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NFV Tutorial and Demo Session

Welcome and Introduction

Don Clarke

Goals & Agenda

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- This session provides a high level introduction to the ETSI NFV work
  - Broadcast and recorded for posting on line
- ETSI NFV founded in October 2012
  - Founding operators published a paper which introduced "NFV" for the first time
  - Now over 300 companies including 38 network operators, vendors and academia
  - **Over 80,000 participant-hours in 18 face-to-face plenary meetings spanning the globe**
- ETSI NFV foundation specs are being referenced globally
  - ETSI NFV co-founders created OPNFV to encourage carrier-grade open source solutions for OPNFV

1415	NFV Tutorial Session
1545	Coffee Break
1600	API Overview and Demo
1800	Close

ETSI

About CableLabs

- Global membership-based innovation and R&D lab for cable operators
  - ✓ 59 members serving >150M end users globally
  - ✓ Offices in Louisville-CO and Sunnyvale-CA
- Active contribution to international standards and open source
  - ✓ DOCSIS® technology developed & specified at CableLabs
- Advancing cable technology and exploring new applications
  - ✓ DOCSIS network evolution (full-duplex, coherent optical)
  - ✓ Wireless, NFV/SDN, IoT, Security, AI, Health, Etc.
- Our innovation time horizon is 3-8 years
  - Creating a multibillion dollar impact for the global cable industry over the next decade

Connecting Emerging Technologies

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Skillfully connecting the startup world to the vast global cable network:

- The UpRamp ‘Fiterator’ accelerator designed to bring later stage startups true product fit within the global cable/broadband/wireless industry
- Innovation Showcases
- Technology Tours
- And more…
- Info: https://www.upramp.com/

Kyrio SDN-NFV Interop Lab

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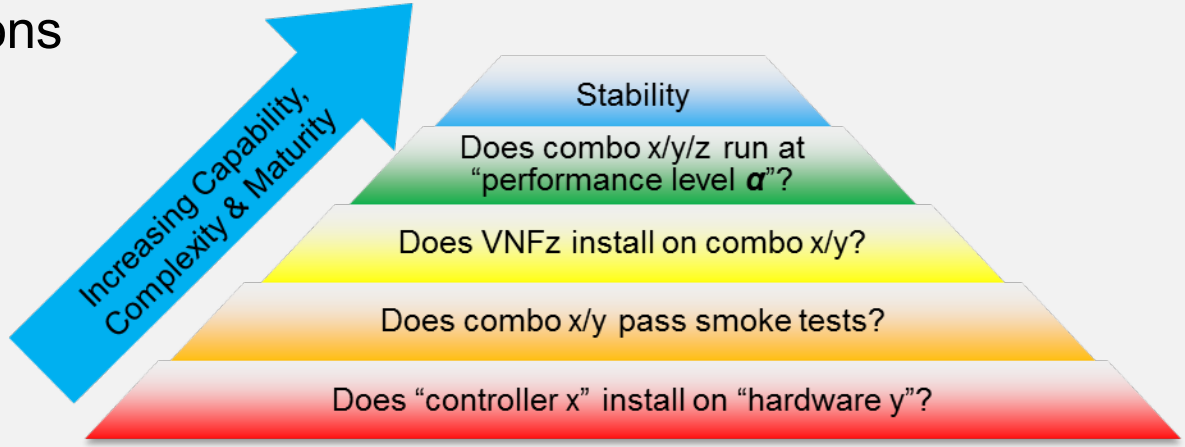
KYRIO

