

Evolving for NFV Transformation

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THE PLATFORM FOR NFV
CLOUDBAND™



Every success has its network

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The NFV evolution



NFV: Virtualization

- Virtualized with hypervisors
- Software only
- CAPEX savings with common hardware
- Investment protection

NFV: IaaS

- Entry to cloud
- Common infrastructure management
- Focus on rapid deployment, scale and upgrades

NFV: PaaS

- Real cloud automation begins
- Comprehensive NFV management and orchestration
- Multi-tenancy

Full NFV

- Multi-tenancy for all apps
- Solution templates and orchestration
- Dynamic elasticity
- Predictive Analytics

CLoud TECHNOLOGY UTILIZATION INCREASES
AND CLoud TECHNOLOGY MATURITY CONTINUES TO EVOLVE



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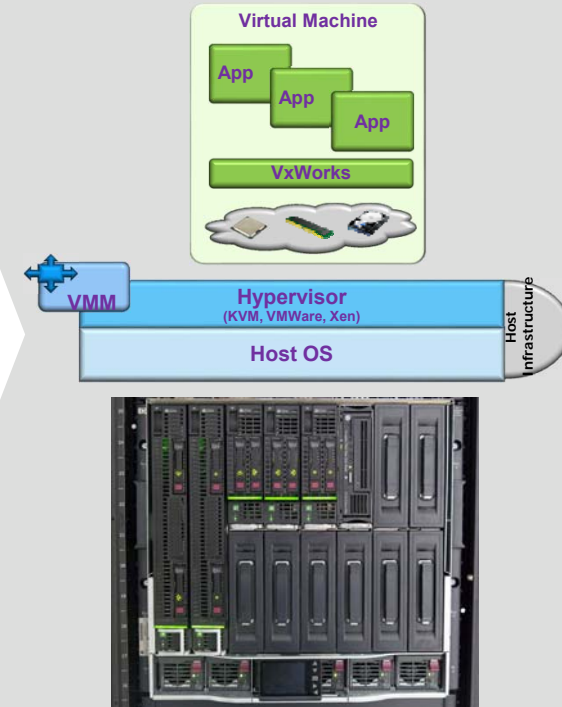


State of the art virtualization (2015)

- Big VMs
 - Typically consuming all NIC bandwidth
 - Direct access to hardware - PCI passthrough
- Master-Slave High availability model
 - State synchronized by the application
 - Hardware monitored by application
- Real time guest operating system (e.g., VxWorks)
 - tick policy
 - Hardware tailored - NUMA aware CPU pinning
- Manual scaling
- Performance tuning
 - DPDK & core pinning for PMD



ATCA



NFV transformation

from early virtualization...

... to efficient cloudification

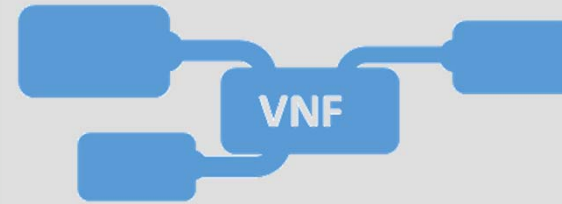
monolithic software

VNF

dedicated COTS

COTS

manual operations



VNF decomposition



open/shared infrastructure



flexible automation

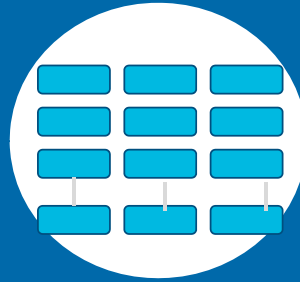
Re-architected VNFs

Make it Heal & Scale Easily



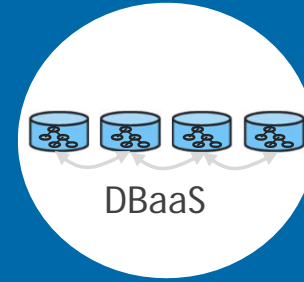
- Quickly and seamlessly add vNF capacity
- Get ready for failures
- Separation of vNF application logic from data (state or subscriber)

