Building container-based NFV solutions with OPNFV, ONAP and VPP on Arm platform

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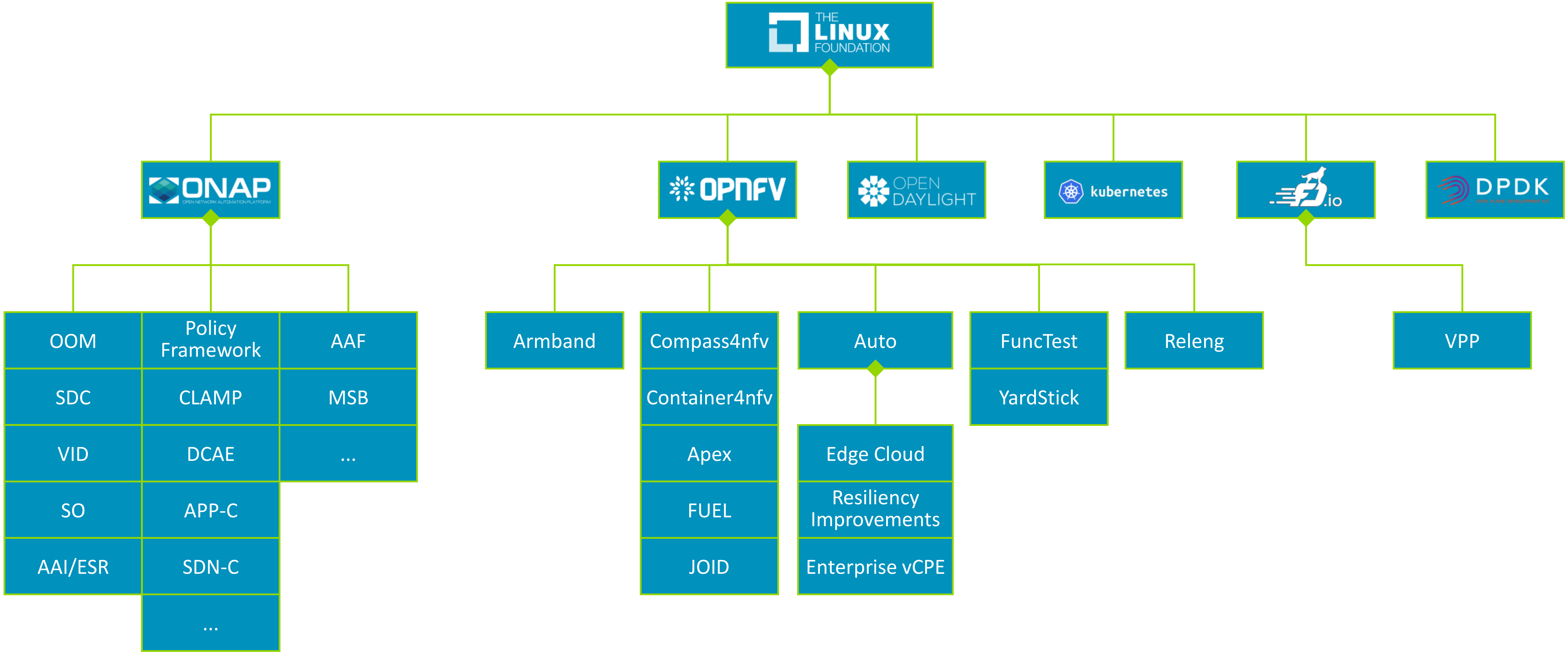
Agenda

- Background
- Project Auto
- Compass4nfv on Arm
- Container4nfv on Arm
- OPNFV CI/CD for Arm
- VPP and Auto on Arm

Background

Linux Foundation Projects



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OPNFV Projects with Arm

Armband

- The purpose of this project is simply to integrate and test all aspects of OPNFV releases on ARM-based servers.

Yardstick

- A test framework with test cases and test stimuli to enable NFV-I performance verification

