A YANG Data Model for Network Inventory

draft-ietf-ivy-network-inventory-yang-05

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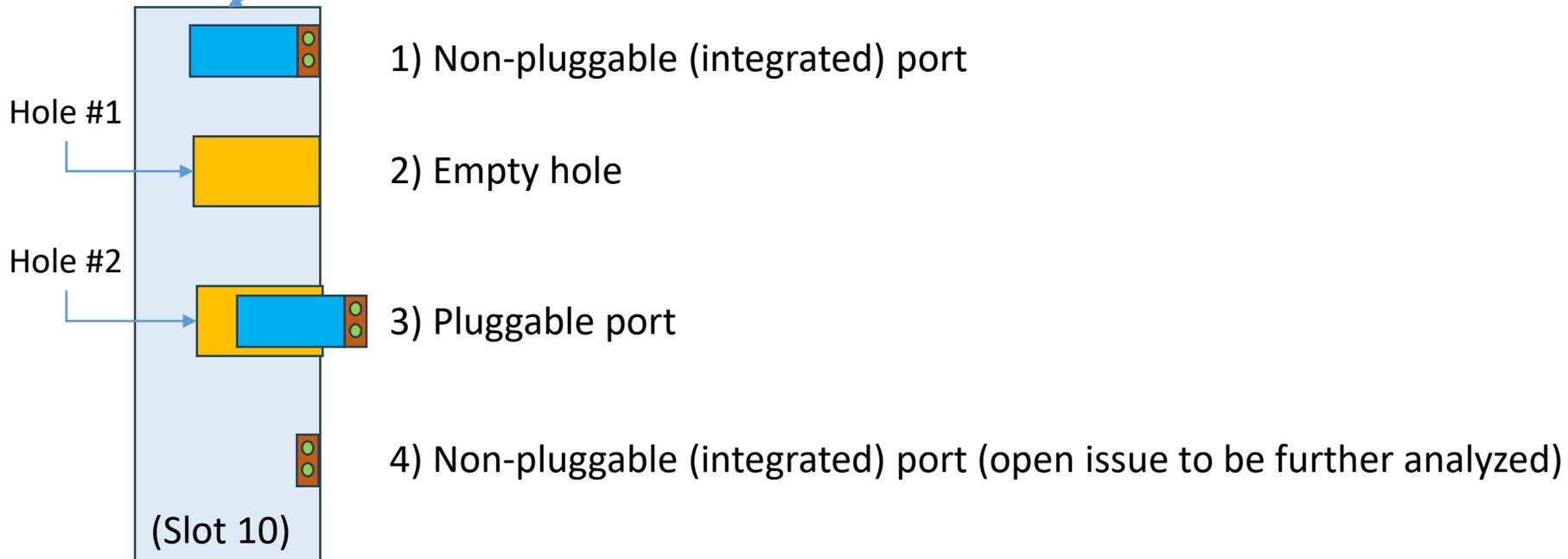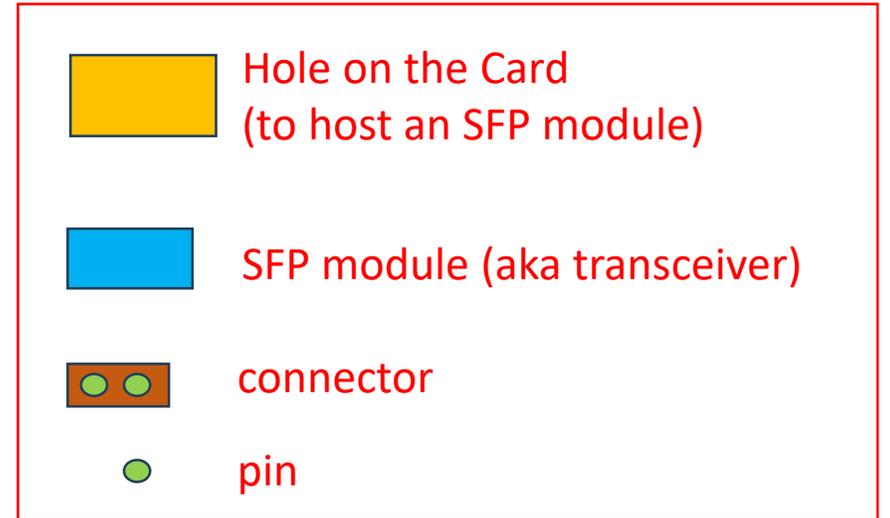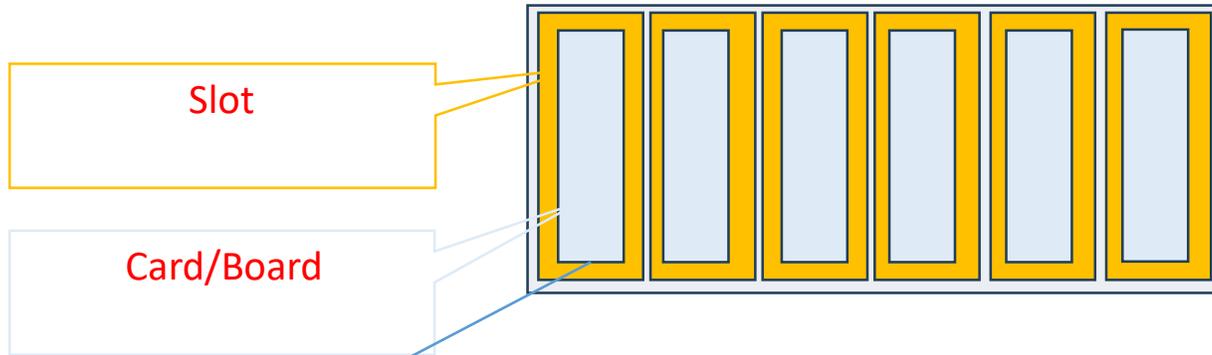
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Updates Since IETF 121

