

Lean NFV : Accelerating the Adoption of NFV and the Deployment of 5G

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Thanks to



Agenda

Lean NFV Drivers

Lean NFV and ETSI NFV comparison

Lean NFV Differentiator - Key Value Store (KVS)

VNFs in Lean NFV vs. ETSI MANO

Why we need Lean NFV

How Lean NFV can accelerate 5G deployment

Deployment options for Lean NFV

Lean NFV current implementations & future directions

MEF project plan for Lean NFV

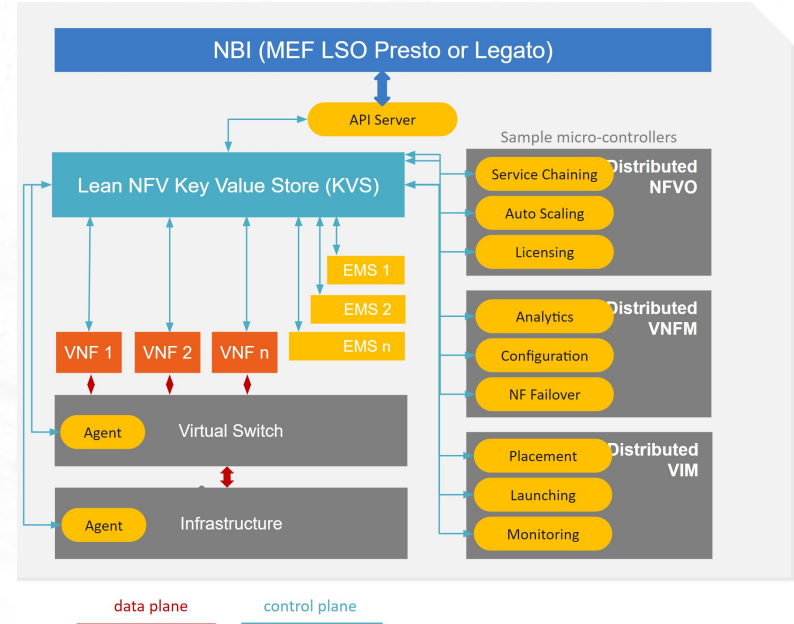
Lean NfV Drivers

Lean NfV Business Drivers

- Competitive pressure to virtualize, cloudify CSP ops
- 5G need for SDN, NFV with easy NFV deployment
- Need for open VNF marketplace

Lean NFV

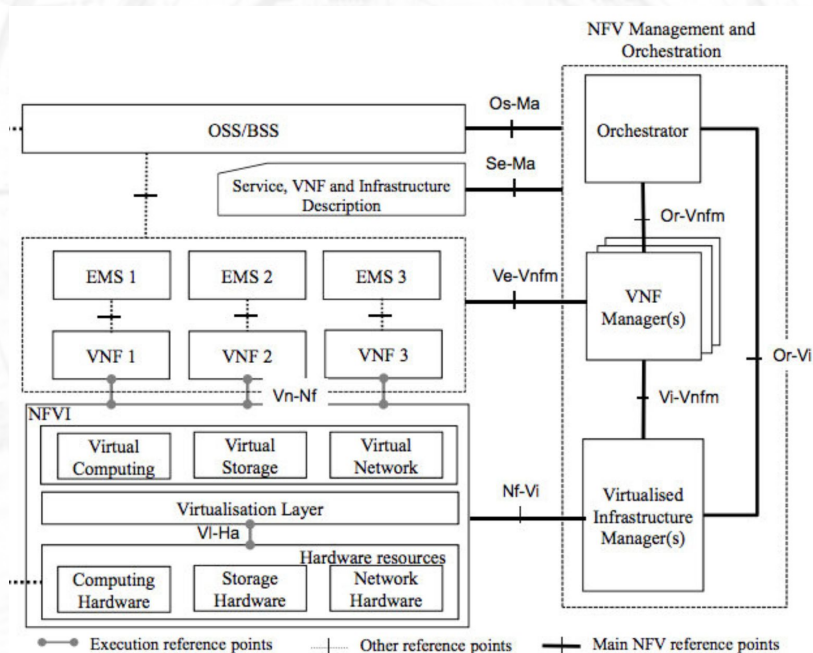
- Simple way to implement and deploy NFV
- Open architecture approach
- Designed to be minimally invasive
- Integrate with existing NFV infrastructure platforms
- Integrate with ongoing orchestration initiatives