Auto

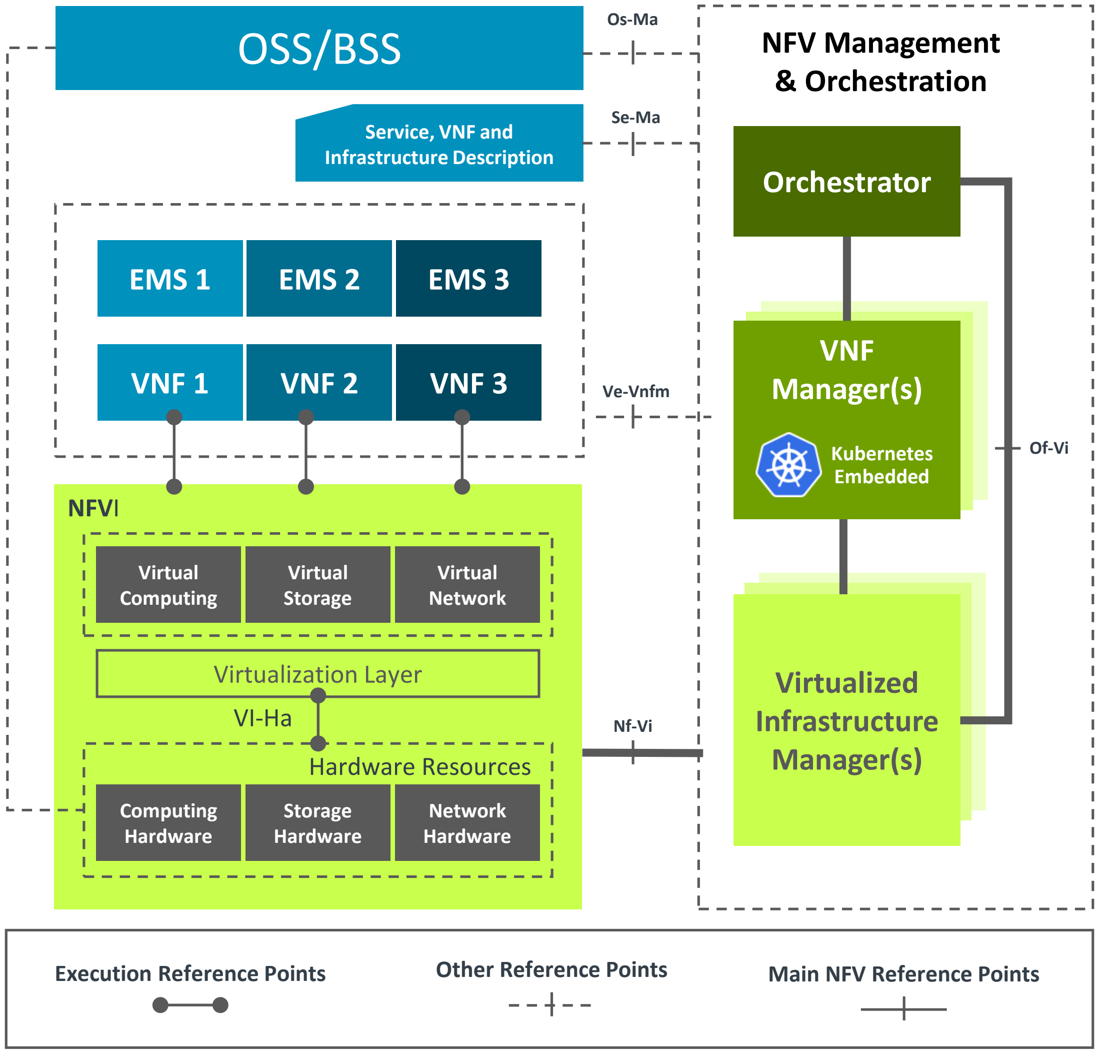
- This project focuses on ONAP component integration and verification with OPNFV reference platforms/scenarios

Compass4nfv

- An installer project based on open source project Compass, which provides automated deployment and management of OpenStack and other distributed systems
- Ansible is used by default.
- Our main installer for OPNFV Container4NFV project

Container4NFV

- Provide a container full-stack environment where VNF can run, including data plane VNF and control plane VNF. Let the platform support container and virtualization technology. Collect requirement for containerized NFVs.
- Previously named as OpenRetriever
- What are we focusing on for building Arm's containerized NFV infrastructure now



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Project Auto

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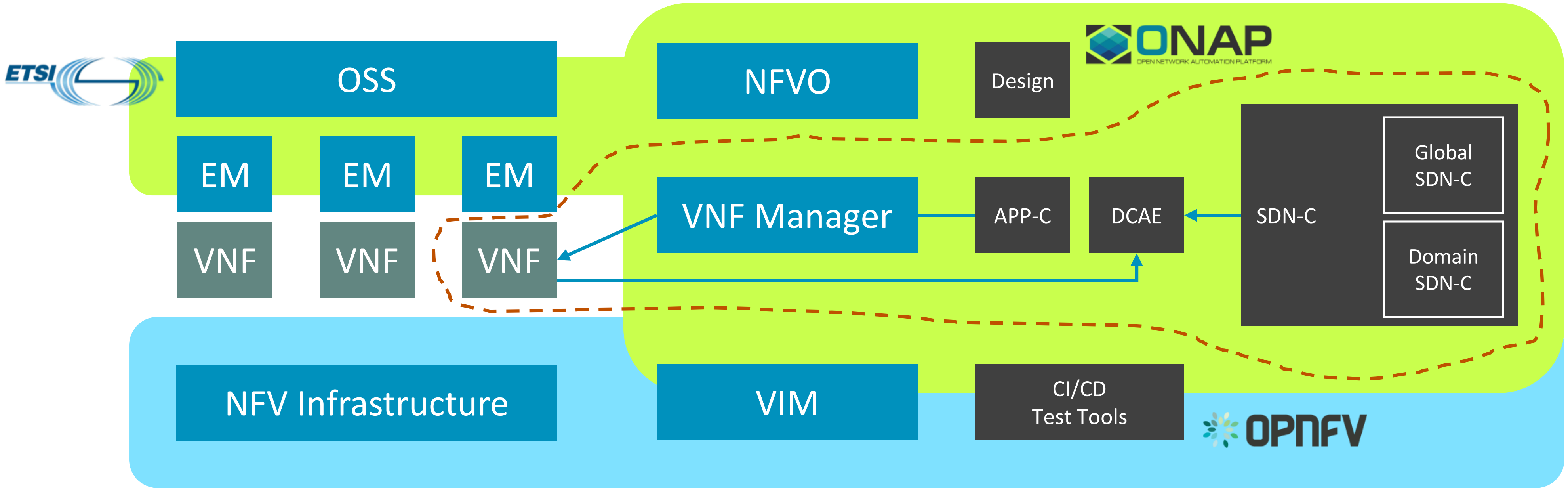
OPNFV Project Auto

This project focuses on **ONAP component integration and verification with OPNFV reference platforms/scenarios**, through primarily a post-install process in order to avoid impact to OPNFV installer projects。

Related Project Opera：developing OPNFV-installer supported scenarios that can deploy and verify ONAP as a whole.



