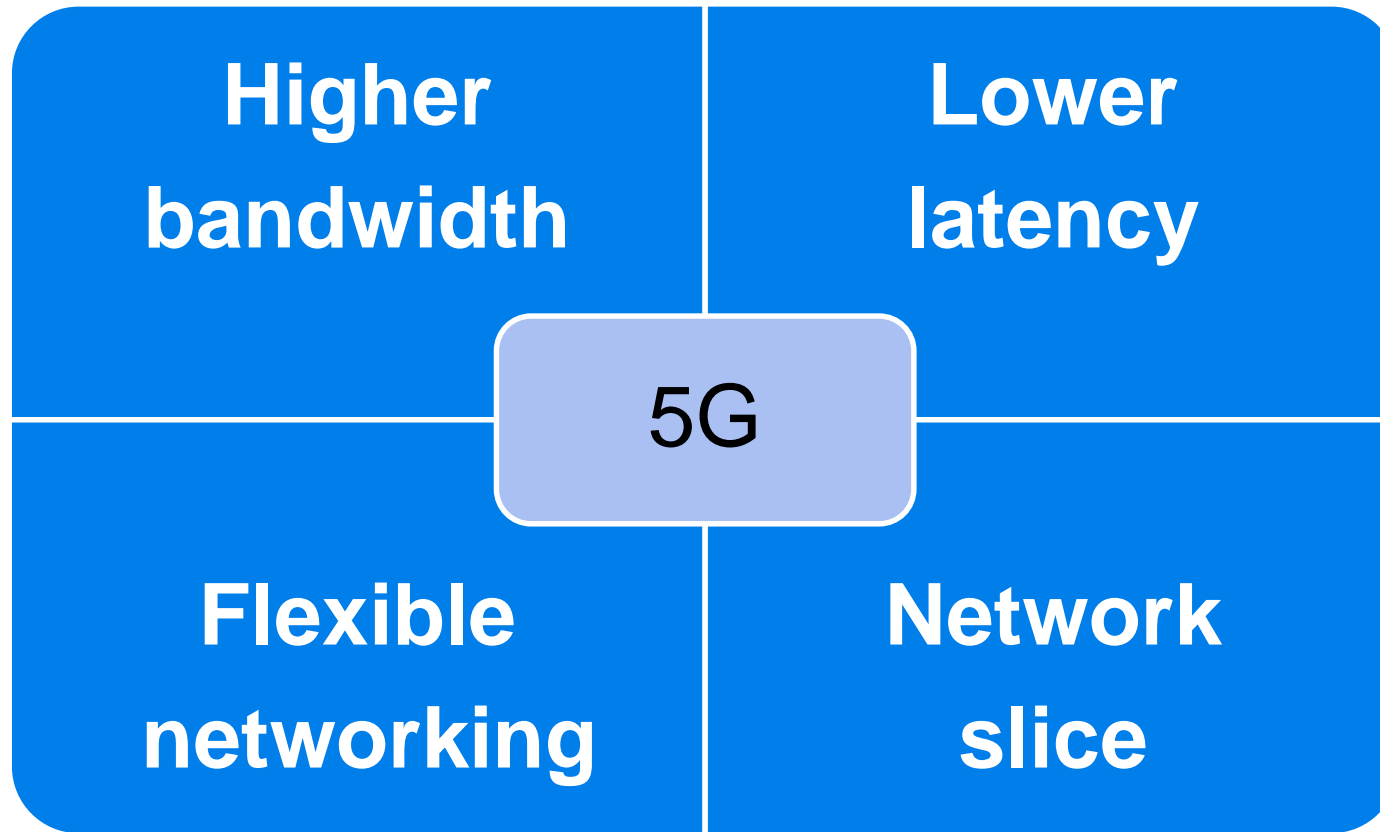




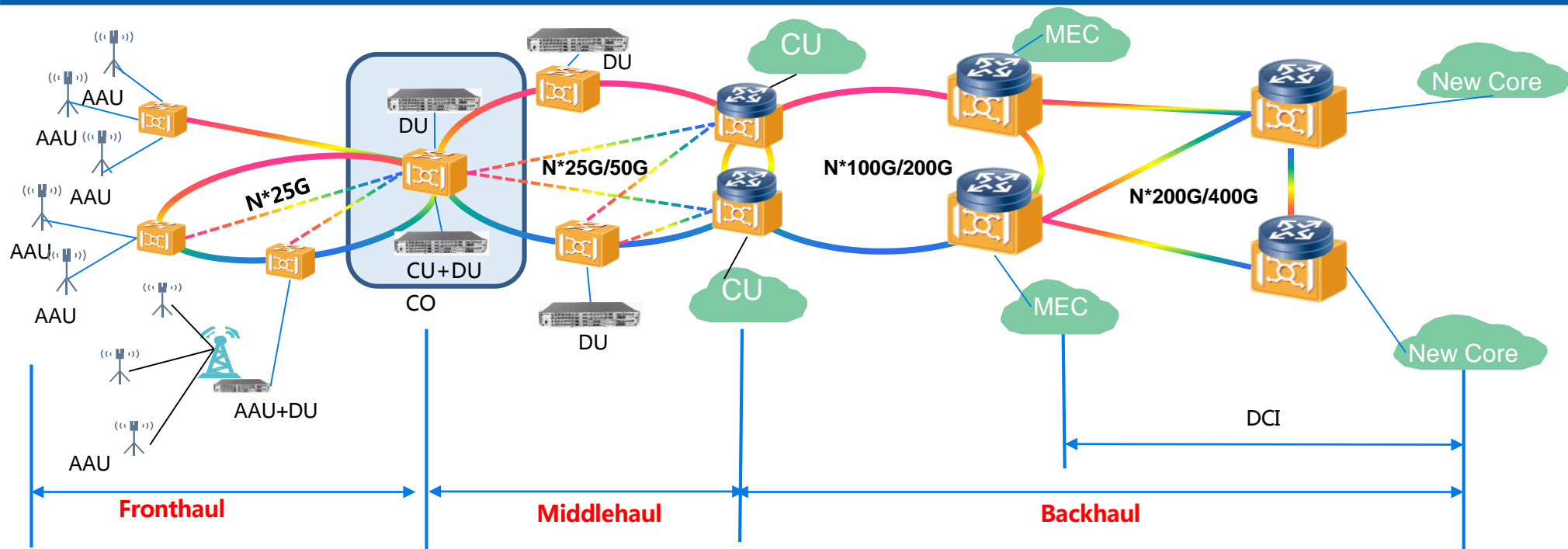
China Telecom's Requirements on 5G Transport

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Highlights