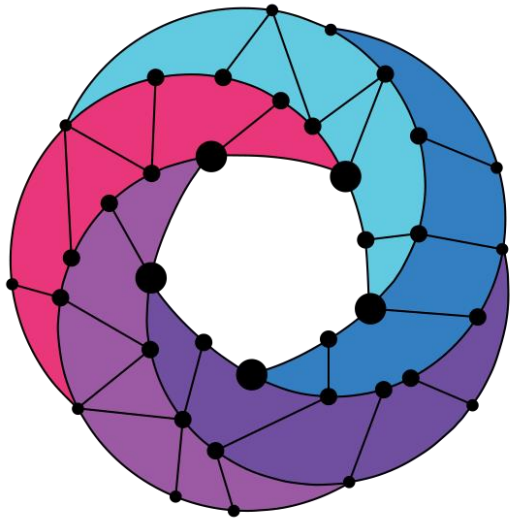

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OSM Ecosystem Day

Automatic Placement of VNFs

Lars-Göran Magnusson (Arctos Labs)

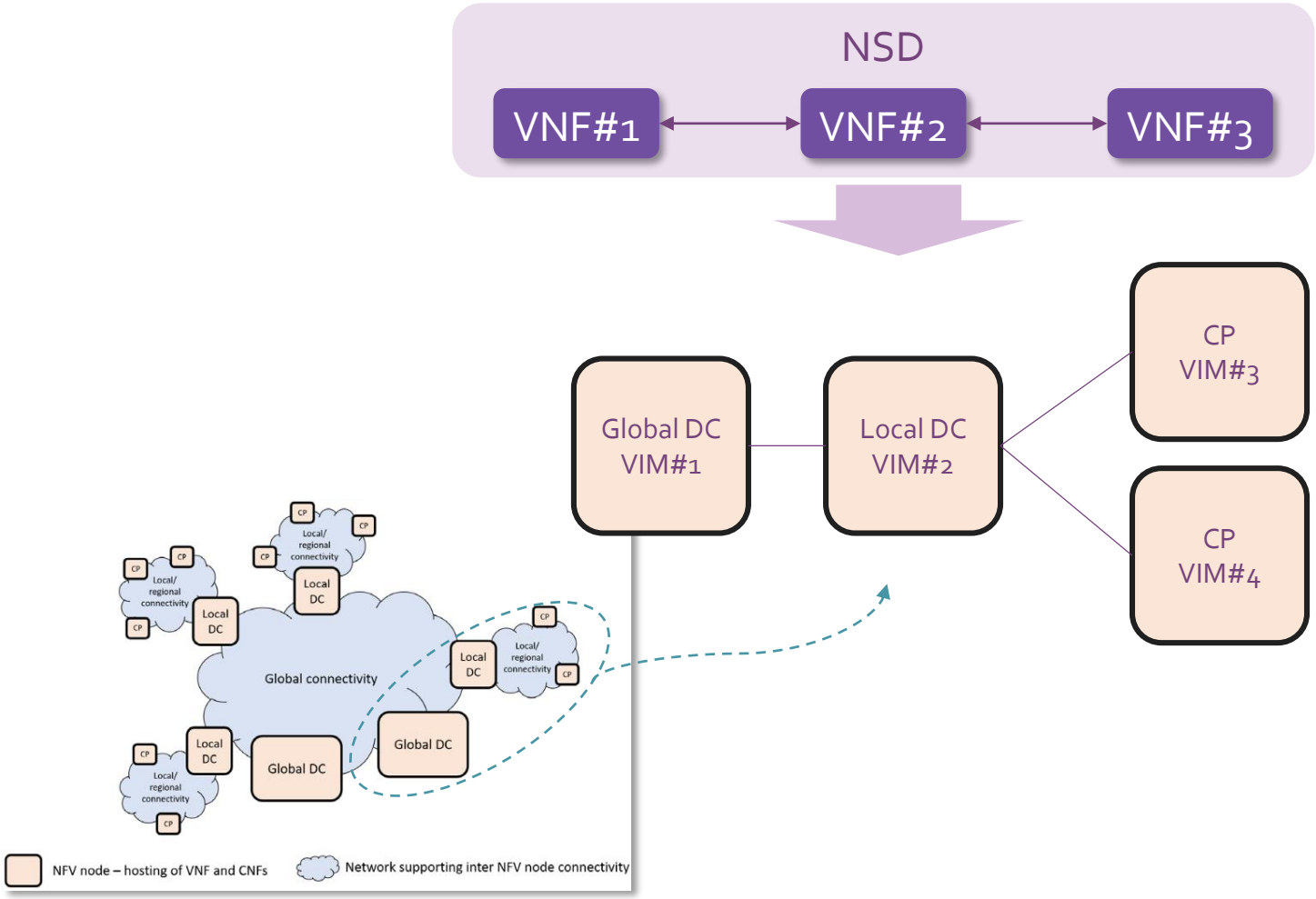
ETSI

Placement Optimization - Outline

- What do we mean by Placement?
