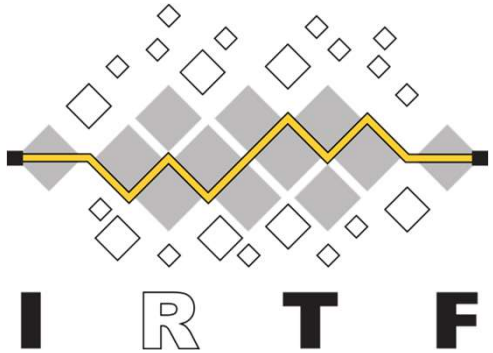


Discovery Mechanisms in the MANO Stack

Carlos J. Bernardos

Montreal, NFV RG, July 2018

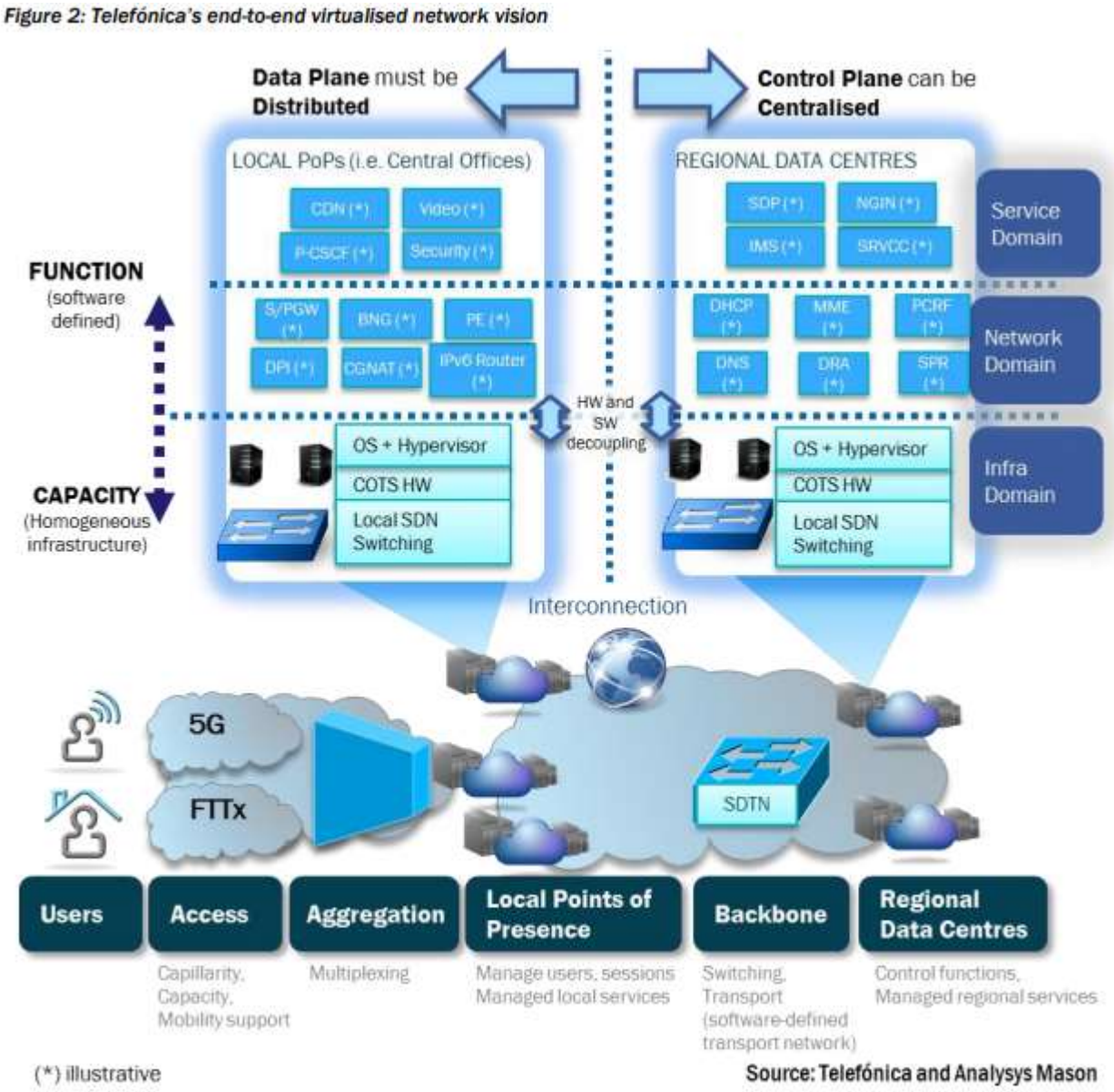
Outline

- Motivation
- Discovery mechanisms in ETSI MANO
- Or-Vi discovery
  - IPv6 based approach
- Conclusion and next steps

