# TSN Fronthaul Considerations


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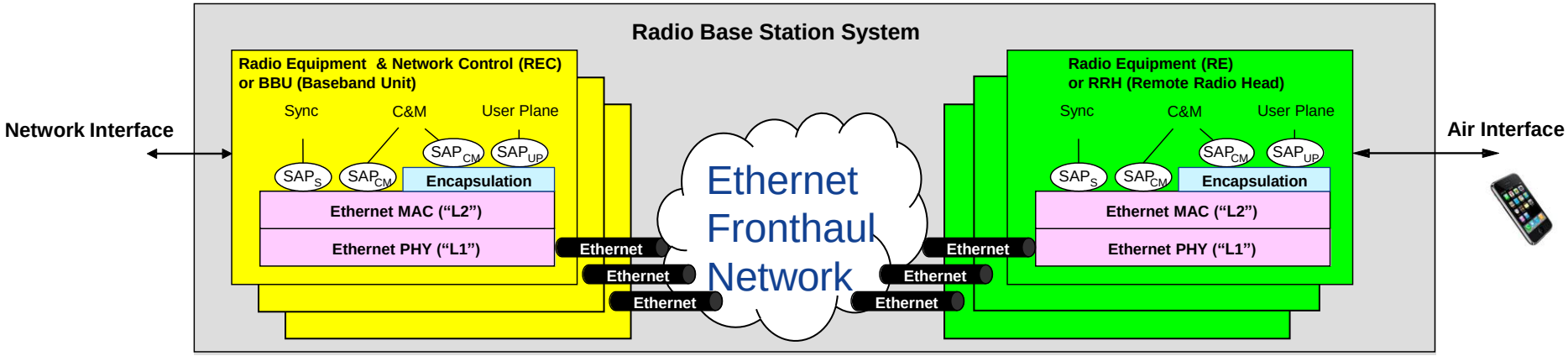
# Motivation / Reasoning to Consider Ethernet for Fronthaul

- Ethernet is a widely adopted & nearly ubiquitous standard technology
- Fronthaul architecture is migrating from traditional RAN where single BBU connects to single/few RRHs to architectures where multiple centralized BBUs connect to multiple RRHs
- To utilize the existing Ethernet Standards, Ecosystem, Operator Network Architectures in the networking items



