Auto-Scaling Capability Support in ONAP

Rashmin Patel

Network Platforms Group, Intel Corporation

December 12 , 2017

Agenda

- Edge NFV Introduction
- Telco Workloads Scalability
- Core Infrastructure Operations
- Generic Auto-Scaling Framework
- vEPC/NGIC Platform Setup Example
- Orchestration Integration Options
- Summary
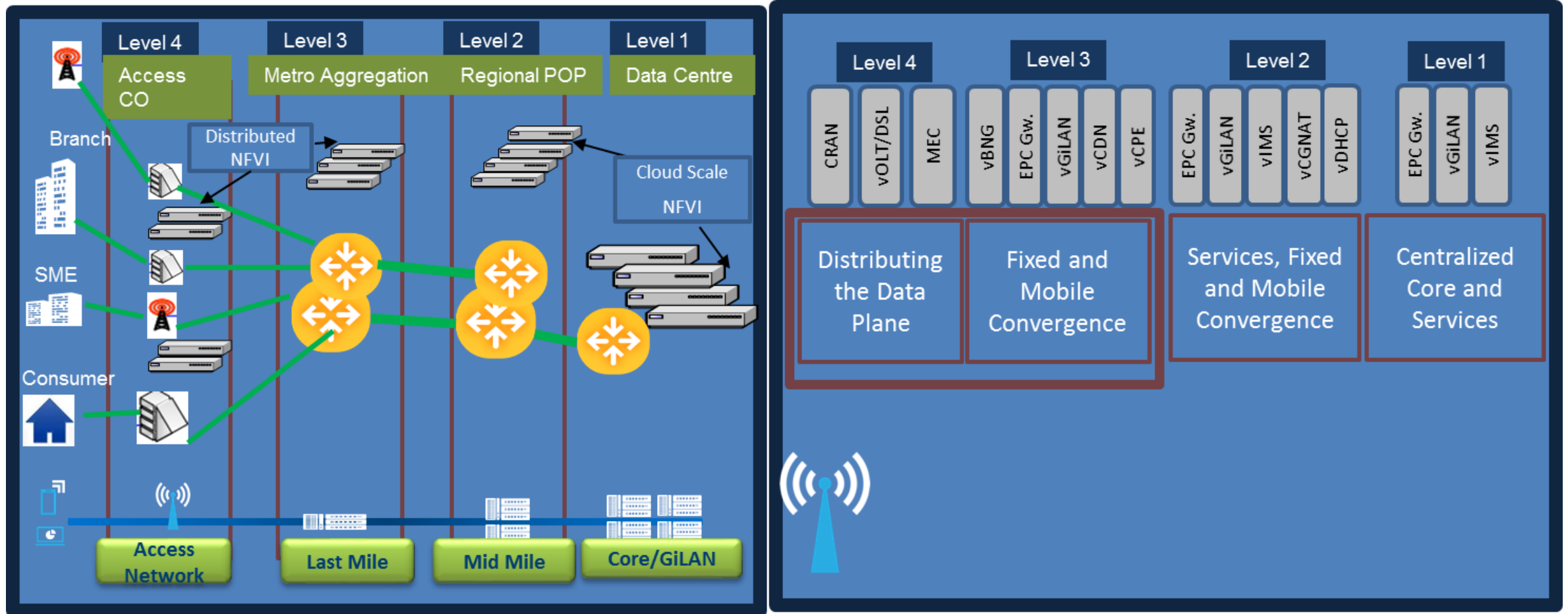
NETWORK GROWTH REQUIRES COMPUTE AT THE EDGE

Connected devices expected to grow to 50 billion 'things' by 2020 according to IDC.

