KEYSIGHT

NAF AUTOCON2: WS:D1
Automated & Scalable Network Testing with OTG

A Brief History of Keysight

KEYSIGHT
+
ixia

1939–1998:
Hewlett-Packard years

1999–2013:
Agilent Technologies years

2014+:
Keysight years

2017:
Keysight acquires Ixia

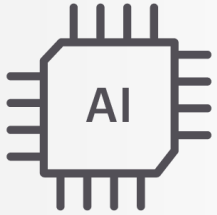
Have you tested your network?

Network Test Automation

Why is it getting more importance today?

Open networking ecosystems

Industry wide co-design



Networks are bottlenecks for AI

Data center refresh cycles are shrinking

Testing as code

Key challenges

Why is not fully automated yet?

- Different tools at different stages
- CI/CD needs CT
- Proprietary non-standard APIs
- Cost prohibitive
- Lack of community

Open Traffic Generator (OTG)

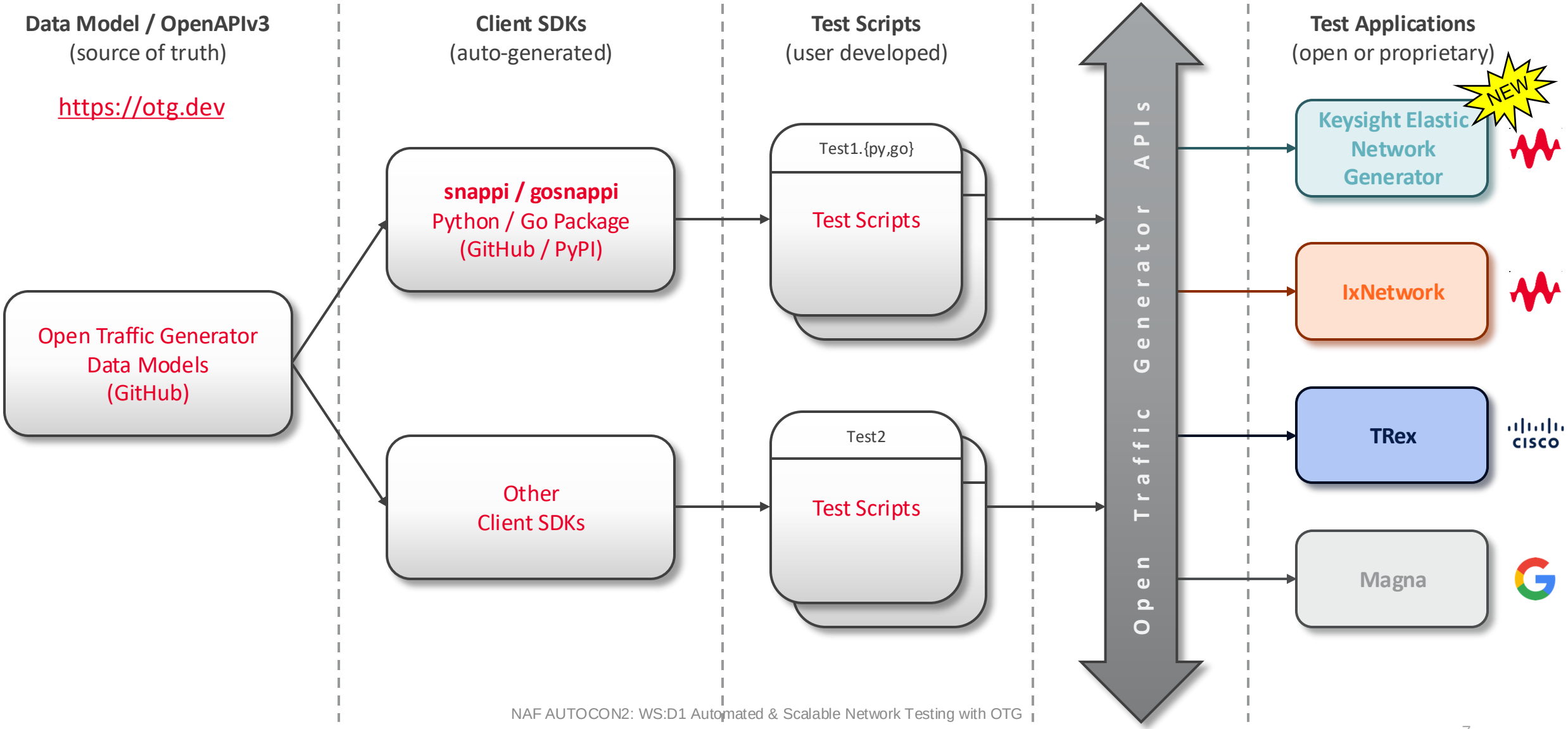




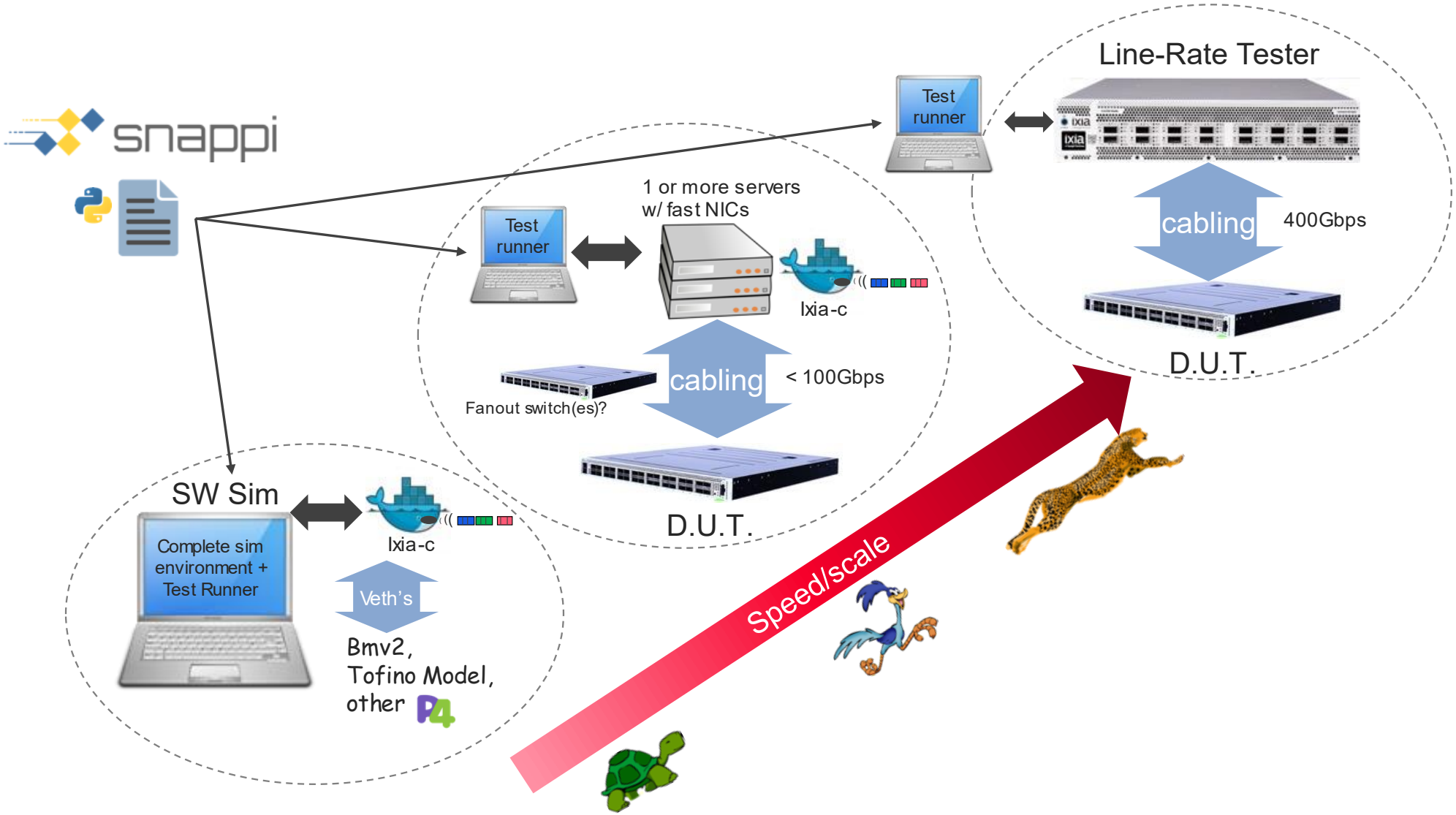
Model-based | Vendor Neutral | Open-API | Use-case driven | Community

