

# Welcome to the World of Standards



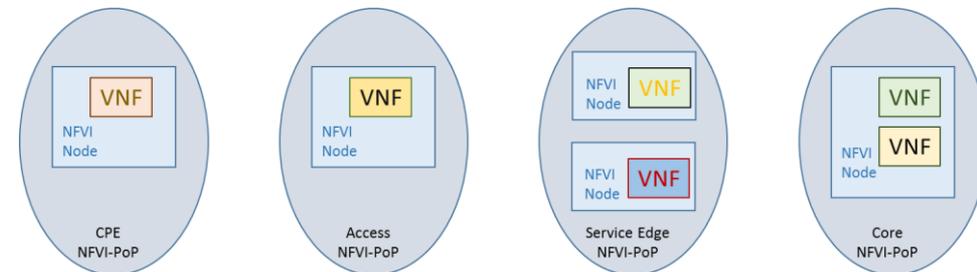
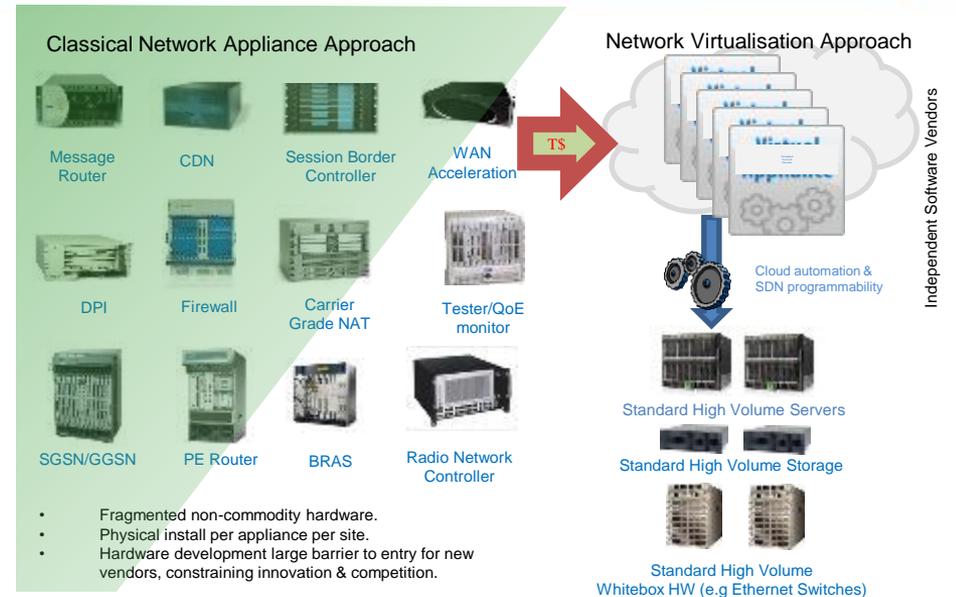
## Information Model Cooperation - An ETSI NFV ISG report for IM Workshop -

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# Introduction - Background

## ● NFV Drivers/ Business Objectives\*

- Rapid Service innovation through software-based deployment and operationalization of network functions and end-to-end services
- Improved operational efficiencies resulting from common automation and operating procedures
- Reduced power usage achieved by migrating workloads and powering down unused hardware
- Standardized and open interfaces between network functions and their management entities so that such decoupled network elements can be provided by different players
- Greater flexibility in assigning VNFs to hardware
- Improved Capital Efficiencies compared with dedicated hardware implementations



\* From GS NFV 001

- **This represents an initial position discussed in ETSI NFV ISG on how to approach cooperation on information model \***
- **It focuses on how information work in ETSI NFV could be leveraged and advanced going forward**
- **Terms such as Common Information Model, Core Model, ... that are used in this proposal are only presented in order to provide a context for the recommendations**
  - Not an assumption that these are agreed terms across the industry