- Introduction to Placement Optimization in OSM
- Acheiving different types of Optimization
- Use case examples for Placement Optimization
- Invoking Placement
- Demonstration

Placement is targeted for next OSM Release

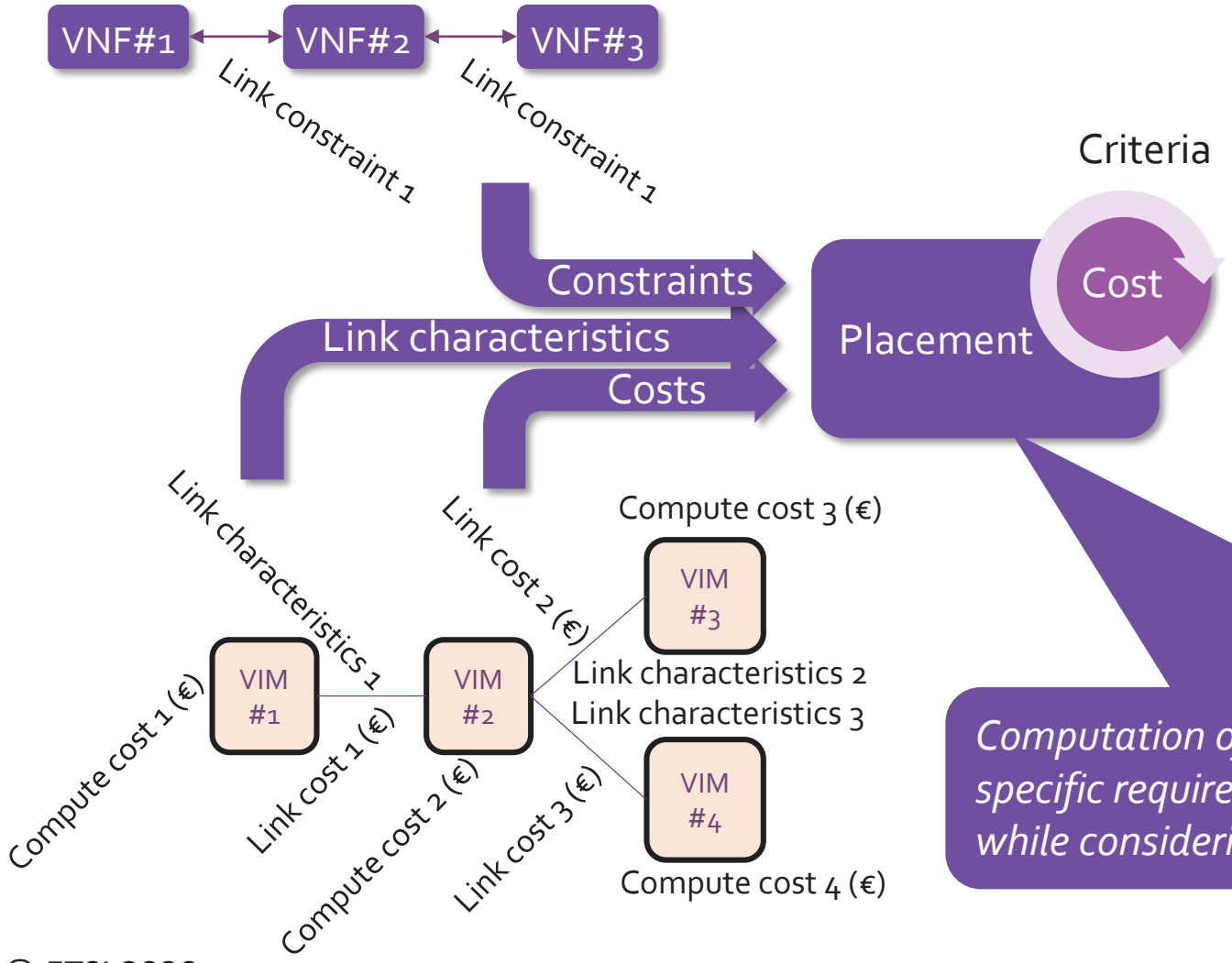
What do we mean by Placement Optimization?



