Bridging Issues in Integration of IEEE 802.16 and Carrier Ethernet

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Re:
Call for Contributions IEEE 802.16-13-0032-01-Gdoc.

Base Contribution:
IEEE 802.16-13-0049.

Purpose:
To seek comment from an 802.1 perspective on a proposal to IEEE Project 802.16r.

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Integration of IEEE 802.16 and Carrier Ethernet

• Contribution IEEE 802.16-13-0049 (“Integration of IEEE 802.16 and Carrier Ethernet”) submitted to IEEE Project 802.16r for March 2013:
  – http://doc.wirelessman.org/16-13-0049

• Proposes operation of IEEE 802.16 (using the IEEE 802.16 Packet Convergence Sublayer) in bridge-centric architecture with an explicit 802.1Q bridging function at the base station;

• Some issues regarding the bridge function require further clarification.
Bridge-Centric Architecture

- Multiple SS Ports per SS
- One SS per SS Port
- One CS instance per SS
- Port-aware CS
- Unidirectional Connections
- Multiple Connections per SS Port
- One SS Port per Connection
- Connections labeled by SS Port
- All Connections linked via PHY

[several examples highlighted]
Notes on Bridge-Centric Architecture

- Bridge functionality at the base station port
- Multiple Ethernet ports per subscriber station (SS)
  - VLAN-multiplexing at those ports is essential
    - C-Tag
- Bridge does the hard work
- 802.16 MAC/PHY simply provides point-to-point links from bridge ports to SS ports
  - lower layers are transparent
Issues that Arise

• 802.16 MAC transports frames on connections
• Currently, connections are not identified with the SS port to which they are connected.
  – This can be easily remedied within IEEE Std 802.16
• Requires the following:
  – 802.16 MAC must receive frames from bridge along with identification of the bridge egress port.
  – 802.16 MAC must hand frames to bridge along with identification of the bridge ingress port.
• But there is no physical bridge port
• Multiplexing/demultiplexing required at the bridge.
  – Use some tag (such as S-Tag) to multiplex?
Bridge-Centric Architecture

- Multiple SS Ports per SS
- One SS per SS Port
- Connections labeled by SS Port

- 802.1Q Bridge
- BS Port
- SS Port 1
- SS Port 2
- SS Port 3

- SS Port 1
- SS Port 2
- SS Port 3

- SS a
- SS b

- MAC SAP
- MAC CPS
- PHY

- Convergence Sublayer

- Multiplex
- Demultiplex

- One CS instance per SS
- Port-aware CS

- Unidirectional Connections
- Multiple Connections per SS Port
- One SS Port per Connection
- Connections labeled by SS Port

- All Connections linked via PHY
  [several examples highlighted]
MAC Service

indication (destination_address, source_address, mac_service_data_unit, priority, drop_eligible, frame_check_sequence, service_access_point_identifier connection_identifier)

request (destination_address, source_address, mac_service_data_unit, priority, drop_eligible, frame_check_sequence, service_access_point_identifier connection_identifier)

• This looks like the 802.1Q ISS
• Can use service_access_point_identifier as the port identifier
• What protocol do we use to express that parameter?
Outstanding Issues

• Are there flaws in this architectural model?
• Does 802.1 specify the protocol for identifying the bridge port in a multiplexed frame emerging from a single point? What is the standard tag?
• It’s preferable for 802.16 to specify an 802.1 protocol rather than inventing one, because:
  – It would be more likely to work correctly.
  – It opens up the possibility of introducing standardized bridging hardware/software implementations into 802.16 base stations