VERIFICATION ACADEMY

UVM Basics

Connecting Components

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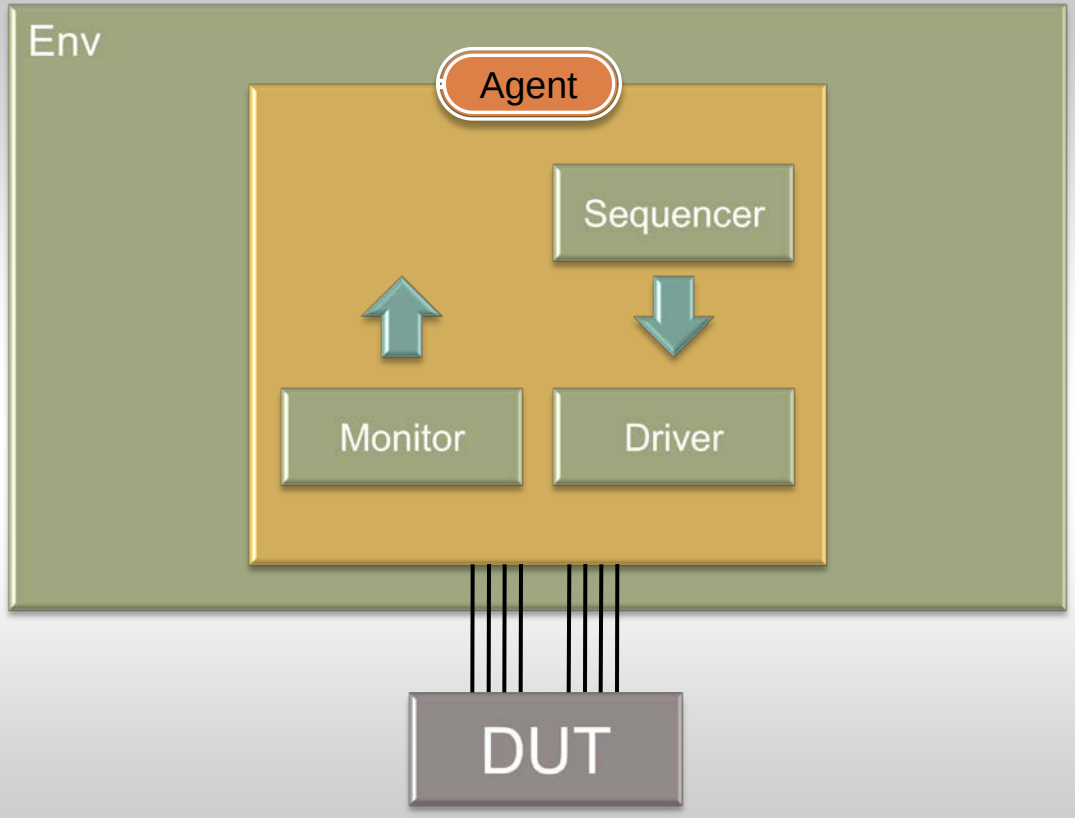
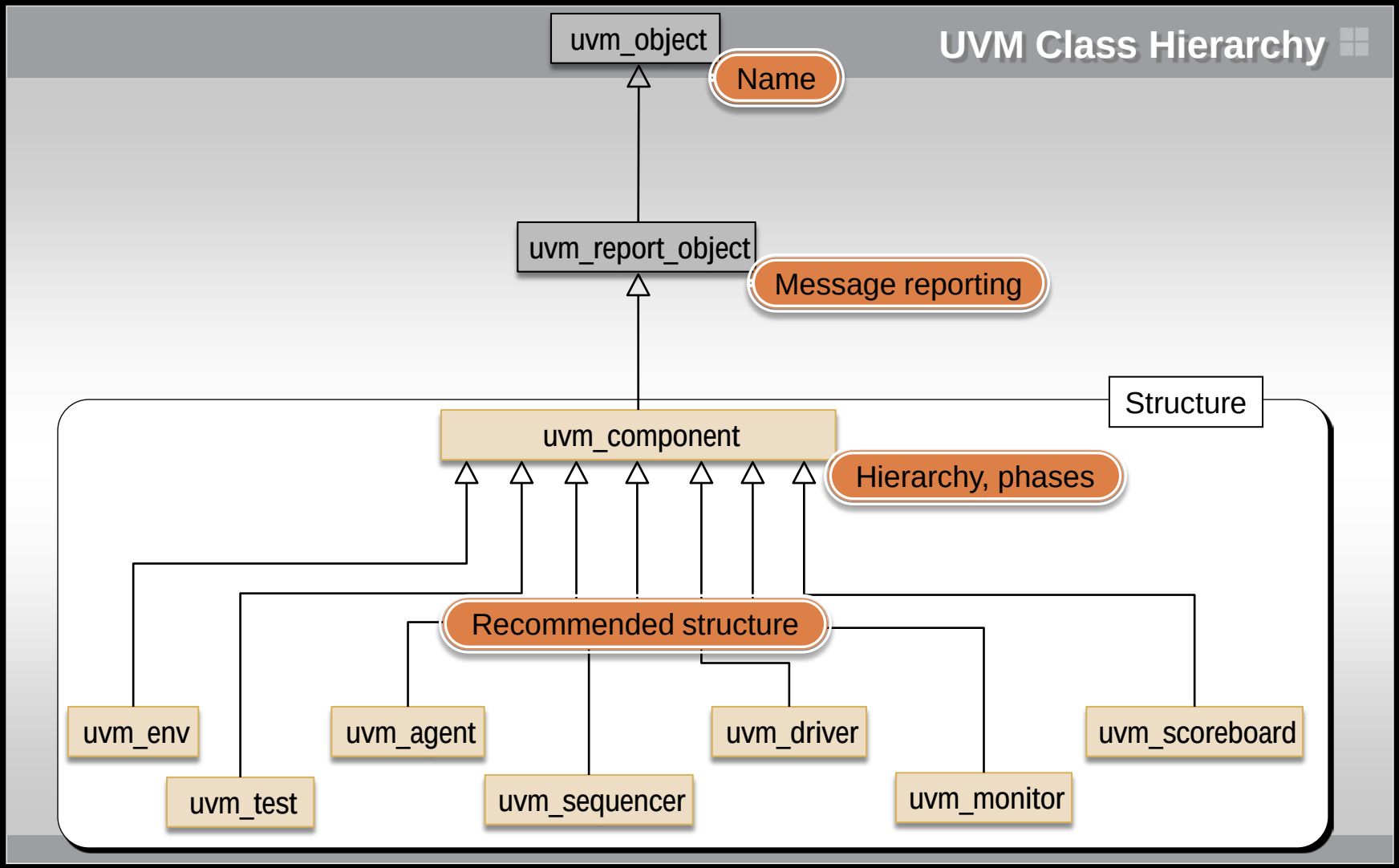
Mentor Graphics®

