Reltool Users Guide

Reltool is a release management tool. It analyses a given Erlang/OTP installation and determines various dependencies between applications. The graphical frontend depicts the dependencies and enables interactive customization of a target system. The backend provides a batch interface for generation of customized target systems.

1.1 Introduction

Reltool is a release management tool. It analyses a given Erlang/OTP installation and determines various dependencies between applications. The graphical frontend depicts the dependencies and enables interactive customization of a target system. The backend provides a batch interface for generation of customized target systems.

1.1.1 Scope and Purpose

This manual describes the Reltool application, as a component of the Erlang/Open Telecom Platform development environment. It is assumed that the reader is familiar with the Erlang Development Environment, which is described in a separate User's Guide.

1.1.2 Prerequisites

The following prerequisites is required for understanding the material in the Reltool User's Guide:

- familiarity with Erlang/OTP system principles and Erlang/OTP design principles

The application requires Erlang/OTP release R13B02 or later.

1.1.3 About This Manual

In addition to this introductory chapter, the Reltool User's Guide contains the following chapters:

- Chapter 2: "Usage" describes the architecture and typical usage of the application.
- Chapter 3: "Examples" gives some usage examples

1.1.4 Where to Find More Information

Refer to the following documentation for more information about Reltool and about the Erlang/OTP development system:

- the Reference Manual of Reltool
- the Erlang/OTP System Principles
- the Erlang/OTP Design Principles

1.2 Usage

1.2.1 Overview

This document focuses on the graphical parts of the tool. The concepts are explained in the reference manual for the module reltool.
1.2.2 System window

The system window is started with the function reltool:start/1. At startup the tool will process all beam files and app files in order to find out dependencies between applications and their modules. Once all this information has been derived, it will be possible to explore the tool.

The system window consists of four main pages (tabs):

- Libraries
- System settings
- Applications
- Releases

Click on a name tag to display its page.

Libraries

On the library page it is possible to control which sources the tool will use. The page is organized as a tree which can be expanded and collapsed by clicking on the little symbol in the beginning of the expandable/collapsible lines.

The Root directory can be edited by selecting the line where the path of the root directory is displayed and clicking the right mouse button. Choose edit in the menu that pops up.

Library directories can be added, edited or deleted. This is done by selecting the line where the path to a library directory is displayed and clicking the right mouse button. Choose add, edit or delete in the menu that pops up. New library directories can also be added by selecting the line Library directories and clicking the right mouse button. Choose add in the menu that pops up.

Escript files can be added, edited or deleted. This is done by selecting the line where the path to an escript file is displayed and clicking the right mouse button. Choose add, edit or delete in the menu that pops up. New escripts can also be added by selecting the line Escript files and clicking the right mouse button. Choose add in the menu that pops up.

When libraries and escripts are expanded, the names of their contained applications will be displayed. Double click on an application name to launch an application window.

System settings

On the system settings page it is possible to control some global settings that are used as defaults for all applications. Set the Application inclusion policy to include or to include all applications that are not explicitly excluded. See incl_cond (application inclusion) and mod_cond (module inclusion) in the reference manual for the module reltool for more info.

The system settings page is rather incomplete.

Applications

There are four categories of applications on the applications page. Included contains applications that are explicitly included. Excluded contains applications that are explicitly excluded. Derived contains applications that either are used directly by explicitly included applications or by other derived applications. Available contains the remaining applications.

Select one or more applications and click on a button directly below the application column to change application category. For example, select an available application and click on its tick button to move the application to the included category. Clicking on the tick symbol for included applications will move the application back to the available category. The tick is undone.

The symbols in front of the application names are intended to describe the status of the application. There are error and warning symbols to signalize that there is something which needs attention. The tick symbol means that the application is included or derived and no problem has been detected. The cross symbol means that the application is excluded or
1.2 Usage

available and no problem has been detected. Applications with error symbols are listed first in each category and are followed by the warnings and the normal ones (ticks and crosses) at the end.

Double click on an application to launch its application window.

Releases

The releases page is incomplete and very experimental.

File menu

- Display application dependency graph - Launches an application force graph window. All included and derived applications and their dependencies will be shown in a graph.
- Display module dependency graph - Launch a module force graph window. All included and derived modules and their dependencies will be shown in a graph.
- Reset configuration to default
- Undo configuration (toggle)
- Load configuration - Loads a new configuration from file.
- Save configuration - Saves the current configuration to file. Normally, only the explicit configuration parameters with values that differ from their defaults are saved. But the configuration with or without default values and with or without derived values may also be saved.
- Generate rel, script and boot files
- Generate target system
- Close - Close the system window and all its subwindows.

Dependencies between applications or modules displayed as a graph

The dependency graph windows are launched from the file menu in the system window. The graph depicts all included and derived applications/modules and their dependencies.

It is possible to perform some limited manipulations of the graph. Nodes can be moved, selected, locked or deleted. Move a single node or the entire graph by moving the mouse while the left mouse button is pressed. A node can be locked into a fix position by holding down the shift button when the left mouse button is released. Select several nodes by moving the mouse while the control key and the left mouse button are pressed. Selected nodes can be locked, unlocked or deleted by clicking on a suitable button.

The algorithm that is used to draw a graph with as few crossed links as possible is called force graph. A force graph consists of nodes and directed links between nodes. Each node is associated with a repulsive force that pushes nodes away from each other. This force can be adjusted with the left slider or with the mouse wheel. Each link is associated with an attractive force that pulls the nodes nearer to each other. This force can be adjusted with the right slider. If this force becomes too strong, the graph will be unstable. The third parameter that can be adjusted is the length of the links. It is adjusted with the middle slider.

The Freeze button starts/stops the redrawing of the graph. Reset moves the graph to the middle of the window and resets all graph settings to default, with the exception of deleted nodes.