Business Service Basic Architecture,
from *OSM Deployment and Integration WP, Feb 2020*

- Placement in context of OSM is the process of deciding **which VNF goes into which VIM**
- Optimal is subject to:
  - Cost of compute in VIMs
  - Cost of links for NS interworking
  - Constraints in NS interworking (Latency, Jitter) – if there are any
- Placement feature makes this process **Automatic & Optimal**

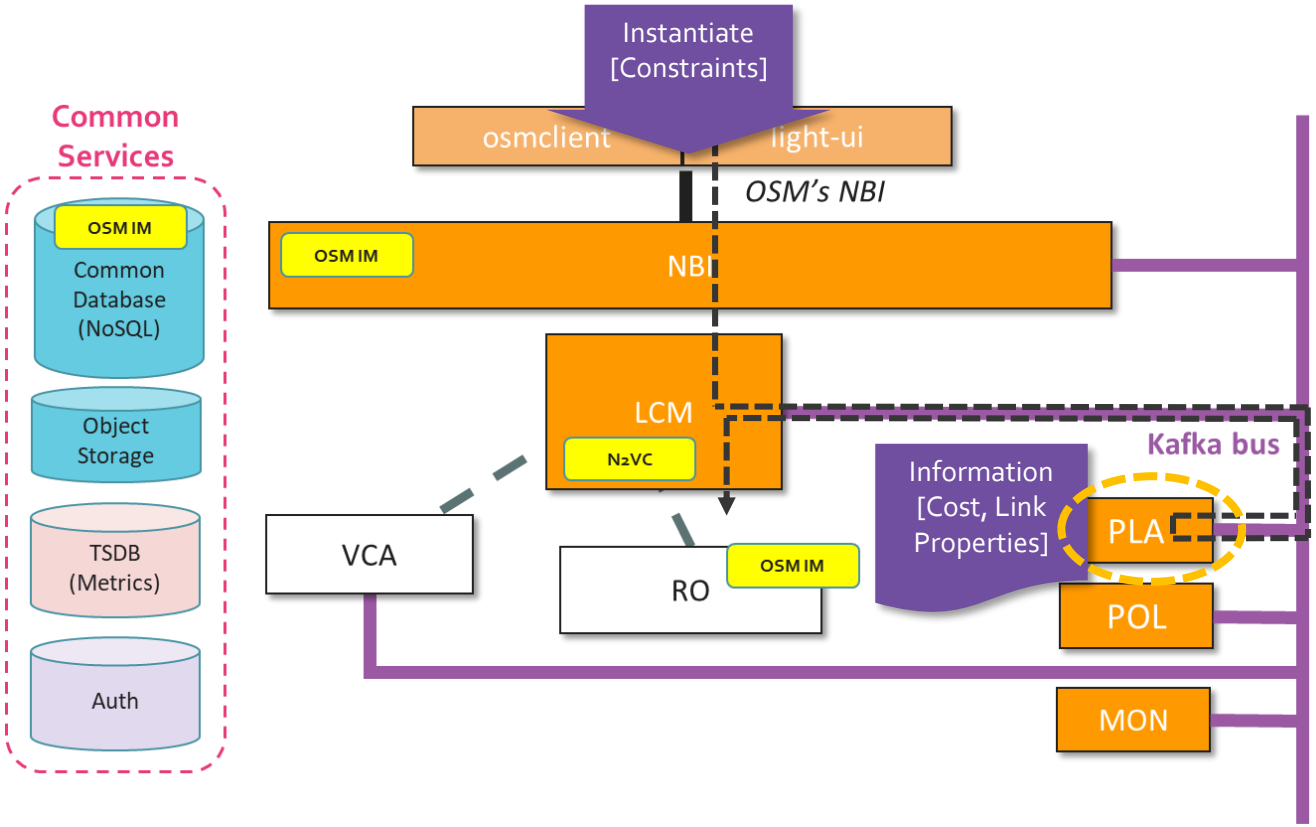
The Optimization Process



- Placement function
  - Will consider all VIM's available to the user
  - Will make sure constraints are met – if there are any
  - Will optimize Cost (the Criteria)
- I.e. select the option that fulfills constraints at the lowest possible cost
  - Modeled as a constraints optimization problem

