



NFV Director Environment Sizing Guide

December 2014



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Objectives

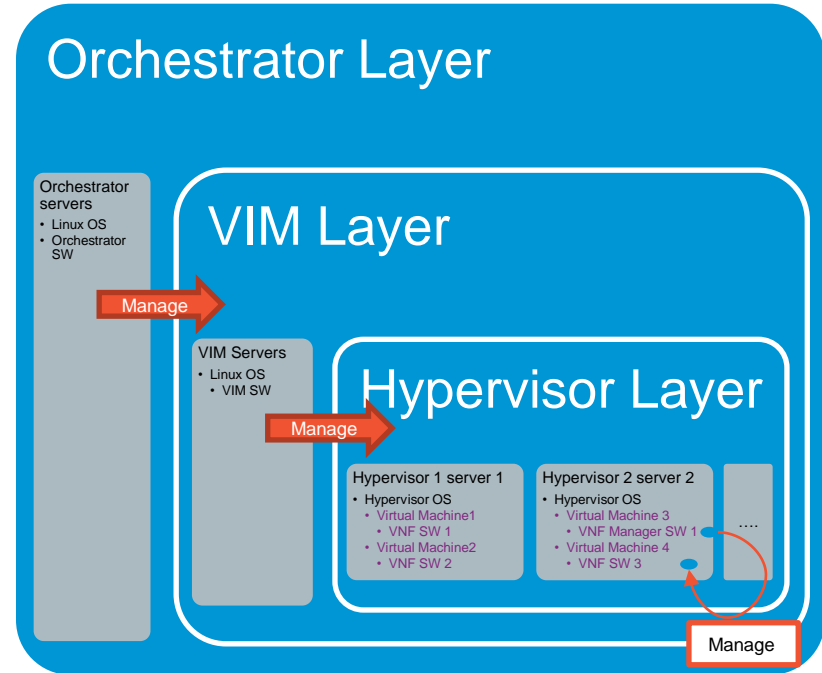
Physical server or
dedicated hypervisor

Virtual Machine inside
an hypervisor

What this document address

- Provide some understanding of what you need to set up an environment to demonstrate VNF
- Provide some options (not exhaustive) of how to set up the demo environment and production environment

All suggestions here with the exception of the NFV director are just indications and need to be validated with the VNF vendors and the VIM provider



Things to consider

Bottom up

1. Hardware

1. Hardware is always needed from Laptop to a bunch of servers and enclosures

2. Hypervisor

1. For each host you need and hypervisor (typically VMware or KVM)
 1. E.g. Typically 1 server per hypervisor

3. VIM

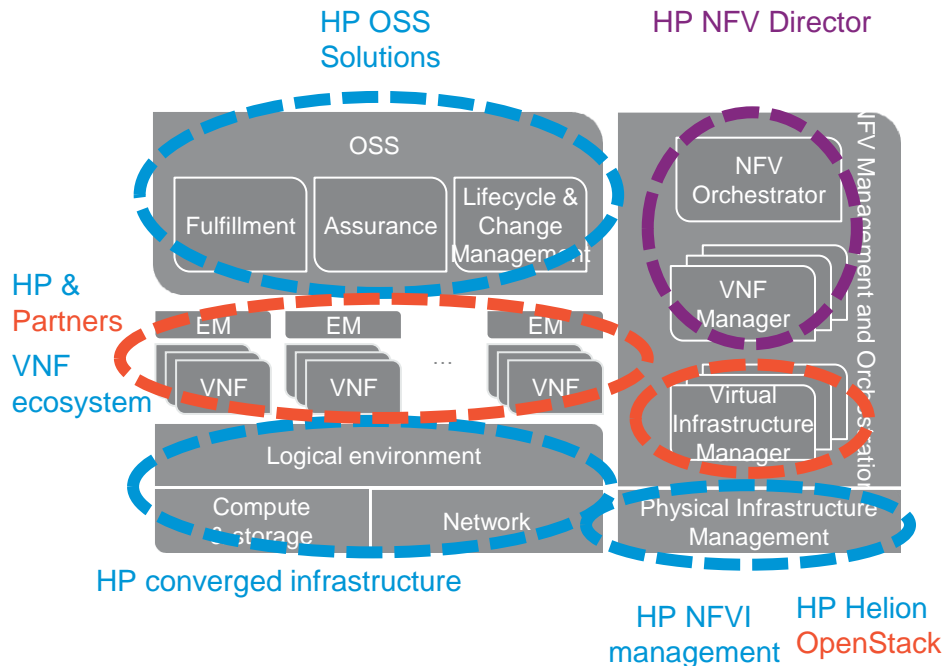
1. To manage the different hypervisors, is typically a Virtual Infrastructure manager is required.
 1. E.g. From 1 server to 10 servers to host the VIM