of 5G Transport Requirements



M-OTN Based 5G Transport network



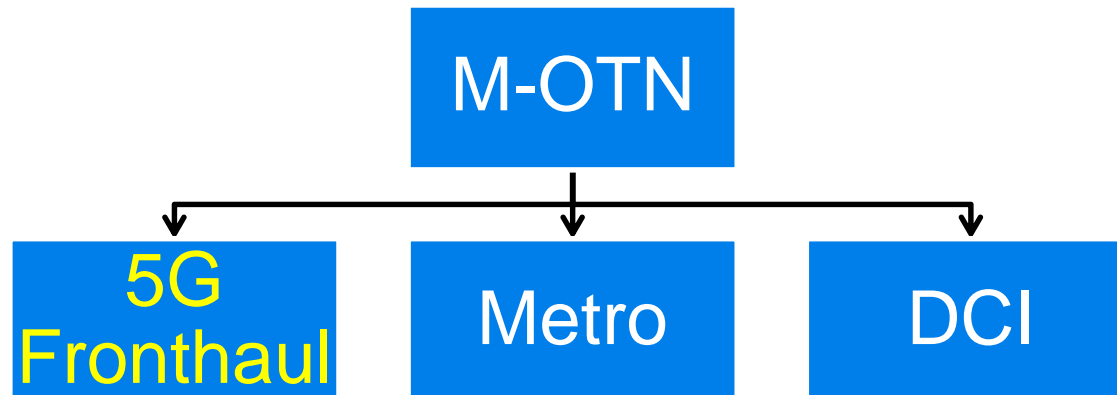
- M-OTN: Mobile-optimized OTN
- CWDM : p2p , 4*25G/50G
- DWDM : p2p /Ring, n*25G/50G

