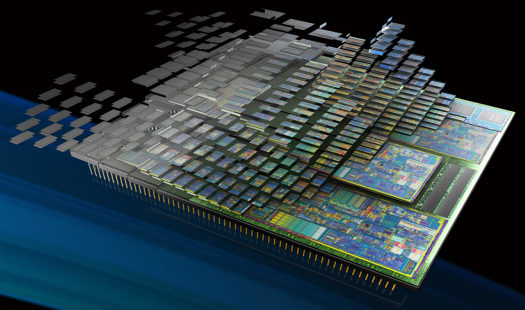
Verification Academy



UVM Basics

UVM "Hello World"

Tom Fitzpatrick
Verification Evangelist

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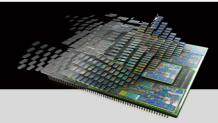
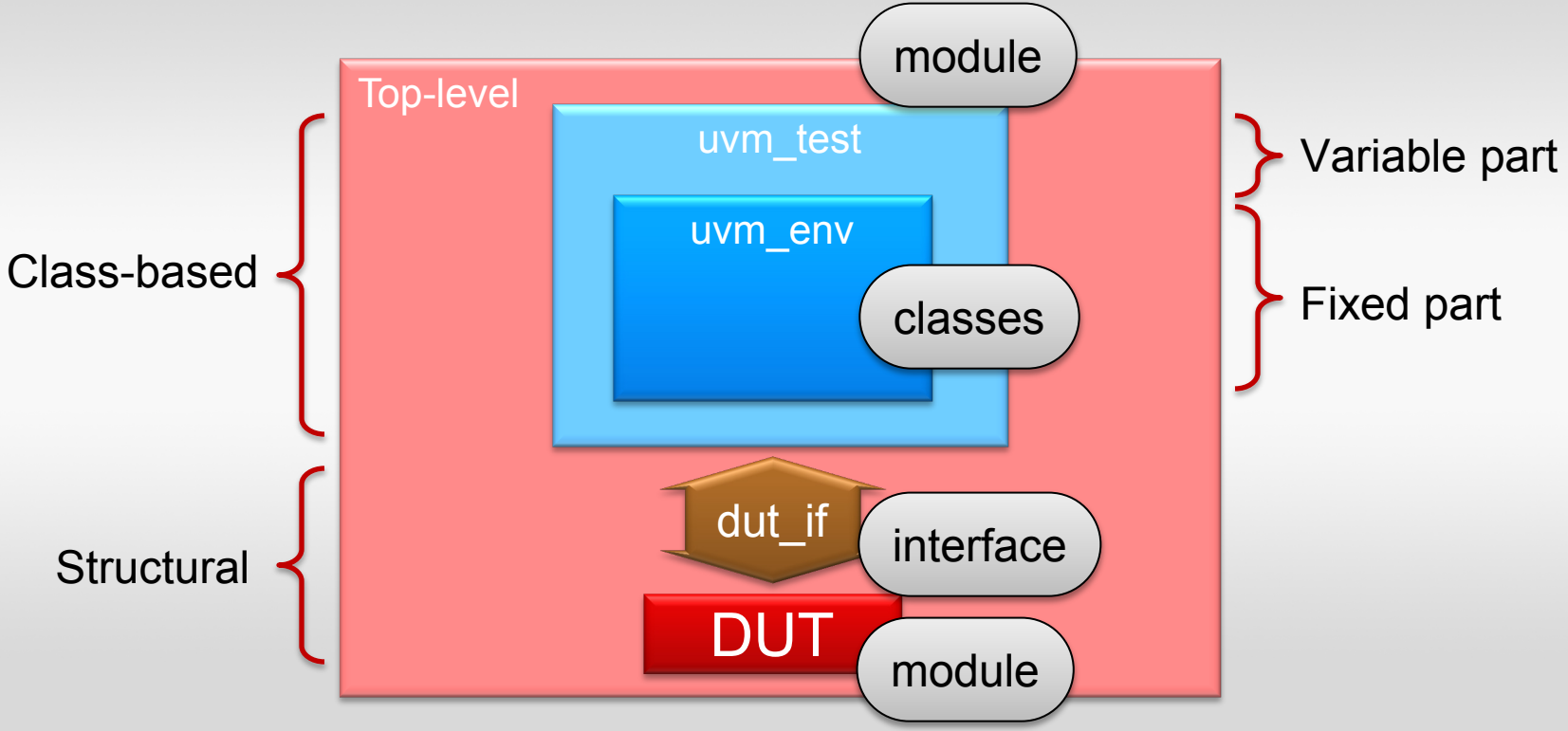
Mentor Graphics