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Auto (ONAP-Automated OPNFV)

Validate ONAP (Open Network Automation Platform) as NFV Orchestrator and VNF Manager in OPNFV ecosystem; Auto project home page

Show added value of:

- Automation using closed loops (defined in CLAMP), policies (defined in Policy Framework), and DCAE (real-time monitoring, execution of closed loops and policies; also alarm correlation)
- Design-time portal-based (as well as API-based control) streamlined VNF lifecycle management: Onboarding (with SDC, to define VSPs with VLMs, and end-to-end Services), Deployment (with VID and MSO), and Operations (with persistent inventory data in AAI)

CLAMP	Closed-Loop Automation Management Platform
DCAE	Data Collection Analytics and Events

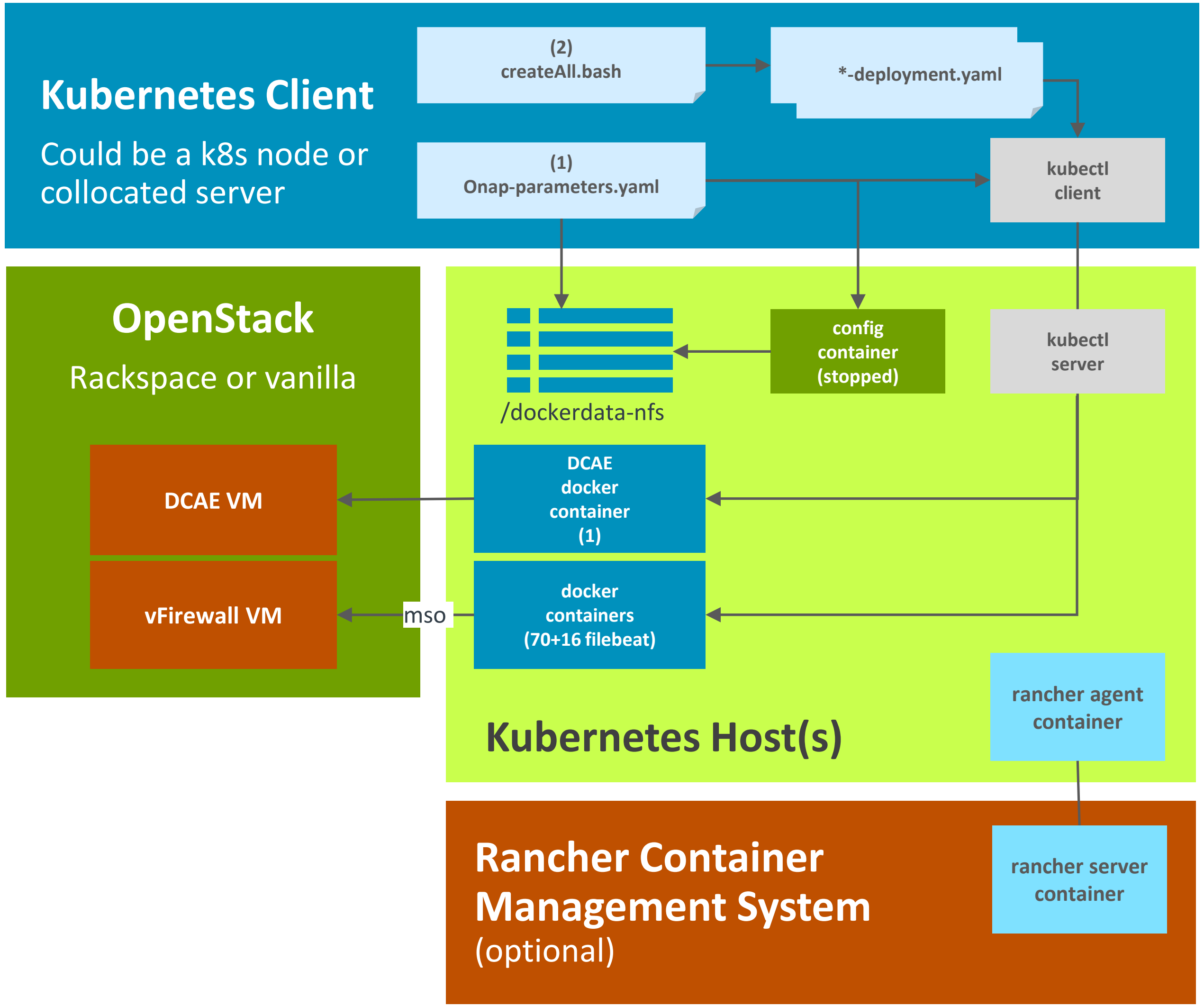
SDC	Service Design and Creation
VSP	Vendor Software Product
VLM	Vendor License Model
VID	Virtual Infrastructure Deployment
MSO	Master Service Orchestration
AAI	Active and Available Inventory

Auto (ONAP-Automated OPNFV) Use Cases

Three specific use cases for Auto:

1. **Edge Cloud** - autonomy of Edge Cloud management
   - Autonomy enabled by systematic catalog-based VNF deployment through SDC/VID/MSO, automated monitoring and management through MSO, DCAE, CLAMP, Policies, and an array of controllers
2. **Resilience** - improvements through ONAP
   - Failure recovery time reduction with ONAP, thanks to automated monitoring and management
3. **Enterprise vCPE** - ensure high performance, enterprise-grade vCPEs in Edge Cloud)
   - Rely on enterprise-grade vCPE VNFs, properly onboarded (tested, certified, approved: multiple Roles in onboarding process), and properly monitored and managed for performance assurance (SLAs and High Availability: redundancy, recovery)

Auto ONAP on Kubernetes Architecture



Auto (ONAP-Automated OPNFV) Status

OOM	ONAP Operations Manager

Test cases:

