Common NFVI Telco Taskforce

Technical F2F Work Shop – January 13-16, 2020

RI Workstream: Key Updates

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Content & MVP Targets

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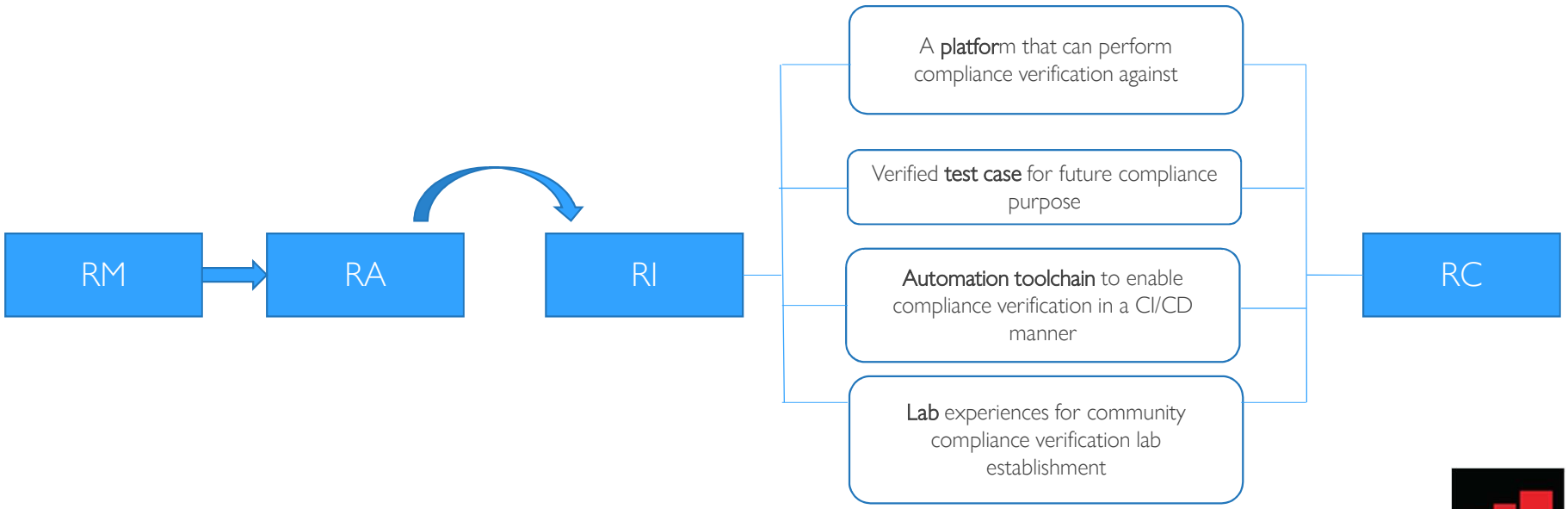
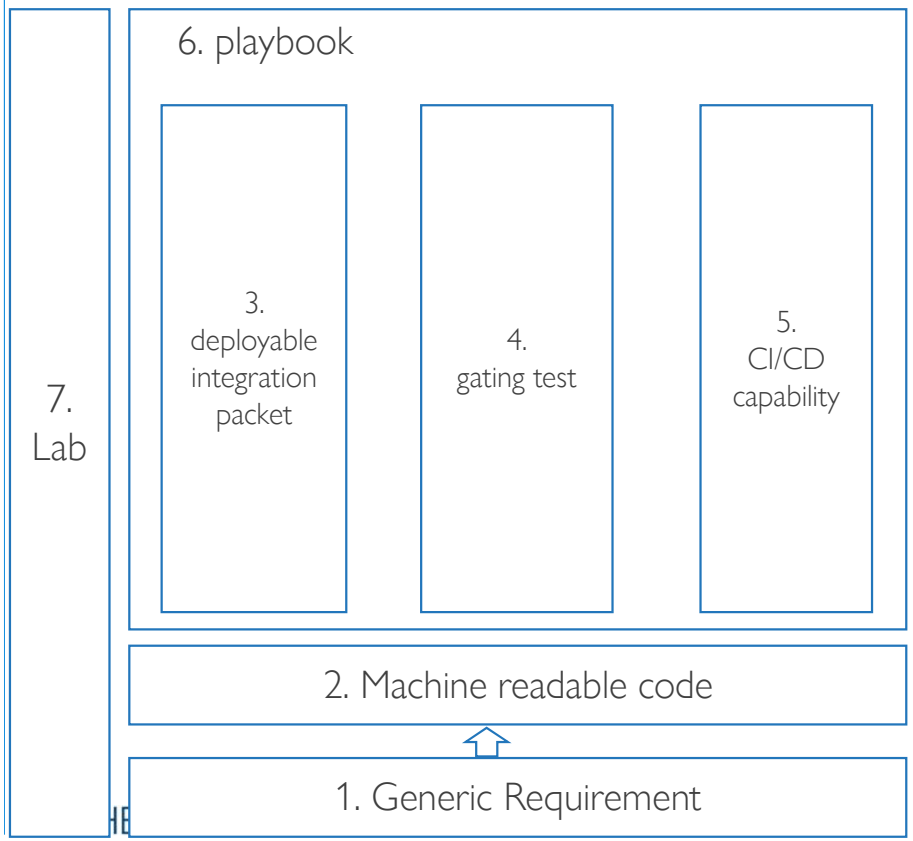
WS Goals

From Document to code

As the first WS to translate documents into real code, RI is responsible to provide RC, and even further to the telco industry, with real deployable tools for compliance testing/POC/Lab setup



