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An Auto generated test framework for improving SAI interoperability

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An Auto generated test framework for improving SAI interoperability

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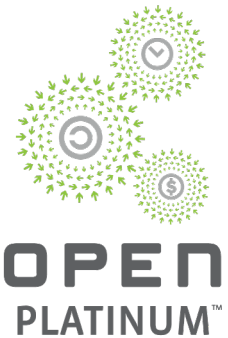

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Agenda

NETWORKING

- Motivation
- Goals
- State of SAI testing
- Thrift auto-generation framework
- PTF tests
- Call to Action

Motivation

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SAI	Functional Definition	Quality	Updates
• Vendor agnostic API with over 50 objects and 1000+ attributes	• Lack of examples on API usage • Scope for ambiguities in API attribute functionality	• Non uniform test coverage • Lack of standard tests for a common bar for all vendors	• Lack of workflow for adding new tests for change/updates to SAI • Can result in poor quality / disparity in SAI implementation

Goals

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Quality

- Publish a unit and functional test plan for most SAI objects
- Increase SAI testing with a goal towards achieving a high and uniform bar for vendor implementations
- Provide a pseudo control-plane using SAI RPC (also auto-generated)

Extensibility

- Provide and fast and easily understood wrapper to invoke and test any libSAI implementation
- Simplify the effort it takes to add new tests going forward

State of SAI API Testing

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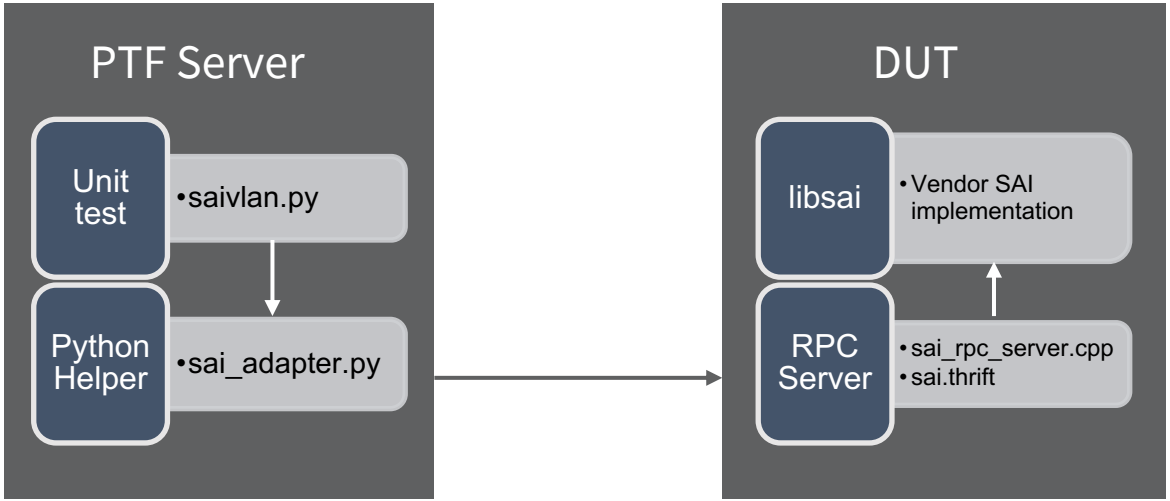
Directory	Contents	Status
basic_router	Simple test to illustrate L3 route setup	not been updated in over 3 years
sai_ut	C++ unit tests for L2/L3 objects using google-test	not been updated in over 3 years
saithrift	PTF based functional tests for L2, L3, Tunnel and Mirror As of today, ~125 testcases present in “saithrift”	updates are very few and far between

