

FlexE Control Plane framework

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Qilei Wang

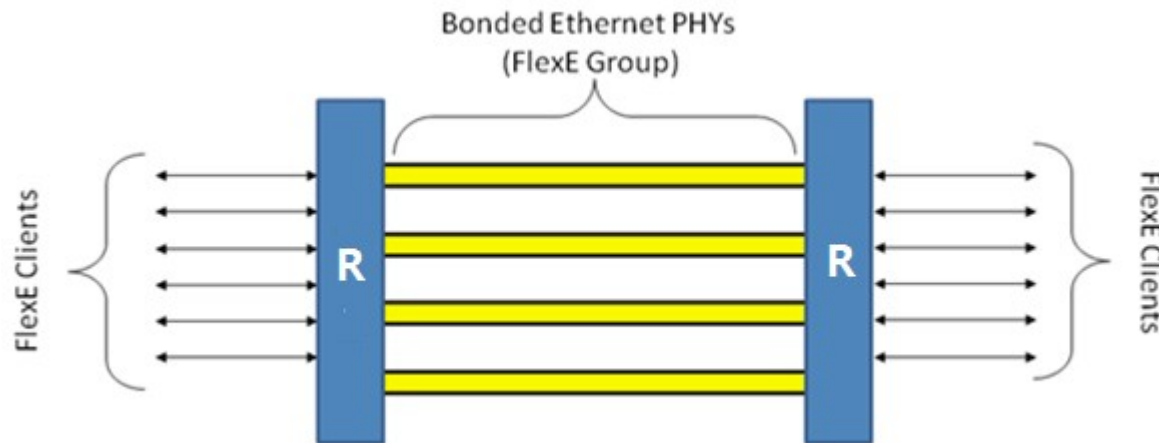
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Introduction

- FlexE is an interface that provides channelization, bonding, and sub-rate functionality to connect one or more Ethernet MAC, even non-standard Ethernet rates, using standard Ethernet modules between routers, either directly or through transport network.
- Several Ethernet PHYs are bonded together as a group to provide service for FlexE, which instead uses these Ethernet PHYs to provide service for client signals.
- Currently, FlexE is carried by 100 GE PHYs. Each PHY is modeled by the FlexE as 20 slots. Each slot has a granularity of 5G.

