

SARNET-21 Workshop - Semantic Addressing and Routing Impact on Future Networks

Workshop Panel

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Question 1

- Do the **challenges** that drive consideration of **semantic addressing and routing** also drive/be driven by a new Internet architecture (and what is it)?
 - How do the limitations of traditional routing approaches translate to shortcomings in network capabilities?
 - Not adapted to the applications' requirements which are different and changing over time
 - There is no perfect nor a one-fit-all solution
 - Lack of semantic
 - Mobility not assured
 - Is it appropriate to overload existing protocol fields to achieve an engineering result?
 - We don't need a particular protocol → we need an Internet architecture or Framework that could allow to support easily any protocol customized to the needs of the application
 - What are the key expected new developments in networking (e.g., programmability, management, etc.) requiring changes in addressing and/or routing.
 - Virtual Network Functions, software defined networking, programmable data planes, dedicated hardware (GPU, NPU, etc.) are the key to program the network and easily change and adapt addressing and routing

Question 1

- Do the **challenges** that drive consideration of **semantic addressing and routing** also drive/be driven by a new Internet architecture (and what is it)?
 - What are the key few research and development challenges and their rationale for the next 5 years period in Semantic Addressing and Routing
 - Major revolution: Virtualisation and Slicing → each slice could have each own semantic addressing and routing
 - What kind of addressing? Semantic?
 - Not restricted to IPv4 or IPv6 addressing or routing
 - Fully flexible header, addressing, routing customized for each slice (promoted by the FlexNGIA architecture www.FlexNGIA.net)
 - What are the impact and benefits in changing addressing and /or routing?
 - Addressing and routing customized to the applications running on the slice (see FlexNGIA architecture www.FlexNGIA.net)
 - Do new routing and forwarding techniques need to interoperate or co-exist with current mechanisms?
 - Yes, Isolated slices → all routing and forwarding techniques should be internal to the slice and isolated !

Question 2

- How to define efficiently “**Limited Domains**” (i.e., factory network, CDN network, IoT network, etc.) and what you consider is their role in the Internet?
 - Domain → Yes, but also Slice
 - A Slice is defined by a technology, routing and addressing schemes, network functions, performance requirements
- To what extent should we aim for a generic solution, and to what extent should we focus on specific solutions for specific environments? Where is the trade-off?
 - A generic solution for the Internet architecture (see FlexNGIA)
 - A specific solution for each slice
 - The Internet is hosting several technologies that can be customized and isolated in each slice and that can co-exist and live simultaneously

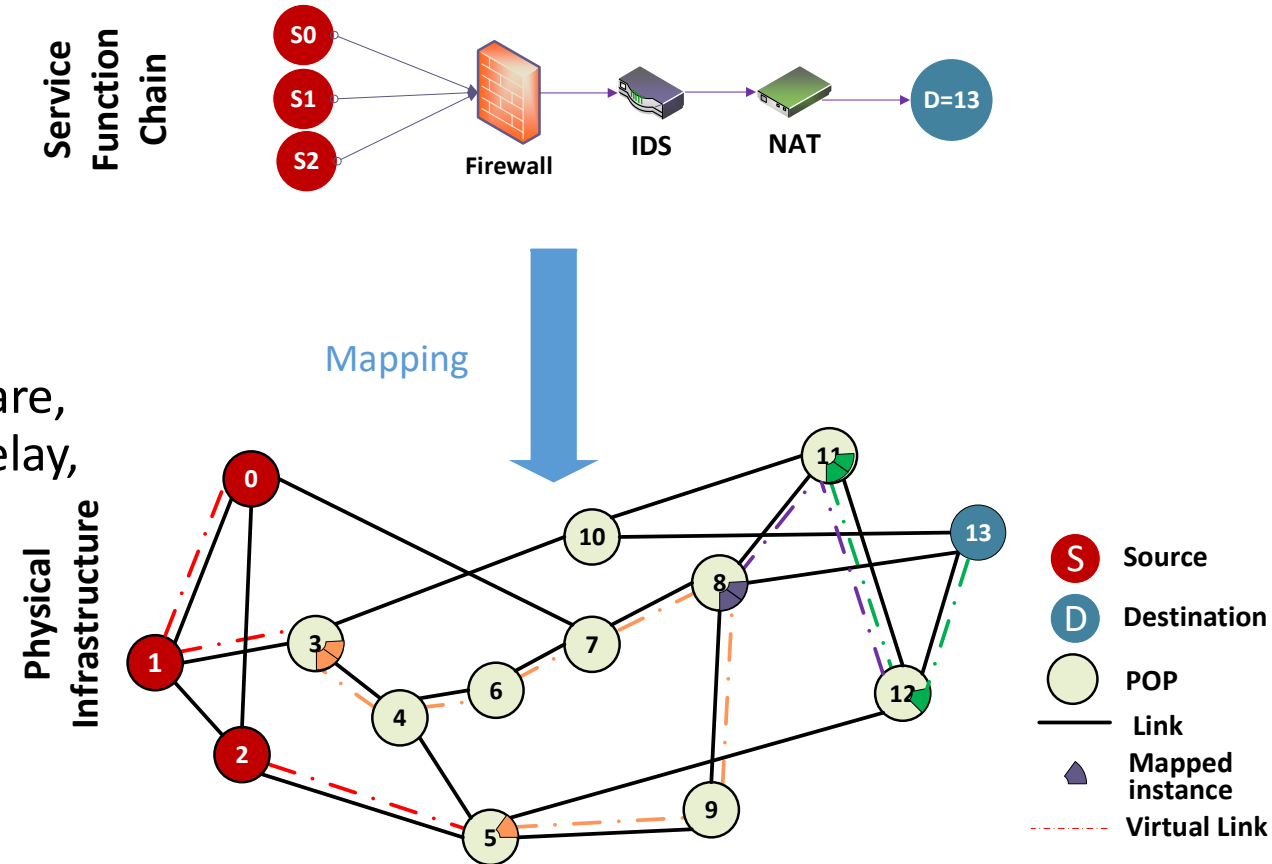
Question 3

- What would be the approach to funnel more research ideas into **SDOs**?
 - What are the expected standardisation actions for the next period?
 - We need a standard for a novel Internet that allows permissionless innovation by allowing isolated and fully customized slices
 - Should we enable "permissionless innovation", or is there a need for standards and mutual review?
 - FlexNGIA allows permissionless innovation by allowing isolated and fully customized slices
 - What are the key expected new developments in networking requiring changes in standards for addressing/ routing?
 - We have already made several steps to such Internet thanks to the trends of softwarization, slicing, data programmability → A fully flexible and programmable Internet architecture

Future Internet Infrastructure and Services

Slice/Service Function Chain (SFC)

- Multiple connected network functions
- Multiple sources and destinations
- Made out from Network Functions
- Defines, for each network function, the type, software, input/output packet format, expected processing delay, buffer size
- Defines customized addressing and routing scheme
- Defines performance requirements (e.g., throughput, packet loss, end-to-end delay, jitter)



FlexNGIA Project

Fully-Flexible Next-Generation Internet Architecture

FlexNGIA

Computing
resources

Business model

Customized Addressing and
Routing

Application-Aware
Network functions

Flexible
headers

- In-Network
Computing: any
function
anywhere

- Multiple source
destination
Service Function
Chains
- Stringent
performance
requirements

- Customized algorithms and
protocols tailored to each
application
- In-Network Computing
- Stringent performance and
reliability guarantees

- Advanced functions
tailored to
applications
- App-aware traffic
engineering

- Tailored
to the
application

Looking for More Details?

- FlexNGIA Project and Papers: www.FleXNGIA.net