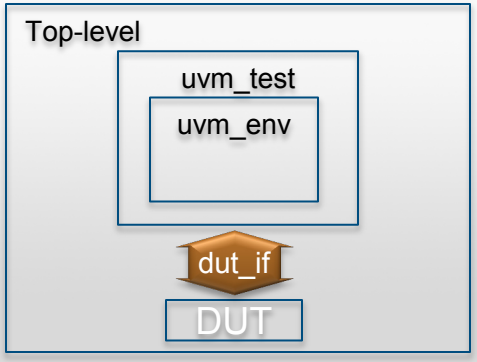
DUT and Verification Environment





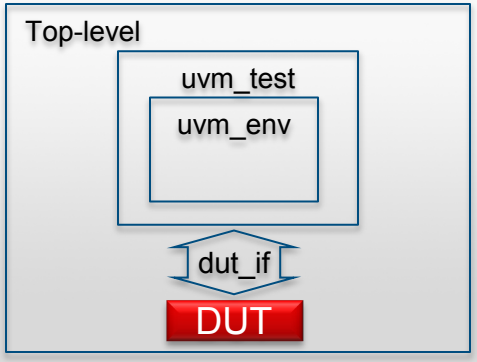
Interface

```
interface dut_if();

   ...

endinterface: dut_if
```



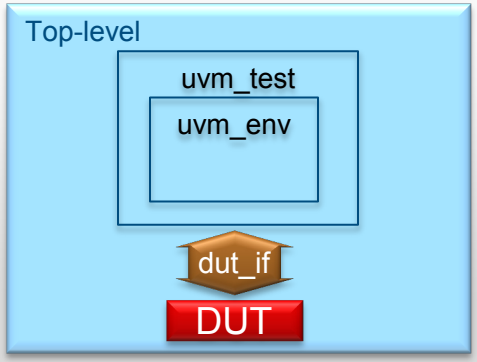
DUT

```
module dut(dut_if _if);

   ...

endmodule: dut
```



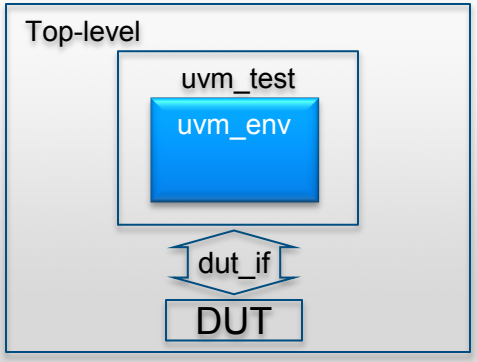
DUT Instantiation

```
module top;
   ...

   dut_if dut_if1 ();

   dut    dut1 ( ._if(dut_if1) );

   ...
endmodule: top
```



Env

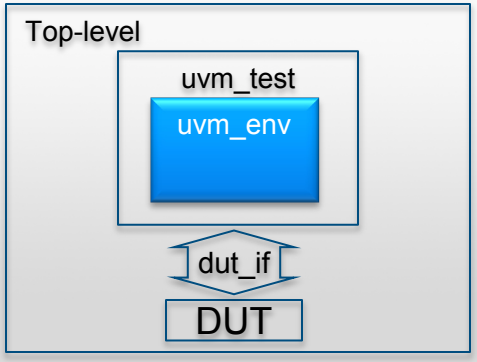
```
class my_env extends uvm_env;
```




```
endclass: my_env
```