Approaches



1. Provide generic requirement for the reference implementation

2. Provide practical machine readable code to reveal and enable these generic requirement

3. Provide deployable integration packet for implementation in accordance to RM and RA defined

4. Provide gating test for the implementation to make sure it meets RM and RA

5. Provide CI/CD capability for the implementation so as to benefit future release evolvement and compliance testing

6. Conclude in a playbook for all the necessary operations of the above capabilities

7. Establish lab environment to demonstrate the above capabilities and provide further guidance to compliance labs

Progress to Date | Key Accomplishments

Requirements

Initial content of requirements for Reference Implementation, including:

- Labs
- Tooling
- Installers, Releases
- Automation Requirements

Cookbook

Labs

RI Lab requirements specified

- Required support for various NFVI profiles defined by RM
- Specifies capabilities required for Compute, Storage, ToR and Controller nodes
- Specifies Lab Topology & Power/cooling requirements

Pod Implementation

Intel POD 10

- Airship 1.0 & Openstack Ocata
- OPNFV Iruya Release
- Performance benchmarking with FuncTest
- 1 jump host, 3 Controllers & 2 compute

POD 15

- Same configuration as POD 10
- Currently facing infrastructure issue and being fixed

RI Requirement Updates

Progress: Initial Content Creation

Initial Content

https://github.com/cntt-n/CNTT/tree/master/doc/ref_impl/cntt-ri

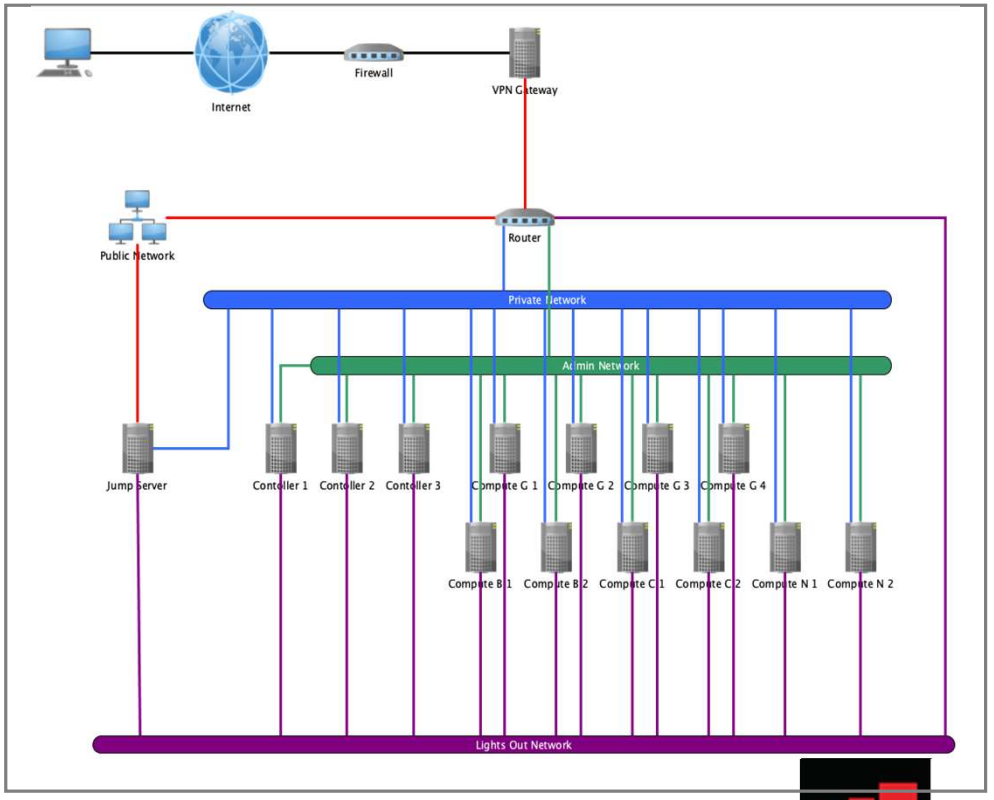
Chapter	Status
Chapter 01 - Overview	Complete
Chapter 02 - Reference Implementation Requirements	Complete
Chapter 03 - NFVI + VNF Target State and Specification	Still Developing Contents
Chapter 04 - Lab Requirements	Still Developing Contents
Chapter 05 - Installer Requirements	Still Developing Contents
Chapter 06 - Lab Operations	Still Developing Contents
Chapter 07 - Integration	Still Developing Contents
Chapter 08 - Gap analysis & Development	Still Developing Contents

Progress: Lab Requirements

Lab Requirements

- Must provide capabilities to support the NFVI Profiles specified by CNTT RM
- Must withstand component failures, provide for network path redundancy & Controller HA
- Must provide Jump Host, Compute & Storage hosts, Controllers & ToR with adequate compute, memory, storage, acceleration & network bandwidth capabilities (minimum 6 hosts, recommended 12 hosts in lab)
- Rack space requirement
  - At least 19U, sufficient for 10-16 servers
- Power requirement
  - ~ 10KWatts needed for max 16 hosts & 2 ToR
- Redundant power sources for each device