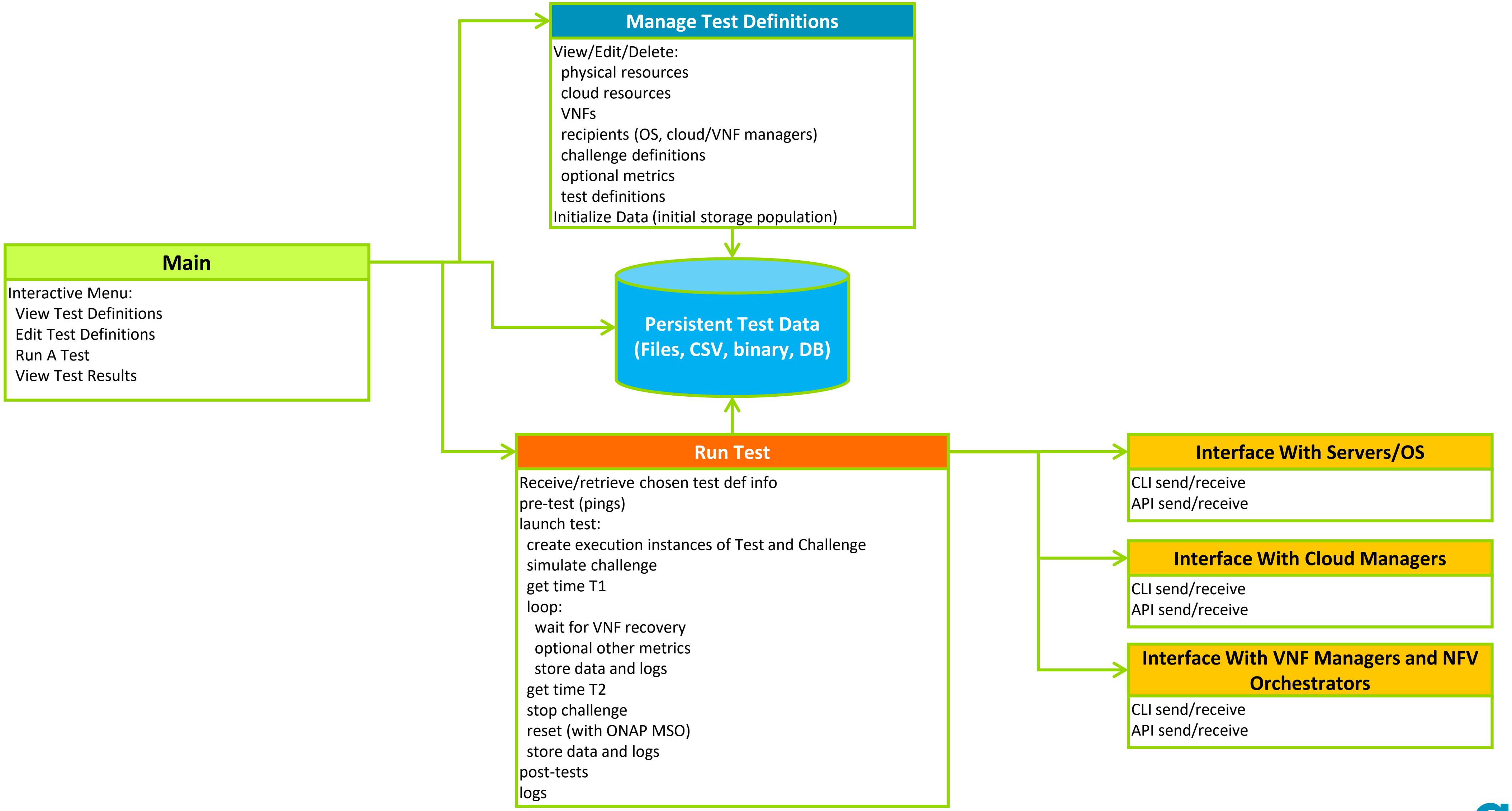
- Top-down definition (methodology like FuncTest)
- For initial Auto project purposes, test environment may not need to be as complete and systematic as YardStick, FuncTest, or Robot; later, alignment with FuncTest and YardStick will be sought
- Script development environment target: Python3, maximize similarity between 3 use cases

Dependency on DCAE, deployment on K8S (hopefully from OOM, for ONAP Beijing release, end March 2018; external dependency: containerized Cloudify)

Infrastructure deployment: two CPU architectures (x86 and Arm)

- 2 pods (6 physical servers each, one x86, one Arm) at UNH IOL (University New Hampshire, Interoperability Lab)
- x86 pod: ONAP on Kubernetes on Bare Metal; no DCAE yet;
- Arm pod: target is ONAP on Kubernetes on OpenStack VMs; also no DCAE yet;
- installation tools:
  - x86: (TBC)
  - Arm: MCP for OpenStack, new tests for K8S (existing methods don't work)
- Note: goal is to have ONAP on Kubernetes in both pods

UC2 Resilience Improvements: Module Design



Auto (ONAP-Automated OPNFV): VNFs in scope

	x86 pod					Arm pod				
VNF	onboarded	deployed	used in UC1	used in UC2	used in UC3	onboarded	deployed	used in UC1	used in UC2	used in UC3
vFW	y	n	n	n	n	n	n	n	n	n
vLB	y	n	n	n	n	n	n	n	n	n
vCPE	n	n	n	n	n	n	n	n	n	n

vFW = virtual Firewall
vLB = virtual Load Balancer
vCPE = virtual CPE (Customer-Premise Equipment)
Future = focus on more Edge Cloud VNFs; explore vIMS (ClearWater)

