NFV Research Agenda

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Building on the current normative and exploratory activities at ETSI NFV ISG, the demonstrations provided by PoCs within the ETSI NFV ISG framework, the interoperability assessments provided by NFV Plugtests, and the contributions of related open-source projects, the following topics are suggested as areas suitable for further research activities to support and augment the ongoing development of the NFV ecosystem. The topics are intentionally wide-ranging and grouped into three general areas related to technology evolution, security, privacy, abstraction and modeling. Finally, the application of NFV to new networking challenges is included as well.

Technology Evolution:

- Cloud-native and beyond: containerized workloads, PaaS, serverless proposals, optimized service meshes…
- Acceleration technologies: integration of acceleration hardware, programmable data planes…
- Support from and to autonomous networks approaches
- New network architectures and protocols enabled by NFV, or supporting NFV evolution
- Coordinated management & orchestration of distributed NFV assets, resource brokering and placement strategies in multi-domain infrastructures
- Mechanisms for cross-domain authentication and authorization of lifecycle management operations, and for distributed rights management
- AI-enabled zero-touch management
- Run time resource (re)scheduling and (re)allocation
- Network management techniques and network anomalies analysis embracing the AI/ML predictions

Security and Privacy:

- Techniques for security verification at the infrastructure, function, and service levels
- Trust frameworks for brokering, selection, usage and accounting of elements at all levels: service, function and infrastructure
- Privacy implications of the new virtualized network service models. Relying on NFV to increase user privacy at the network scale
- Secure methodologies for NFV development, deployment and operation
- AI-enabled security frameworks

Abstraction and Modeling:

- Modeling and orchestration of heterogeneous systems (physical, VM-based and containerized)
- Data-driven management: AI, telemetry data models, action modeling and mapping…
- SDN and NFV interplay: lifecycle management awareness in SDN controllers, multi-tenant SDN environments…
- Network design and usage patterns enabled by pervasive, cloud-native network infrastructures
- Automated service templates modeling and configuration
- Service parameter exposure and negotiation frameworks

Application of NFV technologies:

- Techno-economic analysis of NFV (including energy efficiency) and its impact in the different networking ecosystems
- New application areas for NFV: Edge and in-network computing, E2E slicing, 5G and beyond, constrained environments, quantum networks, TSN…