Recommended Lab topology



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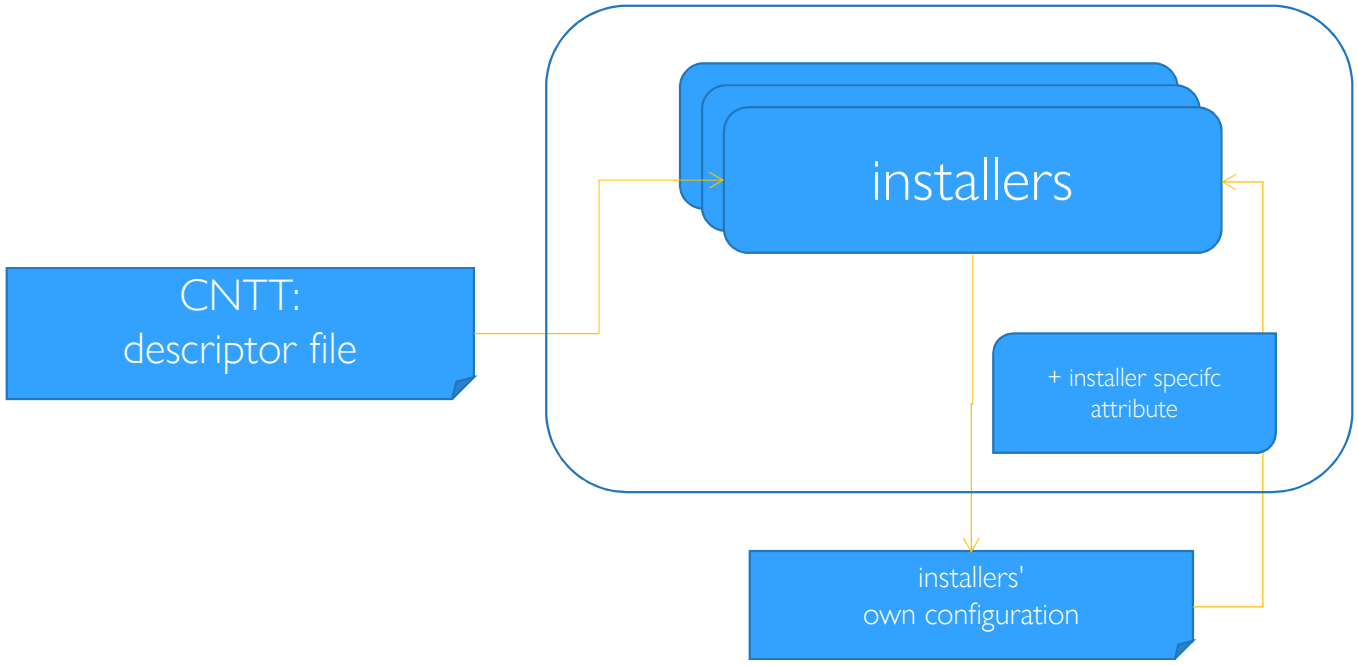
Progress: Installer Requirements(1/4)

Ref	sub-category	Description
req.gen.ins.01	Installer	Installer **must** accept a descriptor file to finish deployment.
req.gen.ins.02	Installer	Installer implementation **must** validate the descriptor file with schema.
req.gen.ins.03	Installer	Any existing installer implementation **may** need adaption for the descriptor file.
req.gen.ins.04	Installer	Installer **may** support reporting the deployment progress status.
req.gen.des.01	Descriptor	Descriptor file **must** include hardware resource configuration, software configuration.
req.gen.des.02	Descriptor	Descriptor file **may** include additional extending configuration.

Progress: Installer Requirements

- installer accept the cntt format descriptor file as input content.
- installer translates content to own configuration.



Progress: Installer Requirements

benefits from a descriptor file

- 1) Aligning with existing OPNFV Standards,
- 2) can be easily maintained and edited Templates and YAML,
- 3) OPNFV installers can consume it, for sure some enhancement needed.
- 4) CICD Pipelines built to consume descriptor files,
- 5) Provides details reference for Test Developers for Test Framework Design

Progress: Installer Requirements

descriptor file content definition

- It defines Hardware configuration, server template, server instances, software configuration (VIM configurations), network configuration(vlan settings, ip), storage configuration, and additional information like NTP, Proxy server, etc.
- check github for the details

https://github.com/cntt-n/CNTT/blob/master/doc/ref_impl/cntt-ri/chapters/chapter05.md

- note: the content of the descriptor file is used to include neccesary configuration information for NFVi, the hierarchy and detail contents still need much more open discussion.

Progress: Installer Requirements

new content need to add

- content below to be added as prerequisite in new commitment.
  - hardware validation requirements(BIOS, RAID, CPU,Memory,IPMI,NIC)
  - network configuration on switch and router.(ie: vlan design and set for network plane for BMC and/or public access vlan).

- complementary information need to add
  - Metadata (Lab Owner,Location, Purpose),
  - Components (SDN-C, NFV features),
  - Common Network Info (IP range, Subnets),Deployment Tools (installers) and Hardware Prerequisites (SRIOV, DPDK). (network information: in range or static? need to further discussion)

NFVI Required State

- Chp03:NFVI + VNF Target State & Specification contains the 3 main sections to identify the required state of NFVI
  - Sec 3.2 VNF profile is used to describe consistent list of options/extensions, i.e., instance type (B/N/C), network itf options, Flavour, persistent storage extension, acceleration extension) that every workload must declare when running on top of NFVI.
  - Sec 3.3 NFVI SW profile provides the list of the global setting per each NFVI resource pool(B/N/C), It is used to describe the list of features provided by hypervisor/host OS in 3 categories, i.e., virtual compute (e.g., CPU allocation ratio, huge page etc), storage (e.g., IOPS criteria and replication factor etc) as well as the network optimization and acceleration options
  - Sec 3.4 NFVI required status assembles the architect requirements regarding to the 8 categories: general, infras, VIM, itf&api, tenants, LCM, assurance, security. It also gives the minimal version of API for the Openstack service components.