Computation of optimal placement of VNFs over VIMs by matching NS specific requirements to infrastructure availability and run-time metrics, while considering cost of compute/network.

The PLA component in OSM



- New component
  - Optional, install with --pla

- Basic functionality intially
- Automatic placement is optional, invoked by the user at instantiate of Network Service
  - --config '{placement-engine: PLA, placement-constraints: {}, ...}'
  - Constraints given in the instantiation request
    - Open issue: Should NSD based constraints be supported?
  - Will consider placement over the VIMs available to the user
- Interacts with LCM, Common Services

Placement optimization examples

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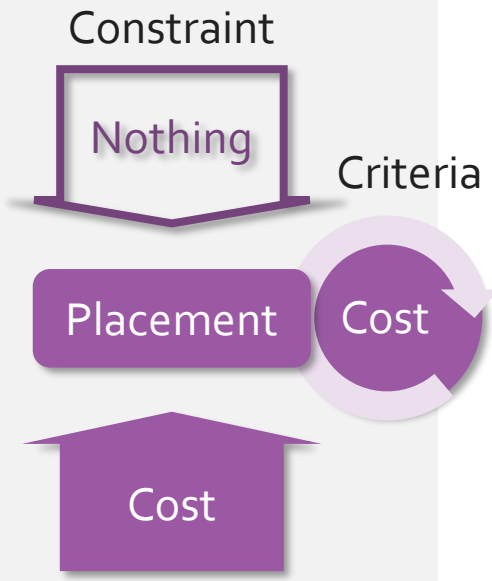
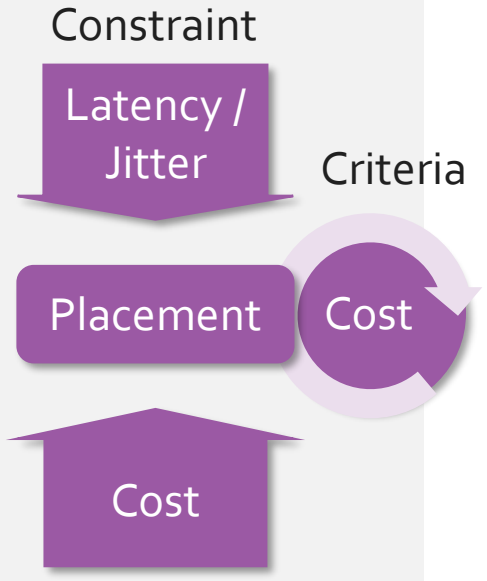
1