Motivation

- (Network) Virtualization is happening…

… but mostly limited to data-center environments

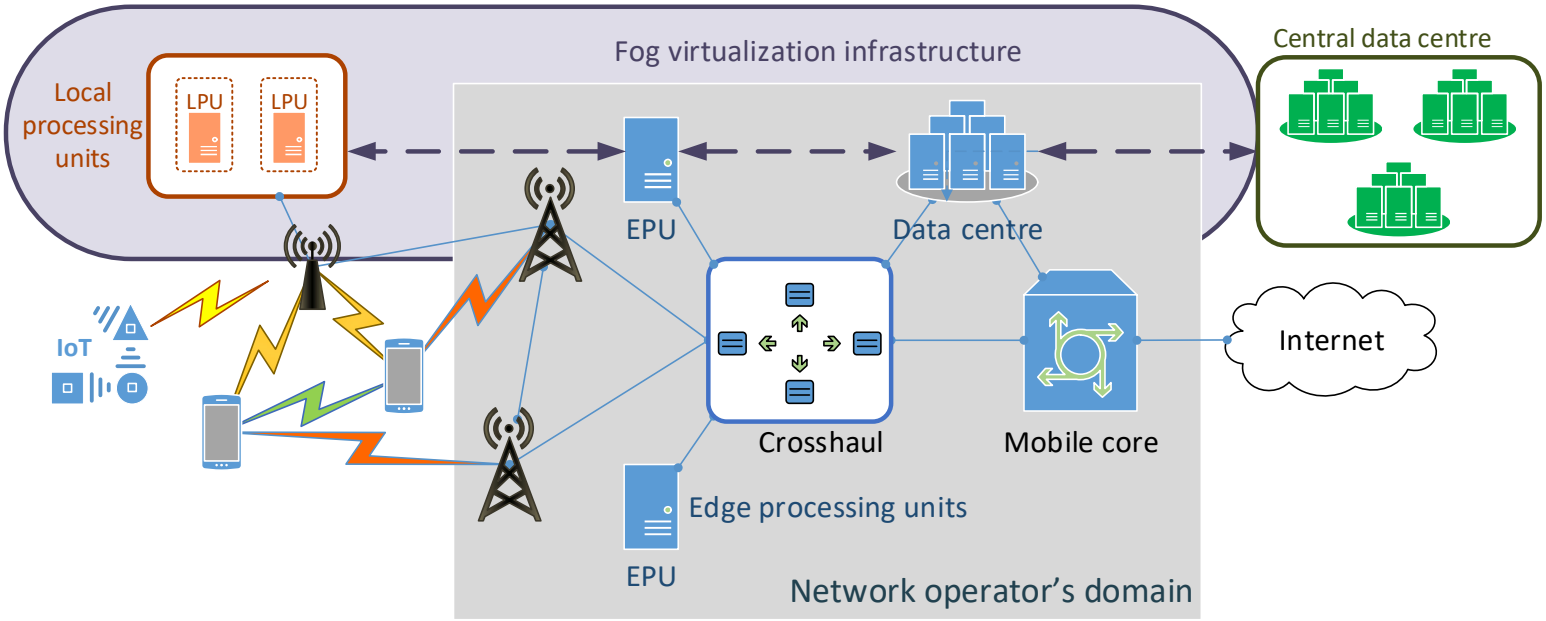


From "White paper Telefónica's UNICA architecture strategy for network virtualization", July 2017

Motivation: Edge/fog and dynamic envs.