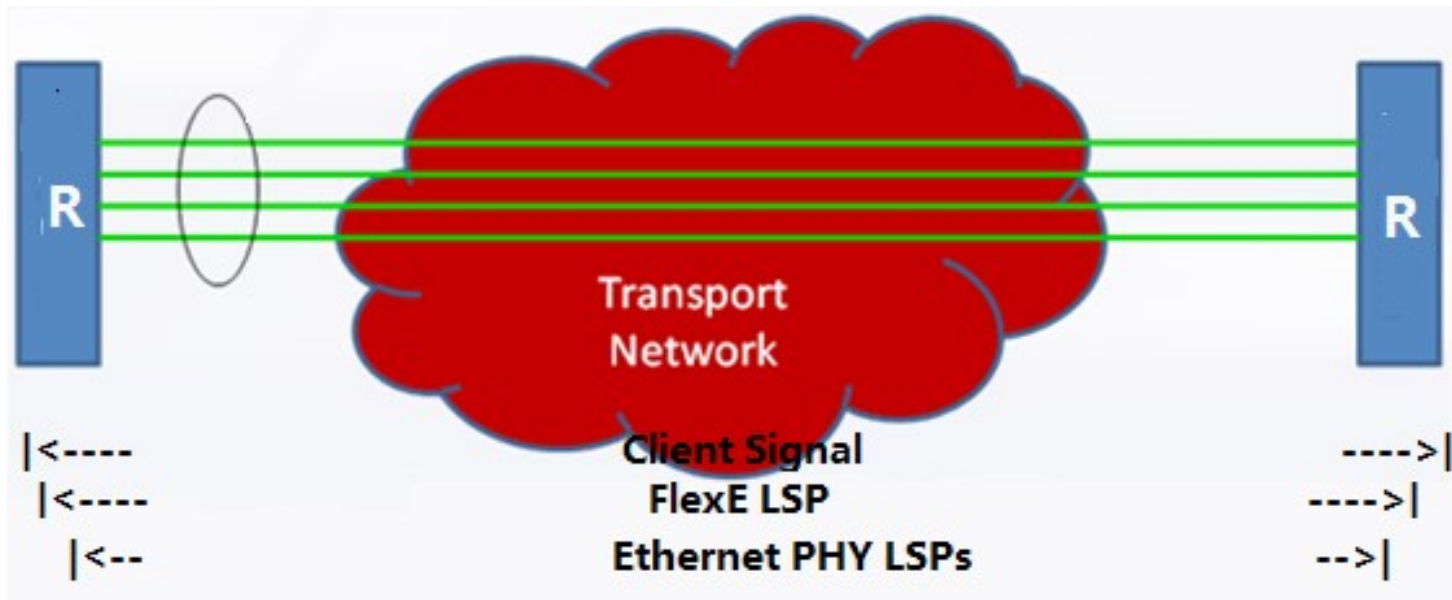


Layer Model

- FlexE layer model needs to be developed first in order to clearly indicate FlexE's relationship within its context, and through the layer model, we know:
 - How to map and demap FlexE signal over and from several Ethernet PHYs or ODUflex LSP?
 - How to assign available resource for client?

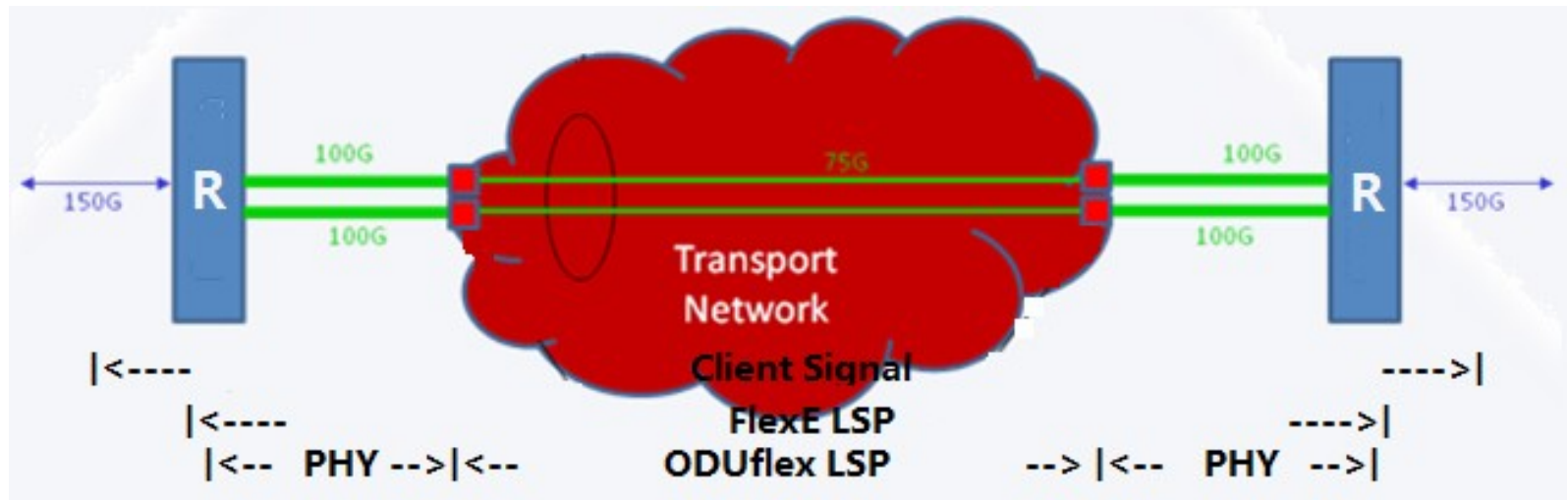
Layer Model – Unaware Case

- Unaware case: this may be used with legacy transport equipments that provide no special support for FlexE.
- FlexE signal and Ethernet PHYs are both terminated at the routers.
- Mapping hierarchy is depicted in the picture.