Businesses need competitive, scalable, secure connectivity that is agile and intelligent.
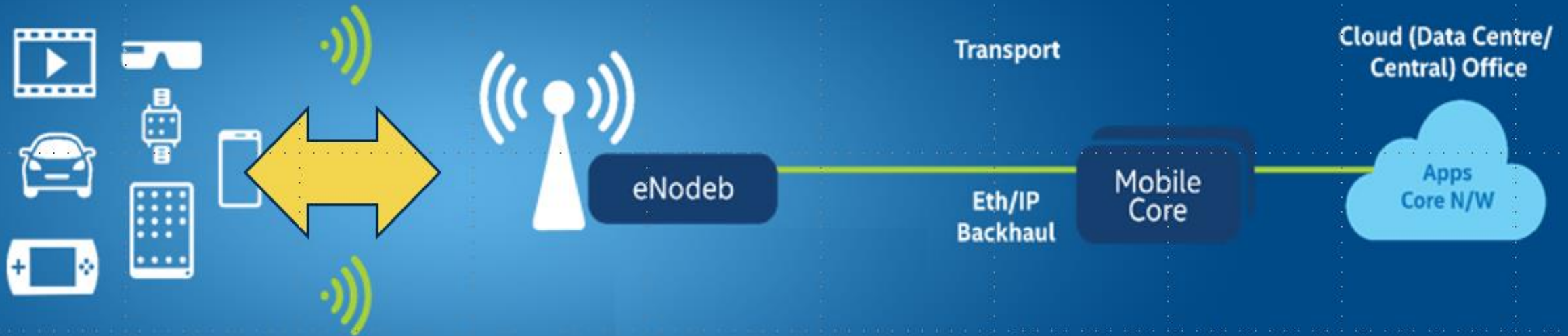
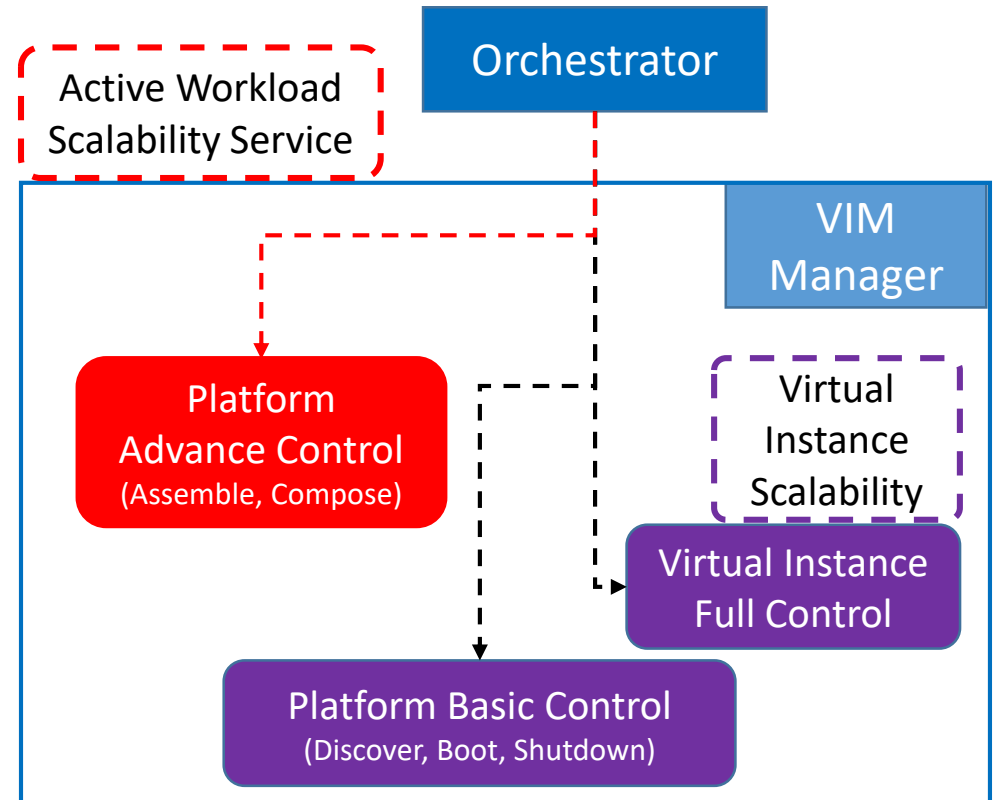Latency, Congestion, Capacity, Revenue – Calls for Network Edge Computing Power