**\* Disclaimer: Content not formally approved by ETSI NFV ISG**

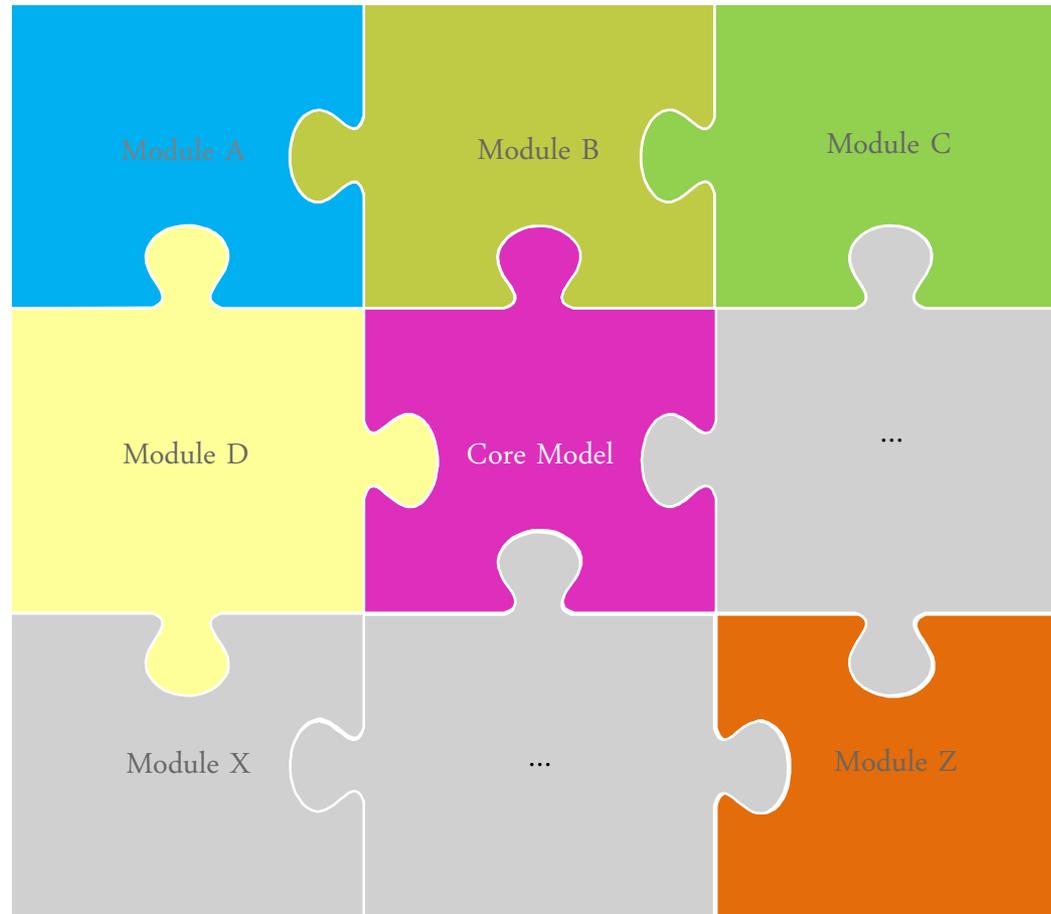
- **Information Models** are used to model objects at a conceptual level, independent of any specific protocols (or devices) and implementation details.
  - *Important considerations in NFV context :*
    - *VNFs are decoupled from execution hardware*
    - *VNFs may be instantiated/ deleted much more rapidly than physical objects*
    - *Multi-tenancy (independent operation/administration) of infrastructure, VNFs, network services*
  - In ETSI NFV: considered at technical requirements level
  - In ETSI NFV: matched to stage 2 of standard development
- **Data Models** are defined at a more detailed level, drive implementation and interoperability testing
  - In ETSI NFV: considered at technical specification level
  - In ETSI NFV: matched data to stage 3 of standard development.



- **A Common Information Model (CIM) consists of object classes representing objects in terms of e. g. properties/attributes & relationships between them and encompasses a Core Model (CM) and several specific modules / fragments which covers several technologies and levels regarding systems, networks, interfaces and applications / services**
  - The CIM can be used by organizations as well as experts /expert groups to define so-called purpose-specific Information Models (IM) via cloning/refactoring of the object classes of the CM as well as of the other modules/fragments of the CIM
  - The CIM is a living model – meant to expand/adapt over time

- **A Core Model (CM) consists of key object classes which represent objects in terms of e. g. properties (attributes) and relationships between them and is part of a Common Information Model (CIM)**
  - The CM can be used in the context of various technologies and levels e. g. concerning networks, interfaces and applications / services
  - The CM can be grouped in several subsets which comprise several topics/aspects e. g. concerning a network, an interface, and a service
  - It is a living model over time and influences the CIM, i. e.
    - key object classes can be tuned or additional object classes can be included or
    - object classes can be removed, if no longer needed as key object classes

