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# NFV – Avoiding Fragmentation

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# NFV Ecosystem Complexity

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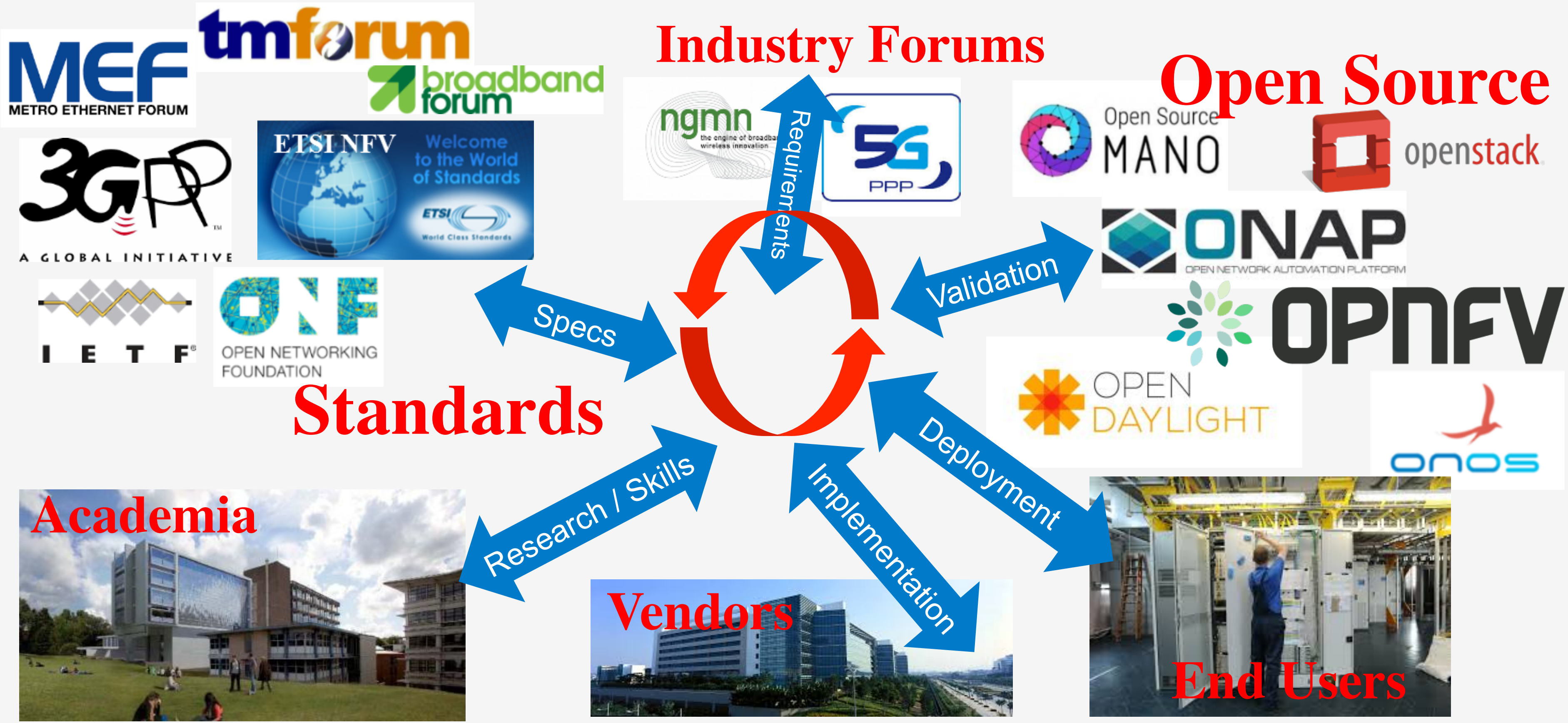


