

Tim Frost

The background of the slide is a close-up, dark photograph of an owl's face, focusing on its large, yellowish-green eye and the texture of its feathers. The owl is looking towards the right side of the frame.

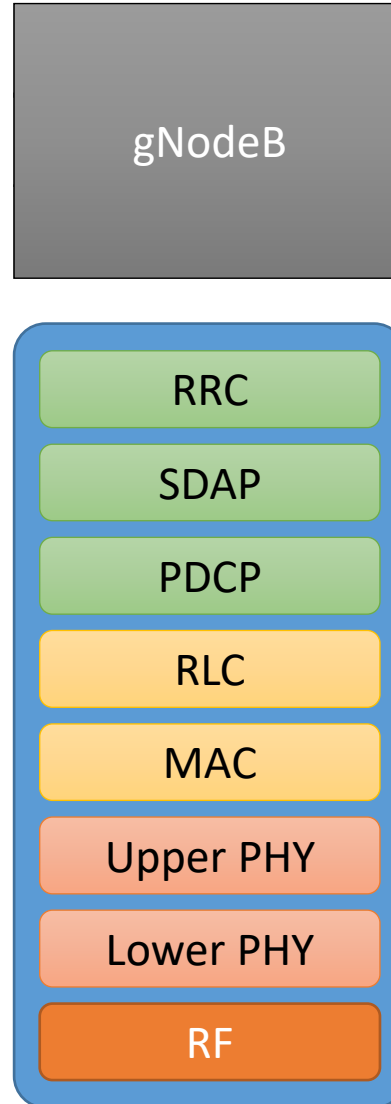
Synchronization for Fronthaul and O-RAN Timing Architectures

ITSF, November 2021

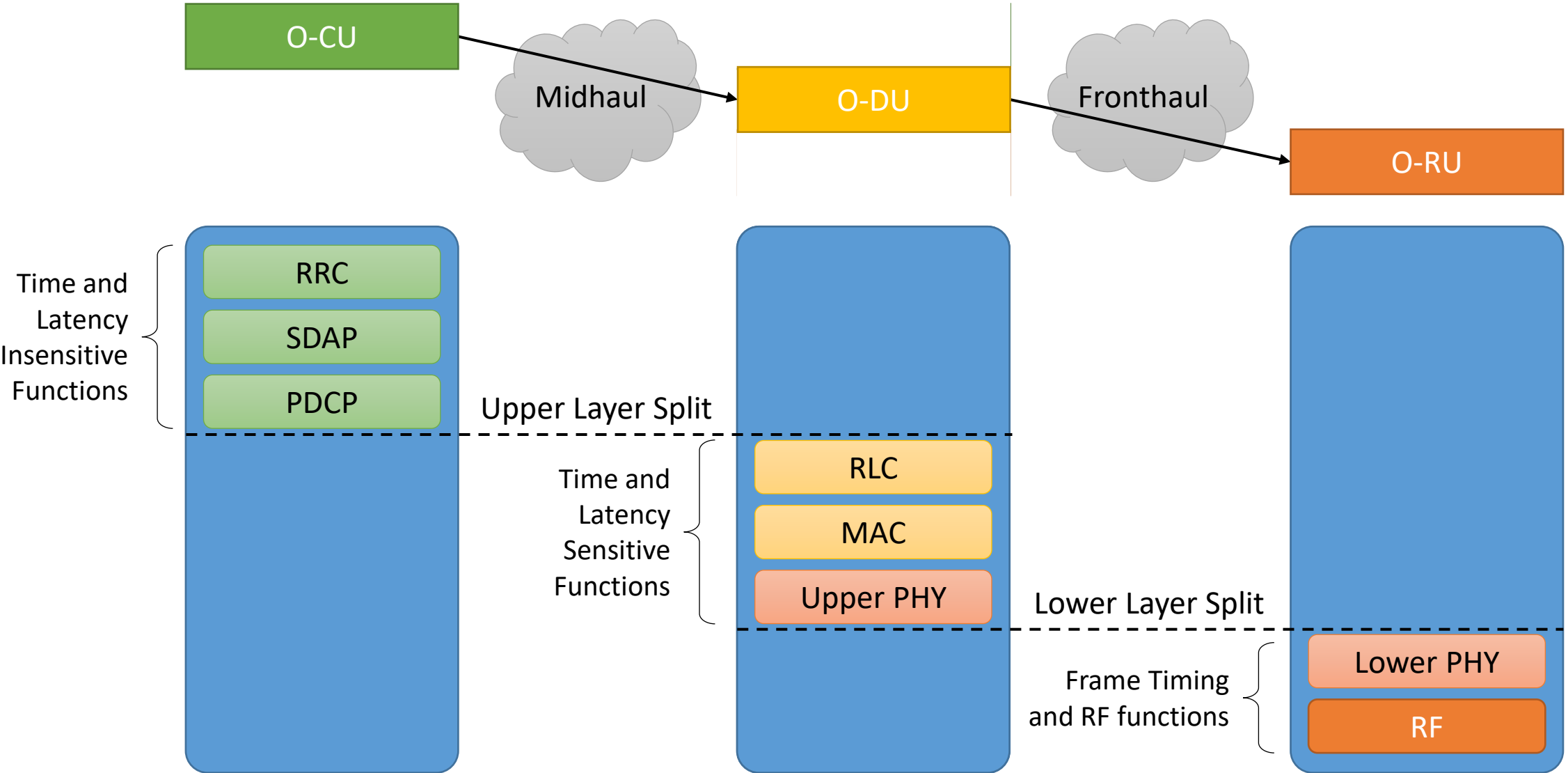
Agenda

- Disaggregated basestation
- Synchronisation requirements for basestation elements
- Latency management
- Fronthaul configurations
- Network limits within the fronthaul network

