

SAI testing catch-up – SAI Challenger's new functionality and use cases

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SAI testing catch-up

SAI Challenger's new functionality and use cases

Networking



NETWORKING

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Empowering the SAI ecosystem



NETWORKING

- PLVision's experience in disaggregated systems (SONiC, SAI, DASH) + Keysight's experience in test and measurement = the best open testing solution for SAI
- SAI Challenger was initially developed by PLVision and contributed to OCP in 2021
- Keysight introduced their Open Traffic Generator API and its Python implementation, snappi, to the community



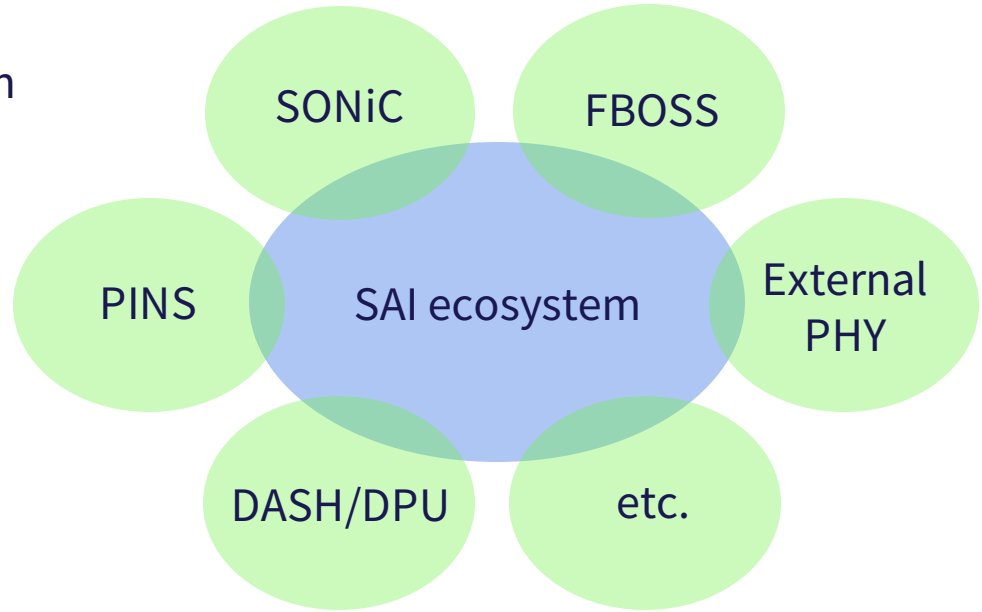
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SAI expansion

- SONiC/FBOSS – disaggregated switch
- DASH – extending SONiC for stateful workloads
- External PHY – Layer-1 SAI switch
- PINS – SDN capabilities and P4 programmability for SAI pipeline
- SyncD as a SAI driver



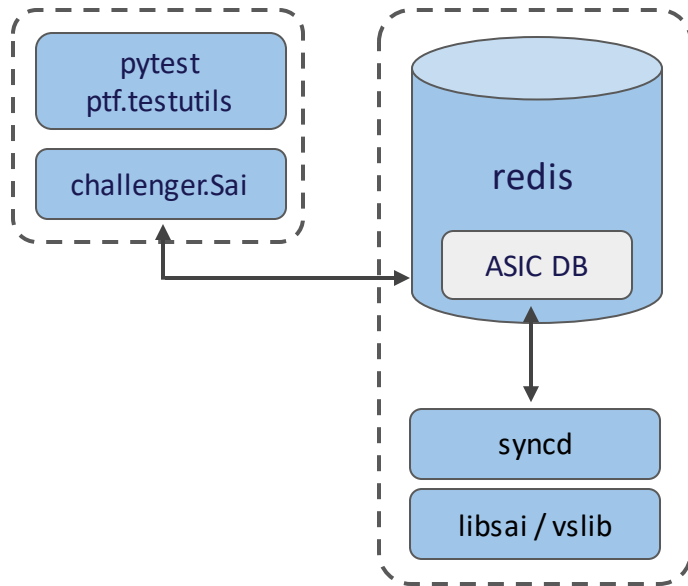
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SAI Challenger as OCP project

