

# UNISIM

## ppcemu Simulator Manual

Gilles Mouchard

### 1 Simulator technical reference (generated)

This documentation has been automatically generated from the simulator UNISIM ppcemu version 1.0beta6 on Dec 12 2014.

#### 1.1 Introduction

UNISIM ppcemu, user level PowerPC simulator with support of ELF32 binaries and Linux system call translation.

Section 1.2 gives licensing informations about the simulator. Section 1.3 shows the set of modules and services that compose the simulator. Section 1.4 shows how to invoke the simulator at the command line prompt. Section 1.5 gives the simulator parameters. Section 1.6 gives the simulator statistic counters. Section 1.7 gives the simulator statistic formulas.

#### 1.2 Licensing

UNISIM ppcemu 1.0beta6

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Authors: Gilles Mouchard <gilles.mouchard@cea.fr>, Daniel Gracia Pérez <daniel.gracia-perez@cea.fr>

#### 1.3 Simulated configuration

The UNISIM ppcemu simulator is composed of the following modules and services:

- **cpu**: this module implements a MPC7447A CPU core
- **debugger**
- **gdb-server**: this service implements the GDB server remote serial protocol over TCP/IP. Standards GDB clients (e.g. gdb, eclipse, ddd) can connect to the simulator to debug the target application that runs within the simulator.
- **host-time**: this service is an abstraction layer for the host machine time
- **inline-debugger**: this service implements a built-in debugger in the terminal console
- **linux-os**
- **memory**: this module implements a memory
- **profiler**
- **tee-memory-access-reporting**
- **tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[0]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[10]**
- **tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[11]**

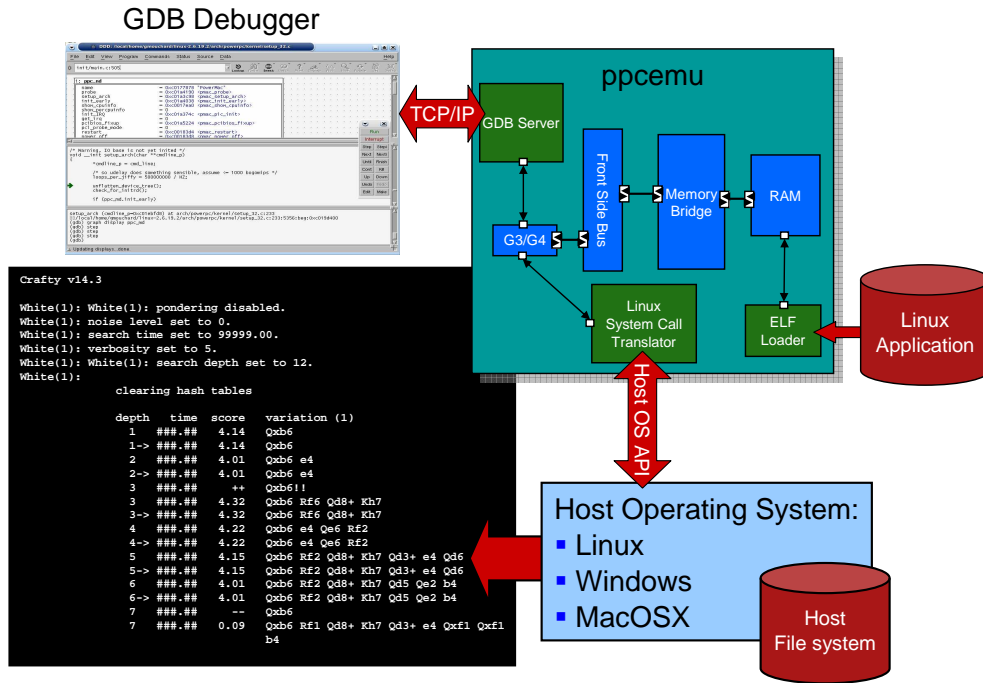


Figure 1: UNISIM ppcemu simulator schematic.

- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[12]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[13]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[14]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[15]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[1]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[2]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[3]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[4]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[5]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[6]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[7]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[8]
- tee-memory-access-reporting.tee-memory-access-reporting.control\_selector[9]
- **time**: this service is an abstraction layer for the SystemC kernel time

#### 1.4 Using the UNISIM ppcemu simulator

The UNISIM ppcemu simulator has the following command line options:

Usage: unisim-ppcemu-1.0beta6 [<options>] [...]  
Options:

- `--set <param=value>` or `-s <param=value>`: set value of parameter 'param' to 'value'
- `--config <XML file>` or `-c <XML file>`: configures the simulator with the given XML configuration file
- `--get-config <XML file>` or `-g <XML file>`: get the simulator configuration XML file (you can use it to create your own configuration. This option can be combined with `-c` to get a new configuration file with existing variables from another file
- `--list` or `-l`: lists all available parameters, their type, and their current value
- `--warn` or `-w`: enable printing of kernel warnings
- `--doc <Latex file>` or `-d <Latex file>`: enable printing a latex documentation
- `--version` or `-v`: displays the program version information
- `--share-path <path>` or `-p <path>`: the path that should be used for the share directory (absolute path)
- `--help` or `-h`: displays this help

## 1.5 Configuration

Simulator configuration (see below) can be modified using command line Options `--set <param=value>` or `--config <config file>`.

Global	
<b>Name:</b> enable-gdb-server <b>Default:</b> true <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Enable/Disable GDB server instantiation.	
<b>Name:</b> enable-inline-debugger <b>Default:</b> true <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Enable/Disable inline debugger instantiation.	
<b>Name:</b> enable-press-enter-at-exit <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Enable/Disable pressing key enter at exit.	
<b>Name:</b> estimate-power <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Enable/Disable power estimators instantiation.	
<b>Name:</b> kernel.logger.file <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean

<b>Description:</b> Keep logger output in a file.	
<b>Name:</b> kernel_logger.filename <b>Default:</b> logger_output.txt	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> Filename to keep logger output _(the option file must be activated).	
<b>Name:</b> kernel_logger.std_err <b>Default:</b> true <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Show logger output through the standard error output.	
<b>Name:</b> kernel_logger.std_err_color <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Colorize logger output through the standard error output _(only works if std_err is active).	
<b>Name:</b> kernel_logger.std_out <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Show logger output through the standard output.	
<b>Name:</b> kernel_logger.std_out_color <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Colorize logger output through the standard output _(only works if std_out is active).	
<b>Name:</b> kernel_logger.xml_file <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Keep logger output in a file xml formatted.	
<b>Name:</b> kernel_logger.xml_file_gzipped <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> If the xml_file option is active, the output file will be compressed (a .gz extension will be automatically added to the xml_filename option).	

<b>Name:</b> kernel_logger.xml_filename <b>Default:</b> logger_output.xml	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> Filename to keep logger xml output _(the option xml.file must be activated).	
<b>cpu</b>	
<b>Name:</b> cpu.cpu-cycle-time <b>Default:</b> 3333	<b>Type:</b> parameter <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> CPU cycle time in picoseconds.	
<b>Name:</b> cpu.voltage <b>Default:</b> 1300	<b>Type:</b> parameter <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> CPU voltage in mV.	
<b>Name:</b> cpu.max-inst <b>Default:</b> 18446744073709551615	<b>Type:</b> parameter <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> maximum number of instructions to simulate.	
<b>Name:</b> cpu.verbose-all <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> globally enable/disable verbosity.	
<b>Name:</b> cpu.verbose-setup <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> enable/disable verbosity while setup.	
<b>Name:</b> cpu.verbose-step <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> enable/disable verbosity when simulating an instruction.	
<b>Name:</b> cpu.verbose-dtlb <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean

<b>Description:</b> enable/disable verbosity when accessing data translation lookahead buffer.	
<b>Name:</b> cpu.verbose-itlb	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when accessing instruction translation lookahead buffer.	
<b>Name:</b> cpu.verbose-dl1	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when accessing L1 data cache.	
<b>Name:</b> cpu.verbose-ill	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when accessing L1 instruction cache.	
<b>Name:</b> cpu.verbose-l2	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when accessing L2 unified cache.	
<b>Name:</b> cpu.verbose-load	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when simulating a load.	
<b>Name:</b> cpu.verbose-store	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when simulating a store.	
<b>Name:</b> cpu.verbose-read-memory	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when reading memory for a debug purpose.	
<b>Name:</b> cpu.verbose-write-memory	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	