4. VNFM

1. Most advanced VNFM are virtual machines and can run inside the infrastructure managed by the VIM, a few need a dedicated physical host

5. Orchestrator

1. Orchestrator manages the VNF Managers, the VIMs and the Isolated hypervisors
2. From 1 Virtual machine to several physical host in cluster



High level Hardware sizing

As high level guidelines the following document shows recommendations of the HW for different scenarios

- Minimal demo set up
- POC small size
- POC medium size
- Lab for Multi VNF demonstrations
- Basic production set up for NFVD
- Example for production for NFVD

Minimal demo set up

- How to perform a minimal demo

POC small size

- Set up for small environment

POC medium size

- Set up for medium environment

Lab for Multi VNF demonstrations

- Set up for a demonstration lab

Basic production set up for NFVD

- Starting point for small production

Example for production for NFVD

- Example of a single production site



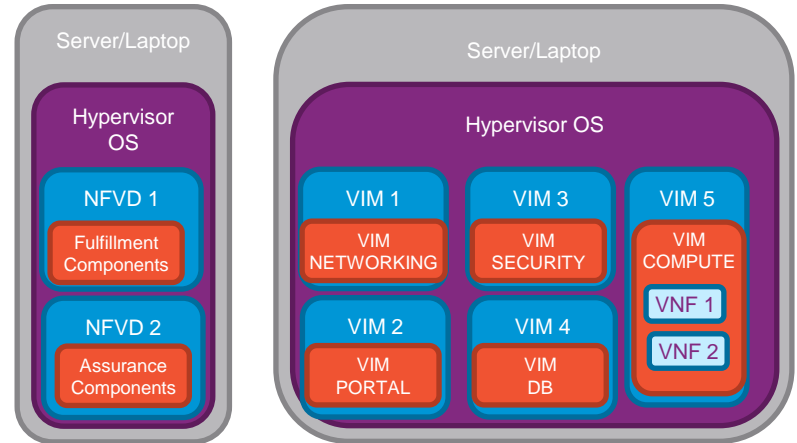
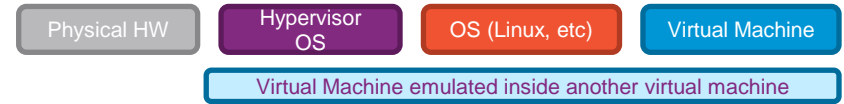
Minimal demo setup

Resources needed

Scope

- For concept demonstrations with example Virtual machines (not real VNFs)
- Demonstrate that few VNFs with very few resources can be created, deleted and orchestrated

http://docs.openstack.org/image-guide/content/ch_obtaining_images.html



Minimal demo setup

Resources needed

| ETSI FUNCTION | PRODUCT | COMPONENT | QUANTITY | RESOURCE TYPE | CORE | RAM (GB) | DISK (GB) | NETWORKING |
|------------------|-----------------|--------------------------|----------|------------------------|------|----------|-----------|---|
| VNF Orchestrator | HP NFV Director | All NFV Director modules | 1 | Virtual Machine | 2 | 8 | 100 | Nothing specific (100Mbps Ethernet and above) |
| VNF Manager | HP NFV Director | Embedded VNF | 0 | Included in the above* | * | * | * | * |

* Consult VNF vendors and VIM provider documents for VNFM and VNF & VIM sizes respectively



Minimal demo setup: Example

Server distribution

Server 1

- Used for Orchestrator

Server 2

- Used for VIM to run Virtual Machines in emulation mode

| RESOURCE TYPE | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|-----------------|------|----------|-----------|-----------|---|
| Server/Laptop 1 | 4 | 16 | 200 | 1 or more | Nothing specific (100Mbps Ethernet and above) |
| Server/Laptop 2 | 8 | 16 | 200 | 1 or more | Nothing specific (100Mbps Ethernet and above) |