1.2.3 Application window

The application window is started by double clicking on an application name. The application window consists of four pages (tabs):

- Application settings
- Modules
- Application dependencies
- Module dependencies
Click on a name tag to display its page.

**Application settings**

Select version of the application in the **Source selection policy** part of the page. By default the latest version of the application is selected, but it is possible to override this by explicitly selecting another version.

Note that in order for reltool to sort application versions and thereby be able to select the latest, it is required that the version id for the application consists of integers and dots only, for example 1.2.0 or 3.17.1.

By default the **Application inclusion policy** on system level is used for all applications. Set the value to `include` if you want to explicitly include one particular application. Set it to `exclude` if you want to exclude the application despite that it is used by another (explicitly or implicitly) included application. `derived` means that the application automatically will be included if some other (explicitly or implicitly) included application uses it.

By default the **Module inclusion policy** on system level is used for all applications. Set it to `derived` if you only want actually used modules to be included. Set it to `app` if you, besides derived modules, also want the modules listed in the app file to be included. Set it to `ebin` if you, besides derived modules, also want the modules that exist as beam files in the ebin directory to be included. Set it to `all` if you want all modules to be included, that is the union of modules found in the ebin directory and listed in the app file.

The application settings page is rather incomplete.

**Modules**

There are four categories of modules on the modules page. **Included** contains modules that are explicitly included. **Excluded** contains modules that are explicitly excluded. **Derived** contains modules that either are used directly by explicitly included modules or by other derived modules. **Available** contains the remaining modules.

Select one or more modules and click on a button directly below the module column to change module category. For example, select an available module and click on its tick button to move the module to the included category. Clicking on the tick symbol for included modules will move the module back to the available category. The tick is undone.

Double click on a module to launch its module window.

**Application dependencies**

There are four categories of applications on the **Application dependencies** page. If the application is used by other applications, these are listed under **Used by**. If the application requires other applications be started before it can be started, these are listed under **Required**. These applications are listed in the **applications** part of the app file. If the application includes other applications, these are listed under **Included**. These applications are listed in the **included_applications** part of the app file. If the application uses other applications, these are listed under **Uses**.

Double click on an application name to launch an application window.

**Module dependencies**

There are two categories of modules on the **Module dependencies** page. If the module is used by other modules, these are listed under **Modules using this**. If the module uses other modules, these are listed under **Used modules**.

Double click on an module name to launch a module window.
1.2.4 Module window

The module window is started by double clicking on a module name. The module window consists initially of two pages (tabs):

- Dependencies
- Code

Click on a name tag to display its page.

Dependencies

There are two categories of modules on the Dependencies page. If the module is used by other modules, these are listed under Modules using this. If the module uses other modules, these are listed under Used modules.

Double click on an module name to launch a module window.

Code

On the Code page the Erlang source code is displayed. It is possible to search forwards and backwards for text in the module. Enter a regular expression in the Find field and press enter. It is also possible to go to a certain line in the module. The Back button can be used to go back to the previous position.

Put the marker on a function name and double click to go to the definition of the function. If the function is defined in another module, that module will be loaded and added to the page list.

1.3 Examples

1.3.1 Start and stop windows and servers

The main process in Reltool is the server. It can be used as it is or be used via the GUI frontend process. When the GUI is started, a server process will automatically be started. The GUI process is started with \texttt{reltool:start/0, reltool:start/1} or \texttt{reltool:start_link/1}. The pid of its server can be obtained with \texttt{reltool:get_server/1}

\begin{verbatim}
1> {ok, Win} = reltool:start([]).
   {ok, <0.36.01>}
2> {ok, Server} = reltool:get_server(Win).
   {ok, <0.37.01>}
3> reltool:get_config(Server).
   {ok, {sys, []}}
4> {ok, Server2} = reltool:start_server([]).
   {ok, <0.6535.01>}
5> reltool:get_config(Server2).
   {ok, {sys, []}}
6> reltool:stop(Server2).
   ok
\end{verbatim}
1.3.2 Inspecting the configuration

Erlang/OTP 20 [erts-9.0] [source-c13b302] [64-bit] [smp:4:4] [ds:4:4:10] [async-threads:10] [hipe] [kernel-poll:false]
Eshell V9.0 (abort with "^G")

1> Config = [{sys, [{escript, "examples/display_args", [{incl_cond, include}]},
                 {app, inets, [{incl_cond, include}]},
                 {app, mnesia, [{incl_cond, exclude}]},
                 {app, ssl, [{incl_cond, exclude}]},
                 {app, runtime_tools, [{incl_cond, exclude}]}],
             [{sys, [{escript, "examples/display_args", [{incl_cond, include}]},
                      {app, inets, [{incl_cond, include}]},
                      {app, mnesia, [{incl_cond, exclude}]},
                      {app, ssl, [{incl_cond, exclude}]}},
             {app, runtime_tools, [{incl_cond, exclude}]}].