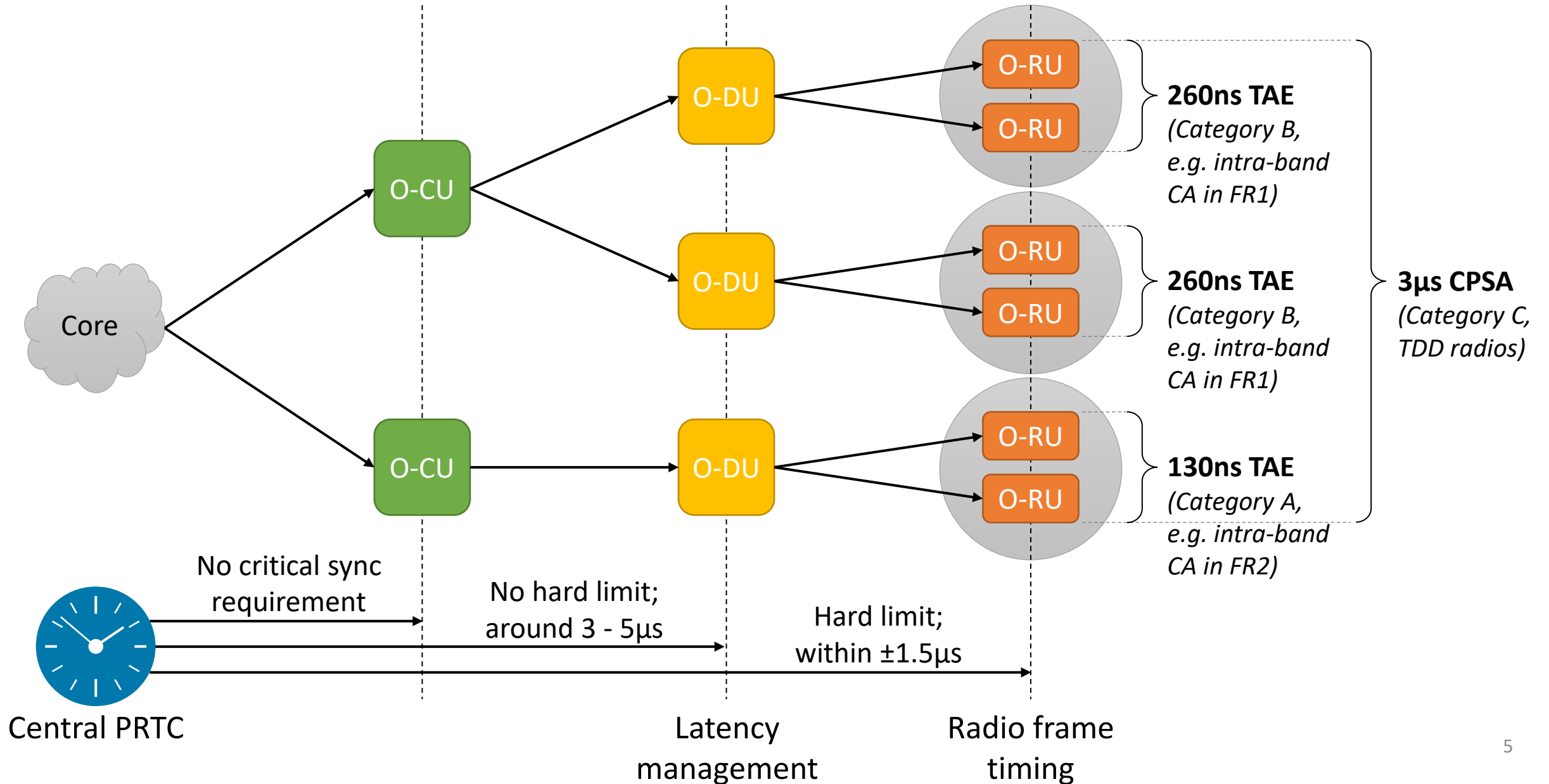
O-RAN gNodeB (*basestation*) Protocol Stack