- Different points of presence: central, regional, local/edge
- The (edge) virtualization substrate has been largely assumed to be fixed or stationary
  - But it is now being extended to scenarios where the edge computing substrate is on the move & distributed
  - This is referred to as ***the fog***
- Mechanisms to **advertise, discover and register** virtualized fog resources are required
  - E.g.: The relationship between an NFVO and the resources it is capable to orchestrate through a VIM is statically defined according to current ETSI NFV specifications (IFA005)
  - Or-Vi interface does not include any discovery and automatic registration of (mobile) VIMs from a (mobile) NFV

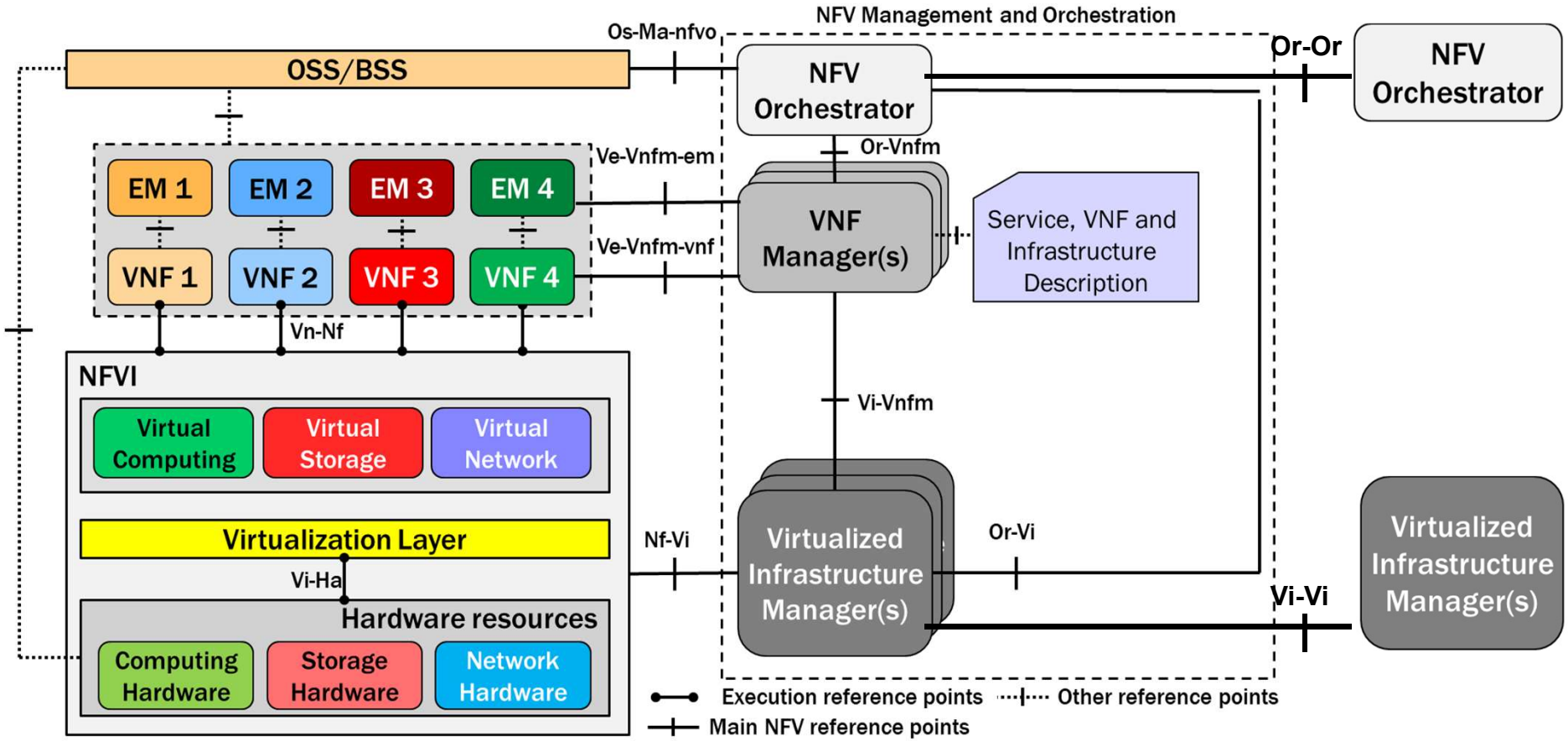
Motivation: Edge/Fog



- The fog is composed by virtual resources on top of heterogeneous resources available at the edge and even further in the RAN and end-user devices
  - Virtual networking functions (VNFs) may execute anywhere in the fog – cloud continuum

Discovery mechanisms in NFV MANO

- Where do we need discovery functions?