# A view of relationship between CIM and CM



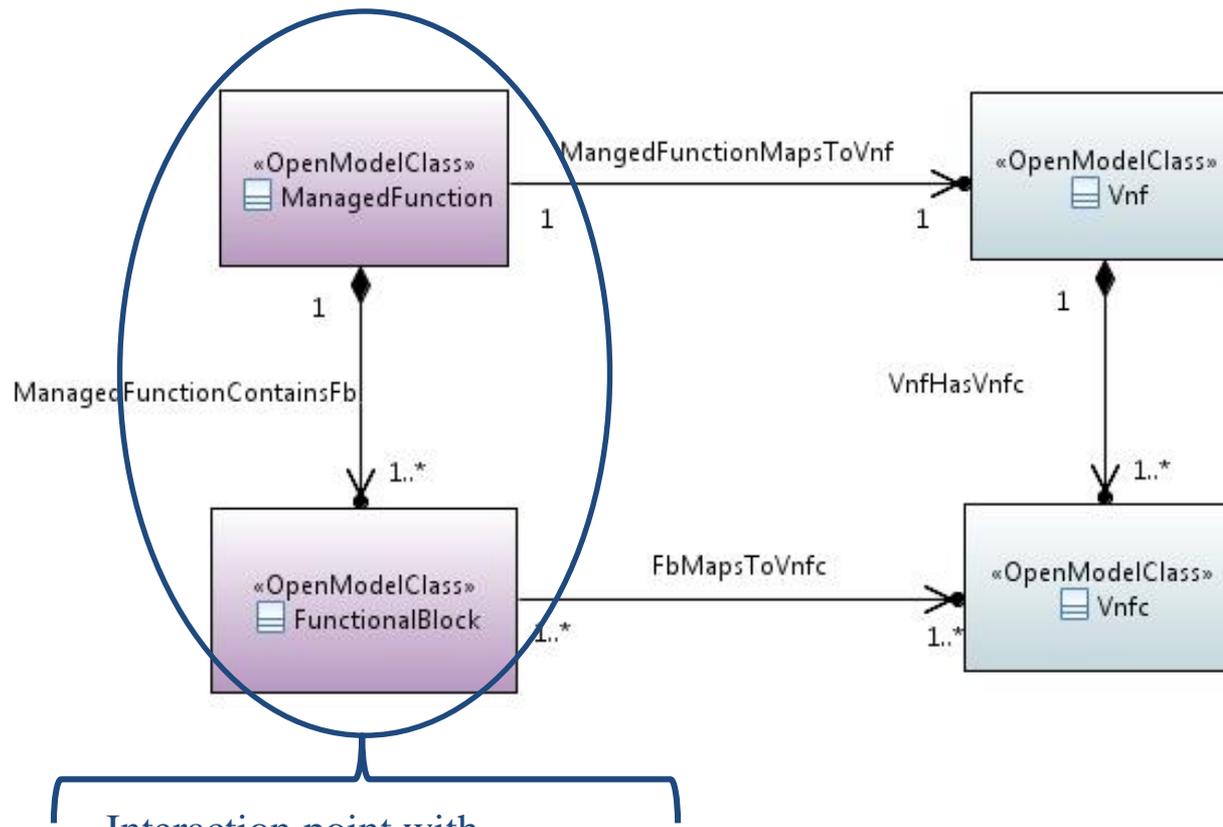
- **ETSI NFV IM uses a subset of the OpenModel profile in Papyrus**
  - This profile is been defined by ONF and is also used by other organizations (MEF, ITU-T...)
- **Likely to move to use the complete profile once in open source**
- **Same model decoration/guidelines can be shared across multiple organizations**
  - Some sharing on gendoc templates - done
- **Potential to leverage tools to generate interfaces or data models**
  - Once ETSI NFV ISG information model is complete