2> {ok, Server} = reltool:start_server([Config]).
   {ok,<0.66.0>}

3> reltool:get_config(Server).
   {ok,{{sys, [{escript, "/usr/local/lib/erlang/lib/reltool-0.7.3/examples/display_args",
                      [{incl_cond, include}]},
              {app, inets, [{incl_cond, include}]},
              {app, mnesia, [{incl_cond, exclude}]},
              {app, ssl, [{incl_cond, exclude}]},
              {app, runtime_tools, [{incl_cond, exclude}]}],
   [{app, syntax_tools, [{incl_cond, exclude}]}]}}

4> reltool:get_config(Server, false, false).
   {ok,{{sys, [{escript, "/usr/local/lib/erlang/lib/reltool-0.7.3/examples/display_args",
                      [{incl_cond, include}]},
              {app, inets, [{incl_cond, include}]},
              {app, mnesia, [{incl_cond, exclude}]},
              {app, ssl, [{incl_cond, exclude}]},
              {app, runtime_tools, [{incl_cond, exclude}]}],
   [{app, syntax_tools, [{incl_cond, exclude}]}]}}

5> reltool:get_config(Server, true, false).
   {ok,{{root_dir, "/usr/local/lib/erlang"},
         {lib_dirs,[]},
         {escript, "/usr/local/lib/erlang/lib/reltool-0.7.3/examples/display_args",
          [{incl_cond, include}]},
         {mod cond, all},
         {incl cond, derived},
         {app, inets, [{incl cond, include}, {vsn, undefined}, {lib_dir, undefined}]},
         {app, mnesia, [{incl cond, exclude}]},
         {app, ssl, [{incl cond, exclude}]},
         {app, runtime_tools, [{incl cond, exclude}]},
         {app, syntax_tools, [{incl cond, exclude}]},
         {boot_rel,"start_clean"},
         {rel,"start_clean","1.0"},
         {rel,"start_sasl","1.0"},
         {emu name, "beam"},
         {relocatable, true},
         {profile, development},
         {incl_sys_filters, [".*"]},
         {excl_sys_filters, []},
         {incl_app_filters, [".*"]},
         {excl_app_filters, []}}}
1.3 Examples

```erlang
{incl_archive_filters, [".*"]},
{excl_archive_filters, [[...]]...],
{archive_opts, []},
{rel_app_type, ...},
{...}...}

6> reltool:get_config(Server, true, true).
{ok, [{root_dir, "/usr/local/lib/erlang"},
{lib_dirs, []},
{escript, "/usr/local/lib/erlang/lib/reltool-0.7.3/examples/display_args"},
{incl_cond, include}],
{mod_cond, all},
{incl_cond, derived},
{erts, [{app, erts, 
{vsn, "10.0"},
{lib_dir, "/usr/local/lib/erlang/lib/erts-10.0"},
{mod, erl_prim_loader, []},
{mod, erl_tracer, []},
{mod, erl, []},
{mod, erts_code_purger, []},
{mod, erts_dirty_process_signal_handler, []},
{mod, erts_internal, []},
{mod, erts literal_area_collector, []},
{mod, init, []},
{mod, otp Ring0, ...},
{mod, ...}],
{...}...}],
{app, compiler,
{vsn, "7.0.4"},
{lib_dir, "/usr/local/lib/erlang/lib/compiler-7.0.4"},
{mod, beam_a, []},
{mod, beam_asm, []},
{mod, beam_block, []},
{mod, beam bs, []},
{mod, beam bsm, []},
{mod, beam_clean, []},
{mod, beam_dead, []},
{mod, beam dict, []},
{mod, beam disasm, []},
{mod, beam except, []},
{mod, beam flatten, ...},
{mod, ...}],
{...}...}],
{app, crypto,
{vsn, "3.7.4"},
{lib_dir, "/usr/local/lib/erlang/lib/crypto-3.7.4"},
{mod, crypto, []},
{mod, crypto_ec_curves, []}]}},
{app, hipe,
{vsn, "3.15.4"},
{lib_dir, "/usr/local/lib/erlang/lib/hipe-3.15.4"},
{mod, cerl cconv, []},
{mod, cerl closurean, []},
{mod, cerl hipeify, []},
{mod, cerl lib, []},
{mod, cerl messagean, []},
{mod, cerl pmatch, []},
{mod, cerl prettypr, []},
{mod, cerl to icode, []},
{mod, cerl typean, ...},
{mod, ...}],
{...}...}],
{app, inets,
{incl_cond, include},
{vsn, "6.3.9"},
{...}...}]
```
{lib_dir,"/usr/local/lib/erlang/lib/inets-6.3.9"},
{mod,ftp,[]},
{mod,ftp_progress,[]},
{mod,ftp_response,[]},
{mod,ftp_sup,[]},
{mod,http_chunk,[]},
{mod,http_request,[]},
{mod,http_response,...},
{mod,...},
{...}...},
{app,kernel,
[{vsn,"5.2"},
{lib_dir,"/usr/local/lib/erlang/lib/kernel-5.2"},
{mod,application,[]},
{mod,application_controller,[]},
{mod,application_master,[]},
{mod,application_starter,[]},
{mod,auth,[]},
{mod,code,[]},
{mod,code_server,...},
{mod,...},
{...}...]},
{app,mnesia,{{incl_cond,exclude}}},
{app,runtime_tools,{{incl_cond,exclude}}},
{app,sasl,
[{vsn,"3.0.3"},
{lib_dir,"/usr/local/lib/erlang/lib/sasl-3.0.3"},
{mod,alarm_handler,[]},
{mod,erlsrv,[]},
{mod,format_lib_supp,[]},
{mod,misc_supp,...},
{mod,...},
{...}...]},
{app,ssl,{{incl_cond,exclude}}},
{app,stdlib,
[{vsn,"3.3"},
{lib_dir,"/usr/local/lib/erlang/lib/stdlib-3.3"},
{mod,array,[]},
{mod,base64,...},
{mod,...},
{...}...]},
{app,syntax_tools,{{incl_cond,exclude}}},
{app,tools,
[{vsn,"2.9.1"},{lib_dir,[...]},mod,...},{...}...],
{boot_rel,"start_clean"},
{rel,"start_clean","1.0","[]"},
{rel,"start_sasl","1.0","[...]"},
{emu_name,"beam"},
{relocatable,true},
{profile,...},
{...}...}}
7> reltool:get_config([{sys, [{profile, embedded}]}], true, false).
{ok,sys,{{root_dir,"/usr/local/lib/erlang"},
{lib_dir,[...],
{mod cond,all},
{incl cond,derived},
{boot_rel,"start_clean"},
{rel,"start_clean","1.0","[]"},
{rel,"start_sasl","1.0","[sasl]"},
{emu name,"beam"},
{relocatable,true},
{profile,embedded},
{incl sys filters,"^bin","^erts","^lib","^releases"},
{excl sys filters,"^bin/(erlc|dialyzer|typer)(||\.exe)"},
{...}...}}
```
8> reltool:get_config([{sys, [{profile, standalone}]}], true, false).
{ok, [sys, [{root_dir, "/usr/local/lib/erlang"}],
    {lib_dirs, []},
    {mod_cond, all},
    {inclCond, derived},
    {boot_rel, "start_clean"},
    {rel, "start_clean", "1.0", []},
    {rel, "start_sasl", "1.0", [sasl]},
    {emu_name, "beam"},
    {relocatable, true},
    {profile, standalone},
    {incl_sys_filters, ["bin/(erl|epmd)(|\.exe|\.ini)$",
                        "\bin/start([-_clean].boot$", "\erts.*/bin/erl\bin|\lib\$"],
    {excl_sys_filters, ["\erts.*/bin/(erlc|dialyzer|typer)(|\.exe)$",
                        "\erts.*/bin/(start|escript|to_erl|run_erl)(|\.exe)$",
                        "\erts.*/bin/.*(debug|pdb)"],
    {incl_app_filters, ["ebin", "\include", "\priv"],
    {excl_app_filters, []},
    {incl_archive_filters, [".*"],
    {excl_archive_filters, ["\include$", "\priv$"],
    {archive_opts, []},
    {rel_app_type, permanent},
    {embedded_app_type, load},
    {app_file, keep},
    {debug_info, keep}]}])
```

