ONAP open lab – A fully virtual flavor

Ver 0.5

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Purpose of building an open lab

- The primary focus of the ONAP lab is to support the CI/CD of the board approved release use cases
  - Run the release gating test cases
- By having additional lab(s) we may :
  - Provide easy access for all developers in the community
  - Support ONAP demos
  - Support Interoperability testing with multi-vendor's hardware and software in "real" environments
  - Showcase use cases outside the board approved ones

We assume there would be multiple labs (physical and virtual) and multiple usages (CI/CD, Demos, Integration, etc.). The assignment of usages to labs is out of the scope of this document, but the goal is not to limit any possible assignment

Implementation options

- Physical (Will of course use virtualization on top of the lab hardware)
  - Requires dedicated hardware and real estate
    - May come from community member contributions – no CapEx upfront
  - Requires support personnel – Already committed by some community members
  - Has fixed capacity with typically long lead times for expansion
  - Limited SLA – Downtime may occur

- Virtual (cloud hosted)
  - No platform maintenance required (handled by the cloud provider)
  - Elastic capacity
  - Globally accessible
  - “Practice what we preach” – full virtualization
  - Incurred OpEx
  - Well defined SLA

Challenges of a virtual lab

- Cost
  - Annual budget for resource consumption
  - Resource capping (per vendor? Only paying members? Etc.)
- Running vendor VNFs on a public cloud
  - Integration with the cloud platform (CPU, storage and networking)
  - Security and confidentiality – Who is liable in case of data breech that will compromise vendor assets?
  - Integration with cloud platform management (may be different than plain OpenStack)
  - Performance – how to match on premise capacity to cloud offering
- Connectivity to physical hardware

Addressing the challenges

- Cost and capping
  - Virtual lab footprint can be kept minimal during normal times and scaled out when there is higher demand
    - When there is a need for more testing (e.g. prior to a release)
    - When there is an outage in the physical labs
    - To support an event (trade show, developer conference, etc.)
  - Agree on capping policy in the community
    - May require assigning community lab managers that will be responsible for lab scaling
    - Will require a usage tracking tool in order to
      - Allow resource usage to be tracked and capped in order to control capital expanses
      - Perform capacity planning

Repeatability and ease of use

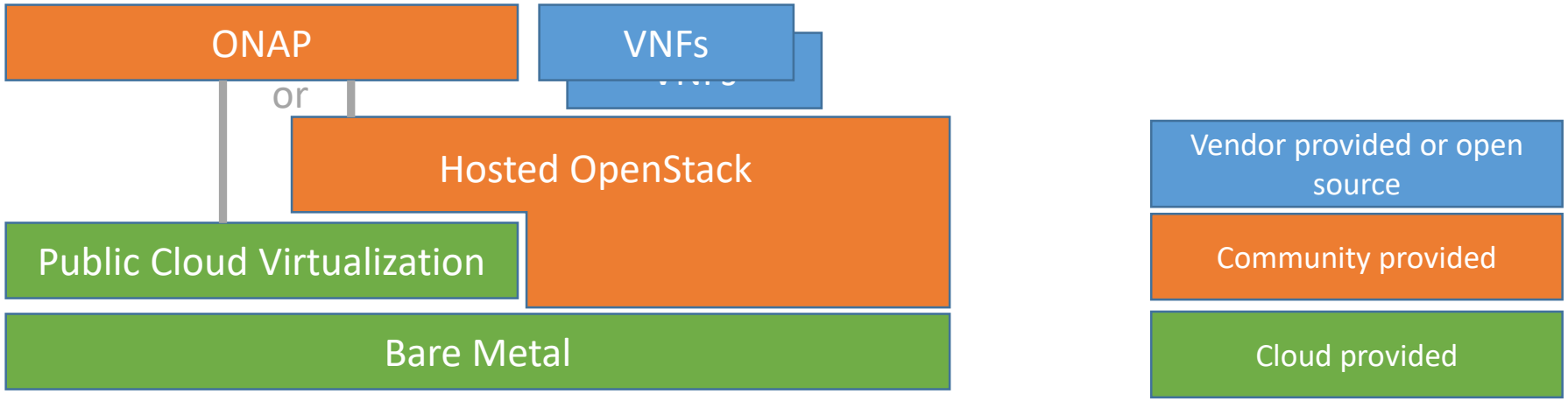
- Repeatability
  - Create lab blueprints, or “packages” that will be reusable and allow scaling out of a virtual lab or creating a new one efficiently
- Ease of use
  - The packages should enable spinning up a lab environment with a click of a button
  - The package should enable easy shutdown and deletion of resources to avoid excessive use of cloud resources
  - ONAP instances will be controlled by the ONAP Operations Manager
- Configuration management
  - The lab should be controlled by a configuration management system to ensure the right versioning, software patches, etc.
- Status tracking
  - There ONAP community should use a resource booking tool to allow for creating maintenance windows and block out times for demos, etc.