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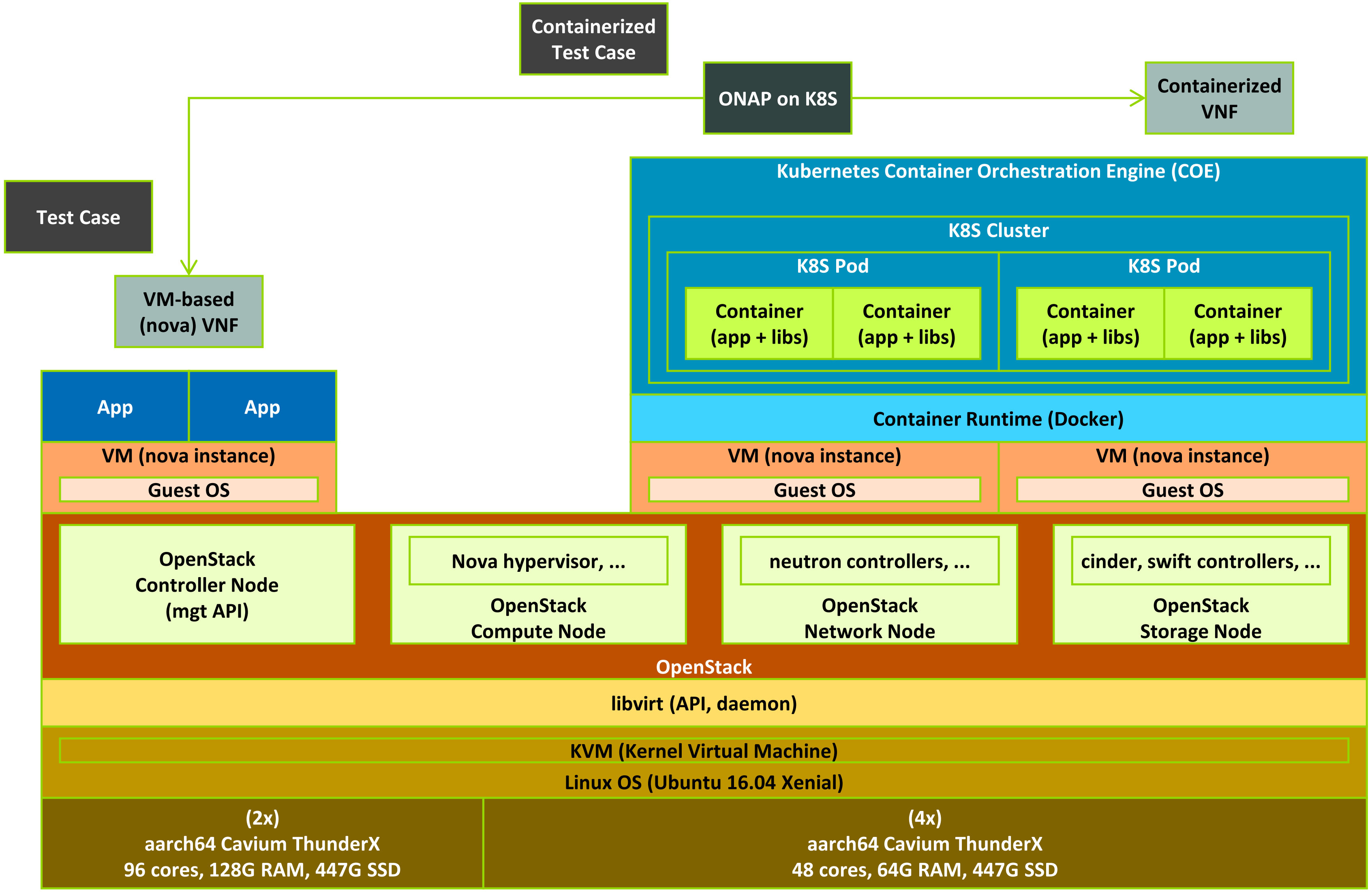
ONAP Installation Target on Arm Pod: ONAP/K8S/VM



Compass4NFV on Arm

Compass4nfv for Kubernetes – Now Arm Installer Support

Compass4NFV on Arm (Yibo Cai, Di Xu):

What We Have Done:

Ported Compass4NFV docker images for AArch64 and uploaded to dockerhub Linaro repo.

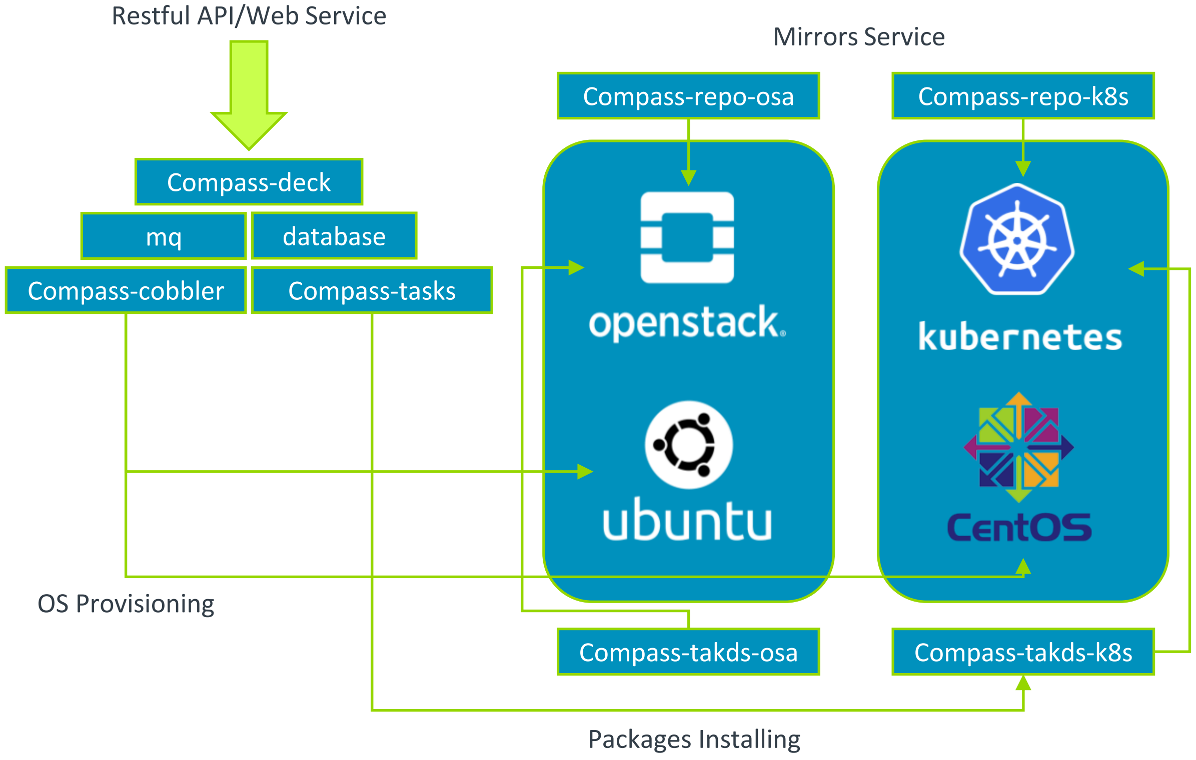
- Compass-tasks-k8s
- Compass-deck
- Compass-mq
- Compass-cobbler
- Compass-db