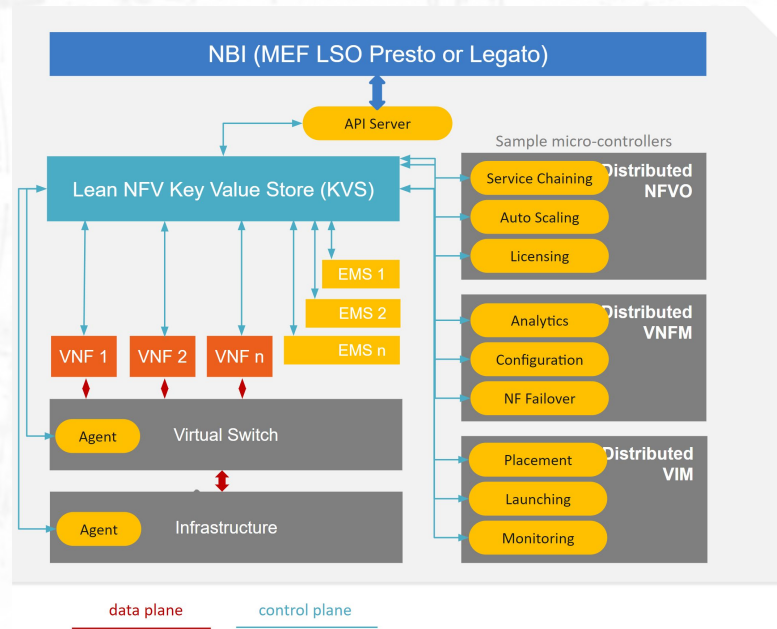
Source: MEF

How Lean NFV relates to ETSI NFV Architecture

Lean NFV is an implementation of ETSI NFV to speed NFV adoption



Source: ETSI NFV MANO Architecture



Source: Lean NFV

Lean NFV Differentiator - Key Value Store (KVS)

- **Data store** that uses an associative array as the fundamental data model where each key is associated with a corresponding value
- **Simple** & general abstraction
- Components **discover/exchange state**: VNF status, configuration, chain definition, service load, resource map, event, etc.
- Many open source implementations; extensively deployed

Key	Value
K1	AAA,BBB,CCC
K2	AAA,BBB
K3	AAA,DDD
K4	AAA,2,01/01/2015
K5	3,ZZZ,5623

put(key,value)

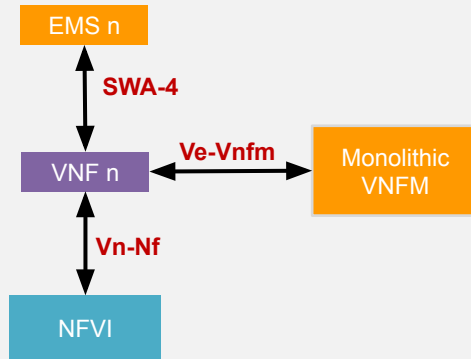
value=get(key)

notification=watch(keys)