Security, licensing, access restriction

- In general, the virtual lab should be treated as any other lab when it comes to public access, security and licensing of VNFs.
  - It just happen to run on hardware provided by a public cloud. Everything on top of the hardware should look similar to the physical labs.
- Access and security
  - Should be restricted to community members and provided through standard mechanisms such as SSH jump servers and remote access VPN servers
  - The lab may provide “free and open to the public” access if required, but the same goes for any other physical lab
- Licensing
  - VNF vendors should provide “lab usage” licenses for their VNFs and are not required to provide licenses for “general public” usage
- Liability
  - There needs to be a clearly assigned responsible entity that will be in charge of running the lab, much like any other, physical lab.

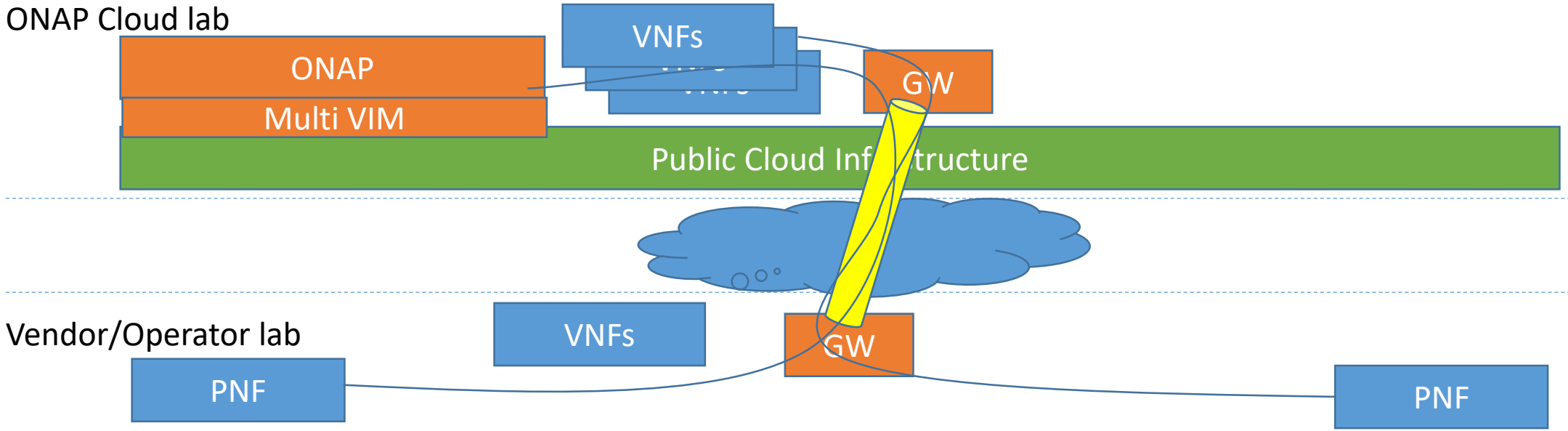
Addressing the challenges

- Running vendor VNF on public cloud
  - Running OpenStack (and later other VIMs) on the public cloud could provide a standard platform.
  - OpenStack may be run on bare metal servers or using nested virtualization (former has better performance, latter higher portability). VMWare may be a challenge (licensing is one).
  - Minimum requirement for the cloud is to support X86
  - ONAP may run directly on public cloud or on hosted OpenStack (ONAP should be OpenStack agnostic)
  - For practical reasons the virtual lab will not be able to host all possible version of OpenStack