➢ Clarified terminology and scope, and in particular:
- ✓ the model applicability includes but it is not limited to ACTN
- ✓ the model is technology- and application-agnostic
- ✓ this version covers only actual inventory and not intended/planned inventory

➢ Updated YANG model to support:
- ✓ navigation from child component to parent component
- ✓ modelling ports, transceivers and breakouts
- ✓ reusable groupings to reference network-elements, port components or breakout channels

➢ Added an initial version of appendixes providing some examples of ports, transceivers and breakouts configurations (to be further improved)
- ✓ JSON instance examples are also provided

➢ Editorial improvements and fixed nits

Summary of the Open Issues (Priority 1)
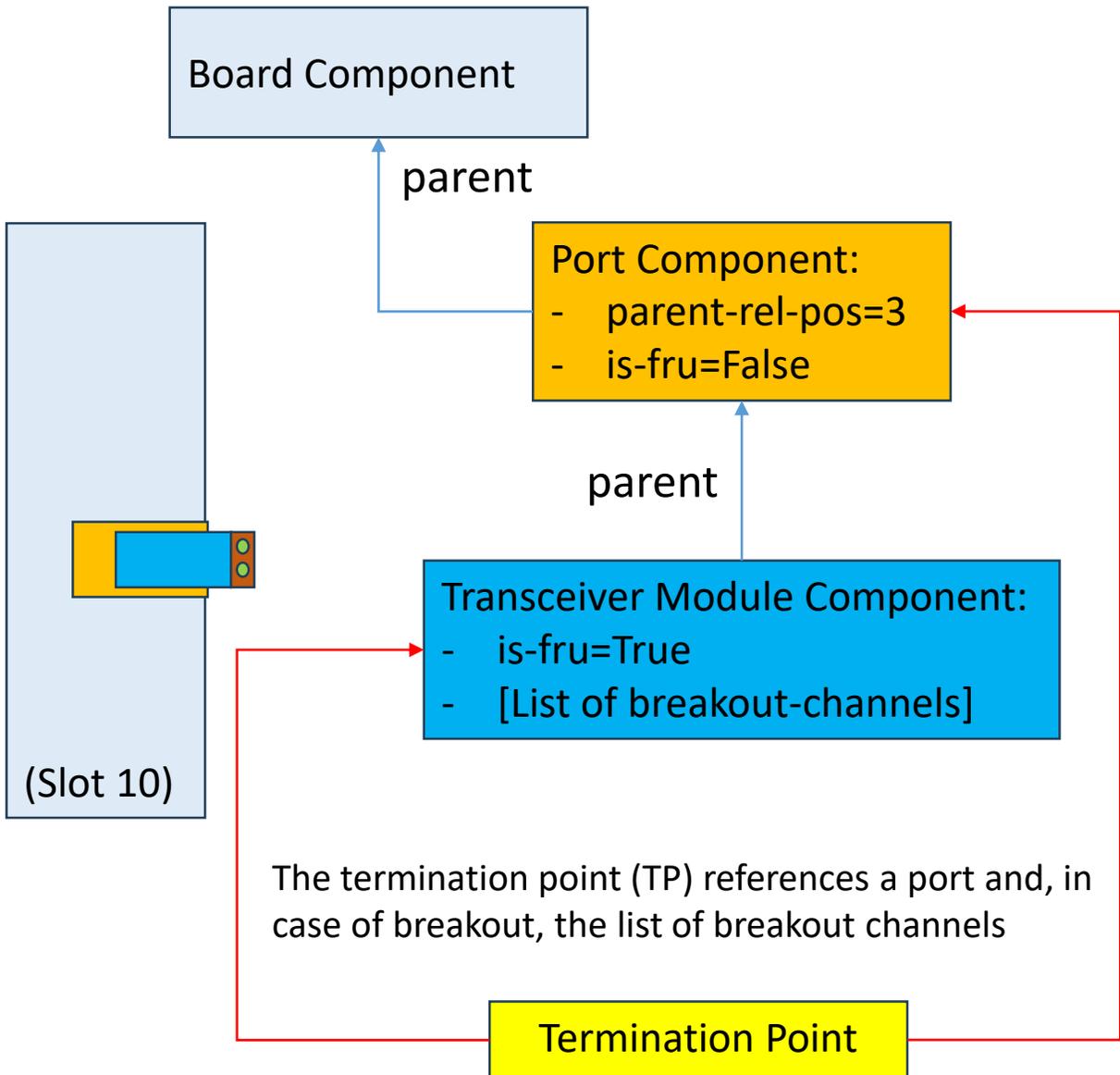
➢ Complete examples of breakout configurations
➢ Definitions of slot/sub-slot and shelf/sub-shelf (chassis/sub-chassis)
  ✓ Examples of multi-shelf (multi-chassis) NEs
➢ Guidelines for future augmentations
➢ Few additional attributes
  ✓ Child/parent reverse navigation
  ✓ System (software) name at NE (device) level
  ✓ Attributes from RFC7317
➢ Security Considerations
➢ Editorial clean-up