<http://pc.sourceforge.net/oldsite/Emulation.html>



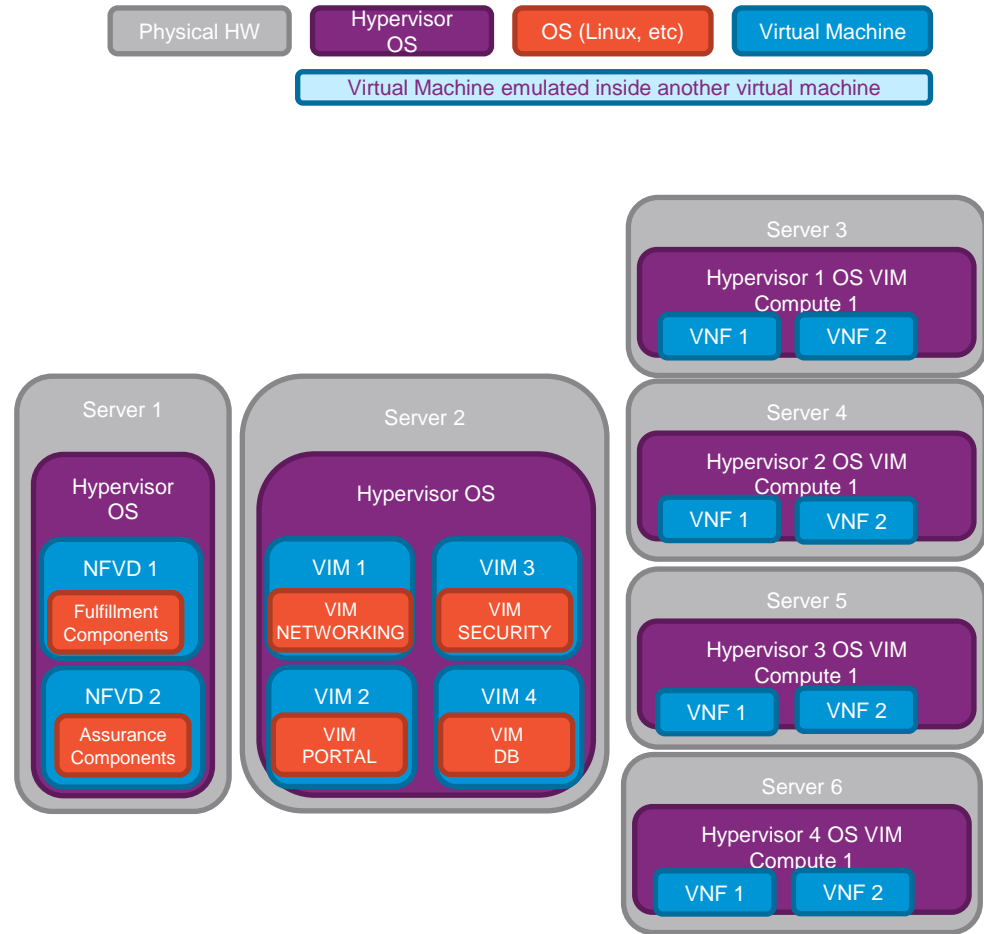
POC small size

Resources needed

Scope

- Demonstrate real VNFs typically within a single VIM a potentially 2 different hypervisors

If Helion VIM or production VIM are used additional servers/blades may be needed to run the management components



POC small size

Resources needed

| ETSI FUNCTION | PRODUCT | COMPONENT | QUANTITY | RESOURCE TYPE | CORE | RAM (GB) | DISK (GB) | NETWORKING |
|------------------|-----------------|-------------------------|----------|------------------------|------|----------|-----------|---|
| VNF Orchestrator | HP NFV Director | All Fulfillment modules | 1 | Virtual Machine | 4 | 16-32 | 60 | Nothing specific (100Mbps Ethernet and above) |
| VNF Orchestrator | HP NFV Director | All Assurance modules | 1 | Virtual Machine | 4 | 16-32 | 60 | Nothing specific (100Mbps Ethernet and above) |
| VNF Manager | HP NFV Director | Embedded VNF | 0 | Included in the above* | * | * | * | * |

