ERICSSON

Virtual EPG Requirements on the Cloud System

OPERATION INSTRUCTIONS

71/1543-AXB 250 12-V3 Uen AA

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1 Introduction

This document gives an overview of requirements on cloud systems for EPG deployment. The virtual EPG implements the same functions as the physical EPG. However, instead of executing the EPG SW on specific Ericsson HW, the EPG SW is executed on several Virtual Machines (VMs). The VMs are deployed in a cloud system based on Ericsson or third-party Commercial Off-The-Shelf (COTS) HW.

1.1 Scope

This document covers high-level description of the requirements on the cloud system in which the virtual EPG is deployed and executed.

This document does not cover the description of specific full solutions where the cloud system can consist of Ericsson Cloud Manager (ECM), Ericsson Cloud Execution Environment (CEE), and reference HW configurations.

Note: Hardware requirements are traffic model and deployment specific. Proper dimensioning is always required.

1.2 Target Groups

This document is intended as background to EPG deployment for system integration and planning engineers. It assumes a basic knowledge of datacom, telecom, and cloud computing.

2 Virtual EPG Requirements on the Cloud System

This section describes the virtual EPG requirements on the following cloud system components:

— The cloud management system

— The cloud infrastructure

— The compute host hardware

Deviations from the requirements described in this section can have impact on the virtual EPG telecom characteristics and can risk both performance and robustness. Deviation from the requirements can require system integration to fill any design gaps.

2.1 Requirements on the Cloud Management System

The virtual EPG has the following requirements on the cloud management system:

— VM affinity and anti-affinity or Availability Zone (AZ) or a solution to control the VM placement on the physical compute hosts.

— Pre-define the vNIC MAC address.

— OpenStack configuration drive using ISO 9660 file system for injection of configuration data is recommended.

— Restart of failing VMs or hosts.

— VLAN awareness when service chaining is used and service functions use VLANs. EPG sends and receives VLAN tagged frames over its vNIC.

The requirements on the cloud management system are supported by the ECM and the Ericsson CEE.

2.2 Requirements on the Cloud Infrastructure

The cloud infrastructure consists of the following three components:

— Compute

— Networking

— Storage

The following sections describe the virtual EPG requirements on the cloud infrastructure.

2.2.1 Compute

The virtual EPG has the following requirements on the compute:

— Cloud service model: IaaS

— Deployment unit: VM

— Hypervisors: KVM and ESXi may be used. For other hypervisors, integration activities may be required.

— The cloud infrastructure must not overcommit CPU, memory, or disk resources.

— It is recommended to realize the logical vCPUs as hyperthreads.

The requirements on the compute are supported by Ericsson CEE.

2.2.2 Networking

This section describes the virtual EPG requirements on the networking.

Page 4 describes the VM vNIC requirements for OpenStack and VMware.

Table 1 VM vNIC Requirements

Cloud Infrastructure	Required VM vNIC Ethernet Adapter Type
OpenStack	VIRTIO
VMware	VMXNet3

For other Ethernet adapter types, integration activities may be required.

The virtual EPG also has the following requirements on the networking:

— Minimum number of vNICs per VM:

  - Virtual Route Processor (vRP): 6
  - Virtual Service-Forwarder (vSFO): 5

— L2 virtual networks must be supported.

  - The cloud infrastructure must allow the VM to send IP packets with arbitrary IP addresses managed internally by the virtual EPG, for example, IP service addresses.

  - The cloud system must forward VM traffic based on the MAC address with preserved Ethernet header.
  - The cloud system must support L2 broadcast VM traffic.

— It must be possible to pre-define the vNIC MAC address through the cloud management system.

— The cloud infrastructure must support duplicate MAC addresses belonging to different virtual networks.

— The cloud infrastructure must provide physical Ethernet link redundancy for each physical NIC.

The virtual EPG has the following networking recommendations:

— Recommended maximum link fail over time in the cloud infrastructure is 0.2 seconds

— To avoid bottlenecks and reduced throughput reduced for OpenStack, disable port security.

If service chaining is used, it requires at least one more vNIC to access service functions. For more information, refer to Service Chaining.

2.2.2.1 MTU Requirements

The following rules and recommendations apply for the MTU size in different virtual EPG networks:

— External Networks: The recommended MTU size between the virtual EPG and the gateway is 1900 bytes to avoid performance penalties because of fragmentation.

— Internal Networks: The MTU size between VMs in the virtual EPG is required to be at least 2000 bytes. The MTU size is also required to be at least 100 bytes larger than the MTU size on the external networks.

— The maximum MTU size supported on any network is 2900 bytes.

2.2.2.2 NIC Requirements

Table 2 describes the NIC requirements for Virtual Routing Engine (VRE) standard networking.

Table 2 NIC Requirements for VRE Standard Networking

I/O Virtualization Modes	NIC Hardware Model	Reference
SR-IOV- VLAN	Intel XL710 (Dual port 40G, Fortville)	For more information on SR-IOV, refer to Virtual EPG External Network Connectivity Configuration.
	Intel X520 (Dual port 10G, Niantic 82599)	
	Intel XXV710 (Dual port 25G, Fortville)	
SR-IOV- Flat	Intel X520 (Dual port 10G, Niantic 82599)	

Note: The virtual EPG does not have any NIC requirements for the VIRTIO I/O virtualization mode.

Page 6 describes the NIC requirements for user plane optimization networking (Direct I/O).

Table 3 NIC Requirements for User Plane Optimization Networking (Direct I/O)

I/O Virtualization Modes	NIC Hardware Model	Reference
PCI Passthrough	Intel XL710 (Dual port 40G, Fortville)	For more information, refer to User Plane Optimization.

Note: Service chaining using Direct I/O can alternatively use paravirtualized NIC. For more information, refer to Service Chaining.

2.2.2.3 VMware Network Requirements

Table 4 shows the VMware network requirements.

Table 4 VMware Network Requirements

VMware Network	Mode
	Promiscous Mode
• BP-1 • BP-2 • DBG • MATE • VFAB • MGMT	Accept

VMware Network	Mode
	Promiscous Mode
SC-X	Reject
External Networks	Reject

2.2.3 Storage

The virtual EPG has the following requirements on the storage:

— VM virtual disk controller:

  • KVM: VirtIO

  • ESXi: IDE

— Local compute host storage is supported and has the following requirements:

  • Minimum 100-MB/s block read and write per host.

  • Maximum 1000-ms access latency for reads and writes.

  • One of the following storage devices:

    — Hard Disk Drive (HDD) or Redundant Array of Independent Disks (RAID) assembly with minimum sustained 100 Inputs/Outputs per Second (IOPS) at 4K random reads and writes. The HDD or RAID assembly needs to be behind a caching RAID controller. The RAID cache needs to be at least 1GB of non-volatile or battery backed cache in write-back mode.

    — Solid State Drive (SSD) with 1000 IOPS (It does not need to be behind a caching RAID controller).

— Storage Area Network (SAN) is supported and requires equivalent performance as the local compute host storage.

— Support for read-write ratio of approximately 50%.

— Storage redundancy is not needed since the virtual EPG replicates data between the VMs. However, the disk failures should not affect more VMs than the virtual EPG can tolerate. For information on redundancy, refer to Resilience.

2.3 Requirements on Compute Host Hardware

EPG supports any host where the VMs can be deployed without overcommit on the CPU, RAM, or disk. For more information, refer to Deploying Virtual EPG.

The number of physical CPU cores, amount of RAM, and the disk space that must be reserved for other compute host resources depend on the cloud system.