<b>Description:</b> enable/disable verbosity when writing memory for a debug purpose.	
<b>Name:</b> cpu.verbose-exception	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when handling exceptions.	
<b>Name:</b> cpu.verbose-set-msr	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when setting MSR.	
<b>Name:</b> cpu.verbose-set-hid0	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when setting HID0.	
<b>Name:</b> cpu.verbose-set-hid1	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when setting HID1.	
<b>Name:</b> cpu.verbose-set-hid2	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when setting HID2.	
<b>Name:</b> cpu.verbose-set-l2cr	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable verbosity when setting L2CR.	
<b>Name:</b> cpu.enable-linux-printk-snooping	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> enable/disable linux printk buffer snooping.	
<b>Name:</b> cpu.enable-linux-syscall-snooping	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean

<b>Valid:</b> true, false		
<b>Description:</b> enable/disable linux syscall snooping.		
<b>Name:</b> cpu.trap-on-instruction-counter	<b>Type:</b> parameter	
<b>Default:</b> 18446744073709551615	<b>Data type:</b> unsigned 64-bit integer	
<b>Description:</b> number of simulated instruction before trapping.		
<b>Name:</b> cpu.halt-on	<b>Type:</b> parameter	
<b>Default:</b>	<b>Data type:</b> string	
<b>Description:</b> Symbol or address where to stop simulation.		
<b>Name:</b> cpu.bus-cycle-time	<b>Type:</b> parameter	
<b>Default:</b> 13333 ps	<b>Data type:</b> sc_time	
<b>Description:</b> bus cycle time.		
<b>Name:</b> cpu.nice-time	<b>Type:</b> parameter	
<b>Default:</b> 1 ms	<b>Data type:</b> sc_time	
<b>Description:</b> maximum time between synchronizations.		
<b>Name:</b> cpu.ipc	<b>Type:</b> parameter	
<b>Default:</b> 1	<b>Data type:</b> double precision floating-point	
<b>Description:</b> maximum instructions per cycle (should be $\leq 2.0$ ).		
<b>Name:</b> cpu.enable-host-idle	<b>Type:</b> parameter	
<b>Default:</b> false	<b>Data type:</b> boolean	
<b>Valid:</b> true, false		
<b>Description:</b> Enable/Disable host idle periods when target is idle.		
<b>Name:</b> cpu.enable-dmi	<b>Type:</b> parameter	
<b>Default:</b> true	<b>Data type:</b> boolean	
<b>Valid:</b> true, false		
<b>Description:</b> Enable/Disable TLM 2.0 DMI (Direct Memory Access) to speed-up simulation.		



<p><b>Name:</b> <code>cpu.debug-dmi</code>                      <b>Type:</b> parameter  <b>Default:</b> <code>false</code>                              <b>Data type:</b> boolean  <b>Valid:</b> <code>true, false</code></p> <p><b>Description:</b>  Enable/Disable debugging of DMI (Direct Memory Access).</p>
<p><b>debugger</b></p>
<p><b>Name:</b> <code>debugger.verbose</code>                      <b>Type:</b> parameter  <b>Default:</b> <code>false</code>                              <b>Data type:</b> boolean  <b>Valid:</b> <code>true, false</code></p> <p><b>Description:</b>  Enable/Disable verbosity.</p>
<p><b>Name:</b> <code>debugger.dwarf-to-html-output-</code> <b>Type:</b> parameter  <code>↪directory</code>  <b>Default:</b>                                      <b>Data type:</b> string</p> <p><b>Description:</b>  DWARF v2/v3 to HTML output directory.</p>
<p><b>Name:</b> <code>debugger.dwarf-register-number-</code> <b>Type:</b> parameter  <code>↪mapping-filename</code>  <b>Default:</b> <code>powerpc_eabi_gcc_dwarf_register_</code> <b>Data type:</b> string  <code>↪number_mapping.xml</code></p> <p><b>Description:</b>  DWARF register number mapping filename.</p>
<p><b>Name:</b> <code>debugger.parse-dwarf</code>                      <b>Type:</b> parameter  <b>Default:</b> <code>true</code>                              <b>Data type:</b> boolean  <b>Valid:</b> <code>true, false</code></p> <p><b>Description:</b>  Enable/Disable parsing of DWARF debugging informations.</p>
<p><b>Name:</b> <code>debugger.debug-dwarf</code>                      <b>Type:</b> parameter  <b>Default:</b> <code>false</code>                              <b>Data type:</b> boolean  <b>Valid:</b> <code>true, false</code></p> <p><b>Description:</b>  Enable/Disable debugging of DWARF.</p>
<p><b>gdb-server</b></p>
<p><b>Name:</b> <code>gdb-server.memory-atom-size</code>              <b>Type:</b> parameter  <b>Default:</b> <code>0x00000001</code>                      <b>Data type:</b> unsigned 32-bit integer</p> <p><b>Description:</b>  size of the smallest addressable element in memory.</p>