Env

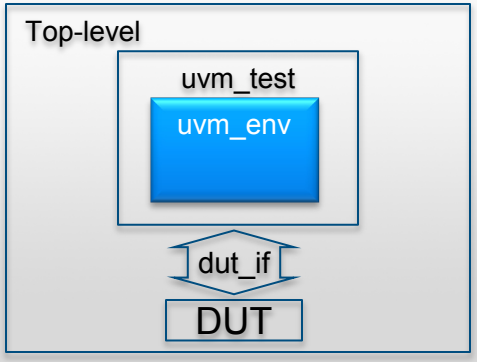
```
class my_env extends uvm_env;
  `uvm_component_utils(my_env)
```




```
endclass: my_env
```

Env

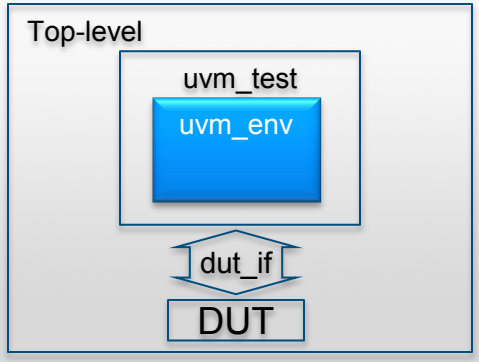
```
class my_env extends uvm_env;
  `uvm_component_utils(my_env)

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
```




```
endclass: my_env
```

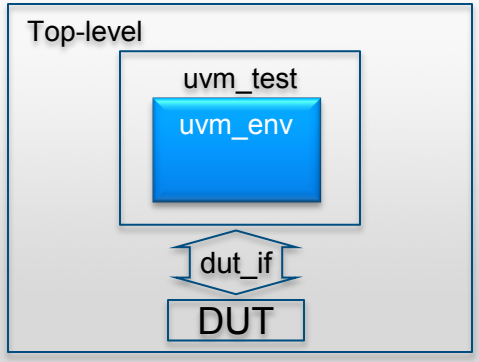
Env

```
class my_env extends uvm_env;
  `uvm_component_utils(my_env)

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new

  function void build_phase(uvm_phase phase);
    ...//instantiate components
  endfunction: build_phase

endclass: my_env
```

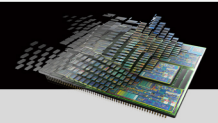


Env

```
class my_env extends uvm_env;
  `uvm_component_utils(my_env)

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new

  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
  endfunction: build_phase

  task run_phase(uvm_phase phase);

  endtask: run_phase
endclass: my_env
```



End-of-Test Mechanism



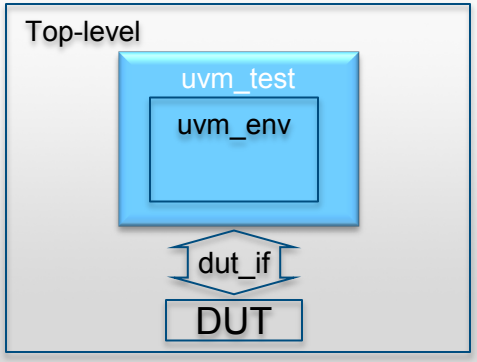
```
task run_phase(uvm_phase phase);

  phase.raise_objection(this);

  #10;

  phase.drop_objection(this);

endtask: run_phase
```

1st objection raised when time = 0

Test ends when all objections dropped

Test

```
class my_test extends uvm_test;
  `uvm_component_utils(my_test)
```

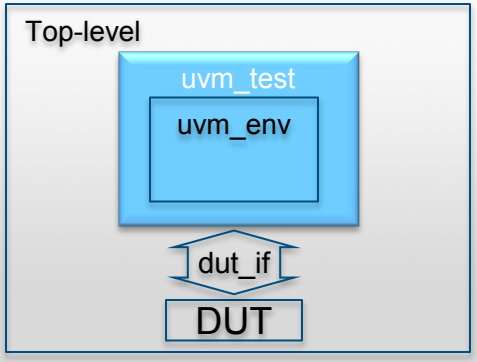



```
endclass: my_test
```

Test

```
class my_test extends uvm_test;
  `uvm_component_utils(my_test)

  my_env my_env_h;
```