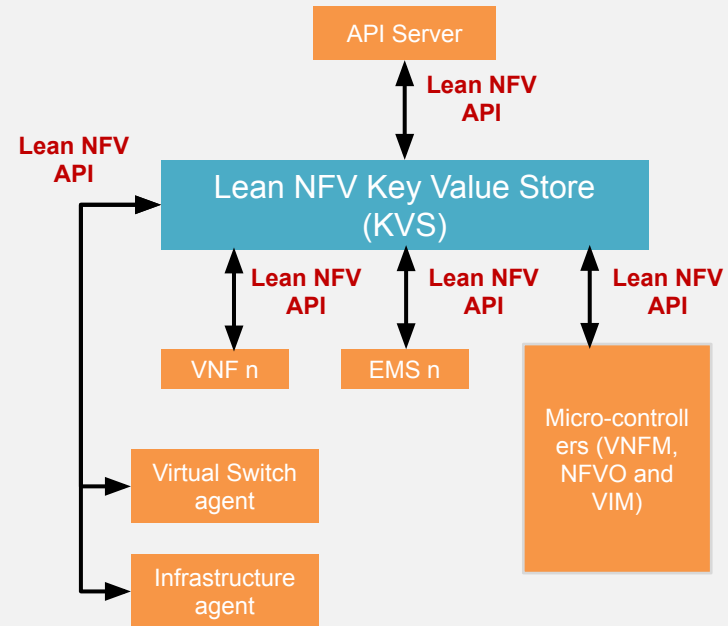


VNFs in ETSI MANO vs. Lean NFV

VNF supporting ETSI-MANO
Customized for each operating
environment



VNF supporting Lean NFV
No customization;
Interfaces only to the KVS



Why Lean NFV

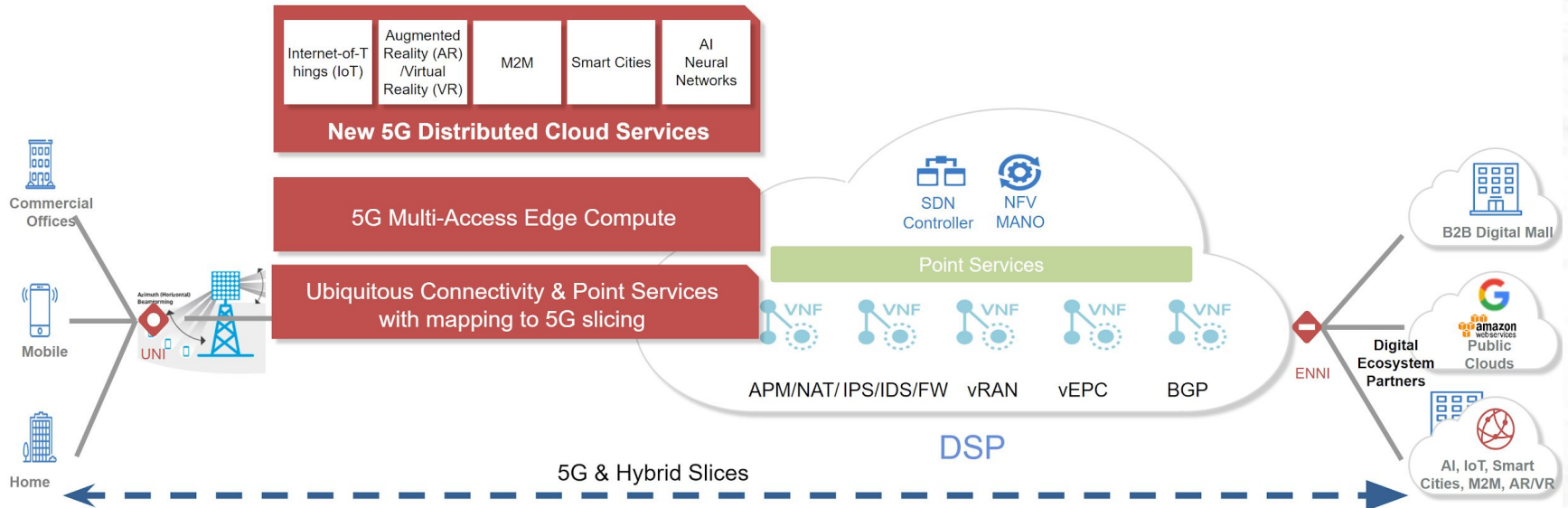
- **Management of virtualized aspects** of Core, Edge, 5G services
- **Minimal necessary integration** between components (NFVM, VIM, VNFs)
 - KVS for primary interface through common schema, distributed control & automation, & resiliency
 - vSwitch integrated with the KVS for load reporting, troubleshooting, monitoring
- **Resource efficiency**
 - Work with or without independent VIM
 - Applied at all levels of scale from DC to MEC to uCPE
- **Incremental adoption**
 - Brownfield: manage existing NFs without any change (via an external wrapper)
 - Use vSwitch to gather load information without querying the VNF/EMS directly
 - Keep EMS, other NFV instances
- **Future-proof**
 - NFs can adopt the KVS interface and EMSs can be replaced by more general NFV management
 - Applies to cloud-native NFs with no change in architecture
 - Provides compatibility across both private and public clouds

How Lean NFV can accelerate deployment of 5G

- Service-based architecture, subscribe/notify (pub/sub)
- Support for microservices
- Highly distributed, cloud-native, vendor-independent framework
- Asynchronous architecture for fast integration, rapid NF development
- Facilitates access aggregation - MEC, edge clouds/cloudlets
- Distributed KVS - autonomous edge NFVI operations (URLLC)
- Hierarchical organization of Keys, Values for distributed environments
- CUPS: publishing of info by VNFs separate from consumption of info by other components; VNFs separate from NFVM, NFVI
- Segmentation for network slicing, KVS per slice, per SP, per tenant

Deployment of Lean NFV in 5G

- Provider Edge/User Edge/Private 5G
- Cell Site
- 5G Island Gateway
- Slicing, splicing points
- Inter-Provider GW
- “Wherever NFV is sold”



Lean NFV current implementations & future directions

Current Implementations

- VNF on-boarding
- Automated service chaining
- Autoscaling
- Change management
- Monitoring, logging, alerts, and troubleshooting
- Automated failover

Future Areas

- Tiered high availability across environments
- Integrated analytics/ML
- Service assurance
- Inventory management

MEF project plan for Lean NFV

MEF Lean NFV Project Plans

- Launch as Incubation Group: April 2020 **[done]**
- Project approval in LSO Committee (W120): July 2020 **[done]**
- Demonstrate PoC on Lean NFV in SASE: 1Q21
- Letter ballot on (control-plane) APIs and schema v1: 2Q21

Lean NFV Resources

Lean NFV manifesto
www.leannfv.org

LEANNFV

MEF Lean NFV white paper

<https://www.mef.net/resources/White-Papers>



Thank you

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