Industry Forums

Open Source

Standards

Academia

Vendors

End Users

Requirements

Specs

Validation

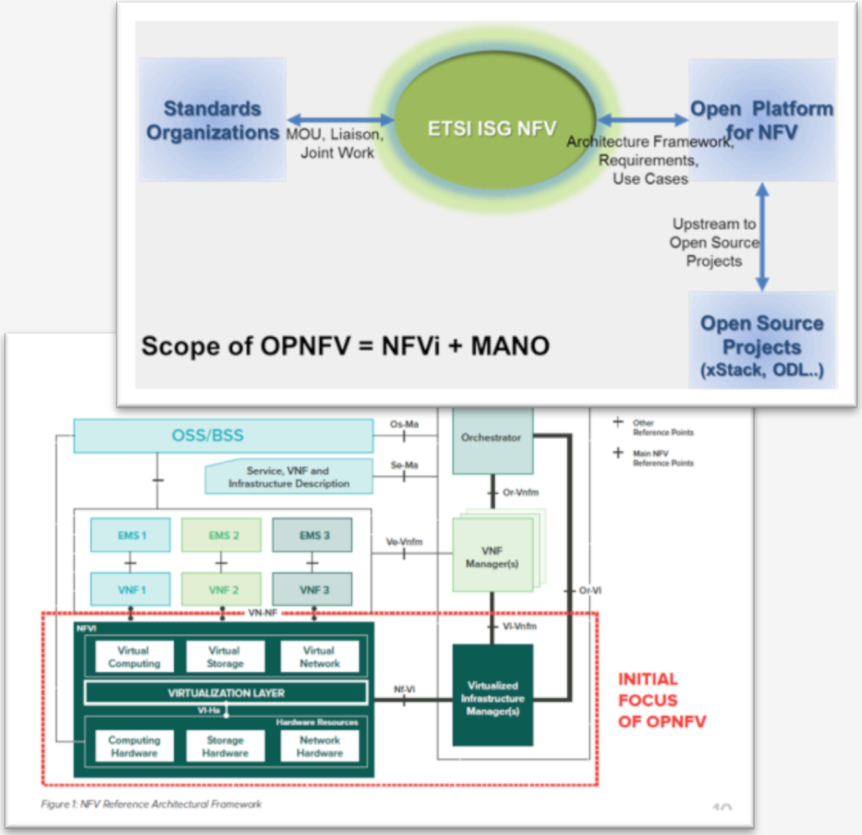
Deployment

Implementation

Research / Skills

# Reminder of why OPNFV exists

- OPNFV was founded by the same people who brought NFV to the forefront of telecommunications network strategy by outlining a vision & founding ETSI NFV
- Our objective was to validate that open source components corresponding to the ETSI NFV Architectural Framework could deliver carrier-grade requirements
- Most importantly this means interoperability in an open ecosystem!



Scope of OPNFV = NFVi + MANO

INITIAL FOCUS OF OPNFV

Figure 1: NFV Reference Architectural Framework

# Example of NFV Interoperability Challenge

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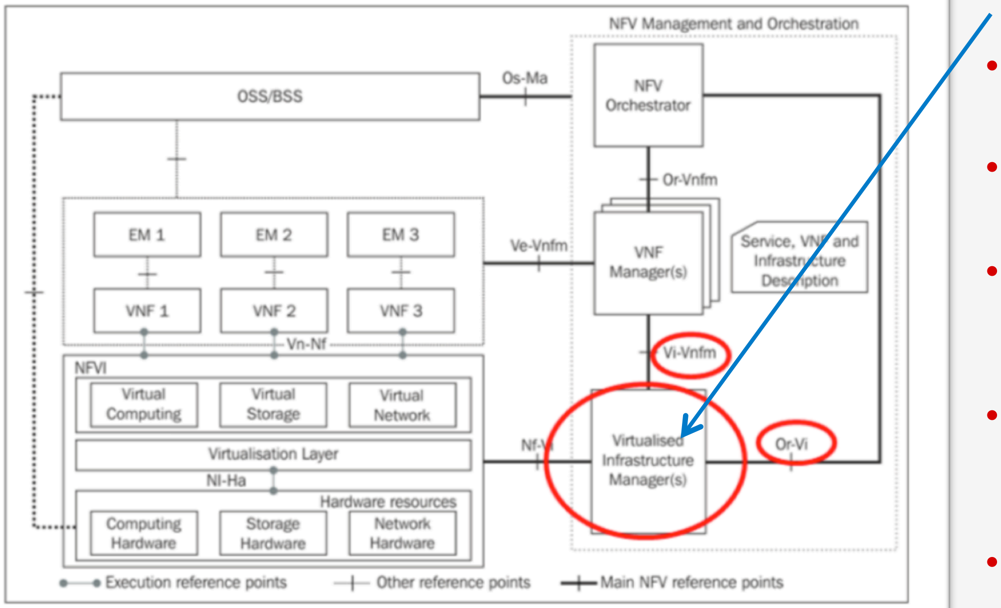
## ETSI NFV Architectural Framework



- VIM could be OpenStack, Kubernetes, Docker, … or Proprietary
- VNF Managers could be generic (preferred) or VNF-specific (problematic)
- NFV Orchestrator could be open source, vendor-proprietary or operator-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 5-years of consensus building on technical rationale
- Enables conformance testing and real interoperability tests to begin
- ETSI Plugtests in January 2018

More info. http://www.etsi.org/technologies-clusters/technologies/nfv

# Standards v Open Source

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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

# Avoiding Fragmentation

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- In the telecommunications industry, standards are mandated by the need for persistent interoperability in large scale multi-domain, multi-vendor deployment
- **Implementers** need clear specifications to develop interoperable products
- **End users** need clear specifications to verify conformance and interoperability
- How will the components for an NFV Framework interoperate if the interfaces are not specified to the required level of detail and with clarity?
- If an open source component becomes dominant then it could become a de-facto standard for the interface(s) to other components
  - It is not obvious that this will happen, or persist throughout the long lifecycle of telecommunications infrastructures
- The key is for open source NFV communities to reference the common foundation specifications coming from ETSI NFV and to provide feedback to evolve/improve them
- **OPNFV should explicitly reference the ETSI NFV specifications in validating components coming from upstream communities!**

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