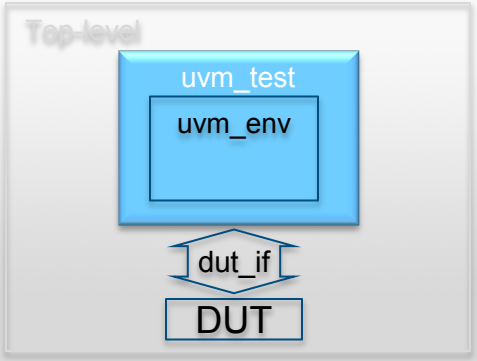
_h = handle




```
endclass: my_test
```

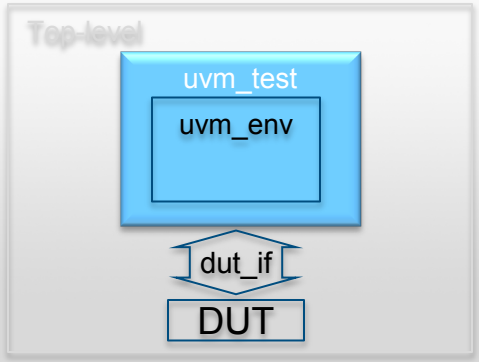
Test

```
class my_test extends uvm_test;
  `uvm_component_utils(my_test)

  my_env my_env_h;

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new

  function void build_phase(uvm_phase phase);

  endfunction: build_phase

endclass: my_test
```



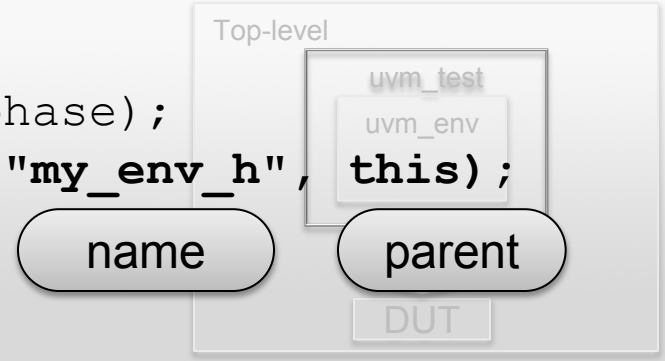
Test

```
class my_test extends uvm_test;
  `uvm_component_utils(my_test)

  my_env my_env_h;

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new

  function void build_phase(uvm_phase phase);
    my_env_h = my_env::type_id::create(...
  endfunction: build_phase

endclass: my_test
```



Test

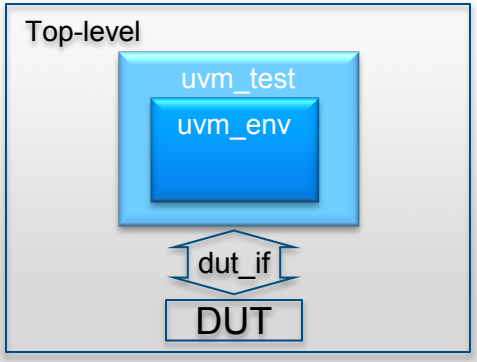
```
class my_test extends uvm_test;
  `uvm_component_utils(my_test)

  my_env my_env_h;

  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new

  function void build_phase(uvm_phase phase);
    my_env_h = my_env::type_id::create("my_env_h", this);
  endfunction: build_phase

endclass: my_test
```