Reference Scenarios of Port Modelling

Slot

Card/Board

Hole #1

Hole #2

(Slot 10)

1) Non-pluggable (integrated) port

2) Empty hole

3) Pluggable port

4) Non-pluggable (integrated) port (open issue to be further analyzed)

Hole on the Card
(to host an SFP module)

SFP module (aka transceiver)

connector

pin

Modelling of a pluggable port

Board Component

parent

Port Component:
- parent-rel-pos=3
- is-fru=False

parent

Transceiver Module Component:
- is-fru=True
- [List of breakout-channels]

(Slot 10)

The termination point (TP) references a port and, in case of breakout, the list of breakout channels

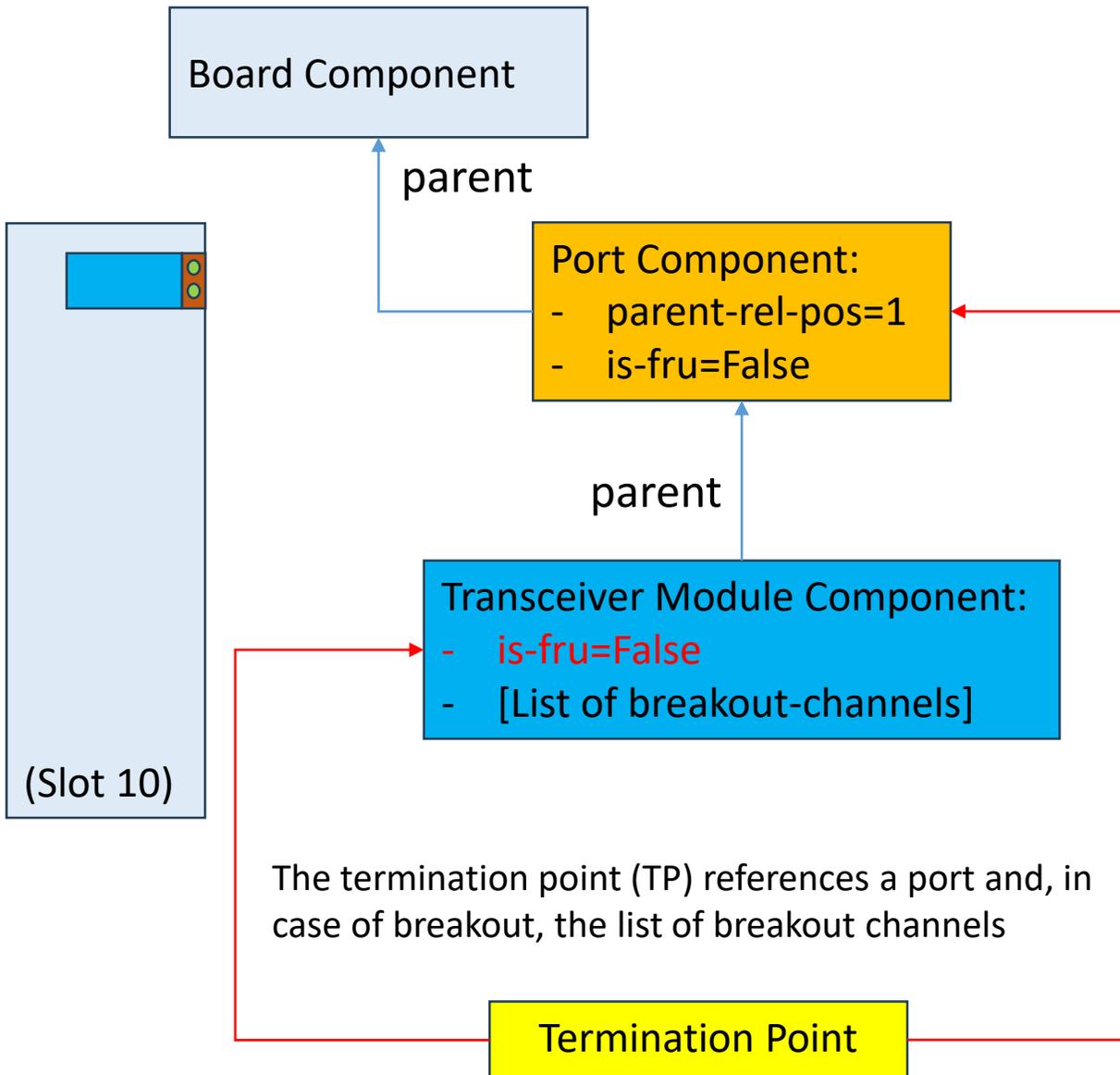**Termination Point**

The port can be associated with:
- Electrical port
- Single-channel optical port
- Multi-channel WDM port (with or without breakout)
- Multi-channel MPO port (with or without breakout)

location=/ne=ne-name/sl=10/p=3

The breakout-channel list is present if and only if the transceiver module supports port breakout

The definition of the references from a termination point to a port and, in case of port breakout configuration, to a list of breakout channels is outside the scope of the base inventory model (to be defined in the inventory topology mapping model)

Modelling of a non-pluggable integrated port

Board Component

parent

Port Component:
- parent-rel-pos=1
- is-fru=False

parent

Transceiver Module Component:
- is-fru=False
- [List of breakout-channels]

(Slot 10)