Edge NFV - Diversified Service Locations in Telco Network

Important Considerations 1. Service 2. Location 3. Platform Convergence

THE LINUX FOUNDATION

ONAP
OPEN NETWORK AUTOMATION PLATFORM

Telco Workload Scalability

- ## Orchestrator
  - Delegates VNF lifecycle management to VIM-manager
  - No active tracking of VNF health and traffic demand up-down events
  - No active control of the platform or workload instances

- ## VIM-Manager
  - Full control over virtual instances
  - Discovery over infrastructure platform and resources only
 - No control over assembly or composition of the infrastructure platform

Orchestrator

Active Workload Scalability Service

VIM Manager

Platform Advance Control (Assemble, Compose)

Virtual Instance Scalability

Virtual Instance Full Control

Platform Basic Control (Discover, Boot, Shutdown)

Workload Scalability limited to a single platform in the infrastructure/cluster

Core Infrastructure Operations

- Discovery of Hardware
  - Infrastructure visibility improvement

- Telemetry from various HW elements
  - Improved Short or Long term decision making for workload scalability

- Assemble and/or Compose a platform from diversified HW blocks
  - Datacenter as a giant HW Warehouse
  - Cook the right NFVi platform on demand

- Power On or Power Off the platform
  - Better control for NFV workload scalability across platform boundaries

- HW block offload configuration in the platform
  - Better performance exposure to meet the SLAs

- Expose the composed platform to the VIM-Manager or higher layers
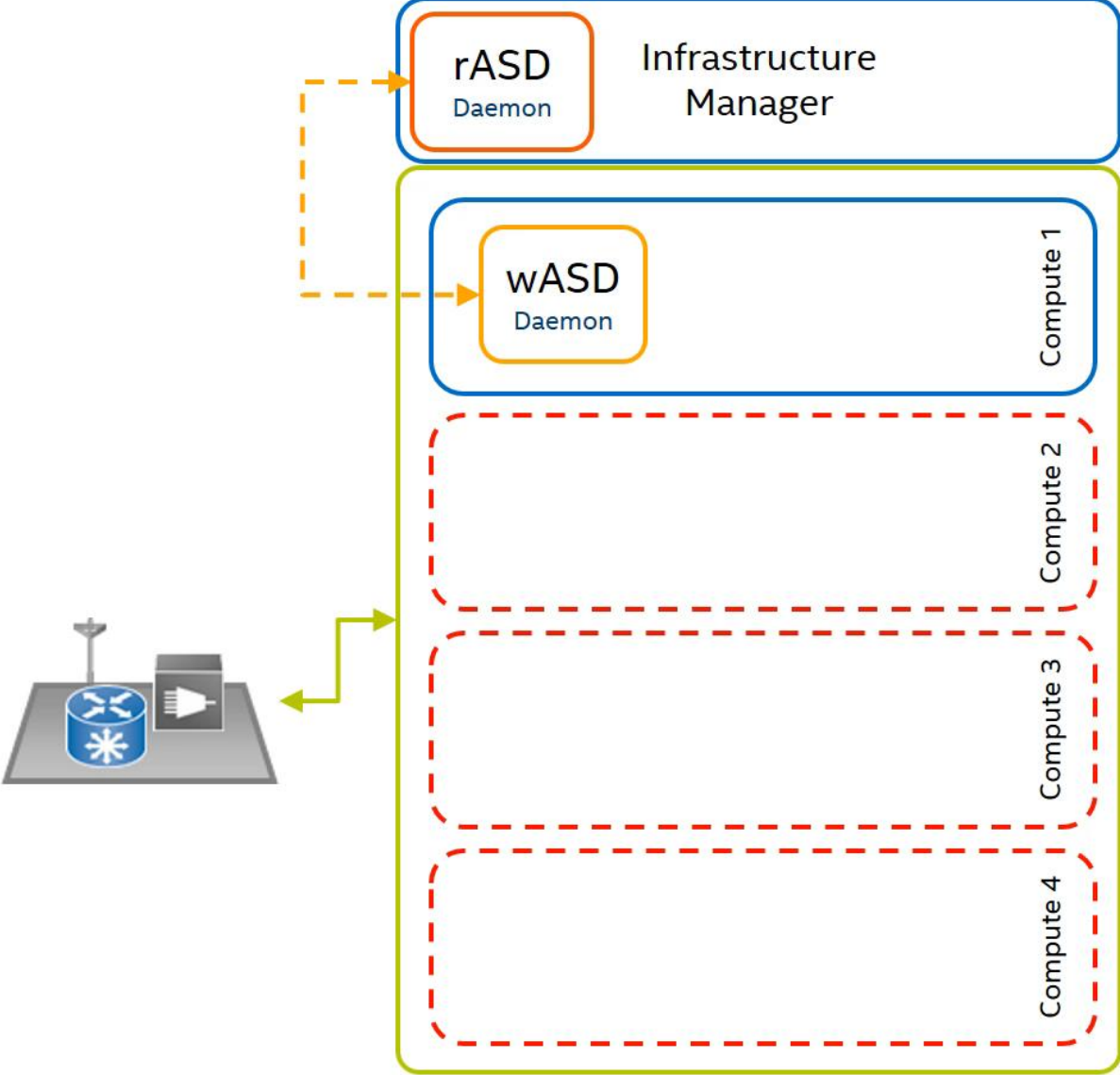 - Improved transparency across Telco Network

