Description

- calls the *can_delete* method to check whether a user have a right to delete a record, and if not, returns
- asks a user to confirm the operation
- calls the *delete* method to delete the record
- calls the *apply* method to write changes to the application database

See also

Modifying datasets

delete

disable_controls

disable_controls()

domain: client

language: javascript

class *Item class*

Description

Call `disable_controls` to "turn off" data-aware controls, so they will not refrect changes to the item dataset data.

Call *enable_controls* to re-enable data display in data-aware controls associated with the dataset and update values they display.

Example

```
function calculate(item) {
    var subtotal,
        tax,
        total,
        rec;
    if (!item.calculating) {
        item.calculating = true;
        try {
            subtotal = 0;
            tax = 0;
            total = 0;
            item.invoice_table.disable_controls();
            rec = item.invoice_table.rec_no;
```

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```
            try {
                item.invoice_table.each(function(d) {
                    subtotal += d.amount.value;
                    tax += d.tax.value;
                    total += d.total.value;
                });
            }
            finally {
                item.invoice_table.rec_no = rec;
                item.invoice_table.enable_controls();
            }
            item.subtotal.value = subtotal;
            item.tax.value = tax;
            item.total.value = total;
        }
        finally {
            item.calculating = false;
        }
    }
}
```

See also

Data-aware controls

enable_controls

disable_edit_form

disable_edit_form()

domain: client

language: javascript

class *Item class*

Description

Call `disable_edit_form` to prevent any user actions when *edit_form* is visible.

Call *enable_edit_form* to re-enable edit form.

Example

```
function on_edit_form_created(item) {
    var save_btn = item.add_edit_button('Save and continue');
    save_btn.click(function() {
        if (item.is_changing()) {
            item.disable_edit_form();
            item.post();
            item.apply(function(error){
                if (error) {
```

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```
                    item.alert_error(error);
                }
                item.edit();
                item.enable_edit_form();
            });
        }
    });
}
```

See also

enable_edit_form

each

each(*function(item)*)

domain: client

language: javascript

class *Item class*

Description

Use each method to iterate over records of an item dataset.

The each() method specifies a function to run for each record. You can break the each loop at a particular iteration by making the callback function return `false`.

Example

In the example below the **t** and **item.invoice_table** are pointers to the same object:

```
var subtotal = 0,
    tax = 0,
    total = 0;
item.invoice_table.each(function(t) {
    subtotal += t.amount.value;
    tax += t.tax.value;
    total += t.total.value;
});
```

See also

Navigating datasets

each_detail

each_detail(*function(detail)*)

domain: client

language: javascript

class *Item class*

Description

Use each method to iterate over details of an item.

The each_detail() method specifies a function to run for each detail of the item (the current detail is passed as a parameter).

You can break the each_detail loop at a particular iteration by making the callback function return `false`.

See also

Details

each_field

each_field(*function(field)*)

domain: client

language: javascript

class *Item class*

Description

Use each_field method to iterate over *fields* owned by an item.

The each_field() method specifies a function to run for each field (the current field is passed as a parameter).

You can break the each_field loop at a particular iteration by making the callback function return `false`.

Example

```
function customer_fields(customers) {
    customers.open({limit: 1});
    customers.each_field(function(f) {
        console.log(f.field_caption, f.display_text);
    });
}
```

Fields

Field class

each_filter

each_filter(*function(filter)*)

domain: client

language: javascript

class *Item class*

Description

Use each_filter method to iterate over *filters* owned by an item.

The each_filter() method specifies a function to run for each filter (the current filter is passed as a parameter).

You can break the each_filter loop at a particular iteration by making the callback function return `false`.

Example

```
function customer_filters(customers) {
    customers.each_filter(function(f) {
        console.log(f.filter_caption, f.value);
    });
}
```

Filters

Filter class

edit

edit()

domain: client

language: javascript

class *Item class*

Description

Enables editing of data in the dataset.

After a call to edit, an application can enable users to change data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to database using *apply* method.

The `edit` method

- checks if the item dataset is active, otherwise raises exception
- checks if the item dataset is not empty, otherwise raises exception
- checks whether the item dataset is already in edit state, and if so, returns
- if item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if item is not a *detail* , checks if it is in browse *state* , otherwise raises exception
- triggers the *on_before_edit* event handler if one is defined for the item
- puts the item into edit *state* , enabling the application or user to modify fields in the record
- triggers the *on_after_edit* event handler if one is defined for the item

See also

Modifying datasets

edit_record

edit_record(*container*)

domain: client

language: javascript

class *Item class*

Description

Puts the current record in edit *state* and creates an *edit_form* for visual editing of the record.

If `container` parameter (Jquery object of the DOM element) is specified the edit form html template is inserted in the container.

If `container` parameter is not specified but **Modeless form** attribute is set in the *Edit Form Dialog* or modeless attribute of the *edit_options* is set programmatically and task has the *forms_in_tabs* attribute set and the application doesn't have modal forms, the modeless edit form will be created in the new tab of the *forms_container* object of the task.

In all other cases the modal form will be created.

If editing is allowed in modeless mode, the user can edit several records at the same time. In this case the application calls the *copy* method to create a copy of the item. This copy will be used to edit the record. The application will call its *open* method to get the record from the server by using the value of the primary key field as a filter.

In case of modal editing the application executes *refresh_record* methods to get from the server the latest data of the record.

If a *record locking* is enabled for the item, along with receiving the record data from the server the application receives the version of the record.

Then the `edit_record` method

- calls the *can_edit* method to check whether a user have a right to edit the record,
- if the user have a right to edit the record, checks whether the item is in edit or insert *state* , and if not, calls the *edit* method to edit the record
- calls the *create_edit_form* method to create a form for visual editing of the record

See also

Forms

Modifying datasets

edit

can_create

Record locking

enable_controls

`enable_controls``()`

domain: client

language: javascript

class *Item class*

Description

Call `enable_controls` to permit data display in data-aware controls and and redraw them after a prior call to *disable_controls*.

See also

Data-aware controls

disable_controls.

enable_edit_form

enable_edit_form()

domain: client

language: javascript

class *Item class*

Description

Call `enable_edit_form` to re-enable edit form after prior call to *disable_edit_form*

Example

```
function on_edit_form_created(item) {
    var save_btn = item.add_edit_button('Save and continue');
    save_btn.click(function() {
        if (item.is_changing()) {
            item.disable_edit_form();
            item.post();
            item.apply(function(error){
                if (error) {
                    item.alert_error(error);
                }
                item.edit();
                item.enable_edit_form();
            });
        }
    });
}
```

See also

disable_edit_form

eof

eof()

domain: client

language: javascript

class *Item class*

Description

Test `eof` (end-of-file) to determine if the cursor is positioned at the last record in an item dataset. If eof returns `true`, the cursor is unequivocally on the last row in the dataset. eof returns `true` when an application:

- Opens an empty dataset.
- Calls an item's *last* method.
- Call an item's *next* method, and the method fails (because the cursor is already on the last row in the dataset).

eof returns false in all other cases.

> **Nota**
>
> If both eof and *bof* return `true`, the item dataset is empty.

See also

Dataset

Navigating datasets

field_by_name

`field_by_name`(*field_name*)

domain: client

language: javascript

class *Item class*

Description

Call `field_by_name` to retrieve field information for a field when only its name is known.

The `field_name` parameter is the name of an existing field.

`field_by_name` returns the field object for the specified field. If the specified field does not exist, `field_by_name` returns `null`.

filter_by_name

`filter_by_name`(*filter_name*)

domain: client

language: javascript

class *Item class*

Description

Call `filter_by_name` to retrieve filter information for a filter when only its name is known.

The `filter_name` parameter is the name of an existing filter.

`filter_by_name` returns the filter object for the specified filter. If the specified filter does not exist, `filter_by_name` returns `null`.

first

`first()`

domain: client

language: javascript

class *Item class*

Description

Call `first` to position the cursor on the first record in the item dataset and make it the active record. `First` posts any changes to the active record.

See also

Dataset

Navigating datasets

insert

`insert()`

domain: client

language: javascript

class *Item class*

Description

Inserts a new, empty record in the item dataset.

After a call to `insert`, an application can enable users to enter data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to the item database table, using *apply* method.

The `insert` method

- checks if item dataset is *active* , otherwise raises exception
- if the item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if the item is not a *detail* checks if it is in browse *state* , otherwise raises exception
- triggers the *on_before_append* event handler if one is defined for the item
- inserts a new, empty record in the item dataset.
- puts the item into insert *state*
- triggers the *on_after_append* event handler if one is defined for the item.
- updates *data-aware controls*

See also

Modifying datasets

insert_record

`insert_record`(*container*)

domain: client

language: javascript

class *Item class*

Description

Open a new, empty record at the beginning of the dataset and creates an *edit_form* for visual editing of the record.

If `container` parameter (Jquery object of the DOM element) is specified the edit form html template is inserted in the container.

If `container` parameter is not specified but **Modeless form** attribute is set in the *Edit Form Dialog* or modeless attribute of the *edit_options* is set programmatically and task has the *forms_in_tabs* attribute set and the application doesn't have modal forms, the modeless edit form will be created in the new tab of the *forms_container* object of the task.

In all other cases the modal form will be created.

If insertion of a record is allowed in modeless mode, the application calls the *copy* method to create a copy of the item. This copy will be used to insert the record.

The `insert_record` method

- calls the *can_create* method to check whether a user have a right to insert a record, and if not, returns
- checks whether the item is in edit or insert *state* , and if not, calls the *insert* method to insert a record
- calls the *create_edit_form* method to create a form for visual editing of the record

See also

Forms

Modifying datasets

insert

can_create

is_changing

`is_changing`()

domain: client

language: javascript

class *Item class*

Description

Checks if an item is in edit or insert state and returns `true` if it is.

An application calls *edit* to put an item into edit state and *append* or *insert* to put an item into insert state.

See also

Modifying datasets

is_edited

`is_edited`()

domain: client

language: javascript

class *Item class*

Description

Checks if an item is in edit state and returns `true` if it is.

An application calls *edit* to put an item into edit state.

See also

Modifying datasets

is_modified

`is_modified`()

domain: client

language: javascript

class *Item class*

Description

Checks if the current record of an item dataset has been modified during edit or insert operations. The method returns `false` after the *post* method is executed.

See also

Modifying datasets

is_new

`is_new`()

domain: client

language: javascript

class *Item class*

Description

Checks if an item is in insert state and returns `true` if it is.

An application calls *append* or *insert* methods to put an item into insert state.

See also

Modifying datasets

last

`last`()

domain: client

language: javascript

class *Item class*

Description

Call `last` to position the cursor on the last record in the item dataset and make it the active record.

See also

Dataset

Navigating datasets

locate

`locate`(*fields*, *values*)

domain: client

language: javascript

class *Item class*

Description

Implements a method for searching an item dataset for a specified record and makes that record the active record.

Arguments:

- `fields`: a field name, or list of field names
- `values`: a field value of list of field values

This method locates the record where the fields specified by `fields` parameter have the values specified by `values` parameter.

`Locate` returns true if a record is found that matches the specified criteria and the cursor repositioned to that record.

If a matching record was not found and the cursor is not repositioned, this method returns false.

See also

Dataset

Navigating datasets

next

next()

domain: client

language: javascript

class *Item class*

Description

Call `next` to position the cursor on the next record in the item dataset and make it the active record. Next posts any changes to the active record.

See also

Dataset

Navigating datasets

open

open(*options*, *callback*, *async*)

domain: client

language: javascript

class *Item class*

Description

Call `open` to sends a request to the server for obtaining an item dataset.

The `open` method can have the following parameters:

- `options` - an object that specifies the parameters of the request sent to the server
- `callback`: if the parameter is not present, the request is sent to the server synchronously, otherwise, the request is executed asynchronously and after the dataset is received, the callback is executed
- `async`: if its value is true, and callback parameter is missing, the request is executed asynchronously

The order of parameters doesn't matter.

The method initializes the item *fields*, formulates parameters of a request, based on the `options` and triggers the *on_before_open* event handler if one is defined for the item.

After that it sends the request to the server. If `callback` parameter-function is specified, the request is executed asynchronously, otherwise - synchronouslly.

The server, after recieving the request, checks if the corresponding item on the server (item of the *task tree* with the same ID attribute) has the *on_open* event handler. If so it executes this event handler and returns the result of the execution to the client, otherwise generates a SELECT SQL query, based on parameters of the request, executes this query and returns the result to the client.

The client, after receiving the result of the request, changes its dataset and sets *active* to true, the *item_state* to browse mode, goes to the first record of the dataset, triggers *on_after_open* and *on_filters_applied* event handlers (if they are defined for the item), and updates controls.

Then it calls `callback` function if it was specified.

Options

The `options` object parameter can have the following attributes:

- `expanded` - if the value of this attribute is true, the SELECT query, generated on the server, will have JOIN clauses to get lookup values of the *lookup fields* , otherwise no lookup values will be returned. The default value if `true`.
- `fields` - use this parameter to specify the WHERE clause of the SELECT query. This parameter is a list of field names. If it is omitted, the fields defined by the *set_fields* method will be used. If the *set_fields* method was not called before the `open` method execution, all the fields created by a developer will be used.
- `where` - use this parameter to specify how records will be filtered in the SQL query. This parameter is an object of key-value pairs, where keys are field names, that are followed, after double underscore, by a filtering symbols (see *Filtering records*). If this parameter is omitted, values defined by the *set_where* method will be used. If the *set_where* method was not called before the `open` method execution, and `where` parameter is omitted, then the values of *filters* defined for the item will be used to filter records.
- `order_by` - use `order_by` to specify sort order of the records. This parameter is a list of field names. If there is a sign '-' before the field name, then on this field records will be sorted in decreasing order. If this parameter is omitted, a list defined by the *set_order_by* method will be used.
- `offset` - use `offset` to specify the offset of the first row to return.
- `limit` - use `limit` to limit the output of a SQL query to the first so-many rows.
- `funcs` - this parameter can be a an object of key-value pairs, where key is a field name and value is function name that will be applied to the field in the SELECT Query
- `group_by` - use `group_by` to specify fields to group the result of the query by. This parameter must be a list of field names.
- `open_empty` - if this parameter is set to `true`, the application does not send a request to the server but just initializes an empty dataset. The default value if `false`.
- `params` - use the parameter to pass some user defined options to be used in the *on_open* event handler on the server. This parameter must be an object of key-value pairs

> **Nota**
>
> When the *paginate* attribute of the item is set to `true` and a table is created by the *create_table* method, the `limit` and `offset` parameters are set internally by the table depending on its row number and current page.

Examples

```
function get_customer_sales(task, customer_id) {
    var date1 = new Date(new Date().setYear(new Date().getFullYear() - 5)),
        date2 = new Date(),
        invoices = task.invoices.copy();

    invoices.open({
        fields: ['customer', 'invoicedate', 'total'],
        where: {customer: customer_id, invoicedate__ge: date1, invoicedate__le: date2},
        order_by: ['invoicedate']
    });
}
```

```
function get_customer_sales(task, customer_id) {
    var date1 = new Date(new Date().setYear(new Date().getFullYear() - 5)),
        date2 = new Date(),
        invoices = task.invoices.copy();

    invoices.set_fields(['customer', 'invoicedate', 'total']);
    invoices.set_where({customer: customer_id, invoicedate__ge: date1, invoicedate__le:␣
↪date2});
    invoices.set_order_by(['invoicedate']);
    invoices.open();
}
```

```
function get_sales(task) {
    var sales = task.invoices.copy();

    sales.open({
        fields: ['customer', 'id', 'total'],
        funcs: {'id': 'count', 'total': 'sum'},
        group_by: ['customer'],
        order_by: ['customer']
    });
}
```

post

post()

domain: client

language: javascript

class *Item class*

Description

Writes a modified record to the item dataset. Call post to save changes made to a record after *append*, *insert* or *edit* method was called.

The `post` method

- checks if an item is in edit or insert *state* , otherwise raises exception
- triggers the *on_before_post* event handler if one is defined for the item
- checks if a record is valid, if not raises exception
- If an item has *details* , post current record in details
- add changes to an item change log
- puts the item into browse *state*
- triggers the *on_after_post* event handler if one is defined for the item.

See also

Modifying datasets

prior

prior()

domain: client

language: javascript

class *Item class*

Description

Call `prior` to position the cursor on the previous record in the item dataset and make it the active record. last posts any changes to the active record.

See also

Dataset

Navigating datasets

record_count

record_count()

domain: client

language: javascript

class *Item class*

Description

Call `record_count` to get the total number of records owned by the item's dataset.