The termination point (TP) references a port and, in case of breakout, the list of breakout channels
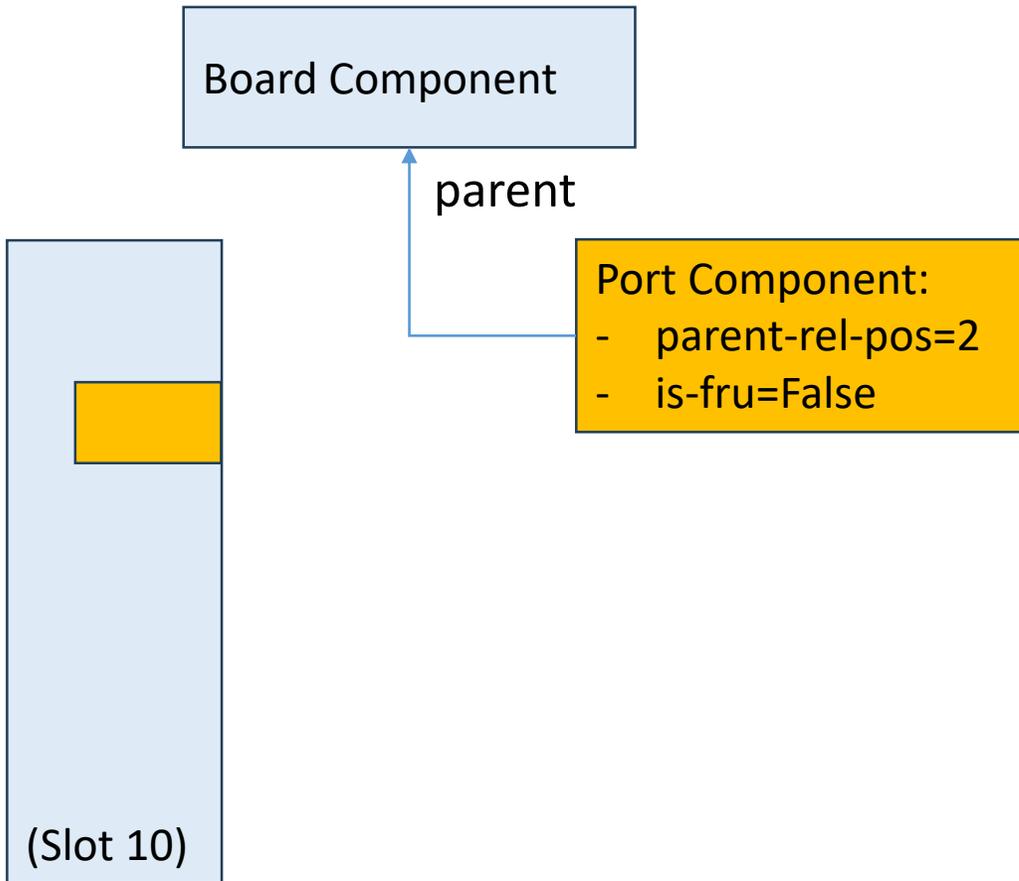
Termination Point

The port can be associated with:
- Electrical port
- Single-channel optical port
- Multi-channel WDM port (with or without breakout)
- Multi-channel MPO port (with or without breakout)

location=/ne=ne-name/sl=10/p=1

The only difference from a pluggable port is that the transceiver module is not field replaceable

Modelling of an empty hole

Board Component

parent

Port Component:
- parent-rel-pos=2
- is-fru=False

(Slot 10)
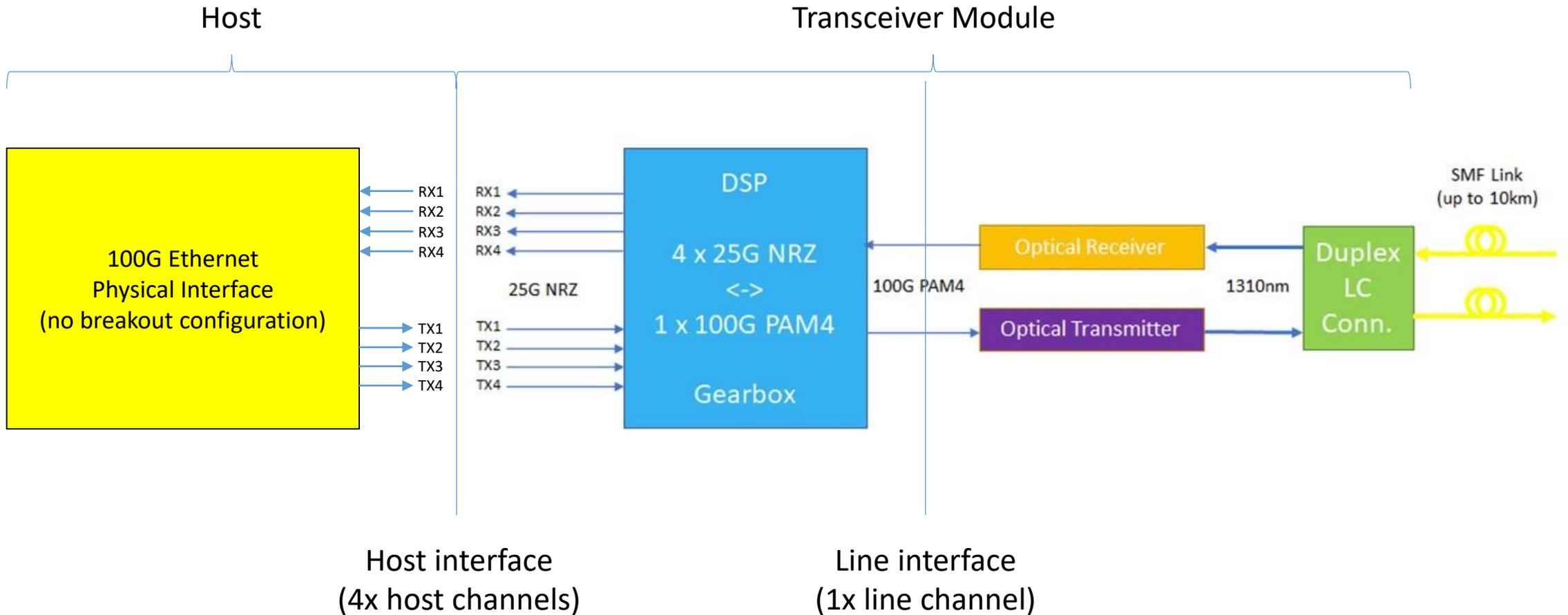
The port can be associated with:
- Electrical port
- Single-channel optical port
- Multi-channel WDM port (with or without breakout)
- Multi-channel MPO port (with or without breakout)