Visit https://ixia-c.dev/ and get involved

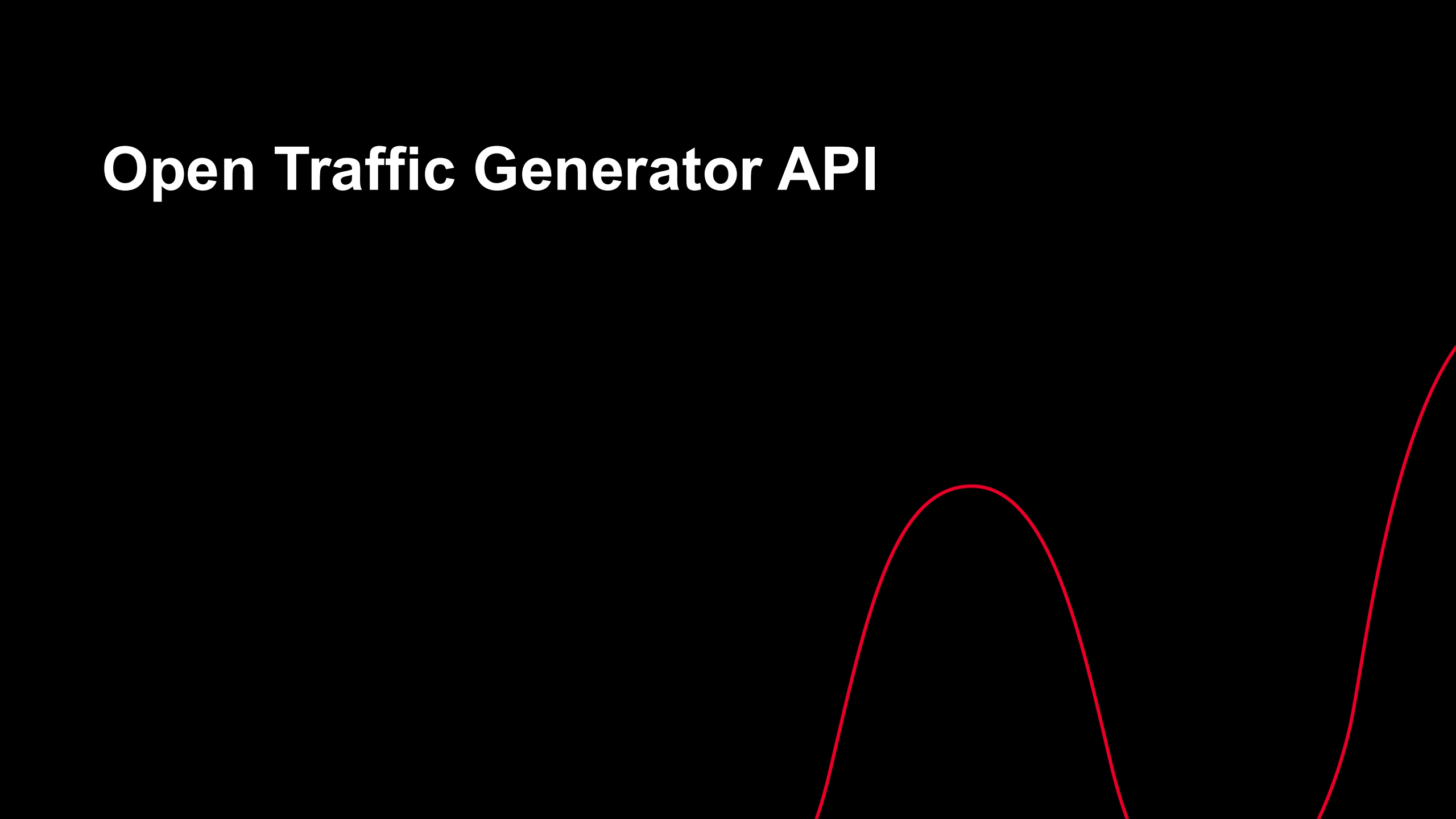
Open Traffic Generator API



Open traffic generator -- portability

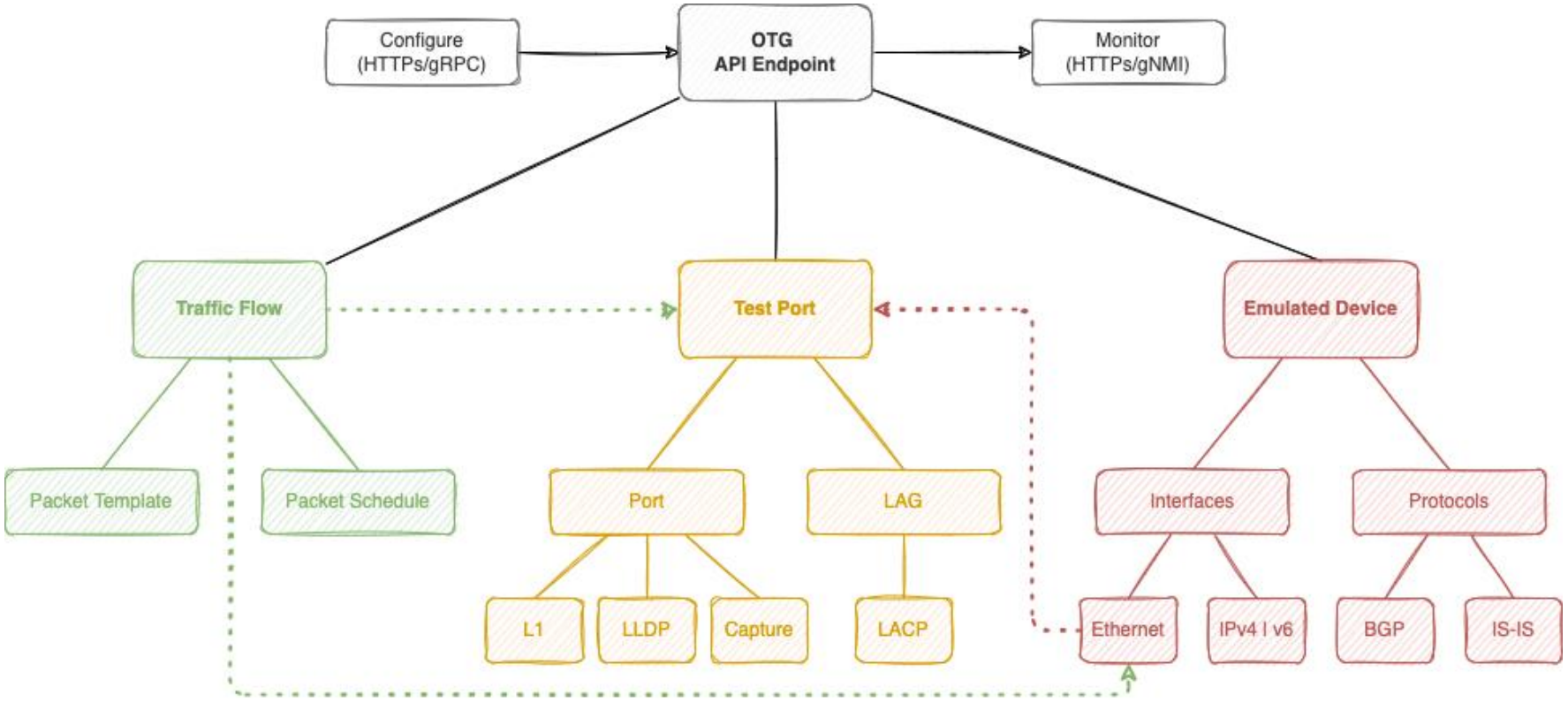


Open Traffic Generator API



What – OTG Model

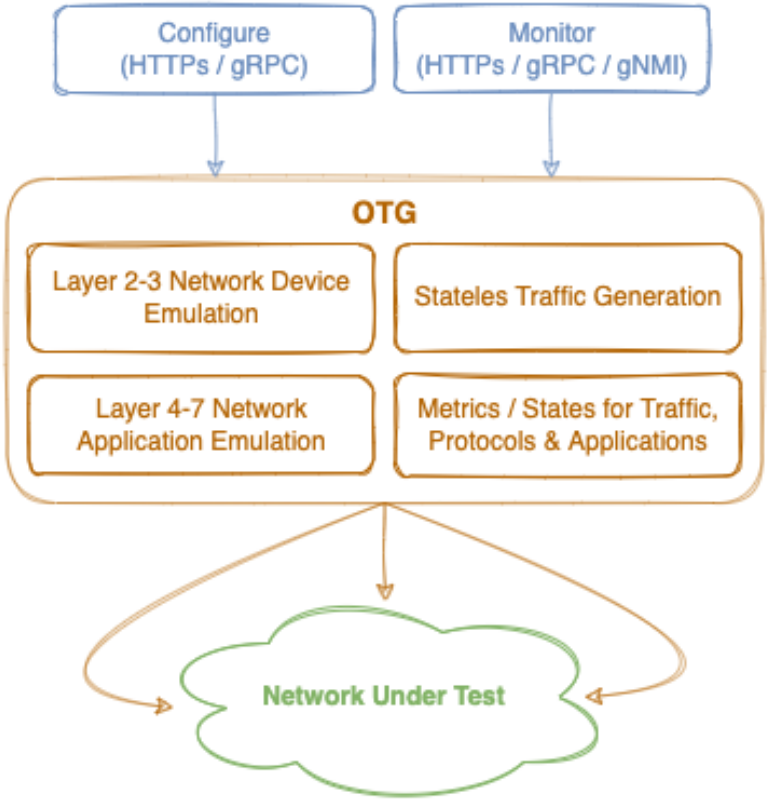
https://otg.dev