Discovery mechanisms in NFV MANO

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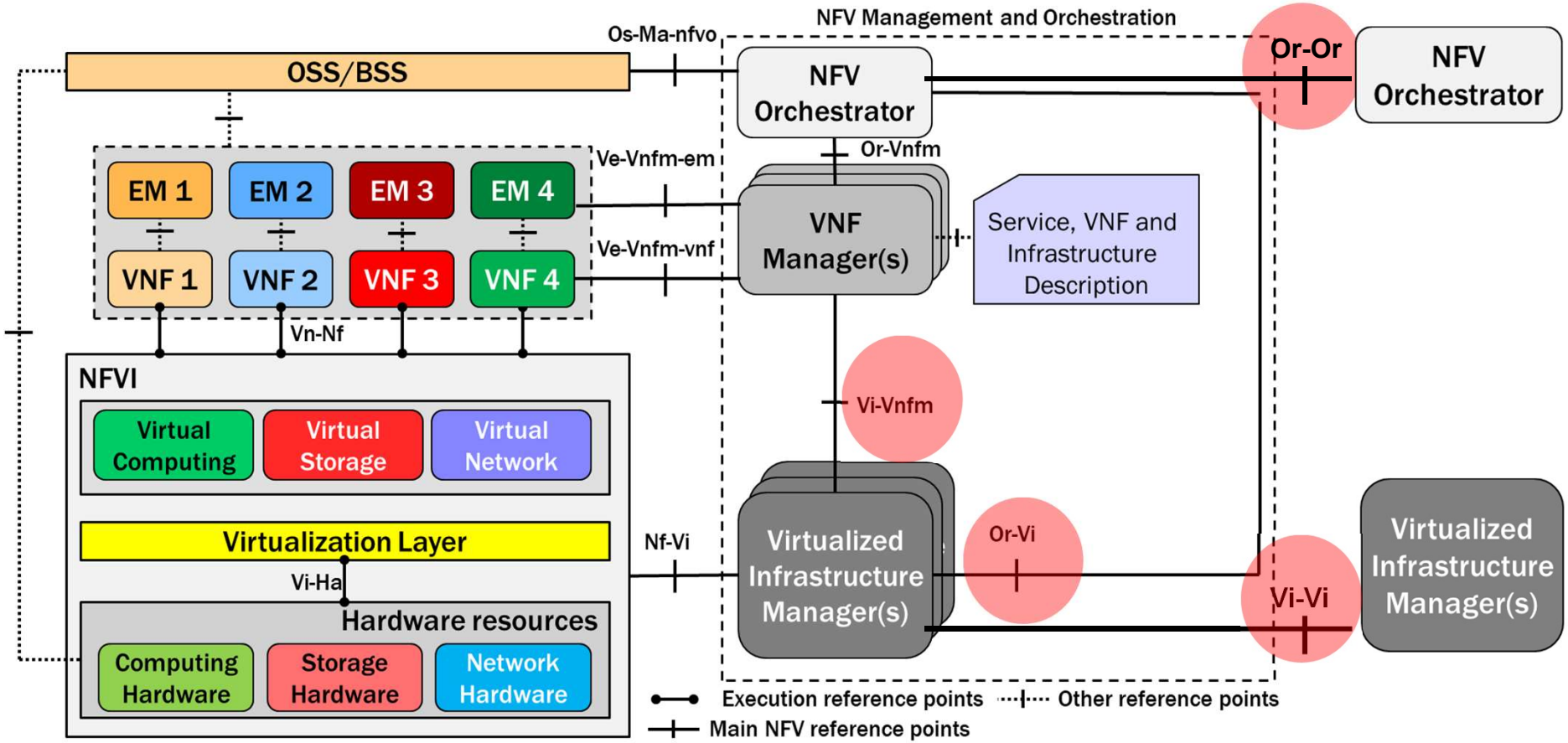

Discovery mechanisms in NFV MANO

- **Multi-domain:** the interconnection of administrative domains implies that some information is to be shared. Two options:
  - Configuration driven: different functional blocks to be interconnected are statically configured with the necessary information
  - Auto-discovery: assumes the implementation of a discovery mechanism in the NFV-MANO functional blocks