- M-OTN@CU: IP/MPLS, L3 VPN, SR
- M-OTN@DU: Ethernet/MPLS-TP
- DWDM : n*25G/50G

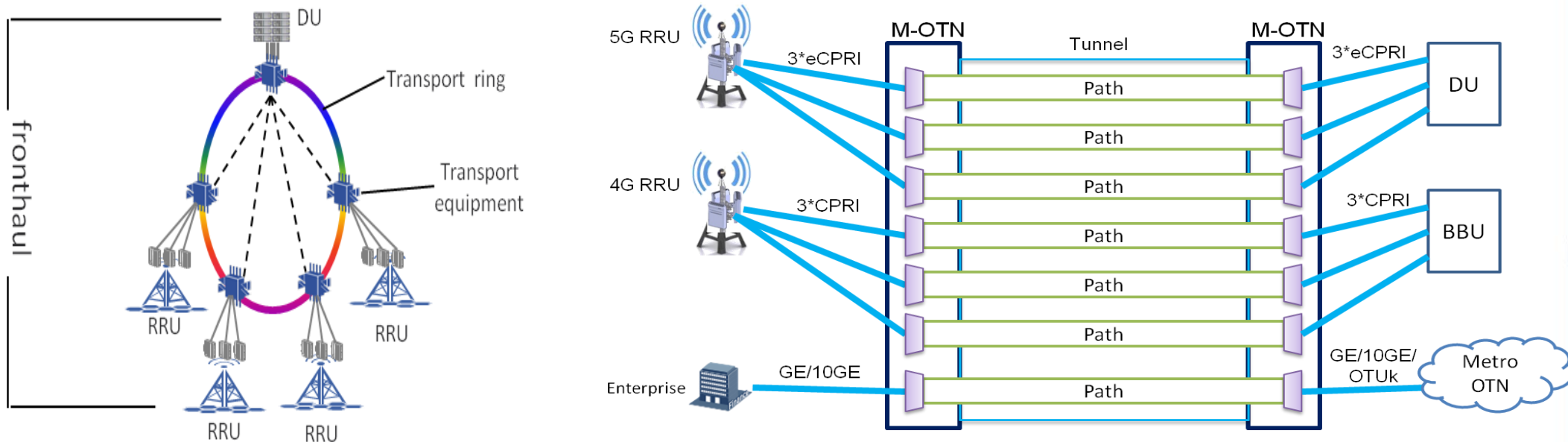
- M-OTN: IP/MPLS, L3 VPN, SR
- DWDM : n*100G/200G/400G
- Integrated with DCI in future

OTN-lite → M-OTN(Mobile-Optimized OTN)

- **OTN-lite:** simple reduction (e.g., eliminating some overhead), with little hint of innovation.
- **M-OTN:**
 - ① To clearly show the industry that SG15 is committed to 5G Transport
 - ② Not to under-value our efforts in developing this new OTN technology
 - ③ Easy in marketing the technology
- **M-OTN application scenarios**



M-OTN network reference model for 5G fronthaul



- P2P topology
- Only one level of multiplexing is required
 - ✓ Path layer: ODUflex or FlexO TS.
 - ✓ Tunnel layer: FlexO or OTUk
- The overhead and OAM capability of the Path and Tunnel should be standardized.

Requirements of M-OTN for 5G fronthaul(1)

Overall requirements: low latency, low power consumption, and low cost

1. Required client types:
 - *Primarily 25GE/50GE/100GE eCPRI, secondarily 10GbE eCPRI. (for 5G fronthaul)*
 - *CPRI (for 3G/4G fronthaul)*
 - *GE/10GE(for leased line service)*
2. M-OTN should support the use of 25G optical modules (SFP28), and future 50G/100G optical modules.
3. FlexO style modular frame format and the bonding should be supported, it allows carrying client with bandwidth larger than 25G, and improving the utilization of link bandwidth.
4. A more flexible tributary slot structure may need to be defined for M-OTN, to allow it supporting different type of clients more efficiently.
5. M-OTN should consider the possible survivability method for the 5G fronthaul applications to provide fast link switching capability.

Requirements of M-OTN for 5G fronthaul(2)

6. The overhead of the Tunnel should support the following OAM functions:
 - *Link Monitoring function: TTI, Bit error parity, BDI, BEI, AIS*
 - *A general communications channel(GCC) or a discovery channel*
 - *An OTN synchronization message channel (OSMC) should be supported to transport SSM and PTP messages.*
7. The overhead of the Path should support the following OAM functions:
 - *Path Monitoring function: TTI, Bit error parity, BDI, BEI, AIS*
 - *client signal fail (CSF) indicator;*
 - *enhanced path delay measurement (DMp)*
8. One way maximum packet delay should be less than 100 μ s.
9. Low latency FEC with proper performance is preferred, and FEC should be standardized for interoperability purpose.
10. IEEE1588 and SyncE should be supported (*).