Anatomy of a PTF test



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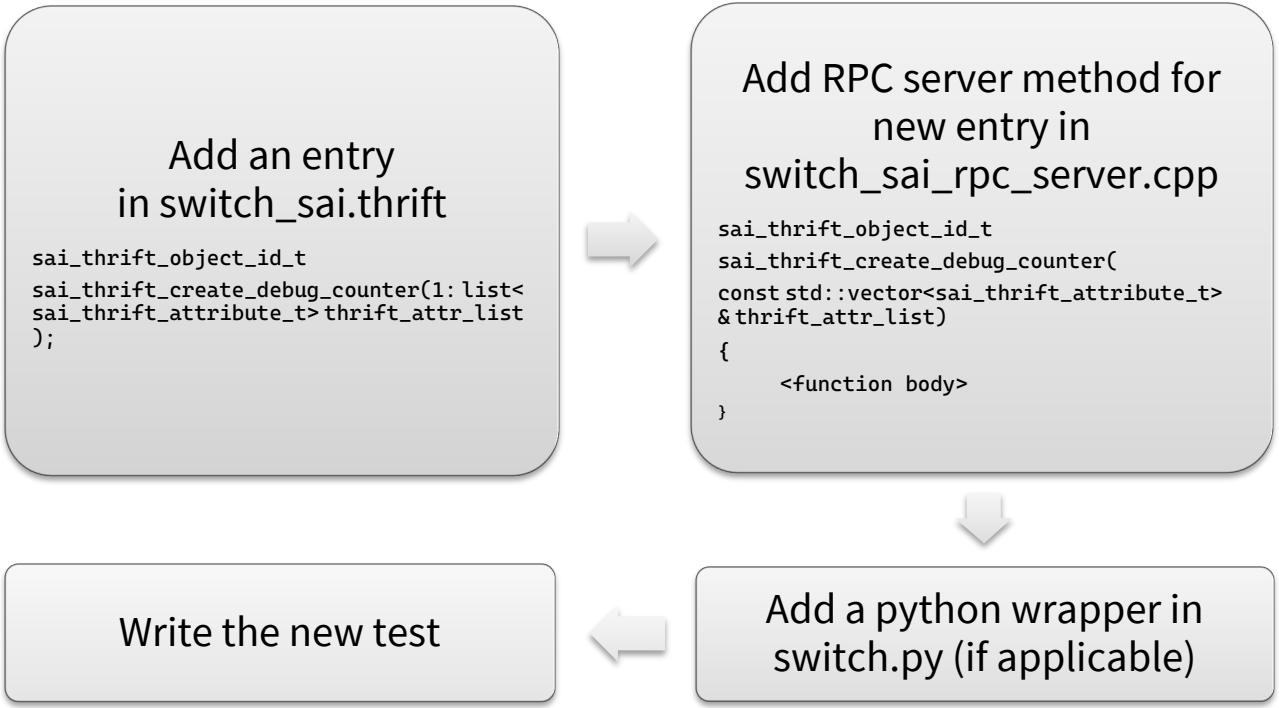
Current: To add a new test



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We believe this is an impediment to writing more tests

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Proposed: To add a new test

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- **sai.thrift**

```
sai_thrift_object_id_t sai_thrift_create_switch(1: list<sai_thrift_attribute_t> attr_list);
sai_thrift_status_t sai_thrift_remove_switch();
sai_thrift_status_t sai_thrift_set_switch_attribute(1: sai_thrift_attribute_t attr);
sai_thrift_attribute_list_t sai_thrift_get_switch_attribute(1: sai_thrift_attribute_list_t attr_list);
```

- **sai_rpc_server.cpp**
  C++ thrift backend implementation for above thrift APIs are auto-generated
- **sai_adapter.py**
  Python wrapper for above thrift APIs, compliant to SAI CRUD semantics

- **All the above files auto-generated and readily available for every new object and attribute**
- Just write the test

SAI Thrift Generation

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SAI Meta

- Utilize existing SAI meta to collect information about object/attributes
- Extend SAI Meta perl scripts to auto-generate wrapper files