1.3 Examples

1.3.3 Generate release and script files

```erlang
codeဣ
1> {ok, Server} = reltool:start_server([{config, [sys, [{boot_rel, "NAME"},
                                                           {rel, "NAME", "VSN",
                                                            [sasl]}]}]}).
{ok,<0.1288.0>}
2> reltool:get_config(Server).
{ok,[{boot_rel,"NAME"},
     {rel,"NAME","VSN"},{sasl}]}]
3> reltool:get_rel(Server, "NAME").
{ok,[{NAME,"VSN"},
     [{erts,"10.0"},
      {kernel,"5.2"},{stdlib,"3.3"},{sasl,"3.0.3"}]}]
4> reltool:get_script(Server, "NAME").
{ok,[{NAME,"VSN"},
     [{preLoaded,[erl_prm_loader,erl_tracer,erlang,
                  erts_code_purger,erts_dirty_process_signal_handler,
                  erts_internal,erts_literal_area_collector,init,otp_ring0,
                  prim eval,prim_file,prim_inet,prim_zip,zlib]},
      {progress,preloaded},
      {path,["$ROOT/lib/kernel-5.2/ebin",
             "$ROOT/lib/stdlib-3.3/ebin"],
      {primLoad,[error_handler]},
      {kernel_load_completed},
      {progress,kernel_load_completed},
      {path,["$ROOT/lib/kernel-5.2/ebin"],
      {primLoad,[application,application_controller,
                  application_master,application Starter,auth,code,
                  code server,disk_log,disk_log_l,disk_log_server,
                  disk_log sup,dist ac,dist util,erl_boot_server|...}],
      {path,["$ROOT/lib/stdlib-3.3/ebin"],
      {primLoad,[array,base64,beam_lib,binary,calendar,dets,
                  dets server,dets sup,dets_utils,dets_v9,dict|...]},
      {path,["$ROOT/lib/sasl-3.0.3/ebin"],
      {primLoad,[alarm_handler,erlsrv,format_lib_sup,misc_supp,
                  rb_rb_format_sup,release_handler,release_handler_1,sasl,
                  sasl_report|...]},
      {progress,modules_loaded},
      {path,["$ROOT/lib/kernel-5.2/ebin",
             "$ROOT/lib/stdlib-3.3/ebin","$ROOT/lib/sasl-3.0.3/ebin"],
      {kernelProcess,heart,[{heart,start,[[]]}],
      {kernelProcess,process_logger,[{error_logger,start_link,[[]]}],
      {kernelProcess,application_controller,
      {application_controller,start,[{|...}|...]]},
      {progress,init_kernel_started},
      {apply,[{application,load,[|...]}],
      {apply,[{application,load,...}],
      {progress,applications_loaded},
      {apply,[{|...}|...]},
      {apply,[{|...}|...]}])
5> reltool:stop(Server).
ok
```
1.3.4 Create a target system

Erang/OTP 20 [erts-10.0] [source-c13b302] [64-bit] [smp:4:4] [ds:4:4:10] [async-threads:10]
hipe [kernel-poll:false]
Eshell V10.0 (abort with ^G)

1> Config = [{sys, [{escript, "examples/display_args", [{incl_cond, include}]},
{app, inets, [{incl_cond, include}]},
{app, mnesia, [{incl_cond, exclude}]},
{app, ssl, [{incl_cond, exclude}]},
{app, runtime_tools, [{incl_cond, exclude}]}],
{sys, [{escript, "examples/display_args", [{incl_cond, include}]},
{app, inets, [{incl_cond, include}]},
{app, mnesia, [{incl_cond, exclude}]},
{app, ssl, [{incl_cond, exclude}]},
{app, runtime_tools, [{incl_cond, exclude}]}],
{sys, [{escript, "examples/display_args", [{incl_cond, include}]},
{app, inets, [{incl_cond, include}]},
{app, mnesia, [{incl_cond, exclude}]},
{app, ssl, [{incl_cond, exclude}]},
{app, runtime_tools, [{incl_cond, exclude}]}]}