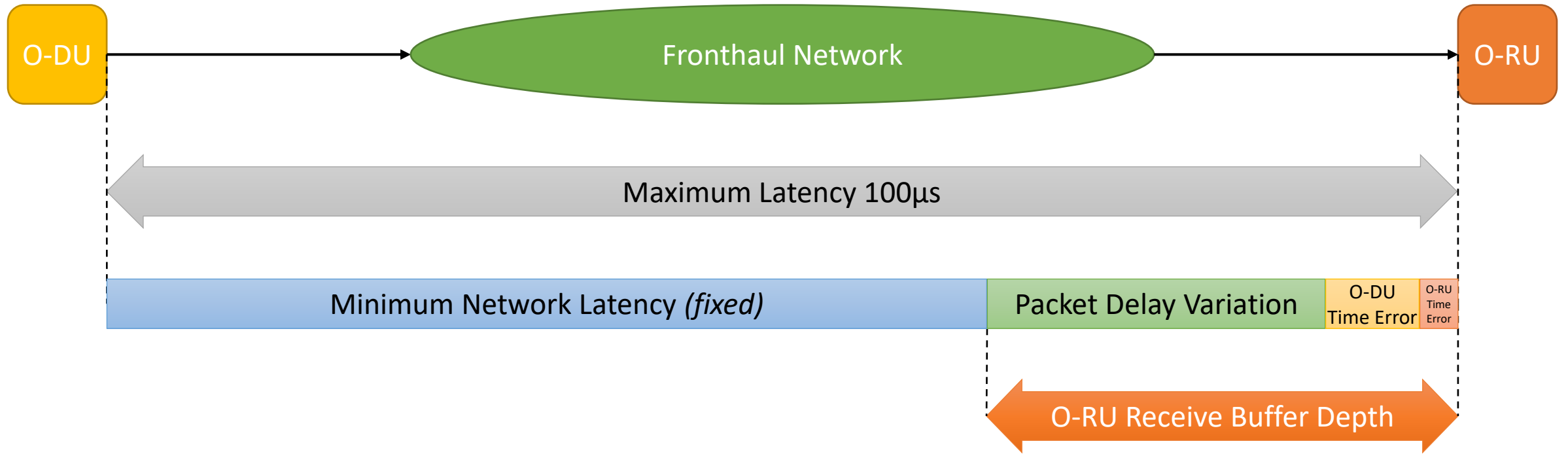
O-RAN 5G Functional Splits



Synchronization Requirements

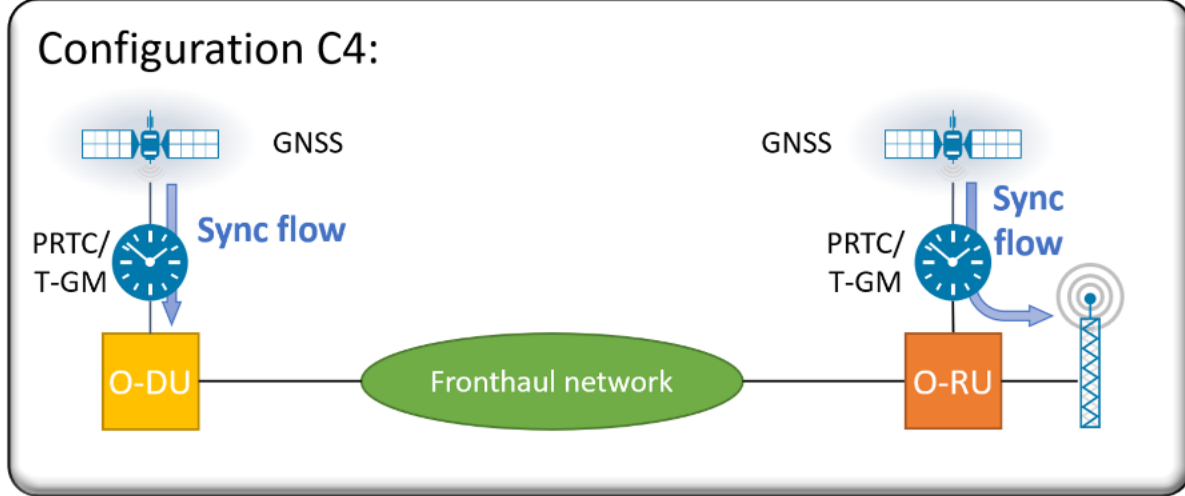