Verification Components



UVM Class Hierarchy



Component

```
class my_agent extends uvm_agent;
```

Component

```
class my_agent extends uvm_agent;
  `uvm_component_utils(my_agent)

  my_sequencer my_sequencer_h;
  my_driver    my_driver_h;
```

Component

```
class my_agent extends uvm_agent;
  `uvm_component_utils(my_agent)

  my_sequencer my_sequencer_h;
  my_driver    my_driver_h;

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

  function void build_phase(uvm_phase phase);
    ...

  function void connect_phase(uvm_phase phase);
    ...
```

Create child components

Connect child components together

Factory Method

```
function void build_phase(uvm_phase phase);
  super.build_phase(phase);
  my_sequencer_h =
    my_sequencer::type_id::create("my_sequencer_h", this);

  my_driver_h    =
    my_driver   ::type_id::create("my_driver_h"   , this);
endfunction: build_phase
```

Instance name

Parent

"Factory methods" can be overridden in tests

Connect

```
function void build_phase(uvm_phase phase);
  super.build_phase(phase);
  my_sequencer_h =
    my_sequencer::type_id::create("my_sequencer_h", this);

  my_driver_h    =
    my_driver   ::type_id::create("my_driver_h"   , this);
endfunction: build_phase

function void connect_phase(uvm_phase phase);
  my_driver_h.seq_item_port.connect(
    my_sequencer_h.seq_item_export );
endfunction: connect_phase
```

Connect

```
function void build_phase(uvm_phase phase);
  super.build_phase(phase);
  my_sequencer_h =
    my_sequencer::type_id::create("my_sequencer_h", this);

  my_driver_h    =
    my_driver   ::type_id::create("my_driver_h"   , this);
endfunction: build_phase

function void connect_phase(uvm_phase phase);
  my_driver_h.seq_item_port.connect(
    my_sequencer_h.seq_item_export );
endfunction: connect_phase
```

Handles used to connect child components

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
```

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
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Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
    ...
```

Called top-down from type_id::create

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
    ...
  function void connect_phase(uvm_phase phase);
    ...
```

Called bottom-up

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
    ...
  function void connect_phase(uvm_phase phase);
    ...
  function void start_of_simulation;
    ...
```

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
    ...
  function void connect_phase(uvm_phase phase);
    ...
  function void start_of_simulation_phase(uvm_phase phase);
    ...
  task run_phase(uvm_phase phase);
    ...
```

The only task amongst the phases shown here

run_phase can have sub-phases

Standard Phase Methods of a Component