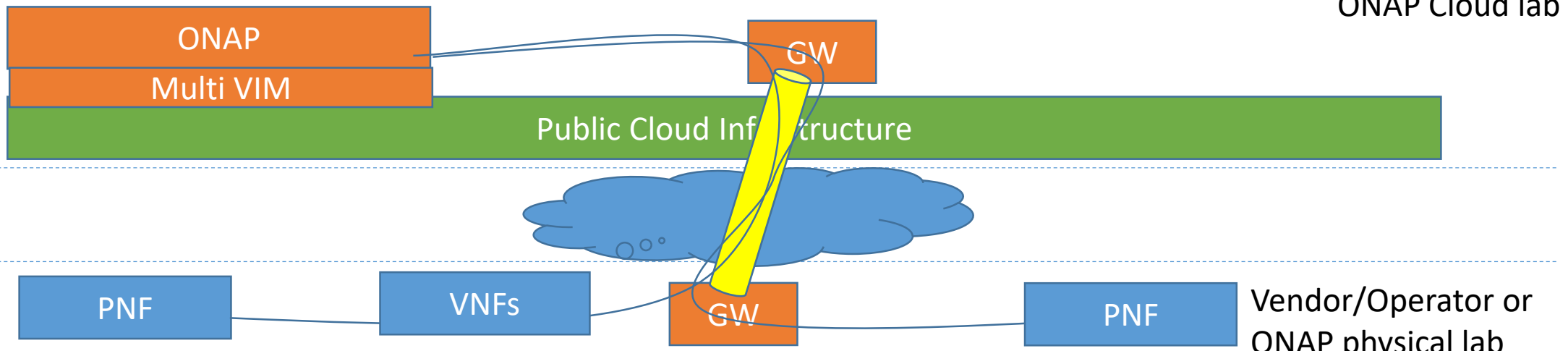
Addressing the challenges

- Connectivity to physical hardware
  - May be solved by using security gateways as part of the lab that will maintain secure tunnels with physical labs of the operators and vendors
  - The tunnels will be used for both VNF-PNF traffic and ONAP-PNF control traffic.
  - Some VNFs may run on the Vendor/Operator lab

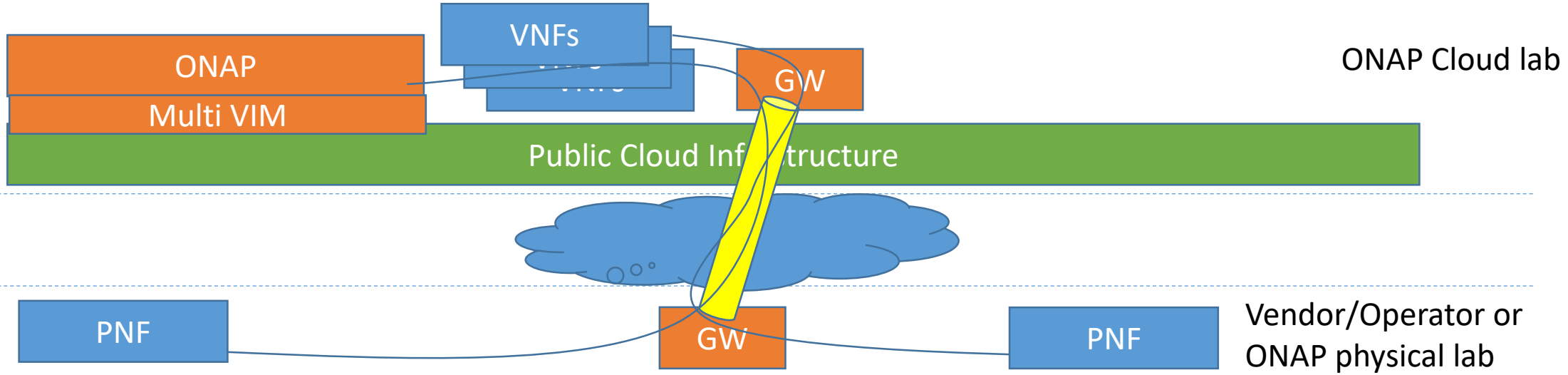


Possible usage scenarios

Scenario 1
ONAP in vLAB, VNFs in pLAB
(This may be easier to accomplish for release 1)