The port is empty because it has no child transceiver module component

location=/ne=ne-name/sl=10/p=2
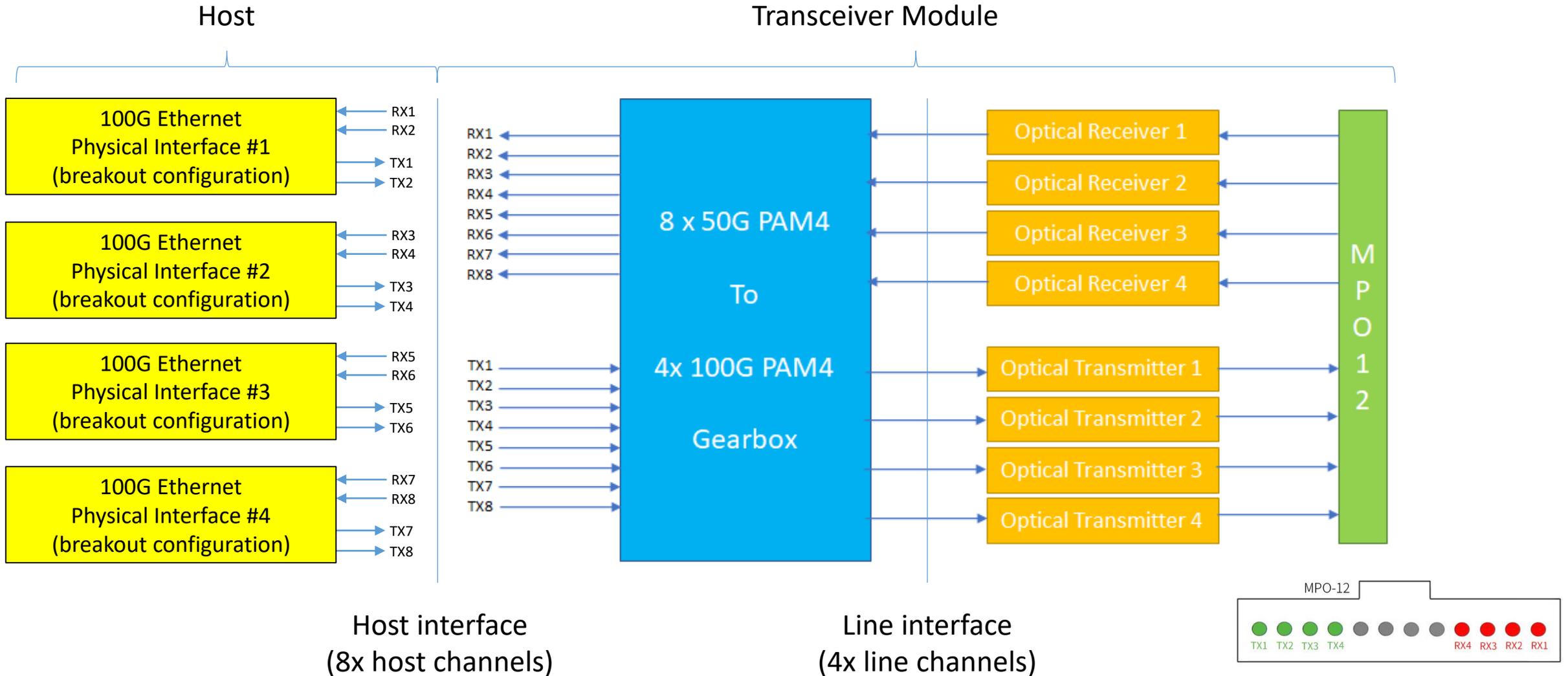
Examples of ports: Optical, single-channel

Host

Transceiver Module

100G Ethernet
Physical Interface
(no breakout configuration)

RX1
RX2
RX3
RX4

TX1
TX2
TX3
TX4

RX1
RX2
RX3
RX4

25G NRZ

TX1
TX2
TX3
TX4

DSP

4 x 25G NRZ
<->
1 x 100G PAM4

Gearbox

100G PAM4

Optical Receiver

Optical Transmitter

1310nm

Duplex
LC
Conn.