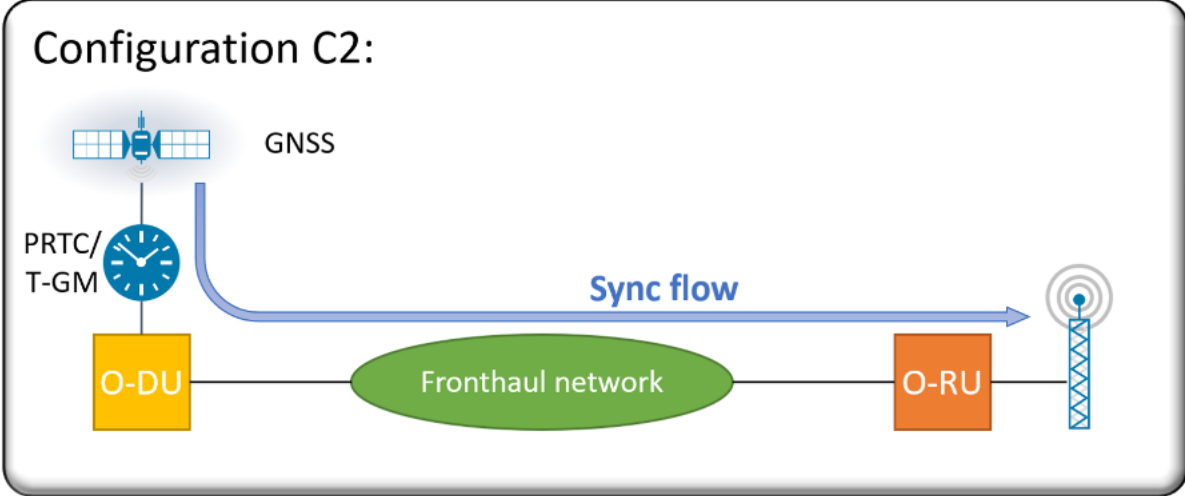
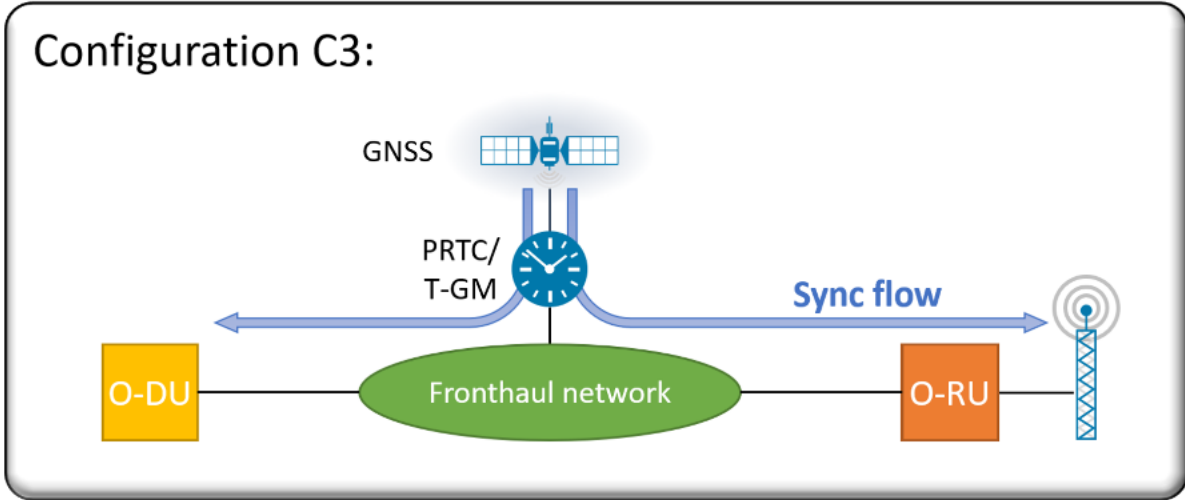
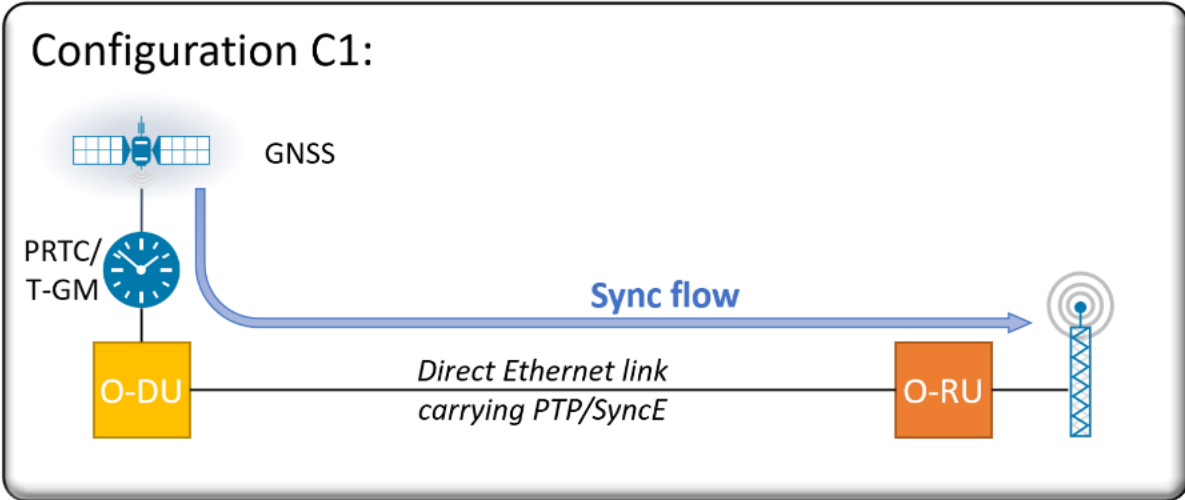