# Example of Interaction at application level



## Application View

Outside of ETSI NFV ISG scope

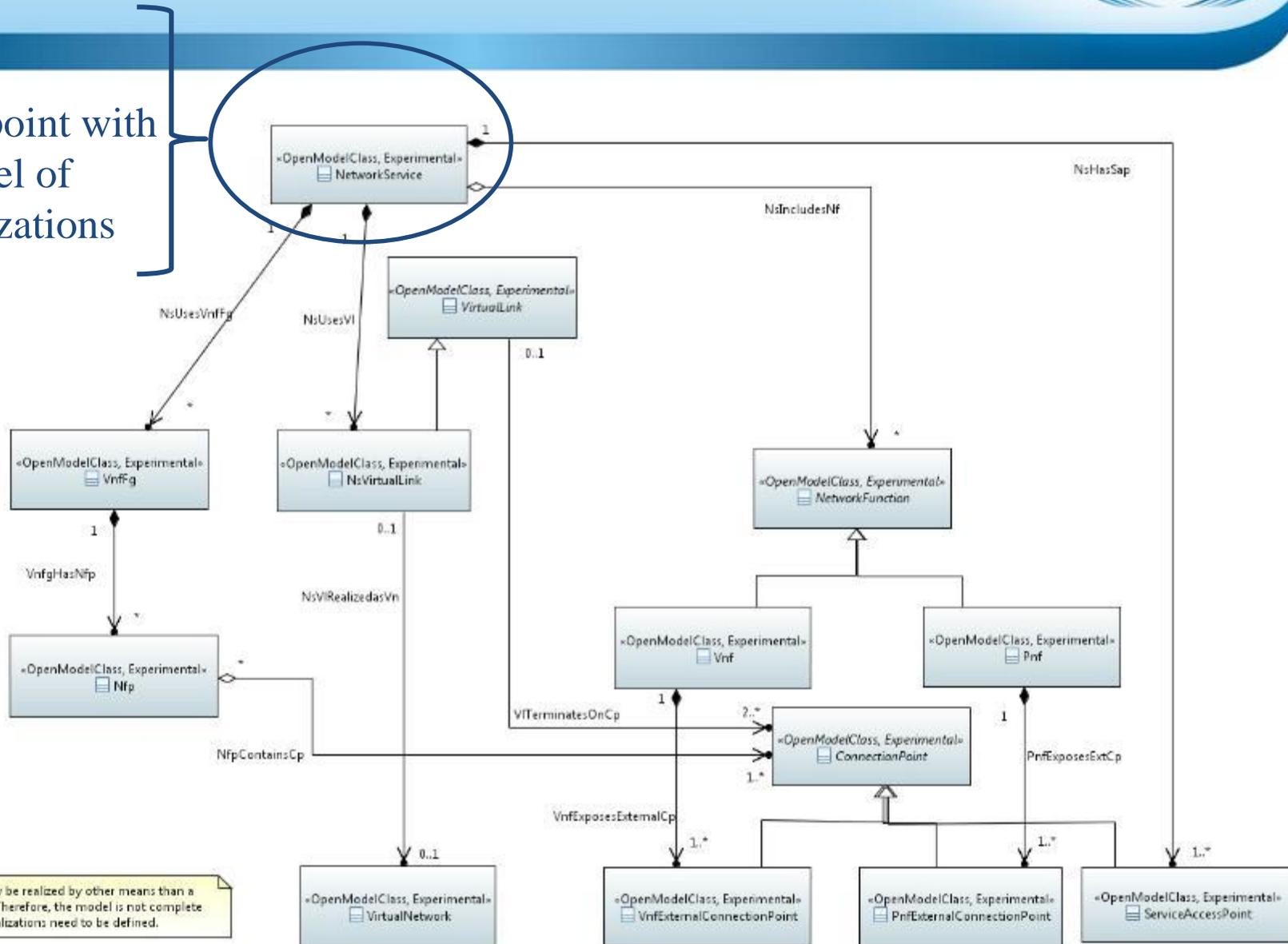


Interaction point with application model of other organizations

# Example of Interaction at Service level

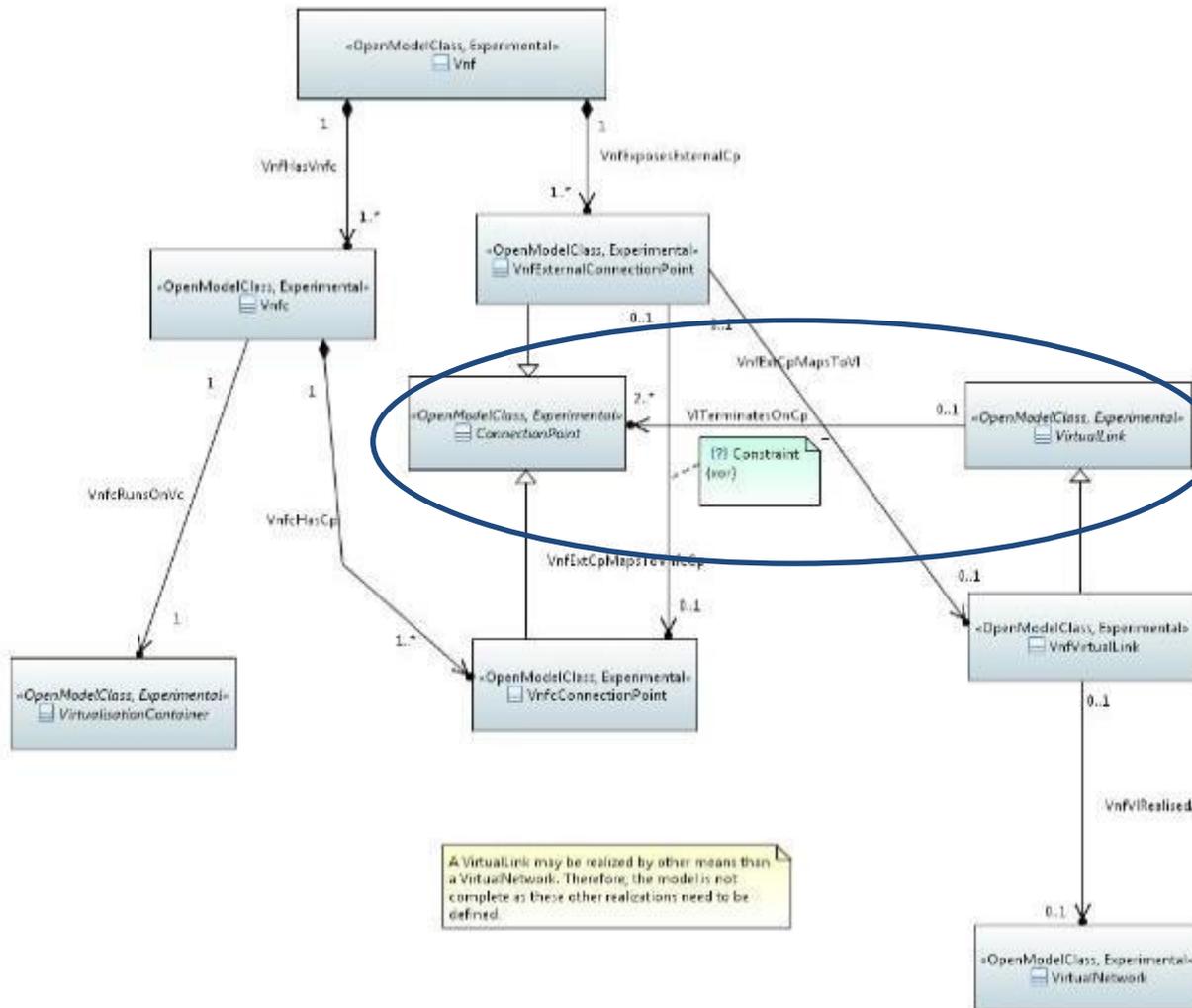


Interaction point with service model of other organizations



A VirtualLink may be realized by other means than a VirtualNetwork. Therefore, the model is not complete as these other realizations need to be defined.

# Example of Interaction at Network level



Interaction point with network model of other organizations

- **Interaction points between ETSI NFV ISG information model and other organizations' models should be defined, allowing all organizations to extend their model based on the interaction points as they see needed**
  - Possibly reuse or reference parts from each other's models
- **ETSI NFV ISG to focus on modeling of selected classes, with the intent to cooperate to promote consistent usage\* of these classes across the industry:**
  - NS and associated classes (NS,VNFFG,VL,PNF,CP,SAP...)
  - VNF and associated classes (VNF,VNFC,CP,VL...)
  - Virtual Resource classes (VirtualCompute/Storage/Network...)
  - Associated descriptors (NSD,VNFFGD,VLD,CPD,VNFD,VDU, ...)

\* consistent usage can be achieved by direct adoption, alignment, mapping or any other cost effective translation or derivation of ETSI NFV ISG classes into third party Information Models, Data Models or implementation patterns that would preserve the substance and semantic of the NFV classes