Supported AArch64 bare metal deployment (CentOS7)

Supported deploying Kubernetes cluster on AArch64 virtual and bare-metal nodes.

Our ‘F’ release scenarios for Container4NFV would be based on the work in Compass4NFV

Compass4NFV repo



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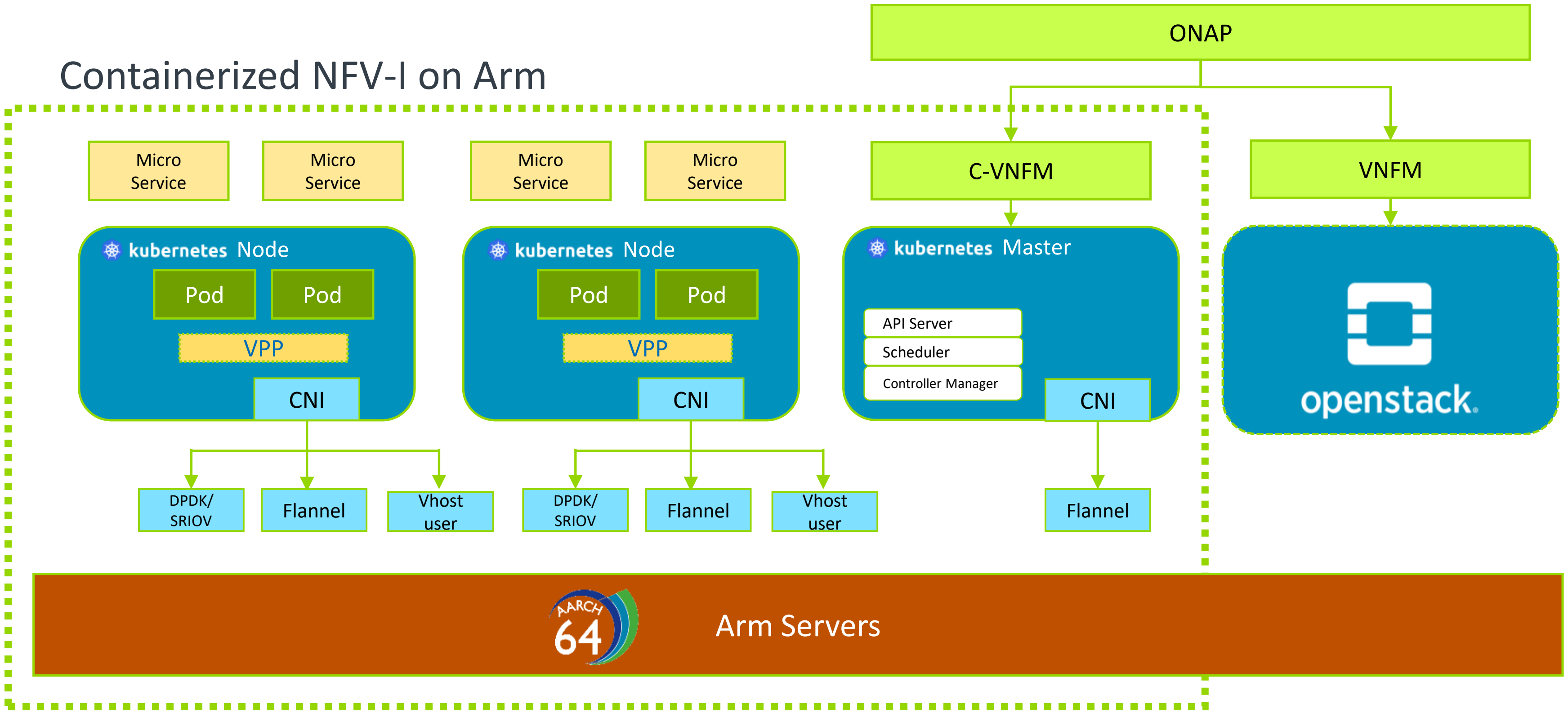
Container4NFV on Arm

Container-based NFV Ecosystem on Arm



ONAP supports multiple VNF environments by integrating with multiple VIMs, VNFMs, SDN Controllers, and even legacy equipment