- Docker-based environment with SONiC SyncD as a SAI driver and Python CRUD API to Redis DB
- SAI integration and testing in one shot
- SONiC Lite prototyping approach
- Ease of reproducing the user scenarios based on SONiC sairedis.rec files
- Simple CLI for SAI debugging



<https://github.com/opencomputeproject/SAI-Challenger>



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SAI Challenger response – what is new

- SAI flexible configuration
- PINS use case support (SONiC Lite)
- Multi-DUT topologies
- ASIC simulators support
- Complex SAI-based networks simulation with GNS3
- Extended logging capabilities
- Data plane testing – from a single packet to the line-rate

PINS



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Open Traffic Generator (OTG) APIs

- Open Model Based Declarative API
 - Write once, run everywhere
- OpenAPIv3 Definition – SDKs in 20+ languages
 - snappi & gosnappi – special case for Python & Golang respectively
- Separation Between API & Data Model
- Flat
- Well Documented Data Model
- REST/gRPC Transports

<https://otg.dev>

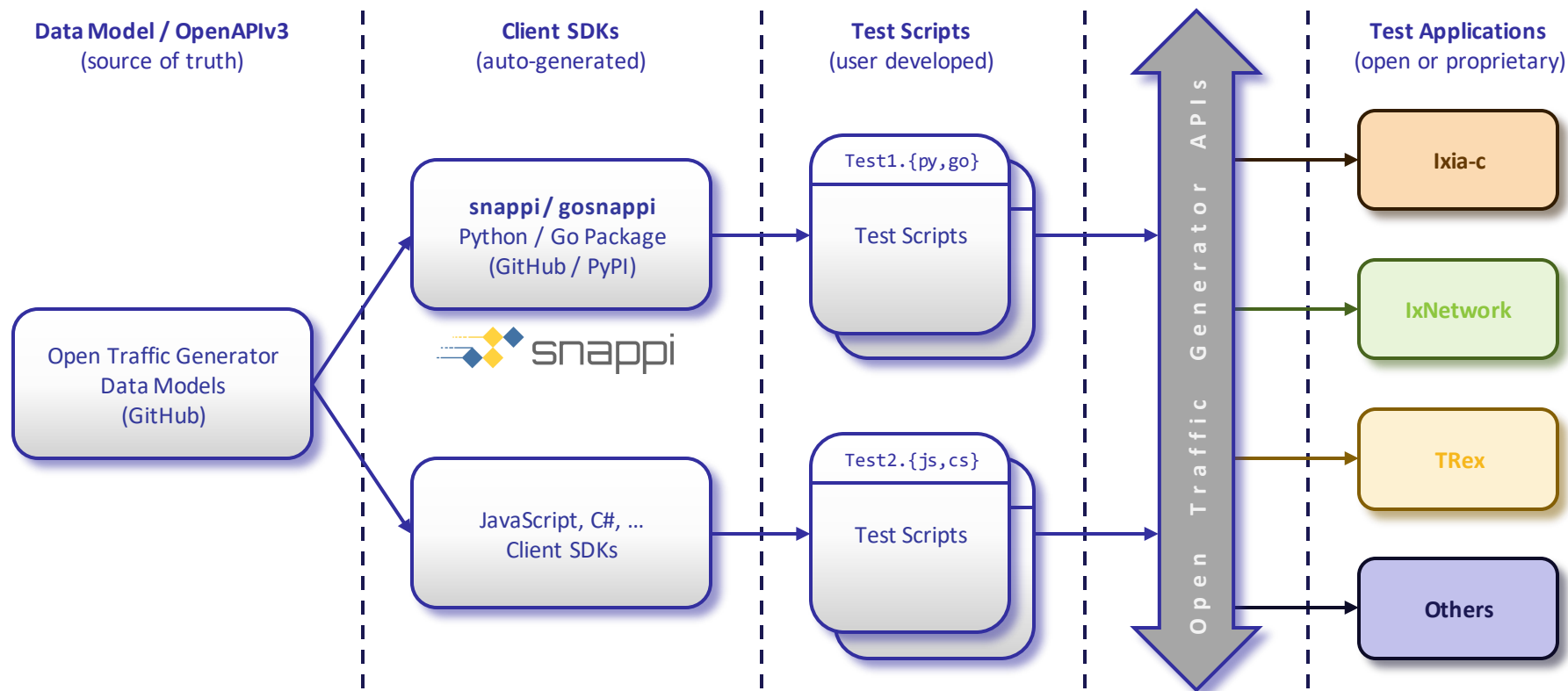


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snappi – From API to Test Script to Test Execution



