INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2009-2012

COM 15 – LS 140 – E

English only

Original: English

Question(s):	9/15

LIAISON STATEMENT

Source:	ITU-T Study Group 15
Title:	Ethernet services over the OTN using transport VLAN tag and optionally MAC encapsulation

LIAISON STATEMENT

For action to:	IEEE 802.1
For comment to:	
For information to:	
Approval:	Agreed to at Question 9/15 meeting (Darmstadt, 1-5 March 2010)
Deadline:	31 May 2010

Contact:	Ghani Abbas Ericsson UK	Tel: +44 7710 370 367 Email: Ghani.Abbas@ericsson.com

Introduction

ITU-T SG15 extended in the last two years the optical transport network's (OTN) service capability. The initial OTN was able to support SDH STM-N and Ethernet Private Line (EPL) services. The extended OTN is able to support any constant bit rate service (e.g. STM-N, Fibre Channel, xGE, CPRI, etc.) and EPL services. A main characteristic of those services is that the service signals are encapsulated in an OTN Optical channel Data Unit (ODU) in the UNI-N ports of the OTN, and that such ODU interconnects the UNI-N ports.

The next step in the development of the OTN is the addition of support for Ethernet Virtual Private Line, Tree and LAN services (EVPL, EVPT, EVPLAN) and Ethernet Private Tree and LAN services (EPT, EPLAN). A main characteristic of those services is that the service signals are encapsulated in an Ethernet Virtual Channel (VC) in the UNI-N ports of the OTN, and that those Ethernet Virtual Channels are switched/bridged within the OTN, in OTN cross connect systems that are equipped with an Ethernet switch function (see figure 1 below). In those Ethernet-OTN (EOTN) cross connect systems one or more Ethernet Virtual Channel signals are aggregated into an ODU and this ODU interconnects two Ethernet switch functions within the OTN. Such Ethernet Virtual Channel carrying ODUs terminate in OTN NNI ports.

The point-to-point, point-to-multipoint, rooted-multipoint and multipoint-to-multipoint Ethernet Virtual Channel layer connections in the OTN will be set up by network management or an ASON/GMPLS control plane. The 802.1Q spanning tree and VLAN registration protocols are not used.

The Ethernet services can be connected to the OTN network via any 802.3/802.1Q type interface; i.e. untagged, C-Tagged, S-Tagged, S+C-Tagged, I-Tagged, B-Tagged, B+I-Tagged. The OTN is required to support those service types by means of a single Ethernet Virtual Channel layer, keeping the different Ethernet UNI interface presentations local to the Ethernet UNI-N ports.

ITU-T SG15 is also developing specifications for a packet transport network. Such network is defined to contain four layers: Virtual Channel (VC), Virtual Path (VP), Virtual Section (VS) and Physical Media (PHY). A Virtual Channel layer connection carries an individual, bundled or port based customer service, a Virtual Path layer connection carries an aggregate of Virtual Channel layer connections, a Virtual Section layer connection carries either an aggregate of Virtual Channel layer connections or an aggregate of Virtual Path layer connections and a Physical Media layer connection carries one Virtual Section layer connection.

Below is further discussion within the context of OTN.

