# Hierarchical Service Function Chaining (hSFC)
## draft-dolson-sfc-hierarchical-06

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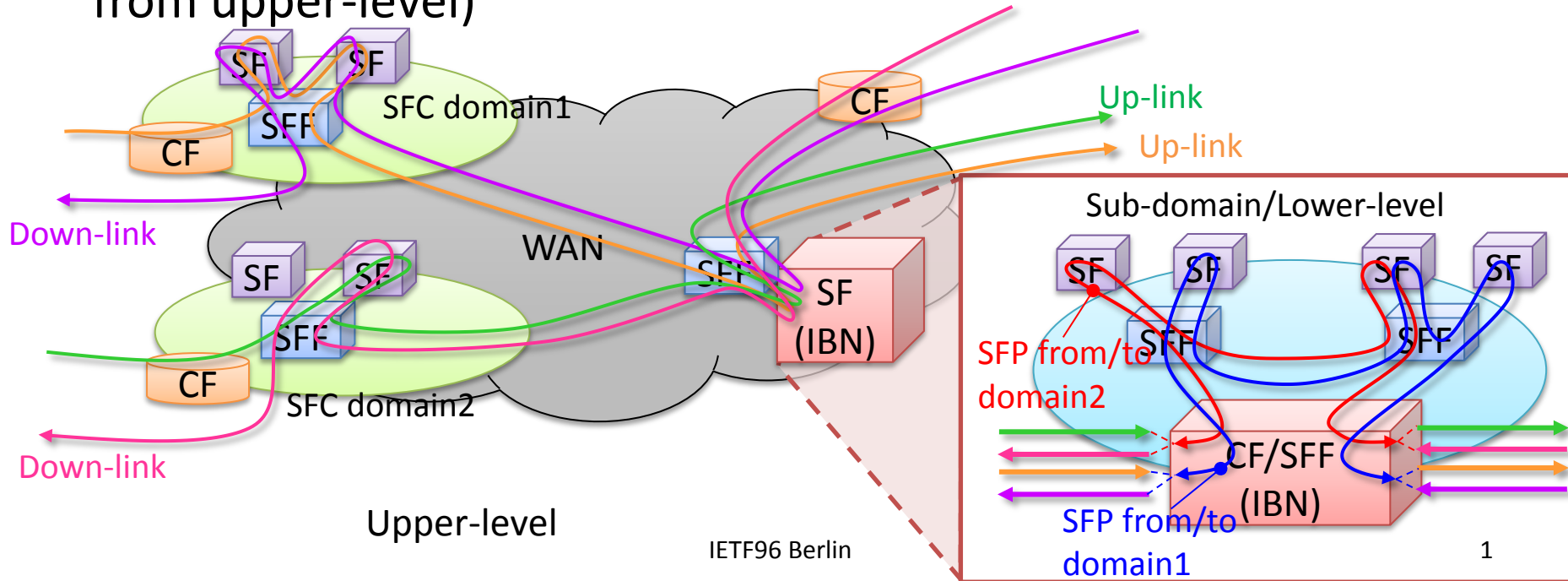
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# Overview of hSFC

- Separate control of SFP in each SFC domain
- IBN conceals sub-domain form upper level (IBN looks like an SF from upper-level)