Progress: Reference Implementation Cookbook

Cookbook Outline | Progress

- Insert information here

Insert Visual Here
(Cookbook Outline?)
Or
Text Box
Or
Remove

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Reference Implementation Achievements | Targets for Alpha

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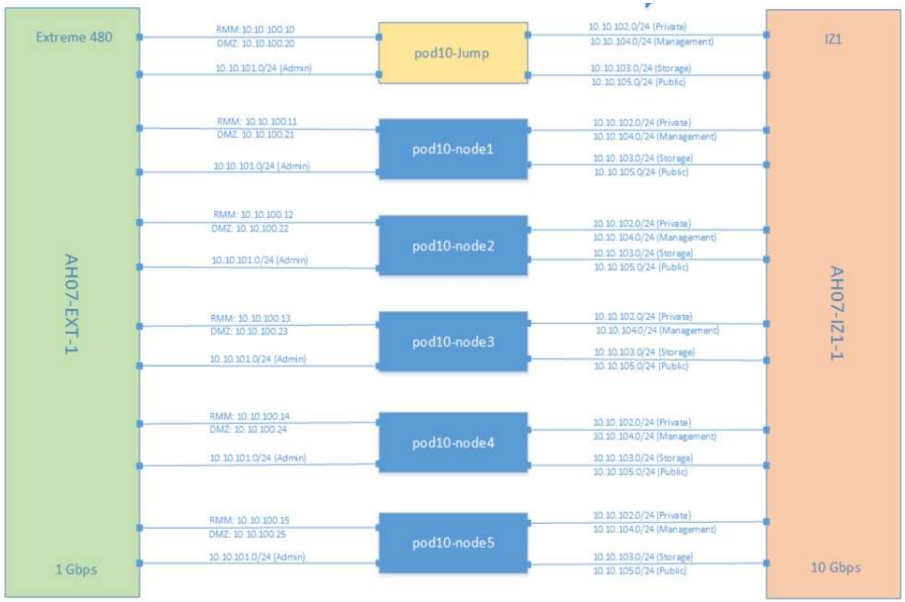
POD10 : Install State & Availability

Installer: Airship version v1.0
Openstack: Ocata
Installation Type: OOK

POD 10 Install state / Known Issues

	Pod-10
Owner	Trevor Cooper
Purpose	CNTT testing PoC
Status	Ready to Use. All dashboards up and running. Test Tools deployment in progress
Networking support	Openvswitch and SRIOV
Functest Compatibility	~90%-95%
Performance Benchmarking	In-Progress
Usecases	NI – SRIOV. Compute Intensive.
GAPS	Low on Storage Yet to assess CNTT RM/RA compatibility due to lack of manifest validation specifications
Deployed and Maintained By	Sridhar@OPNFV-Airship

POD 10 Topology



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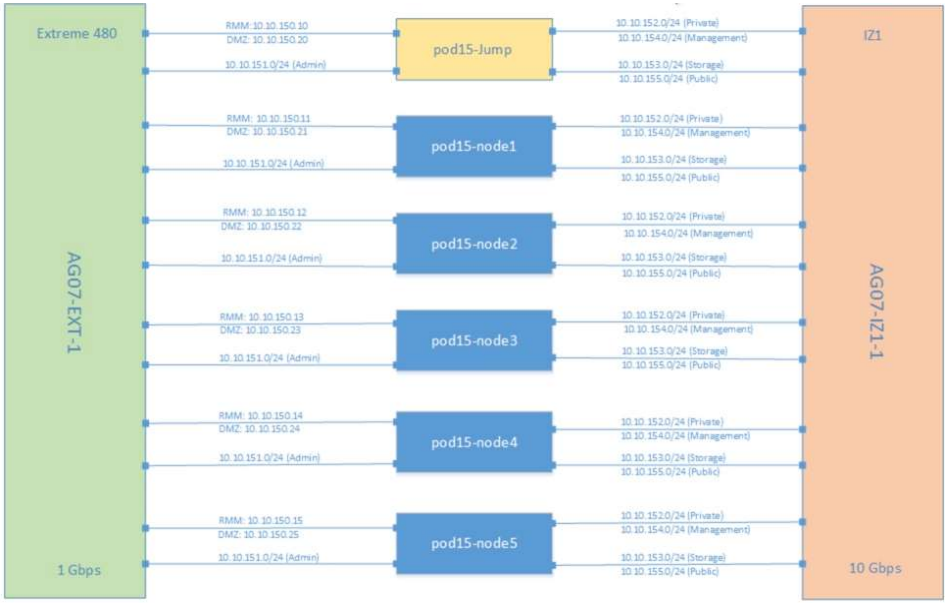
POD15 : Install State & Availability

Installer: Airship version v1.0
Openstack: Ocata
Installation Type: OOK

POD 15 Install state / Known Issues

	Pod-15
Owner	TBD
Purpose	CNTT RI
Status	Manifests are Ready. Infra Issue is being addressed by Team-Intel.
Networking support	Openvswitch and SRIOV
Functest Compatibility	Yet to be performed
Performance Benchmarking	Yet to be performed
Usecases	NI – SRIOV. Compute Intensive.
GAPS	No SSD for data storage
Deployed and Maintained By	Sridhar@OPNFV-Airship