Example

```
item.open()
if (item.record_count()) {
    // some code
}
```

See also

Dataset

open

refresh_page

refresh_page(*callback*, *async*)

domain: client

language: javascript

class *Item class*

Description

Call `refresh_page` to send to the server a request to get current data of the current page and refresh existing visual controls.

The `refresh_page` method can have the following parameters:

- `callback`: if the parameter is not present, the request is sent to the server synchronously, otherwise, the request is executed asynchronously and after that the callback is executed
- `async`: if its value is true, and callback parameter is missing, the request is executed asynchronously

refresh_record

refresh_record(*options*, *callback*, *async*)

domain: client

language: javascript

class *Item class*

Description

Call `refresh_record` to send to the server a request to get current data of the current record and refresh existing visual controls.

The `refresh_record` method can have the following parameters:

- `callback`: if the parameter is not present, the request is sent to the server synchronously, otherwise, the request is executed asynchronously and after that the callback is executed
- `async`: if its value is true, and callback parameter is missing, the request is executed asynchronously
- `options` - an object that can have an attribute `details` - a list of item_names of details the item. These details are refreshed too.

The order of the parameters does not matter

search

search(*field_name*, *value*, *search_type*, *callback*)

domain: client

language: javascript

class *Item class*

Description

Call `search` to send to the server a request to generate and execute an sql query to get all records which satisfy the search condition for the field. The query will also satisfy currently set filters or where condition for an item. The existing visual controls will be update with the returned dataset.

Parameters:

- `field_name` - name of the field
- `value` - value of the condition
- `search_type` - type of search as a string, see Filter symbol in *Filtering records*
- `callback` - a callback function that will be executed after search is executed

See also

Dataset

Filtering records

select_records

select_records(*field_name*, *all_records*)

domain: client

language: javascript

class *Item class*

Description

Use the select_records method to add records to an item by selecting them from the lookup item of a field.

For example, this method is used in the Demo application to add tracks to an invoice by selecting them from Tracks catalog.

Parameters:

- The `field_name` parameter is a field name of a lookup field of the item
- If the `all_records` parameter is set to true, all selected records are added, otherwise the method omits existing records (they were selected earlier).

Example

```
function on_view_form_created(item) {
    var btn = item.add_view_button('Select', {type: 'primary'});
    btn.click(function() {
        item.select_records('track');
    });
}
```

set_fields

set_fields(*field_list*)

domain: client

language: javascript

class *Item class*

Description

Use the `set_fields` method to define and store internally the `fields` option that will be used by the *open* method, when its own `fields` option is not specified.

After the *open* method executes it clears this internally stored value.

The `field_list` parameter is a list of field names.

Example

The result of the execution of following code snippets will be the same:

```
item.open({fields: ['id', 'invoicedate']});
```

```
item.set_fields(['id', 'invoicedate']);
item.open();
```

See also

Dataset

open

set_order_by

set_order_by(*field_list*)

domain: client

language: javascript

class *Item class*

Description

Use the `set_order_by` method to define and store internally the `order_by` option that will be used by the *open* method, when its own `order_by` option is not specified. The *open* method clears internally stored parameter value.

The `field_list` parameter is a list of field names. If there is a sign '-' before a field name, then on this field records will be sorted in decreasing order.

Example

The result of the execution of following code snippets will be the same:

```
item.open({order_by: ['-invoicedate']});
```

```
item.set_order_by(['-invoicedate']);
item.open();
```

See also

Dataset

open

set_where

set_where(*where*)

domain: client

language: javascript

class *Item class*

Description

Use the `set_where` method to define and store internally the `where` option that will be used by the *open* method, when its own `where` option is not specified. The *open* method clears internally stored parameter value.

The `where` parameter is an object of key-value pairs, where keys are field names, that are followed, after double underscore, by a filtering symbols (see *Filtering records*).

Example

The result of the execution of following code snippets will be the same:

```
item.open({where: {id: 100}});
```

```
item.set_where({id: 100});
item.open();
```

See also

Dataset

open

show_history

show_history()

domain: client

language: javascript

class *Item class*

Description

Class show_history method of am item to open a dialog displaying history of changes of the selected record

See also

Saving the history of changes made by users

update_controls

`update_controls()`

domain: client

language: javascript

class *Item class*

Description

Call *update_controls* to tell associated controls to redraw to reflect current data.

See also

Data-aware controls

disable_controls

enable_controls

view

`view(`*container*`)`

domain: client

language: javascript

class *Item class*

Description

Use `view` method to create a view form of the item.

The method check if the javascript modules of the item and its owner are loaded, and if not (the **Dynamic JS modules loading** *parameter of the project* is set) then loads them.

If `container` parameter (Jquery object of the DOM element) is specified the view form html template is inserted in the container.

If the *init_tabs* method of the task is called for this container the tab is created for this form.

After that it calls the *create_view_form* method

Example

In the following code the view for of the **Tasks** journal is created in the on_page_loaded event handler:

```
function on_page_loaded(task) {

    $("#title").html(task.item_caption);
    if (task.safe_mode) {
        $("#user-info").text(task.user_info.role_name + ' ' + task.user_info.user_name);
        $('#log-out')
        .show()
        .click(function(e) {
            e.preventDefault();
            task.logout();
        });
    }

    task.init_tabs($("#content"));
    task.tasks.view($("#content"));

    $(window).on('resize', function() {
        resize(task);
    });
}
```

See also

Forms

view_form

view_options

create_view_form

close_view_form

Events

on_after_append

on_after_append(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application inserts or appends a record.

The `item` parameter is an item that triggered the event.

Write an on_after_append event handler to take specific action immediately after an application inserts or appends a record in an item. on_after_append is called by *insert* or *append* method.

See also

Modifying datasets

on_after_apply

on_after_apply(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application saves the change log to the project database.

The `item` parameter is an item that triggered the event.

Write an `on_after_apply` event handler to take specific action immediately after an application saves data changes to the project database.

On_after_apply is triggered by *apply* method.

See also

Modifying datasets

on_after_cancel

on_after_cancel(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application cancels modifications made to the item dataset.

The `item` parameter is an item that triggered the event.

Write an on_after_cancel event handler to take specific action immediately after an application cancels modifications made to the item dataset.

See also

Modifying datasets

on_after_delete

on_after_delete(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application deletes a record.

The `item` parameter is an item that triggered the event.

Write an on_after_delete event handler to take specific action immediately after an application deletes the active record in an item. on_after_delete is called by *delete* after it deletes the record, and repositions the cursor on the record prior to the one just deleted.

See also

Modifying datasets

on_after_edit

on_after_edit(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application starts editing a record.

The `item` parameter is an item that triggered the event.

Write an on_after_delete event handler to take specific action immediately after an application starts editing a record. on_after_edit is called by *edit*.

See also

Modifying datasets

on_after_open

on_after_open(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application receives a response from the server for obtaining a dataset.

The `item` parameter is an item that triggered the event.

Write an `on_after_open` event handler to take specific action immediately after an application obtains an dataset from the server. `on_after_open` is called by *open* method.

See also

Dataset

on_after_post

on_after_post(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application posts a record to the item dataset.

The `item` parameter is an item that triggered the event.

Write an on_after_post event handler to take specific action immediately after an application posts a record in the item dataset. on_after_post is called by *post* method.

See also

Modifying datasets

on_after_scroll

on_after_scroll(item)

domain: client

language: javascript

class *Item class*

Description

Occurs after an application scrolls from one record to another.

The `item` parameter is an item that triggered the event.

Write an on_after_scroll event handler to take specific action immediately after an application scrolls to another record as a result of a call to the *first*, *last*, *next*, *prior*, and *locate* methods. on_after_scroll is called after all other events triggered by these methods and any other methods that switch from record to record in the item dataset.

Example

The following code is used in the *Demo project* to asynchronously open **invoice_table** detail dataset after the **Invoice** journal record has changed:

```
var ScrollTimeOut;

function on_after_scroll(item) {
    clearTimeout(ScrollTimeOut);
    ScrollTimeOut = setTimeout(
        function() {
            item.invoice_table.open(function() {});
```

(continua na próxima página)

(continuação da página anterior)

```
        },
        100
    );
}
```

See also

Navigating datasets

on_before_scroll

on_before_append

on_before_append(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application inserts or appends a record.

The `item` parameter is an item that triggered the event.

Write an on_before_append event handler to take specific action immediately before an application inserts or appends a record in an item. on_before_append is called by *insert* or *append* method.

See also

Modifying datasets

on_before_apply

on_before_apply(item, params)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application saves dataset changes to the project database.

The `item` parameter is an item that triggered the event.

The `params` parameter is an object that has been passed to the *apply* method or an empty object if this object is undefined. This object is passed to the server and can be used in the *on_apply* event handler to perform some actions when saving changes to the database.

Write an on_before_apply event handler to take specific action immediately before an application saves the change log to the project database.

`on_before_apply` is triggered by *apply* method.

See also

Modifying datasets

on_before_cancel

on_before_cancel(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application cancels modifications made to the item dataset.

The `item` parameter is an item that triggered the event.

Write an on_before_cancel event handler to take specific action immediately before an application cancels modifications made to the item dataset.

See also

Modifying datasets

on_before_delete

on_before_delete(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application deletes a record.

The `item` parameter is an item that triggered the event.

Write an on_before_delete event handler to take specific action immediately before an application deletes the active record in an item. on_before_delete is called by *delete* method before it deletes the record.

See also

Modifying datasets

on_before_edit

on_before_edit(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application enables editing of the active record.

The `item` parameter an the item that triggered the event.

Write an on_before_edit event handler to take specific action immediately before an application enables editing of the active record in an item dataset. on_before_edit is called by *edit* method.

See also

Modifying datasets

on_before_field_changed

on_before_field_changed(field)

domain: client

language: javascript

class *Item class*

Description

Write an `on_before_field_changed` event handler to implement any special processing before field's data has been changed.

The `field` parameter is the field whose data is about to be changed. To get the item that owns the field, use the *owner* attribute of the field.

Before triggering this event handler the application assigns the new value that is about to be set to the `new_value` attribute to of the field. You can change the value of this attribute. This value will be used to change field's data.

Example

```
function on_before_field_changed(field) {
    if (field.field_name === 'quantity' && field.new_value < 0) {
        field.new_value = 0;
    }
}
```

See also

Fields

value

on_before_field_changed

on_before_open

on_before_open(item, params)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application sends a request to the server for obtaining a dataset.

The `item` parameter is an item that triggered the event.

The `params` parameter is an object that has been passed to the *open* method or an empty object if this object is undefined. This object is passed to the server and can be used in the *on_open* event handler to perform some actions when obtaining a dataset

Write an on_before_open event handler to take specific action immediately before an application obtains an dataset from the server.

on_before_open is called by *open* method.

See also

Dataset

on_before_post

on_before_post(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application posts a record to the item dataset.

The `item` parameter is an item that triggered the event.

Write an on_before_post event handler to take specific action immediately before an application posts a record in the item dataset. on_before_post is called by *post* method.

See also

Modifying datasets

on_before_scroll

on_before_scroll(item)

domain: client

language: javascript

class *Item class*

Description

Occurs before an application scrolls from one record to another.

The `item` parameter is an item that triggered the event.

Write an on_before_scroll event handler to take specific action immediately before an application scrolls to another record as a result of a call to the *first*, *last*, *next*, *prior*, and *locate* methods. on_before_scroll is called before all other events triggered by these methods and any other methods that switch from record to record in the item dataset.

See also

Navigating datasets

on_after_scroll

on_detail_changed

on_detail_changed(item, detail)

domain: client

language: javascript

class *Item class*

Description

Occurs after changes to detail record has been posted. It uses the clearTimeout and setTimeout Javascript functions so if records have been changed in a cycle it is triggered only when last record change occurs.

The `item` parameter is an item that triggered the event. The `detail` parameter is a detail that has been changed.

Write an on_detail_changed event handler to calculate, by using *calc_summary* method, sums for fields of a detail and save these values in fields of its master.

Example

```
function on_detail_changed(item, detail) {
    var fields;
    if (detail.item_name === 'invoice_table') {
        fields = [
            {"total": "total"},
            {"tax": "tax"},
            {"subtotal": "amount"}
        ];
        item.calc_summary(detail, fields);
    }
}
```

See also

Details calc_summary

on_edit_form_close_query

on_edit_form_close_query(item)

domain: client

language: javascript

class *Item class*

Description

The `on_edit_form_close_query` event is triggered by the *close_edit_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

create_edit_form

edit_form

close_edit_form

on_edit_form_created

on_edit_form_created(item)

domain: client

language: javascript

class *Item class*

Description

The **on_edit_form_created** event is triggered by the *create_edit_form* method when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

See also

Forms

create_edit_form

edit_form

on_edit_form_keydown

on_edit_form_keydown(item, event)

domain: client

language: javascript

class *Item class*

Description

The `on_edit_form_keydown` event is triggered when the keydown event occurs for the *edit form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

edit_form

on_edit_form_keyup

on_edit_form_keyup(item, event)

domain: client

language: javascript

class *Item class*

Description

The `on_edit_form_keyup` event is triggered when the keyup event occurs for the *edit form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

create_edit_form

edit_form

on_edit_form_shown

on_edit_form_shown(item)

domain: client

language: javascript

class *Item class*

Description

The **on_edit_form_shown** event is triggered by the *create_edit_form* method when the form has been shown.

The `item` parameter is the item that triggered the event.

See also

Forms

create_edit_form

edit_form

on_field_changed

on_field_changed(field, lookup_item)

domain: client

language: javascript

class *Item class*

Description

Write an `on_field_changed` event handler to respond to any changes in the field's data.

The `field` parameter is the field whose data has been changed. To get the item that owns the field, use the *owner* attribute of the field.

The `lookup_item` parameter is not `undefined` when the field is a *lookup field* and a change has occurred when a user selected a record from a lookup item dataset.

Example

```
function on_field_changed(field, lookup_item) {
    var item = field.owner;
    if (field.field_name === 'quantity' || field.field_name === 'unitprice') {
        item.owner.calc_total(item);
    }
    else if (field.field_name === 'track' && lookup_item) {
        item.quantity.value = 1;
        item.unitprice.value = lookup_item.unitprice.value;
    }
}
```

See also

Fields

value

on_before_field_changed

on_field_get_html

on_field_get_html(field)

domain: client

language: javascript

class *Item class*

Description

Write an `on_field_get_html` event handler to specify the html that will be inserted in the table cell for the field.

If the event handler does not return a value, the application checks if the *on_field_get_text* event handler is defined and it returns a value, otherwise the *display_text* property value will be used to display the field value in the cell.

The `field` parameter is the field whose *display_text* is processed. To get the item that owns the field, use the *owner* attribute of the field.

Example

```
function on_field_get_html(field) {
    if (field.field_name === 'total') {
        if (field.value > 10) {
            return '<strong>' + field.display_text + '</strong>';
        }
    }
}
```

See also

Fields

on_field_get_text

on_field_select_value

on_field_select_value(field, lookup_item)

domain: client

language: javascript

class *Item class*

Description

When user clicks on the button to the right of the field input or uses typeahead, the application creates a copy of the lookup item of the field and triggers `on_field_select_value` event. Use `on_field_select_value` to specify fields that will be displayed, set up filters for the lookup item, before it will be opened.

The `field` parameter is the field whose data will be selected.

The `lookup_item` parameter is a copy of the lookup item of the field

Example

```
function on_field_select_value(field, lookup_item) {
    if (field.field_name === 'customer') {
        lookup_item.set_where({lastname__startwith: 'B'});
        lookup_item.view_options.fields = ['firstname', 'lastname', 'address', 'phone'];
    }
}
```

See also

Fields

Lookup fields

on_field_validate

on_field_validate(field)

domain: client

language: javascript

class *Item class*

Description

Write an `on_field_validate` event handler to validate changes made to the field data.

The `field` parameter is the field whose data has been changed. To get the item that owns the field, use the *owner* attribute of the field.

The event handler must return a string if the field value is invalid. When an event handler returns a string, the application throws an exception.

The event is triggered when the *post* method is called or when the user leaves the input used to edit the field value.

Example

```
function on_field_validate(field) {
    if (field.field_name === 'sum' && field.value > 10000000) {
            return 'The sum is too big.';
    }
}
```

See also

Fields

value

How to validate field value

on_filter_changed

on_filter_changed(filter, lookup_item)

domain: client

language: javascript

class *Item class*

Description

Write an `on_filter_changed` event handler to respond to any changes in the filter's data.

The `filter` parameter is the filter whose data has been changed. To get the item that owns the filter, use the *owner* attribute of the filter.