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- Client-Side SDK for Open Traffic Generator APIs
- OO, defaults, client-side validations, factory methods, single import, serialize/deserialize whole config or objects, IntelliSense...
- Pythonic
- Available on PyPI
 - `pip install snappi`

```
1 # test TCP ACL on ASIC
2 # increment TCP source port
3
4 import snappi
5
6 api = snappi.api(location = "https://10.3.2.3")
7 cfg = api.config()
8
9 f1 = cfg.flows.flow(name = 'flow1')[-1]
10 f1.size.fixed = 1518
11 f1.rate.percentage = 10
12 f1.metrics.enable = True
13
14 eth, ip, tcp = f1.packet.ethernet().ipv4().tcp()
15
16 eth.src.value = "00:CD:DC:CD:DC:CD"
17 eth.dst.value = "00:AB:BC:AB:BC:AB"
18
19 ip.src.value = "1.1.1.2"
20 ip.dst.value = "1.1.1.1"
21
22 tcp.src_port.increment.start = 5000
23 tcp.src_port.increment.step = 2
24 tcp.src_port.increment.count = 10
```



OTG - Current Status

- Traffic Generation : Layer 2/3/4 Traffic Generation & Analysis
- Device Emulation : PFC, BGP, ISIS, LACP/LAG, RSVP*
- Endpoint Emulation : HTTP(S)*
- Ecosystem Presence : SAI Challenger, SONiC, DASH,
Emulation Platforms – KNE & ContainerLab,
OpenConfig Feature Profiles
- Version 1.0
 - ETA – Q1 '23



