

SEBA Operations and FCAPS

Session 3: 1:30pm - 3pm

In this session

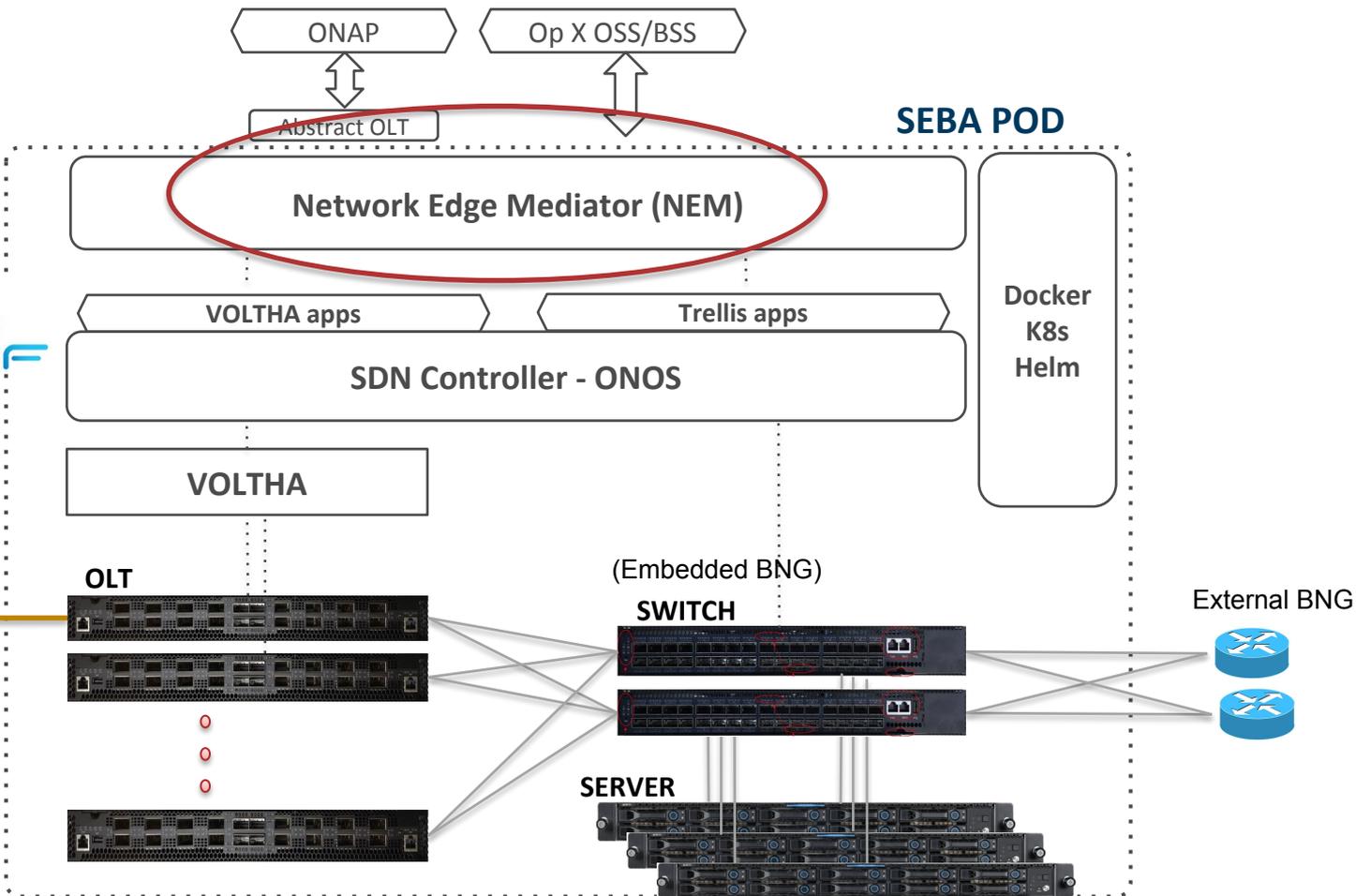
- How are operator workflows implemented in XOS, and what are its internal models and services?
- How is SEBA doing monitoring, telemetry and FCAPS with ELK stack, Prometheus and Grafana?
- How do we troubleshoot the system?
- How is the lifecycle of the pod managed?