See also

Filters

value

on_filter_form_close_query

on_filter_form_close_query(item)

domain: client

language: javascript

Description

The `on_filter_form_close_query` event is triggered by the *close_filter_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

create_filter_form

filter_form

close_filter_form

on_filter_form_created

on_filter_form_created(item)

The item parameter is the item that triggered the event.

domain: client

language: javascript

Description

The **on_filter_form_created** event is triggered by the *create_filter_form* method when the form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

See also

Forms

create_filter_form

filter_form

on_filter_form_shown

on_filter_form_shown(item)

The item parameter is the item that triggered the event.

domain: client

language: javascript

Description

The **on_filter_form_shown** event is triggered by the *create_filter_form* method when the form has been shown.

The `item` parameter is the item that triggered the event.

See also

Forms

create_filter_form

filter_form

on_filter_record

on_filter_record(item)

The item parameter is the item that triggered the event.

domain: client

language: javascript

Description

Use an `on_filter_record` event to filter dataset records locally. It is triggered when the cursor moves to another record and *Filtered* property is set to `true`

Write an `on_filter_record` event handler to specify for each record in a dataset whether it should be visible to the application. To indicate that a record passes the filter condition, the `on_filter_record` event handler must return true.

The `item` parameter is the item that triggered the event.

Example

```
function on_filter_record(item) {
    if (item.type.value === 2) {
        return true;
    }
}

function enable_filtering(item) {
    item.filtered = true;
}

function disable_filtering(item) {
    item.filtered = false;
}
```

See also

Filtered

on_filters_applied

on_filters_applied(item)

domain: client

language: javascript

class *Item class*

Description

Write an `on_filters_applied` event handler to make special processing when filters have been applied to the item dataset.

See also

Filters

on_field_get_text

on_field_get_text(field)

domain: client

language: javascript

class *Item class*

Description

Write an `on_field_get_text` event handler to perform custom processing for the *display_text* property. If the event handler does not return a value, the application uses the *display_text* property value to display the field value in the data-aware controls, otherwise the returned value will be used.

The `field` parameter is the field whose *display_text* is processed. To get the item that owns the field, use the *owner* attribute of the field.

Example

```
function on_field_get_text(field) {
    if (field.field_name === 'customer') {
        return field.owner.firstname.lookup_text + ' ' + field.lookup_text;
    }
}
```

See also

Fields

on_view_form_close_query

on_view_form_close_query(item)

domain: client

language: javascript

class *Item class*

Description

The `on_view_form_close_query` event is triggered by the *close_view_form* method of the item.

The `item` parameter is the item that triggered the event.

See also

Forms

view

view_form

close_view_form

on_view_form_created

on_view_form_created(item)

domain: client

language: javascript

class *Item class*

Description

The **on_view_form_created** event is triggered by the *view* method when form has been created but not shown yet.

The `item` parameter is the item that triggered the event.

See also

Forms

view

view_form

on_view_form_keydown

on_view_form_keydown(item, event)

domain: client

language: javascript

class *Item class*

Description

The `on_view_form_keydown` event is triggered when the keydown event occurs for the *view form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

view_form

on_view_form_keyup

on_view_form_keyup(item, event)

domain: client

language: javascript

class *Item class*

Description

The `on_view_form_keyup` event is triggered when the keyup event occurs for the *view form* of the item.

The `item` parameter is the item that triggered the event.

The `event` is JQuery event object.

See also

Forms

view

view_form

on_view_form_shown

on_view_form_shown(item)

domain: client

language: javascript

class *Item class*

Description

The **on_view_form_shown** event is triggered by the *view* method of the item when the form has been shown.

The **item** parameter is the item that triggered the event.

See also

Forms

view

view_form

7.1.5 Detail class

`class Detail()`

domain: client

language: javascript

Detail class inherits attributes, methods and events of *Item class*

Attributes

master

`master`

domain: client

language: javascript

class *Detail class*

Description

Use `master` attribute to get reference to the master of the detail.

See also

Details

7.1.6 Reports class

`class Reports()`

domain: client

language: javascript

Reports class is used to create the group object of the *task tree* that owns the reports of a project.

Below the events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Events

on_before_print_report

on_before_print_report(item)

domain: client

language: javascript

class *Reports class*

Description

The `on_before_print_report` event is triggered by the *process_report* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

process_report

on_open_report

on_open_report(report)

domain: client

language: javascript

class *Reports class*

Description

The `on_open_report` event is triggered by the *process_report* method.

The `report` parameter is the report that triggered the event.

See also

Client-side report programming

process_report

on_param_form_close_query

on_param_form_close_query(item)

domain: client

language: javascript

class *Reports class*

Description

The `on_param_form_close_query` event is triggered by the *close_param_form* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

on_param_form_created

on_param_form_created(item)

domain: client

language: javascript

class *Reports class*

Description

The `on_param_form_created` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

on_param_form_shown

on_param_form_shown(item)

domain: client

language: javascript

class *Reports class*

Description

The `on_param_form_shown` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

See also

Forms

Client-side report programming

print

create_param_form

7.1.7 Report class

`class Report()`

domain: client

language: javascript

Report class inherits

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes

extension

extension

domain: client

language: javascript

class *Report class*

Description

Use `extension` attribute to specify a report type. The server, based on the report template, first generates **ods** file. And if report extension is other that **ods** performs convertion using the LibreOffice.

The attribute value can be any extension that LibreOffice supports convertion to.

Example

```
function on_before_print_report(report) {
    report.extension = 'html';
}
```

See also

Client-side report programming

Server-side report programming

print

create_param_form

on_before_print_report

param_form

param_form

domain: client

language: javascript

class *Report class*

Description

Use `param_form` attribute to get access to a Jquery object representing the param form of the report.

It is created by the *create_param_form* method, that, usually, is called by then *print* method.

The *close_param_form* method sets the `param_form` value to undefined.

Example

```
function on_param_form_created(report) {
    report.create_param_inputs(report.param_form.find(".edit-body"));
    report.param_form.find("#cancel-btn").on('click.task', function() {
        report.close_param_form();
    });
    report.param_form.find("#ok-btn").on('click.task', function() {
        report.process_report()
    });
}
```

See also

Forms

print

create_param_form

close_param_form

param_options

param_options

domain: client

language: javascript

class *Report class*

Description

Use the `param_options` attribute to specify parameters of the modal param form.

`param_options` is an object that has the following attributes:

- `width` - the width of the modal form, the default value is 560 px,
- `title` - the title of the modal form, the default value is the value of a *report_caption* attribute,
- `close_button` - if true, the close button will be created in the upper-right corner of the form, the default value is true,
- `close_caption` - if true and close_button is true, will display 'Close - [Esc]' near the button
- `close_on_escape` - if true, pressing on the Escape key will trigger the *close_param_form* method.
- `close_focusout` - if true, the *close_param_form* method will be called when a form loses focus
- `template_class` - if specified, the div with this class will be searched in the task *templates* attribute and used as a form html template when creating a form

Example

```
function on_param_form_created(report) {
    report.param_options.width = 800;
    report.param_options.close_button = false;
    report.param_options.close_on_escape = false;
}
```

See also

Forms

print

create_param_form

close_param_form

Methods

close_param_form

`close_param_form()`

domain: client

language: javascript

class *Report class*

Description

Use `close_param_form` method to close the param form of the report.

The `close_param_form` method triggers the *on_param_form_close_query* event handler of the report, if one is defined. If the event handler is defined and

- returns true - the form is destroyed, the report's *param_form* attribute is set to undefined and the methods exits
- return false - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_param_form_close_query* of the group that owners the report, if one is defined for the group. If this event handler is defined and

- returns true - the form is destroyed, the report's *param_form* attribute is set to undefined and the methods exits
- return false - the operation is aborted and the methods exits,

If it don't return a value (undefined) the method triggers the *on_param_form_close_query* of the task. If this event handler is defined and

- returns true - the form is destroyed, the report's *param_form* attribute is set to undefined and the methods exits
- return false - the operation is aborted and the methods exits,

If no event handler is defined or none of these event handlers return false, the form is destroyed and the report's *param_form* attribute is set to undefined.

See also

Forms

Client-side report programming

print

create_param_form

`create_param_form()`

domain: client

language: javascript

class *Report class*

Description

The `create_param_form` method is called by the *print* method to create a form to set report parameters before sending a request to the server by the *process_report* method.

The method checks if javascript modules of the report and its owner are loaded, and if not (the *Dynamic JS modules loading parameter* is set) then loads them.

Then it searches for the report html template in the task *templates* attribute (See *Forms*) and creates a clone of the template and assigns it to the report *param_form* attribute.

Creates a form and appends the html to it.

Triggers the *on_param_form_created* of the task.

Triggers the *on_param_form_created* of the report group, if one is defined.

Triggers the *on_param_form_created* of the report, if one is defined.

Shows the form. Before showing the form the method applies options specified in the *param_options* attribute.

Triggers the *on_param_form_shown* of the task.

Triggers the *on_param_form_created* of the report group, if one is defined.

Triggers the *on_param_form_shown* of the report, if one is defined.

See also

Forms

Client-side report programming

print

create_param_inputs

`create_param_inputs(`*container*, *options*`)`

domain: client

language: javascript

Description

Use `create_param_inputs` to create data-aware visual controls (inputs, checkboxes) for editing of report parameters.

This method is usually used in `on_param_form_created` events triggered by *create_param_form* method, that, usually, is called by then *print* method.

The following parameters are passed to the method:

- `container` - a JQuery object that will contain visual controls, if container length is 0 (no container), the method returns.
- `options` - options that specify how controls are displayed

The `options` parameter is an object that may have following attributes:

- `params` - a list of param names. If specified, a visual control will be created for each param whose name is in this list, if not specified (the default) then control will be created for all visible params specified in the Application builder
- `col_count` - the number of columns that will be created for visual controls, the default value is 1
- `label_on_top`: the default value is false. If this value is false, the labels are placed to the left of controls, otherwise the are created above the controls
- `tabindex` - if tabindex is specified, it will the tabindex of the first visual control, tabindex of all subsequent controls will be increased by 1.
- `autocomplete` - the default value is false. If this attribute is set to true, the autocomplete attribute of controls is set to "on"

Before creating controls the application empties the container.

Example

```
function on_param_form_created(item) {
    item.create_param_inputs(item.param_form.find(".edit-body"));
    item.param_form.find("#cancel-btn").on('click.task', function() {
        item.close_param_form()
    });
    item.param_form.find("#ok-btn").on('click.task', function() {
        item.process_report()
    });
}
```

See also

create_param_form

param_form

param_options

print

print(*create_form*)

domain: client

language: javascript

class *Report class*

Description

Use `print` to print the report.

If `create_form` parameter is omitted or equals true, the method calls the *create_param_form* method to create a form based on the html template defined in the index.html file.

If `create_form` parameter is set to `false` and the report has no visible parameters, it calls *process_report* to send request to server to generate the report, otherwise it calls *create_param_form* method.

See also

Forms

Report parameters

Client-side report programming

create_param_form

process_report

process_report

process_report()

domain: client

language: javascript

class *Report class*

Description

The *process_report* method sends the report to the server to generate its content and accepts the report file that the server returns to the client and opens or saves it.

It is called by the *print* method directly, if its `create_form` parameter equals false and there are no visible parameters. If there are visible parameters, the *print* method creates a form to specify parameter values and the form should call it (for example, by some button onclick event).

The checks if parameter values are valid and the triggers the following events:

- *on_before_print_report* event handler of the report group
- *on_before_print_report* event handler of the report

In this event handlers developer can define some common (report group event handler) or specific (report event handler) attributes of the report.

After that the *process_report* method sends asynchronous request to the server to generate a report content. (see *Server-side report programming*).

The server returns to the method an url to a file with the generated report content.

The method then checks if the *on_open_report* event handler of the report group is defined. If this events handler if defined calls it, otherwise checks the *on_open_report* of the report. If it is defined then calls it.

If none of this events are defined, it (depending on the report *extension* attribute) opens the report in the browser or saves it to disc.

Example

In the following event handler, defined in the client module of the **invoice** report of the Demo application, the value of the report **id** parameter is set:

```
function on_before_print_report(report) {
    report.id.value = report.task.invoices.id.value;
}
```

Events

on_before_print_report

on_before_print_report(report)

domain: client

language: javascript

class *Report class*

Description

The `on_before_print_report` event is triggered by the *process_report* method. Use `on_before_print_report` to take specific actions before sending request to the server to generate the report.

The `report` parameter is the report that triggered the event.

See also

Client-side report programming

process_report

on_open_report

on_open_report(report)

domain: client

language: javascript

class *Report class*

Description

The `on_open_report` event is triggered by the *process_report* method.

The `report` parameter is the report that triggered the event.

See also

Client-side report programming

process_report

on_param_form_close_query

on_param_form_close_query(report)

domain: client

language: javascript

class *Report class*

Description

The `on_param_form_close_query` event is triggered by the *close_param_form* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

close_param_form

on_param_form_created

on_param_form_created(report)

domain: client

language: javascript

class *Report class*

Description

The `on_param_form_created` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

on_param_form_shown

on_param_form_shown(report)

domain: client

language: javascript

class *Report class*

Description

The `on_param_form_shown` event is triggered by the *create_param_form* method, that, usually, is called by then *print* method.

The `report` parameter is the report that triggered the event.

See also

Forms

Client-side report programming

print

create_param_form

7.1.8 Field class

class Field()

domain: client

language: javascript

Attributes and properties

display_text

display_text

domain: client

language: javascript

class *Field class*

Description

Represents the field's value as a string.

Display_text property is a read-only string representation of a field's value to display in a data-aware control. If an *on_get_field_text* event handler is assigned, **display_text** is the value returned by this event handler. Otherwise, display_text is the value of the *lookup_text* property for *lookup fields* , and *text* property, converted according to the *language locale* settings, for other fields.

Display_text is the string representation of the field's value property when it is not being edited. When the field is being edited, the *text* property is used.

Example

```
function on_get_field_text(field) {
    if (field.field_name === 'customer') {
        return field.owner.firstname.lookup_text + ' ' + field.lookup_text;
    }
}
```

See also

Fields

Lookup fields

on_get_field_text

text

lookup_text

field_caption

`field_caption`

domain: client

language: javascript

class *Field class*

Description

Field_caption attribute specifies the name of the field that appears to users.

See also

Dataset

Fields

field_name

field_mask

`field_mask`

domain: client

language: javascript

class *Field class*

Description

You can use **field_mask** attribute to specify the name of the field that appears to

The mask allows a user to more easily enter fixed width input where you would like them to enter the data in a certain format (dates,phone numbers, etc).

A mask is defined by a format made up of mask literals and mask definitions. Any character not in the definitions list below is considered a mask literal. Mask literals will be automatically entered for the user as they type and will not be able to be removed by the user.The following mask definitions are predefined:

- a - Represents an alpha character (A-Z,a-z)
- 9 - Represents a numeric character (0-9)
- * - Represents an alphanumeric character (A-Z,a-z,0-9)

Example

```
function on_edit_form_created(item) {
    item.phone.field_mask = '999-99-99';
}
```

field_name

`field_name`

domain: client

language: javascript

class *Field class*

Description

Specifies the name of the field as referenced in code. Use **field_name** to refer to the field in code.

See also

Dataset

Fields

field_caption

field_size

`field_size`

domain: client

language: javascript

class *Field class*

Description

Identifies the size of the text field object.

See also

Dataset

Fields

field_type

`field_type`

domain: client

language: javascript

class *Field class*

Description

Identifies the data type of the field object.

Use the **field_type** attribute to learn the type of the data the field contains. It is one of the following values:

- “text”,
- “integer”,

- “float”,
- “currency”,
- “date”,
- “datetime”,
- “boolean”,
- “blob”

See also

Dataset

Fields

lookup_text

lookup_text

domain: client

language: javascript

class *Field class*

Description

Use **lookup_text** property to get the lookup value of the *lookup field* converted to string.

If the field is *lookup field* gives its lookup text, otherwise gives the value of the *text* property

See also

Fields

Lookup fields

lookup_value

text

lookup_type

lookup_type

domain: client

language: javascript

class *Field class*

Description

For *lookup fields* identifies the type of the *lookup_value*, otherwise returns the value of *field_type* attribute.

See also

Dataset

Fields

lookup_value

lookup_value

domain: client

language: javascript

class *Field class*

Description

Use **lookup_value** property to get the lookup value of the *lookup field*

If the field is *lookup field* gives its lookup value, otherwise gives the value of the *value* property

See also

Fields

Lookup fields

lookup_value

lookup_text

owner

owner

domain: client

language: javascript

class *Field class*

Description

Identifies the item to which a field object belongs.

Check the value of the owner attribute to determine the item that uses the field object to represent one of its fields.

