QCN in Overlay Networks

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Architectural Principles

- To enable QCN over tunnels, Layering Principles SHALL not be violated

Observations

- A Transit CP is oblivious to the existence of overlay networks
  - The Nodes in the overlay network SHALL NOT inspect Payload
  - The Nodes in the overlay network NEED NOT understand various header formats
  - The CNM generation mechanism is independent of the overlay
- An RP is oblivious to the existence of overlay networks
  - The RP SHALL receive the same congestion information from any CP

Goal

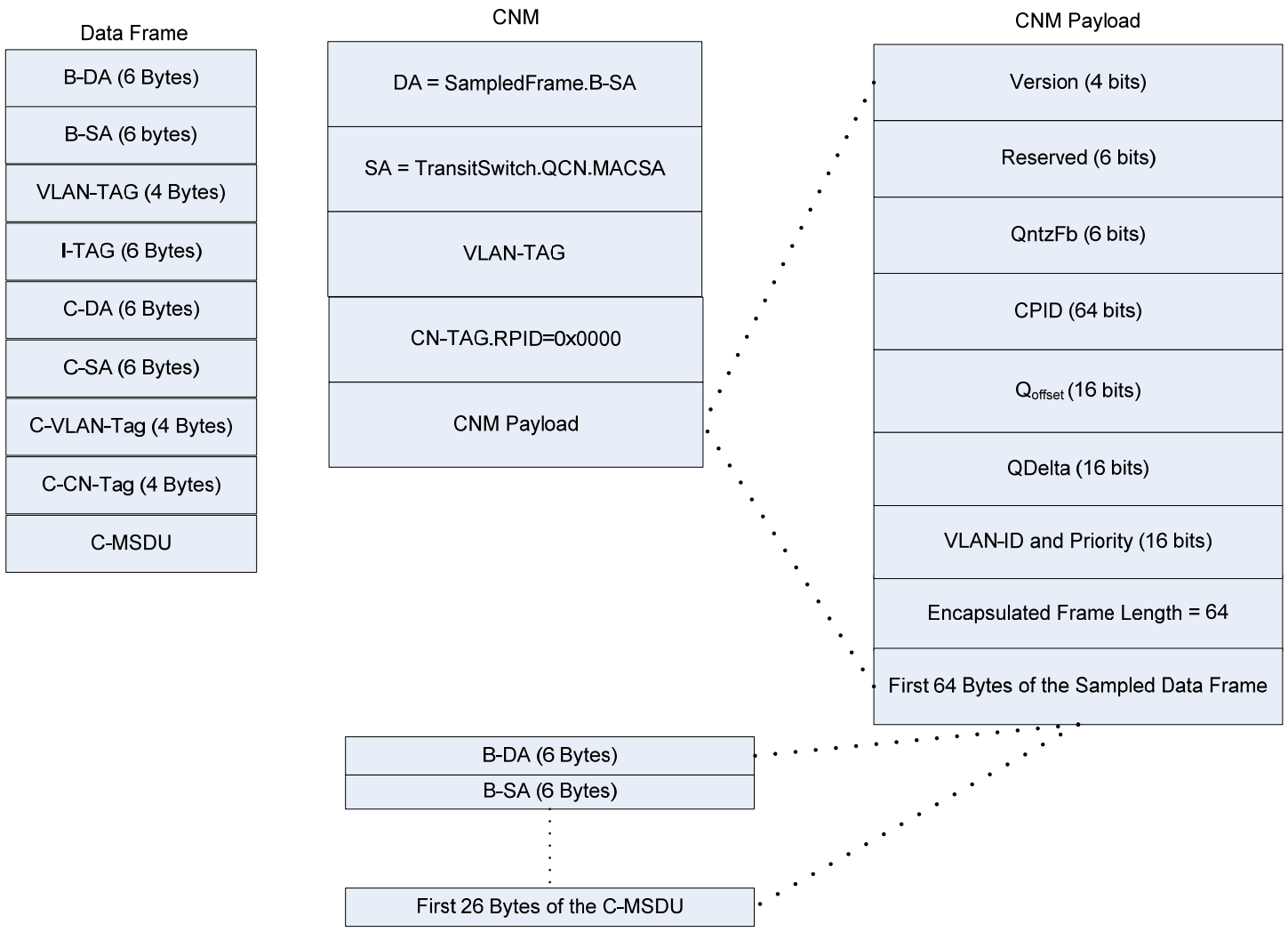
- Provide PBB support for QCN in a manner that does not violate the layering principles