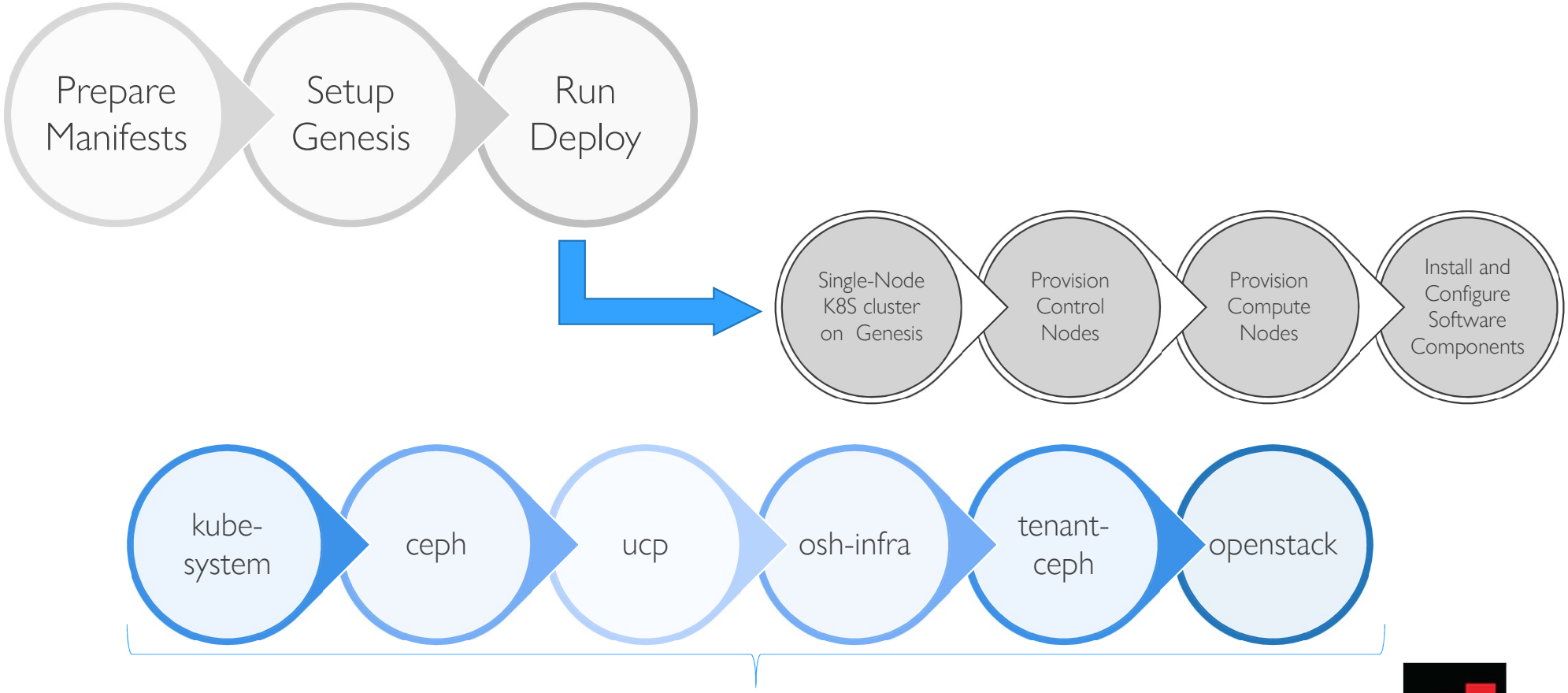
POD 15 Topology



Initial NFVI Installation – The Installer

- Infrastructure defined using Airship Manifests, and deployed using Airship Installer.
  - How to create manifests: https://wiki.opnfv.org/display/AIR/Airship+Manifest+Creation+For+New+Sites
- Why Airship?
  - Opensource, Declarative, Flexibile and Consistent
  - OPNFV-Airship has simplified manifest creation.
  - OPNFV-Airship has also simplified IP planning (Internal).
  - Airship has captured all aspects of deployment
    - Strategy, definition, networking (networks, NetworkLinks and NIC-Mapping), profiling, security, software, bootactions, baremetal-provisioning, LMA serverside (even RHOSP-13 Director does not support any serverside monitoring).
- Why Not Airship
  - Ubuntu Only, as MaaS is used.
  - SDN controller deployment is not supported.
  - MANO (VNFM/NFVO) deployment is not supported.
  - Airship 2.0 may fix these issues.
- Contacts with other, related, installer has proved to be unsuccessful.
  - Kayobe (similar to Airship – OOK)
-

Initial NFVI Installation – The Process, Summarized



Initial NFVI Installation - Learnings

- Physical-networking (connectivity and configuration), and Internet-Access Issues can cause delays.
  - Pings and LLDP tools can help in former.
  - At times the access to repos can be slow.
    - **Offline repository, possibly in jumphost, would be helpful**.
- Getting Ceph right is very important.
  - It would help to have SSDs for datadisks and preferably separate journal disks (NVMes)
  - **In Intel-Pods, this is not the case**.
- Open IT tickets early and follow it up – provide as much details as possible.
  - **Different timezones (Deployment and IT/Admin) will not help**
- Though, with its well-defined process, flow and detailed logs, troubleshooting any deployment failures is relatively easier, **OPNFV-Airship should come-up with Troubleshooting Guide**.
  - Some simple 'inspection' and 'validation' tools would be very helpful.
- OPNFV PDF is not used for manifest creation (yet).
  - Shortcomings = Automation Challenges.
  - Enhancement to PDF/IDF/SDF is under consideration. Once done, auto manifest creation can be achieved.

Initial NFVI Installation – Access

Dashboards	URL	Credentials
Horizon	dashboard-airship.intel-pod10.opnfv.org	admin/password123
Grafana	grafana-airship.intel-pod10.opnfv.org	grafana/password123
Kibana	kibana-airship.intel-pod10.opnfv.org	elasticsearch/password123
Nagios	nagios-airship.intel-pod10.opnfv.org	nagios/password123

Release Notes | Issues

- **Release Notes, and Issues**
  - RA defines the API should follow Pike. While for this release, Airship only support Ocata for now
  - Installer description file requirements are raised. However, detailed machine readable description file is still under working. Airship currently is not following the common description file. Will fix that after the enhancement of description file

Next Steps

Current Status

Completed:

- RM | RA | RI Requirements
- Lab Requirements
- Initial Lab Secured
- S/W Deployed | Config
- Smoke Test | Sanity
- Continuous Deployment (with errors)