Example

```
function calculate(item) {

}

function on_field_changed(field, lookup_item) {
    if (field.field_name === 'taxrate') {
        calculate(field.owner);
    }
}
```

See also

Dataset

Fields

raw_value

raw_value

domain: client

language: javascript

class *Field class*

Description

Represents the data in a field object.

Use **raw_value** read only property to read data directly from the item dataset. Other properties such as *value* and *text* use convesion. So the *value* property converts the **null** value to **0** for the numeric fields.

See also

Fields

value

text

Field read_only

read_only

domain: client

language: javascript

class *Field class*

Description

Determines whether the field can be modified in data-aware controls.

Set **read_only** to **true** to prevent a field from being modified in data-aware controls.

See also

Fields

required

required

required

domain: client

language: javascript

class *Field class*

Description

Specifies whether a not empty value for a field is required.

Use **required** to find out if a field requires a value or if the field can be blank. When **required** property is set to true, trying to post a null value will cause an exception to be raised.

See also

Fields

read_only

text

text

domain: client

language: javascript

class *Field class*

Description

Use **text** property to get or set the text value of the field.

Getting text property value

Gets the value of the *value* property and converts it to text.

Setting text property value

Converts the text to the type of the field and assigns its *value* property to this value

See also

Fields

Lookup fields

lookup_value

text

lookup_text

value

value

domain: client

language: javascript

class *Field class*

Description

Use **value** property to get or set the value of the field.

Getting value

When field data is **null**, the field converts it to **0**, if the field_type is "integer", "float" or "currency", or to empty string if field_type is "text".

For *lookup fields* the value of this property is an integer that is the value of the id field of the corresponding record in the lookup item. To get lookup value of the field use the *lookup_value* property.

Setting value

When a new value is assigned, the field checks if the current value is not equal to the new one. If so it

- sets its **new_value** attribute to this value,
- triggers the *on_before_field_changed* event if one is defined for the field,
- changes the field data to the **new_value** attribute and sets it to **null**,
- mark item as modified, so the *is_modified* method will return **true**
- triggers the *on_field_changed* event if one is defined for the field
- updates data-aware controls

Example

```
function calc_total(item) {
    item.amount.value = item.round(item.quantity.value * item.unitprice.value, 2);
    item.tax.value = item.round(item.amount.value * item.owner.taxrate.value / 100, 2);
    item.total.value = item.amount.value + item.tax.value;
}
```

See also

Fields

Lookup fields

lookup_value

text

lookup_text

Methods

download

download()

domain: client

language: javascript

class *Field class*

Description

Call `download` for fields of type FILE to download the file.

Example

```
function on_view_form_created(item) {
  item.add_view_button('Download').click(function() {
     item.attachment.download();
  });
}
```

open

open()

domain: client

language: javascript

class *Field class*

Description

Call `open` for fields of type FILE to open the url to the file by using `window.open`.

Example

```
function on_view_form_created(item) {
  item.add_view_button('Open').click(function() {
     item.attachment.open();
  });
}
```

7.1.9 Filter class

class Filter()

domain: client

language: javascript

Attributes and properties

filter_caption

filter_caption

domain: client

language: javascript

class *Filter class*

Description

Filter_caption attribute specifies the name of the filter that appears to users.

See also

Filters

filter_name

Dataset

filter_name

`filter_name`

domain: client

language: javascript

class *Filter class*

Description

Specifies the name of the filter as referenced in code. Use **filter_name** to refer to the field in code.

See also

Filters

filter_caption

Dataset

owner

`owner`

domain: client

language: javascript

Filter class

Description

Identifies the item to which a filter object belongs.

Check the value of the owner attribute to determine the item that uses the filter object to represent one of its filters.

value

`value`

domain: client

language: javascript

class *Filter class*

Description

Use **value** property to get or set the value of the filter.

Example

```
function on_view_form_created(item) {
    item.filters.invoicedate1.value = new Date(new Date().setYear(new Date().
↪getFullYear() - 1));
}
```

See also

Filters

visible

Dataset

visible

visible

domain: client

language: javascript

class *Filter class*

Description

If the value of this property is **true** the input control for this filter will be created by the *create_filter_inputs* method, if the **filters** option in not specified.

See also

Filters

value

Dataset

7.2 Server side (python) class reference

All objects of the framework represent a *task tree*. Bellow is classes for each kind of task tree objects:

7.2.1 App class

class App

domain: server

language: python

App class is used to create a WSGI application

Below the attributes of the class are listed.

admin

admin

domain: server

language: python

class: *App class*

Description

Returns a reference to the Application builder task tree

See also

Workflow

Task tree

task

task

domain: server

language: python

class: *App class*

Description

Returns a reference to the Project task tree

See also

Workflow

Task tree

7.2.2 AbstractItem class

class AbstractItem

domain: server

language: python

AbstractItem class is the ancestor for all item objects of the *task tree*

Below the attributes and methods of the class are listed.

Attributes

environ

environ

domain: server

language: python

class *AbstractItem class*

Description

Specifies the WSGI environment dictionary of the current request from the client.

See also

Server side programming

session

ID

ID

domain: server

language: python

class *AbstractItem class*

Description

The ID attribute is the unique in the framework id of the item

The ID attribute is most useful when referring to the item by number rather than name. It is also used internally.

See also

Task tree

item_caption

item_caption

domain: server

language: python

class *AbstractItem class*

Description

Specifies the name of the item that appears to users

See also

Task tree

item_name

item_name

domain: server

language: python

class *AbstractItem class*

Description

Specifies the name of the item as referenced in code.

Use `item_name` to refer to the item in code.

See also

Task tree

item_type

item_type

domain: server

language: python

class: *AbstractItem class*

Description

Specifies the type of the item.

Use the `item_type` attribute to get the type of the item. It can have one of the following values

- "task",
- "items",
- "details",
- "reports",
- "item",
- "detail_item",
- "report",
- "detail"

See also

Task tree

items

`items`

domain: server

language: python

class *AbstractItem class*

Description

Lists all items owned by the item.

Use `items` to access any of the item owned by this object.

See also

Task tree

owner

Indicates the item that owns this item.

`owner`

domain: server

language: python

class *AbstractItem class*

Description

Use `owner` to find the owner of an item.

See also

Task tree

session

`session`

domain: server

language: python

class *AbstractItem class*

Description

Use the `session` property to get access to session object of the current request from the client.

The session is a dictionary that has the following items:

- `ip` - ip address of the user
- `user_info` - dictionary containing information about the user
  - `user_id` - id identifying the user
  - `user_name` - name of the user

- `role_id` - id of user role
- `role_name` - name of user role

Example

```
def on_open(item, params):
    user_id = item.session['user_info']['user_id']
    if user_id:
        params['__filters'].append(['user_id', item.task.consts.FILTER_EQ, user_id])

def on_apply(item, delta, params):
    user_id = item.session['user_info']['user_id']
    if user_id:
      for d in delta:
          d.edit()
          d.user_id.value = user_id
          d.post()
```

See also

Server side programming

environ

task

task

domain: server

language: python

class *AbstractItem class*

Description

Indicates the root of the *task tree* that owns this item.

Use `task` attribute to find the root of the *task tree* of which the item is a member.

See also

Task tree

Mehods

can_view

can_view(*self*)

domain: server

language: python

class *AbstractItem class*

Description

Use the `can_view` method to determine whether a user of the current session can view records if a data item or print a report.

See also

Roles

session

can_create

can_edit

can_delete

item_by_ID

`item_by_ID`(*self*, *ID*)

domain: server

language: python

class *AbstractItem class*

Description

`item_by_ID` searches among all items of the project *task tree*, starting with the current item, for an item whose *ID* attribute is equal to the `ID` parameter.

See also

Task tree

7.2.3 Task class

`class Task`

domain: server

language: python

Task class is used to create the root of the *Task tree* of the project.

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes

app

`app`

domain: server

language: python

class: *Task class*

Description

Returns a reference to WSGI *application object*.

The Framework uses Werkzeug WSGI Utility Library.

See also

Workflow

work_dir

work_dir

domain: server

language: python

class: *Task class*

Description

Returns the real absolute path to the project directory.

See also

Workflow

Mehods

check_password_hash

check_password_hash(*self*, *pwhash*, *password*)

domain: server

language: python

class *Task class*

Description

Use `check_password_hash` to check a password against a given salted and hashed password value.

The method is wrapper over Werkzeug **check_password_hash** function: https://werkzeug.palletsprojects.com/en/0.15.x/utils/

Example

```
def on_login(task, login, password, ip, session_uuid):
  users = task.users.copy(handlers=False)
  users.set_where(login=login)
  users.open()
  for u in users:
      if task.check_password_hash(u.password_hash.value, password):
          return {
              'user_id': users.id.value,
```

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```
            'user_name': users.name.value,
            'role_id': users.role.value,
            'role_name': users.role.display_text
        }
```

See also

generate_password_hash

connect

connect(*self*)

domain: server

language: python

class *Task class*

Description

Use `connect` to procure a connection from the SQLAlchemy connection pool.

The return value of this method is a DBAPI connection.

A developer must return a connection to the connection poll when it is no longer needed by calling `close` method of the connection.

Example

```
def delete_rec(item, item_id):
  conection = item.task.connect()
  try:
    cursor = conection.cursor()
    cursor.execute('delete from %s where id=%s' % (item.table_name, item_id))
    conection.commit()
  finally:
    conection.close()
```

copy_database

TBA - changed from Jam.py v5.

copy_database(*self*, *dbtype*, *database=None*, *user=None*, *password=None*, *host=None*, *port=None*, *encoding=None*, *server=None*)

domain: server

language: python

class *Task class*

Description

Use `copy_database` to copy database data when migrating to another database.

See *How to migrate to another database*

Example

in the following code when the project task tree is created the application copies the data from the demo.sqlite database to the project database:

```
from jam.db.db_modules import SQLITE

def on_created(task):
    task.copy_database(SQLITE, '/home/work/demo/demo.sqlite')
```

create_connection

create_connection(*self*)

domain: server

language: python

class *Task class*

Description

Use `create_connection` to create a connection to the project database.

The method returns a new connection.

A developer must close a connection after it is no longer needed.

See also

execute

select

create_connection_ex

TBA - changed from Jam.py v5.

create_connection_ex(*self*, *db_module*, *database*, *user=None*, *password=None*, *host=None*, *port=None*, *encoding=None*, *server=None*)

domain: server

language: python

class *Task class*

Description

Use `create_connection_ex` to create a connection to other databases.

The method returns a new connection.

A developer must close a connection after it is no longer needed.

See also

How can I use data from other database tables

execute

execute(*self*, *sql*)

domain: server

language: python

class *Task class*

Description

Use `execute` to execute an SQL query (except SELECT queries) using multiprocessing connection pool. For SELECT queries use the *select* method.

The `sql` parameter can be a query string, a list of query strings, a list of lists and so on.

All queries are executed in one transaction and if execution succeeds the `COMMIT` command is called, otherwise `ROLLBACK` command is executed.

Example

```
sql = []
for i in ids:
    sql.append('UPDATE DEMO_CUSTOMERS SET QUANTITY=2 WHERE ID=%s' % i)
item.task.execute(sql)
```

See also

select

generate_password_hash

generate_password_hash(*self*, *password*, *method='pbkdf2:sha256'*, *salt_length=8*)

domain: server

language: python

class *Task class*

Description

This method hash a password with the given method and salt with a string of the given length. The format of the string returned includes the method that was used so that *check_password_hash* can check the hash.

The method is wrapper over Werkzeug **generate_password_hash** function: https://werkzeug.palletsprojects.com/en/0.15.x/utils/

Example

```
def on_apply(item, delta, params, connection):
    for d in delta:
        if d.password.value:
            d.edit();
            d.password_hash.value = delta.task.generate_password_hash(d.password.value)
            d.password.value = None
            d.post();
```

See also

check_password_hash

lock

lock(*self*, *lock_name*, *timeout=-1*)

domain: server

language: python

class *Task class*

Description

Use `lock` to implement a platform independent file lock in Python, which provides a simple way of inter-process communication.

This method is a wrapper around Python filelock library: https://github.com/benediktschmitt/py-filelock

Once lock has been acquired, subsequent attempts to acquire it block execution, until it is released.

`lock_name` parameter is the name of the lock. It must be unic in the application. The filelock library creates a file in the *locks* folder with this name and *.lock* extension that it uses to implement the lock.

`timeout` parameter - if the lock cannot be acquired within timeout seconds, a Timeout exception is raised.

Example

The code

```
def calculate(item):
    lock = item.task.lock('calculation'):
    lock.acquire()
    try:
        #some code
    finally:
        lock.release()
```

is equivalent to

```
def calculate(item):
    with item.task.lock('calculation'):
        #some code
```

The example with timeout:

```
from jam.third_party.filelock import Timeout

def calculate(item):
  try
    with item.task.lock('calculation', timeout=10):
        #some code
  except Timeout:
    print("Another instance of this application currently holds the lock.")
```

In the following example when saving invoice the app calculates sold tracks. Before doing this it acquires a lock:

```
def on_apply(item, delta, params):
    with item.task.lock('invoice_saved'):
        tracks_sql = []
        delta.update_deleted()
        for d in delta:
            for t in d.invoice_table:
                if t.rec_inserted():
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪+ \
                    %s WHERE ID = %s" % \
                    (t.quantity.value, t.track.value)
                elif t.rec_deleted():
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪- \
                    (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) WHERE ID = %s"
↪% \
                    (t.id.value, t.track.value)
                elif t.rec_modified():
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪- \
                    (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) + %s WHERE ID␣
↪= %s" % \
                    (t.id.value, t.quantity.value, t.track.value)
                tracks_sql.append(sql)
        sql = delta.apply_sql()
        return item.task.execute(tracks_sql + [sql])
```

redirect

redirect(*self*, *location*, *code=302*, *Response=None*)

domain: server

language: python

class *Task class*

Description

Using Werkzeug `redirect` Object to redirect a Client to the target location.

Example

```
task.redirect('/login.html')
```

See also

serve_page

select

select(*self*, *sql*)

domain: server

language: python

class *Task class*

Description

Use `select` to execute select `SELECT` SQL query. To execute the query the connection pool is used.

The `sql` parameter is a query to execute.

The method returns a list of records.

Example

```
recs = item.task.execute_select("SELECT * FROM DEMO_CUSTOMERS WHERE ID=41")
for r in rec:
    print(r)
```

See also

execute

serve_page

serve_page(*self*, *file_name*, *dic=None*)

domain: server

language: python

class *Task class*

Description

Use `serve_page` to send a html page to to Client. `serve_page` is using Werkzeug Response Object.

Example

```
task.serve_page('index.html')
```

See also

redirect

Events

on_created

on_created(task)

domain: server

language: python

class *Task class*

Description

Use `on_created` to initialize the application on the server side.

The event is triggered when the project *task tree* has just been created. See *Workflow*

The `task` parameter is a reference to the *task tree*

> **Nota**
>
> The execution time of the code in this handler must be very short because of detrimental effects to the end user's experience.

Example

```
def on_created(task):
    # some code
```

See also

Workflow

Task tree

on_ext_request

on_ext_request(task, request, params)

domain: server

language: python

class *Task class*

Description

Use `on_ext_request` to send a request to the server for processing.

The `task` parameter is a reference to the *task tree* The `request` is a string that must starts with '/ext' There could be a list of parameters.

Example

The following application will send every 60 seconds a request to the server of Demo application

```
#!/usr/bin/env python

try:
    # For Python 3.0 and later
    from urllib.request import urlopen
except ImportError:
    # Fall back to Python 2's urllib2
    from urllib2 import urlopen
import json
import time

def send(url, request, params):
    a = urlopen(url + '/' + request, data=str.encode(json.dumps(params)))
    r = json.loads(a.read().decode())
    return r['result']['data']

if __name__ == '__main__':
    url = 'http://127.0.0.1:8080/ext'
    while True:
        result = send(url, 'get_sum', [1, 2, 3])
        print(result)
        time.sleep(60)
```

The server will process this request and return the sum of parameters. The `on_ext_request` must be declared in task server module:

```
def on_ext_request(task, request, params):
    #print request, params
    reqs = request.split('/')
    if reqs[2] == 'get_sum':
        return params[0] + params[1] + params[2]
```

on_login

on_login(task, form_data, info)

domain: server

language: python

class *Task class*

Description

Use `on_login` to override default login procedure using Application Builder Users table.

`task` parameter is a reference to the *task tree*.

`form_data` is a dictionary containing the values that the user entered in the inputs in the login form. The keys of the dictionary are name attributes of the inputs.

`info` parameter is a dictionary with the following attributes:

- `ip` is the ip address of the request

- session_uuid is uuid of the session that will be created.

The event handler must return the dictionary with the following attributes:

- user_id - the unique id of the user
- user_name - user name
- role_id - ID of the role defined in the *Roles*
- role_name - role name

The login form is located in the *index.html* file. You can add your own custom inputs and get their values using form_data parameter