Decompose the Functions



- Deploy independent vNF functionality
- Each function independently scalable

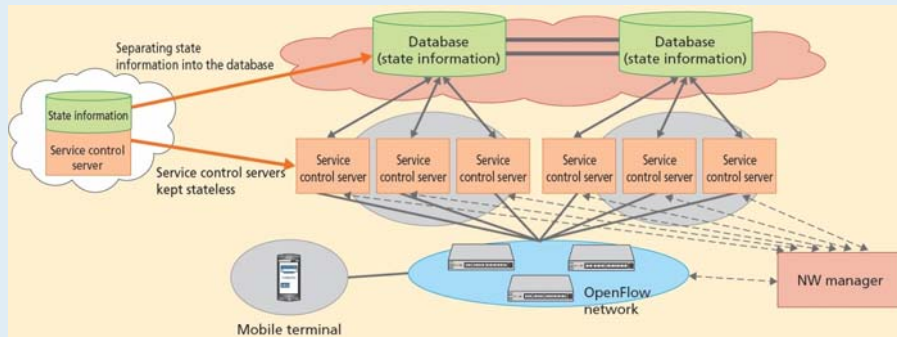
Use Commoditized Cloud Resources



- Common cloud resources (Database as a Service, Firewall as a Service, etc.)
- The use of these services depends on vNF SLAs

Infrastructure services & QoS

State as a Service

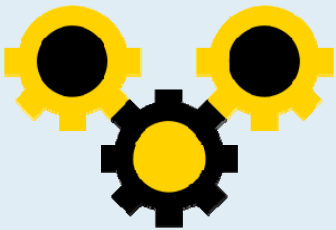


Network services



- Load Balancing as a Service
 - for telecom protocols (e.g. SIP)
- Anycast as a Service
 - for geographically distributed apps
- Chaining as a Service
 - Steer traffic through a chain of services

Monitoring & Analytics as a Service



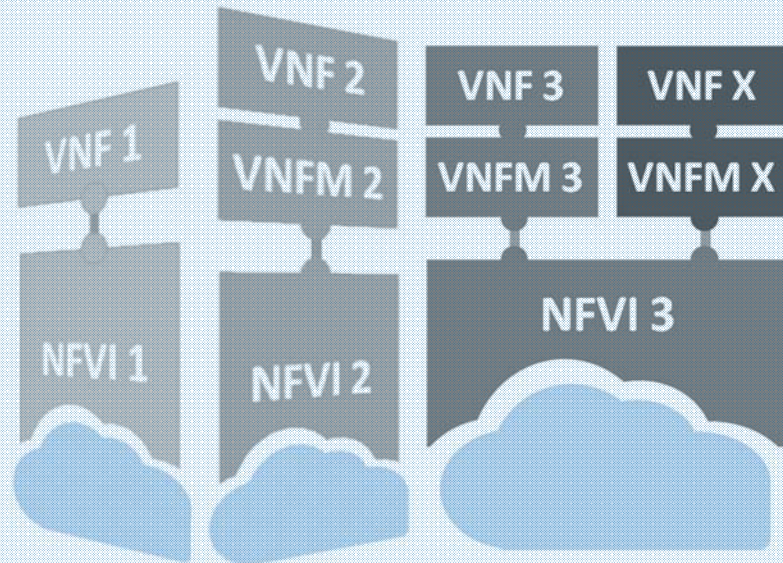
- Data collection and filtering
- Alarm correlation and Root Cause analysis
- Predictive healing and scaling
- Anomaly detection

QoS & SLA

- Required network bandwidth and latency
- Processing access time and bandwidth
- Storage performance
- Cache QoS