<b>Name:</b> gdb-server.tcp-port	<b>Type:</b> parameter
<b>Default:</b> 0	<b>Data type:</b> signed 32-bit integer
<b>Description:</b> TCP/IP port to listen waiting for a GDB client connection.	
<b>Name:</b> gdb-server.architecture-description ↔filename	<b>Type:</b> parameter
<b>Default:</b> gdb_powerpc.xml	<b>Data type:</b> string
<b>Description:</b> filename of a XML description of the connected processor.	
<b>Name:</b> gdb-server.verbose	<b>Type:</b> parameter
<b>Default:</b> false	<b>Data type:</b> boolean
<b>Valid:</b> true, false	
<b>Description:</b> Enable/Disable verbosity.	
<b>inline-debugger</b>	
<b>Name:</b> inline-debugger.memory-atom- ↔size	<b>Type:</b> parameter
<b>Default:</b> 0x00000001	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> size of the smallest addressable element in memory.	
<b>Name:</b> inline-debugger.search-path	<b>Type:</b> parameter
<b>Default:</b>	<b>Data type:</b> string
<b>Description:</b> Search path for source (separated by ';').	
<b>Name:</b> inline-debugger.init-macro	<b>Type:</b> parameter
<b>Default:</b>	<b>Data type:</b> string
<b>Description:</b> path to initial macro to run when debugger starts.	
<b>Name:</b> inline-debugger.output	<b>Type:</b> parameter
<b>Default:</b>	<b>Data type:</b> string
<b>Description:</b> path to output file where to redirect the debugger outputs.	
<b>linux-os</b>	
<b>Name:</b> linux-os.verbose	<b>Type:</b> parameter

<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Name:</b> linux-os.parse-dwarf <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Name:</b> linux-os.debug-dwarf <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Name:</b> linux-os.dwarf-to-html-output- ↪directory <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Name:</b> linux-os.dwarf-to-xml-output- ↪filename <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Name:</b> linux-os.stdin-pipe-filename <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> stdin pipe filename.	
<b>Name:</b> linux-os.stdout-pipe-filename <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> stdout pipe filename.	
<b>Name:</b> linux-os.stderr-pipe-filename <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> stderr pipe filename.	
<b>Name:</b> linux-os.system <b>Default:</b> ppc	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> Emulated system architecture available values are "arm", "arm-eabi" and "powerpc".	
<b>Name:</b> linux-os.endianness <b>Default:</b> big-endian <b>Valid:</b> little-endian, big-endian	<b>Type:</b> parameter <b>Data type:</b> endianness
<b>Description:</b> The endianness of the binary loaded. Available values are: little-endian and big-endian..	