2> {ok, Spec} = reltool:get_target_spec([{Config}]).
{ok, [{create_dir, "releases",
{write_file, "start_erl.data", "10.0 1.0
"},
{create_dir, "1.0",
{write_file, "start_clean.rel",
[37,37,32,114,101,108,32,103,101,110,101,114,97,116|...]
},
{write_file, "start_clean.script",
[37,37,32,115,99,114,105,112,116,32,103,101,110|...]
},
{write_file, "start_clean.boot",
<<131,104,3,119,6,115,99,114,105,112,116,104|...>>]],
{write_file, "start_sasl.rel",
[37,37,32,114,101,108,32,103,101,110|...]
},
{write_file, "start_sasl.script",
[37,37,32,115,99,114,105,112,116,32|...]
},
{write_file, "start_sasl.boot",
<<131,104,3,119,6,115,99,114,105,112,116,104|...>>}]],
{create_dir, "bin",
{copy_file, "display_args.escript",
"/usr/local/lib/erlang/lib/reltool-0.7.3/examples/display_args"},
{copy_file, "display_args", "erts-10.0/bin/escript"},
{copy_file, "start", "erts-10.0/bin/start"},
{copy_file, "ct_run", "erts-10.0/bin/ct_run"},
{copy_file, "dialyzer", "erts-10.0/bin/dialyzer"},
{copy_file, "run.erl", "erts-10.0/bin/run.erl"},
{copy_file, "erl", "erts-10.0/bin/dyn.erl"},
{copy_file, "to.erl", "erts-10.0/bin/to.erl"},
{copy_file, "epmd", "erts-10.0/bin/epmd"},
{copy_file, "erlc", "erts-10.0/bin/erlc"},
{copy_file, "typer", "erts-10.0/bin/typer"},
{copy_file, "escript", "erts-10.0/bin/escript"},
{write_file, "start_clean.boot", <<131,104,3,119,6,115,...>>},
{write_file, "start_sasl.boot", <<131,104,3,119,6,...>>},
{write_file, "start.boot", <<131,104,3,119,...>>}],
{copy_file, "Install"},
{create_dir, "misc"},
{copy_file, "makewhatis"}, {copy_file, "format_man_pages"}],
{create_dir, "usr"},
{create_dir, "lib"},
{copy_file, "liberts.a"},
{copy_file, "liberl_interface_st.a"},
{copy_file, "liberts_r.a"},
{copy_file, "libic.a"},
{copy_file, "liberl_interface.a"},
{copy_file, "libei_st.a"},
1.3 Examples

{copy_file,"libei.a"}],
{create_dir,"include",
    [{copy_file,"erl_memory_trace_parser.h"},
    {copy_file,"driver_int.h"},
    {copy_file,"ei_connect.h"},
    {copy_file,"ei.h"},
    {copy_file,"erl_nif_api_funcs.h"},
    {copy_file,"erl_fixed_size_int_types.h"},
    {copy_file,"erl_int_sizes_config.h"},
    {copy_file,"erl_interface.h"},
    {copy_file,"eicode.h"},
    {copy_file,"erl.driver.h"},
    {copy_file,"erlang.idl"},
    {copy_file, [...]},
    {copy_file,...}]
},
{create_dir,"erts-10.0",
    [{create_dir,"bin",
        [{copy_file,"start"},
        {copy_file,"ct_run"},
        {copy_file,"erlexec"},
        {copy_file,"dialyzer"},
        {copy_file,"beam.smp"},
        {copy_file,"run_erl"},
        {copy_file,"erl","erts-10.0/bin/dyn_erl"},
        {copy_file,"to_erl"},
        {copy_file,"epmd"},
        {copy_file,"erl.child_setup"},
        {copy_file,"heart"},
        {copy_file,...}]
    }]
},
{create_dir,"lib",
    [{create_dir,"internal",
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        {copy_file,"liberts_internal.r.a"},
        {copy_file,"libethread.a"},
        {copy_file,"README"}],
        {copy_file,"liberts.a"},
        {copy_file,"liberts.r.a"}],
    {create_dir,"doc"},
    {create_dir,"man"},
    {create_dir,"include",
        [{create_dir,"i386", [{...}...]},
        {copy_file,"erl_errno.h"},
        {copy_file,...},
        {copy_file,...}]
    }]
},
{create_dir,"lib",
    [{archive,"compiler-7.0.4.ez", [ ],
        [{create_dir,"compiler-7.0.4",
            [{create_dir,"src",
                [{copy_file,"beam Flatten.erl"},
                {copy_file,...},
                {copy_file,...}]}
        }]
    }]
}
3> TargetDir = "/tmp/my_target_dir".
"/tmp/my_target_dir"
4> reltool:eval_target_spec(Spec, code:root_dir(), TargetDir).
(error,"/tmp/my_target_dir: no such file or directory")
5> file:make_dir(TargetDir).
oke
6> reltool:eval_target_spec(Spec, code:root_dir(), TargetDir).
oke
7> file:list_dir(TargetDir).
{ok,"bin","Install","lib","misc","usr","erts-10.0","releases"}
{ok, ["bin", "Install", "lib", "misc", "usr", "erts-10.0", "releases"]}
Reltool is a release management tool. It analyses a given Erlang/OTP installation and determines various dependencies between applications. The graphical frontend depicts the dependencies and enables interactive customization of a target system. The backend provides a batch interface for generation of customized target systems.
This is an interface module for the Reltool application.

Reltool is a release management tool. It analyses a given Erlang/OTP installation and determines various dependencies between applications. The graphical frontend depicts the dependencies and enables interactive customization of a target system. The backend provides a batch interface for generation of customized target systems.

