

OpenStack Summit at Vancouver

NFVRG Update

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Highlights

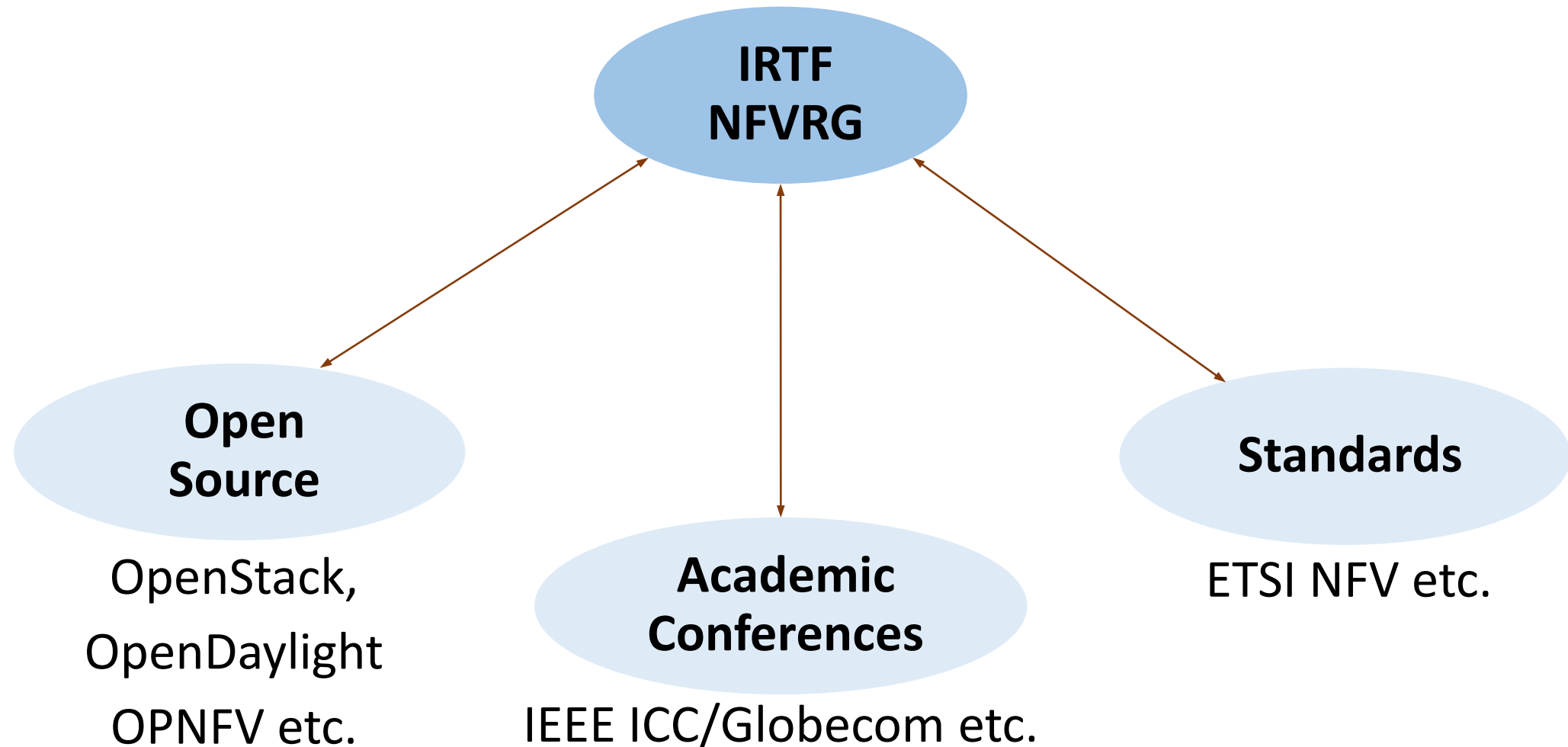
- Huge Crowd – 5000+ attendees
- OpenStack getting deployment traction in enterprise (media, financial etc.) and cloud market segments
- Telco NFV work is gathering increasing interest – key open source sessions below
 - Role of NFV Research in Open Source and Open Standards
 - Video Link: <https://www.openstack.org/summit/vancouver-2015/summit-videos/presentation/role-of-nfv-research-in-open-source-and-open-standards>
 - Helping Telcos go Green and save OpEx via Policy
 - Video Link: <https://www.openstack.org/summit/vancouver-2015/summit-videos/presentation/helping-telcos-go-green-and-save-opex-via-policy>
 - OPNFV Panel
 - Video Link: <https://www.openstack.org/summit/vancouver-2015/summit-videos/presentation/opnfv-panel>
 - Tacker: Virtual Network Function Life-cycle Management for OpenStack
 - Video Link: <https://www.openstack.org/summit/vancouver-2015/summit-videos/presentation/tacker-virtual-network-function-life-cycle-management-for-openstack>
 - Customize OpenStack NBI for Telco NFV
 - Video Link: <https://www.openstack.org/summit/vancouver-2015/summit-videos/presentation/customize-openstack-nbi-for-telco-nfv>