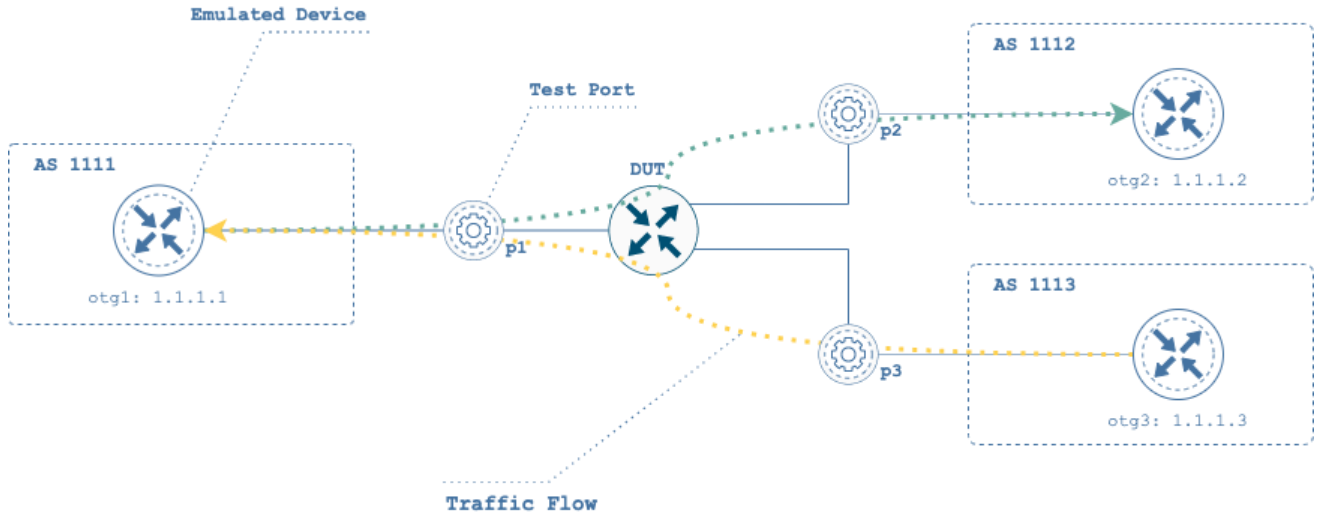
OTG L2-3 Model Hierarchy

What – OTG API

https://otg.dev



OTG API Surface

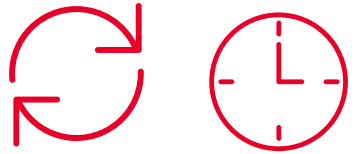


OTG L2-3 Components

- Test Ports
- Emulated Devices
- Traffic Flows

Open Traffic Generator API

Declarative vs Imperative