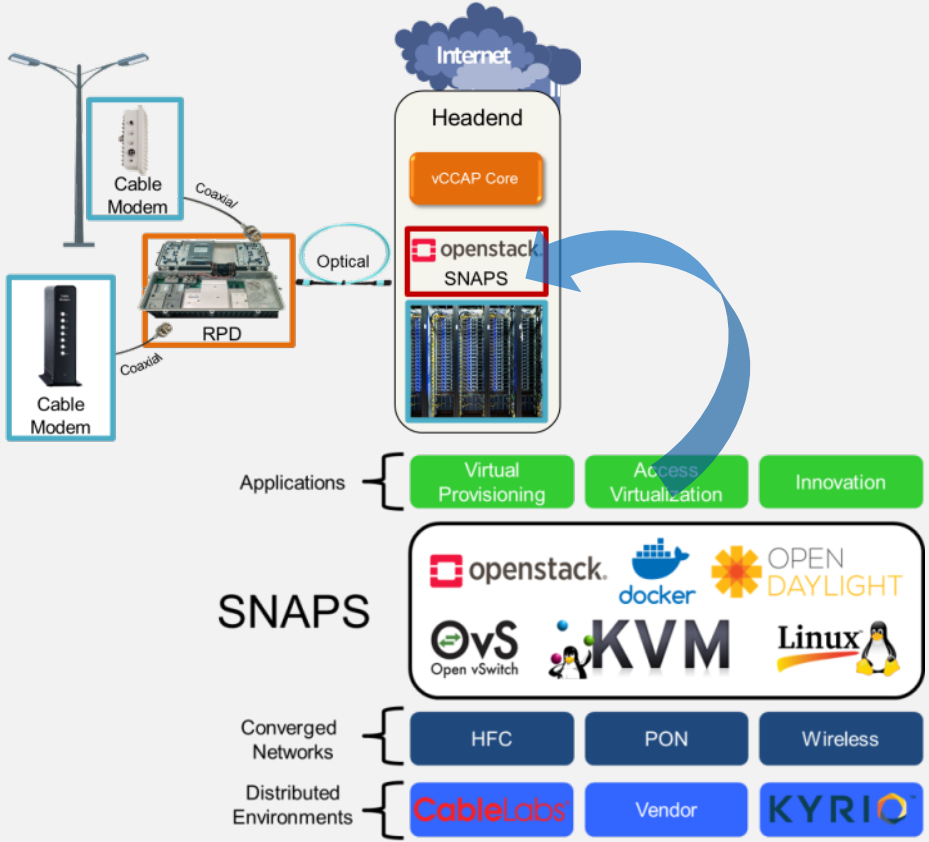
Kyrio is the commercial arm of CableLabs

- Industry is past PoC, now we are in Interop
- Leverage CableLabs' testing experience
- Reference implementations
- Recent demos:
  - Virtual CMTS
  - SD-WAN
- Open to non-cable
- www.kyrio.com



CableLabs NFV Focus

- Focus is on virtualizing the cable network edge
  - Head-end (technology agnostic provisioning)
  - Distributed DOCSIS network
  - Customer environment
- Aligning virtualization architecture to be applicable to global cable industry
  - Disseminating best practices for carrier-grade virtualization at the edge
  - Maximizing economies of scale for everyone
- Emphasis on open standards and open source
  - ETSI NFV, OPNFV, OSM, OpenStack, ODL, …
  - We don't evaluate proprietary solutions