* Consult VNF vendors and VIM provider documents for VNFM and VNF & VIM sizes respectively



POC Small size: Example

Server distribution

Enclosure

- Can be used individual servers or an enclosure with blades

Server/Blade 1

- Used for Orchestrator

Server/Blade 2

- Used for VIM to run management components

Server/Blade 3,4,5,6

- Used to host VNF and VNFM as virtual machines

| RESOURCE TYPE | QTY | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|----------------------|-----|------|----------|-----------|-----------|--|
| Enclosure (optional) | 0-1 | NA | NA | NA | 1+ | Without Virtual connect |
| Server/Blade 1 | 1 | 8 | 64 | 250 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 2 | 1 | 8 | 128 | 500 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 3,4,5,6 | 4 | 8 | 128 | 500 | 1 or more | Nothing specific (100Mps Ethernet and above) |



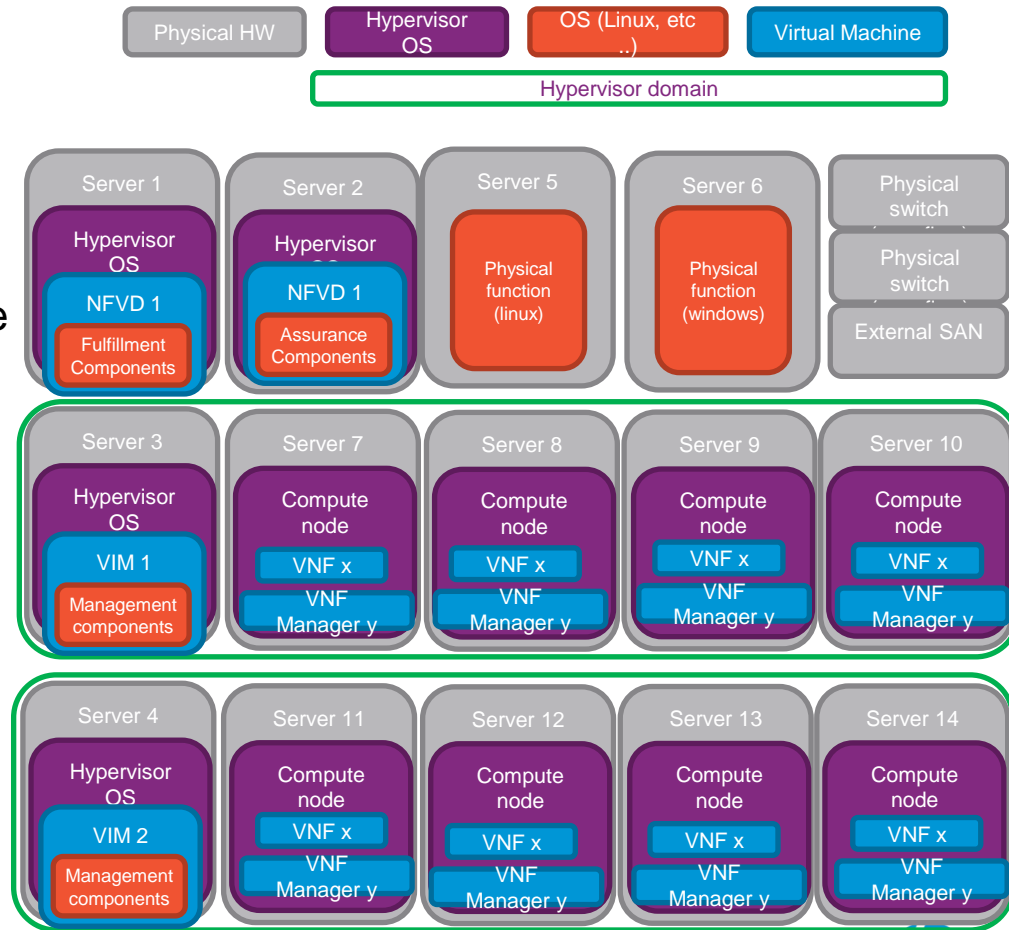
POC Medium size

Resources needed

Scope

- Demonstrate real VNFs typically with one or 2 VIMs (potentially more) 2 different hypervisors and potentially real networking and physical servers