SEBA

SDN
Enabled
Broadband
Access



ONU



NEM Orchestration & SEBA Workflows

Different operators ==

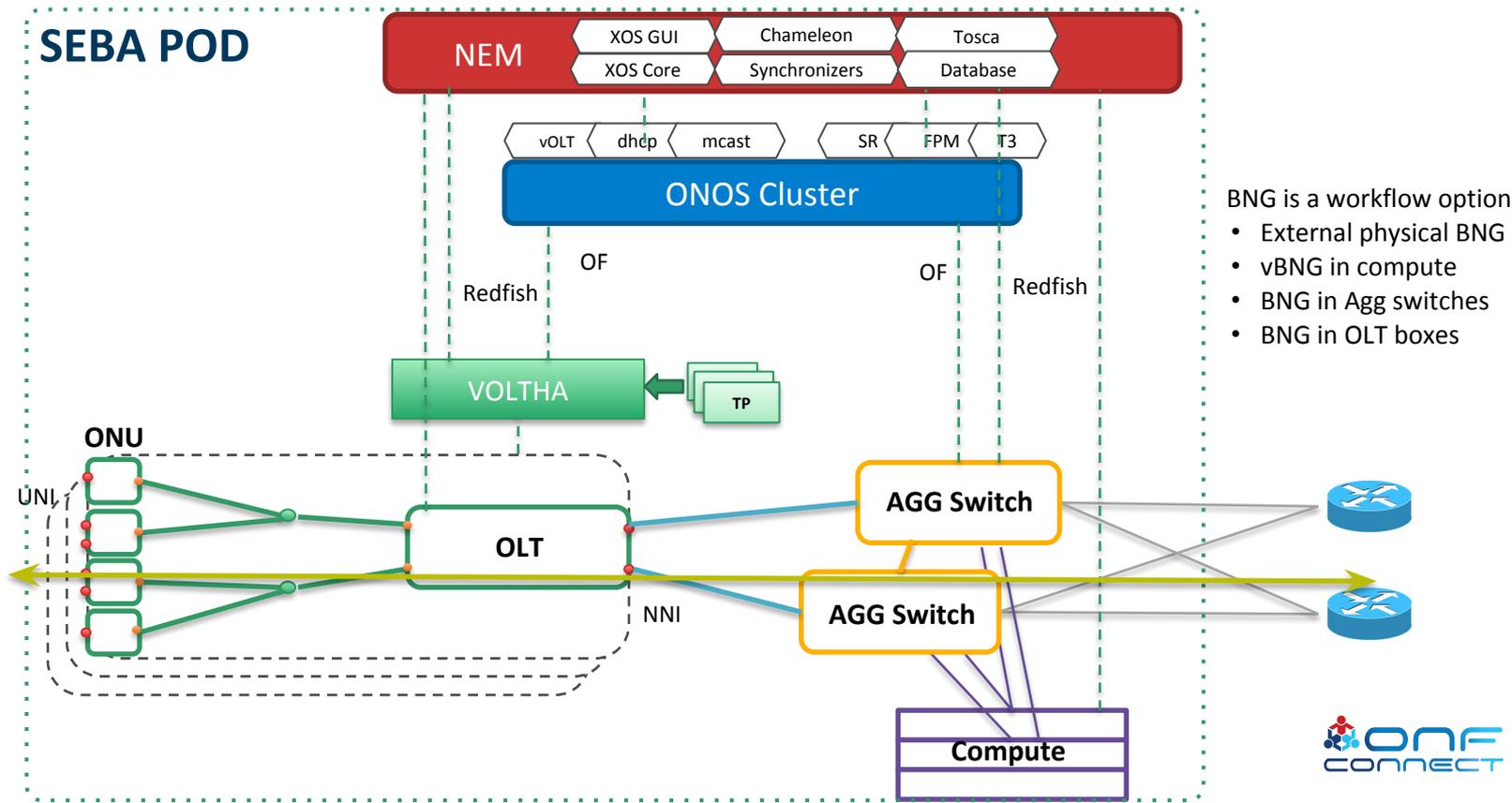
Different workflows

Authentication is a workflow option

- 802.1x based
- PPPOE based
- DHCP based

Subscriber services are workflow options

- HSIA
- Voice
- IPTV
- Business services
- Technology profiles
- Speed profiles



Why do we need a WorkflowDriver?