SMF Link
(up to 10km)

Host interface
(4x host channels)

Line interface
(1x line channel)

Note: no breakout channels are reported (the port cannot support breakout)

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Examples of ports: Optical, MPO breakout (e.g., 400G-DR)

Host

Transceiver Module

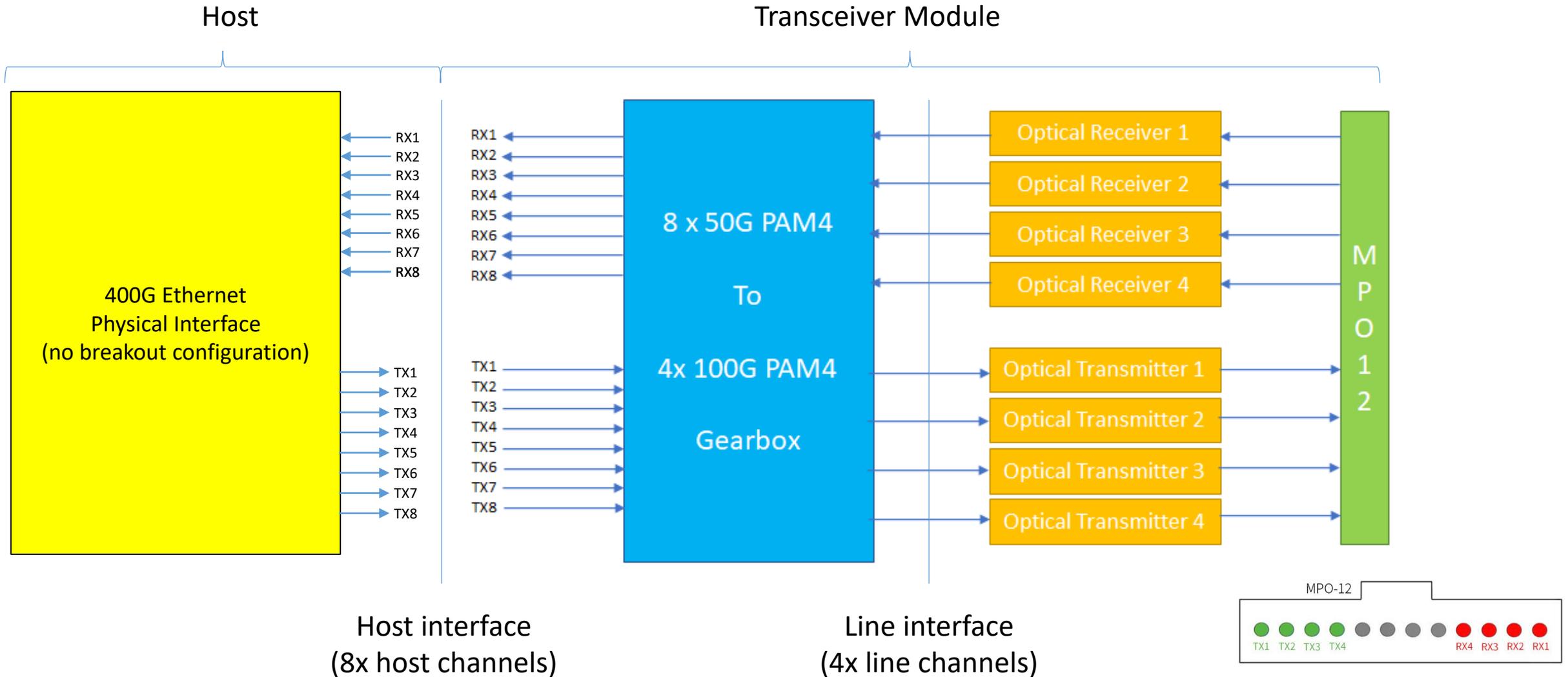**Host interface**
(8x host channels)

Line interface
(4x line channels)

Note: 4x breakout channels (one for each line channel) are reported (the port shall support breakout).

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# Examples of ports: Optical, MPO trunk (e.g., 400G-DR)

Host

Transceiver Module

400G Ethernet
Physical Interface
(no breakout configuration)

RX1
RX2
RX3
RX4
RX5
RX6
RX7
RX8

TX1
TX2
TX3
TX4
TX5
TX6
TX7
TX8

8 x 50G PAM4

To

4x 100G PAM4

Gearbox

Optical Receiver 1
Optical Receiver 2
Optical Receiver 3
Optical Receiver 4

Optical Transmitter 1
Optical Transmitter 2
Optical Transmitter 3
Optical Transmitter 4

M
P
O
1
2

Host interface
(8x host channels)

Line interface
(4x line channels)

MPO-12

TX1 TX2 TX3 TX4   RX4 RX3 RX2 RX1

Note: even if the port breakout is not configured, 4x breakout channels (one for each line channel) are reported if the port can support breakouts. No breakout channel are reported if and only if the port cannot support breakouts.