Package

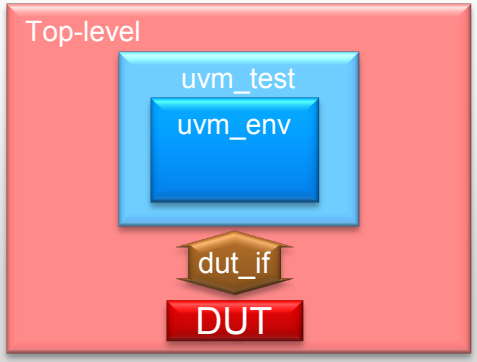
```
package my_pkg;
`include "uvm_macros.svh"
 import uvm_pkg::*;
`include "my_env.svh"
`include "my_test.svh"
endpackage: my_pkg
```

```
my_env.svh:
  class my_env extends uvm_env;
    ...
  endclass: my_env

my_test.svh:
  class my_test extends uvm_test;
    ...
  endclass: my_test
```



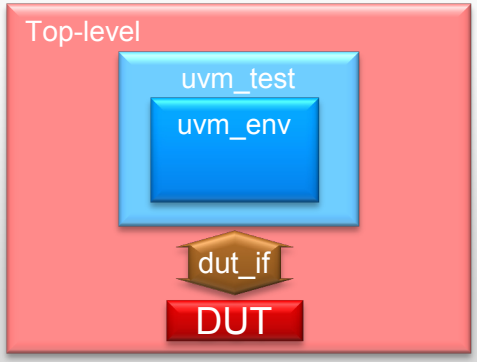
Test Instantiation

```
module top;

  import uvm_pkg::*;
  import my_pkg::*;

  dut_if dut_if1 ();

  dut    dut1 ( ._if(dut_if1) );

endmodule: top
```

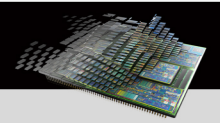


Test Instantiation

```
module top;

  import uvm_pkg::*;
  import my_pkg::*;

  dut_if dut_if1 ();

  dut    dut1 ( ._if(dut_if1) );

  initial
  begin
    run_test("my_test");
  end

endmodule: top
```

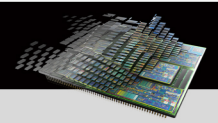


Running the Simulation



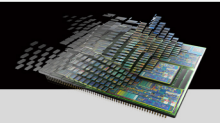
```
> vlog file.sv
> vsim top
# Loading sv_std.std
# Loading work.uvm_pkg
# Loading work.my_pkg
# Loading work.top
# Loading work.dut_if
# Loading work.dut
# Loading ./work/_dpi/qv_dpi.so
# run -all
# ----------------------------------------------------------------
# UVM-1.1d
# (C) 2007-2013 Mentor Graphics Corporation
# (C) 2007-2013 Cadence Design Systems, Inc.
# (C) 2006-2013 Synopsys, Inc.
# (C) 2001-2013 Cypress Semiconductor Corp.
# ----------------------------------------------------------------
```