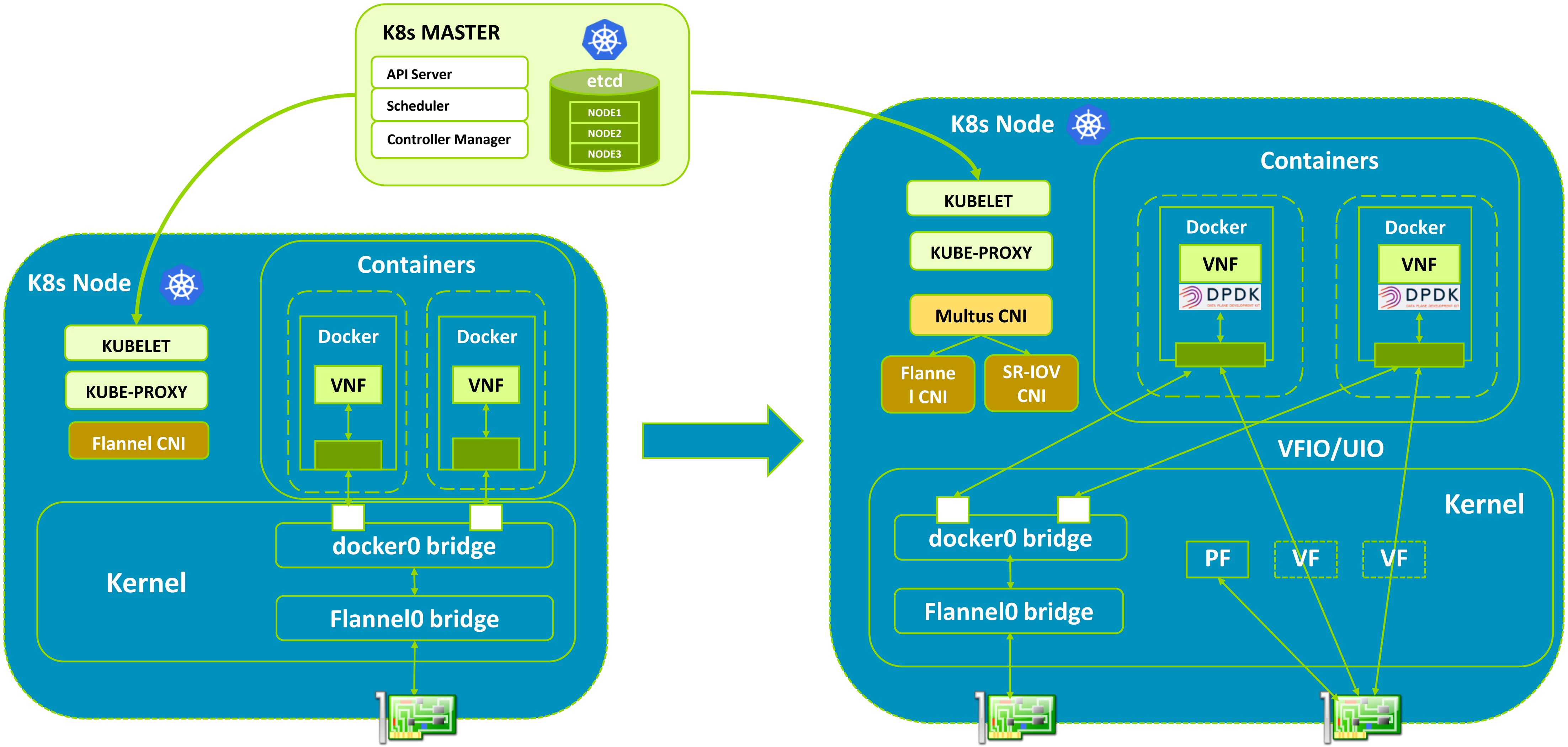
Kubernetes as COE

Multus plugin for Kubernetes as CNI

Flannel/DPDK/Vhost user CNI plugins integrated

Ref: https://wiki.opnfv.org/pages/viewpage.action?spaceKey=OpenRetriever&title=Container%27s+Architecture+for+Cloud+Native+NFV

Container Networking Acceleration with DPDK



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VPP and Auto on Arm

Linking VPP and Auto for Arm architecture

VPP data-plane optimized VNFs (FD.io, DPDK), validated for Arm architecture

The VPP-optimized VNFs are containerized (Kubernetes/Docker)

The VPP-optimized VNFs can be managed by ONAP (onboarded and deployed as end-to-end Services)

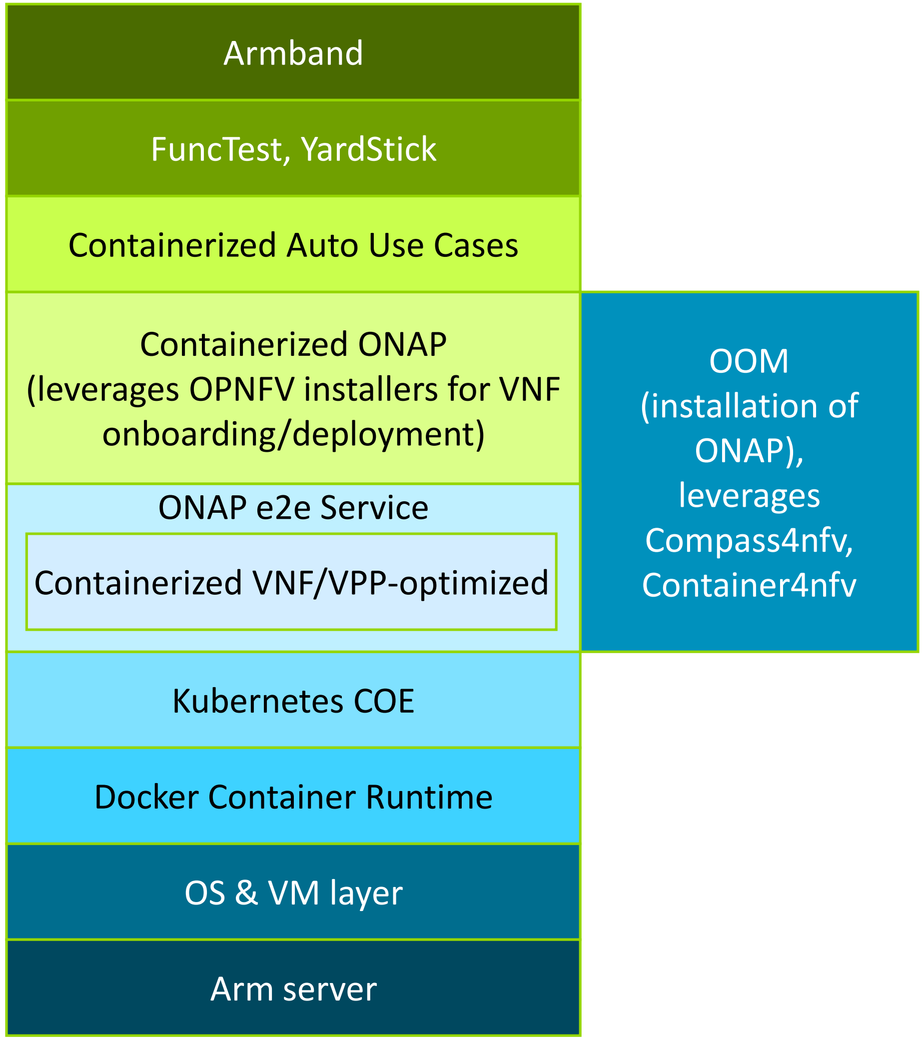
ONAP itself (each component: SDC, CLAMP, DCAE, etc.) is also containerized and validated for Arm architecture