Most services are common to many use-cases.

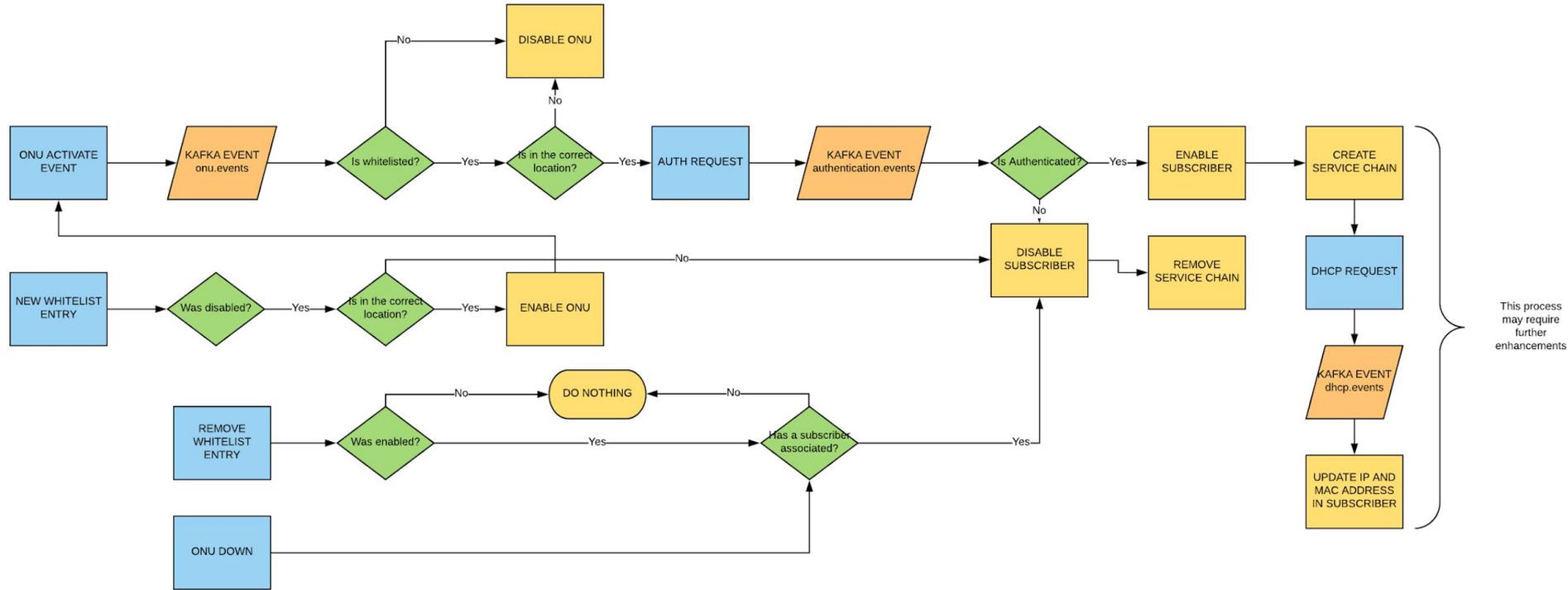
The business logic is different operator by operator.

The workflow driver lets us re-use the same components to achieve different solutions