Discovery mechanisms in NFV MANO

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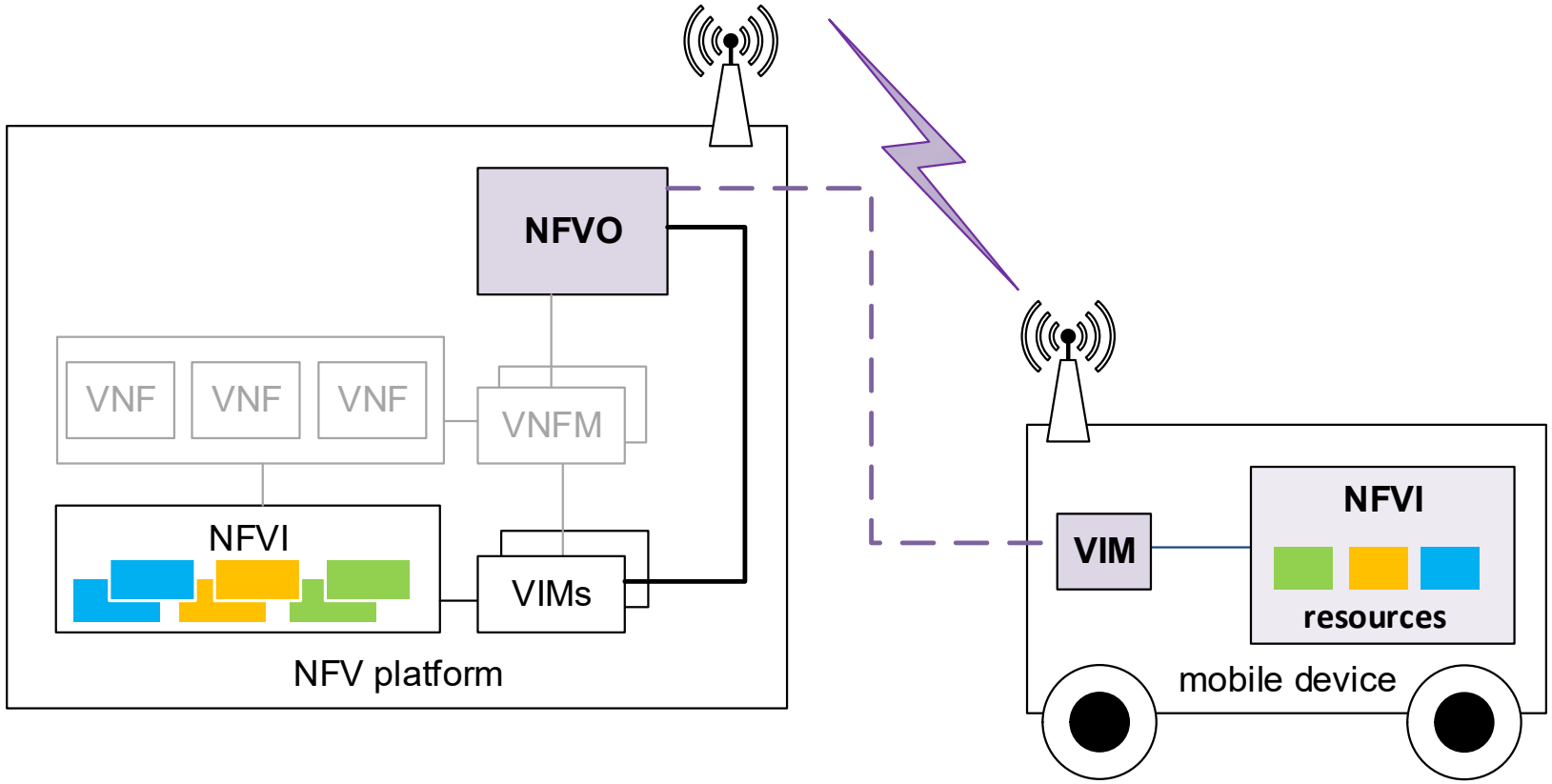
Discovery mechanisms in NFV MANO

- Different requirements
  - Or-Or (e.g., between admin domains)
    - Exchange of relevant information across orchestrators (allowing discovery of resources and functions available at other domains)
  - Vi-Vnfm
    - Discovery for direct mode of operation