```
<form id="login-form" target="dummy" class="form-horizontal" data-caption="Log in">
    <div class="control-group">
        <label class="control-label" for="input-login">Login</label>
        <div class="controls">
            <input type="text" id="input-login" name="login" tabindex="1" placeholder=
↪"login">
        </div>
    </div>
    <div class="control-group">
        <label class="control-label" for="input-password">Password</label>
        <div class="controls">
            <input type="password" id="input-password" name="password" tabindex="2"
                placeholder="password" autocomplete="on">
        </div>
    </div>
    <div class="form-footer">
        <input type="submit" class="btn expanded-btn pull-right" id="login-btn" value="OK
↪" tabindex="3">
    </div>
</form>
```

Example

In this example user information is stored in the table of the **Users** item in the project database:

```
def on_login(task, form_data, info):
    users = task.users.copy(handlers=False)
    users.set_where(login=form_data['login'])
    users.open()
    if users.rec_count == 1:
        if task.check_password_hash(users.password_hash.value, form_data['password']):
            return {
                'user_id': users.id.value,
                'user_name': users.name.value,
                'role_id': users.role.value,
                'role_name': users.role.display_text
            }
```

See also

session

environ

generate_password_hash

check_password_hash

on_request

on_request(task, request)

domain: server

language: python

class *Task class*

Description

Use `on_request` to send a request to the server for processing.

The `task` parameter is a reference to the *task tree*

Example

```
def on_request(task, request):
        parts = request.path.strip('/').split('/')
        if parts[0] == 'register.html':
            return task.serve_page('register.html')
```

See also

serve_page

7.2.4 Group class

`class Group`

domain: server

language: python

Group class is used to create group objects of the *task tree*

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

7.2.5 Item class

`class Item`

domain: server

language: python

Item class is used to create item objects of the *task tree* that may have an associated database table.

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes and properties

active

active

domain: server

language: python

class *Item class*

Description

Specifies whether or not an item dataset is open.

Use `active` read only property to determine whether an item dataset is open.

The *open* method changes the value of `active` to `true`. The *close* method sets it to `false`.

When the dataset is open its records can be navigated and its data can be modified and the changes saved in the item database table.

See also

Dataset

Navigating datasets

Modifying datasets

details

details

domain: server

language: python

class *Item class*

Description

Lists all *detail* objects of the item.

See also

Details

fields

fields

domain: server

language: python

class *Item class*

Description

Lists all *field* objects of the item dataset.

Example

```
def customer_fields(customers):
    customers.open(limit=1)
    for f in customers.fields:
        print f.field_caption, f.display_text
```

See also

Fields

Field class

filters

filters

domain: server

language: python

class *Item class*

Description

Lists all *filter* objects of the item dataset.

Example

```
def invoices_filters(invoices):
    for f in invoices.filters:
        print f.filter_name, f.value
```

See also

Filters

Filter class

item_state

item_state

domain: server

language: python

class *Item class*

Description

Examine `item_state` to determine the current operating mode of the item. Item_state determines what can be done with data in an item dataset, such as editing existing records or inserting new ones. The `item_state` constantly changes as an application processes data.

Opening a item changes state from inactive to browse. An application can call *edit* to put an item into edit state, or call *insert* or *append* to put an item into insert state.

Posting or canceling edits, insertions, or deletions, changes `item_state` from its current state to browse. Closing a dataset changes its state to inactive.

To check item_state value use the following methods:

- *is_new* - indicates whether the item is in insert state
- *is_edited* - indicates whether the item is in edit state
- *is_changing* - indicates whether the item is in edit or insert state

item_state value can be:

- 0 - inactive state,
- 1 - browse state,
- 2 - insert state,
- 3 - edit state,
- 4 - delete state

item *task* attribute have consts object that defines following attributes:

- "STATE_INACTIVE": 0,
- "STATE_BROWSE": 1,
- "STATE_INSERT": 2,
- "STATE_EDIT": 3,
- "STATE_DELETE": 4

so if the item is in edit state can be checked the following way:

```
item.item_state == 2
```

or:

```
item.item_state == item.task.consts.STATE_INSERT
```

or:

```
item.is_new()
```

See also

Modifying datasets

log_changes

log_changes

domain: server

language: python

class *Item class*

Description

Indicates whether to log data changes.

Use `log_changes` to control whether or not changes made to the data in an item dataset are recorded. When `log_changes` is `true` (the default), all changes are recorded. They can later be applied to an application server by calling the *apply* method. When `log_changes` is `false`, data changes are not recorded and cannot be applied to an application server.

See also

Modifying datasets

apply

rec_no

rec_no

domain: server

language: python

class *Item class*

Description

Examine the `rec_no` property to determine the record number of the current record in the item dataset.

`rec_no` can be set to a specific record number to position the cursor on that record.

See also

Dataset

Navigating datasets

table_name

table_name

domain: server

language: python

class *Item class*

Description

Read this property to get the name of the corresponding table in the project database.

virtual_table

`virtual_table`

domain: server

language: python

class *Item class*

Description

Use the read-only `virtual_table` property to find out if the item has a corresponding table in the project database.

If `virtual_table` is `True` there is no corresponding table in the project database. You can use these items to work with in-memory dataset or use its modules to write code. Calling the *open* method creates an empty data set, and calling the *apply* method does nothing.

Mehods

append

`append`(*self*)

domain: server

language: python

class *Item class*

Description

Open a new, empty record at the end of the dataset.

After a call to `append`, an application can enable users to enter data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to the item database table, using *apply* method.

The `append` method

- checks if item dataset is *active* , otherwise raises exception
- if the item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if the item is not a *detail* checks if it is in browse *state* , otherwise raises exception
- open a new, empty record at the end of the dataset
- puts the item into insert *state*

See also

Modifying datasets

apply

apply(self, connection=None, params=None, safe=False):

domain: server

language: python

class *Item class*

Description

Writes all updated, inserted, and deleted records from the item dataset to the database.

The `apply` method

- checks whether the item is a detail, and if it is, returns (the master saves the details changes)
- checks whether the item is in edit or insert *state* , and if so, posts the record
- checks if the change log has changes, and if not, returns
- triggers the `on_before_apply` event handler if one is defined for the item
- if `connection` parameter is `None` the task *connect* method is called to get a connection from task connection pool
- if `on_apply` event handler of the task is defined, executes it
- if *on_apply* event handler is defined for the item, executes it
- generates and executes SQL query to write changes to the database using the connection
- if `connection` parameter was not specified, commits changes to the database and returns connection to the connection pool
- after writing changes to the database, updates the change log and the item dataset - updates primary key values of new records
- triggers the `on_after_apply` event handler if one is defined for the item

Parameters

- `connection` - if this parameter is specified the application uses it to execute sql query that it generates (it doesn't commit changes and doesn't close the connection), otherwise it procures a connection from the task connection pool that will be returned to the pool after changes are committed.
- `params` - use the parameter to pass some user defined options to be used in the *on_apply* event handler. This parameter must be an object of key-value pairs
- `safe` - if set to `True`, the method checks if the user that called the method has a right to create, edit or delete records in the item's database table (if such operation is going to be performed) and, if not, raises an exception. The default value is `False`. See *Roles*

Examples

In the second example below, the changes are saved in one transaction.

```
def change_invoice_date(item, item_id):
    inv = item.copy()
    cust = item.task.customers.copy()
    inv.set_where(id=item_id)
```

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```
    inv.open()
    if inv.record_count():
        now = datetime.datetime.now()
        cust.set_where(id=inv.customer.value)
        cust.open()

        inv.edit()
        inv.invoice_datetime.value = now
        inv.post()
        inv.apply()

        cust.edit()
        cust.last_action_date.value = now
        cust.post()
        cust.apply()
```

```
def change_invoice_date(item, item_id):
    con = item.task.connect()
    try:
        inv = item.copy()
        cust = item.task.customers.copy()
        inv.set_where(id=item_id)
        inv.open()
        if inv.record_count():
            now = datetime.datetime.now()
            cust.set_where(id=inv.customer.value)
            cust.open()

            inv.edit()
            inv.invoice_datetime.value = now
            inv.post()
            inv.apply(con)

            cust.edit()
            cust.last_action_date.value = now
            cust.post()
            cust.apply(con)
    finally:
        con.commit()
        con.close()
```

See also

Modifying datasets

bof

bof(*self*)

domain: server

language: python

class *Item class*

Description

Test `bof` (beginning of file) method to determine if the cursor is positioned at the first record in an item dataset.

If bof returns true, the cursor is unequivocally on the first row in the dataset. bof returns true when an application

- Opens an item dataset.
- Calls an item's *first* method.
- Call an item's *prior* method, and the method fails (because the cursor is already on the first row in the dataset).

bof returns false in all other cases.

> **Nota**
>
> If both *eof* and bof return true, the item dataset is empty.

See also

Dataset

Navigating datasets

can_create

can_create(*self*)

domain: server

language: python

class *AbstractItem class*

Description

Use the `can_create` method to determine whether a user of the current session have a right to create a new record.

Example

```
def send_email(item, selected, subject, mess):
    if not item.can_create():
        raise Exception('You are not allowed to send emails.')
    #code sending email
```

See also

Roles

session

can_view

can_create

can_edit

can_delete

can_delete

`can_delete`(*self*)

domain: server

language: python

class *AbstractItem class*

Description

Use the `can_delete` method to determine whether a user of the current session have a right to delete a record.

See also

Roles

session

can_view

can_create

can_edit

can_edit

`can_edit`(*self*)

domain: server

language: python

class *AbstractItem class*

Description

Use the `can_edit` method to determine whether a user of the current session have a right to edit a record.

See also

Roles

session

can_view

can_create

can_delete

cancel

cancel(*self*)

domain: server

language: python

class *Item class*

Description

Call `cancel` to undo modifications made to one or more fields belonging to the current record, as long as those changes are not already posted to the item dataset.

`Cancel`

- triggers the `on_before_cancel` event handler if one is defined for the item.
- to undo modifications made to the current record and its details if the record has been edited or removes the new record if one was appended or inserted.
- puts the item into browse *state*
- triggers the `on_after_cancel` event handler if one is defined for the item.

See also

Modifying datasets

clear_filters

clear_filters(*self*)

domain: server

language: python

class *Item class*

Description

Use `clear_filters` to set filter values of the item to `None`.

See also

Filtering records

Filters

close

close(*self*)

domain: server

language: python

class *Item class*

Description

Call `lose` to close an item dataset. After dataset is closed the *active* property is `false`.

See also

Dataset

open

copy

copy(*self*, *filters=True*, *details=True*, *handlers=True*)

domain: server

language: python

class *Item class*

Description

Use copy to create a copy of an item. The created copy is not added to the *task tree* and will be destroyed by Python garbage collector when no longer needed.

All attributes of the copy object are defined as they were at the time of creating of the task tree. See *Workflow*

The method can have the following parameters:

- `handlers` - if the value of this parameter is `true`, all the functions and events defined in the server module of the item will also be available in the copy. The default value is `true`.
- `filters` - if the value of this parameter is `true`, the filters will be created for the copy, otherwise there will be no filters. The default value is `true`.
- `details` - if the value of this parameter is `true`, the details will be created for the copy, otherwise there will be no details. The default value is `true`.

Example

```
def on_generate(report):
    cust = report.task.customers.copy()
    cust.open()

    report.print_band('title')

    for c in cust:
        firstname = c.firstname.display_text
        lastname = c.lastname.display_text
        company = c.company.display_text
        country = c.country.display_text
        address = c.address.display_text
        phone = c.phone.display_text
        email = c.email.display_text
        report.print_band('detail', locals())
```

See also

Task tree

Workflow

delete

delete(*self*)

domain: server

language: python

class *Item class*

Description

Deletes the active record and positions the cursor on the next record.

The `delete` method

- checks if item dataset is *active*, otherwise raises exception
- checks if item dataset is not empty, otherwise raises exception
- if item is a *detail* , checks if the master item is in edit or insert *state*, otherwise raises exception.
- if item is not a *detail* , checks if it is in browse *state*, otherwise raises exception.
- puts the item into delete *state*
- deletes the active record and positions the cursor on the next record
- puts the item into browse *state*

See also

Modifying datasets

edit

edit(*self*)

domain: server

language: python

class *Item class*

Description

Enables editing of data in the dataset.

After a call to `edit`, an application can enable users to change data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to database using *apply* method.

The `edit` method

- checks if item dataset is active, otherwise raises exception
- checks if item dataset is not empty, otherwise raises exception
- checks whether the item dataset is already in edit state, and if so, returns

- if item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if item is not a *detail* , checks if it is in browse *state* , otherwise raises exception
- puts the item into edit *state* , enabling the application or user to modify fields in the record

See also

Modifying datasets

eof

eof(*self*)

domain: server

language: python

class *Item class*

Description

Test `eof` (end-of-file) to determine if the cursor is positioned at the last record in an item dataset. If eof returns true, the cursor is unequivocally on the last row in the dataset. eof returns true when an application:

- Opens an empty dataset.
- Calls an item's *last* method.
- Call an item's *next* method, and the method fails (because the cursor is already on the last row in the dataset).

eof returns false in all other cases.

> **Nota**
>
> If both eof and *bof* return true, the item dataset is empty.

See also

Dataset

Navigating datasets

field_by_name

field_by_name(*self*, *field_name*)

domain: server

language: python

class *Item class*

Description

Call `field_by_name` to retrieve field information for a field when only its name is known.

The `field_name` parameter is the name of an existing field.

`field_by_name` returns the field object for the specified field. If the specified field does not exist, `field_by_name` returns `None`.

filter_by_name

`filter_by_name`(*self*, *filter_name*)

domain: server

language: python

class *Item class*

Description

Call `filter_by_name` to retrieve filter information for a filter when only its name is known.

The `filter_name` parameter is the name of an existing filter.

`filter_by_name` returns the filter object for the specified filter. If the specified filter does not exist, `filter_by_name` returns `None`.

first

`first`(*self*)

domain: server

language: python

class *Item class*

Description

Call `first` to position the cursor on the first record in the item dataset and make it the active record. `First` posts any changes to the active record.

See also

Dataset

Navigating datasets

insert

`insert`(*self*)

domain: server

language: python

class *Item class*

Description

Inserts a new, empty record in the item dataset.

After a call to `insert`, an application can enable users to enter data in the fields of the record, and can then post those changes to the item dataset using *post* method, and then apply them to the item database table, using *apply* method.

The `insert` method

- checks if item dataset is *active* , otherwise raises exception
- if the item is a *detail* , checks if the master item is in edit or insert *state* , otherwise raises exception
- if the item is not a *detail* checks if it is in browse *state* , otherwise raises exception
- inserts a new, empty record in the item dataset.
- puts the item into insert *state*

See also

Modifying datasets

is_changing

`is_changing`(*self*)

domain: server

language: python

class *Item class*

Description

Checks if an item is in edit or insert state and returns true if it is.

An application calls *edit* to put an item into edit state and *append* or *insert* to put an item into insert state.

See also

Modifying datasets

is_edited

`is_edited`(*self*)

domain: server

language: python

class *Item class*

Description

Checks if an item is in edit state and returns true if it is.

An application calls *edit* to put an item into edit state.

See also

Modifying datasets

is_modified

`is_modified`(*self*)

domain: server

language: python

class *Item class*

Description

Checks if the current record of an item dataset has been modified during edit or insert operations. The method returns `false` after the *post* method is executed.

See also

Modifying datasets

is_new

`is_new`(*self*)

domain: server

language: python

class *Item class*

Description

Checks if an item is in insert state and returns true if it is.

An application calls *append* or *insert* methods to put an item into insert state.

See also

Modifying datasets

last

`last`(*self*)

domain: server

language: python

class *Item class*

Description

Call `last` to position the cursor on the last record in the item dataset and make it the active record.

See also

Dataset

Navigating datasets

locate

locate(*self*, *fields*, *values*)

domain: server

language: python

class *Item class*

Description

Implements a method for searching an item dataset for a specified record and makes that record the active record.

Arguments:

- `fields`: a field name, or list of field names
- `values`: a field value of list of field values

This method locates the record where the fields specified by `fields` parameter have the values specified by `values` parameter.

`locate` returns true if a record is found that matches the specified criteria and the cursor repositioned to that record.

If a matching record was not found and the cursor is not repositioned, this method returns false.