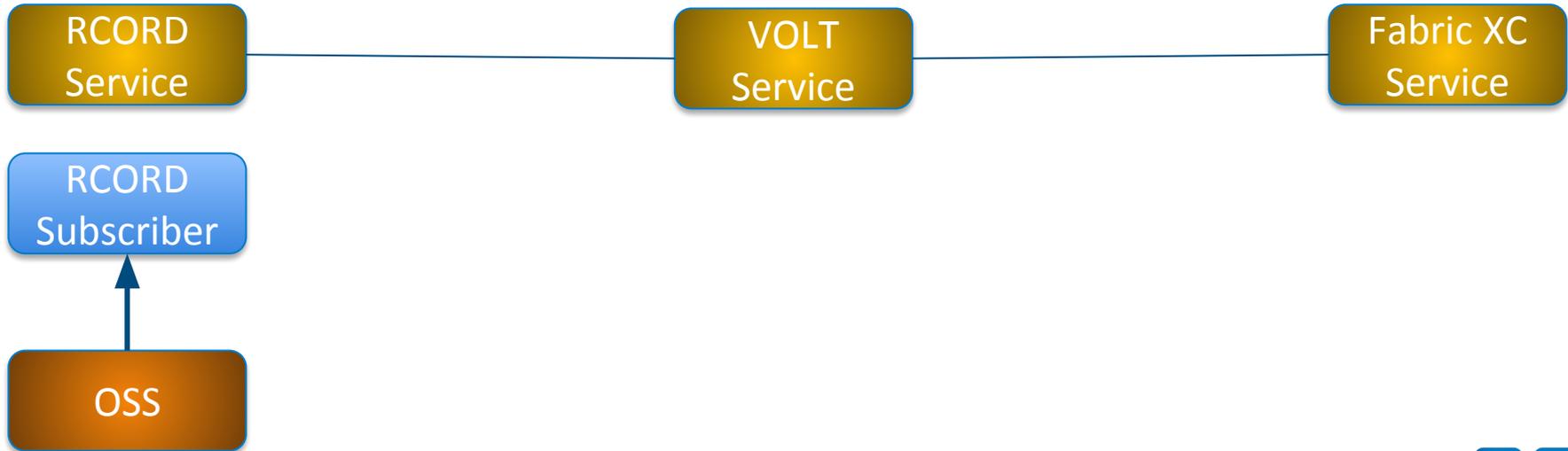
ATTWorkflowDriver Modeling

- White List
 - Specifies which ONUs are allowed, and on which PONs
- *WorkflowDriverServiceInstance
 - Identifies ONU
 - Identifies Subscriber
 - Contains dynamic state, typically learned from events
 - administrative
 - authentication
 - dhcp