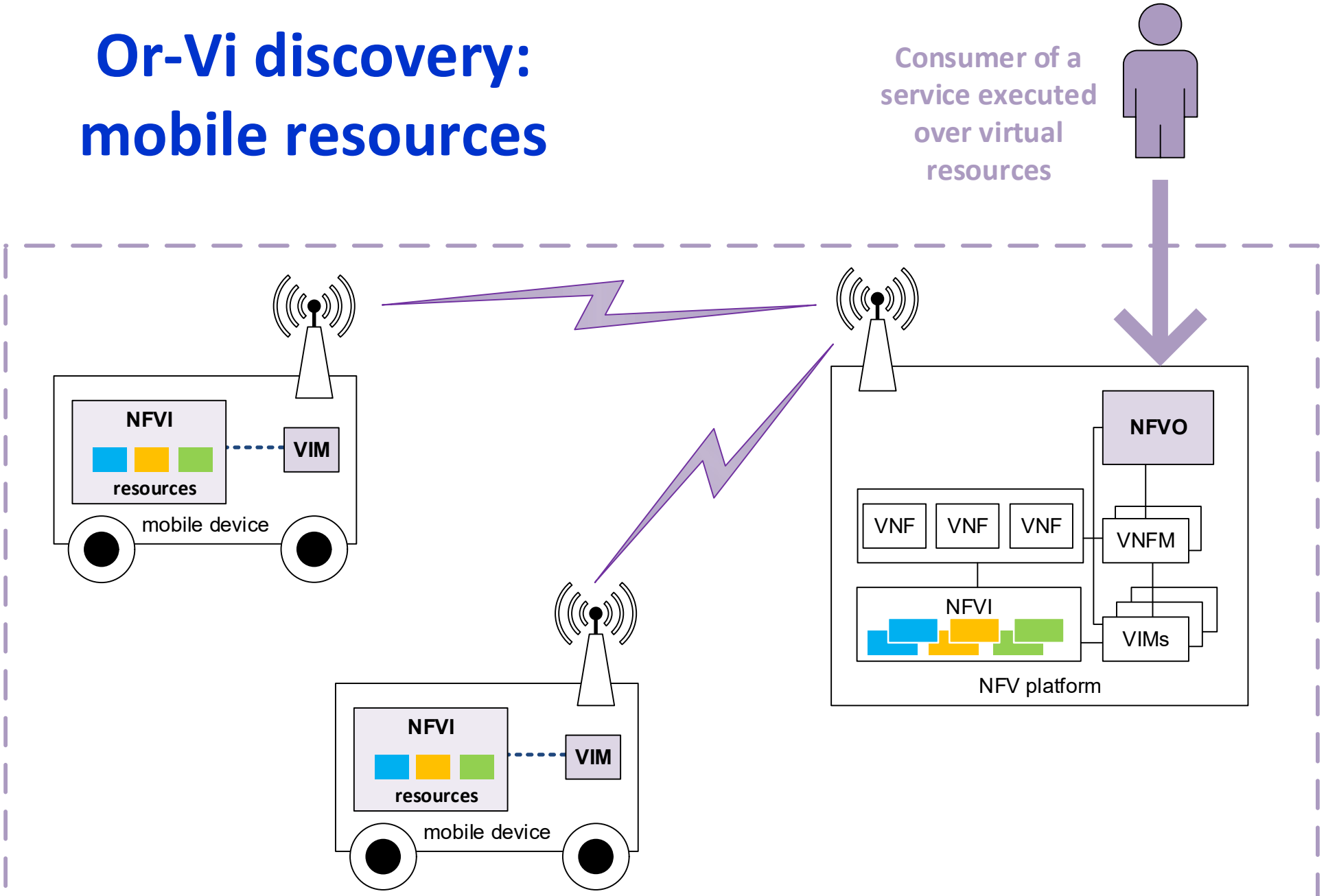
Discovery mechanisms in NFV MANO

- Or-Vi
  - When involving different domains, auto-discovery of the NFVO and the VIM is required
  - More about this in next slides
- Vi-Vi
  - Similar to Or-Vi (if SLPOC implemented by VIM)

