

Highlights in Erlang 5.2/OTP R9B

This document describes the major new features and changes in version R9B of Erlang/OTP. The changes are described as a comparison with the original R8B release and some of them have already been delivered as patches to R8B and/or R7B. For more detailed information, please refer to the release notes for the individual applications. Interesting news in this release is that we have integrated results from the [ASTECH-HiPE research project](#) as part of the product. See HiPE and Packages below for more info on that.

Significantly updated or new applications in OTP R9B

Asn1	
Comet	REMOVED
Compiler	
CosEventDomain	NEW
Erlang Runtime System (ERTS)	
Et (Event Tracer)	NEW
GS (Graphical System)	
HiPE	NEW
IC (IDL compiler)	
Inets	
Kernel	
Megaco (H.248)	
Mnesia	
Observer	NEW
ODBC	
Orber	
OS_mon	
Packages	NEW
Runtime_tools	
SNMP	
Stdlib	
Tools	

Applications with minor changes and bugfixes

The following applications have only minor changes in R9B:
CosNotification, CosTransactions, Debugger, Erl_interface, EVA (Event & Alarm), Mnesia_session, Pman, SASL, SSL, Toolbar, Tv (Table Visualizer), WebTool.

Asn1, compiler and runtime functions for ASN.1

- New option optimize in combination with per_bin and ber_bin which makes the encode/decode functions much faster than before. In rough terms the encode/decode is 2 times faster when optimize is used.
- It is now possible to add options to the Erlang compiler to be used when compiling the generated .erl file. Any option that is not recognized as a specific ASN.1 option will be passed to the final step like: erlc +debug_info Mymodule.asn or asn1ct:compile('Mymodule',[debug_info]).
- The feature "multi file compilation" which compiles several ASN.1 modules together and produces one .erl file is improved.

Comet, COM client for Erlang (**REMOVED**)

The Comet application is removed from the product because we currently have no resources to maintain it. We plan to make it available on the Open Source site. It still works on Windows NT 4, but there are problems on Windows XP.

Compiler

- The documentation for the 'compile' module now lists several options that were previously undocumented or only documented in the 'erl_lint' documentation. One very useful option is warn_unused_vars, which also is improved in the compiler. Use of this option can reveal bugs and dead code, it is highly recommended.
- The endianness specification 'native' has been added to the bit syntax. It will resolve to either big or little endian at load time. It is specially useful for communicating with linked-in drivers.

cosEventDomain, OMG Event Domain Admin Service

NEW

A new Corba service "cosEventDomain" is added as a separate application. cosEventDomain is compliant with the OMG service CosEventDomainAdmin.

ERTS, Erlang emulator

- The previous hard system limit of 255 known remote nodes has been removed. With the exception of node-name atoms, all data regarding remote nodes is now garbage collected.
- Major improvements regarding memory handling, introduction of sl_alloc version 1 default and sl_alloc version 2 which makes it possible to tune the memory allocation behaviour to best suite a certain system. A number of other memory handling improvements are also added.
- The endianness specification 'native' has been added to the bit syntax. It will resolve to either big or little endian at load time. It is specially useful for communicating with linked-in drivers.
- The maximum number of Erlang processes within one Erlang node is increased to $2^{18} - 1 = 262143$, previously the limit was 32768. To enable the higher limit the +P flag must be used when Erlang is started.

Et, an Event Tracer with graphical viewing of trace data

NEW

The two major components of the Event Tracer (ET) tool is a graphical sequence chart viewer (et_viewer) and its backing storage (et_collector).

One collector may be used as backing storage for several simultaneous viewers where each one may display a different view of the same trace data.

GS, a Graphics System

GS is updated to use Tcl/Tk 8.3.4. This is a major update since GS previously used an ancient version of Tcl/Tk.

HiPE, High Performance Erlang

NEW

A number of useful and promising features from the HiPE project at Uppsala University is integrated into this version of Erlang/OTP. The major features are:

- Native code generation for Sparc (Solaris) and x86 (Linux). The native option to the compiler is used to select this codegeneration. It is then possible to run the generated modules together with the ordinary interpreted modules on a standard OTP R9B system.

The native codegeneration can give significant performance improvements especially on sequential code. See <http://www.csd.uu.se/projects/hipe/hipe.html> for more info.

This feature is intended for evaluation and may be supported in future versions.

Feedback is welcome.

- "Shared heap" a new approach to memory handling within the Erlang emulator where all Erlang processes share a common heap. This way of handling memory is very interesting and have a potential to reduce memory consumption an improve performance. A separate emulator is built to support "shared_heap", it is started with 'erl -shared'. This feature is intended for evaluation and may be supported in future versions. Feedback is welcome.

IC, an IDL compiler

A number of minor improvements and corrections.

Inets, HTTP server and FTP client.