<b>Name:</b> linux-os.memory-page-size <b>Default:</b> 0x00001000	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Name:</b> linux-os.stack-base <b>Default:</b> 0xc0000000	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> The stack base address used for the load and execution of the linux application.	
<b>Name:</b> linux-os.binary <b>Default:</b>	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> The binary to execute on the target simulator. Usually it is the same value than the argv[1] parameter..	
<b>Name:</b> linux-os.argc <b>Default:</b> 0	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Number of commands in the program execution line (usually at least one which is the name of the program executed). The different tokens can be set up with the parameters argv[<n>] where <n> can go up to argc - 1..	
<b>Name:</b> linux-os.apply-host-environment <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> Wether to apply the host environment on the target simulator or use the provided envc and envp..	
<b>Name:</b> linux-os.envc <b>Default:</b> 0x00000000	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Number of environment variables defined for the program execution. The different variables can be set up with the parameters envp[<n>] where <n> can go up to envc - 1..	
<b>Name:</b> linux-os.utsname-sysname <b>Default:</b> Linux	<b>Type:</b> parameter <b>Data type:</b> string
<b>Description:</b> The value that the uname system call should return. As this service is providing linux emulation suppoort its value should be 'Linux', so you should not modify it..	

<b>Name:</b> linux-os.utsname-nodename	<b>Type:</b> parameter
<b>Default:</b> (none)	<b>Data type:</b> string
<b>Description:</b> The network node hostname that the uname system call should return. Default value is localhost, but you could write whatever name you want..	
<b>Name:</b> linux-os.utsname-release	<b>Type:</b> parameter
<b>Default:</b> 3.0.4	<b>Data type:</b> string
<b>Description:</b> The kernel release information that the uname system call should return. This should usually match the linux-kernel parameter..	
<b>Name:</b> linux-os.utsname-version	<b>Type:</b> parameter
<b>Default:</b> #1 PREEMPT Thu Jan 1 00:00:00 ↪CEST 1970	<b>Data type:</b> string
<b>Description:</b> The kernel version information that the uname system call should return..	
<b>Name:</b> linux-os.utsname-machine	<b>Type:</b> parameter
<b>Default:</b> ppc	<b>Data type:</b> string
<b>Description:</b> The machine information that the uname system call should return. This should be one of the supported architectures (the system parameter, that is, arm or powerpc) or a specific model derived from it (i.e., arm926ejs)..	
<b>Name:</b> linux-os.utsname-domainname	<b>Type:</b> parameter
<b>Default:</b> (none)	<b>Data type:</b> string
<b>Description:</b> The domain name information that the uname system call should return..	
<b>Name:</b> linux-os.hwcap	<b>Type:</b> parameter
<b>Default:</b>	<b>Data type:</b> string
<b>Description:</b> CPU Hardware capabilities to enable (e.g. "swp thumb fastmult vfp"..	
<b>memory</b>	
<b>Name:</b> memory.org	<b>Type:</b> parameter
<b>Default:</b> 0x00000000	<b>Data type:</b> unsigned 32-bit integer

<b>Description:</b> memory origin/base address.	
<b>Name:</b> memory.bytesize <b>Default:</b> 4294967295	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> memory size in bytes.	
<b>Name:</b> memory.initial-byte-value <b>Default:</b> 0x00	<b>Type:</b> parameter <b>Data type:</b> unsigned 8-bit integer
<b>Name:</b> memory.cycle-time <b>Default:</b> 13333 ps	<b>Type:</b> parameter <b>Data type:</b> sc_time
<b>Description:</b> memory cycle time.	
<b>Name:</b> memory.read-latency <b>Default:</b> 13333 ps	<b>Type:</b> parameter <b>Data type:</b> sc_time
<b>Description:</b> memory read latency.	
<b>Name:</b> memory.write-latency <b>Default:</b> 0 s	<b>Type:</b> parameter <b>Data type:</b> sc_time
<b>Description:</b> memory write latency.	
<b>Name:</b> memory.verbose <b>Default:</b> false <b>Valid:</b> true, false	<b>Type:</b> parameter <b>Data type:</b> boolean
<b>Description:</b> enable/disable verbosity.	
<b>profiler</b>	
<b>Name:</b> profiler.min-data-read-prof- ↪addr <b>Default:</b> 0x00000000	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Minimum address for data read profiling.	
<b>Name:</b> profiler.max-data-read-prof- ↪addr <b>Default:</b> 0xffffffff	<b>Type:</b> parameter <b>Data type:</b> unsigned 32-bit integer

