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Common NFVI Telco Taskforce

Intel RI-2 and RC-2 Contribution Proposal – Kubernetes Networking

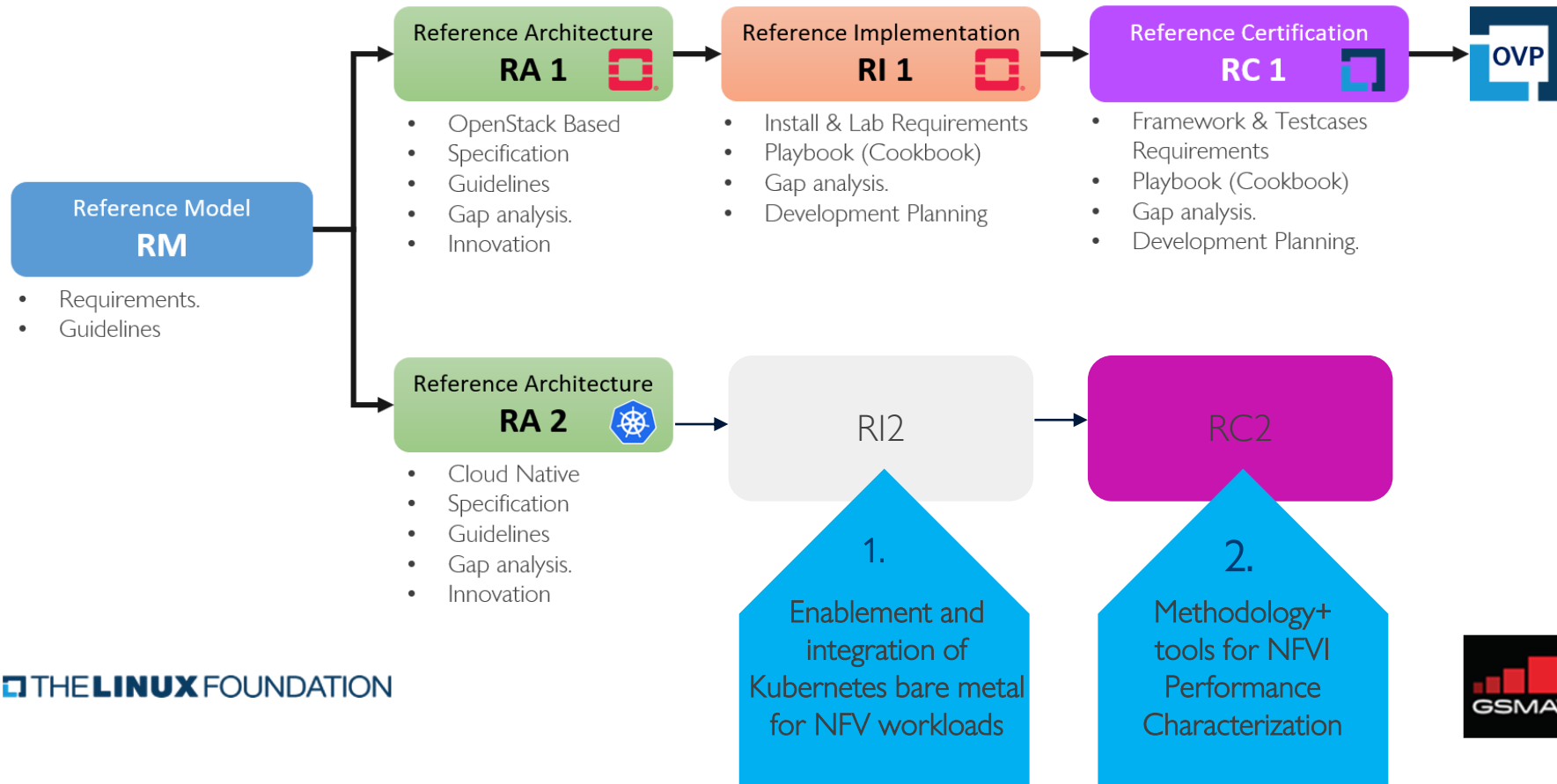
March 31st, 2020

 THE **LINUX** FOUNDATION


































Contribution Proposal Areas

CNTT | Current Specs



Intel work on Kubernetes networking

TECHNOLOGY GAPS IN	ADDRESSED BY		https://networkbuilders.intel.com/network-technologies/container-experience-kits
K8s NETWORKING 	Multiple Network for CNF 		Open Source: CNI plug-in – V3.3 Mar '19 NSM - Prototype stage, open source TBD
PACKET PROCESSING 	High Performance E-W 	 	Open Source: Userspace CNI – V1.1 Aug'18
	High Performance N-S 	  	Open Source: SR-IOV CNI plugin v2.1 Jun'19, Release: v3.0 Mar'19
	scalable , Portable N-S 	 	Prototype stage, open source TBD
	HA Networking 	 	Open Source: CNI plug-in – v1.0 Dec '17
RESOURCE MANAGEMENT (ENHANCED PLATFORM AWARENESS) 	Platform discovery 	Node Feature Discovery (Intel® AVX; SR-IOV; etc.)	Upstream K8s: K8s SIG Mar '19, v 0.4.0 May'19
	CPU pinning/isolation 	CPU Manager for Kubernetes (CMK) CPU Manager (Native K8s)	CMK Open Source: CMK v1.3 Sept'18, v2 Dec '19 CPU Mgr.: Proposal to SIG node – Mar '20
	Dynamic Huge Page 	Native Huge page support for K8s	Upstream K8s: Beta - v1.10 Dec '17
	Manage Devices 	Device Plugins(SR-IOV with DDP, QAT, FPGA, GPU, AF-XDP)	Open Source: SR-IOV v3.0.0 June '19, SR-IOV w DDP Mar'20; QAT v1.0 Aug'18; FPGA & GPU May '18, AF-XDP TBD
	Set NUMA Alignment 	Topology Manager (NUMA)	Upstream K8s: Alpha - v1.16 Sept '19