NFVRG Positioning

Applied NFV Research, Open Participation

Open Source Community Bridge, 300+ members

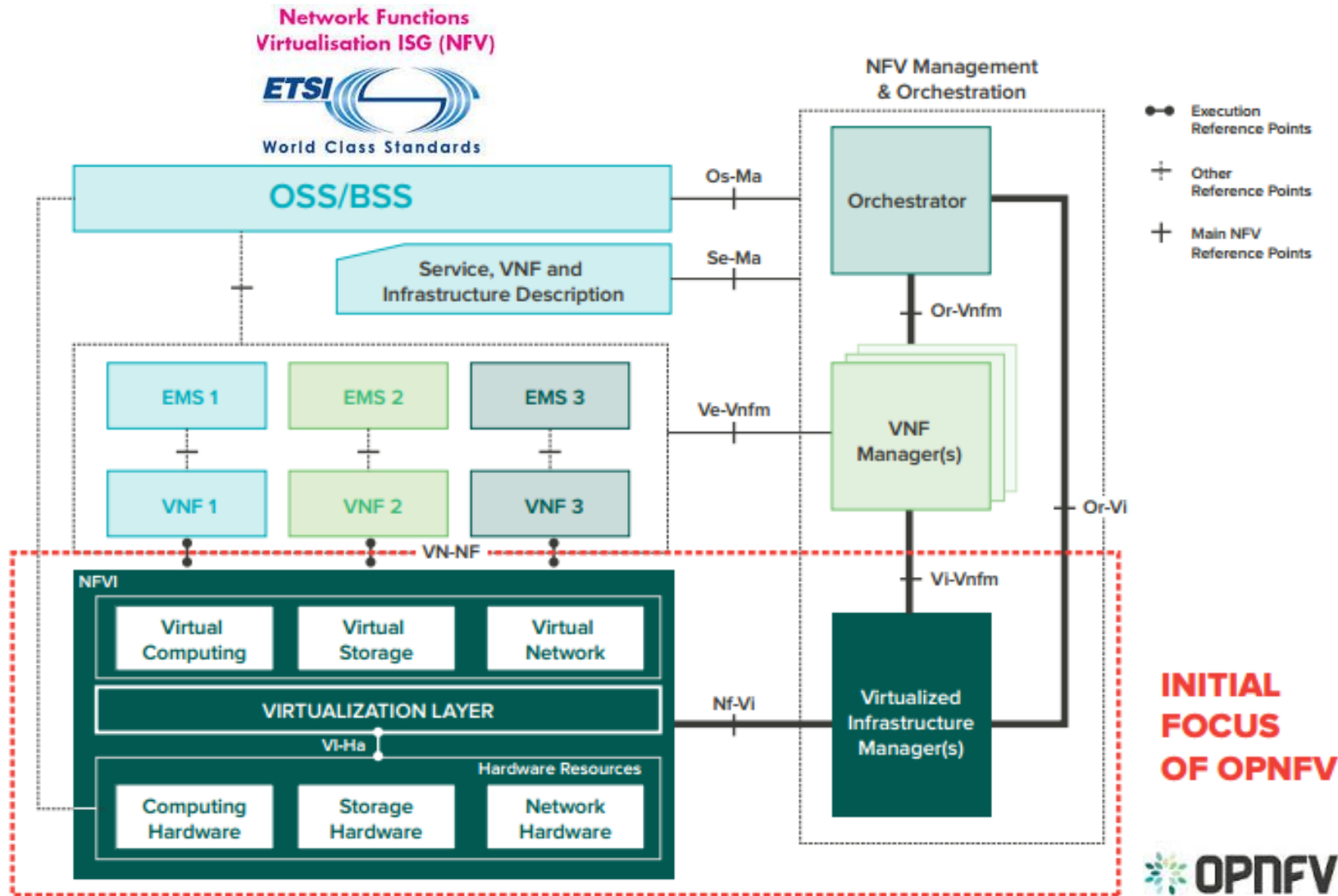
3 Meetings every year, Interim Meetings at IEEE Conferences



OpenStack Related Work Item Summary

- 1. Policy-Based Resource Management
 - Optimize resource usage, open APIs ...
- 2. Analytics for Visibility and Orchestration
 - Real-time analytics, machine learning ...
- 3. Service Verification with Regards to Security and Resiliency
 - Security issues and relevant solutions related to the elastic nature of VNFs ...
- Direct Impact on OpenStack Telco Working Group and several other projects
 - Link: <https://wiki.openstack.org/wiki/TelcoWorkingGroup>