See also

Dataset

Navigating datasets

next

next(*self*)

domain: server

language: python

class *Item class*

Description

Call `next` to position the cursor on the next record in the item dataset and make it the active record. Next posts any changes to the active record.

open

open(self, options=None, expanded=None, fields=None, where=None, order_by=None, open_empty=False, params=None, offset=None, limit=None, funcs=None, group_by=None, safe=False)

domain: server

language: python

class *Item class*

Description

Call `open` to generate and execute a SELECT SQL query to the item database table for obtaining a dataset.

The method initializes the item *fields*, formulates parameters of a request, and triggers the `on_before_open` event handler if one is defined for the item.

If there is a *on_open* event handler defined for the item, `open` executes this event handler and assigns a dataset to the result, returned by it, otherwise generates a SELECT SQL query, based on parameters of the request, executes this query and assigns the result of the execution to the dataset

After that it sets *active* to true, the *item_state* to browse mode, goes to the first record of the dataset, triggers `on_after_open`, if it is defined for the item.

Parameters

You can pass `options` dictionary to specify parameters of the request in the same form as for the *open* method on the client:

```
invoices.open({
    'fields': ['customer', 'invoicedate', 'total'],
    'where': {customer: customer_id, invoicedate__ge: date1, invoicedate__le: date2},
    'order_by': ['invoicedate']
})
```

or pass the keyworded arguments:

```
invoices.open(
    fields=['customer', 'invoicedate', 'total'],
    where={customer: customer_id, invoicedate__ge: date1, invoicedate__le: date2},
    order_by=['invoicedate']
)
```

- `expanded` - if the value of this parameter is true, the SELECT query will have JOIN clauses to get lookup values of the *lookup fields* , otherwise there will be no lookup values. The default value if `true`.
- `fields` - use this parameter to specify the WHERE clause of the SELECT query. This parameter is a list of field names. If it is omitted, the fields defined by the *set_fields* method will be used. If the *set_fields* method was not called before the `open` method execution, all available fields will be used.
- `where` - use this parameter to specify how records will be filtered in the SQL query. This parameter is a dictionary, whose keys are field names, that are followed, after double underscore, by a filtering symbols (see *Filtering records*). If this parameter is omitted, values defined by the *set_where* method will be used. If the *set_where* method was not called before the `open` method execution, and `where` parameter is omitted, then the values of *filters* defined for the item will be used to filter records.
- `order_by` - use `order_by` to specify sort order of the records. This parameter is a list of field names. If there is a sign '-' before the field name, then on this field records will be sorted in decreasing order. If this parameter is omitted, a list defined by the *set_order_by* method will be used.
- `offset` - use `offset` to specify the offset of the first row to get.
- `limit` - use `limit` to limit the output of a SQL query to the first so-many rows.
- `funcs` - this parameter can be a a dictionary, whose keys are a field names and values are function names that will be applied to the fields in the SELECT Query
- `group_by` - use `group_by` to specify fields to group the result of the query by. This parameter must be a list of field names.

- `open_empty` - if this parameter is set to `true`, the application does not send a request to the server but just initializes an empty dataset. The default value if `false`.
- `params` - use the parameter to pass some user defined options to be used in the *on_open* event handler. This parameter must be an object of key-value pairs
- `safe` - if set to `True` the method checks if the user that called the method has a right to view the item's data and, if not, raises an exception. The default value is `False`. See *Roles*

Examples

In this example the parameters of the request are a dictionary:

```
import datetime

def get_sales(item):
    date1 = datetime.datetime.now() - datetime.timedelta(days=3*365)
    date2 = datetime.datetime.now()
    invoices = item.task.invoices.copy()

    invoices.open({
        'fields': ['customer', 'date', 'total'],
        'where': {'date__ge': date1, 'date__le': date2},
        'order_by': ['customer', 'date']
    })
```

Below the parameters are passed as a keyworded list:

```
import datetime

def get_sales(item):
    date1 = datetime.datetime.now() - datetime.timedelta(days=3*365)
    date2 = datetime.datetime.now()
    invoices = item.task.invoices.copy()

    invoices.open(
        fields=['customer', 'date', 'total'],
        where={'date__ge': date1, 'date__le': date2},
        order_by=['customer', 'date']
    )
```

The same result can be achieved by using set_fields, set_where, set_order_by methods:

```
import datetime

def get_sales(item):
    date1 = datetime.datetime.now() - datetime.timedelta(days=3*365)
    date2 = datetime.datetime.now()
    invoices = item.task.invoices.copy()

    invoices.set_fields('customer', 'date', 'total')
    invoices.set_where(date__ge=date1, date__le=date2);
    invoices.set_order_by('customer', 'date');
    invoices.open();
```

```
import datetime
```

def get_sales(item):
date1 = datetime.datetime.now() - datetime.timedelta(days=3*365) date2 = datetime.datetime.now() invoices = item.task.invoices.copy()

invoices.set_fields(['customer', 'date', 'total']) invoices.set_where({'date__ge': date1, 'date__le': date2}); invoices.set_order_by(['customer', 'date']); invoices.open();

```
def get_sales(task) {
    sales = task.invoices.copy()

    sales.open(fields=['customer', 'id', 'total'],
        funcs={'id': 'count', 'total': 'sum'},
        group_by=['customer'],
        order_by=['customer'])
```

See also

Dataset

Filtering records

set_fields

set_order_by

set_where

post

post(*self*)

domain: server

language: python

class *Item class*

Description

Writes a modified record to the item dataset. Call post to save changes made to a record after *append*, *insert* or *edit* method was called.

The `post` method

- checks if an item is in edit or insert *state* , otherwise raises exception
- triggers the `on_before_post` event handler if one is defined for the item
- checks if a record is valid, if not raises exception
- If an item has *details* , post current record in details
- add changes to an item change log
- puts the item into browse *state*
- triggers the `on_after_post` event handler if one is defined for the item.

See also

Modifying datasets

prior

prior(*self*)

domain: server

language: python

class *Item class*

Description

Call `prior` to position the cursor on the previous record in the item dataset and make it the active record. last posts any changes to the active record.

See also

Dataset

Navigating datasets

record_count

record_count()

domain: server

language: python

class *Item class*

Description

Call `record_count` to get the total number of records owned by the item's dataset.

Example

```
item.open()
if item.record_count():
    # some code
```

See also

Dataset

open

set_fields

set_fields(*self*, *lst=None*, **fields*)

domain: server

language: python

class *Item class*

Description

Use the `set_fields` method to define and store internally the `fields` parameter that will be used by the *open* method, when its own `fields` parameter is not specified. The *open* method clears internally stored parameter value.

The `fields` is arbitrary argument list of field names.

Parameters

You can specify the fields as a list, the way the *set_fields* method on the client does or as non-keyworded arguments.

Example

The result of the execution of following code snippets will be the same:

```
item.open(fields=['id', 'invoicedate'])
```

```
item.set_fields('id', 'invoicedate')
item.open()
```

```
item.set_fields(['id', 'invoicedate'])
item.open()
```

See also

Dataset

open

set_order_by

set_order_by(*self*, *lst=None*, **fields*)

domain: server

language: python

class *Item class*

Description

Use the `set_order_by` method to define and store internally the `order_by` parameter that will be used by the *open* method, when its own `order_by` parameter is not specified. The *open* method clears internally stored parameter value.

Parameters

You can specify the fields as a list, the way the *set_order_by* method on the client does or as non-keyworded arguments.

If there is a sign '-' before a field name, then on this field records will be sorted in decreasing order.

Example

The result of the execution of following code snippets will be the same:

```
item.open(order_by=['customer', '-invoicedate'])
```

```
item.set_order_by('customer', '-invoicedate')
item.open();
```

```
item.set_order_by(['customer', '-invoicedate'])
item.open();
```

See also

Dataset

open

set_where

set_where(*self*, *dic=None*, ***fields*)

domain: server

language: python

class *Item class*

Description

Use the `set_where` method to define and store internally the where filters that will be used by the *open* method, when its own where parameter is not specified. The *open* method clears internally stored parameter value.

Parameters

You can specify the filters as a dictionary, the way the *set_where* method on the client does or as keyworded arguments

Example

The result of the execution of following code snippets will be the same:

```
import datetime

date = datetime.datetime.now() - datetime.timedelta(days=3*365)
item.open(where={'customer': 44, 'invoicedate__gt': date})
```

```
import datetime

date = datetime.datetime.now() - datetime.timedelta(days=3*365)
```

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```
item.set_where({'customer': 44, 'invoicedate__gt': date})
item.open()
```

```
import datetime

date = datetime.datetime.now() - datetime.timedelta(days=3*365)
item.set_where(customer=44, invoicedate__gt=date)
item.open()
```

See also

Dataset

open

Events

on_apply

on_apply(self, delta, params, connection)

domain: server

language: python

class *Item class*

Description

Write `on_apply` event handler when you need to override the standard data saving procedure during the execution of the apply method on the *client* or *server*.

See *on_apply events* to understand how on_apply events are triggered.

The `on_apply` event handler has the following parameters:

- `item` - a reference to the item,
- `delta` - a delta containing item change log (discussed in more detail below),
- `params` - the parameters passed to the server by apply method,
- `connection` - the connection that will be used to save changes to the database.

The delta parameter contains changes that must be saved in the database. By itself, this option is an item's copy, and its dataset is the item's change log. The nature of the record change can be obtained by using following methods:

- `rec_inserted`
- `rec_modified`
- `rec_deleted`

each of which returns a value of `True`, if the record is added, modified or deleted, respectively.

If the item has a detail items, delta also has a corresponding detail items, storing detail changes.

Nota

Please note that when a record is deleted from an item and this record has detail records, the change log will just keep this deleted record, information about the deleted records of the details is not stored. To add this deleted detail records, call delta's `update_deleted` method.

You do not need to open delta detail after the cursor has been moved to another record.

Delta dataset fields have an old_value attribute that can be used to get the value of a field before changes have been made.

Fields of the delta dataset have an `old_value` attribute that can be used to get the value of a field before changes have been made.

when the `on_apply` event handler is not defined the `apply_delta` method is executed, that generates SQL queries and executes them. After that it returns the information about the result of processing, that stores the id's of the new records as well. The client based on this information updates the item's change log and values of the primary fields of new records.

When `on_apply` event handler returns `None` the `apply_delta` is executed.

You can make some additional processing of the delta. In the following code, the a value of the date field is set to the current date before changes are applied to the database table.

```
import datetime

def on_apply(item, delta, params, connection):
    for d in delta:
        d.edit()
        d.date.value = datetime.datetime.now()
        d.post()
```

Nota

Please note that changes made this way are not reflected in the item dataset on the client. You can use the item client methods *refresh_record* or *refresh_page* to display these changes.

In the following code, while saving the changes made to the invoices, the application as well updates the value of the `tracks_sold` field for tracks in this invoices. All this is done in one transaction.

```
def on_apply(item, delta, params, connection):
    tracks = item.task.tracks.copy()
    changes = {}
    delta.update_deleted()
    for d in delta:
        for t in d.invoice_table:
            if not changes.get(t.track.value):
                changes[t.track.value] = 0
            if t.rec_inserted():
                changes[t.track.value] += t.quantity.value
            elif t.rec_deleted():
                changes[t.track.value] -= t.quantity.value
            elif t.rec_modified():
```

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```
                changes[t.track.value] += t.quantity.value - t.quantity.old_value
    ids = list(changes.keys())
    tracks.set_where(id__in=ids)
    tracks.open()
    for t in tracks:
        q = changes.get(t.id.value)
        if q:
            t.edit()
            t.tracks_sold.value += q
            t.post()
    tracks.apply(connection)
```

In the previous examples the on_apply event handler returns None so after that the apply_delta method is executed by the application.

The more general case is:

```
def on_apply(item, delta, params, connection):

  # execute some code before changes are written to the database

  result = item.apply_delta(delta, params, connection)

  # execute some code after changes are written to the database

  return result
```

See also

Server side programming

on_apply events

Modifying datasets

on_open

on_open(item, params)

domain: server

language: python

class *Item class*

Description

Write on_open event handler when you need to override the standard procedure of fetching the records from the dataset during the execution of the open method on the *client* or *server*.

See *on_open_events* to understand how on_open events are triggered.

The on_open event handler has the following parameters:

- item - reference to the item,
- params - dictionary containing parameters passed to the server by the open method:

- `__expanded` - corresponds to the `expanded` parameter of the server *open* method / `expanded` attribute of options parameter of the client *open* method
- `__fields` - list of field names
- `__filters` - list of items, each of which is a list with the following members:
  - field name
  - filter constant from *Filtering records*
  - filter value
- `__funcs` - functions dictionary
- `__order` - list of items, each of which is a list with the following members:
  - field name
  - boolen value, if it is true the order is descending
- `__offset` - corresponds to the offset parameter of the open method
- `__limit` - corresponds to the limit parameter of the open method
- `__client_request` - is true when request came from the client

`params` can also include user defined parameters passed to the open method.

Below is an example of params that the client open methods of invoices items sends to the server:

```
{
    '__fields': [u'id', u'deleted', u'customer', u'firstname', u'date',
        u'subtotal', u'taxrate', u'tax', u'total',
        u'billing_address', u'billing_city', u'billing_country',
        u'billing_postal_code', u'billing_state'],
    '__filters': [[u'customer', 7, [6]]],
    '__expanded': True,
    '__limit': 11,
    '__offset': 0,
    '__order': [[u'date', True]]
}

{
    '__fields': [u'id'],
    '__funcs': {u'id': u'count'},
    '__filters': [],
    '__expanded': False,
    '__offset': 0,
    '__order': [],
    '__summary': True
}
```

The server application generates an SQL query, based on params and executes them.

The server returns to the client the resulting records and the error message if it occurs during the execution.

Here is an example how server events can be used

See also

on_open_events

Server side programming

Dataset

7.2.6 Detail class

class Detail

domain: server

language: python

Detail class inherits attributes, methods and events of *Item class*

Attributes

master

master

domain: server

language: python

class *Detail class*

Description

Use `master` attribute to get reference to the master of the detail.

See also

Details

7.2.7 Reports class

class Reports

domain: server

language: python

Reports class is used to create the group object of the *task tree* that owns the reports of a project.

Below the events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Events

on_convert_report

on_convert_report(*report*)

domain: client

language: python

class: *Reports class*

Description

The framework converts reports internally, using LibreOffice. Use the **on_convert_report** event if you want to use some other service or change some parameters of report conversion.

The **report** parameter is the report that triggered the event.

Example

```
import os
from subprocess import Popen, STDOUT, PIPE

def on_convert_report(report):
    try:
        if os.name == "nt":
            import _winreg
            regpath = "SOFTWARE\\Microsoft\\Windows\\CurrentVersion\\App Paths\\soffice.
↪exe"
            root = _winreg.OpenKey(_winreg.HKEY_LOCAL_MACHINE, regpath)
            s_office = _winreg.QueryValue(root, "")
        else:
            s_office = "soffice"
        convertion = Popen([s_office, '--headless', '--convert-to', report.ext,
            report.report_filename, '--outdir', os.path.join(report.task.work_dir,
↪'static', 'reports') ],
            stderr=STDOUT,stdout=PIPE)
        out, err = convertion.communicate()
        converted = True
    except Exception as e:
        print(e)
```

7.2.8 Report class

class Report

domain: server

language: python

Report class inherits

Below the attributes, methods and events of the class are listed.

It, as well, inherits attributes and methods of its ancestor class *AbstractItem class*

Attributes

report_filename

report_filename

domain: client

language: python

class *Report class*

Description

When the *template* attribute of the report is specified, the *generate* method saves the content of the generated report to a file in a report folder of the static directory and set the value of the **report_filename** attribute to the name of the saved file.

Its value can be used in the *on_after_generate* event handler.

See also

Server-side report programming

generate

report_url

`report_url`

domain: client

language: python

class *Report class*

Description

The *generate* method sends to the client the value that is stored in this attribute as url of the generated file.

When the *template* attribute of the report is specified, this value is set by the *generate* method after it save generated content. Otherwise a developer must set it himself.

See also

Server-side report programming

generate

template

`template`

domain: client

language: python

class *Report class*

Description

The **report_filename** attribute stores a file name of the report template. Usually it is set in the Application builder when the report is created. But it can be changed dynamically on the server in the *on_before_generate* event handler or be empty, if it's necessary to create, for example, some **txt** file.

See also

Report templates

Creating a report

Server-side report programming

Mehods

generate

`generate`(*self*)

domain: client

language: python

class *Report class*

Description

The method is used internally to generate the content of the report.

When a server gets a request from a client to generate report, it first of all creates a copy of the report and then this copy calls the method.

This method triggers the *on_before_generate* event.

If the report *template* is defined, parses it and triggers *on_parsed* and *on_generate* events.