Generic Auto-Scaling Framework
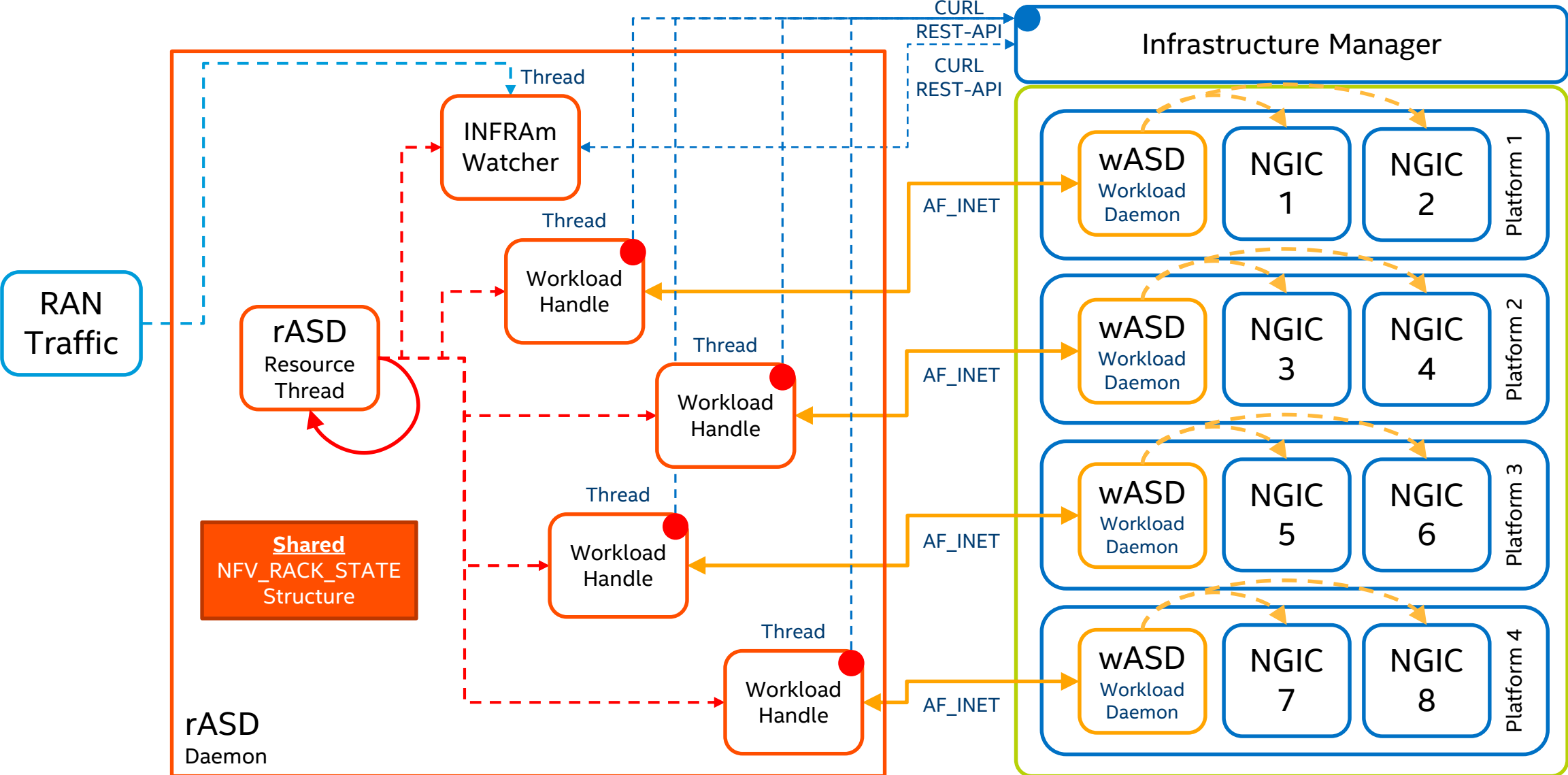
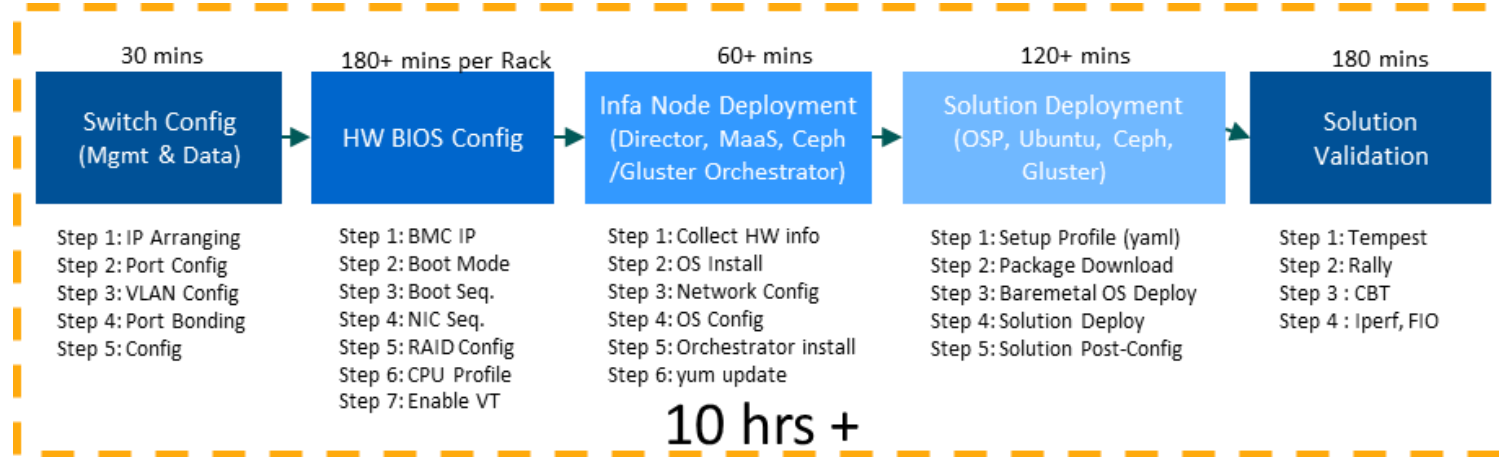