Ecosystem Interdependency

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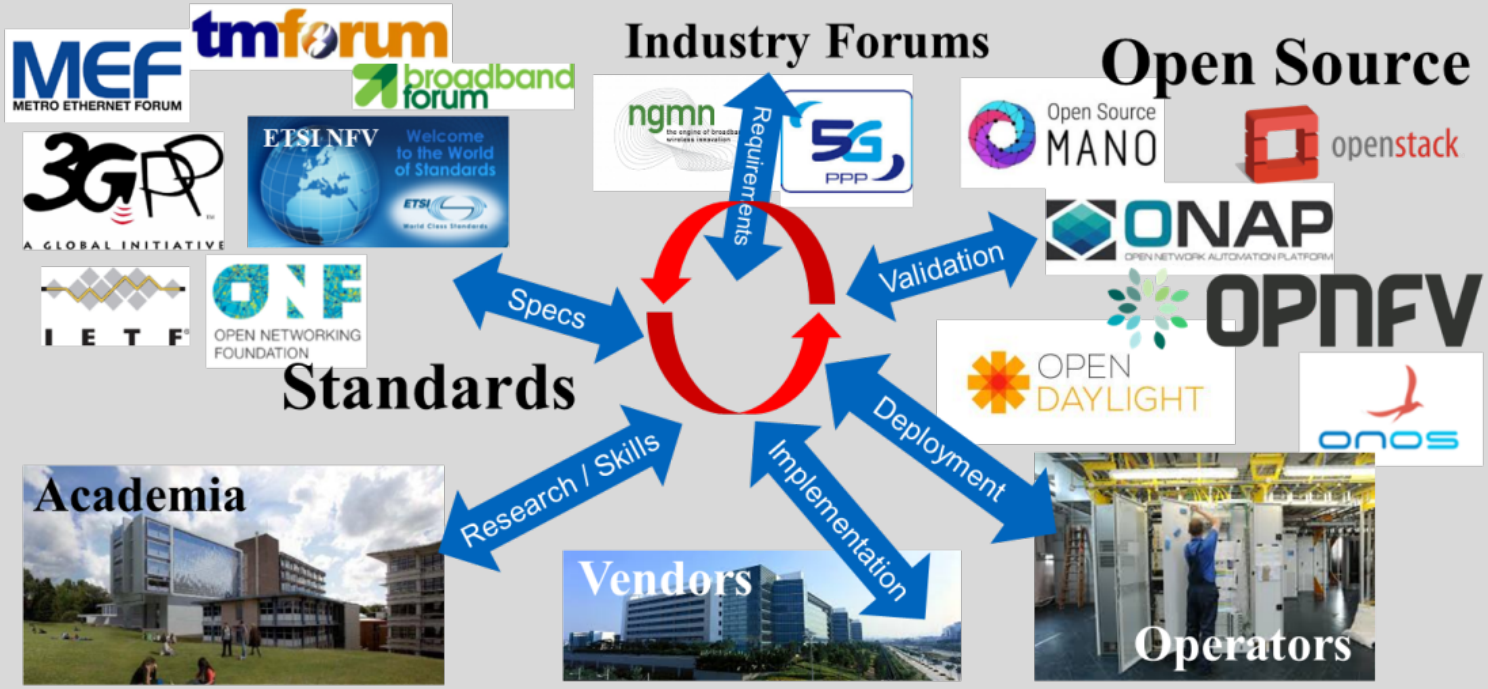
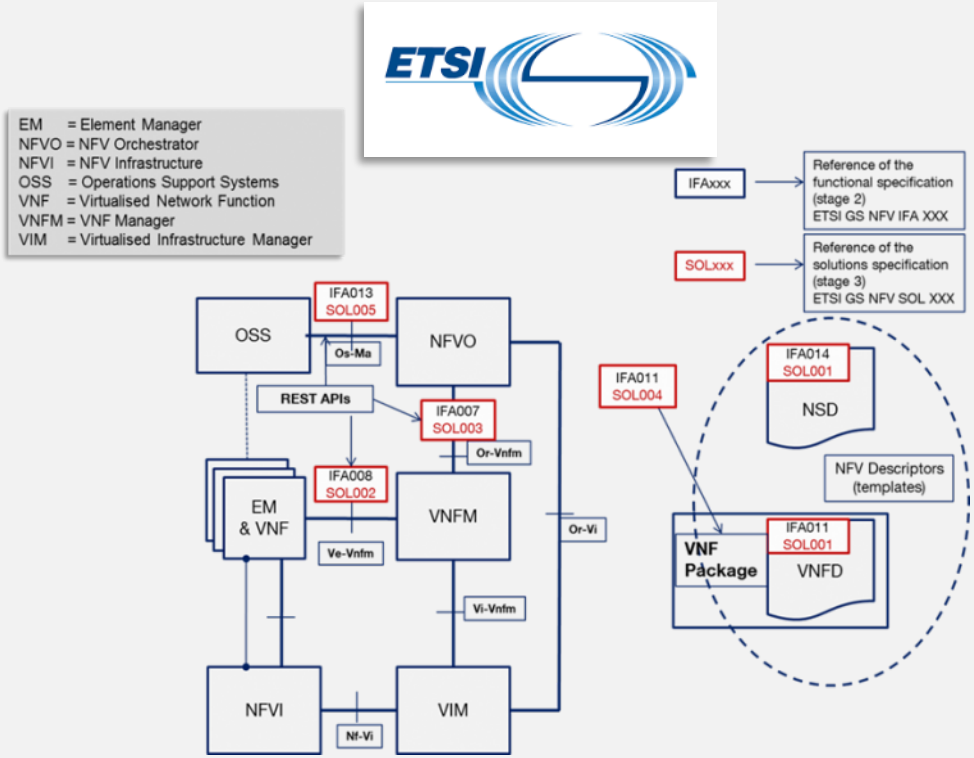
How to avoid fragmentation?