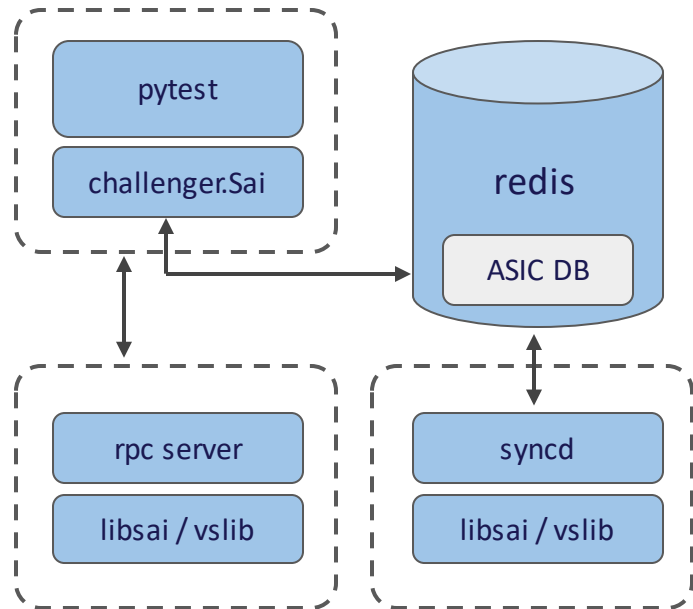
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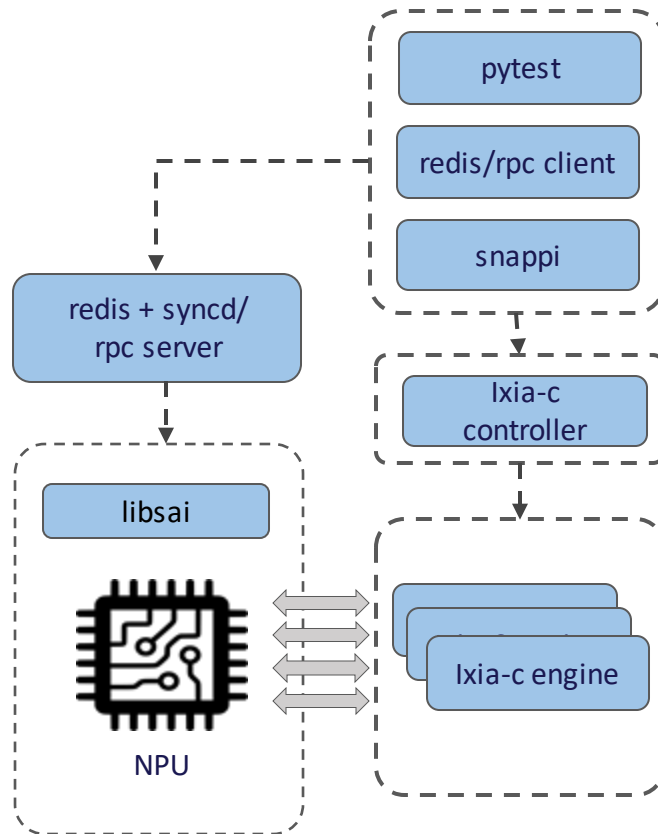
SAI thrift integration

- Utilize existing Thrift auto-generation framework
- Allow for testing w/o syncd