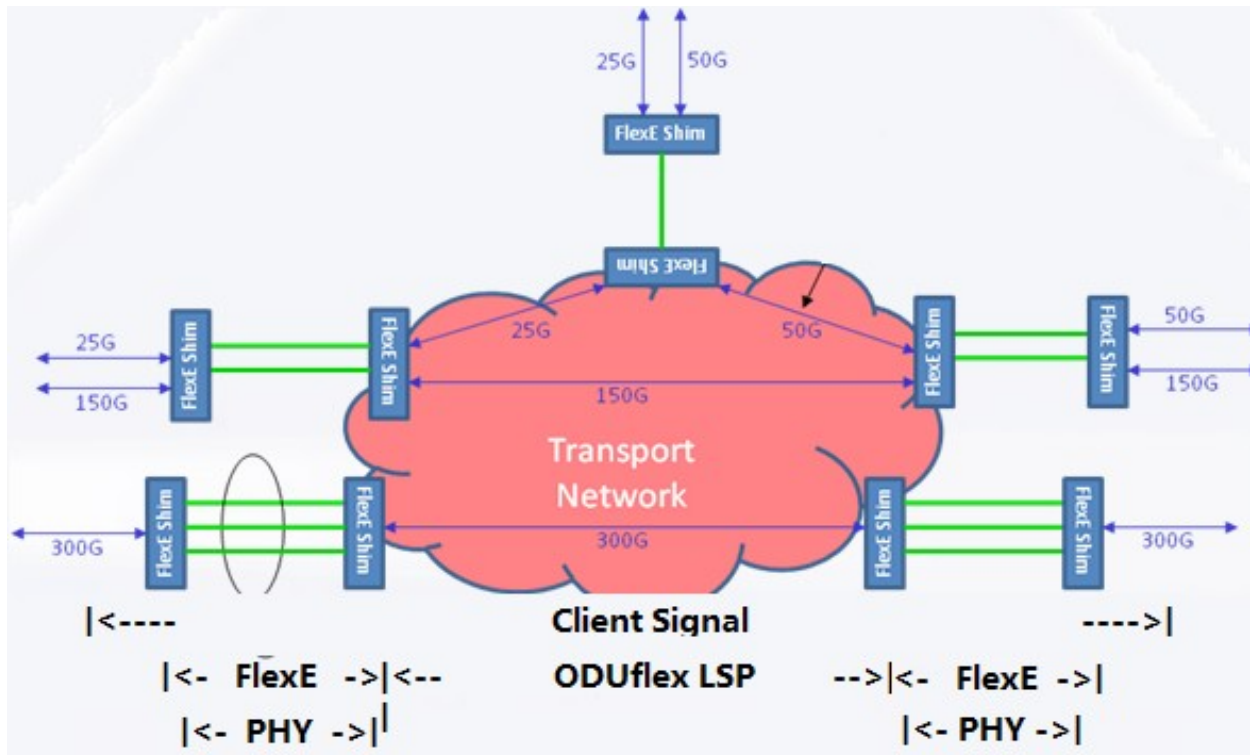
Layer Model – Aware case

- Aware case: transport equipment is aware that it is carrying FlexE signal, FlexE slots is carried by ODUk slots. Some slots may be unavailable and will be dropped before mapping (Partial-rate).
- Ethernet PHYs are terminated at the transport equipment.
- Mapping hierarchy is depicted in the picture.



Layer Model – Terminating Case

- Terminating case: FlexE group is terminated before crossing the transport network and FlexE client is extracted from the FlexE signal and then carried across the transport network.



Control-Plane Requirements

- Signaling shall be able to indicate FlexE layer's relationship with the client layer and server layer. So FlexE signalling should be able to assign FlexE group number, PHY number to indicate the bonding of Ethernet PHY and slots assigned for client layer signal.
- The routing protocol SHALL advertise node's and link's available resources and capabilities, including the FlexE support information, partial-rate support information and unused slot information on each Ethernet PHY port.
- Control plane SHOULD allow the nodes at opposite ends of a link to correlate the unavailable slot information that applied to the link.

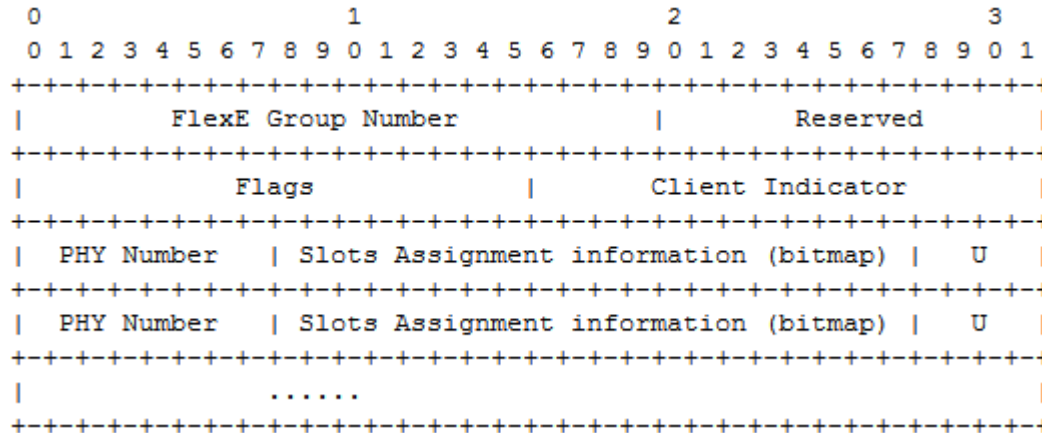
FlexE Signalling Extension

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Signaling Extension

- Label Extension:



- The signaling procedure of a FlexE LSP always involves the setup of server layer LSP (Ethernet PHY LSPs or ODU LSPs) first, and presents the resource reserved for client.
- Group number, PHY number, Slots assignment information...

- Comments?