NFV Interoperability Challenge



ETSI NFV Architectural Framework

- VNFs and VNF Managers from diverse sources
- NFV Orchestrator could be open source, vendor-proprietary or operator-proprietary
- VIM could be OpenStack, CloudStack, OpenNebula, …, or Proprietary
- How to ensure interchangeable NFV components if common interface specifications are not mandated..?
- ETSI NFV has specified most of the interfaces in this diagram after 4-years of consensus building on technical rationale
- Enables conformance testing and real interoperability tests to begin
- ETSI NFV Plugtests in January 2018

Standards & Open Source are Complementary!

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Standards

Pros

- Universally accepted specification that can be referenced globally
- Community learning by sharing rationale
- Discourages vendor lock-in
- Recognized authority
- Clear licensing model
- Capable of addressing “Security by Design”

Cons

- Time to analyze technical impacts and feasibility and develop consensus
- Implementation feedback cycle is too long
- Difficult to align domain-specific standards organizations to create compatible specs.
- Barriers to participation for small players
- Culture resistant to change

Open Source

Pros

- Bypasses consensus reducing time to implementation
- Fast bug fixes, and improvements
- Community development
- Low barrier to participation

Cons

- Lacks recognized/persistent authority
- Uncertain delivery timescales for given feature set
- Feature persistence from release to release -- what constitutes “normative” in open source code?
- Risk of vendor lock-in through forking
- Uncertain licensing model
- Difficult to address “Security by Design”
- Culture -- hard to manage individual developer contributions
- Vulnerable to fragmentation into multiple communities

Why ETSI NFV is Important

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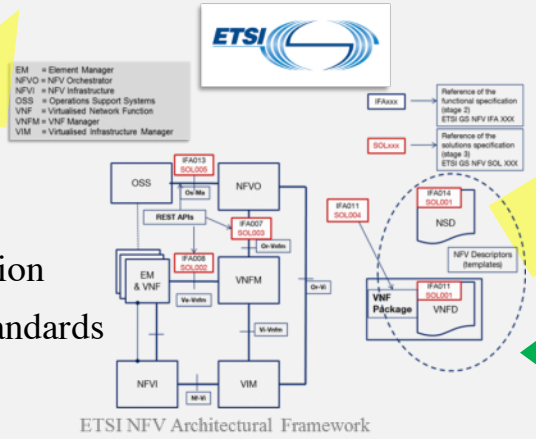
Avoiding fragmentation…



ETSI NFV Architectural Framework

Foundation NFV Standards

Open innovation, the best of both worlds…

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Validation

Foundation NFV Standards - the basis for openness & interoperability!