# vEPC/NGIC Platform Setup Example
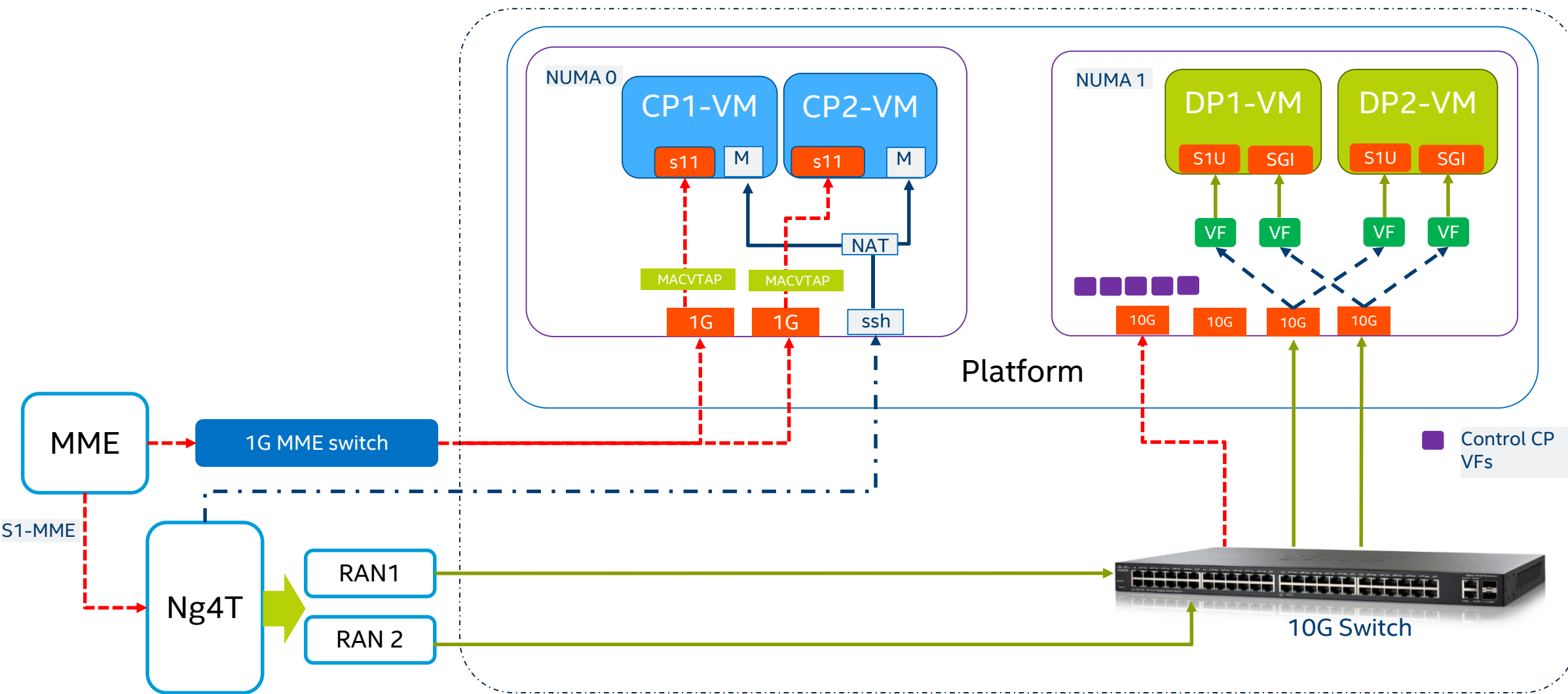