Fronthaul Latency



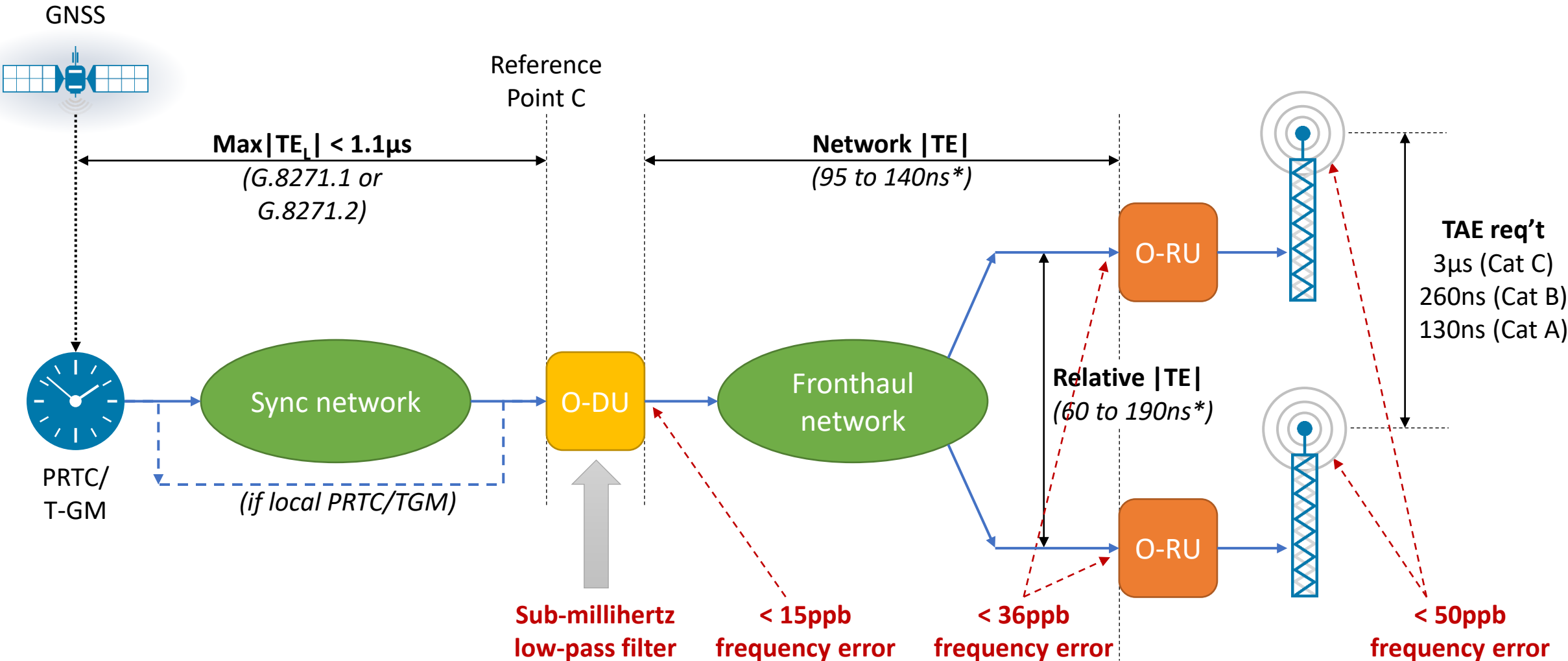
- O-DU estimates one-way latency to schedule traffic on the O-RU
- Relative time error between the O-DU and O-RU causes error in that latency estimate, and must be accounted for in O-RU receive buffer depth
- No hard limit on O-DU time error, but somewhere in the range of 3 to 5µs is reasonable

