Name-Based Service Function Forwarder (nSFF) component within SFC framework

https://www.ietf.org/internet-drafts/draft-trossen-sfc-name-based-sff-01.txt

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Recap

- 5G SBA Use Case illustrates, in distributed data centers (virtualized) service end points are created/recreated frequently
  - Requires the SFC framework to reconfigure the existing chain
  - Reconfiguration, using information of the new relationships, cause overhead in many components, such as Orchestrator

- **Rev 00** of the draft, proposes to
  - lift the chaining relationship from Layer 2 and 3 information to that of service function 'names'
  - extend major concepts of SFCs based on such named relations
    - nSFP : Name based Service Function Path
    - nNLM: Name based Network Locator Map
    - nSFF: Name based SFF which extends SFF operations to act on such name based information

Main Idea

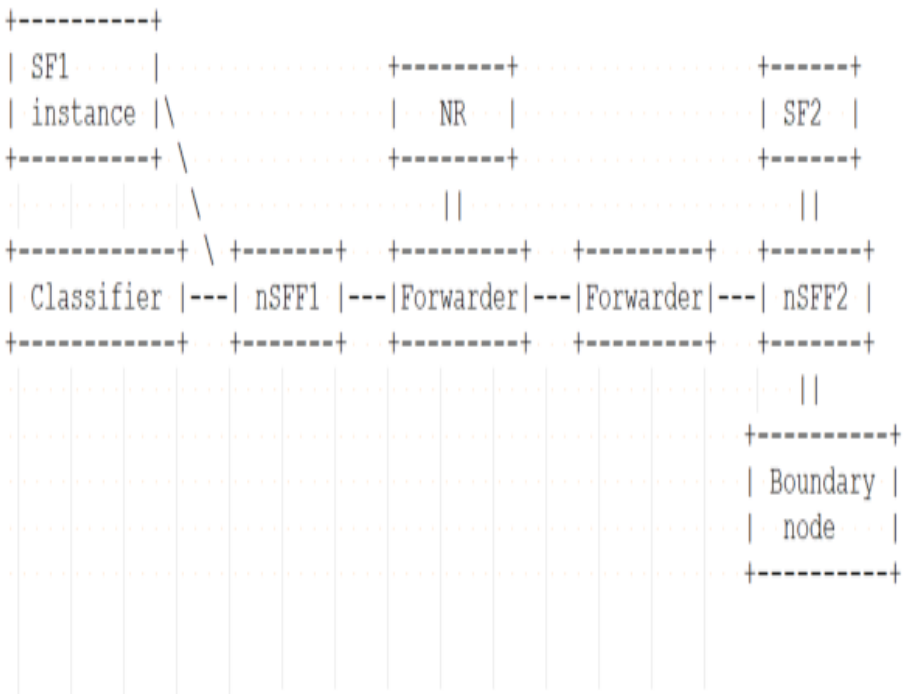


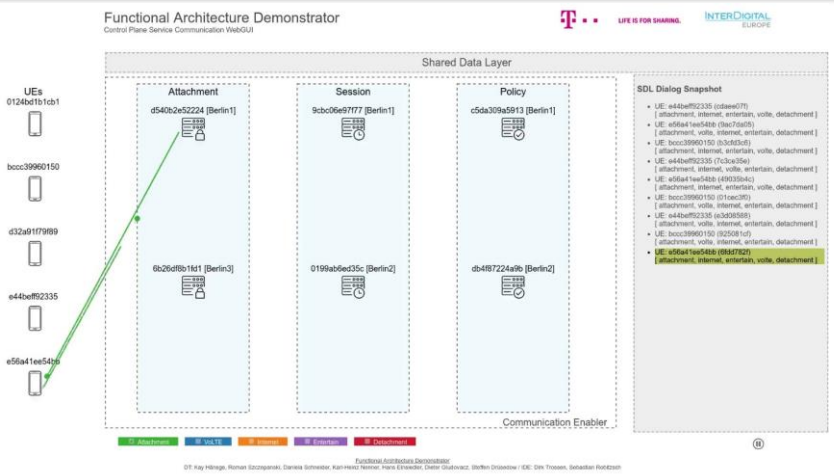
Figure 5: High-level architecture

- Extend relationships between SFs from L2/L3 to names, expressed through e.g., URIs
- Extend SFC concepts with name relation in mind
  - nSFP: Extended Service Function Path to include ‘name-based interactions’
  - nNLM: Extended Network Locator Maps to include ‘name-based next hops’
  - nSFF: Extended Service Function Forwarder operation to act on such name-based information
  - NR (Name Resolver): capable of identifying the execution end points, where a “named SF” is running.