MANO Focused NFV Ensures Next Gen Operational Optimization

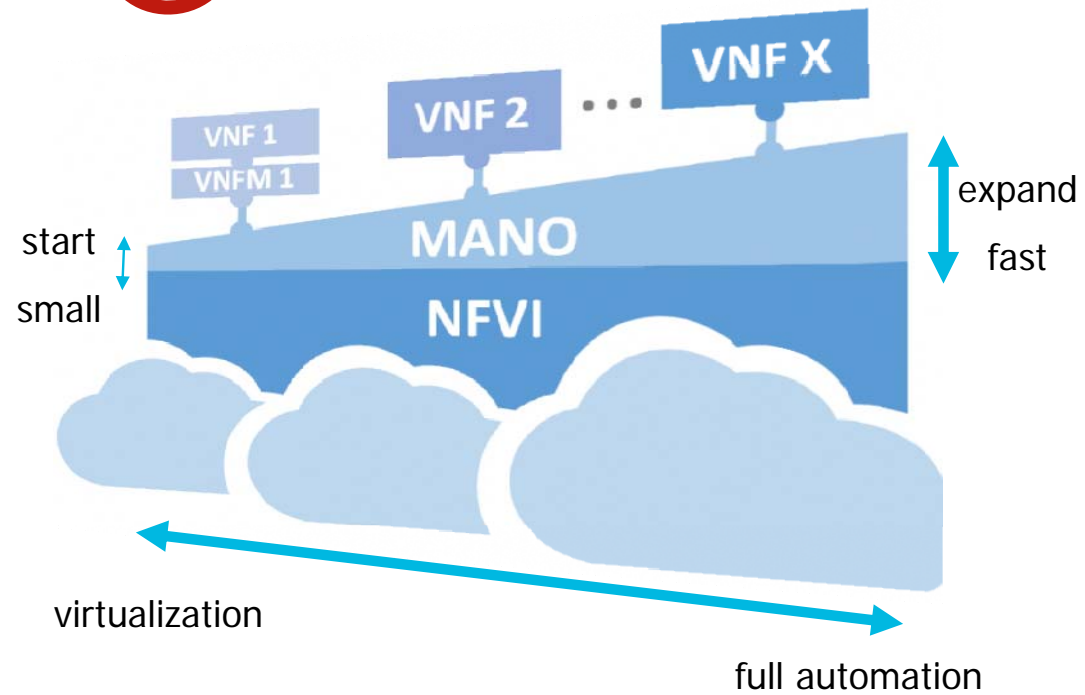
wrestling with vertical sprawl



vs.

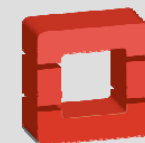
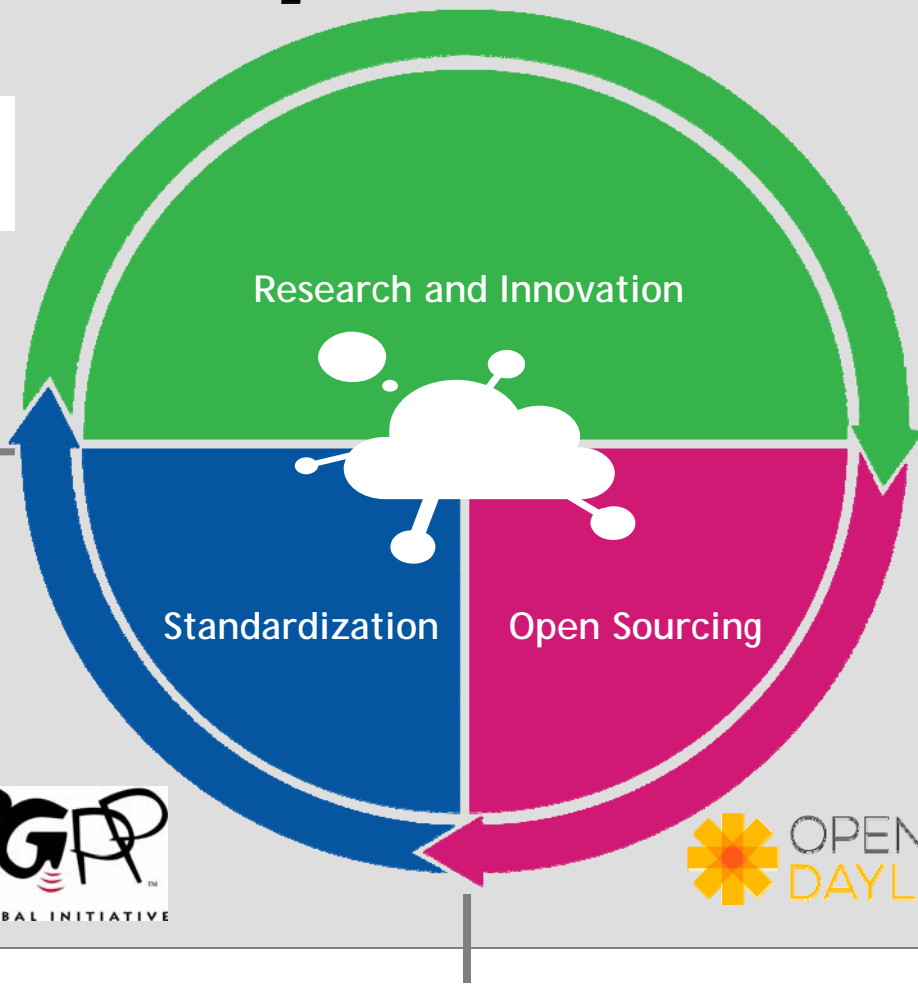


