

What's the Impact of Virtualization on Application-Layer Traffic Optimization (ALTO)?

draft-fu-alto-nfv-usecase-04

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Outlines

- A usecase of ALTO with the emergence of NFV
 - Scenario 1: End points can be VNFs
 - Scenario 2: ALTO clients can be embedded in NFV
- An architecture for interfaces between NFV and ALTO server

Scenario 1: Endpoints become VNFs

Service assurance

- Service assurance of virtualized endpoints is more difficult to ensure

Energy efficiency

- NFV could potentially deliver up to 50% energy saving compared with traditional appliance based network

ALTO ECS may need to be aware of this

Portability

- VNFs have the capability to load, execute and move across the NFV platform
- Have impact on the mobility and network location of the service points

Elasticity

- VNFs is capable of on-demand scaling or automatically scaling. Therefore its computing and networking capability is dynamic

Network infrastructure maintenance

- VNFs can be bridged with ovs on the compute node, ovs can have influence on VNF performance
- Network layer performance and availability metrics should collect not only the physical network, but also these virtual switches.

ALTO cost map and network map can become highly dynamic

Cost metrics can have larger variance, depending on configuration

Require update of the South bound interface

VNF monitoring

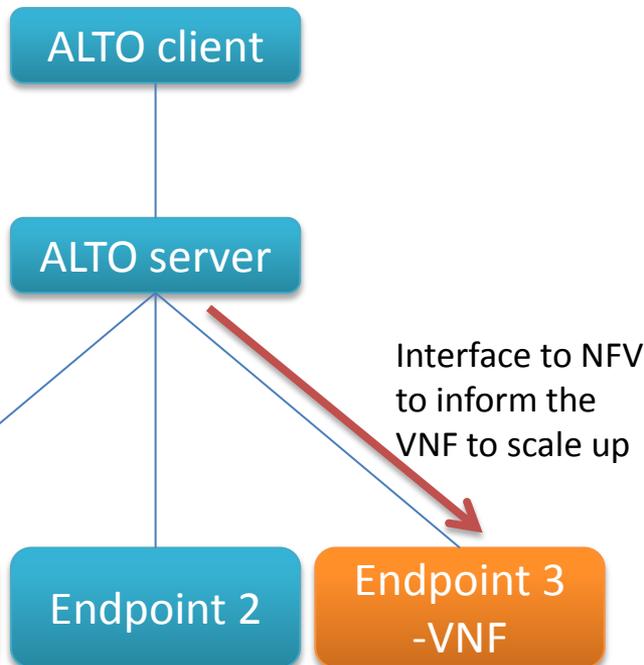
- VIM and VNFM are capable of monitoring the metrics such as packet loss rate, latency, delay variation of flows, maximum time to detect and recover from faults. All of these information will be valuable to ALTO client.