```
class my_component extends uvm_component;
  ...
  function new(string name, uvm_component parent);
    super.new(name, parent);
  endfunction: new
  function void build_phase(uvm_phase phase);
    super.build_phase(phase);
    ...
  function void connect_phase(uvm_phase phase);
    ...
  function void start_of_simulation_phase(uvm_phase phase);
    ...
  task run_phase(uvm_phase phase);
    ...
  function report_phase(uvm_phase phase);
    ...
```

Anatomy of an UVM Component

```
class my_component extends uvm_component;
  `uvm_component_utils(my_component)

  virtual dut_if dut_if_h;

  my_sequencer my_sequencer_h;
  my_driver    my_driver_h;

  function new(string name, uvm_component parent); ...
  function void build_phase(...); ...
  function void connect_phase(...); ...
  function void start_of_simulation_phase(...); ...
  task run_phase(...); ...
  function check_phase(...); ...
  function report_phase(...); ...
endclass
```

Factory registration

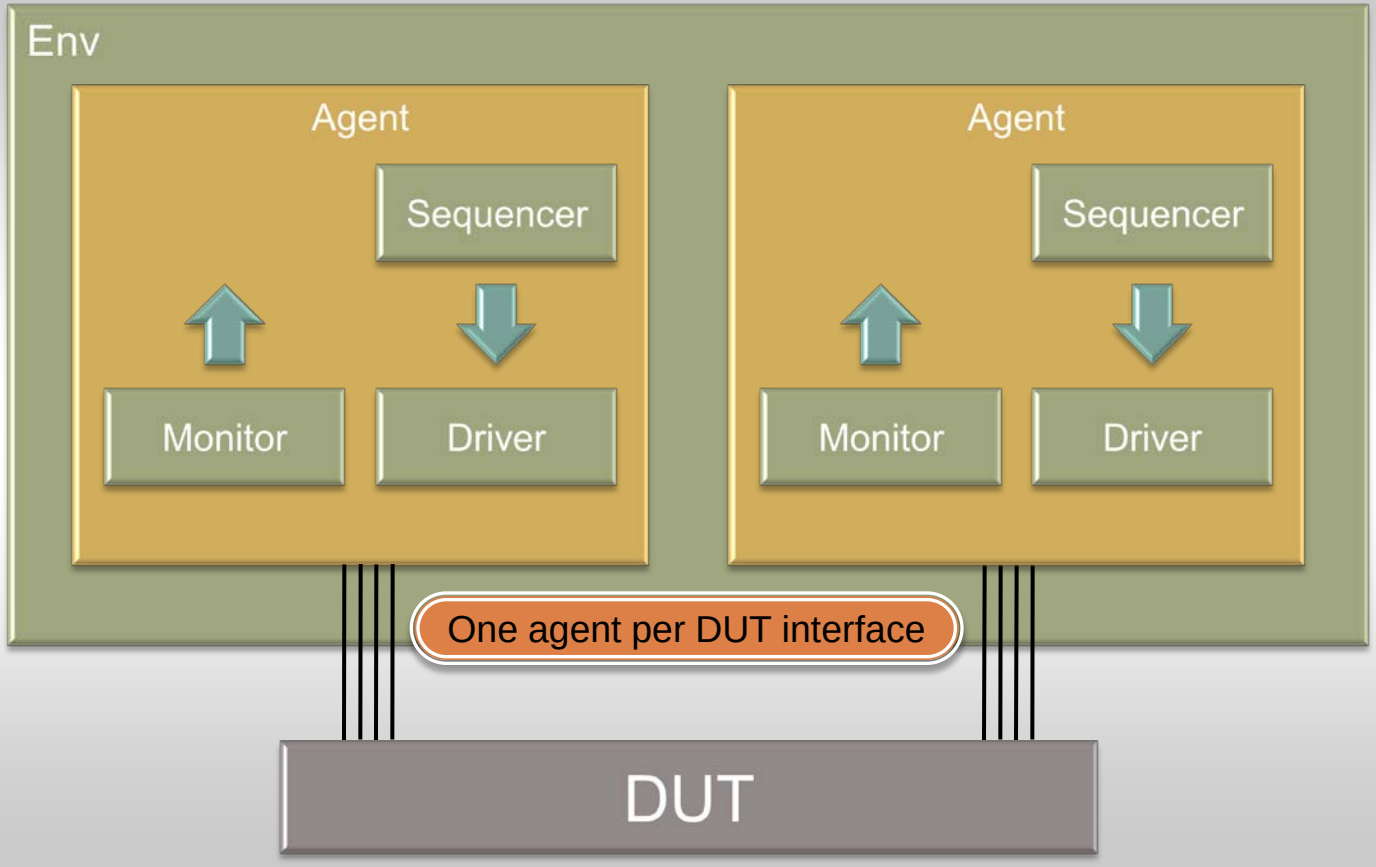
External interfaces, ports

Internal component handles

Standard phase methods

Recommended order

Summary


Env
Agent
Sequencer
Monitor
Driver
Agent
Sequencer
Monitor
Driver
One agent per DUT interface
DUT

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