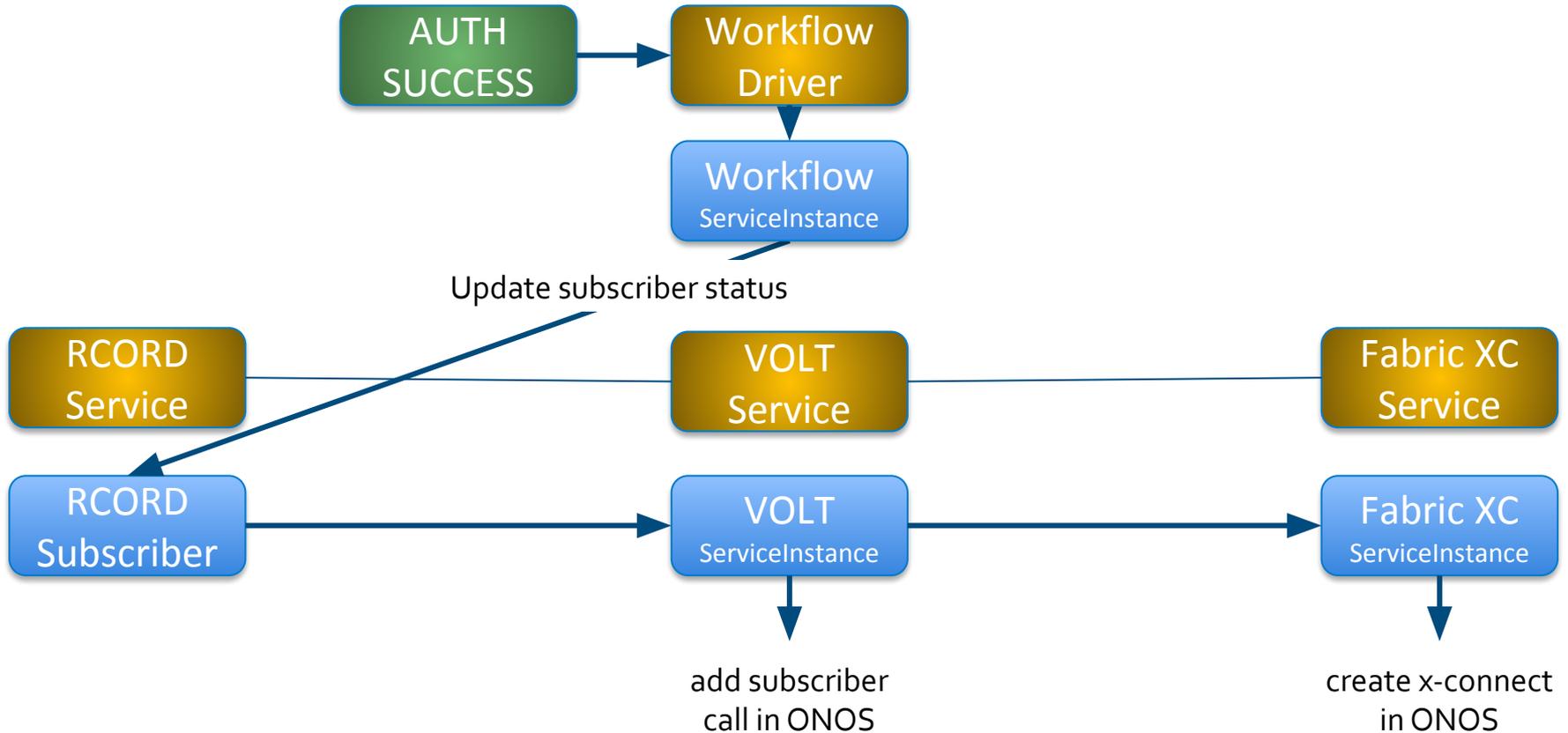
ATTWorkflowDriver: State Machine



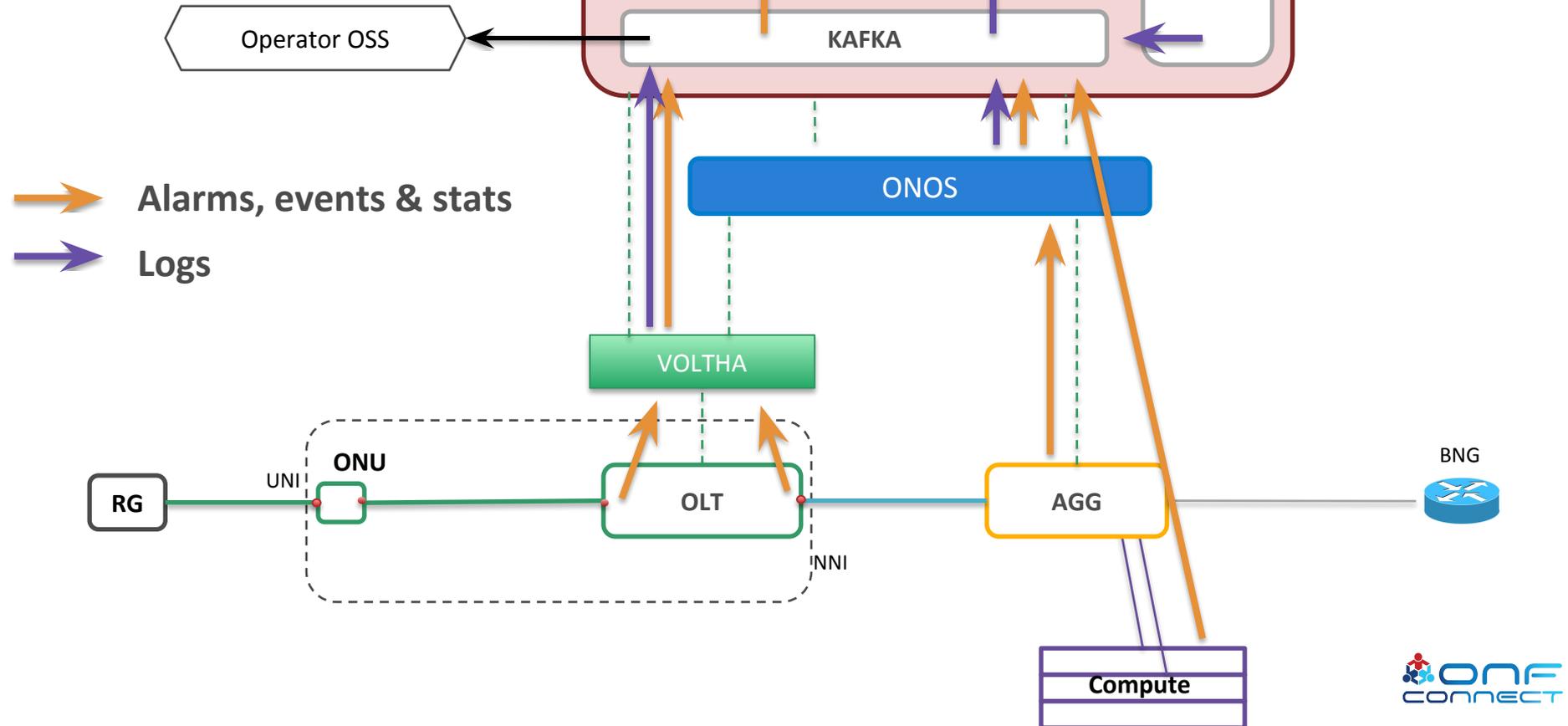
Workflow kickoff



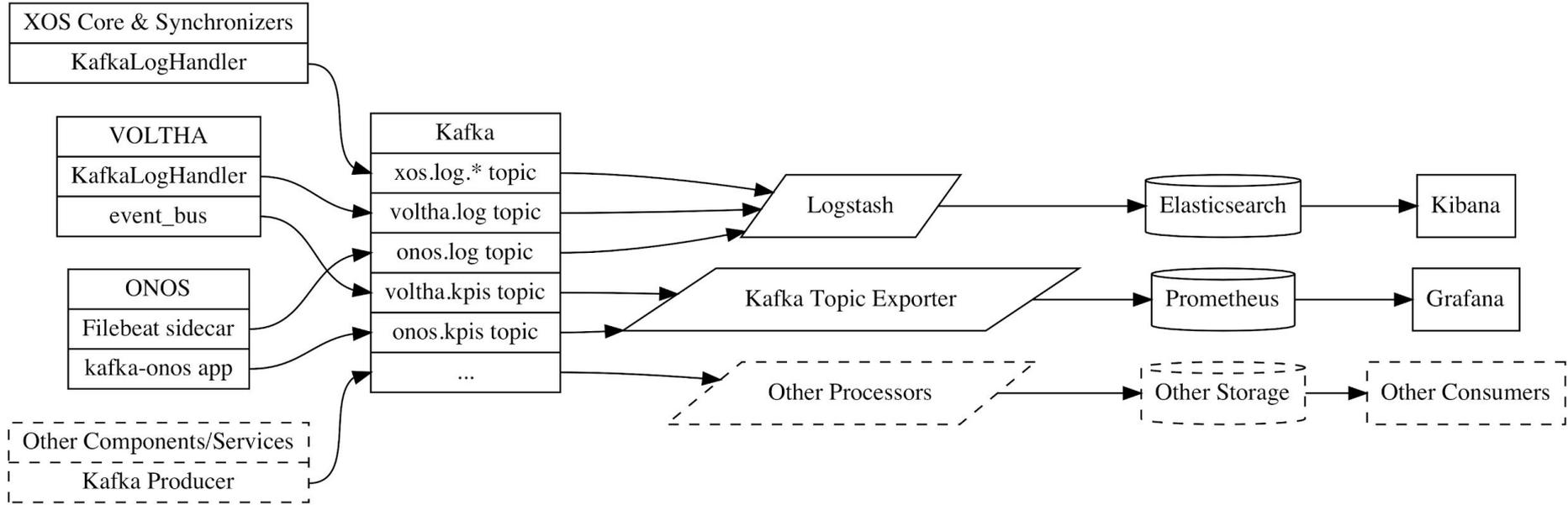
Sample effects on the Service Chain



NEM Monitoring Infrastructure



Data flow for Monitoring and Logging



Kafka Topics within SEBA

Kafka allows many components to publish and subscribe to messages, and has topics for:

- *.log* - log messages
- *.kpis - key performance indicators
- *.events - events created by ONOS or VOLTHA

Current convention is to encode messages as JSON, in the future Protobuf may be used.