ORAN LLS* Sync Architectures

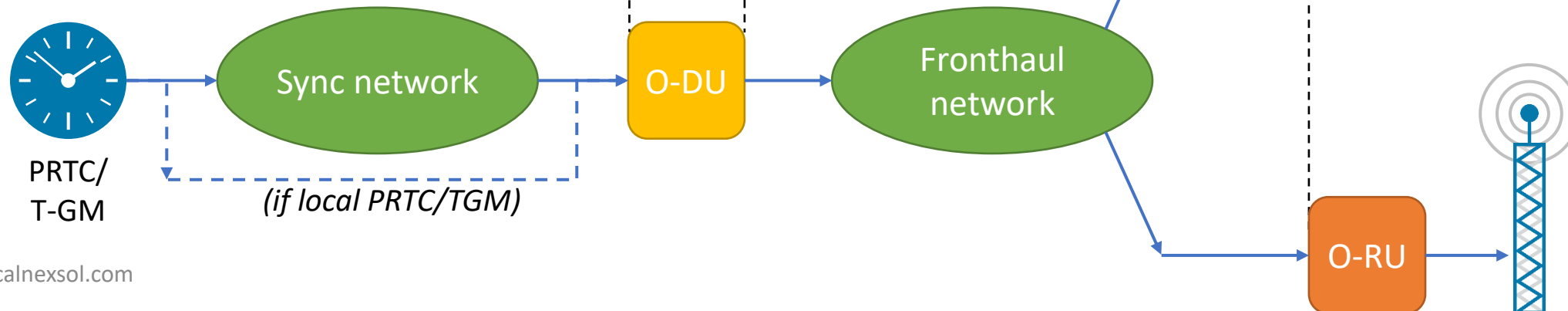
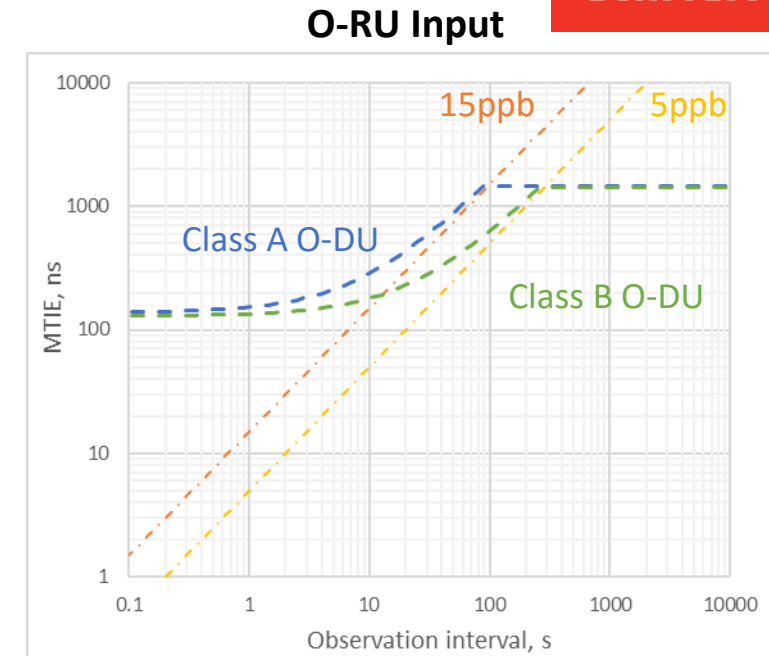
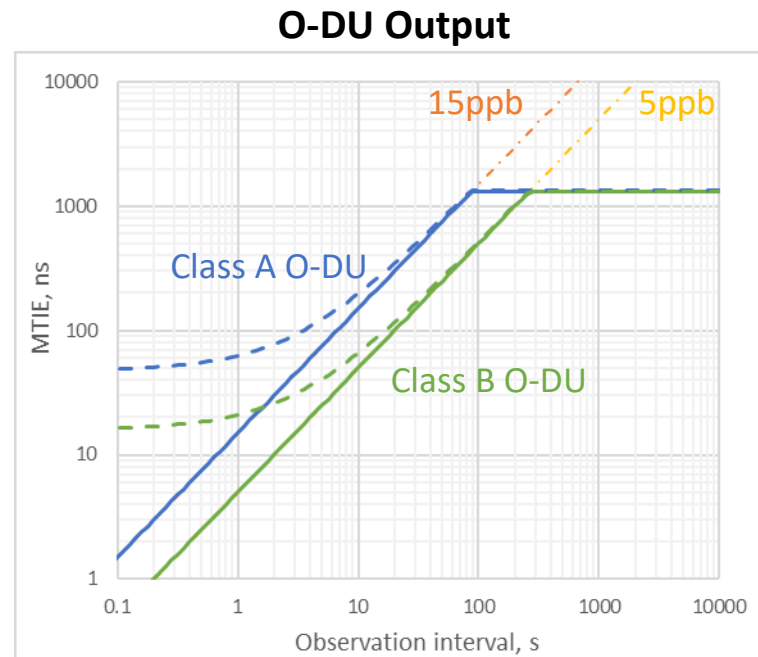
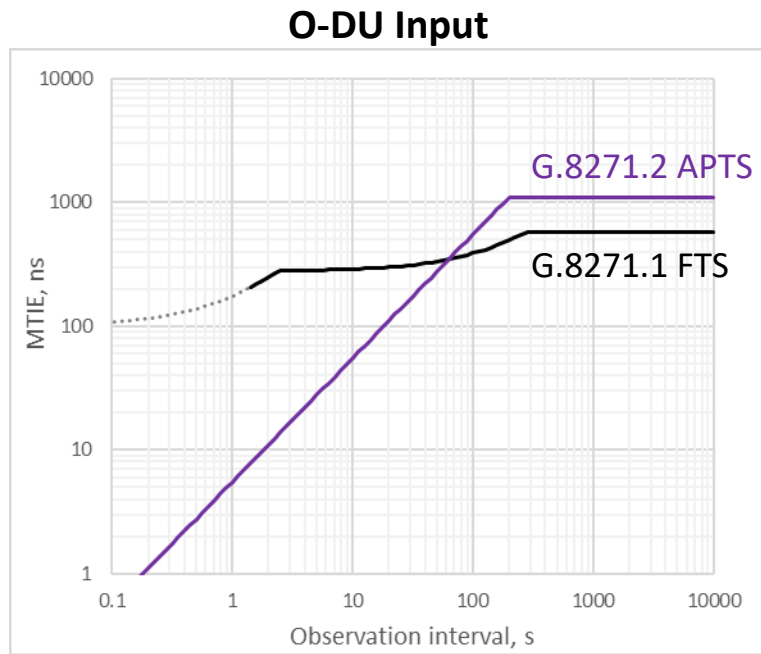