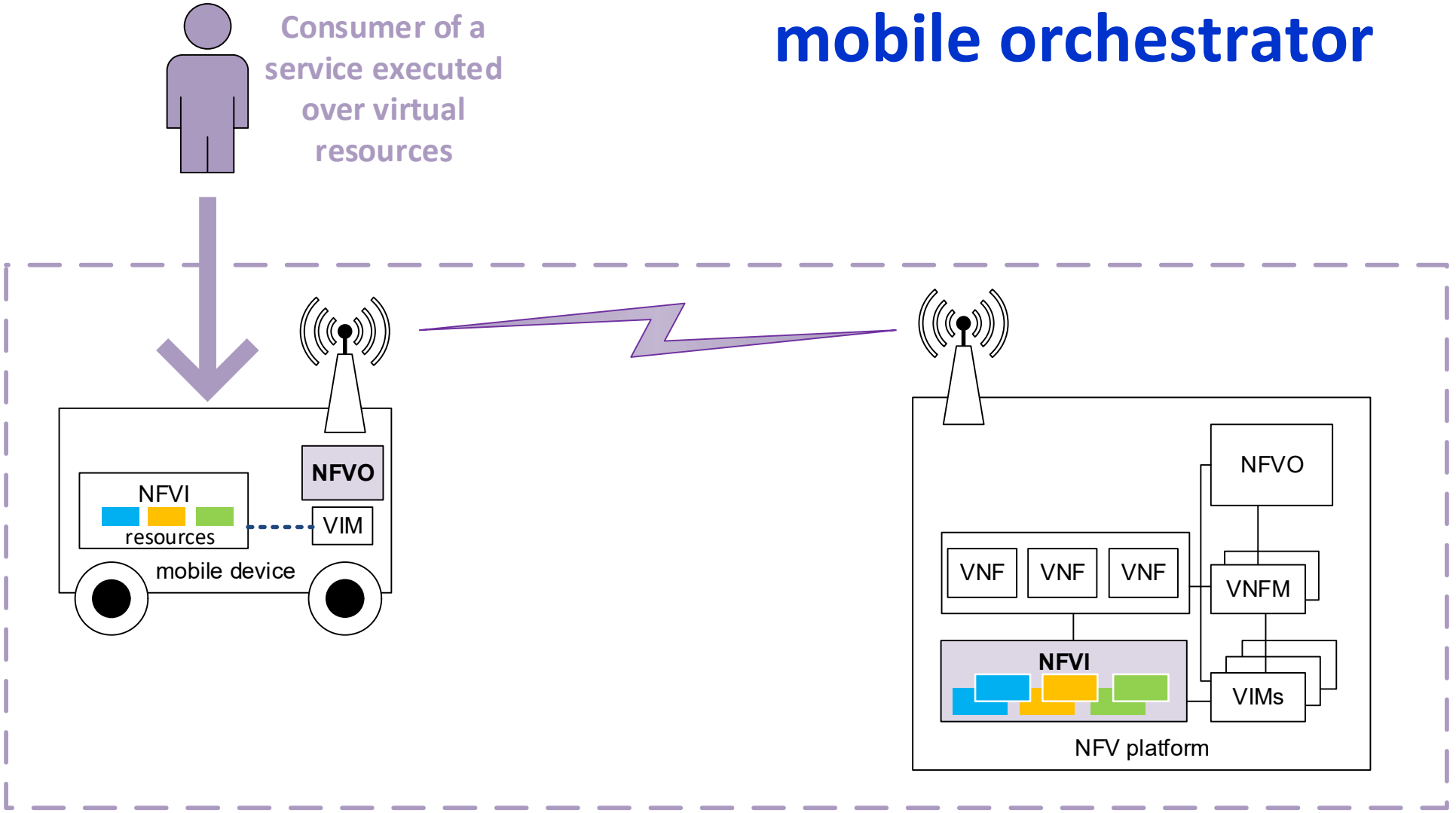
Or-Vi discovery (of resources from an orchestrator)