Cost optimization **only**



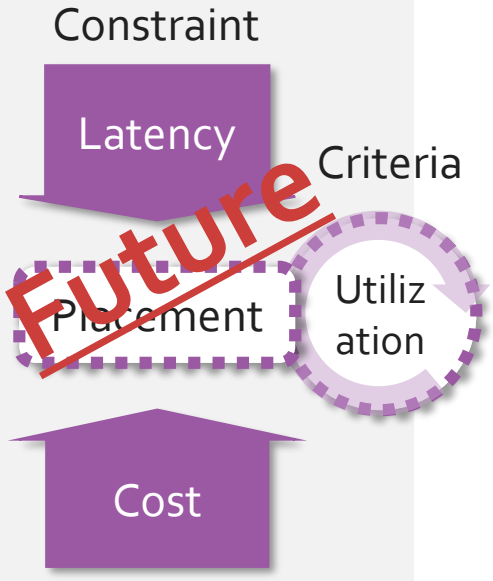
2

Cost optimization **with Latency** constraint



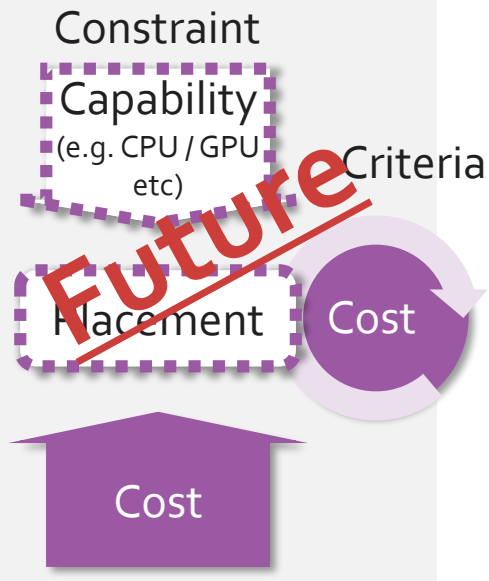
3

Utilization optimization **with Latency** constraint



4

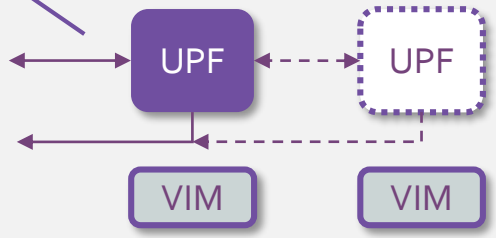
Cost optimization **with Capability** constraint



Examples of use cases

UPF supporting Low-latency

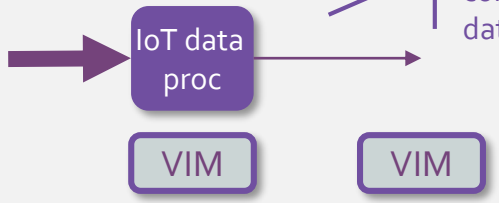
Placement of UPF close to customer to acheive latency constraint



Deploy as close as it has to be

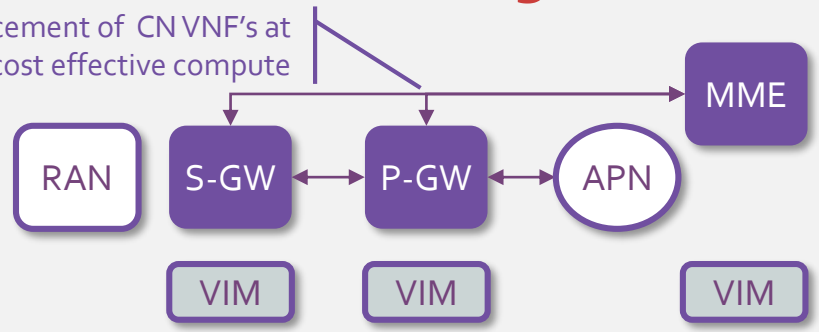
Transport optimization (cost) for Application components

Placement of Application components close to the source of data to reduce transport cost / load



Compute cost optimization for slicing

Placement of CN VNF's at most cost effective compute



Deploy as far away as it can be

Invoking Placement

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1. Request Placement Cost Optimization

   --config '{ **placement-engine: PLA** }'

2. Request Placement Cost Optimization with pinning of specified VNF

   --config '{placement-engine: PLA,
   vnf: [{member-vnf-index: "1", vim_account: OpenStack3}]}'

3. Request Placement Cost Optimization with VLD Constraints

   --config '{placement-engine: PLA,
   placement-constraints: {vld-constraints: [{id: vld_1, link-constraints: {latency: 120, jitter: 20}}, {id: vld_2, link-constraints: {jitter: 20 }}]}}'