The tool uses an installed Erlang/OTP system as input. root_dir is the root directory of the analysed system and it defaults to the system executing Reltool. Applications may also be located outside root_dir. lib_dirs defines library directories where additional applications may reside and it defaults to the directories listed by the operating system environment variable ERL_LIBS. See the module code for more info.

An application directory AppDir under a library directory is recognized by the existence of an AppDir/ebin directory. If this does not exist, Reltool will not consider AppDir at all when looking for applications.

It is recommended that application directories are named as the application, possibly followed by a dash and the version number. For example myapp or myapp-1.1.

Finally single modules and entire applications may be read from Escripts.

Some configuration parameters control the behavior of Reltool on system (sys) level. Others provide control on application (app) level and yet others are on module (mod) level. Module level parameters override application level parameters and application level parameters override system level parameters. Escript escript level parameters override system level parameters.

The following top level options are supported:

```
config
```

This is the main option and it controls the configuration of Reltool. It can either be a sys tuple or a name of a file containing a sys tuple.

```
trap_exit
```

This option controls the error handling behavior of Reltool. By default the window processes traps exit, but this behavior can altered by setting trap_exit to false.

```
wx_debug
```

This option controls the debug level of wx. As its name indicates it is only useful for debugging. See wx:debug/1 for more info.

Besides the already mentioned source parameters root_dir and lib_dirs, the following system (sys) level options are supported:

```
erts
```

Erts specific configuration. See application level options below.

```
escript
```

Escript specific configuration. An escript has a mandatory file name and escript level options that are described below.

```
app
```

Application specific configuration. An application has a mandatory name and application level options that are described below.
mod_cond

This parameter controls the module inclusion policy. It defaults to all which means that if an application is included (either explicitly or implicitly) all modules in that application will be included. This implies that both modules that exist in the ebin directory of the application, as well as modules that are named in the app file will be included. If the parameter is set to ebin, both modules in the ebin directory and derived modules are included. If the parameter is set to app, both modules in the app file and derived modules are included. derived means that only modules that are used by other included modules are included. The mod_cond setting on system level is used as default for all applications.

incl_cond

This parameter controls the application and escript inclusion policy. It defaults to derived which means that the applications that do not have any explicit incl_cond setting, will only be included if any other (explicitly or implicitly included) application uses it. The value include implies that all applications and escripts that do not have any explicit incl_cond setting will be included. exclude implies that all applications and escripts that do not have any explicit incl_cond setting will be excluded.

boot_rel

A target system may have several releases but the one given as boot_rel will be used as default when the system is booting up.

rel

Release specific configuration. Each release maps to a rel, script and boot file. See the module systools for more info about the details. Each release has a name, a version and a set of applications with a few release specific parameters such as type and included applications.

relocatable

This parameter controls whether the erl executable in the target system should automatically determine where it is installed or if it should use a hardcoded path to the installation. In the latter case the target system must be installed with reltool:install/2 before it can be used. If the system is relocatable, the file tree containing the target system can be moved to another location without re-installation. The default is true.

profile

The creation of the specification for a target system is performed in two steps. In the first step a complete specification is generated. It will likely contain much more files than you are interested in in your customized target system. In the second step the specification will be filtered according to your filters. There you have the ability to specify filters per application as well as system wide filters. You can also select a profile for your system. Depending on the profile, different default filters will be used. There are three different profiles to choose from: development, embedded and standalone, development is default. The parameters that are affected by the profile are: incl_sys_filters, excl_sys_filters, incl_app_filters and excl_app_filters.

app_file

This parameter controls the default handling of the app files when a target system is generated. It defaults to keep which means that app files are copied to the target system and their contents are kept as they are. strip means that a new app file is generated from the contents of the original app file where the non included modules are removed from the file. all does also imply that a new app file is generated from the contents of the original app file, with the difference that all included modules are added to the file. If the application does not have any app file a file will be created for all but not for keep and strip.

debug_info

The debug_info parameter controls whether the debug information in the beam file should be kept (keep) or stripped strip when the file is copied to the target system.
excl_lib

Warning:
This option is experimental.

If the excl_lib option is set to otp_root then reltool will not copy anything from the Erlang/OTP installation ($OTP_ROOT) into the target structure. The goal is to create a "slim" release which can be used together with an existing Erlang/OTP installation. The target structure will therefore only contain a lib directory with the applications that were found outside of $OTP_ROOT (typically your own applications), and a releases directory with the generated .rel, .script and .boot files.

When starting this release, three things must be specified:

Which releases directory to use
Tell the release handler to use the releases directory in our target structure instead of $OTP_ROOT/releases. This is done by setting the SASL environment variable releases_dir, either from the command line (-sasl releases_dir <target-dir>/releases) or in sys.config.

Which boot file to use
The default boot file is $OTP_ROOT/bin/start, but in this case we need to specify a boot file from our target structure, typically <target-dir>/releases/<vsn>/<RelName>. This is done with the -boot command line option to erl.

The location of our applications
The generated .script (and .boot) file uses the environment variable $RELTOOL_EXT_LIB as prefix for the paths to all applications. The -boot_var option to erl can be used for specifying the value of this variable, typically -boot_var RELTOOL_EXT_LIB <target-dir>/lib.