NEM Dashboards: XOS GUI

Runtime service instantiation, Inventory, Workflow status

 **CORD**
v.6.1.0-devel

☰

☰ **AttWorkflowDriver Service Instances** Add

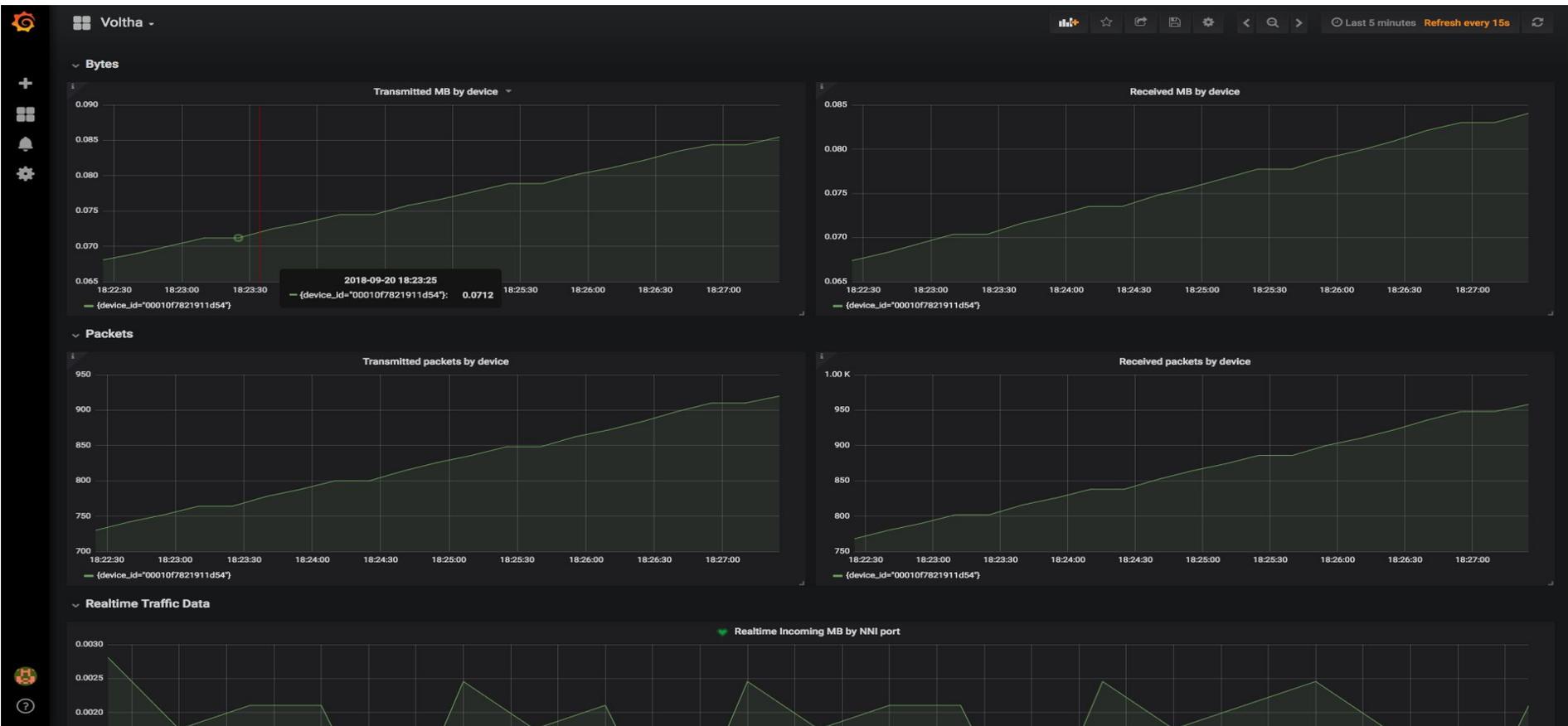
Actions:	Authentication state	Backend status	Dhcp state	Id	Ip address	Mac address	Name	Of dpid	Onu state	Owner id	Policy status	Serial number	Status message	Uni port id
🔍 ✖	AWAITING	⊖	AWAITING	56				of:00000000c0a8646f	ENABLED	att-workflow-driver	✓	ISK771e81130	ONU has been validated - Awaiting Authentication	32
🔍 ✖	APPROVED	⊖	DHCPACK	57	10.11.1.107	90:E2:BA:8E:70:64		of:00000000c0a8646f	ENABLED	att-workflow-driver	✓	ALPHe3d1cee9	ONU has been validated - Authentication succeeded	16
🔍 ✖	APPROVED	⊖	DHCPACK	58	10.33.1.105	90:E2:BA:8E:70:66		of:00000000c0a86471	ENABLED	att-workflow-driver	✓	CIGG18a00002	ONU has been validated - Authentication succeeded	2064
🔍 ✖	APPROVED	⊖	AWAITING	59				of:00000000c0a86473	ENABLED	att-workflow-driver	✓	ISK745f2c688	ONU has been validated - Authentication succeeded	16
🔍 ✖	APPROVED	⊖	DHCPACK	60	10.44.1.101	90:E2:BA:8E:70:67		of:00000000c0a86472	ENABLED	att-workflow-driver	✓	ISK771e81070	ONU has been validated - Authentication succeeded	16
🔍 ✖	APPROVED	⊖	DHCPACK	61	10.22.1.101	90:E2:BA:8E:70:65		of:00000024454a6be4	ENABLED	att-workflow-driver	✓	ADTN17510028	ONU has been validated - Authentication succeeded	10240