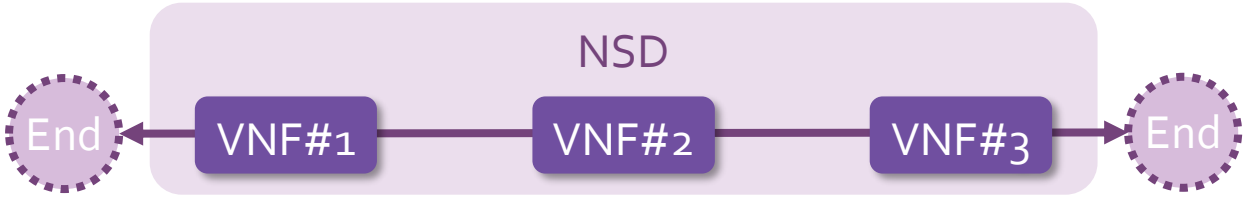
4. Combo of 2 and 3

   --config '{placement-engine: PLA,
   vnf: [{member-vnf-index: "1", vim_account: OpenStack4}], placement-constraints: {vld-constraints: [{id: vld_1, link-constraints: {latency: 15}}]}}'

Note: GUI is also supported, with or without YAML file

VNF Pinning

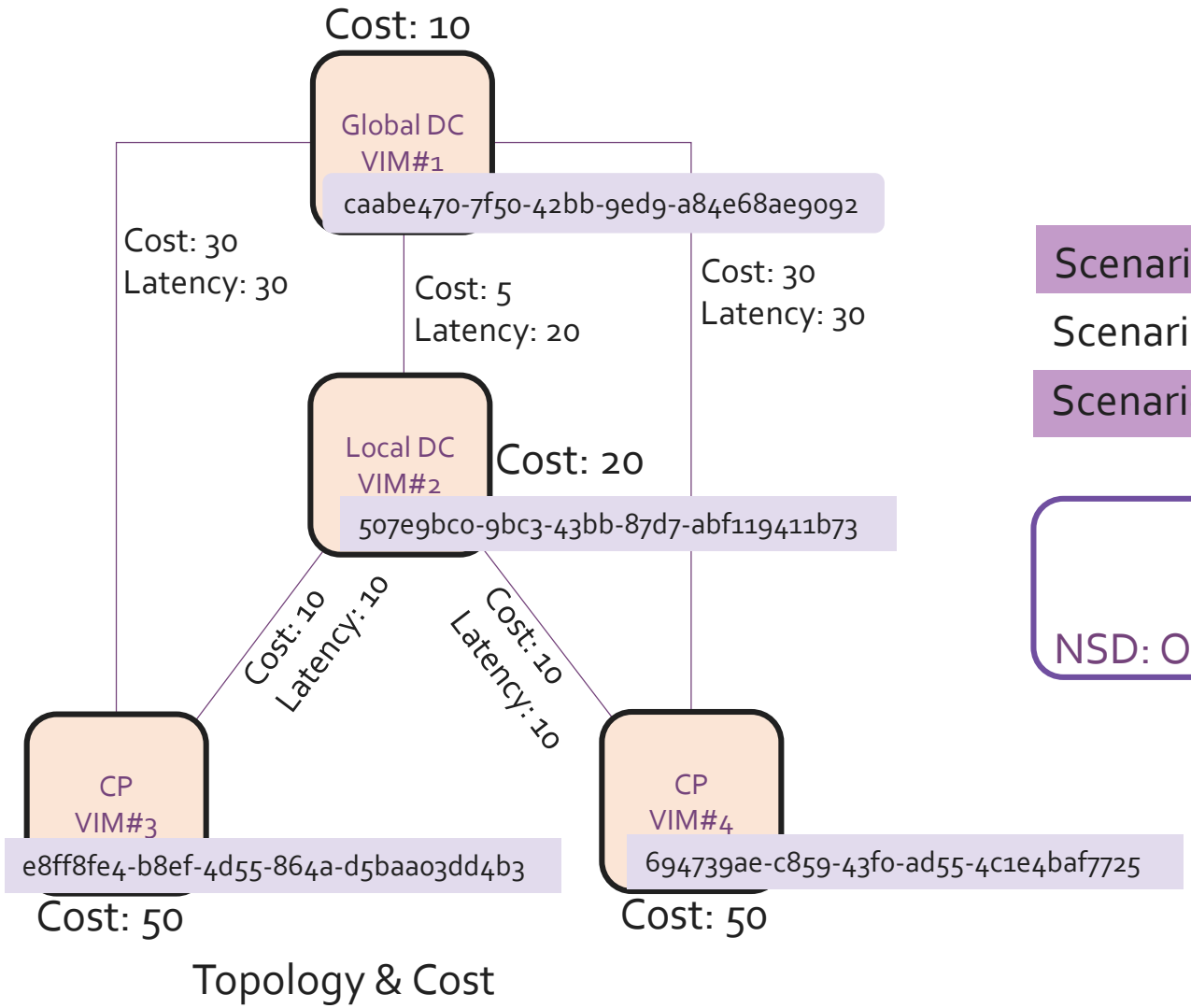
Example 1:	Auto	Auto	VIM#3
Example 2:	VIM#2	Auto	Auto
Example 3:	Auto	Auto	Auto