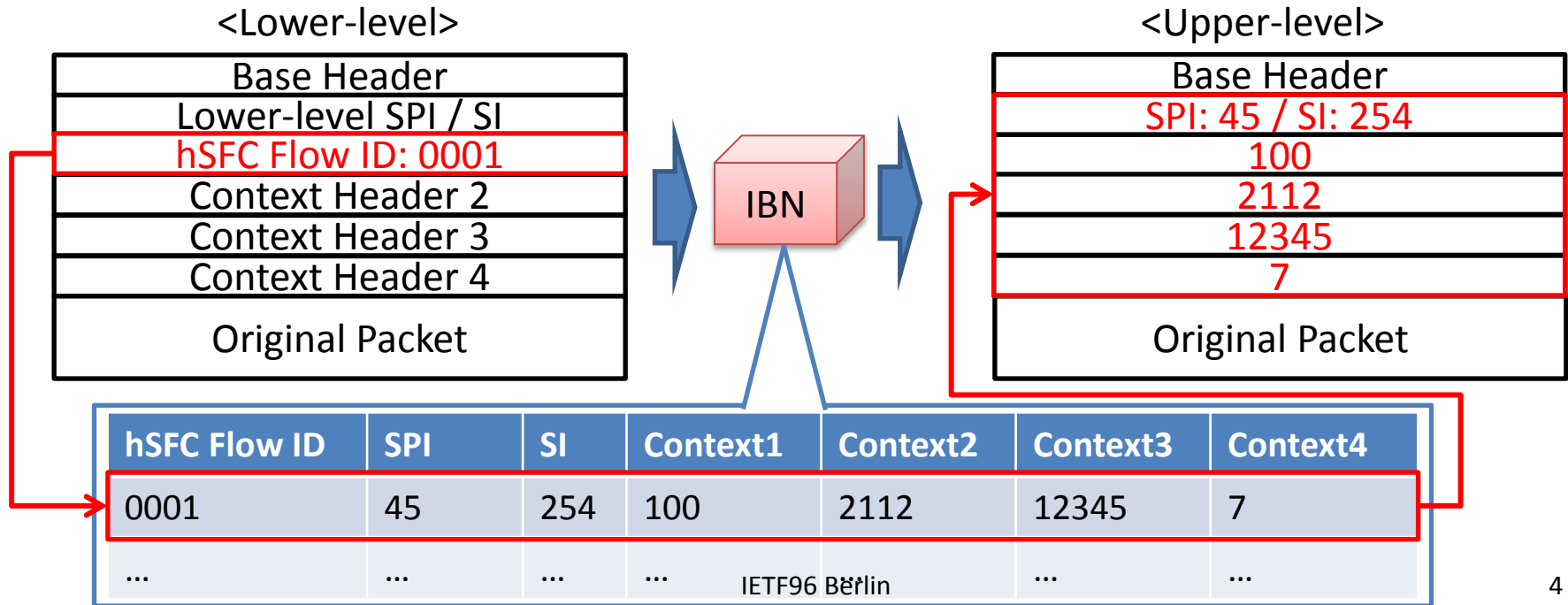# Main Changes since Buenos Aires

1.  Add a new paths-gluing mechanism of IBN (Hybrid Approach)

2.  Discuss hSFC for NSH-unaware SFs

# Paths-Gluing Mechanisms

- Packets exiting lower-level domains are returned to path in the higher levels.

- Current draft introduces 5 methods as follows:

  1. Flow-stateful IBN – remember which path flow information (E.g., 5-tuple)

  2. Encode upper-level paths as context metadata of lower-level

  3. Unique lower-level paths per upper level path

  4. Nesting upper-level NSH within lower-level NSH

  5. **Stateful / Metadata Hybrid** **New in -06**

# Hybrid Approach

- IBN saves upper-level NSH with mapping to hSFC Flow ID and inserts the ID into context header 1 of lower-level NSH