Declarative – choice for OTG

- One OTG config – one API call to apply
- Speed to apply & speed to fail!
- Model enforcement – client and server

Imperative

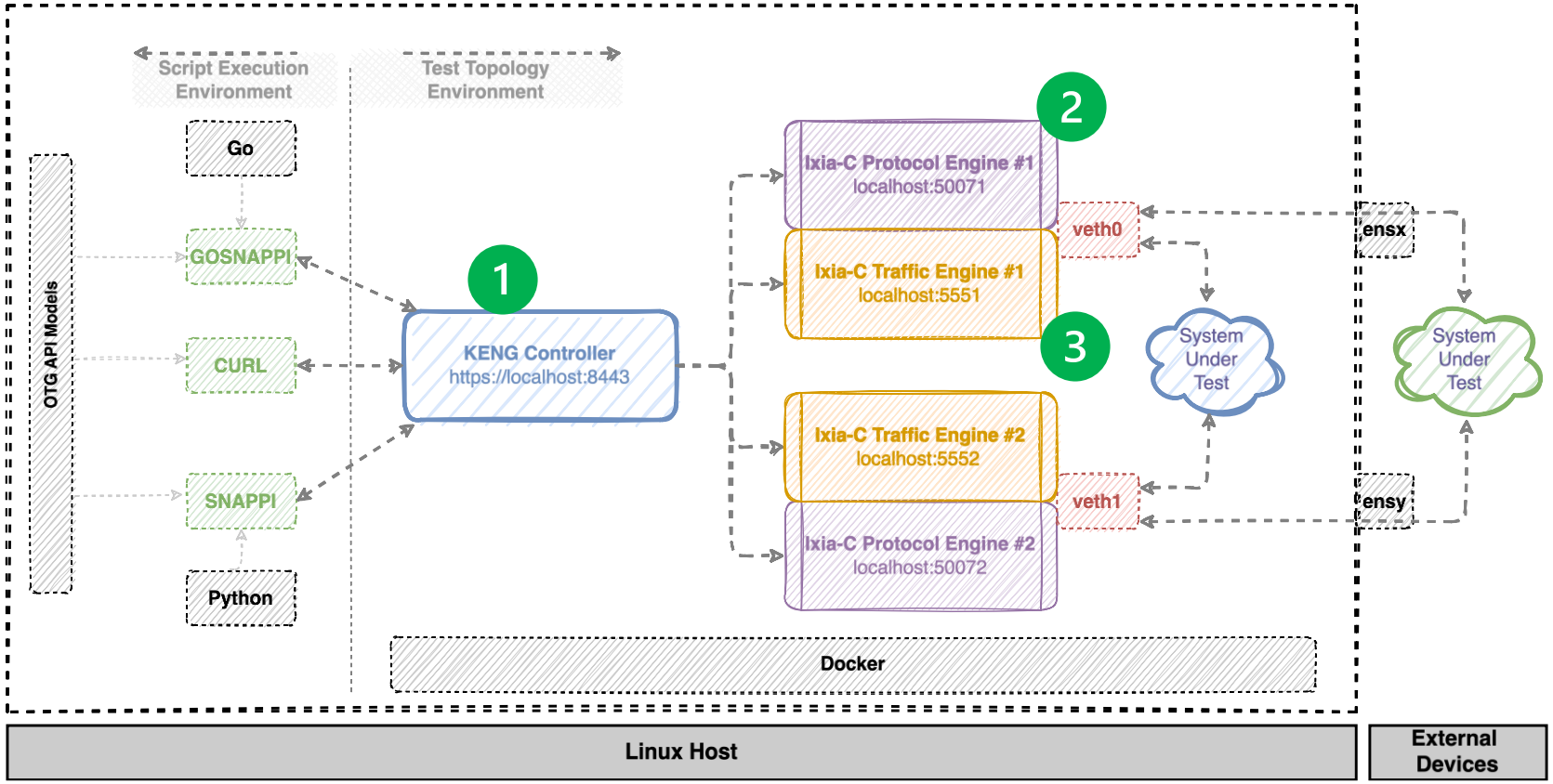
- Sequence of API calls
- Latency of each call compounds
- Slow in getting to a failing API call