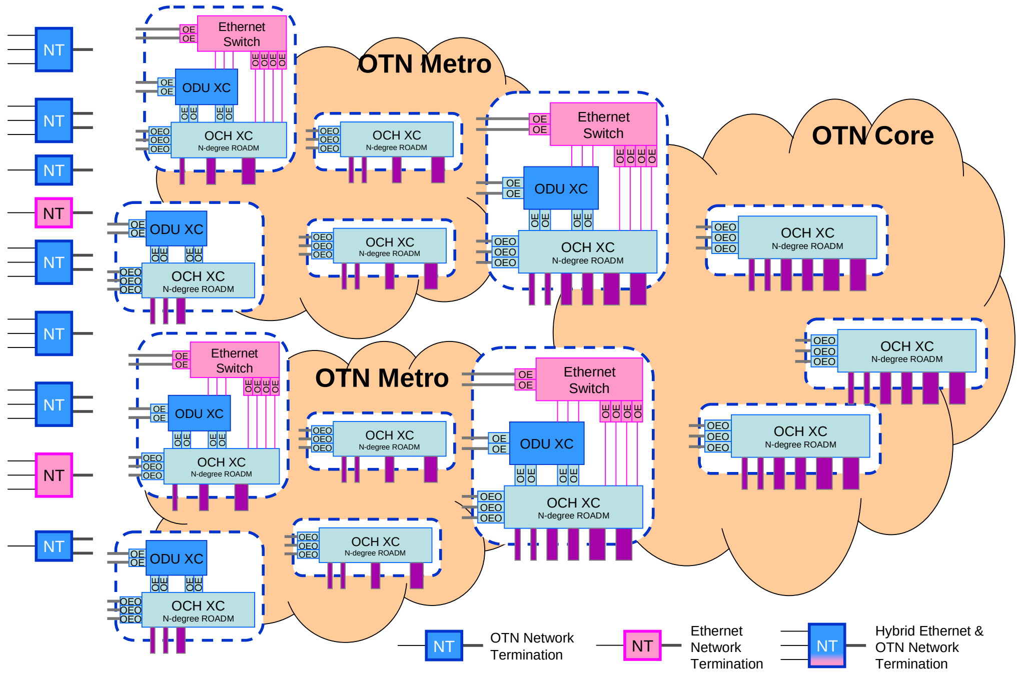

Figure 1

Discussion

When Ethernet Virtual Channel signals are multiplexed into an ODU, the Ethernet MAC frames of each virtual channel signal are equipped with a new “Transport VLAN” Tag – to distinguish this Ethernet over OTN usage from 802.1Q specified usages – and preceded by a Generic Framing Procedure (GFP-F) header (refer to ITU-T Rec. G.7041). Such transport VLAN tags are inserted in the egress ports of the EOTN nodes in Figure 2 below and extracted in the ingress ports of these EOTN nodes.

The use of a Transport VLAN Tag is indicated as the preferred means[1] to transport the Ethernet Virtual Channel Identifier, priority and drop eligible information over the ODU connection. The Ethernet Virtual Channel Identifier value can be translated on each EOTN ingress/egress port.

---

[1] The alternative method to carry Ethernet Virtual Channel Identifier, priority and drop eligible information in an ODU is by means of a specific ‘GFP Extension Header’.

To enhance scalability of MAC learning in the Ethernet switches within the OTN network, future UNI-N ports should have the capability to insert a network MAC header (TYPE, SA, DA) into the incoming client Ethernet frames. Such capability can be deployed when every UNI-N port on which a rooted-multipoint or multipoint-to-multipoint Ethernet Virtual Channel connection terminates supports such network MAC header insertion capability. For example, such is envisaged for Ethernet virtual channel connections with endpoints on UNI-N ports A, B, F, G, I, J, K, L and N (see Figure 2).

The Ethernet services supported by the OTN may have one or more of their UNI-N ports located outside the OTN (see figure 2 above); e.g. located in PEB, I-BEB, B-BEB, IB-BEB, T-BEB or Packet Transport Network (PTN) Network Termination (NT) devices.

Those devices are then connected either directly, or via intermediate PB, PBB, or PBB-TE access networks to Ethernet NNI ports at the edge of the OTN. These Ethernet NNI ports on the EOTN nodes present the Ethernet Virtual Channel Connection (ETH VCC) signals in the appropriate NNI format expected by these devices; i.e. S-Tagged or I-Tagged Ethernet Virtual Channel Connection signals. For the case an Ethernet Virtual Channel connection signal is to be transported via an I-Tagged LAN, the values of the different I-Tag fields are determined according the specifications in clause 6.18 of 802.1ah.