Proposal Overview

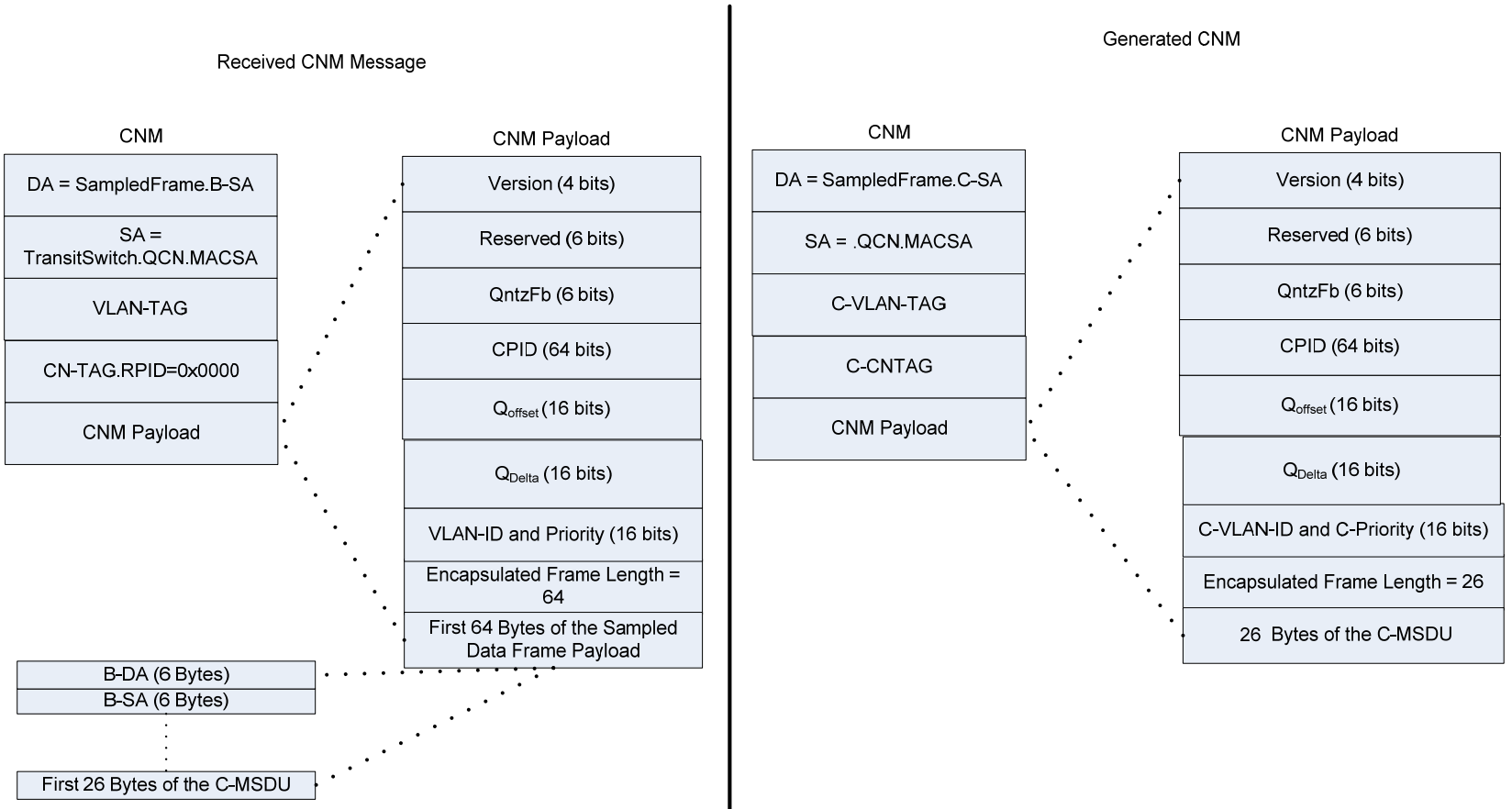
- A backbone switch facing congestion will generate a QCN CNM for the consumption of the QCN CNM Relay Entity
  - The QCN CNM Relay entity is the switch that encapsulated the sampled data frame

- The QCN CNM Relay is responsible for reconstructing the *QCN CNM* for the source of the Sampled Data Frame

QCN CNM Format: From Transit CP to CNM Relay



QCN CNM Format: From CNM Relay to RP



Reconstruction of the QCN CNM at the CNM Relay

- Delete the CNM L2-header
- Construct a new L2-header based on the CNM payload values
- Delete the corresponding values in the payload
- Update the encapsulated frame length field in the CNM payload
- Recompute CRC32
- Pass the frame to the packet forwarding engine

Advantages

- A Transit CP is oblivious to the existence of overlay networks
  - Transit CP does not inspect payload
  - CNM generation is independent of the CP's position in the network
  - CP needs to understand only one type of MAC header format
- Works across hierarchical MiM
  - MiM inside an MiM frame
  - Including the first 64 bytes of Sampled Data Frame would be sufficient to support 2 levels of hierarchy
  - Extending the hierarchy to multiple levels would require including more bytes from the sampled data frame
    - No additional parsing complexity
- The rate control occurs only at the sources
- RP is oblivious of tunnels

Observations

- The RP cannot know the actual MAC-SA of the CP when receiving a CNM across an overlay network
- If CPID is local to the CP, then debugging the network will become difficult
- CPID needs to be made globally unique in the network
  - CPID can consist of 48 bit MAC-SA of the Switch and a 16 bit locally unique number

Thank you

Backup

RP Component in the CP