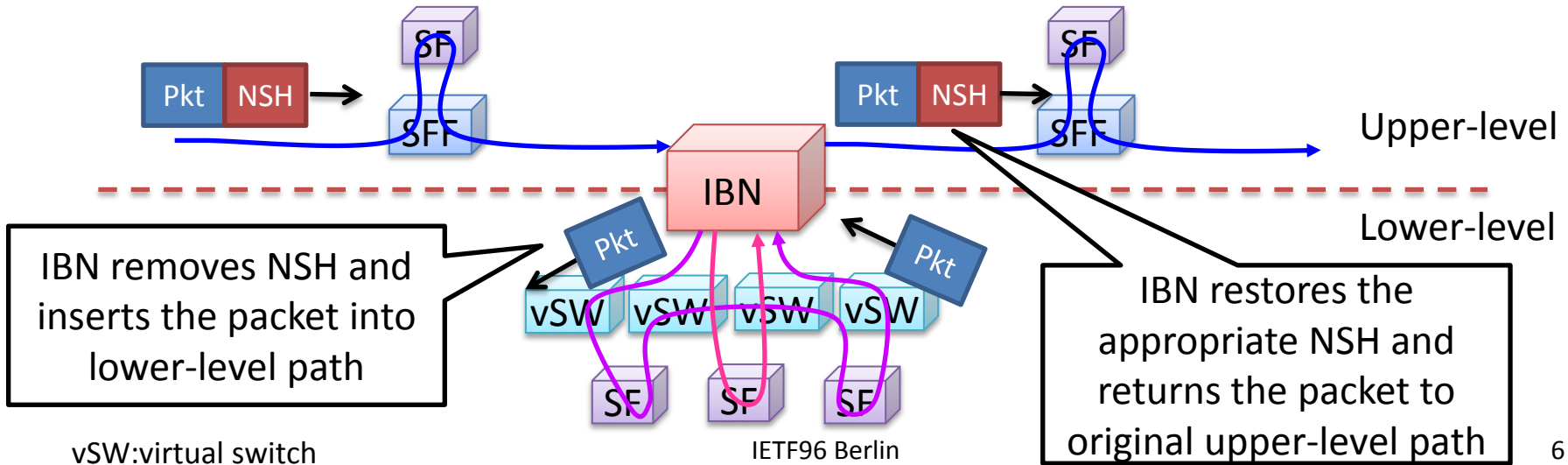- IBN retrieves the original upper-level NSH by referring the hSFC Flow ID



<Lower-level>

| Base Header |
| :---: |
| Lower-level SPI / SI |
| hSFC Flow ID: 0001 |
| Context Header 2 |
| Context Header 3 |
| Context Header 4 |
| Original Packet |

IBN

<Upper-level>

| Base Header |
| :---: |
| SPI: 45 / SI: 254 |
| 100 |
| 2112 |
| 12345 |
| 7 |
| Original Packet |

| hSFC Flow ID | SPI | SI | Context1 | Context2 | Context3 | Context4 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 0001 | 45 | 254 | 100 | 2112 | 12345 | 7 |
| ... | ... | ... | ... | ... | ... | ... |

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4

# Advantages of Hybrid Approach

- Does not require state based on 5-tuple

    -> Can be used for SFs changing original packets

- Does not require all domains to have the same metadata scheme

- Can be used to restore any upper-level NSH information including context headers

- Requires only a single context header in lower-level domain

- Does not require any special functionality from SFs, other than the usual ability to preserve metadata and to apply metadata to injected

# hSFC for NSH-unaware SFs

- hSFC can be used for dividing networks into NSH-aware and NSH-unaware domains

- IBN converts NSH forwarding to other forwarding techniques (E.g., 5-tuple based routing with OpenFlow)



SF

Pkt NSH → SFF

SF

Pkt NSH → SFF

Upper-level

IBN

Lower-level

IBN removes NSH and inserts the packet into lower-level path

Pkt

vSW vSW vSW vSW

Pkt

SF SF SF

IBN restores the appropriate NSH and returns the packet to original upper-level path

vSW:virtual switch

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6

# hSFC for NSH-unaware SFs (Cont'd)

- Following methods are required to glue higher-level and lower-level paths:
  - Saving NSH information with flow states
  - Using unique lower-level paths per upper-level NSH
- Additions：
  - Transforming packet to appropriate format

    (E.g., restore L2 information from metadata)

# RECOMMENDED IBN Behavior?

- The document describes several methods to achieve the required behavior
  - Leave the choice of method to deployment (*our proposal*)
- Or should we recommend one or more of these?
  - If yes, based on which criteria?

# Use Cases

- The document discusses some use cases in two appendices
  - Should that text be moved to core text?
  - Maintain the text as it is? (***Our proposal***)
  - Or, remove the appendices?
- Opinions?

# Document Status & Next Steps

- Many reviews and contributions
- The document is currently under WG call for adoption
- Reviews are more than welcome
  - Any chance to get 3 volunteers to review from the audience?
- Proposed Milestone
  - If the document is adopted, the authors commit to prepare a stable version for a WGLC prior to the next IETF meeting