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Examples of ports: Optical, WDM multi-channel (e.g., 400G LR)
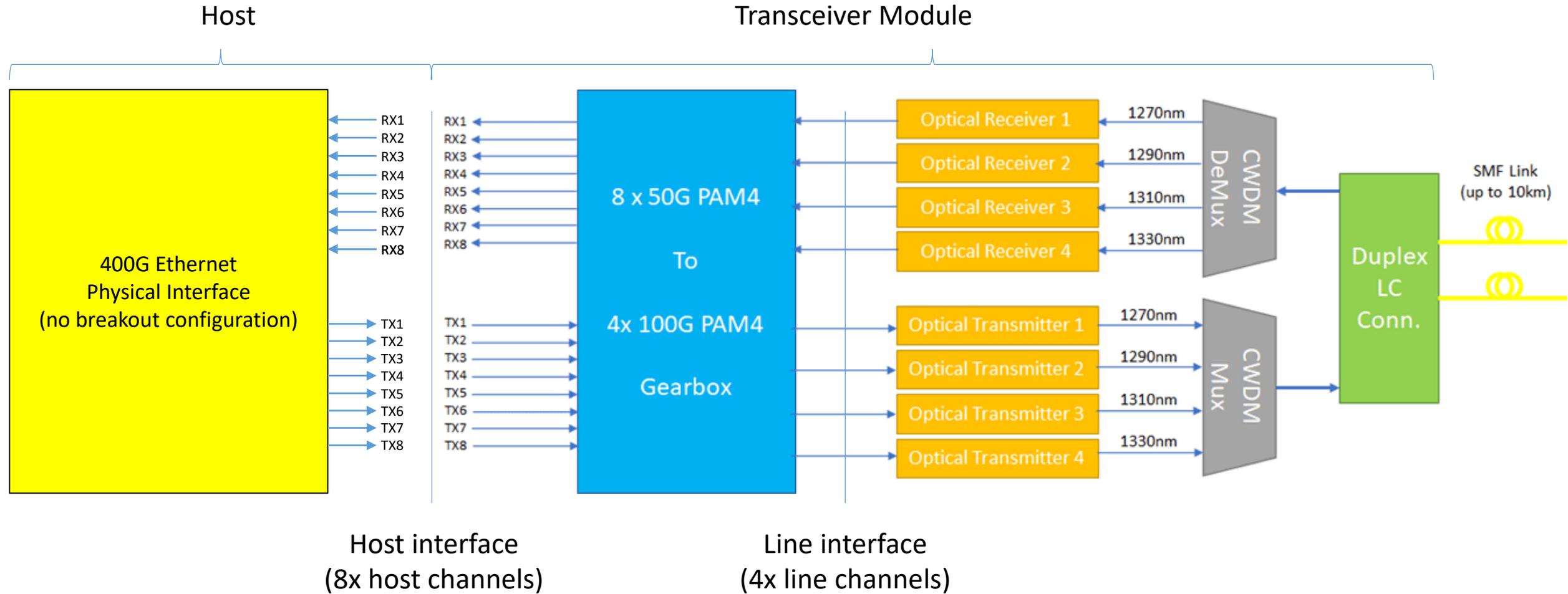
Host

Transceiver Module

Host interface
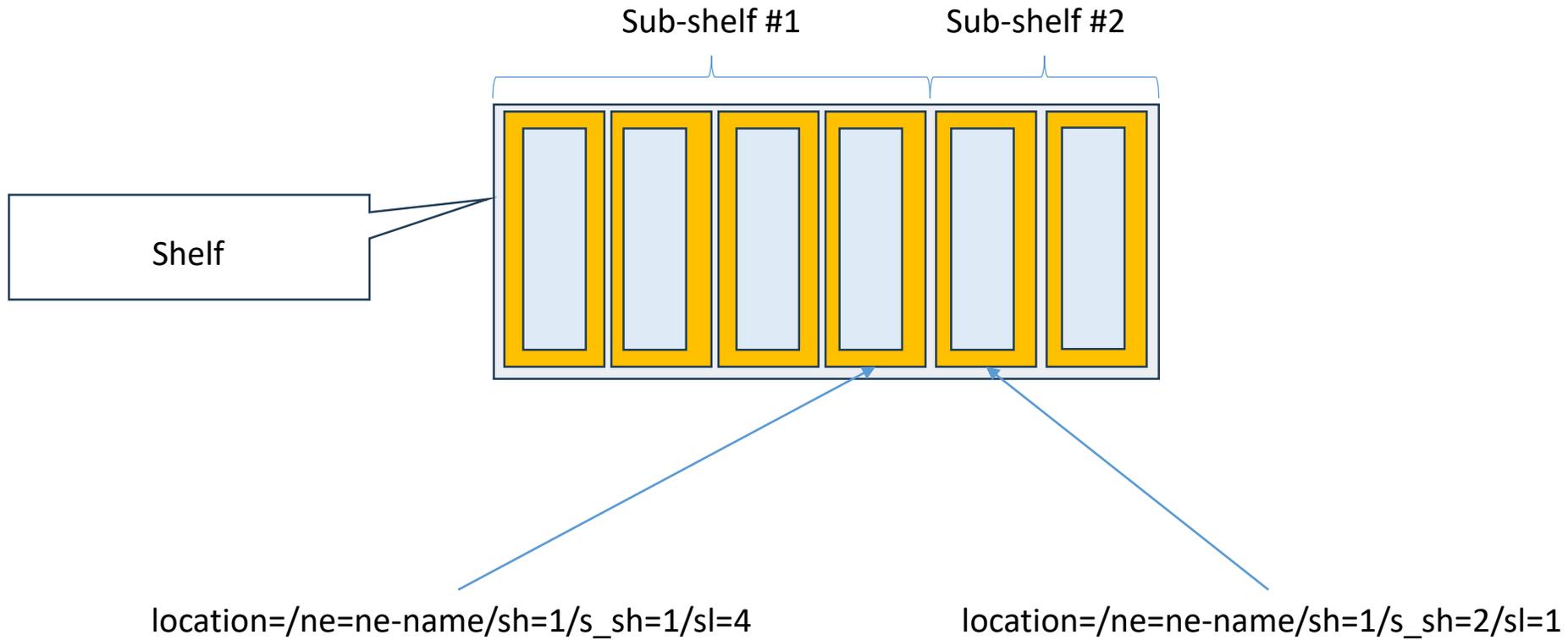(8x host channels)

Line interface
(4x line channels)

Note: even if the port breakout is not configured, 4x breakout channels (one for each line channel) are reported if the port can support breakouts. No breakout channel are reported if and only if the port cannot support breakouts.