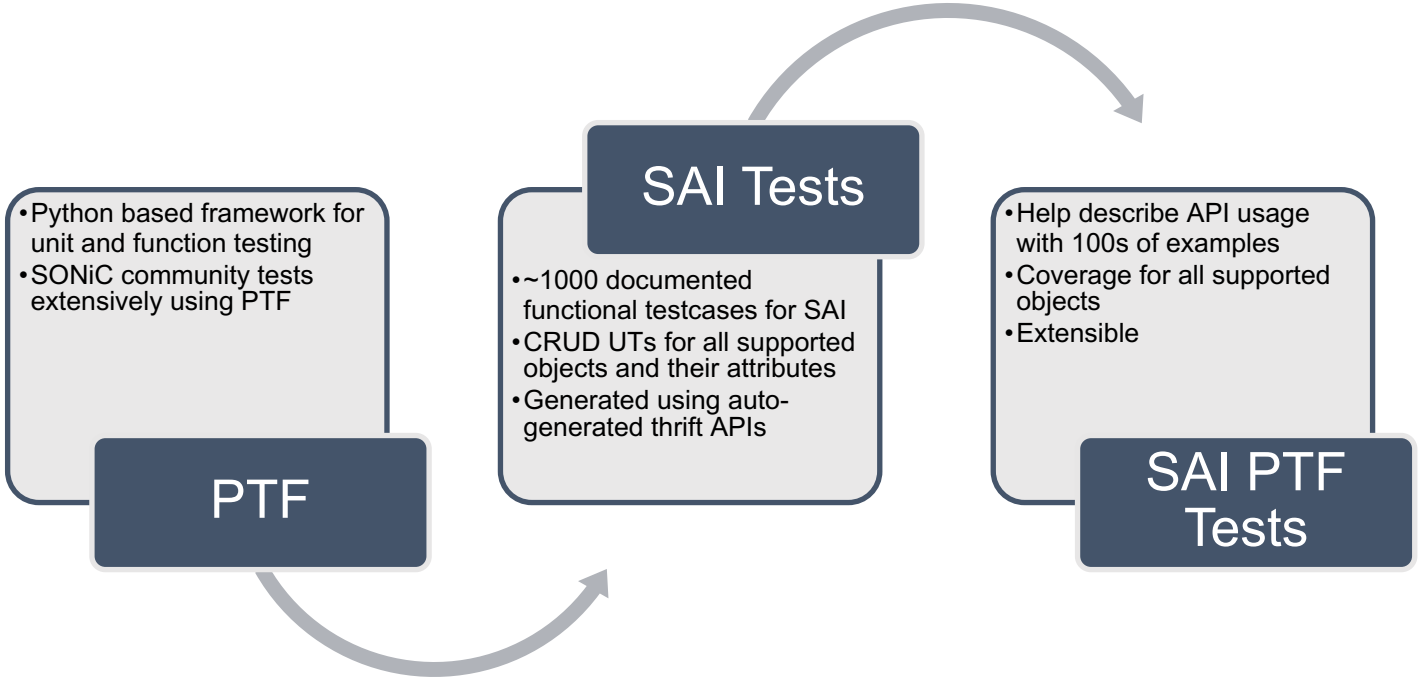
Code Generation

- Provide new template files for auto-code generation
- New extended perl script + template files output .thrift, C++ wrapper + python thrift interface

Test Creation

- Write new tests using Auto-generated code
- Primary focus on tests rather than on boiler-plate code
- SAI Object definition/update need regeneration allows quick addition/update of tests

SAI PTF Tests



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SAI PTF Tests

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- The test cases include
- - CRUD unit tests
- - Functional tests

- The functional tests conform to **SAI behavior model**
- Allow for different implementations to have a consensus on API behavior
- Decrease cases of ambiguity for a given API
- Establish a common bar of quality for all SAI implementations

SONiC Community Tests

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- All of these tests can run in a SONiC community test environment
- Build the libsaithrift using ENABLE_RPC functionality in SONiC
- Work in progress to define a community test topology to run new tests
- More details will be published soon

Call to Action

- We invite all vendors and partners to review and contribute testcases
- Help us review the design of the thrift wrapper
- Help is review the test cases
- Start adding your own PTF tests

Thank you!

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Open Discussion