If Helion VIM or production VIM are used additional servers/blades may be needed to run the management components



POC Medium size

Resources needed

| ETSI FUNCTION | PRODUCT | COMPONENT | QUANTITY | RESOURCE TYPE | CORE | RAM (GB) | DISK (GB) | NETWORKING |
|------------------|-----------------|-------------------------|----------|------------------------|------|----------|-----------|--|
| VNF Orchestrator | HP NFV Director | All Fulfillment modules | 1 | Virtual Machine | 4-8 | 64-128 | 200 | Nothing specific (100Mps Ethernet and above) |
| VNF Orchestrator | HP NFV Director | All Assurance modules | 1 | Virtual Machine | 4-8 | 64-128 | 200 | Nothing specific (100Mps Ethernet and above) |
| VNF Manager | HP NFV Director | Embedded VNF | 0 | Included in the above* | * | * | * | * |

* Consult VNF vendor and VIM provider documents for VNFM and VNF & VIM sizes respectively

** Consult PNF vendor for its sizing requirements



POC Medium size: Example

Server distribution

Enclosure

- For this amount of server normally is better a enclosure with NO Virtual connect

Server/Blade 1,2

- Used for Orchestrator

Server/Blade 3,4

- Used for VIM to run management components (typically 2 VIMS)

Server/Blade 5,6

- Used to demonstrate physical functions working with virtual ones

Server/Blade 7,8,9,10,11,12,13,14

- Used to host VNF and VNFM as virtual machines

Physical switch (openflow)

- To demonstrate physical networking or SDN

External SAN

- To demonstrate external storage

| RESOURCE TYPE | QTY | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|-----------------------------------|-----|------|----------|-----------|-----------|--|
| Enclosure (optional) | 0-1 | NA | NA | NA | 1+ | Without Virtual connect |
| Server/Blade 1 | 1 | 8 | 128 | 500 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 2 | 1 | 8 | 128 | 500 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 3,4 | 2 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 5,6 | 0-2 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Server/Blade 7,8,9,10,11,12,13,14 | 8 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Physical switch (openflow) | 0-2 | NA | NA | NA | 5 or more | Nothing specific (100Mps Ethernet and above) |
| External SAN | 0-1 | NA | NA | 10.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |

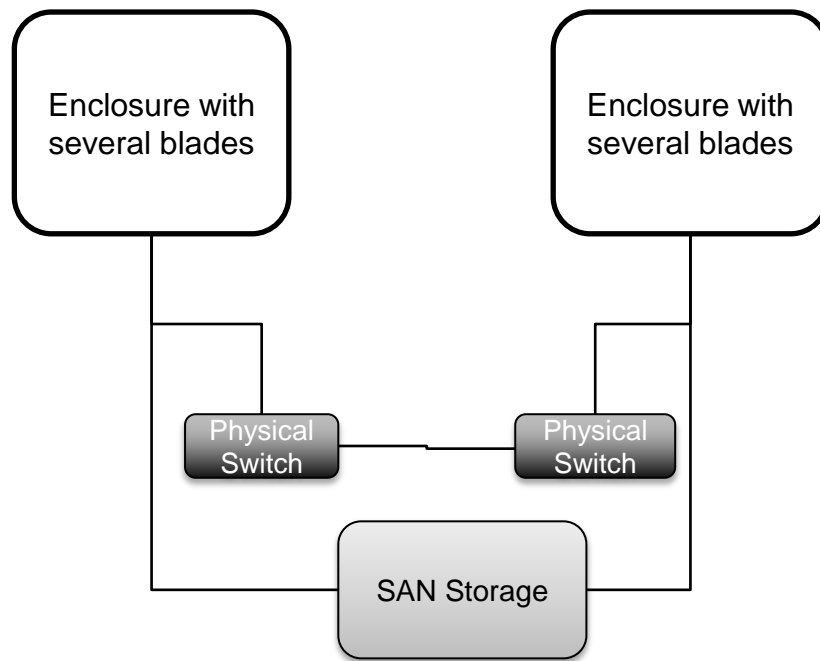


Lab for Multi VNF demonstrations

Resources needed

Scope

- Medium Setup simulating to physical locations (each location represented with 1 enclosure with similar set up as POC medium size)
- More