In the *on_generate* event handler developer should write a code that generates the content of the report and saves it in the **ods** file, by using the *print_band* method to print bands .

When the report is generated and the value of report *extension* attribute, set on the client, is not equal **ods**, the server tries to convert the **ods** file.

To convert the file, it first checks if the report group (owner of the report) has *on_convert_report* event handler. If this handler is defined it uses it to convert the report. Otherwise it uses for conversion the **LibreOffice** installed on the server in **headless** mode.

After that the application saves generated report to a file in a report folder of the static directory, set the value of the *report_filename* attribute to the name of the saved file, generates the value of the *report_url* attribute and triggers *on_after_generate* event.

Once the report is generated it is saved in a **report** folder of the **static** directory and the server sends the client the report file url.

If the report *template* attribute is not set, the server triggers the *on_generate* and after that *on_after_generate* events. In this case you should save the generated content to a file yourself and and set a value of the *report_url* attribute.

See also

Programming reports

Server-side programming

hide_columns

`hide_columns`(*self*, *col_list*)

domain: client

language: python

class *Report class*

Description

Use **hide_columns** method to hide some columns defined in the report *template*.

The **col_list** parameter specifies which columns should be hidden. This is a list of integers or letters, defining the position of the report columns.

Use this method in the *on_parsed* event handler.

Example

```
def on_parsed(report):
    report.hide_columns(['A', 'C')
#    report.hide_columns([1, 3])
```

See also

Programming reports

Report templates

Server-side report programming

on_parsed

on_generate

print_band

print_band(*self*, *band*, *dic=None*)

domain: client

language: python

class *Report class*

Description

Use print_band method to set values of programmable cells of the band defined in the report *template* and add the band to the content of the report.

It has the following parameters:

- **band** - specifies the name of the band to be printed.
- **dic** - dictionary, containing values than will be assigned to programmable cells of the band.

Example

The following code generates content of the **Customer list** report of the Demo application:

```
def on_generate(report):
    cust = report.task.customers.copy()
    cust.open()

    report.print_band('title')

    for c in cust:
```

(continua na próxima página)

(continuação da página anterior)

```
        firstname = c.firstname.display_text
        lastname = c.lastname.display_text
        company = c.company.display_text
        country = c.country.display_text
        address = c.address.display_text
        phone = c.phone.display_text
        email = c.email.display_text
        report.print_band('detail', locals())
```

See also

Programming reports

Report templates

Server-side report programming

generate

on_generate

Events

on_after_generate

on_after_generate(*report*)

domain: client

language: python

class *Report class*

Description

The **on_after_generate** event is triggered by the *generate* method, when the report has been generated and saved to a file with the name that is stored in the *report_filename* attribute.

The **report** parameter is the report that triggered the event.

See also

Programming reports

generate

on_before_generate

on_before_generate(*report*)

domain: client

language: python

class *Report class*

Description

The **on_before_generate** event is triggered by the *generate* method, before generating the report.

The **report** parameter is the report that triggered the event.

See also

Programming reports

generate

on_generate

`on_generate`(*report*)

domain: client

language: python

class *Report class*

Description

The **on_generate** event is triggered by the *generate* method.

Write the on_generate event handler to generate the content of the report. Use the *print_band* method to print bands, defined in the report *template*.

The **report** parameter is the report that triggered the event.

See also

Programming reports

Server-side report programming

Report templates

generate

on_parsed

`on_parsed`(*report*)

domain: client

language: python

class *Report class*

Description

The **on_parsed** event is triggered by the *generate* method, after the report *template* have been parsed.

Use this event handler you hide some columns in the report template by calling *hide_columns*

The **report** parameter is the report that triggered the event.

See also

Programming reports

Server-side report programming

Report templates

hide_columns

7.2.9 Field class

class Field

domain: server

language: python

Attributes and properties

display_text

display_text

domain: server

language: python

Field class

Description

Represents the field's value as a string.

Display_text property is a read-only string representation of a field's value to display it to users. If an *on_get_field_text* event handler is assigned, **display_text** is the value returned by this event handler. Otherwise, display_text is the value of the *lookup_text* property for *lookup fields* and *text* property converted according to the *language locale* settings for other fields.

Display_text is the string representation of the field's value property when it is not being edited. When the field is being edited, the *text* property is used.

Example

```
def on_generate(report):
    cust = report.task.customers.copy()
    cust.open()

    report.print_band('title')

    for c in cust:
        firstname = c.firstname.display_text
        lastname = c.lastname.display_text
        company = c.company.display_text
        country = c.country.display_text
        address = c.address.display_text
        phone = c.phone.display_text
        email = c.email.display_text
        report.print_band('detail', locals())
```

See also

Fields

Lookup fields

on_get_field_text

text

lookup_text

field_caption

field_caption

domain: server

language: python

Field class

Description

`Field_caption` attribute specifies the name of the field that appears to users.

See also

Dataset

Fields

field_name

field_name

field_name

domain: server

language: python

Field class

Description

Specifies the name of the field as referenced in code. Use `field_name` to refer to the field in code.

See also

Dataset

Fields

field_caption

field_size

field_size

domain: server

language: python

Field class

Description

Identifies the size of the text field object.

See also

Dataset

Fields

field_type

field_type

domain: server

language: python

Field class

Description

Identifies the data type of the field object.

Use the `field_type` attribute to learn the type of the data the field contains. It is one of the following values:

- "text",
- "integer",
- "float",
- "currency",
- "date",
- "datetime",
- "boolean",
- "blob"

See also

Dataset

Fields

lookup_text

lookup_text

domain: server

language: python

Field class

Description

Use `lookup_text` property to get the lookup value of the *lookup field* converted to string.

If the field is *lookup field* gives its lookup text, otherwise gives the value of the *text* property

See also

Fields

Lookup fields

lookup_value

text

lookup_value

lookup_value

domain: server

language: python

Field class

Description

Use `lookup_value` property to get the lookup value of the *lookup field*

If the field is *lookup field* gives its lookup value, otherwise gives the value of the *value* property

See also

Fields

Lookup fields

lookup_value

lookup_text

owner

owner

domain: server

language: python

Field class

Description

Identifies the item to which a field object belongs.

Check the value of the owner attribute to determine the item that uses the field object to represent one of its fields.

See also

Dataset

Fields

raw_value

raw_value

domain: server

language: python

Field class

Description

Represents the data in a field object.

Use `raw_value` read only property to read data directly from the item dataset. Other properties such as *value* and *text* use convesion. So the *value* property converts the `null` value to `0` for the numeric fields.

See also

Fields

value

text

read_only

read_only

domain: server

language: python

Field class

Description

Determines whether the field can be modified in data-aware controls.

Set `read_only` to `true` to prevent a field from being modified in data-aware controls.

See also

Fields

required

required

required

domain: server

language: python

Field class

Description

Specifies whether a not empty value for a field is required.

Use `required` to find out if a field requires a value or if the field can be blank. When `required` property is set to true, trying to post a null value will cause an exception to be raised.

See also

Fields

read_only

text

text

domain: server

language: python

Field class

Description

Use `text` property to get or set the text value of the field.

Getting text property value

Gets the value of the *value* property and converts it to text.

Setting text property value

Converts the text to the type of the field and assigns its *value* property to this value

See also

Fields

Lookup fields

lookup_value

text

lookup_text

value

value

domain: server

language: python

Field class

Description

Use `value` property to get or set the value of the field.

Getting value

When field data is `null`, the field converts it to `0`, if the field_type is "integer", "float" or "currency", or to empty string if field_type is "text".

For *lookup fields* the value of this property is an integer that is the value of the id field of the corresponding record in the lookup item. To get lookup value of the field use the *lookup_value* property.

Setting value

When a new value is assigned, the field checks if the current value is not equal to the new one. If so it

- sets its `new_value` attribute to this value,
- triggers the *on_before_field_changed* event if one is defined for the field,
- changes the field data to the `new_value` attribute and sets it to `null`,
- mark item as modified, so the *is_modified* method will return `true`
- triggers the *on_field_changed* event if one is defined for the field
- updates data-aware controls

See also

Fields

Lookup fields

lookup_value

text

lookup_text

7.2.10 Filter class

class Filter

domain: server

language: python

Attributes and properties

filter_name

filter_name

domain: server

language: python

class *Filter class*

Description

Specifies the name of the filter as referenced in code. Use `filter_name` to refer to the field in code.

See also

Filters

Dataset

owner

owner

domain: server

language: python

class *Filter class*

Description

Identifies the item to which a filter object belongs.

Check the value of the owner attribute to determine the item that uses the filter object to represent one of its filters.

value

value

domain: server

language: python

class *Filter class*

Description

Use `value` property to get or set the value of the filter.

Example

```
function on_view_form_created(item) {
    item.filters.invoicedate1.value = new Date(new Date().setYear(new Date().
↪getFullYear() - 1));
}
```

See also

Filters

Dataset

CAPÍTULO 8

Release notes

8.1 Version 1

Version 1 was designed to develop database desktop applications based on the GTK Toolkit.

8.2 Version 2

In version 2, support for developing database applications with a web interface was added.

8.3 Version 3

In version 3, support for development of database desktop applications based on the GTK Toolkit was removed.

8.4 Version 4

In Version 4 the server side was reworked. Web.py library was replaced with werkzeug. Session support was added.

8.4.1 Version 4.0.70

Jam.py library:

- Bug, related to last column disappearance when table content is larger than its container, fixed.
- Bug, related to table footer, fixed.
- *lookup_type* property of *Field class* added
- Exception is now raised when developer forgets to add a value attribute to a field, when specifing a value for programmable cell.
- Bug, related to date and datetime fields in when clause for SQlite database, fixed.
- Administrator now shows project version / jam.py version information.

Demo application:

- Filter text bug in demo application fixed.
- Selection of search field for catalogs in demo application is added.
- Multiple record selection in invoices journal in demo application is added (used when delete button is clicked)
- Menu in demo application is changed.
- blue-theme.css file added

Twitter account created: https://twitter.com/jampy_framework

Jam.py Users Mailing List created: https://groups.google.com/forum/#!forum/jam-py

8.4.2 Version 4.0.71

Jam library:

- Tables are now responsive
- Fixed header columns and table columns mismatch
- Several themes added

Demo application:

- Dashboard added
- Theme selections added
- Resize function from Task client module removed

8.4.3 Version 4.0.74

Jam.py:

- Bug with *open* method, when order_by parameter is an empty list fixed
- Bug with sql generated when default order is set and fields parameter do not contain any of field of default order in the *open* method fixed
- The exception handling of errors occurring in the code, when inplace editor is used reworked so developer can find the reson of an error

Administrator:

- Tabs are now created for opened modules.

Demo application:

- Search for catalogs reworked.

8.4.4 Version 4.0.78

Jam.py:

- Import functionality for SQLITE databases is available now
- Creation of foreign field indexes for SQLITE databases are removed
- Popovers for fields with help attribute reworked

Admin:

- Bugs related to tabs are fixed

Demo:

- For Customers item email sending functionally is added. It demonstrates the use of *server* method to execute script defined in the server module from client module, how to use fields of item with virtual_table to create a form for input of data.

8.4.5 Version 4.0.79

Jam.py:

- Tables columns resizing reworked
- Mysql - bug with datetime fields in where clause fixed
- *on_ext_request* event published

Demo application:

- For Customers lookup modal view form Send and Print buttons are hidden now

Documentation:

- Faq - new topics added

8.4.6 Version 4.0.81

Jam.py:

- Displaying of wells in modeless forms is corrected
- Async parameter for the client apply method added
- Bug of clone method when expanded attribute is false fixed
- Bug related to lookup_value, lookup_text and display_text properties of fields and params with lookup_lists fixed
- Bug, when users were able to print reports when 'Can view' was disabled for their role, fixed
- Open, set_where, set_fields, set_order_by methods on the server can have the same parameters as corresponding. methods on the client
- Edit_record, apply changes, cancel_edit methods on the client modified so that user can open documents for viewing when can_edit method returns false
- When converting reports the soffice is passed norestore parameters
- Starting '/' signs are removed from css and js links in index.html file
-

Administrator:

- Validation of field names is corrected

Demo application:

- Select button added to the Invoices edit form to add selected tracks to the invoice.
- Visible items whose set_view method returns false are not added to the dynamic menu

8.4.7 Version 4.0.84

Library:

- Python 3 is now supported
- The work is started to support multiple languages

- Reports on server now have ext attribute

Demo:

- Example of using *on_convert_report* event of reports group on the server is created

8.4.8 Version 4.0.88

Library:

- Html templates reworked
- You can change 12px default font to 14px default font by replace jam.css to jam14.css in index.html

Demo:

- New examples of using html templates

8.5 Version 5

8.5.1 Version 5.0.1

Library:

- Default font is 14px now you can change it to 12px font by replacing

  ```
  <link href="jam/css/jam.css" rel="stylesheet">
  ```

  with

  ```
  <link href="jam/css/jam12.css" rel="stylesheet">
  ```

  in index.html

- Administrator is renamed to Application builder you can run it by typing 127.0.0.1:8080/builder.html, 127.0.0.1:8080/admin.html is also supported
- Asterisk is added to required fields now

  To cancel it add

  ```
  .control-label.required:after {
      content: "";
  }
  ```

  to project.css file

- Selection of lookup list value in report parameters for fixed.

Documentation:

- First version of Documentation completed
- New topics added:

  refresh_record

  refresh_page

  search

- Jam.py roadmap added

Demo:

- Small font menu item is added to Themes menu

8.5.2 Version 5.1.1

Library:

- History of changes made by users can now be stored. See *Saving the history of changes made by users*
- Local filtering of dataset records is reworked and published. See *Filtered*, *on_filter_record*
- *clone* method is published
- Application is now throws an exception when an attempt is made to get or set a value to a field when the dataset is empty.

Application Builder:

- **Delete reports after** attribute is added to *Project parameters*
- Some changes to interface are made.

8.5.3 Version 5.2.1

Library:

- DBtable class declared jam.js reworked. Paginator div is removed from table and doesn't scroll when table is scrolled. For tables with pagination y scrolling is removed. You can pass *create_table* method two new options:
  - summary_fields - a list of field names. When it is specified and item paginate attribute is true, the table calculates sums for numeric fields and displays them in the table footer, for not numeric fields it displays the number of records.
  - freeze_count - an integer value. If it is greater than 0, it specifies number of first columns that become frozen - they will not scroll when the table is scrolled.
- Bug when inserting a new record and pressing Escape key doesn't cancel operation fixed
- Bug when history doesn't save user name fixed

Demo project:

- Code that calculated summary for table in invoices client module removed
- Code of on_view_form_created event handler in the task client module of demo application and new project is changed so after deleting a record the *refresh_page* method is called

8.5.4 Version 5.3.1

Library:

- A set of client methods of the task for working with tabs developed
  - *init_tabs*
  - *add_tab*
  - *close_tab*
- Forms are reworked. Each form now have a div with modal-header class declared in the index.html file. The elements for search input and filter text are removed from the form templates and placed in the form header.
- The *view*, *append_record*, *insert_record* and *edit_record* methods are reworked. If a container parameter is passed to these methods and the *init_tabs* method is called for the container, the tabs are created that contains the forms.

For existing projects add the line

```
task.init_tabs($("#content"));
```

at the beginning on the on_page_loaded event handler of the task client module to forms be displayed in tabs and add a $("#content") container parameter to append_record, insert_record and edit_record methods.

You can add a line

```
task.add_form_borders = false;
```

if you don't want to change html templates of the forms. Otherwise remove elements for search input and filter text (in the div with form-header class, remove it) from the form templates and add the div with modal-header class to templates.

Demo:

- Demo was rewritten to display forms in tabs and modeless edit forms

Documentation:

- *on_ext_request* example corrected for Python 3

8.5.5 Version 5.3.3

Library:

- Safe mode bug (after version 5.3.1) fixed
- Postgres import bug fixed
- Task attribute `edit_form_container` is defined in the on_page_loaded event handler of the task client module of a new project and demo application

```
task.edit_form_container = $("#content"); // comment this line to have modal edit␣
↪forms
```

8.5.6 Version 5.4.1

Application builder

- The language attribute is added to the Project parameters to select the language used in the Project and allows to add or edit the language.
- Interface tab added to Project parameters dialog
- Buttons "View" and "Edit" renamed to "View form" and "Edit form"
- The "View form" dialog lets now setup, besides fields used to create tables, table options such as columns to set sorting order and summary fields. Use "Form" tab to setup from options including detail that will be displayed in the view form
- The "Edit form" dialog allows to create tabs and bands to display field inputs in the edit forms. You can setup details that will be displayed and edited in the edit form in the "Form" tab

Library

- First stage of internalization completed. Developers can add their languages
- Processing of form events worked over. See _process_event method in jam.js

- To avoid concurrency problems and memory leaks the task tree on the server side is immutable now, except when on_created event is executed. You must use copy method when you need to call open method or want to change attributes of items in the event handlers or functions on the server
- The create_detail_views method added that allows to edit details in the edit forms
- Item class: table_options attribute added (contains table options setup in the AppBuilder)
- DBAbstructInput class: coping, pasting, Escape key processing worked over
- DBTable class: hints worked over
- Themes were corrected
- A lot of minor changes

Demo application

- Themes removed. You can set theme in the Project parameters Interface tab.
- Dynamic menu worker over

Nota

If you created your project with a version of the library less than 4.3.1 add the following line in the on_page_loaded event handler in the task's client module:

```
task.old_forms = true;
```

For libraries with versions 4.3, clear the code of client modules of catalogs and journals and replace client module of the task with the corresponding code of the Demo application or the new project. Make an archive of the project before doing it.