horizontal's efficient design





CogNet



openstack



NET FUTURES 2015



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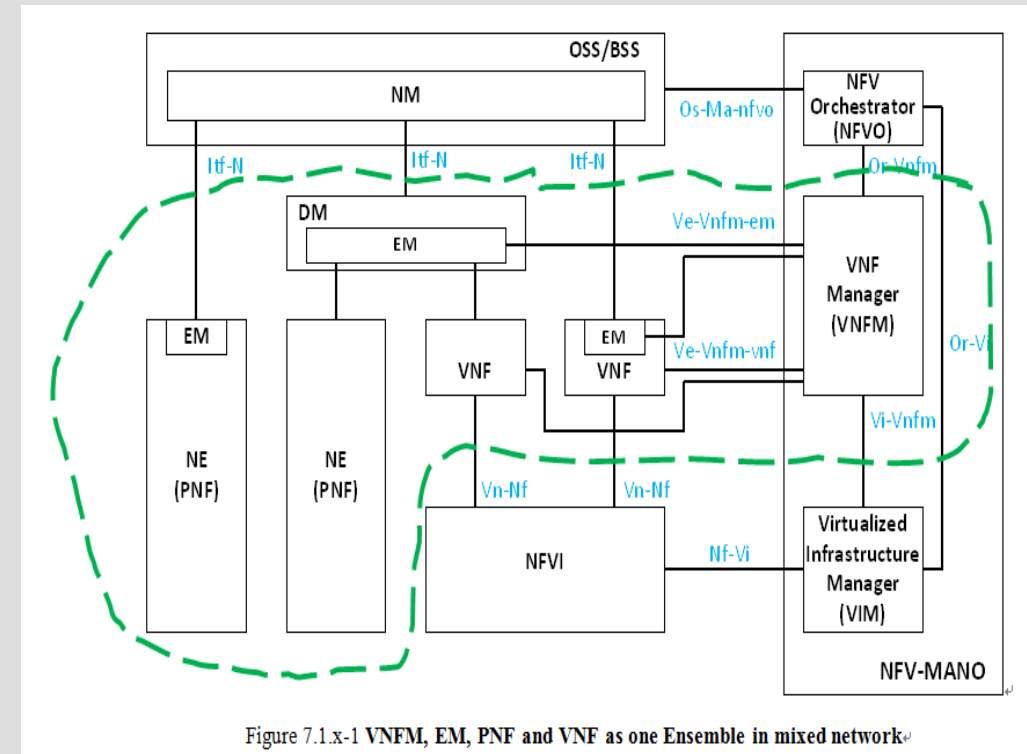


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Yet, there are strong forces against...

- VNF packaging - *might imply vendor lock-in*
 - “The VNF Package is a physical arrangement that contains all components that are necessary for the VNF Product to be deployed and maintained”
 - “Therefore, it is fully legitimate for a VNF vendor to prepare customer tailored VNF with unique resource demands and unique capacities”
- Specific VNFm vs Generic VNFm
- OSS vs. NFO



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