Guidelines for future augmentations

➢ Comments on the mailing list for providing guidelines for future augmentations
  ➢ Authors believe that it will be hard to predict the need for augmentations – possible guidelines could be either too restrictive or too liberal
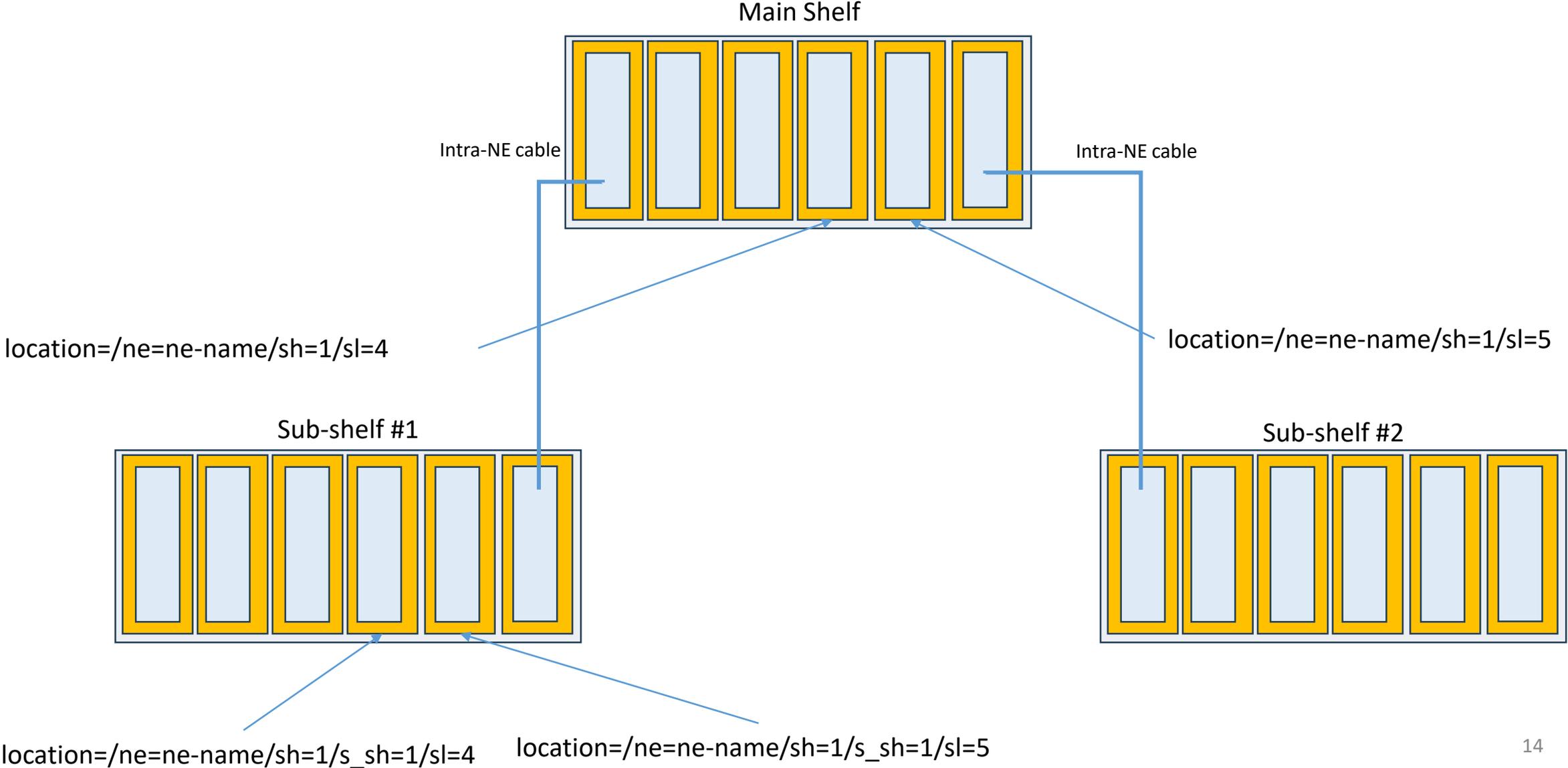➢ Existing examples?

Sub-shelf definition
Option 1 (Logical partitioning of the slots within a shelf)

Sub-shelf #1 Sub-shelf #2

Shelf

location=/ne=ne-name/sh=1/s_sh=1/sl=4

location=/ne=ne-name/sh=1/s_sh=2/sl=1

Sub-shelf definition
Option 2 (Hierarchy of shelves in a multi-shelf NE)

Main Shelf

Intra-NE cable

Intra-NE cable

location=/ne=ne-name/sh=1/sl=4

location=/ne=ne-name/sh=1/sl=5

Sub-shelf #1

Sub-shelf #2

location=/ne=ne-name/sh=1/s_sh=1/sl=4

location=/ne=ne-name/sh=1/s_sh=1/sl=5

Next Step

➢Resolve the priority 1 open issues

➢Editorial clean-up

➢The target is to have a draft ready for WG LC by IETF 123

   ➢Address some of the priority 2 open issue, time permitting

➢Further review and comments from the WG is appreciated