8.5.7 Version 5.4.11

Library:

- Metadata import/export and copy_database method of the server task reworked for compatibility with different databases, when a project moved to a database of different type
- *on_detail_changed* event and *calc_summary* method added
- *alert*, alert_info and alert_success methods added
- python 3 bugs of MYSQL, Postgres, Oracle database support fixed
- some bugs fixed related to SQL queries generation
- on_login event bugs fixed
- *field_mask* attribute for fields on client added
- date inputs use masks now
- create_menu method of the client task added.
- As much code as possible are moved from default code (and demo project) to the library
- Bugs related to non-ascii characters in the project path fixed

Application builder:

- keyboard shortcuts bugs fixed
- roles bugs fixed

- rights can be set for details
- mask attribute added to Fields Dialog
- Summary fields attribute added in the View Form Dialog for details
- Default search field, Detail height attributes added in the View Form Dialog
- Detail height attribute added in the Edit Form Dialog
- some minor bugs fixed

Nota

To use masks in existing projects the following line must be added to index.html after package update:

<script src="jam/js/jquery.maskedinput.js"></script>

before

<script src="jam/js/jam.js"></script>

8.5.8 Version 5.4.14

Library:

- add_button method added
- *select_records* method added
- *alert* method bugs fixed
- bootstrap theme buttons changed
- Metadata import bug fixed - didn't display error that was raised when changes to DB were committed

8.5.9 Version 5.4.15

Library:

- Support for MS SQL SERVER added
- Jam.py supports deletion and changing of fields, and foreign indexes for SQLITE database now. As SQLITE doesn't support column changing and deletion and addition of foreign indexes to existing tables, Jam.py creates a new table and copies records into it from old one.
- for SQLITE database Jam.py doesn't support import of metadata to an existing project (project items of which have corresponding tables in database) now. You can import of metadata to a new project
- BLOB field type renamed to LONGTEXT and corresponding DB field changed from Blob (if it was) to Long text type wherever possible

Application Builder:

- History item creation bug fixed
- Foreign indexes creation bug fixed

8.5.10 Version 5.4.21

Library:

- SQLITE - case insensitive search implemented
- MSSQL bugs fixed
- Search reworked
- Field Dialogs - you can specify default values for DATE, DATETIME, BOOLEAN fields and for lookup fields that are based on lookup lists. Theses default values are assigned to fields when append or insert methods of element are called on the client or server. These default values are not applied when you are changing table record using direct SQL query.
- select_records method reworked
- add_view_button, add_edit_button methods added
- When user tries to close or reload page and there is an item that is being edited and its data has been modified the application warns user about it.
- A lot of miscellaneous bug fixed
- FAQ, Application Builder, Into chapter in the documentation reworked

8.5.11 Version 5.4.22

Library:

- *upload* method reworked
- Image and file field types added - *Tutorial. Part 2. File and image fields*
- **Buttons on top** attribute added to the Form tab of the *View Form Dialog*
- *refresh_record* method reworked, it can refresh details of the item
- on_field_get_html event added

Demo application:

- Invoices: on_field_get_html handler added
- Customer: image field "Photo" added
- Tracks: file field "File" added

8.5.12 Version 5.4.23

Library:

- *refresh_record* bugs fixed
- Image and file fields can be lookup fields now

Application builder:

- creating new group bug fixed

8.5.13 Version 5.4.24

Library:

- Language support reworked

- Images of image fields of Application builder items are stored in static/builder folder now to be able to export/import them to/from metadata file
- MSSQL ALTER TABLE bug fixed

8.5.14 Version 5.4.27

Library:

- Capturing image from camera options is now available. See **Capturing image from camera** in the *Field Editor Dialog*
- Bug in Chrome 7 with report parameters order is fixed.
- **Buttons on top** attribute added to the Form tab of the *Edit Form Dialog* Works for new projects, for existing project copy the div with class 'default-top-edit' form a new project index.html to your index.html
- *read_only* reworked
- *on_login* event params changed, previous params supported with warning in the logs
- There can be multiple details in view form
- Details order can be changed now
- Esprima-python library is used now for parsing javascript on the server
- German translation added
- Various minor bugs fixed
- Readme file changed

Demo application:

- Tracks catalog view form displays sold tracks.

8.5.15 Version 5.4.29

Library:

- Jam.py uses JQuery 3 now
- *lock* method added
- *create_connection_ex* method added
- *edit_record* method reworked, the edit form events are triggered after all data are get from the server
- connection of connection pull is recreated after one houre of inactivity
- minor bugs fixed

Documentation:

- *How can I perform calculations in the background*
- *How can I use data from other database tables*

8.5.16 Version 5.4.30

- Bug when creating a new project on some systems, related to encoding, fixed
- Greek language added
- For fields of longtext type when value is null value property returns empty string now.

- *select_records* method reworked. all_record parameter added. If the all_records parameter is set to true, all selected records are added, otherwise the method omits existing records (they were selected earlier).
- view_form_created and edit_form_created methods added to the Task class (reserved for future use)
- Code that used to create tables and detail tables in on_view_form_created event handler of task moved to create_view_tables method of Item class in jam.js module
- table_container_class and detail_container_class attributes added to items view_options to enable developer to change in on_view_form_created event handler of item
- inputs_container_class and detail_container_class attributes added to items edit_options to enable developer to change in on__form_created event handler of item
- In jam.css and jam12.css fixed the btn groups left margin in form-header and form-footer class
- Some minor bugs fixed

8.5.17 Version 5.4.31

- Bug when reading index.html file fixed. Index.html must have a unicode encoding.
- German translation updated.
- Bug when Dashboard are opened fixed in Demo.
- Users item added to demo.
- on_login event handler in task server module that uses Users item to login is written (commented) and changing of password implemented. Uncomment on_login to see how it works. Description is here https://groups.google.com/forum/#!topic/jam-py/Obkv5d3yT8A

8.5.18 Version 5.4.36

Library:

- tables reworked, they now support virtual scrolling.
- some bugs fixed

Application Builder:

- Search added for items.

Demo application:

- User registration implemented

8.5.19 Version 5.4.37

Library:

- Jam.py can now be deployed on PythonAnywhere. See *How to deploy project on PythonAnywhere*
- Directory of the project can be passed to the create_application function now (jam/wsgi.py module).
- Multiprocessing connection pool parameter removed from project *Parameters*
- Bugs related to processing of keyboard events by forms fixed
- Some bugs fixed

Documentation:

- *How to* section created. That section will contain code examples that can be useful to quickly accomplish common tasks.

8.5.20 Version 5.4.40

Library:

- Jam.py now uses SQLAlchemy connection poll
- when image field read_only attribute is set user can not change the image by double-clicking on it
- Some bugs fixed

Documentation:

deployment section added to *How to*

How to lock a record so that users cannot edit it at the same time topic added

8.5.21 Version 5.4.53

Library:

- *on_login* event changed
- *generate_password_hash* and *check_password_hash* mathods added
- bugs related to moving to SQLAlchemy and tables with virtual scroll are fixed.
- tables resizing bug for numeric fields fixed
- tables with freezed cols bugs fixed
- details bug when renaming copy fixed
- minor bugs fixed

Documentation:

- latest docs changes
- how to section bug fixed
- 'How to lock a record so that users cannot edit it at the same time' topic removed - other algorithm will be used

8.5.22 Version 5.4.54

Library:

- MSSQL bug when selecting tables for import fixed
- delta old_value property code modified (not documented yet)

Documentation:

- *Authentication* section added to *How to*

8.5.23 Version 5.4.56

Library:

- *Record locking* is available
- task creation in wsgi.py modified to avoid 'project have not been created yet' message
- report parameters display_text bug fixed
- `show_hints` and `hint_fields` attributes can be added to the *table_options* or options parameter of the *create_table* method.
- *refresh_record* method restore positions of detail records

Documentation:

- *Form events* rewriten
- Some topics from *Jam.py FAQ* are moved to *How to*

Demo application

- on_apply event handler in Invoices server module modified

8.5.24 Version 5.4.57

Library:

- *Record locking* bug, when PostgreSQL, MSSQL or Firebird database is used, fixed

To use record locking for items for which you defined *on_apply* event handler you must change. Add the connection parameter, create a cursor and use the cursor to execute sql queries. Otherwise the record locking won't work.

For example, the code

```
def on_apply(item, delta, params):
    tracks_sql = []
    delta.update_deleted()
    for d in delta:
        for t in d.invoice_table:
            if t.rec_inserted():
                sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0) + \
                %s WHERE ID = %s" % \
                (t.quantity.value, t.track.value)
            elif t.rec_deleted():
                sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0) - \
                (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) WHERE ID = %s" % \
                (t.id.value, t.track.value)
            elif t.rec_modified():
                sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0) - \
                (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) + %s WHERE ID = %s
↪" % \
                (t.id.value, t.quantity.value, t.track.value)
            tracks_sql.append(sql)
    sql = delta.apply_sql()
    return item.task.execute(tracks_sql + [sql])
```

must be changed to

```
def on_apply(item, delta, params, connection):
    with item.task.lock('invoice_saved'):
        cursor = connection.cursor()
        delta.update_deleted()
        for d in delta:
            for t in d.invoice_table:
                if t.rec_inserted():
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪+ \
                    %s WHERE ID = %s" % \
                    (t.quantity.value, t.track.value)
                elif t.rec_deleted():
```

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```
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪- \
                    (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) WHERE ID = %s"
↪% \
                    (t.id.value, t.track.value)
                elif t.rec_modified():
                    sql = "UPDATE DEMO_TRACKS SET TRACKS_SOLD = COALESCE(TRACKS_SOLD, 0)␣
↪- \
                    (SELECT QUANTITY FROM DEMO_INVOICE_TABLE WHERE ID=%s) + %s WHERE ID␣
↪= %s" % \
                    (t.id.value, t.quantity.value, t.track.value)
                cursor.execute(sql)
```

8.5.25 Version 5.4.60

Library:

- Synchronization of parameters and reloading of the task tree when metadata changes for web applications running on parallel processes reworked.
- Import of metadata reworked. See Export/import metadata
- Created the ability to import metadata from the migration folder when the server is restarted. See *How to migrate development to production*
- Migration to another database is available now. See *How to migrate to another database*
- virtual_table is now a read-only property on the client *virtual_table* and server *virtual_table*. For an item which virtual_table property is true, calling the open method creates an empty data set, and calling the apply method does nothing.
- When importing a table the virtual_table attribute id read only now.
- title_line_count option is added to the *table_options* specifies the number of lines of text displayed in a title row, if it is 0, the height of the row is determined by the contents of the title cells It can be set in Application Builder.

8.5.26 Version 5.4.69

Library:

- Werkzeug library upgraded to the version 0.15.4
- common.py module rewritten, consts object created
- adm_server.py module removed
- admin folder is created with modules
  - admin.py - application builder server side module
  - task.py - loading of task from admin.sqlite database
  - export_metadata.py
  - import_metadata.py
- builder folder added to package that contains Application Builder project that is used to create Jam.py Application Builder, see read.me file in the folder.
- task loading accelerated

- import of metadata rewritten
- import of metadata accelerated
- *permissions* property added
- logging created (currently under development and not documented yet)
- edit method on the client and server checks now if item state is in edit mode and if it is does nothing
- round methods are corrected on the client and server, value of currency fields are rounded before they are assigned
- inline editing is now available for any items (not details only)
- inline editing of lookup fields, list fields, date and datetime inputs reworked, bugs fixed
- fixed columns of tables bugs fixed
- tables striped option added
- search input is focused now by Ctrl-F, Escape returns focus to the table
- *enable_controls* redraws controls now, no need to call update_controls method
- lot of bugs fixed

Application builder:

- a link to the form-related documentation page has been added to the application Builder form headers

Documentation:

- search bug fixed
- topics related to the server on_apply and on_open events rewritten
- new topic added *How to prohibit changing record*

8.5.27 Version 5.4.109

- The work on sanitizing of field values is completed. See *Sanitizing*
- The **TextArea** attribute is added the **Interface Tab** of the *Edit Form Dialog* for TEXT fields
- The **Do not sanitize** attribute is added the **Interface Tab** of the *Edit Form Dialog*. See *Sanitizing*
- The **Accept** attribute of the **Interface Tab** of the *Edit Form Dialog* for FILE fields is required now. Uploaded files are checked on the server against this attribute.
- The **Upload file extensions** attribute is added to the *Project parameters* that defines file types that are allowed to be uploaded by the task *upload* method.
- The `expanded` options is added to the *add_edit_button* and *add_view_button* methods.

8.5.28 Version 5.5.4

- The version bump up to indicate a fork from jam.py to jam.py-v5. The reason for a fork is Andrew retiring from this project.

8.6 Version 7

The version 7 is still under development. The biggest difference to V5 is routing support, and Bootstrap 5, enabling modern support for mobile devices.

8.6.1 Version 7.0.39

First V7 documentation created.

8.6.2 Version 7.0.50

New date-picker implemened - https://github.com/stefangabos/Zebra_Datepicker

The Docs how use the plugin is TBA.

Alternatively, please visit above GitHub page.

8.6.3 Version 7.0.53

Camera capture fixed.

8.7 Jam.py roadmap

We plan to add the following features to Jam.py:

- Support for actions that can be represented as buttons panels, navbars, pop-up menus and simplifying support for keyboard events, internalization and mobile devices.
- Language support stage 2: internalization, support for multiple languages in the project.
- Support for Bootstrap 4.
- Support for mobile devices.
- Development of report wizards, simplifying report creation
- Rework of import/export utility: visual interface, control over merging of changes.
- DBTree component revision and creation of documentation

8.7.1 Andrew leaving Jam.py

The notes from a current Jam.py maintainer D. Babic:

Q: Since Andrew decided to leave this project due to the health reasons, the question is how will the roadmap reflect on the project?

A: This is a good question. Andrew invested a lot of time and effort in Jam.py, and it has been great. My huge thanks for that. I would say the Jam.py v5 is very stable, production ready, and there will be minimal effort in the core code maintenance. The v7 on the other hand already reflected some of the above roadmap points, mainly BS4 and mobile devices. Which was a fantastic effort again by Andrew. The idea of report wizards was great, basically to eliminate the LibreOffice Calc dependency. The question here is how many users actually utilize the true power of reports? Not quite sure how many. Hence, for now, the LibreOffice will stay as is.

Q: Would there be new Jam.py v5 releases at all?

A: I'm not sure if Andrew will engage in the new v5 releases. The pull requests will be accommodated as per demand. However, the Jam.py will be released as a fork, which means the merge will be synced to the fork and then the new version will be built automatically by GitHub Actions as jam.py-v5

Q: Why forking as jam.py-v5?

A: Because of the GitHub Organisation. We need project maintainers, who can manage GitHub Actions and PyPi. Current Jam.py is owned by Andrew, which does not support this I'm afraid. Hence, new releases will exist on PyPi as jam.py-v5. Similar to this is a v7 fork as jam.py-v7, also available on PyPi.

Q: So the v7 is also available?

A: Yes it is. Currently, it is not production ready. However, if Andrew will be able to do some tweaks during the year 2024 or latter, it might be production ready. We will see.

Q: Are the v7 Docs ready?

A: We also decided to move Docs from the PyPi distribution, due to work in progress. We believe that the users very rarely built the Docs themselves, hence it would be better to point the users to any online documents repository, which is again built by the GitHub Actions. At the moment when v7 Docs are ready, we will publish them by Actions as well.

Q: What is the Jam.py future?

A: I see a very bright future with Jam.py! Ultimately, we would love to see Jam.py built as Windows App Store application by the GitHub Actions. This would enable a huge exposure to the Windows users and bring the very bright future.

Thanks for reading.

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