<b>Description:</b> Maximum address for data read profiling.	
<b>Name:</b> profiler.min-data-write-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0x00000000	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Minimum address for data write profiling.	
<b>Name:</b> profiler.max-data-write-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0xffffffff	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Maximum address for data write profiling.	
<b>Name:</b> profiler.min-insn-fetch-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0x00000000	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Minimum address for instruction fetch profiling.	
<b>Name:</b> profiler.max-insn-fetch-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0xffffffff	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Maximum address for instruction fetch profiling.	
<b>Name:</b> profiler.min-insn-exec-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0x00000000	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Minimum address for instruction execution profiling.	
<b>Name:</b> profiler.max-insn-exec-prof- ↔addr	<b>Type:</b> parameter
<b>Default:</b> 0xffffffff	<b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> Maximum address for instruction execution profiling.	
<b>Name:</b> profiler.enable-data-read- ↔prof	<b>Type:</b> parameter

<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Description:</b> Enable/Disable data read profiling.	
<b>Name:</b> profiler.enable-data-write- ↔prof	<b>Type:</b> parameter
<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Description:</b> Enable/Disable data write profiling.	
<b>Name:</b> profiler.enable-insn-fetch- ↔prof	<b>Type:</b> parameter
<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Description:</b> Enable/Disable instruction fetch profiling.	
<b>Name:</b> profiler.enable-insn-exec- ↔prof	<b>Type:</b> parameter
<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Description:</b> Enable/Disable instruction execution profiling.	
<b>Name:</b> profiler.verbose	<b>Type:</b> parameter
<b>Default:</b> false <b>Valid:</b> true, false	<b>Data type:</b> boolean
<b>Description:</b> Enable/Disable verbosity.	

## 1.6 Statistics

Simulation statistic counters are listed below:

<b>cpu</b>	
<b>Name:</b> cpu.instruction-counter	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of simulated instructions.	
<b>Name:</b> cpu.timer-cycle	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of simulated timer cycles.	
<b>Name:</b> cpu.num-ill-accesses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer



<b>Description:</b> number of accesses to L1 instruction cache.	
<b>Name:</b> cpu.num-il1-misses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to L1 instruction cache.	
<b>Name:</b> cpu.num-dl1-accesses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to L1 data cache.	
<b>Name:</b> cpu.num-dl1-misses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to L1 data cache.	
<b>Name:</b> cpu.num-l2-accesses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to unified L2 cache.	
<b>Name:</b> cpu.num-l2-misses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to unified L2 cache.	
<b>Name:</b> cpu.num-ibat-accesses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to IBATs.	
<b>Name:</b> cpu.num-ibat-misses	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to IBATs.	

<b>Name:</b> <code>cpu.num-dbat-accesses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to DBATs.	
<b>Name:</b> <code>cpu.num-dbat-misses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to DBATs.	
<b>Name:</b> <code>cpu.num-itlb-accesses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to ITLB.	
<b>Name:</b> <code>cpu.num-itlb-misses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to ITLB.	
<b>Name:</b> <code>cpu.num-dtlb-accesses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of accesses to DTLB.	
<b>Name:</b> <code>cpu.num-dtlb-misses</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> number of misses to DTLB.	
<b>Name:</b> <code>cpu.num-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of interrupts.	
<b>Name:</b> <code>cpu.num-system-reset-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of system reset interrupts.	

<p><b>Name:</b> <code>cpu.num-machine-check-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of machine check interrupts.</p>
<p><b>Name:</b> <code>cpu.num-data-storage-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of data storage interrupts.</p>
<p><b>Name:</b> <code>cpu.num-instruction-storage-  ↔interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of instruction storage interrupts.</p>
<p><b>Name:</b> <code>cpu.num-external-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of external interrupts.</p>
<p><b>Name:</b> <code>cpu.num-alignment-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of alignment interrupts.</p>
<p><b>Name:</b> <code>cpu.num-program-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of program interrupts.</p>
<p><b>Name:</b> <code>cpu.num-floating-point-unavailable-  ↔interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p> <p><b>Description:</b>  Number of floating-point unavailable interrupts.</p>
<p><b>Name:</b> <code>cpu.num-decrementer-interrupts</code> <b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer</p>