ONAP installer (OOM) and ONAP components leverage OPNFV installers such as Compass4nfv and Container4nfv

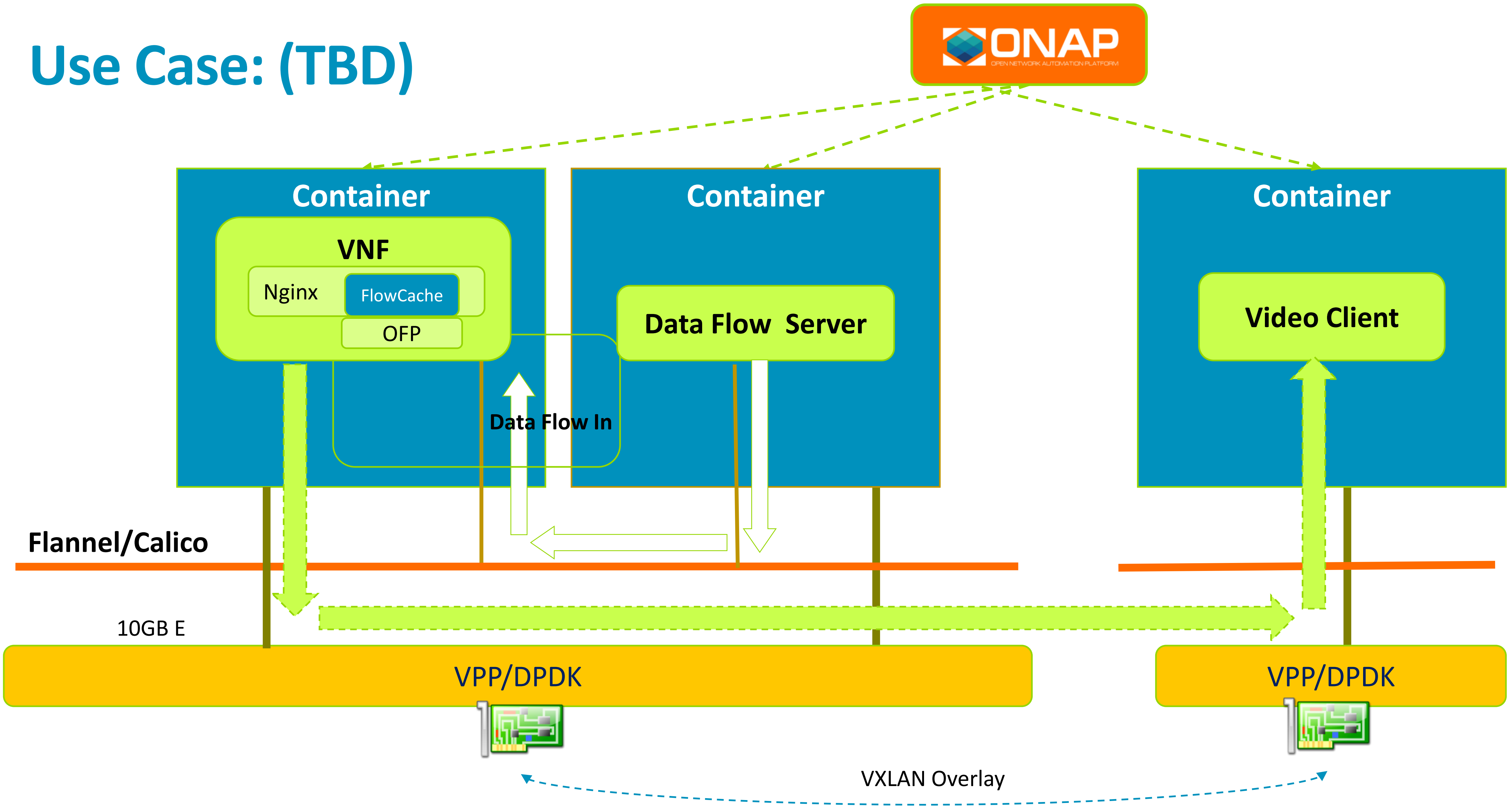
Auto use cases (current three, and future) will be tested on these VPP-optimized VNFs

Auto use cases will eventually align with OPNFV test frameworks (FuncTest, YardStick)

overall governance of Test-Frameworks/Auto-tests/ONAP/VPP-optimized-VNFs on Arm architecture: Armband



Use Case: (TBD)



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Thank You!
Danke!
Merci!
谢谢!
ありがとう!
Gracias!
Kiitos!
감사합니다
धन्यवाद