Example:
```
erl -sasl releases_dir "mytarget/releases" -boot mytarget/releases/1.0/myrel
    -boot_var RELTOOL_EXT_LIB mytarget/lib
```

incl_sys_filters
This parameter normally contains a list of regular expressions that controls which files in the system should be included. Each file in the target system must match at least one of the listed regular expressions in order to be included. Further the files may not match any filter in excl_sys_filters in order to be included. Which application files should be included is controlled with the parameters incl_app_filters and excl_app_filters. This parameter defaults to "*.*".

excl_sys_filters
This parameter normally contains a list of regular expressions that controls which files in the system should not be included in the target system. In order to be excluded, a file must match some filter in incl_sys_filters but not any filter in excl_sys_filters. This parameter defaults to [].

incl_app_filters
This parameter normally contains a list of regular expressions that controls which application specific files that should be included. Each file in the application must match at least one of the listed regular expressions in order to be included. Further the files may not match any filter in excl_app_filters in order to be included. This parameter defaults to "*.*".

excl_app_filters
This parameter normally contains a list of regular expressions that controls which application specific files should not be included in the target system. In order to be included, a file must match some filter in incl_app_filters but not any filter in excl_app_filters. This parameter defaults to [].
incl_archive_filters

This parameter normally contains a list of regular expressions that controls which top level directories in an application should be included in an archive file (as opposed to being included as a regular directory outside the archive). Each top directory in the application must match at least one of the listed regular expressions in order to be included. Further the files may not match any filter in excl_app_filters in order to be included. This parameter defaults to [".*"].

excl_archive_filters

This parameter normally contains a list of regular expressions that controls which top level directories in an application should not be included in an archive file. In order to be included in the application archive, a top directory must match some filter in incl_archive_filters but not any filter in excl_archive_filters. This parameter defaults to ["^include$", "^priv$"].

archive_opts

This parameter contains a list of options that are given to zip:create/3 when application specific files are packaged into an archive. Only a subset of the options are supported. The most useful options in this context are the ones that control which types of files should be compressed. This parameter defaults to [].

On application (escript) level, the following options are supported:

incl_cond

The value of this parameter overrides the parameter with the same name on system level.

On application (app) level, the following options are supported:

vsn

The version of the application. In an installed system there may exist several versions of an application. The vsn parameter controls which version of the application will be chosen.

This parameter is mutual exclusive with lib_dir. If vsn and lib_dir are both omitted, the latest version will be chosen.

Note that in order for reltool to sort application versions and thereby be able to select the latest, it is required that the version id for the application consists of integers and dots only, for example 1, 2.0 or 3.17.1.

lib_dir

The directory to read the application from. This parameter can be used to point out a specific location to fetch the application from. This is useful for instance if the parent directory for some reason is no good as a library directory on system level.

This parameter is mutual exclusive with vsn. If vsn and lib_dir are both omitted, the latest version will be chosen.

Note that in order for reltool to sort application versions and thereby be able to select the latest, it is required that the version id for the application consists of integers and dots only, for example 1, 2.0 or 3.17.1.

mod

Module specific configuration. A module has a mandatory name and module level options that are described below.

mod_cond

The value of this parameter overrides the parameter with the same name on system level.

incl_cond

The value of this parameter overrides the parameter with the same name on system level.
app_file

The value of this parameter overrides the parameter with the same name on system level.

debug_info

The value of this parameter overrides the parameter with the same name on system level.

incl_app_filters

The value of this parameter overrides the parameter with the same name on system level.

excl_app_filters

The value of this parameter overrides the parameter with the same name on system level.

incl_archive_filters

The value of this parameter overrides the parameter with the same name on system level.

excl_archive_filters

The value of this parameter overrides the parameter with the same name on system level.

archiveOpts

The value of this parameter overrides the parameter with the same name on system level.

On module (mod) level, the following options are supported:

incl_cond

This parameter controls whether the module is included or not. By default the mod_cond parameter on application and system level will be used to control whether the module is included or not. The value of incl_cond overrides the module inclusion policy. include implies that the module is included, while exclude implies that the module is not included. derived implies that the module is included if it is used by any other included module.

debug_info

The value of this parameter overrides the parameter with the same name on application level.
**DATA TYPES**

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<thead>
<tr>
<th>option()</th>
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</tr>
</thead>
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<td>{libdirs, [libdir()]}</td>
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<tr>
<td></td>
<td>{profile, profile()}</td>
</tr>
<tr>
<td></td>
<td>{erts, app()}</td>
</tr>
<tr>
<td></td>
<td>{escript, escript_file(), [escript()]}</td>
</tr>
<tr>
<td></td>
<td>{app, app_name(), [app()]}</td>
</tr>
<tr>
<td></td>
<td>{mod cond, mod cond()}</td>
</tr>
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<td></td>
<td>{incl cond, incl cond()}</td>
</tr>
<tr>
<td></td>
<td>{boot rel, boot rel()}</td>
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<td>{rel, rel_name(), rel_vsn(), [rel_app()]}</td>
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<td>{incl sys filters, incl sys filters()}</td>
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<td>{mod, mod_name(), [mod()]}</td>
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<td>= app_name()</td>
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<tr>
<td></td>
<td>{app_name(), app_type()}</td>
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<td>app_type()</td>
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<td>app_vsn()</td>
<td>= string()</td>
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<td>archive_opt</td>
<td>= zip create_opt()</td>
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<td>boot rel()</td>
<td>= rel name()</td>
</tr>
<tr>
<td>app_file()</td>
<td>= keep</td>
</tr>
<tr>
<td>debug_info()</td>
<td>= keep</td>
</tr>
<tr>
<td>dir()</td>
<td>= string()</td>
</tr>
<tr>
<td>escript()</td>
<td>= [incl cond, incl cond()]</td>
</tr>
<tr>
<td>escript_file()</td>
<td>= file()</td>
</tr>
<tr>
<td>excl app filters()</td>
<td>= regexps()</td>
</tr>
<tr>
<td>excl archive filters()</td>
<td>= regexps()</td>
</tr>
<tr>
<td>excl_lib()</td>
<td>= otp_root</td>
</tr>
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<td>excl_sys filters()</td>
<td>= regexps()</td>
</tr>
<tr>
<td>file()</td>
<td>= string()</td>
</tr>
<tr>
<td>incl app()</td>
<td>= app_name()</td>
</tr>
</tbody>
</table>
incl_app_filters() = regexps()
incl_archive_filters() = regexps()
incl_cond() = include | exclude | derived
incl_sys_filters() = regexps()
lib_dir() = dir()
mod_cond() = all | app | ebin | derived | none
mod_name() = atom()
profile() = development | embedded | standalone
re_regexp() = string()
reason() = string()
regexps() = [re_regexp()]
| {add, [re_regexp()]}   
| {del, [re_regexp()]}   
rel_file() = term()
rel_name() = string()
rel_vsn() = string()
relocatable = boolean()
root_dir() = dir()
script_file() = term()
server() = server_pid() | options()
server_pid() = pid()
target_dir() = file()
window_pid() = pid()
base_dir() = dir()
base_file() = file()
top_dir() = file()
top_file() = file()
target_spec() = [target_spec()]
| {create_dir, base_dir(), [target_spec()]}      
| {create_dir, base_dir(), top_dir(), [target_spec()]} 
| {archive, base_file(), [archive_opt()], [target_spec()]}   
| {copy_file, base_file()}                        
| {copy_file, base_file(), top_file()}            
| {write_file, base_file(), iolist()}             
| {strip_beam_file, base_file()}                  