- Client-Side library for OTG APIs
- OO, defaults, client-side validations, factory methods, single import, serialize/deserialize whole config or objects…
- Pythonic
- Available on PyPI
  - `pip install snappi`

```python
# test TCP ACL on ASIC
# increment TCP source port

import snappi

api = snappi.api(location = "https://10.3.2.3")
cfg = api.config()

f1 = cfg.flows.flow(name = 'flow1')[-1]
f1.size.fixed = 1518
f1.rate.percentage = 10
f1.metrics.enable = True

eth, ip, tcp = f1.packet.ethernet().ipv4().tcp()

eth.src.value = "00:CD:DC:CD:DC:CD"
eth.dst.value = "00:AB:BC:AB:BC:AB"

ip.src.value = "1.1.1.2"
ip.dst.value = "1.1.1.1"

tcp.src_port.increment.start = 5000
tcp.src_port.increment.step = 2
tcp.src_port.increment.count = 10
```

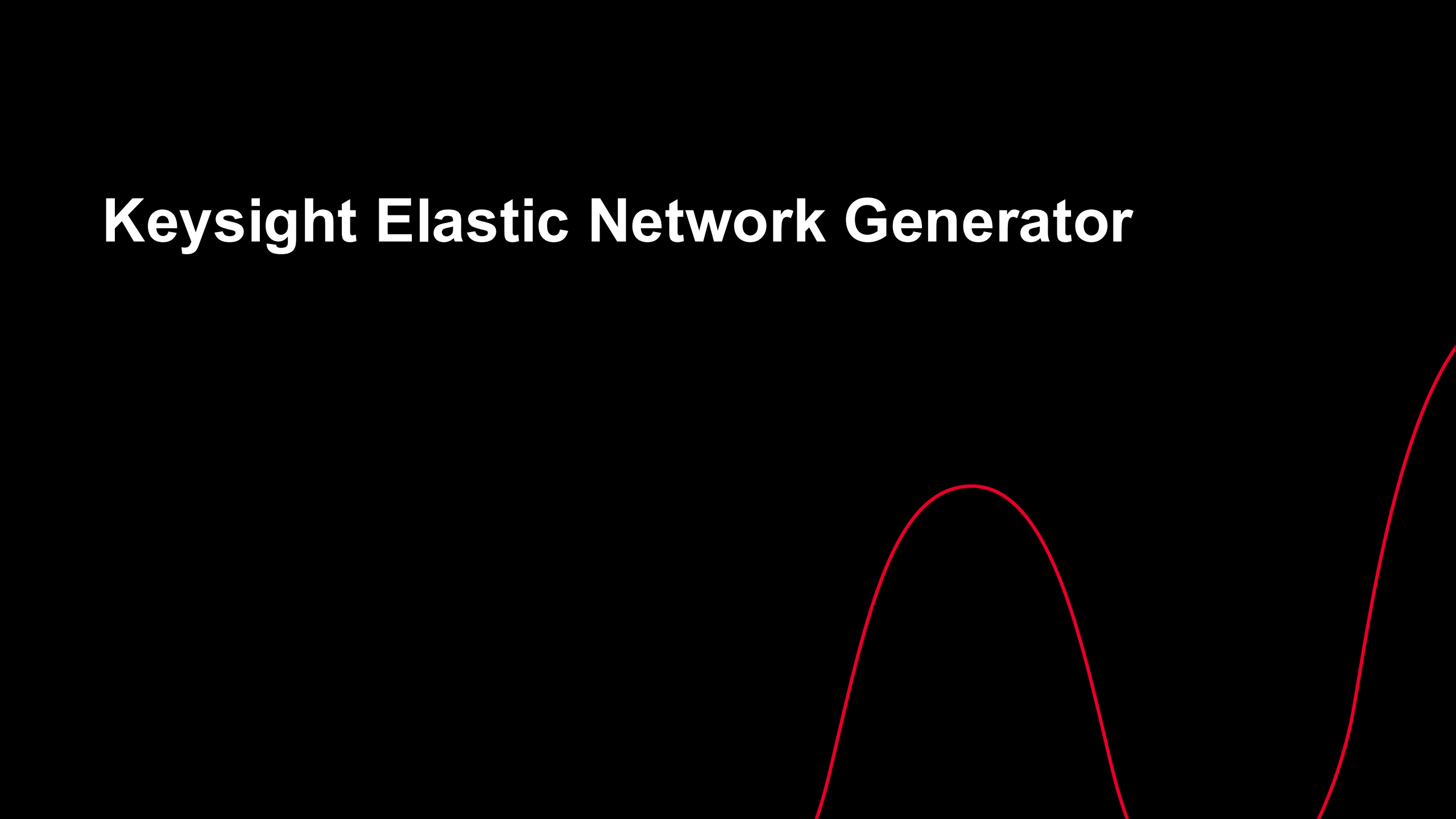
OTG Components

Building blueprint



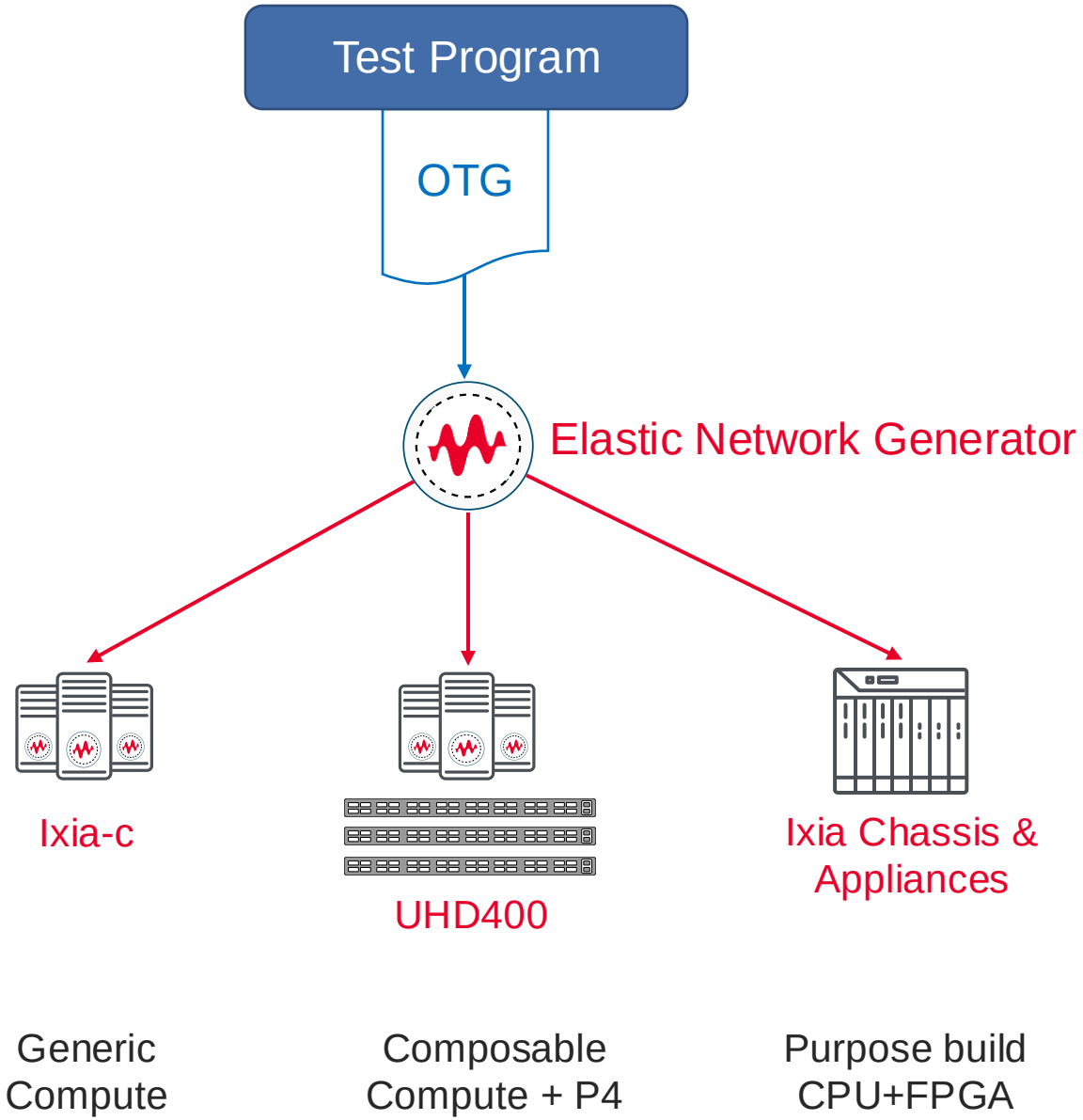
1. KENG Controller: The brain which manages all the components
2. Ixia-c protocol engine: Control plane emulation (BGP, ISIS)
3. Ixia-c traffic engine: Data plane, traffic flows etc.