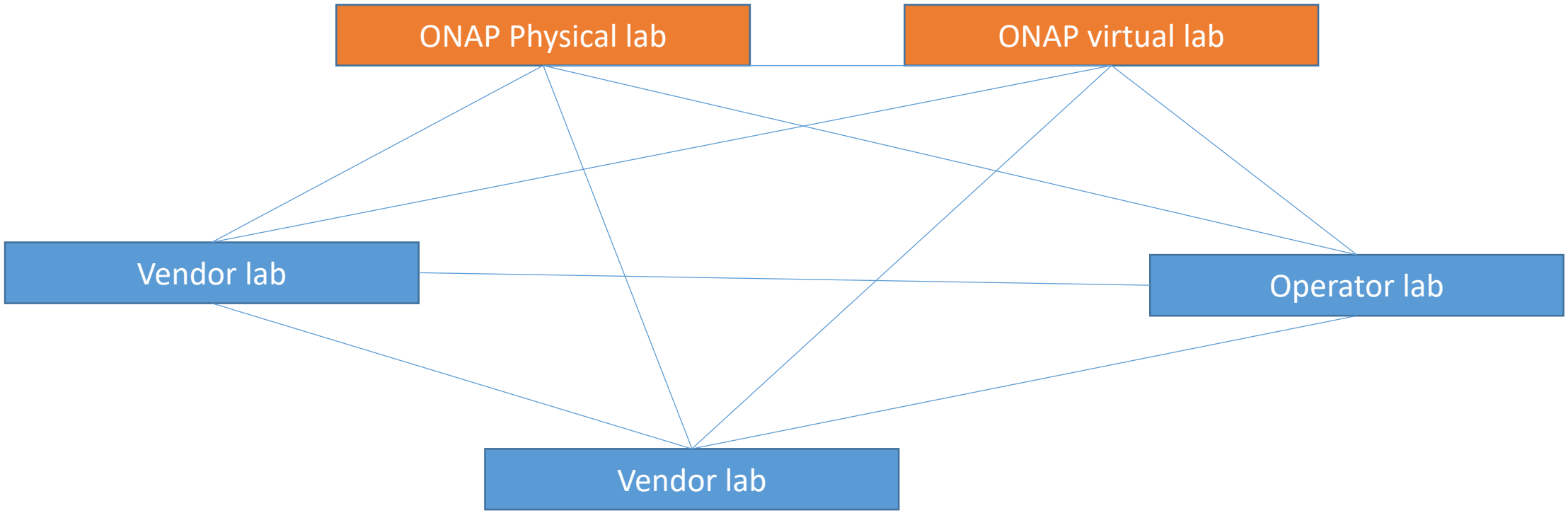


Scenario 2
ONAP and VNFs in vLAB



A mesh of labs

- Why stop at two?



Resource tally sheet

- Based on https://wiki.onap.org/display/DW/Lab+Resource

		Memory	Storage	Network	Qty
Lab					
Jump server	Xeon-E5-2658A 2.2GHz equivalent	256G	2T	2X10G	1
Security GW	Xeon-E5-2658A 2.2GHz equivalent	256G	100G	2X10G	2
ONAP					
ONAP	Xeon-E5-2658A 2.2GHz equivalent	256G	2T	2X10G	3
OpenStack					
Controllers	Xeon-E5-2658A 2.2GHz equivalent	256G	2T	2X10G	2
Compute	Xeon-E5-2658A 2.2GHz equivalent	256G	2T	2X10G	3

Public cloud requirements

- X86 based platform (e.g. not ARM, etc.) – The majority of VNFs are only certified to run on X86
- Support for running KVM virtualization and OpenStack VIM
  - Advantage for bare-metal option as it will avoid the need for nested virtualization
- Support for overlay secure tunnels between VMs in the cloud and physical labs
  - E.g. IPSec or SSL
- Compute, storage and networking resources as specified in the previous slide
- SLA – A committed reliability/resiliency of the provided cloud resources
- Usage tracking tool
- <More requirements to follow based on use case analysis>

Summary and next steps

- We identified several usages (CI/CD, integration, development, etc.) for a virtual lab
- We identified several scenarios (local VNFs, remote VNFs, etc.)
- Release 1 scope may be limited and with probably be focused on the scenario where VNFs are in a remote lab and only ONAP is running in a virtual lab.
- Next steps would involve:
  - finalizing the exact requirements – This can only happen once the detailed use cases are agreed upon
  - Approaching cloud providers with a request for proposal that will include the requirements
  - Approving the virtual lab proposal

ONAP
OPEN NETWORK AUTOMATION PLATFORM

Backup (for future use)

Cost assessment

- Annual cost estimate

	Minimum (steady state)	Max (burst)
Compute		
Network		
Storage		
Personnel		
???		
Total		