<b>Description:</b> Number of decremter interrupts.	
<b>Name:</b> <code>cpu.num-system-call-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of system call interrupts.	
<b>Name:</b> <code>cpu.num-trace-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of trace interrupts.	
<b>Name:</b> <code>cpu.num-performance-monitor-↵interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of performance monitor interrupts.	
<b>Name:</b> <code>cpu.num-instruction-address-↵breakpoint-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of instruction address breakpoint interrupts.	
<b>Name:</b> <code>cpu.num-system-management-↵interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of system management interrupts.	
<b>Name:</b> <code>cpu.num-itlb-miss-interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of ITLB miss interrupts.	
<b>Name:</b> <code>cpu.num-dtlb-miss-on-load-↵interrupts</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer

<b>Description:</b> Number of DTLB Miss-On-Load interrupts.	
<b>Name:</b> <code>cpu.num-dtlb-miss-on-store-↔interrupts</code>	<b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of DTLB Miss-On-Store interrupts.	
<b>Name:</b> <code>cpu.num-altivec-unavailable-↔interrupts</code>	<b>Type:</b> statistic  <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of altivec unavailable interrupts.	
<b>Name:</b> <code>cpu.num-altivec-assist</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> Number of altivec assist interrupts.	
<b>Name:</b> <code>cpu.run-time</code>	<b>Type:</b> statistic <b>Data type:</b> <code>sc_time</code>
<b>Description:</b> run time.	
<b>Name:</b> <code>cpu.idle-time</code>	<b>Type:</b> statistic <b>Data type:</b> <code>sc_time</code>
<b>Description:</b> idle time.	
<b>memory</b>	
<b>Name:</b> <code>memory.memory-usage</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 32-bit integer
<b>Description:</b> target memory usage in bytes (page granularity of 1048576 bytes).	
<b>Name:</b> <code>memory.read-counter</code>	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> read access counter (not accurate when using SystemC TLM 2.0 DMI).	

<b>Name:</b> memory.write-counter	<b>Type:</b> statistic <b>Data type:</b> unsigned 64-bit integer
<b>Description:</b> write access counter (not accurate when using SystemC TLM 2.0 DMI).	

## 1.7 Formulas

Simulation statistic formulas are listed below:

<b>cpu</b>		
<b>Name:</b> cpu.il1-miss-rate <b>Formula:</b> $\text{cpu.num-il1-misses} / \text{cpu.} \hookrightarrow \text{num-il1-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.dl1-miss-rate <b>Formula:</b> $\text{cpu.num-dl1-misses} / \text{cpu.} \hookrightarrow \text{num-dl1-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.l2-miss-rate <b>Formula:</b> $\text{cpu.num-l2-misses} / \text{cpu.} \hookrightarrow \text{num-l2-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.ibat-miss-rate <b>Formula:</b> $\text{cpu.num-ibat-misses} / \text{cpu.} \hookrightarrow \text{num-ibat-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.dbat-miss-rate <b>Formula:</b> $\text{cpu.num-dbat-misses} / \text{cpu.} \hookrightarrow \text{num-dbat-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.itlb-miss-rate <b>Formula:</b> $\text{cpu.num-itlb-misses} / \text{cpu.} \hookrightarrow \text{num-itlb-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.dtlb-miss-rate <b>Formula:</b> $\text{cpu.num-dtlb-misses} / \text{cpu.} \hookrightarrow \text{num-dtlb-accesses}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Name:</b> cpu.idle-rate <b>Formula:</b> $\text{cpu.idle-time} / \text{cpu.run-} \hookrightarrow \text{time}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision
<b>Description:</b> idle rate.		
<b>Name:</b> cpu.load-rate <b>Formula:</b> $1 - \text{cpu.idle-time} / \text{cpu.} \hookrightarrow \text{run-time}$	<b>Type:</b> formula <b>Data type:</b> floating-point	double precision

**Description:**  
load rate.