ETSI NFV, OPNFV and NFVRG



ETSI NFV Architecture

NFVRG Mapping

- Work Item 1.* VIM, Orchestrator
- Work Item 2.* VIM, VNF Manager
- Work Item 3.* OSS, Orchestrator



Policy-based Resource Management

DESCRIPTION

- NFV Point of Presence (PoP) DCs will be likely constrained in compute and storage capacity. Since practically all NFV PoPs are foreseen to be distributed, inter-datacenter network capacity is also a constraint.
- Additionally, energy is also a constraint, both as a general concern for NFV operators, and in particular for specific-purpose NFV PoPs such as those in mobile base stations.
- This work item will focus on optimized resource management and workload distribution based on analytics-driven policy.

Policy-based Resource Management

RELATED OPENSTACK PROJECTS AND IRTF DRAFTS

- OpenStack Heat -- Orchestration
 - Link: <https://wiki.openstack.org/wiki/Heat>
- OpenStack Congress – Policy as Service
 - Link: <https://wiki.openstack.org/wiki/Congress>
 - New ideas: Energy efficiency using analytics-driven policy
 - Congress Delegation; VM placement engine for migrating under-utilized VMs; PoC demo at summit
- Solver Scheduler -- An efficient and richer scheduling driver
 - Link: <https://blueprints.launchpad.net/nova/+spec/solver-scheduler>
- General Purpose VNF Manager for OpenStack
 - Link: <https://wiki.openstack.org/wiki/Tacker>
- Links to related IRTF NFVRG Drafts
 - <https://datatracker.ietf.org/doc/draft-norival-nfvrg-nfv-policy-arch/>
 - <https://datatracker.ietf.org/doc/draft-krishnan-nfvrg-policy-based-rm-nfvias/>
 - <https://datatracker.ietf.org/doc/draft-lee-nfvrg-resource-management-service-chain/>



Policy-based Resource Management

RELATED OPNFV PROJECTS

Copper
Policy

- Identifying gaps in virtualized infrastructure deployment policies in related upstream projects in ODL, OpenStack

Promise
Resource
Manager

- Resource reservation (beyond network) for future usage

Resource
Scheduler

- Constraint and policy-based resource scheduling

MOVIE
Intent

- Intent based abstraction layer for copper, promise, resource scheduler etc.

Analytics for Visibility and Orchestration

DESCRIPTION

- Real-time analytics providing insight into various components such as compute (e.g. dynamic CPU utilization), storage (e.g. dynamic capacity usage), network (e.g. dynamic bandwidth utilization), energy (e.g. dynamic power consumption) are key to not only providing visibility into the NFV infrastructure but also optimizing resource usage for the purposes of orchestration.
- This work item will contemplate techniques (including advanced machine learning approaches) for the applicability of real-time analytics.

Analytics for Visibility and Orchestration

RELATED OPENSTACK PROJECTS AND IRTF DRAFTS

- Ceilometer -- OpenStack Telemetry
 - Link: <https://wiki.openstack.org/wiki/Ceilometer>
 - New ideas:
 - Push-model (instead of classic poll-model); machine learning for automatic threshold detection
 - Consolidate monitoring/analytics information from different sub-systems such as compute, storage, networks and energy
- Links to related IRTF NFVRG Drafts
 - <https://www.ietf.org/archive/id/draft-krishnan-nfvrg-real-time-analytics-orch-01.txt>



Analytics for Visibility and Orchestration

RELATED OPNFV PROJECTS



- Analytics based failure prediction – works in close co-operation with Doctor

Security and Service Verification

DESCRIPTION

- NFV configuration is expected to be dynamic especially in the edge NFV PoP where capacity is limited; a very good example is handling a viral event such as mobile gaming application.
- Incomplete and/or inconsistent configuration may lead to security issues.
- DDoS attacks could be an additional source of compromise with additional implications due to the dependency of NFV on a distributed infrastructure.
- Finally, elasticity of VNFs entails dynamic scale up/down/out with awareness of the resiliency considerations, completely different with the approach of monolithic implementations.
- Security issues and relevant solutions related to the elastic nature of VNFs are the objectives of this work item.

Security and Service Verification

RELATED OPENSTACK PROJECTS AND IRTF DRAFTS

- Applies to each and every component, e.g., Cinder verification
 - Link: <https://wiki.openstack.org/wiki/Cinder>
 - New ideas: Near real-time handling of configuration changes
- Links to related IRTF NFVRG Drafts
 - <https://datatracker.ietf.org/doc/draft-shin-nfvrg-service-verification/>



Security and Service Verification

RELATED OPNFV PROJECTS



- Service chaining at various layers in the NFV architecture