 **R-CORD**
Your VNF orchestrator

🔒 Logout

NEM Dashboards: Grafana

Statistics (FCAPS)



NEM Dashboards: Kibana

Logs (FCAPS)

112 hits

New Save Open Share Inspect Auto-refresh Last 15 minutes

>_ PSMO00000000 OR "of:0000d0d3e158fede"

Options

Actions ▶

NOT levelname: "DEBUG" Add a filter +

logstash*

Selected fields

- t kafka_topic
- t levelname
- t message

Available fields

- @timestamp
- @version
- DownstreamBandwidt...
- Subscriber
- UpstreamBandwidthP...
- _id
- _index
- #_score
- _type
- args
- asctime
- beat.hostname
- beat.name

Discover

Visualize

Dashboard

Timelion

Dev Tools

Management

Collapse

September 9th 2019, 11:13:19.712 - September 9th 2019, 11:28:19.712 — Auto

Timestamp	Count
11:17:00	50
11:18:00	15
11:19:00	10
11:25:00	30

Count

@timestamp per 30 seconds

Time	kafka_topic	levelname	message
▶ September 9th 2019, 11:25:58.056	onos.log	INFO	Sending DHCP packet to client at of:0000d0d3e158fede/128
▶ September 9th 2019, 11:25:58.042	onos.log	INFO	Received DHCP Packet of type DHCPREQUEST from of:0000d0d3e158fede/128
▶ September 9th 2019, 11:25:57.911	onos.log	INFO	Sending DHCP packet to client at of:0000d0d3e158fede/128
▶ September 9th 2019, 11:25:54.927	onos.log	WARN	getMacVlanNextObjectiveId query – groupHandler for device of:0000d0d3e158fede not found
▶ September 9th 2019, 11:25:54.925	onos.log	WARN	Untagged host 46:E3:2F:F5:27:8B/None is not allowed on of:0000d0d3e158fede/128 without untagged or nativevlan config
▶ September 9th 2019, 11:25:54.924	onos.log	INFO	Host 46:E3:2F:F5:27:8B/None is added at [of:0000d0d3e158fede/128]
▶ September 9th 2019, 11:25:54.924	onos.log	INFO	Populating bridging entry for host 46:E3:2F:F5:27:8B/None at of:0000d0d3e158fede:128
▶ September 9th 2019, 11:25:54.882	onos.log	INFO	Received DHCP Packet of type DHCPDISCOVER from of:0000d0d3e158fede/128

Backup

The NEM database (Postgres) can be backed up and restored using the `cordctl` CLI tool, or via gRPC API.

Logging/monitoring services can be configured to use persistent storage within the pod, and have API's for export/storage.

SEBA Lifecycle and Upgrades

In-service software upgrade (ISSU) is supported within NEM

- XOS
- 3rd party components (monitoring/logging/storage)

Other components (ONOS, VOLTHA) don't have persistent state and are configured by XOS, so can be upgraded or restarted with minimal service interruption.

Troubleshooting a SEBA deployment

- Check the cabling
- Check that traffic is flowing
 - Packet counters are aggregated in Prometheus and Grafana
 - tcpdump and similar
- Check for errors in the logs
 - Logs are aggregated across components in ELK Stack
- Follow the troubleshooting guide
 - <https://guide.opencord.org/profiles/seba/>

Most common issues

- Configuration differs from physical setup
 - How to spot: port state (up/down) in ONOS and XOS
 - Errors in the ONOS log
- Serial Numbers mismatch
 - How to spot: AttWorkflowDriver, sadis command in ONOS

Most common issues

- OLT Agent incompatible version
 - How to spot: Device is not active in VOLTHA, or no ONUs are discovered
- BNG or Radius configuration
 - How to spot: EAPOL, DHCP or Ping not working, ONOS/AttWorkflowDriver logs

Q & A?