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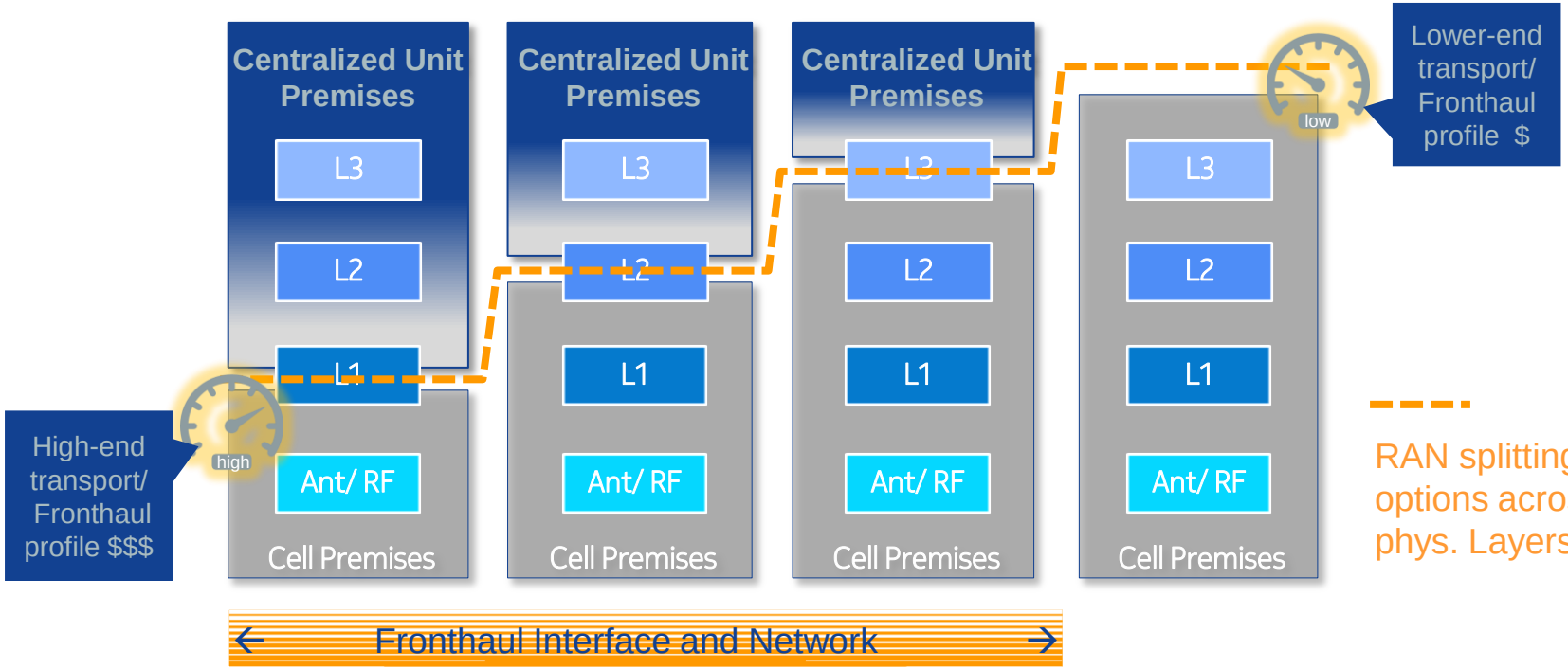
# Optimal Functional Split is a Multi-dimensional Tradeoff

There is no one-size-fits-all solution as split may depend on deployment scenario



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# 6 Active 802.1 TSN Projects with 2 New PARs

- 802.1AS Rev Precise Timing Protocol Gen 2 (gPTP Gen 2)
  - A plug-and-play PTP profile that allow bridges, routers, or multi-homed end stations to serve as “time relays”
- 802.1Qbu Transmit Preemption (collaborating w/ 802.3br Interspersing Express Traffic)
  - Allow time sensitive frames to preempt other frames
- 802.1Qbv Time Aware Shaper (TAS) — Scheduled Traffic
  - Every bridge port runs a synchronized, repeating schedule that turns on and off each of the 8 queues with up to *ns* precision
- 802.1Qca Shortest Path Control & Reservations — Path Distribution
  - ISIS TLVs to compute and distribute multiple paths through a network
- 802.1CB Frame Replication & Elimination — Seamless Redundancy
  - 1+1 duplication for reliability
- 802.1Qcc Stream Reservation Protocol — SRP Enhancements and Performance Improvements
  - A protocol (MSRP) to reserve bandwidth along an L2 path determined by L2 topology protocol, e.g. ISIS
- (New PAR) 802.1Qch Synchronized Queuing and Forwarding
- (New PAR) 802.1Qci Per-Stream Filtering and Policing

 

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# Some Thoughts

- Standard network profiles are required for enabling Fronthaul over Ethernet
  - A profile should define end-to-end requirements for the fronthaul
  - To foster availability of appropriate transport in the market
  - Profile creation in 802.1 or MEF forum (tbd), e.g., MEF 22.2 Mobile Backhaul
- How to reach agreements on the profiles to be standardized?
  - Potentially more than one profile is desired
  - IQ functional split may cause real challenges in current TSN framework
  - Some new functional split may relax the requirements to the Ethernet transport
- CPRI Cooperation maybe the appropriate forum to define the profile requirements
  - Strong participation of radio experts from the mobile network vendors
- What role should 802.1 play in this fronthaul profile development?
  - Keep alignment between TSN functionalities and fronthaul requirements

 

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