Running the Simulation



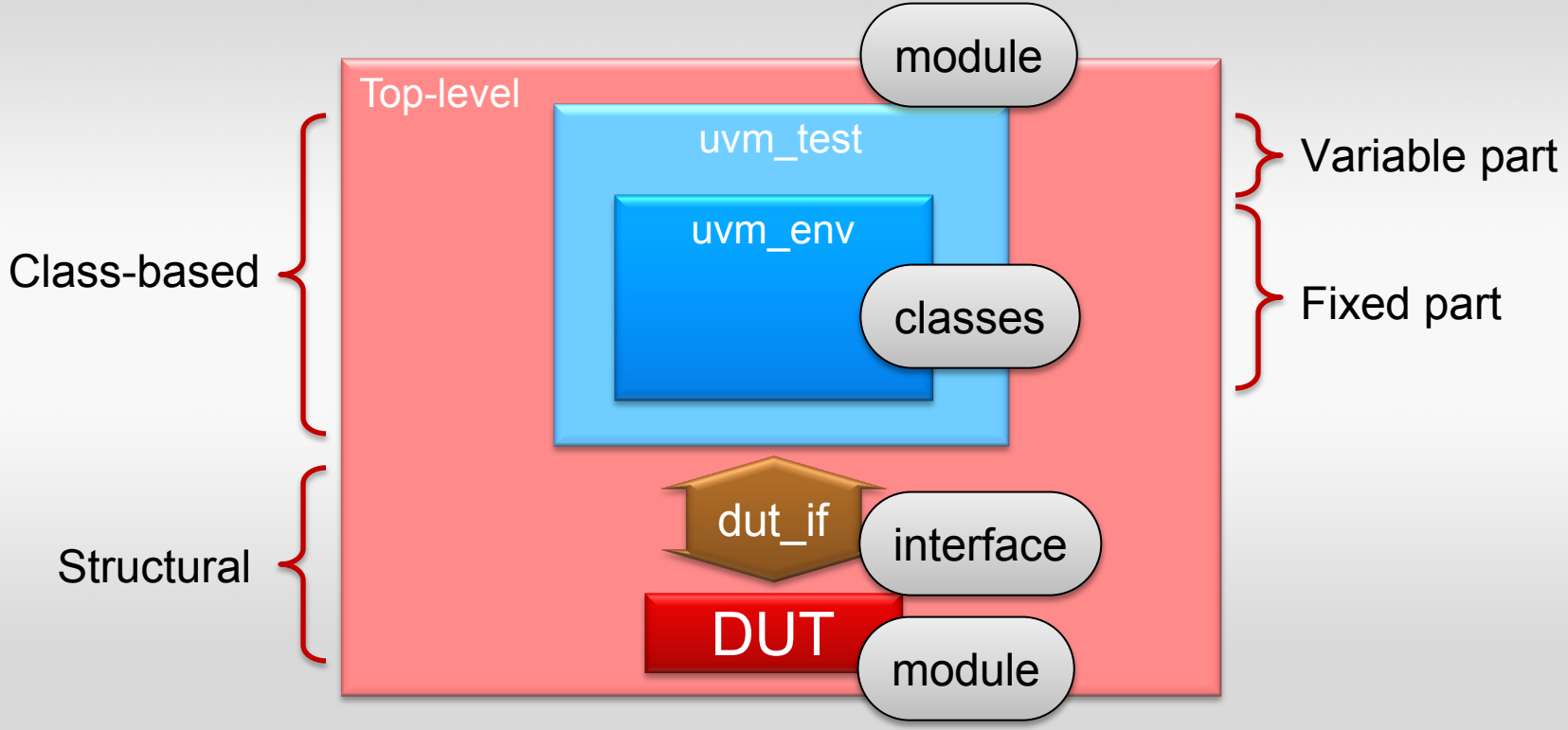
```
# UVM_INFO @ 0: reporter [RNTST] Running test my_test...
# UVM_INFO /home/UVM/uvm-1.1d/src/base/uvm_objection.svh(1116) @ 10:
reporter [TEST_DONE] 'run' phase is ready to proceed to the 'extract' phase
#
```

Running the Simulation



```
# --- UVM Report Summary ---
#
# ** Report counts by severity
# UVM_INFO :    2
# UVM_WARNING :    0
# UVM_ERROR :    0
# UVM_FATAL :    0
# ** Report counts by id
# [RNTST]     1
# [TEST_DONE]     1
# ** Note: $finish    : /home/UVM/uvm-1.1d/src/base/uvm_root.svh(430)
#    Time: 10 ns  Iteration: 55  Instance: /top
```

Summary



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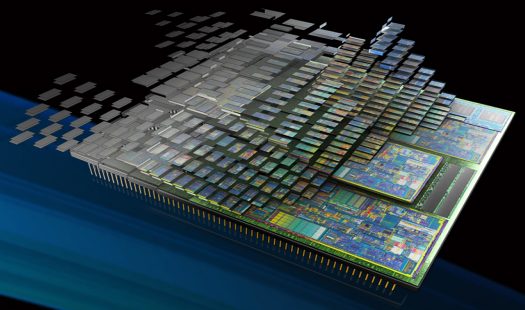

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