In-Progress

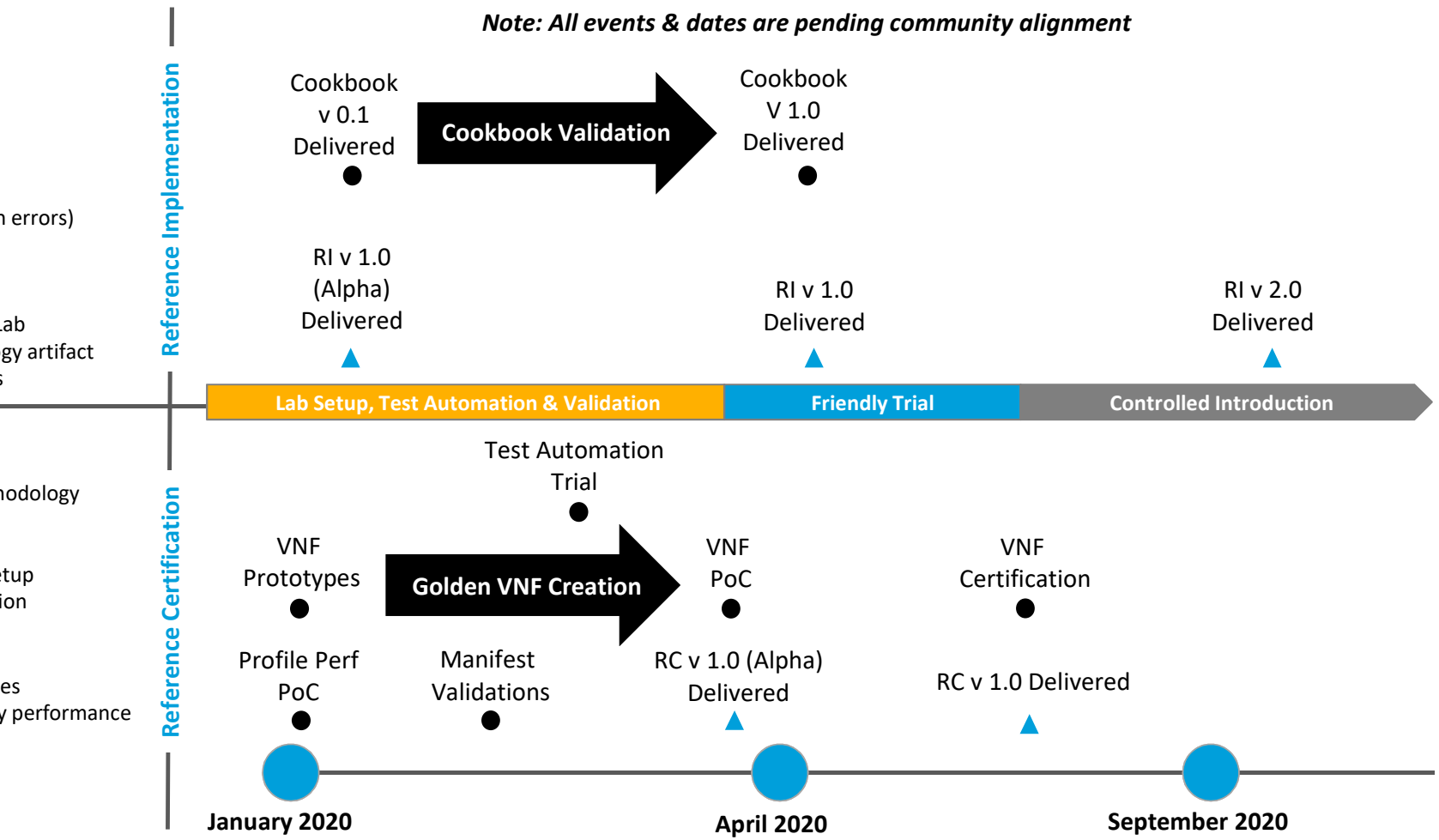
- Manifest > PDF & IDF
- Complete Lab PoC & Deliver Lab
- Create Cookbook & RI Topology artifact
- Implement PoC Key Learnings

Completed:

- Define & Vet Verification Methodology
- Stage Jenkins Hosts
- Prep Health/Smoke Suites
- Completed API test harness setup
- Initial API Compliance Validation

In-Progress

- Design & deliver VNF Prototypes
- Integrate upstream community performance & storage test cases



Appendix

Reference Implementation

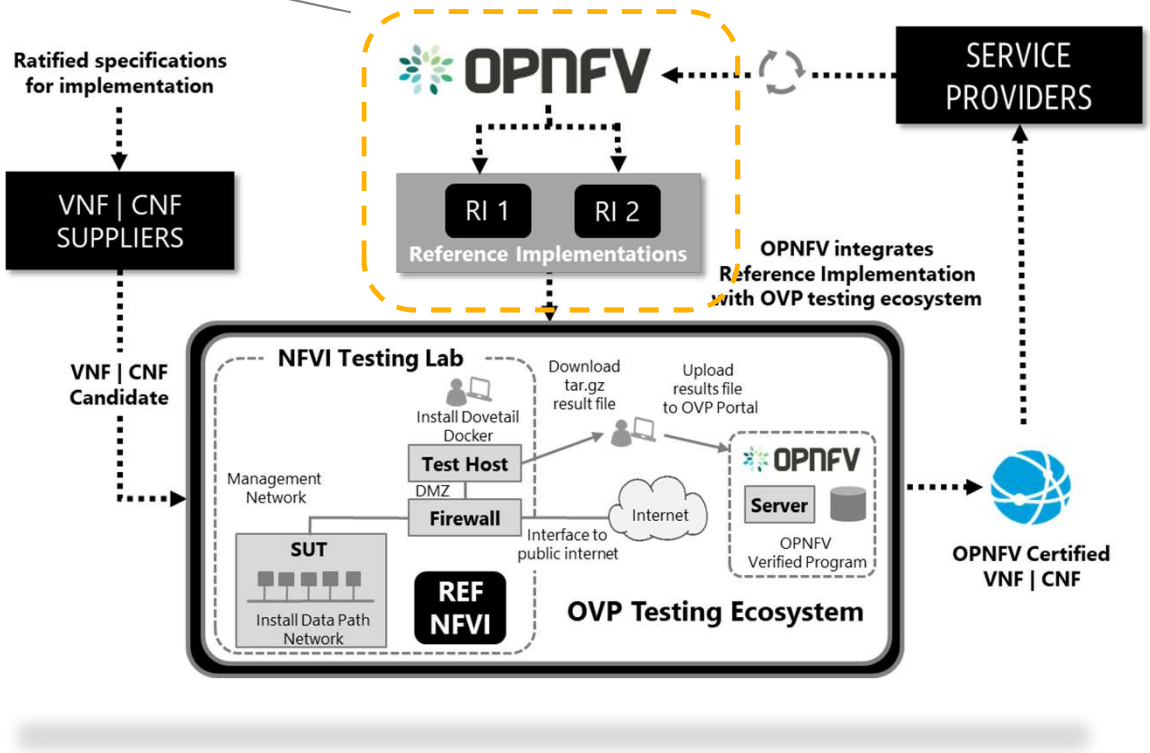
Objective
Implement & deploy based on the design & configurations of each Reference Architecture