Keysight Elastic Network Generator

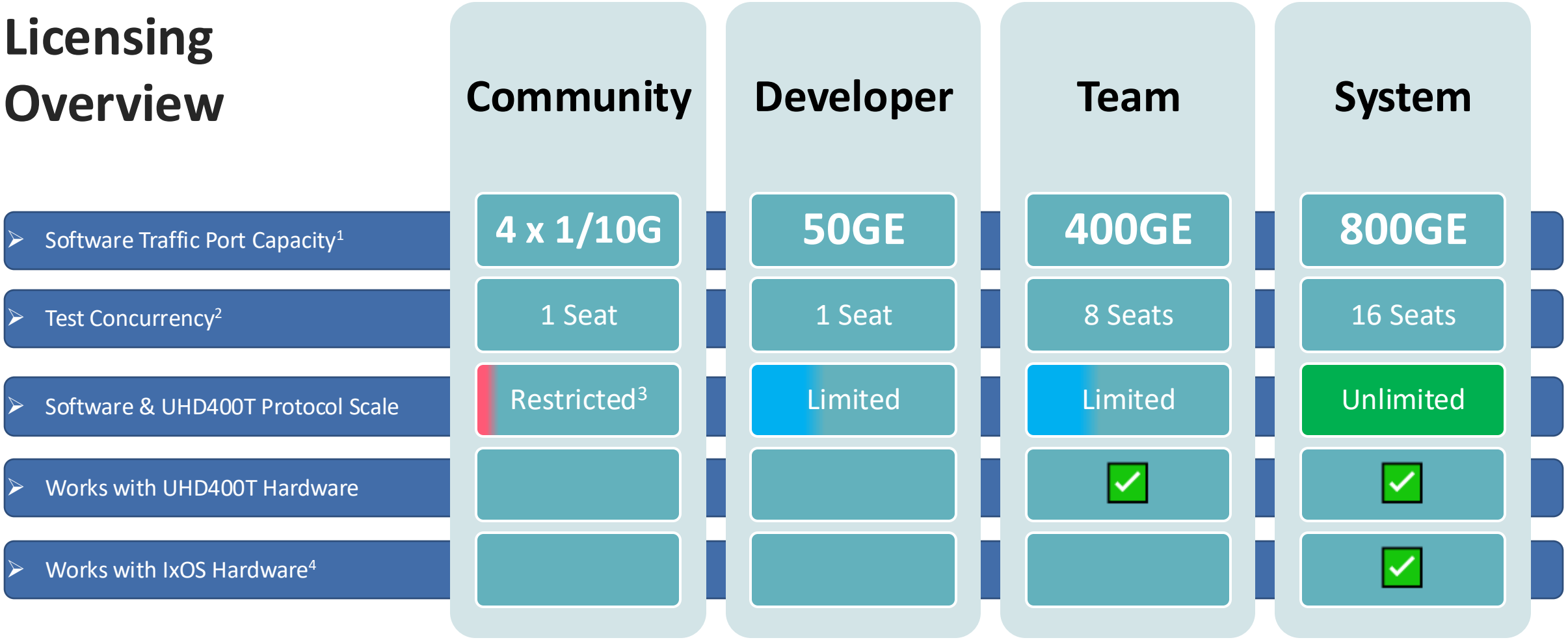


Keysight Elastic Network Generator

- Keysight OTG UX
- User-facing API Endpoint
- Write test once, run anywhere



Licensing Overview



(1) Port capacity applies to Ixia-c software ports and is determined as a sum of configured test port speeds: 100G, 50G, 40G, 25G, 10G, 1G
(2) Concurrently running controller instances with non-empty configuration
(3) Restricted protocol scale: 4 x IP/BGP sessions
(4) Novus and AresONE load modules and appliances

KENG/OTG learning path

- Docs: https://ixia-c.dev/
- OTG GitHub Repository: https://github.com/open-traffic-generator
- OTG Examples: https://github.com/open-traffic-generator/otg-examples
- Quick start with Ixia-c: https://github.com/open-traffic-generator/conformance
- Labs (with deployments on different environments):
  - B2B Ixia-c Traffic
  - Static B2B LAG
  - B2B IxOS Hardware
  - More labs: https://github.com/open-traffic-generator/otg-examples#reference
- Ixia-c Slack channel: https://join.slack.com/t/ixia-c/shared_invite/zt-2p11e5yua-u3o1aWzlJcjJquSAqoDk2Q

Keysight Elastic Network Generator – References

- **Open Traffic Generator**
  - otg.dev
  - OTG Data Models
  - OTG Examples
  - OTG Snappi SDK
  - OTG Snappi Test Collection
- **OSS OTG CI Pipelines**
  - Open Config – Feature Profiles
  - Azure DASH CI Pipeline
- **Other Information**
  - OTG / OTGEN CLI / OTG Examples
- **Keysight Elastic Network Generator**
  - KENG Product Page
  - KENG Data Sheet
  - KENG Automation Video
- **Keysight Ixia-c**
  - Ixia-c Product Page
  - Ixia-c Packages
  - Ixia-c Releases
- **Related OSS Projects**
  - Open Config – Kubernetes Network Emulation (KNE)
  - Open Config – ONDATRA
  - Containerlab / Ixia-c-one