Autoscaling Demo
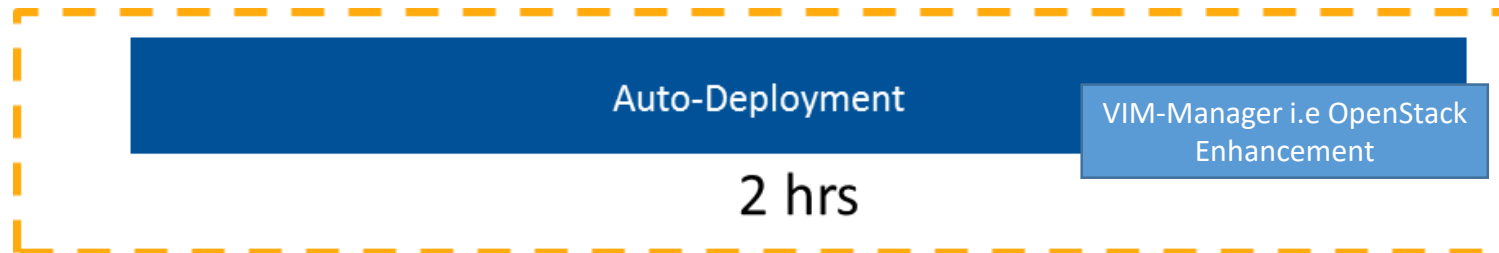
Auto-Scaling Latency Variables