TELEMETRY 	Scheduling per Telemetry 	Telemetry Aware Scheduling	Open Source: v1.0 Nov'19
EASE OF DEPLOYMENT 	Deployment Playbook 	  	Open Source: Jan'20 (k8s 1.13, 1.14, 1.15 & 1.16)

Kubernetes Networking - RI-2 Alignment

- › RI-2 workstream is analyzing RA-2 to drive requirements - propose parallel hands-on activity to accelerate RI-2
 - Help identify gaps and improve RI-2 specifications by testing deployment configurations and features
 - Support with Intel OPNFV Community Lab (2 dedicated sand box environments i.e. 12 servers)
- › Kubernetes Networking + bare metal reference includes many capabilities specified in RA-2, for example
 - CNI plugins: Multus for multiple network interfaces; User-space plugin for OVS-DPDK, VPP; SR-IOV plugin
 - Device Plugin Framework with device plugins: QuickAssist crypto acceleration, FPGA accelerators, GPU accelerators
 - Performance optimization features: CPU core pinning with CPU manager for Kubernetes (CMK), Huge page support (K8s v1.8), NUMA support
 - Hardware capability discovery: Node feature discovery (NFD)
- › Hardware and Software Profiles
 - Plan to map hardware skus/platforms to Reference Model defined profiles and demonstrate commercial feasibility of profiles
 - Platform BIOS optimizations for network and compute intensive use-cases
- › Installer and SW components
 - RI-2 installer requirements are WIP – provide gap analysis c.f. Ansible (node config), Helm (package manager), Kubespray (K8s HA cluster, networking, plugins)
 - Need analysis of dependencies for upgrades of current Host OS (kernel v3.10) and Kubernetes (v1.13)

Appendix