Exports

create_target(Server, TargetDir) -> ok | {error, Reason}

Types:
  Server = server()
  TargetDir = target_dir()
  Reason = reason()

Create a target system. Gives the same result as {ok, TargetSpec}=reltool:get_target_spec(Server)
and reltool:eval_target_spec(TargetSpec, RootDir, TargetDir).

eval_target_spec(TargetSpec, RootDir, TargetDir) -> ok | {error, Reason}

Types:
  TargetSpec = target_spec()
  RootDir = root_dir()
  TargetDir = target_dir()
  Reason = reason()

Create the actual target system from a specification generated by reltool:get_target_spec/1. The creation
of the specification for a target system is performed in two steps. In the first step a complete specification will
be generated. It will likely contain much more files than you are interested in in your target system. In the second step the
specification will be filtered according to your filters. There you have the ability to specify filters per application as well as system wide filters. You can also select a profile for your system. Depending on the profile, different default filters will be used.

The top directories bin, releases and lib are treated differently from other files. All other files are by default copied to the target system. The releases directory contains generated rel, script, and boot files. The lib directory contains the applications. Which applications are included and if they should be customized (archived, stripped from debug info etc.) is specified with various configuration parameters. The files in the bin directory are copied from the erts-vsn/bin directory, but only those files that were originally included in the bin directory of the source system.

If the configuration parameter relocatable was set to true there is no need to install the target system with reltool:install/2 before it can be started. In that case the file tree containing the target system can be moved without re-installation.

In most cases, the RootDir parameter should be set to the same as the root_dir configuration parameter used in the call to reltool:get_target_spec/1 (or code:root_dir() if the configuration parameter is not set). In some cases it might be useful to evaluate the same target specification towards different root directories. This should, however, be used with great care as it requires equivalent file structures under all roots.

get_config(Server) -> {ok, Config} | {error, Reason}
Types:
  Server = server()
  Config = config()
  Reason = reason()
Get reltool configuration. Shorthand for reltool:get_config(Server,false,false).

get_config(Server, InclDefaults, InclDerived) -> {ok, Config} | {error, Reason}
Types:
  Server = server()
  InclDefaults = incl_defaults()
  InclDerived = incl_derived()
  Config = config()
  Reason = reason()
Get reltool configuration. Normally, only the explicit configuration parameters with values that differ from their defaults are interesting. But the built-in default values can be returned by setting InclDefaults to true. The derived configuration can be returned by setting InclDerived to true.

get_rel(Server, Relname) -> {ok, RelFile} | {error, Reason}
Types:
  Server = server()
  RelName = rel_name()
  RelFile = rel_file()
  Reason = reason()
Get contents of a release file. See rel(4) for more details.
get_script(Server, Relname) -> {ok, ScriptFile | {error, Reason}
Types:
  Server = server()
  RelName = rel_name()
  ScriptFile = script_file()
  Reason = reason()
Get contents of a boot script file. See script(4) for more details.

get_status(Server) -> {ok, [Warning]} | {error, Reason}
Types:
  Server = server()
  Warning = string()
  Reason = reason()
Get status about the configuration

get_server(WindowPid) -> {ok, ServerPid} | {error, Reason}
Types:
  WindowPid = window_pid()
  ServerPid = server_pid()
  Reason = reason()
Return the process identifier of the server process.

get_target_spec(Server) -> {ok, TargetSpec} | {error, Reason}
Types:
  Server = server()
  TargetSpec = target_spec()
  Reason = reason()
Return a specification of the target system. The actual target system can be created with reltool:eval_target_spec/3.

install(RelName, TargetDir) -> ok | {error, Reason}
Types:
  RelName = rel_name()
  TargetDir = target_dir()
  Reason = reason()
Install a created target system

start() -> {ok, WindowPid} | {error, Reason}
Types:
  WindowPid = window_pid()
  Reason = reason()
Start a main window process with default options
start(Options) -> {ok, WindowPid} | {error, Reason}
Types:
  Options = options()
  WindowPid = window_pid()
  Reason = reason()
Start a main window process with options

start_link(Options) -> {ok, WindowPid} | {error, Reason}
Types:
  Options = options()
  WindowPid = window_pid()
  Reason = reason()
Start a main window process with options. The process is linked.

start_server(Options) -> {ok, ServerPid} | {error, Reason}
Types:
  Options = options()
  ServerPid = server_pid()
  Reason = reason()
Start a server process with options. The server process identity can be given as an argument to several other functions in the API.

stop(Pid) -> ok | {error, Reason}
Types:
  Pid = server_pid() | window_pid()
  Reason = reason()
Stop a server or window process