- **The IM workshop is the opportunity to investigate if convergence on a selected subset of the ETSI NFV ISG information model is possible and identify that subset**
  - Alignment on the used terminology is a pre-requisite
- **ETSI NFV ISG discussed the interest in achieving an industry-wide Common Information Model (including a Core Information Model), shared between organizations.**
  - It will take a village
  - Getting there: bottom-up? top-down? Hybrid?

# Recommendation regarding transition from Information Models (IM) to Data Models (DM)



- **Purpose specific Information Models can evolve to Data Models**
  - automation via tooling to Data Models/Data Schemas can play a role (e.g. Model Driven Architectures)
- **To enable the use of ETSI NFV ISG IM by other organizations for data model development following actions would make sense:**
  - Provision of the necessary information from the corresponding Information Models will be needed, e. g. concerning semantics, structure, data type, value space, ...
  - Work together with organizations (responsible for stage 3 DM) on a mapping from NFV IM to stage 3 data types and basic classes

- **Leverage ETSI NFV ISG information model core classes at well-defined interaction points with other organizations' information models**
- **Align on terminology in general, and in particular at interaction points**
- **Strive to use the same/similar methodology**
- **We would like to get the view of other organizations regarding interest, viability, approach and timing to achieve a Common Information Model for the industry, applicable to NFV**
- **Thanks!**