Lab for Multi VNF demonstrations

Resources needed

| ETSI FUNCTION | PRODUCT | COMPONENT | QUANTITY | RESOURCE TYPE | CORE | RAM (GB) | DISK (GB) | NETWORKING |
|------------------|-----------------|-------------------------|----------|------------------------|------|----------|-----------|--|
| VNF Orchestrator | HP NFV Director | All Fulfillment modules | 1 | Virtual Machine | 8 | 128 | 200 | Nothing specific (100Mps Ethernet and above) |
| VNF Orchestrator | HP NFV Director | All Assurance modules | 1 | Virtual Machine | 8 | 128 | 200 | Nothing specific (100Mps Ethernet and above) |
| VNF Manager | HP NFV Director | Embedded VNF | 0 | Included in the above* | * | * | * | * |

* Consult VNF vendor and VIM provider documents for VNFM and VNF & VIM sizes respectively

** Consult PNF vendor for its sizing requirements



Lab for Multi VNF demonstrations: Example

Server distribution

Enclosure

- 2 enclosures for demonstration of different locations

Blade for NFVD

- Used to host 1 or 2 instances of NFVD

Blades for VIM management

- Blades to host several VIM

Blades for compute nodes

- Used to host VNF and VNFM as virtual machines

Physical servers

- Used to demonstrate physical functions working with virtual ones

Physical switch (openflow)

- To demonstrate physical networking or SDN

External SAN

- To demonstrate external storage

| RESOURCE TYPE | QTY | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|----------------------------|-----|------|----------|-----------|-----------|--|
| Enclosure | 2 | NA | NA | NA | 1+ | Without Virtual connect |
| Blade for NFVD | 2-4 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Blades for VIM management | 8 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Blades for compute nodes | 16 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Physical servers | 4 | 8 | 256 | 1.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |
| Physical switch (openflow) | 2 | NA | NA | NA | 5 or more | Nothing specific (100Mps Ethernet and above) |
| External SAN | 1 | NA | NA | 10.000 | 1 or more | Nothing specific (100Mps Ethernet and above) |



Basic production set up for NFVD

Server distribution

Fulfillment

- 1 Fulfillment server
- 1 Fulfillment DB server

Assurance

- 1 Monitor server
- 1 Correlation server
- 1 Assurance DB server

| RESOURCE TYPE | QTY | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|-----------------------|-----|------|----------|-----------|------|-----------------------------------|
| Fulfillment server | 1 | 4 | 128 | 1000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Fulfillment DB server | 1 | 8 | 128 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Monitor server | 1 | 4 | 128 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Correlation server | 1 | 4 | 128 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Assurance DB server | 1 | 8 | 128 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |

Of course, servers can be replaced with VMs with the same amount of dedicated non-shared resources

Multiple setups are possible depending on specific environment and use case requirements this is just an example



Example for production for NFVD

Server distribution

Fulfillment

- 1 Fulfillment portal server
- 1 Fulfillment GW server
- 2 Fulfillment engine servers in cluster

Assurance

- 2 Monitor server in cluster
- 2 Correlation servers in cluster

DB

- 2 DB server in a cluster

Of course, servers can be replaced with VMs with the same amount of dedicated non-shared resources

Multiple setups are possible depending on specific environment and use case requirements this is just an example

| RESOURCE TYPE | QTY | CORE | RAM (GB) | DISK (GB) | NICs | NETWORKING |
|----------------------------|-----|------|----------|-----------|------|-----------------------------------|
| Fulfillment Portal | 1 | 4 | 256 | 1000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Fulfillment GW | 1 | 8 | 256 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Fulfillment Engine Cluster | 2 | 4 | 256 | 1000 | 2+ | 2 ports (1Gps Ethernet and above) |
| NFVD DB server cluster | 2 | 8 | 256 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Monitor server cluster | 2 | 8 | 256 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |
| Correlation server cluster | 4 | 4 | 256 | 1.000 | 2+ | 2 ports (1Gps Ethernet and above) |