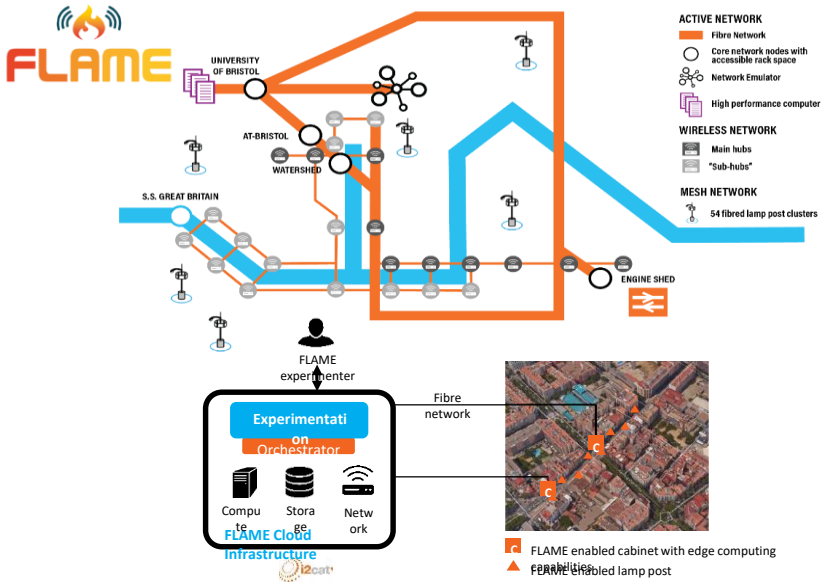
Main Idea

- The extended operations in nSFF is only invoked when the next hop in the NLM is described as a name, e.g. URI
- If the next hop information is described as L2/L3 identifier, then normal SFF operations are executed.
- This will be clarified in the next update of the draft.

Deployment/Trial examples

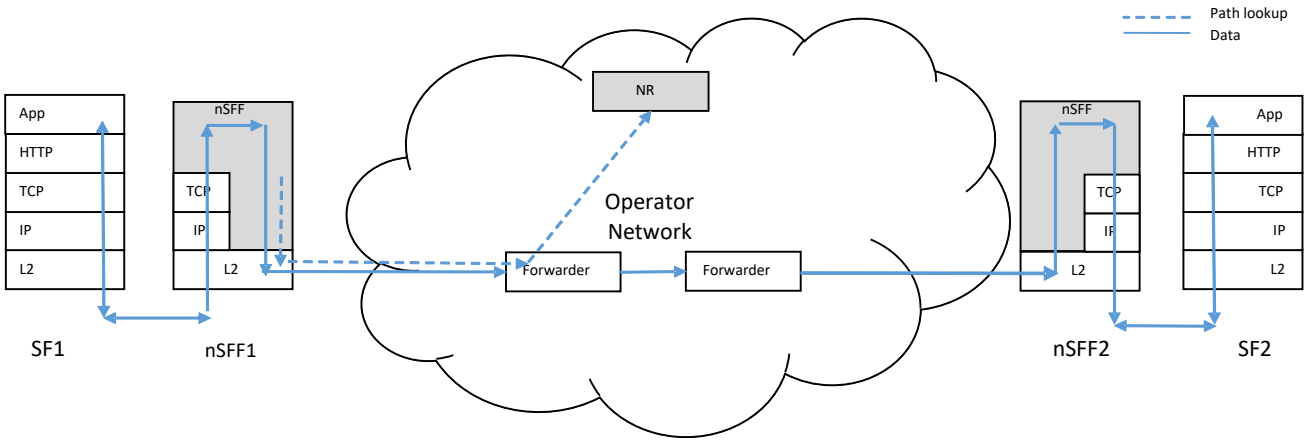


- Demonstration of the 5G SBA Use Case at NGMN Forum April 2018, jointly with DT
- Shows control plane executed as HTTP-based services



- Flame platform : Validation through Urban Scale Trials & Experiments
- Focus on media scenarios, e.g., VR, AR, MR
- Ecosystem partners
  - 5 operator infrastructures
  - 25+ customer trials

Main Comments Addressed in Update



- Description of operations in *the nSFF, between nSFF and NR to forward to remote SF*, specifically considering
  - *Avoid delay* in forwarding by saving forwarding information previously obtained
  - *Avoid staleness* of forwarding information by periodically updating the saved information

nSFF Operation details

- The detailed operations described in the draft include:
  - Forwarding between nSFFs and nSFF-NR.
  - Service Function (SF) Registration
  - Forwarding to a local SF
  - Forwarding to a remote SF
    - Remote SF Discovery
    - Maintaining Forwarding Information at Local nSFF
    - Updating Forwarding Information at nSFF

Minimize latency of forwarding

- The discovery operation of remote SF may introduce latency in forwarding at nSFF
- To minimize latency in discovery, the following steps are executed
  - Response to a discovery request is saved in nSFF
  - Any future forwarding request to the same remote SF is resolved locally
- First time requests, which cannot be resolved locally, may still experience certain latency
  - Could be resolved through pre-population as described in draft on optimized chaining (see https://datatracker.ietf.org/doc/draft-khalili-sfc-optimized-chaining/)

Avoid staleness of forwarding information

- NR maintains a table of discovery requests
- It maps discovered (hash of) FQDN to the nSFF_id that requested it and the pathID that is being calculated for remote nSFF forwarding
- Information at NR is updated
  - If an SF is not reachable
  - A new SF has become available
  - SF is unreachable as link has gone down
- May lead to re-discovery at nSFF for remote SF whose pathID has been updated

Future work

- Defining transport protocol between nSFF-nSFF and nSFF-NR
- Handling HTTP responses
- Security (TLS handling)
- Addressing nits identified by readers

Next steps

- Collect feedback from the WG
  - On the **general validity** of this extension to SFC, i.e., its scope within the SFC WG
  - On this **solution** specifically

- We will work on aligning solutions, being deployed for trials, fully with this draft
  - Contribute to work in NGMN SBA WG on performance evaluation of message routing (which could be realized via nSFF)