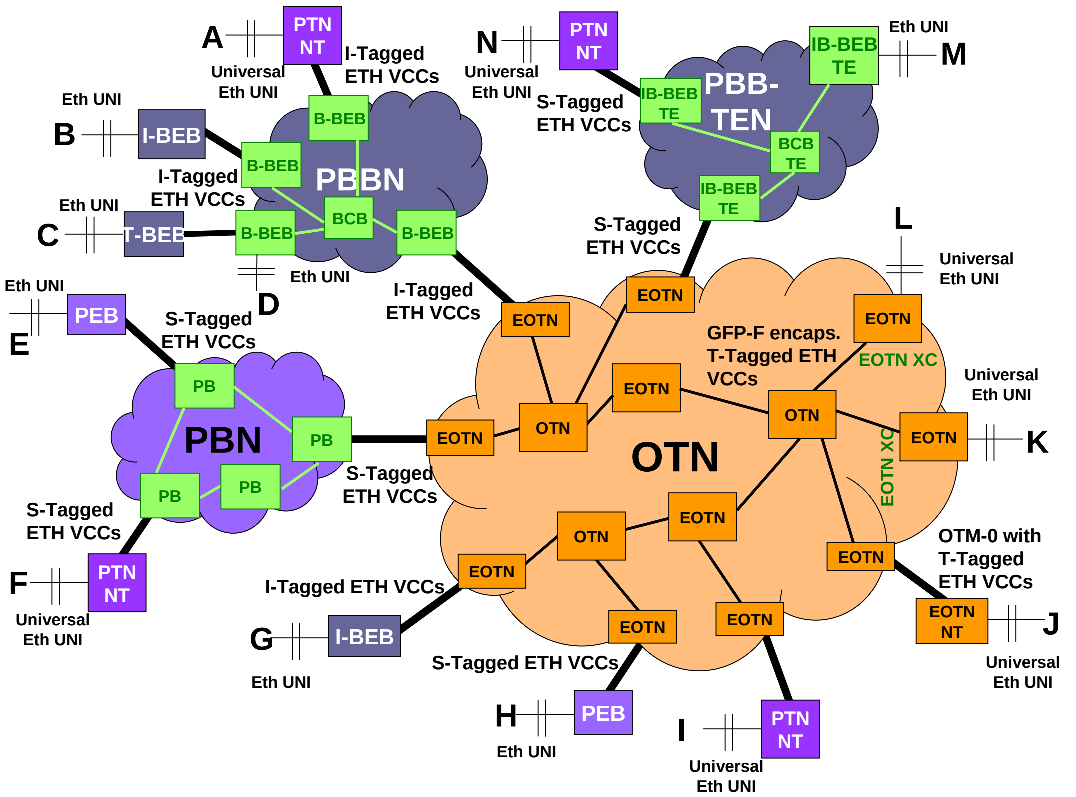

Figure 2

Question

ITU-T Q.9/15 has started the development of the Ethernet Virtual Channel layer functionality in EOTN equipment in its March 2010 meeting. This development will be progressed during subsequent Q.9/15 meetings in 2010. Q.9/15 would like to

- invite comment from IEEE 802.1 on the above EVPL, EVPT, EVPLAN, EPT and EPLAN service support by the OTN,

- verify with IEEE 802.1 if the transport of an Ethernet Virtual Channel signal through a PB, PBB or PBB-TE network is possible as described
- verify with IEEE 802.1 if endpoints of an Ethernet Virtual Channel connection can be supported on PEB, I-BEB, T-BEB and IB-BEB.

ITU-T Q.9/15 would like to present further details of this application in IEEE 802.1's May meeting in Geneva. ITU-T Q.9/15 would appreciate the allocation of a timeslot for this presentation.

We would appreciate a response in time for our next meeting on this topic to be held May 31 – June 11, 2010.

We look forward to your reply and continued assistance.