*LLS: "Lower Layer Split" – in effect, fronthaul

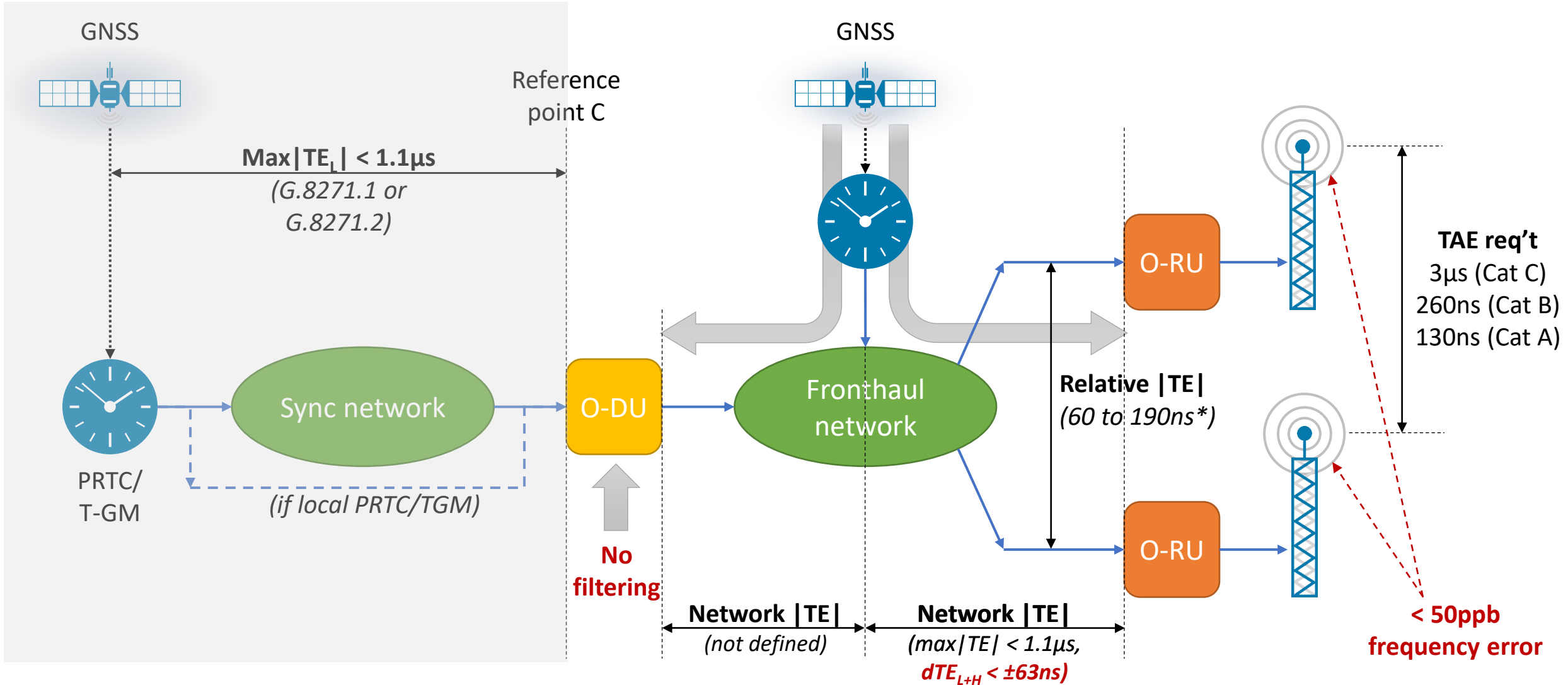
In detail: O-RAN LLS-C2 fronthaul configuration