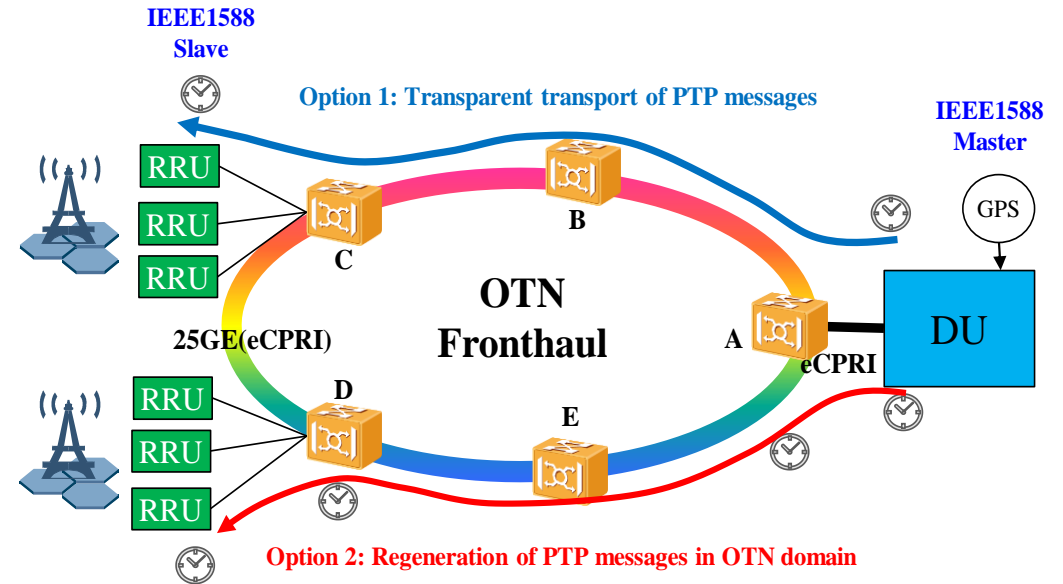
IEEE1588 over OTN in 5G fronthaul application

Option 1: Transparent transport of PTP messages (Preferred)

- ① link delay measurement & compensated
- ② Single fiber bi-direction transport

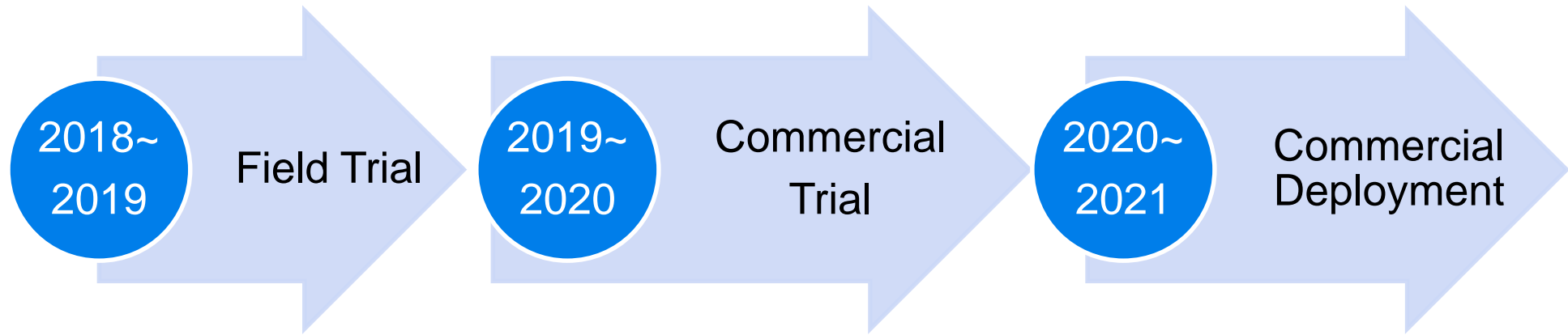
Option 2: Regeneration of PTP messages in OTN domain

- ① PTP messages identify
- ② PTP messages should be regenerated from OTN and reinsert into eCPRI.



Q11 should evaluate the above two solutions and then decide which option should be supported.

China Telecom 5G network deployment roadmap



- It's proposed that SG15 should begin to develop OTN based 5G transport solution ASAP!

THANKS!