- Ability to “pin” a VNF to e.g.
  - the VIM with a specific VNF (e.g. P-GW)
  - the VIM with connectivity to a PNF
  - a CPE (customer location)

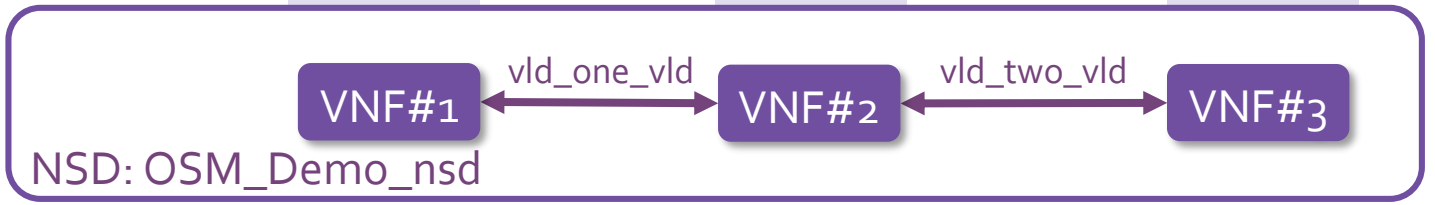
Auto implies there is no VIM specified, this placement is therfore subject to placement optimization
=> this is what Placement is all about – finding out where VNFs should (or must) be deployed in a multi-VIM NFVI

Demo introduction



Topology & Cost

	Pinning	Constraints	Pinning	Constraints	Pinning
Scenario a:	Auto		Auto		Auto
Scenario b:	VIM#3		Auto		Auto
Scenario c:	VIM#4		Auto	latency=15	Auto



Demo scenarios outline

Live Demo

We want to assist...

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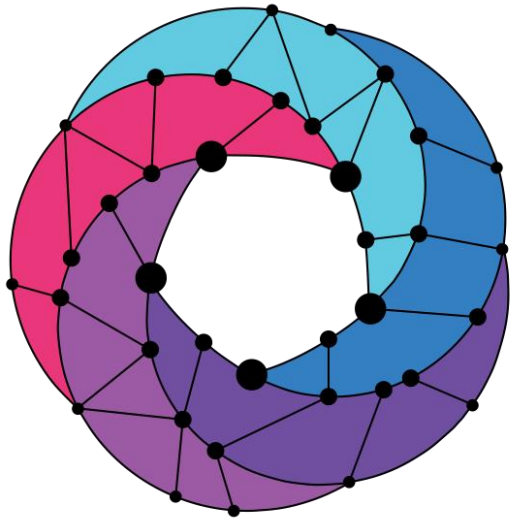
OSM Slack: @Lars-Göran Magnusson

- We would appreciate community feedback to evolve the placement feature
- We would be happy to assist You in applying placement in your next project



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