Goals

- Provide CNTT verification labs with standard hardware/software for cloud platform & VNF certification
- Providing Reference Implementation leveraging Reference VNFs (“Golden VNFs”) for interoperability testing
- Collaborate with OPNFV on approach & tools, aligning with CNTT community requirements
- Establish hardware | software manifests

Target Delivery

January 2020 (v 1.0- Alpha)
Aligns with Reference Architecture # 1 (OpenStack)



Reference Implementation Approach | Outcome

Actions Underway	Outcomes
Generate eco-system requirements for Reference Implementation, including: • Labs • Tooling • Installers, Releases • Automation Requirements	Efficient and effective quality approach while aligning with CNTT objectives.
Create detailed description file definitions for installers, VNF features, etc..	User follows the steps or procedures to achieve an RI identical to the lab utilized by CNTT
Create detailed Lab criteria & operations	Optimized approach and aligned with CVC lab setup, operations, & support
Create a cookbook for the first RI, which includes detailed steps for the deployment and configuration	User follows the steps or procedures to achieve an RI identical to the lab utilized by CNTT
Create a detailed design for automation for deployment & testing	Reference Implementation is integrated with CVC ecosystem, including test cases & framework
Create continuous integration & delivery pipeline for Reference Implementation	Alignment with OPNFV CI to generate CNTT Reference Implementation in a continuous manner
Perform gap analysis to determine required actions for existing eco-system within LFN/OPNFV community projects	Required test cases & test frameworks are identified & created in collaboration with upstream communities

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Reference Implementation: Lab Strategy & Plan

Goal

Select a secure, stable, and configurable lab, enabling automated reference implementation (RI) validations

Vision & Recommendation

- ✓ **Establish at least 2 community labs** (leverage testing & HW expertise)
  - ✓ Supports multiple RI validations in parallel
  - ✓ Readily available supplier test apparatus & expertise
  - ✓ Leverage geo diversity
- ✓ **Leverage Lab as a Service (UNH-IOL) labs**
- ✓ **Promote 3rd Party Vendor Labs for Scalability**

Qualifications – Must be Satisfied for Lab Selection

- **Available** with Outage Contingency (4-nine uptime)
- **Current & Stable** (current patch sets)
- Demonstrated **Integration with the OVP Ecosystem**
- **Secure** (physical, and logical)
- **Configurable with minimal downtime**
- **Effortless onboarding process**

RI-1 Lab Chosen (Alpha)

- Intel POD10 PoC & POD15 Target State
- 3 x Controller Nodes
- 10 x Compute Nodes (4 general + 2 per B/N/C)
- 1 x Jump Host
- 1 x Spine Switch and 2 x Leaf Switch in 1 x 48u Rack

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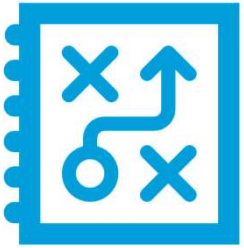
Reference Implementation Challenges

- Community resources (engagement & contributions)
- **OPNFV capabilities & alignment with CNTT objectives**
  - Ability to scale to demand
- Alignment with other communities
- Limited support structure for defects | issues (best-effort community Triage)
- Agreement & Support to build a normalized POD/Infrastructure Descriptor File for installers
- Closure on target location and quantity of code repos needed
- Consensus to create a long-term delivery Work Group (WG) for LCM
- Need automated BareMetal validations



CNTT will maintain ownership of the Reference Implementation until a satisfactory level of support, stability, & maturity is attained

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POD10 | POD15: Install State & Availability

	Pod-10	Pod-15
Owner	Trevor Cooper	TBD
Purpose	CNTT testing PoC	CNTT RI
Pod-Topology	https://wiki.opnfv.org/display/pharos/Intel+POD10	https://wiki.opnfv.org/display/pharos/Intel+POD15
Status	Ready to Use. All dashboards up and running. Test Tools deployment in progress	Manifests are Ready. Infra Issue is being addressed by Team-Intel.
Installer	Airship	Airship
Infrastructure Definition	https://github.com/opnfv/airship/tree/master/site/intel-pod10	https://github.com/opnfv/airship/tree/master/site/intel-pod15 [Coming Soon]
Openstack Installation Type	OOK: Openstack on Kubernetes	OOK: Openstack on Kubernetes
Networking support	Openvswitch and SRIOV	Openvswitch and SRIOV
Functest Compatibility	~90%-95%	Yet to be performed
Performance Benchmarking	In-Progress	Yet to be performed
CNTT RA/RM Compatibility	Yet to Assess. Lack to requirement specification	NA
Usecases	NI – SRIOV. Compute Intensive.	NI-SRIOV. Compute Intensive
GAPS	Low on Storage. Yet to assess CNTT RM/RA compatibility due to lack of manifest validation specification	No SSD for datadisk.
Deployed and Maintained By	Sridhar@OPNFV-Airship	Sridhar@OPNFV-Airship

POD 10 Configuration Details

Installer:

- Airship version v1.0
- Airship TreasureMap version v1.6

Openstack:

- Openstack version: Ocata
- Installation type: Openstack on Kubernetes

Other software versions & locations:

- https://github.com/airshipit/treasuremap/blob/v1.6/global/software/config/versions.yaml

Infrastructure definition / descriptor files:

- https://github.com/opnfv/airship/tree/master/site/intel-pod10

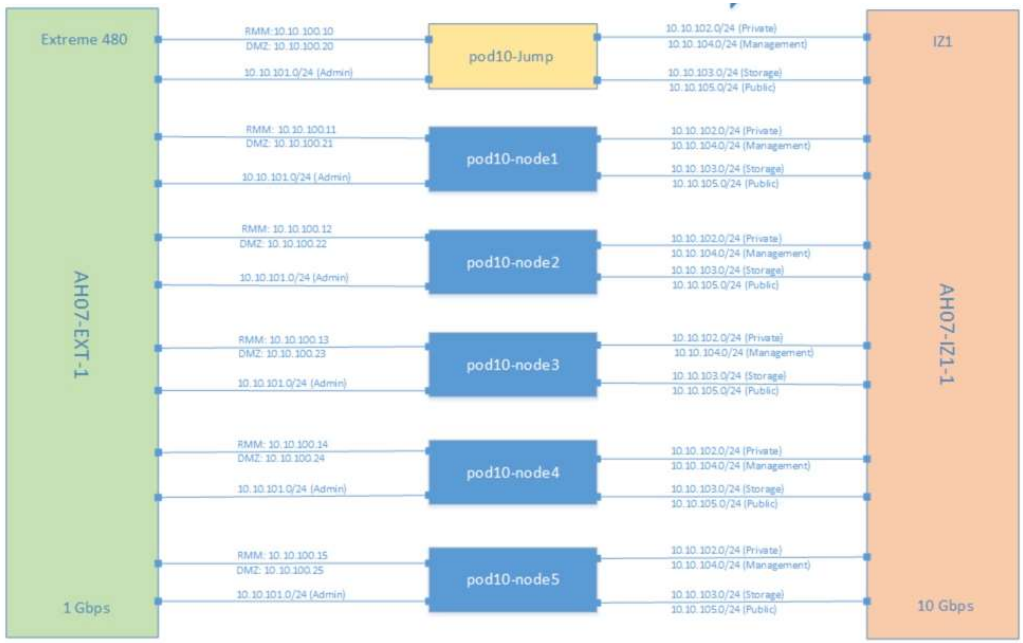
Hardware details:

Node description	Compute	Memory	Storage
pod10-jump	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod10-node1	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod10-node2	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod10-node3	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod10-node4	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod10-node5	2xE5-2699	64GB	3TB (Sata) 180 (SSD)

Test Tooling:

- OPNFV Iruya Release
- https://wiki.opnfv.org/display/SWREL/Iruya
- OPNFV projects used for testing
  - Yardstick
  - FuncTest
    - Rally
    - Tempest
  - Dovetail

POD 10 Topology



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Infrastructure definition / descriptor files:

- https://github.com/opnfv/airship/tree/master/site/intel-pod15 [Coming Soon]

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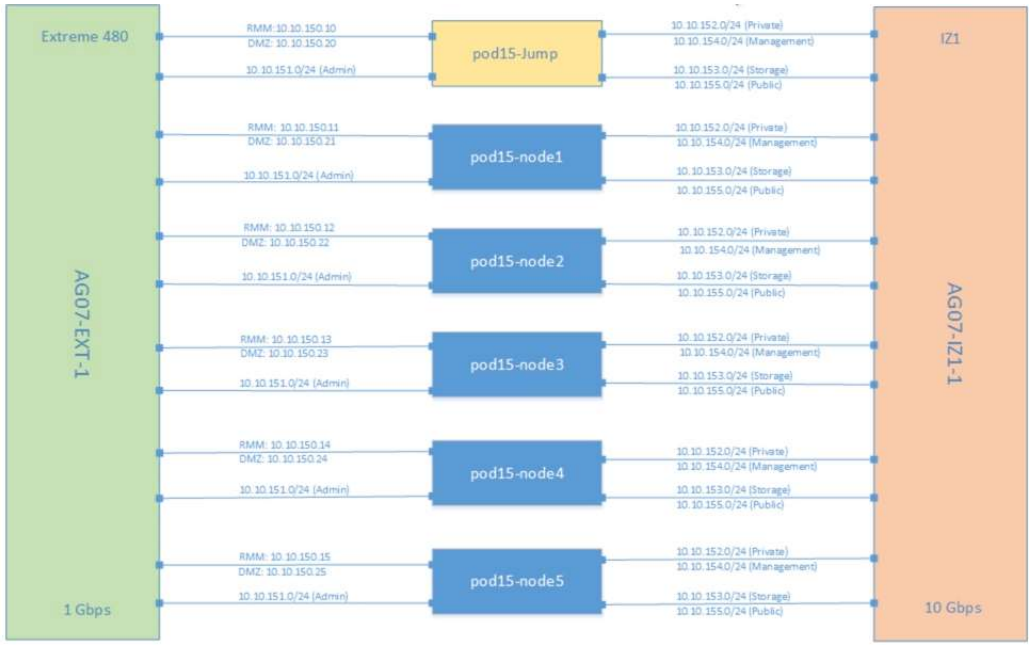
pod15-node3	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod15-node4	2xE5-2699	64GB	3TB (Sata) 180 (SSD)
pod15-node5	2xE5-2699	64GB	3TB (Sata) 180 (SSD)

Test Tooling:

- OPNFV Iruya Release
- https://wiki.opnfv.org/display/SWREL/Iruya
- OPNFV projects used for testing
  - -Yardstick
  - -FuncTest
    - Rally
    - Tempest
  - -Dovetail

POD 15 Topology



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