- Boot Time of Compute Node with required HW resources (Est: ~1m)
  - According to Infrastructure REST API Reporting

- Boot Time of Workload (W) Instance-VM (Est: ~5s)
  - Depends on the tenant type i.e VM, VM-Container, Baremetal Container

- Number of Workload Instances (N) per Compute Node (Est: NxW)
  - Depends on the type of workload and its complexity

- Infra Watcher to Workload Handle Comms Latency (Est: ~0.2s – Controllable)
  - Depends on the Sleep Intervals i.e HB_INTERVAL, PW_INTERVAL

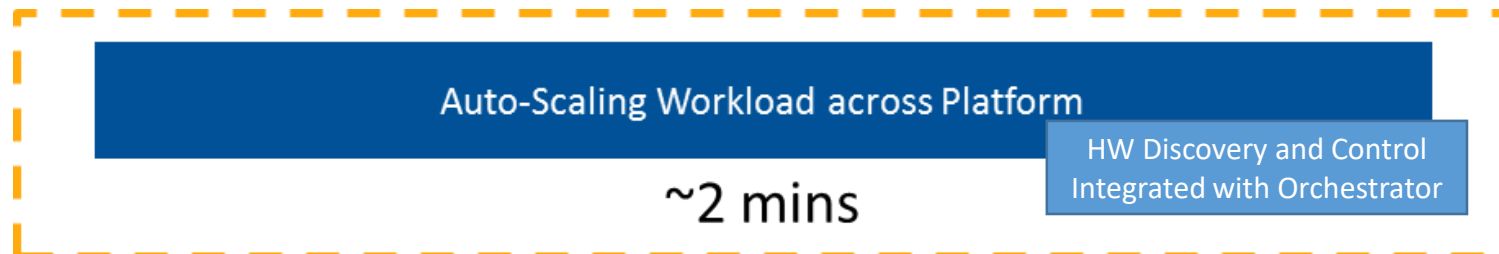# Towards Self Organized Network (SON) for Telco Cloud

Traditional Approach

30 mins	180+ mins per Rack	60+ mins	120+ mins	180 mins
Switch Config (Mgmt & Data)	HW BIOS Config	Infa Node Deployment (Director, MaaS, Ceph /Gluster Orchestrator)	Solution Deployment (OSP, Ubuntu, Ceph, Gluster)	Solution Validation

Step 1: IP Arranging
Step 2: Port Config
Step 3: VLAN Config
Step 4: Port Bonding
Step 5: Config

Step 1: BMC IP
Step 2: Boot Mode
Step 3: Boot Seq.
Step 4: NIC Seq.
Step 5: RAID Config
Step 6: CPU Profile
Step 7: Enable VT

Step 1: Collect HW info
Step 2: OS Install
Step 3: Network Config
Step 4: OS Config
Step 5: Orchestrator install
Step 6: yum update

Step 1: Setup Profile (yaml)
Step 2: Package Download
Step 3: Baremetal OS Deploy
Step 4: Solution Deploy
Step 5: Solution Post-Config