- A HTTP client is added to the application. Author: Johan Blom of Mobile Arts AB. It is provided as is with very limited documentation in this version but we plan to support it fully in coming versions of Inets.
- Updated to handle HTTP/1.1.

Kernel

- The `set_net_ticktime/[1,2]` and `get_net_ticktime/0` functions has been added to the `net_kernel` module (see `net_kernel(3)`) which makes it possible to change the `net_tick` time during operation.
- There are new functions `bchunk/2,3` in the `disk_log` module that are to be used like `chunk/2,3` but return objects as binaries.
- The loading of BEAM code at start-up of embedded systems has been optimized: if the thread pool is non-empty (see the system flag `+A` in `erl(3)`) and files are read from a file system (the default, see the value `efile` of the `-loader` flag in `erl(3)`) disk seek times have been reduced.

Megaco, a Megaco/H.248 protocol stack

- The binary codecs `ber_bin` and `per_bin` is now both compiled with the `+optimize asn1-compiler` flag for better runtime performance.
- The previously included tool, `et`, has been moved out of the Megaco application. It is now provided as a separate application called `Et`.

Mnesia, a heavy duty real-time distributed database

- The table fragmentation functionality in Mnesia has been improved.
 - `Select` and `match_object` is done in parallel which should improve performance.
 - A new concept of hash modules has been introduced. This means that a user now can define its own mapping between record keys and the actual table fragment hosting the record.
- Improved table loading performance during startup. Mnesia should be able to utilize the network bandwidth better, and Mnesia also uses new `dets` functionality to improve the loading of `disc_only_copies` tables, if possible.

Observer **NEW**

Observer is a new application with various facilities for "observing" a live system with minimal disturbance. The application is fully functional and supported, but the functionality and API's are still in beta-status i.e they can be changed in the next versions. We are very interested in feedback from users regarding the functionality in Observer.

Observer currently contains two different parts:

- Trace Tool Builder , a base for building trace tools for single node or distributed Erlang systems.
- Erlang Top, a tool for monitoring of Erlang processes similar to the UNIX `top` utility.

ODBC

- The Erlang ODBC application consists of both Erlang and C code. The C code is now delivered as a precompiled executable for Windows and Solaris.
- Various optimizations.

- New API that has an Erlang/OTP touch and feel instead of being a C-interface with Erlang syntax. The old interface is deprecated and will be removed in Erlang/OTP R10.

Orber, a CORBA Object Request Broker

- Support for fragmented IIOP-1.2 messages.
- Possible to add and use the IOR component TAG_ALTERNATE_IOP_ADDRESS.
- Unique VMCID:s assigned to Orber by the OMG.
- Supports the Fixed datatype.
- Possible to add new initial references.
- The NameService can be configured to be stored on disk.
- It is now possible to set Orber's configuration parameters in, for example, an Erlang shell.
- Possible to list which port numbers Orber may use locally when connecting to another ORB.
- Improved documentation.
- Several new debugging facilities:
 - Two IIOP trace interceptors included (different verbosity).
 - Type checking within an Erlang node.
 - OrberWeb, which is an extension of the WebTool application.
 - IOR dump.

OS_Mon, monitoring of disk usage and OS resources

- `cpu_sup:util/0` and `cpu_sup:util/1` which returns information about cpu utilization have been added. For further information see `cpu_sup(3)`.
- Nodename is now used as key in `loadtable` (`os_mon` mib).
- The `loadCpuLoad5`, `loadCpuLoad15` values has been added to the `os_mon` mib.

Packages **NEW**

This is an extension to Erlang with structured program module packages, in a simple, straightforward and useful way. The implementation is done by Richard Carlsson from the HiPE team at Uppsala University and is intended for evaluation. This or a slightly modified solution may be supported in future versions of Erlang/OTP. The debugger might have some problems with the naming of modules when packages are used. See <http://www.erlang.se/publications/packages.html> for more info. There is also a paper about Packages at <http://www.it.uu.se/research/reports/2000-001>.

Runtime_Tools

- Trace ports can now be opened on remote nodes
- It is possible to use the local node as a "trace control node", i.e. trace only remote nodes.
- The function `dbg:i/0` now prints information about all traced nodes
- Added a number of functions for controlling tracing on remote nodes.

SNMP

Minor additions and bugfixes.

STDLIB, Erlang standard libraries

- A number of improvements in `dets`.
- The function `ets:select_count/2` is added to the `stdlib` application.
- New functions `sofs:extension/3` and `sofs:partition/3`.
- A new module `ms_transform` which implements a parse transform that translates 'fun' syntax into "match specifications". This simplifies writing of "match specifications" used in `ets:select` and in `dbg`.
- The undocumented and deprecated modules `bplus_tree` and `unix` has been removed.

Tools

There is a new tool `cprof`, a call count profiler. It is something inbetween `cover` and `fprof`, and can be used to get a picture of which functions are most frequently called. See [Tools User's Guide and Reference Manual](#).