Or-Vi discovery: mobile resources



Or-Vi discovery: mobile orchestrator

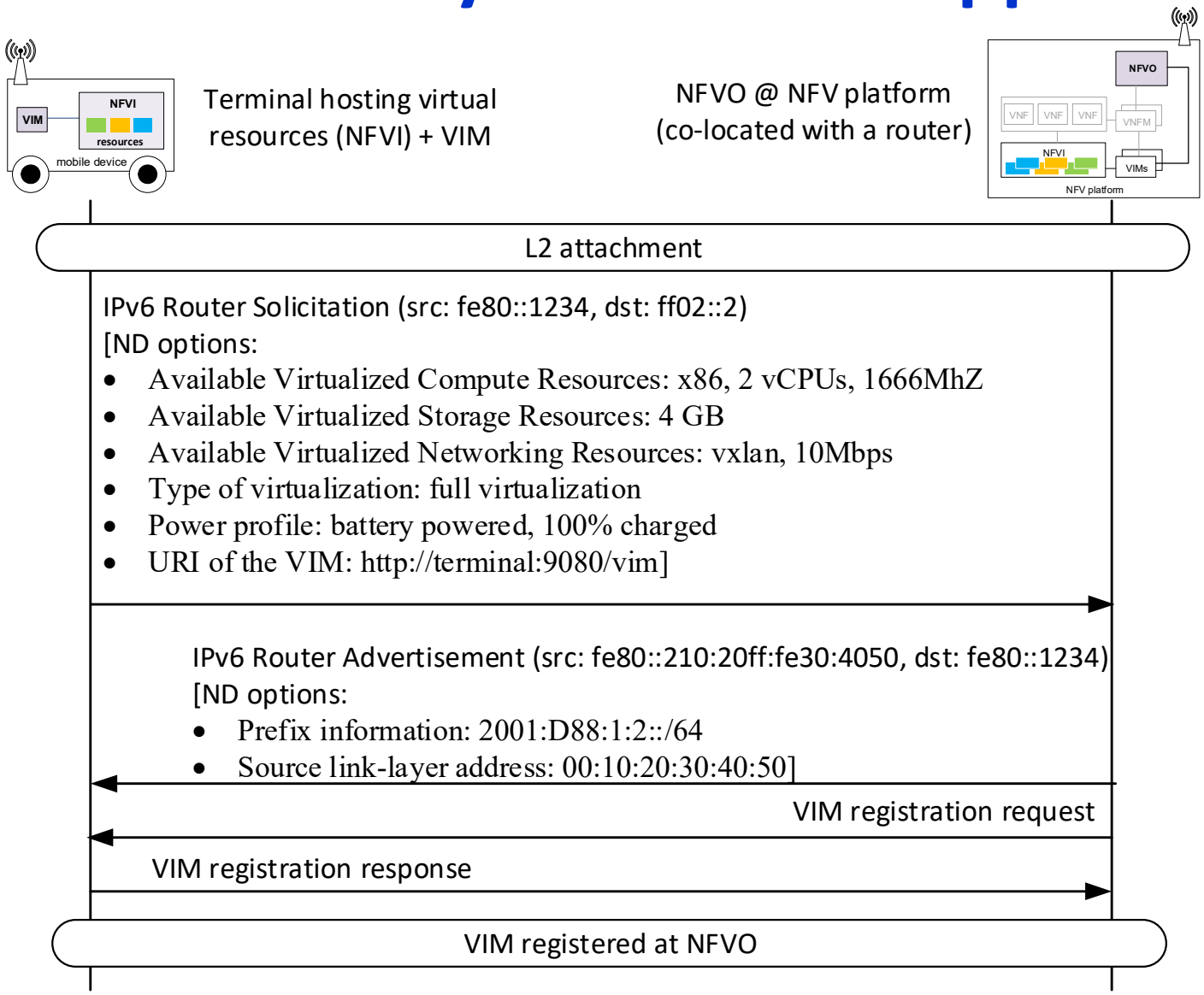


Or-Vi discovery: IPv6 based approach

- Assuming a mobile environment where resources come and go as they appear on a network (resulting from a device connecting/disconnecting)
- We (will) propose in [1] extensions to IETF IPv6 protocol between terminal and network (new ICMPv6 options) to discover and associate NFV resources

[1] draft-bernardos-nfvrg-vim-discovery-01 (to be published)

Or-Vi discovery: IPv6 based approach



Conclusion and next steps

- Mechanisms for auto-discovery of NFV functional blocks are required
  - Not only in fog/edge dynamic environments,
  - also in generic multi-domain environments
- ETSI NFV already identified this need (IFA028)
  - IETF protocols might be used to provide a solution for certain scenarios (e.g., Or-Vi discovery of VIMs+resources hosted at mobile devices)
- Do we want to continue exploring this here?