LLS-C2 Fronthaul Input/Output Limits

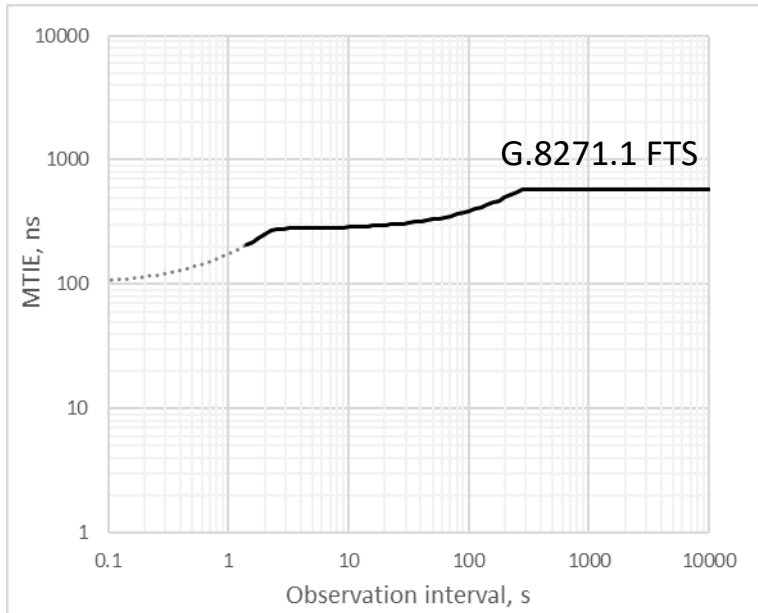


In detail : O-RAN C3 fronthaul configuration

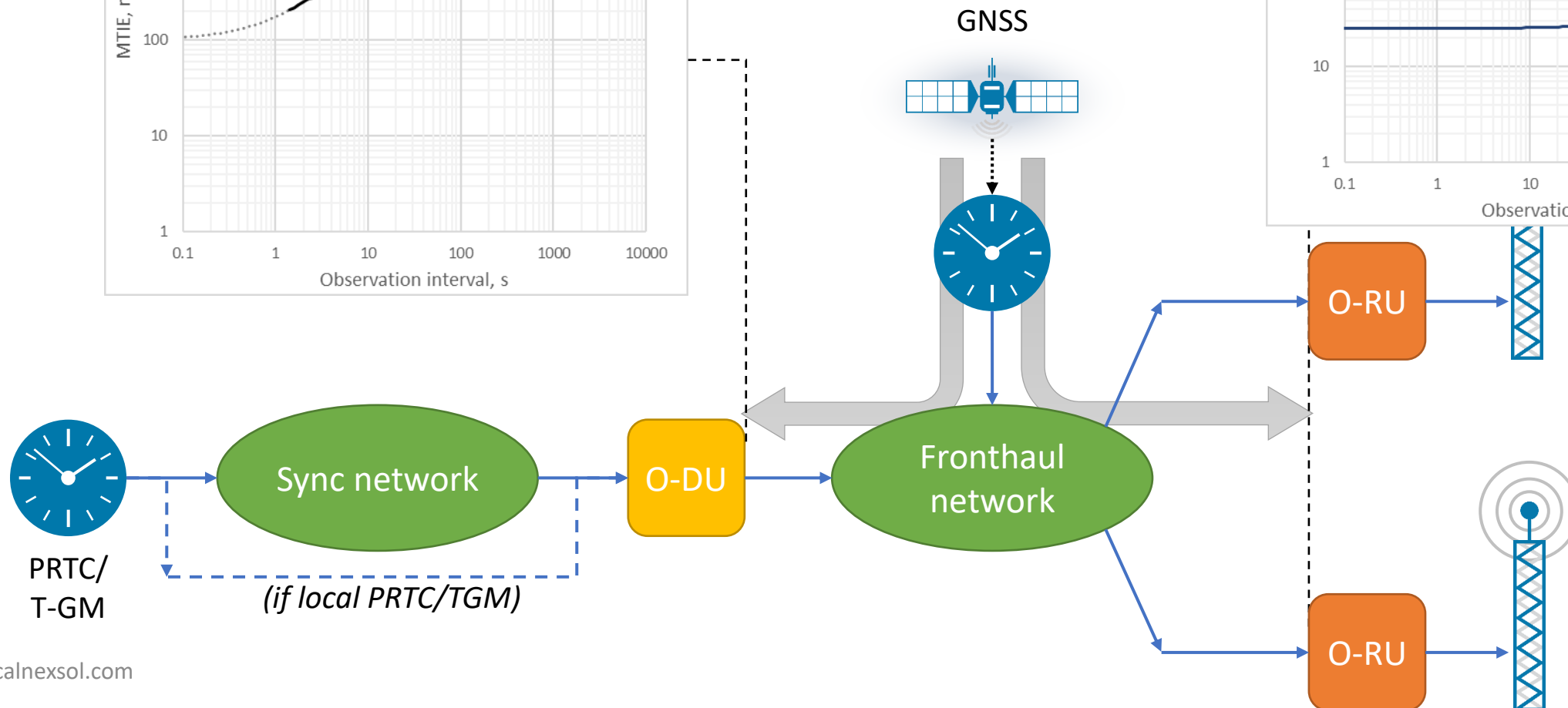
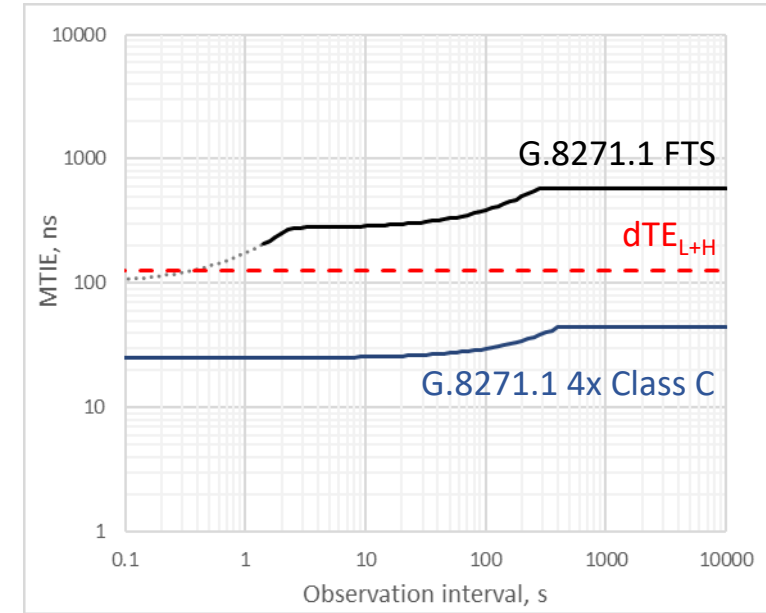


LLS-C3 Fronthaul Input/Output Limits

O-DU Input



O-RU Input



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