NFV MANO can become information sources for ALTO servers or clients

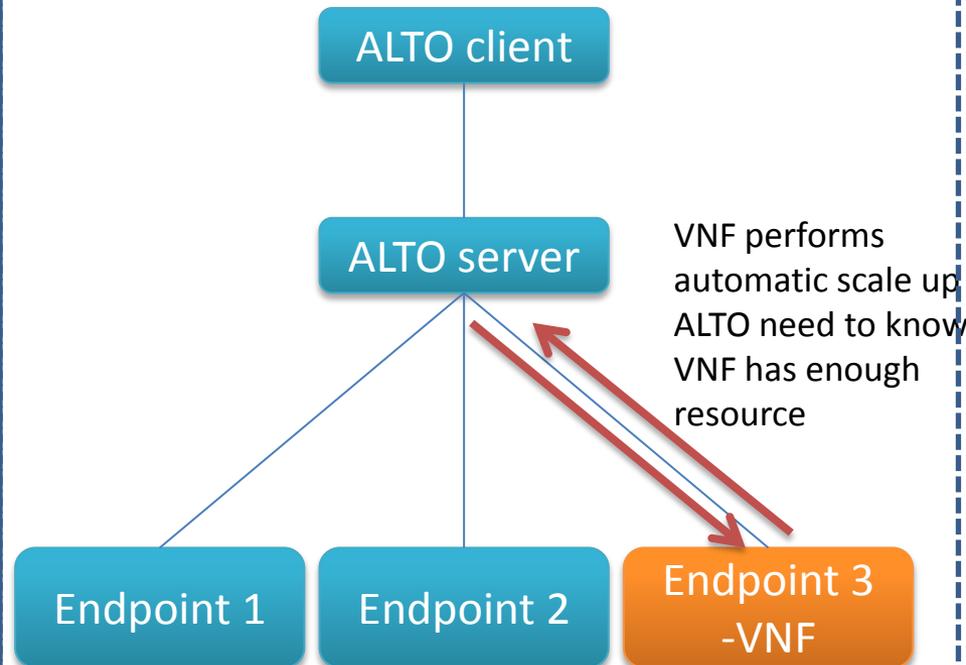
Example Extensions

- **Endpoint property extension of geo-location**
 - A VNF can be composed of several VMs located on several physical servers at different geo-locations
 - Geo-location may also change due to migration and restoration
 - Require property extension of endpoint geo-location
- **VNF elasticity property—intelligent ALTO server**
 - Require update of south bound interface

Solution 1



Solution 2



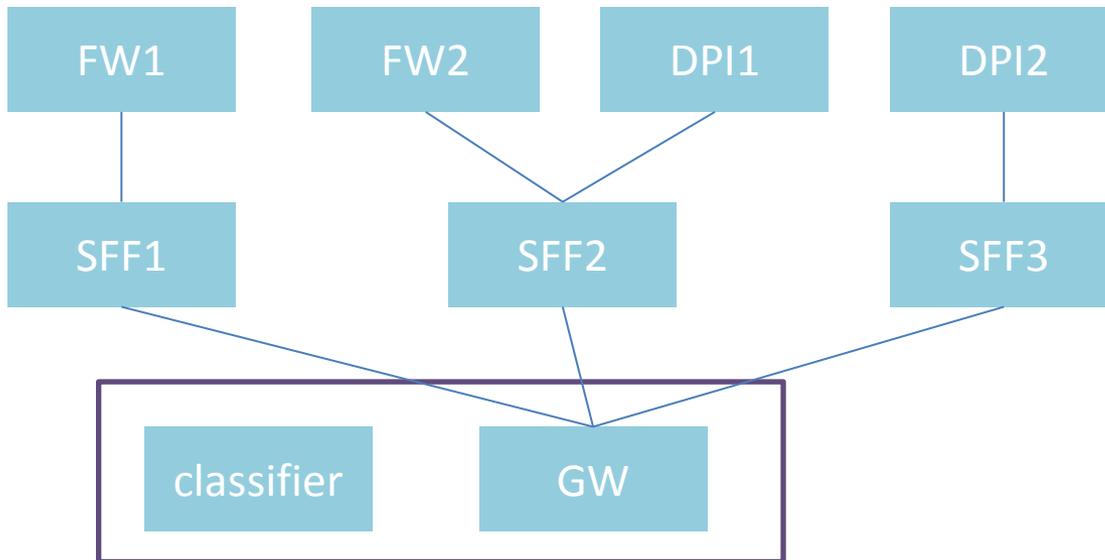
Scenario 2: ALTO client embedded in NFV

- Usecase of SFC in virtual networks



Service Chain: FW->DPI

SFC DC



Cost of a sequence of endpoints:

- FW1->DPI1
- FW2->DPI1
- FW1->DPI2
- FW2->DPI2

Extension for ALTO Endpoint Cost Parameters

```
"cost-type": {"cost-mode" : "ordinal", "cost-metric" : "routingcost"},
"endpoints" : { "srcs": [ "ipv4:192.0.2.2" ],
                "dsts": [ "ipv4:192.0.2.89",
                          "ipv4:198.51.100.34",
                          ]
                }
}
```



```
"cost-type": {"cost-mode" : "ordinal", "cost-metric" : "routingcost"},
"endpoints" : { "srcs": [ "ipv4:192.0.2.2" ],
                "dsts": [ ["ipv4:192.0.2.89",           // FW way point candidates
                          "ipv4:198.51.100.34",
                          ],
                        ["ipv4:192.0.2.88",           // DPI way point candidates
                          "ipv4:198.51.100.33",
                          ],
                ]
                }
}
```

Architecture and Interfaces

NFV MANO

- ◆ Act as a dynamic VNF information provider for ALTO.
- ◆ Act as ALTO client for the cost map of endpoints