DASH

- NPU functional, scale and performance testing
- Line rate tests with HW TG



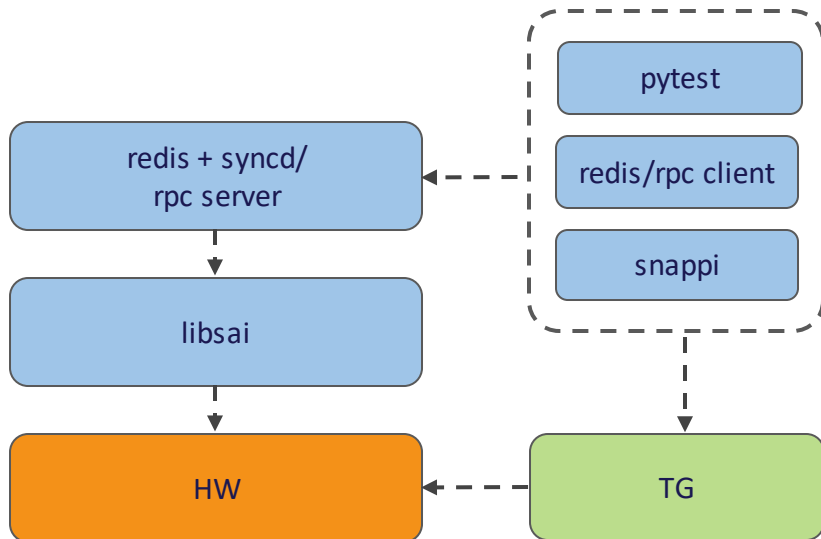
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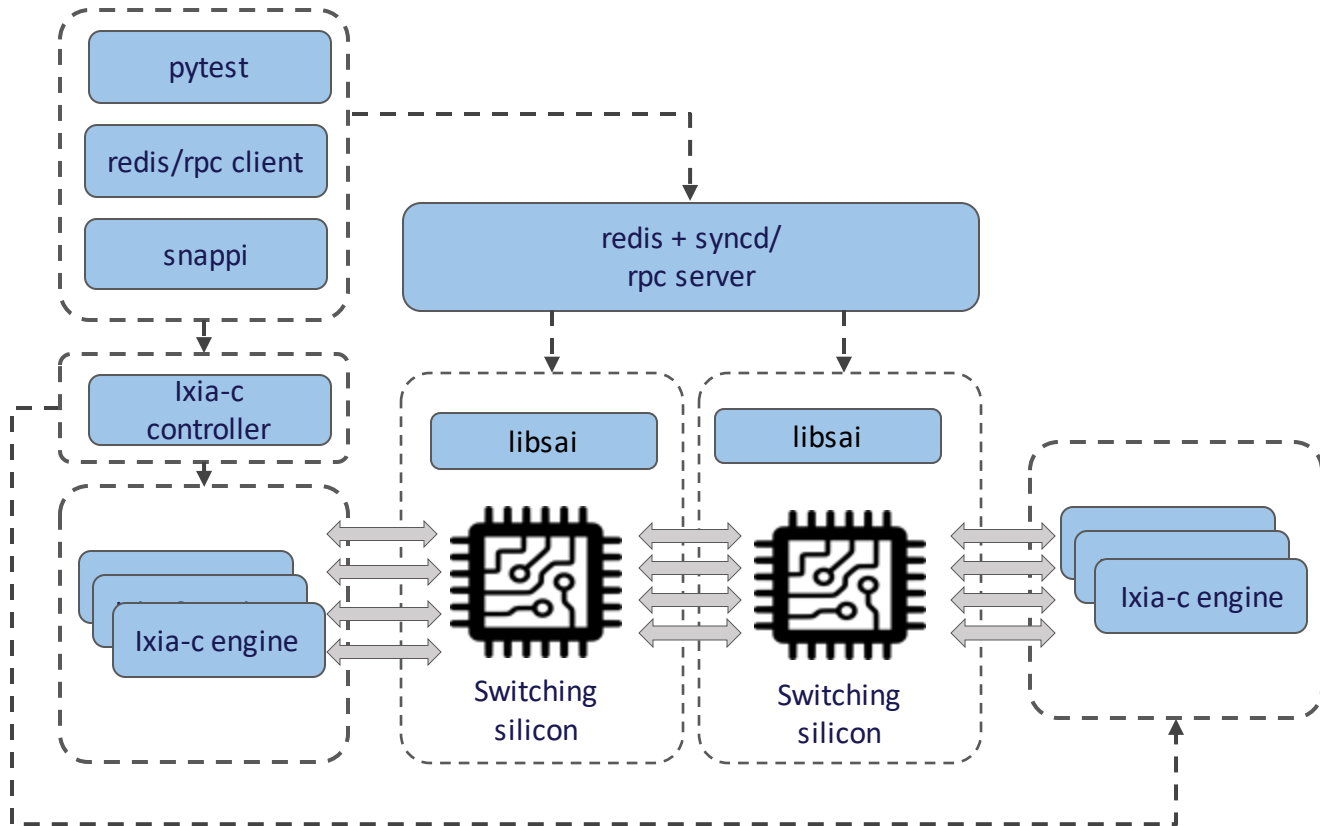
SAI testing

- Configure HW (ASIC/PHY/NPU) via redis + syncd or thrift or grpc
- Data plane testing with vendor agnostic TG API



Multi DUT

- JSON topology description
- Complex scenarios support (BFD etc.)



Call to Action

- Try it:

https://github.com/opencomputeproject/SAI-Challenger/blob/main/docs/standalone_mode.md

- Start using:

https://github.com/opencomputeproject/SAI-Challenger/blob/main/docs/porting_guide.md

- Scale to the line-rate:

<https://otg.dev>

- Adapt and extend:

<https://github.com/opencomputeproject/SAI-Challenger/tree/main/usecases>



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Thank you!

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