Step 1: Tempest
Step 2: Rally
Step 3 : CBT
Step 4 : Iperf, FIO

10 hrs +

Present Approach

Auto-Deployment

VIM-Manager i.e OpenStack Enhancement

2 hrs

Next Gen. Approach

Auto-Scaling Workload across Platform

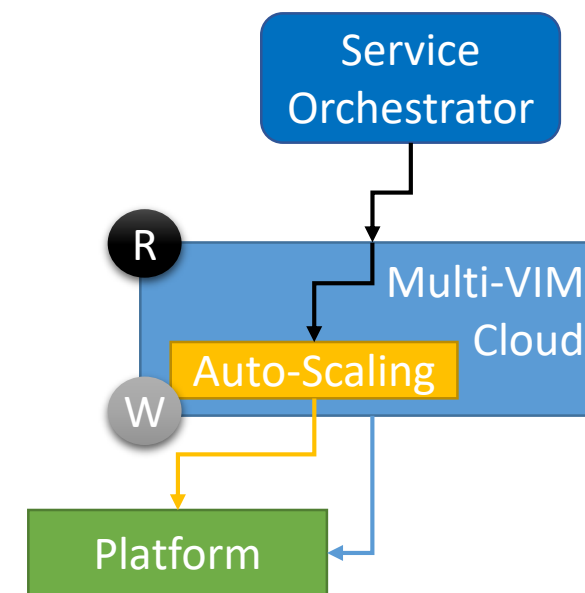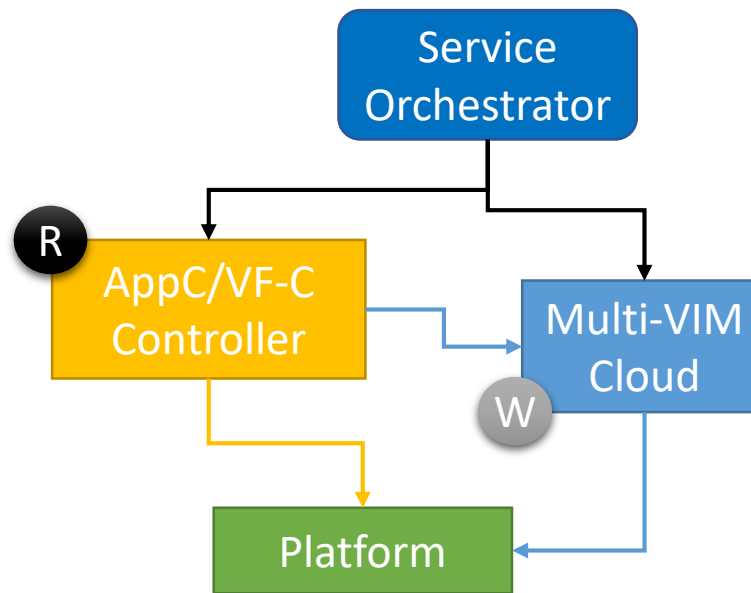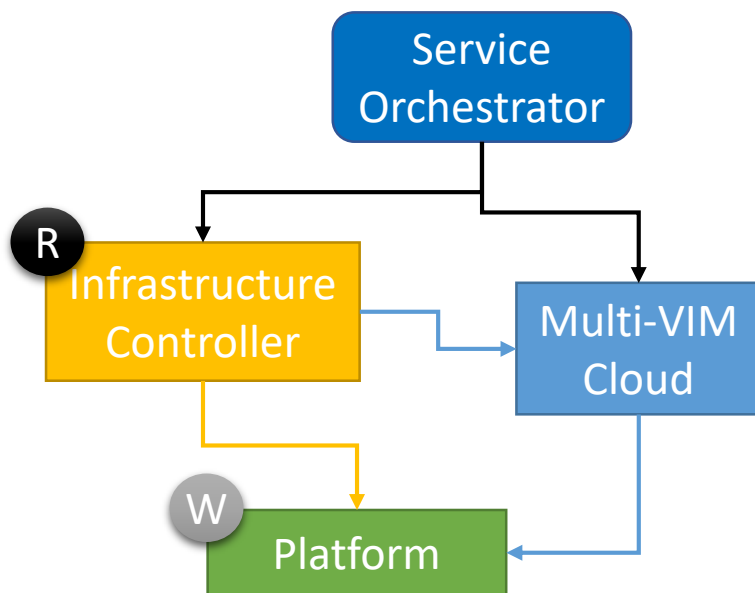HW Discovery and Control Integrated with Orchestrator

~2 mins

Orchestration Integration Options

- **Infrastructure Controller**
  - Best place to align for 5G Slicing, Scalability and Visibility

- **AppC or VF-C Controller**
  - Bind the scalability feature with workload or VNF

- **Multi-VIM/Cloud Abstract**
  - Contained implementation close to virtual instance deployment

VNF Tenant Instantiation (VM/Container)   Physical Instantiation (Compute/Storage/Network)

Summary

- Platform Capabilities integrated to support low latency and high throughput to meet Edge NFV requirements
- Enhance Platform Controls take scalability automation to the next level in ONAP
- The prototype greatly reduces the time to scale-in/out any workload
- Requesting feedback and collaboration for next level of auto scaling
  - Infrastructure Controller contributions
  - AppC and/or VF-c intercept contributions
  - Template support contributions