

3 Steps to 5G



Anand Ram
vWSTS 2020

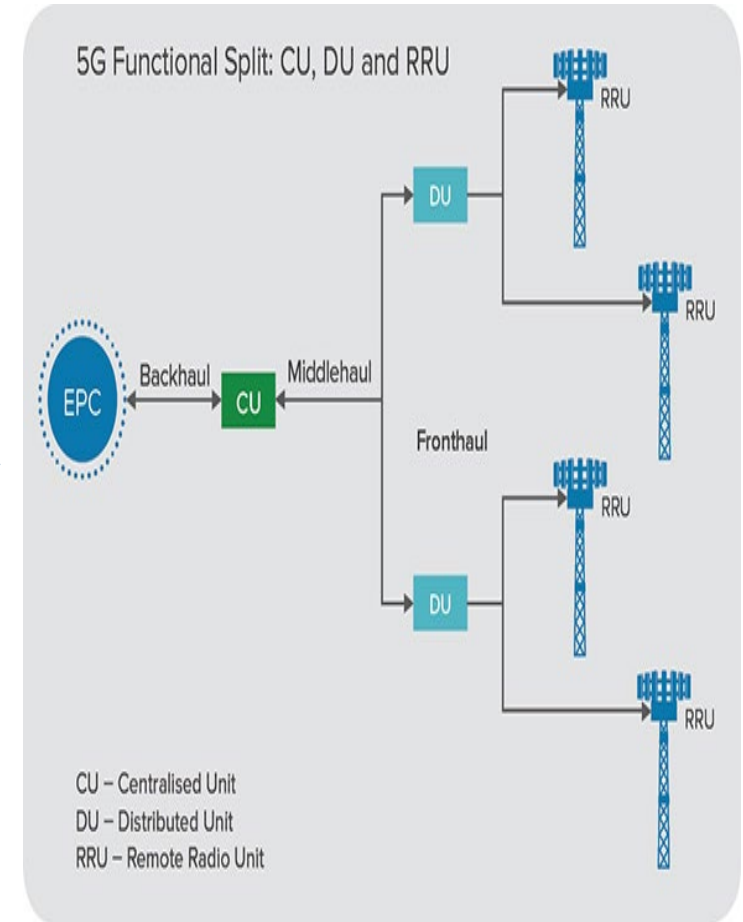
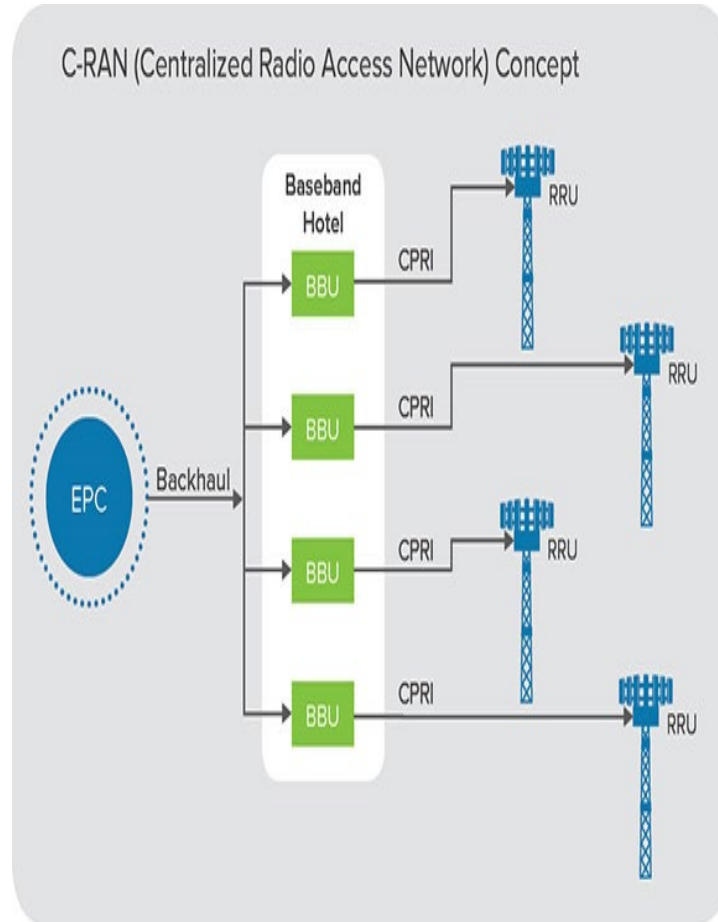
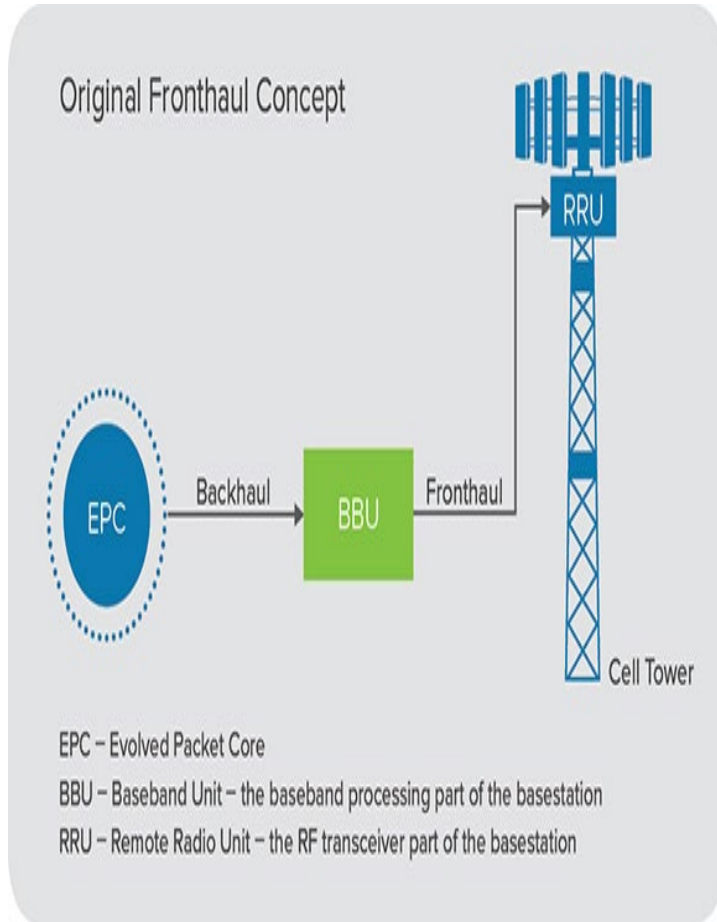
A close-up, high-contrast photograph of an owl's face, showing its large yellow eyes and detailed feathers. The image is dark and serves as a background for the text.

TEST SOLUTIONS
FOR THE WORLD'S NETWORKS

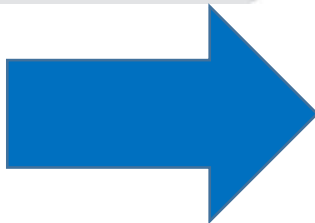
The 3 Considerations

- What the Haul?!
- Timing & Synchronisation
- Disaggregation & Virtualization

What the Haul?!



- Fiber**
- Fixed and known latency (low), asymmetry.
 - Almost no packet loss and jitter

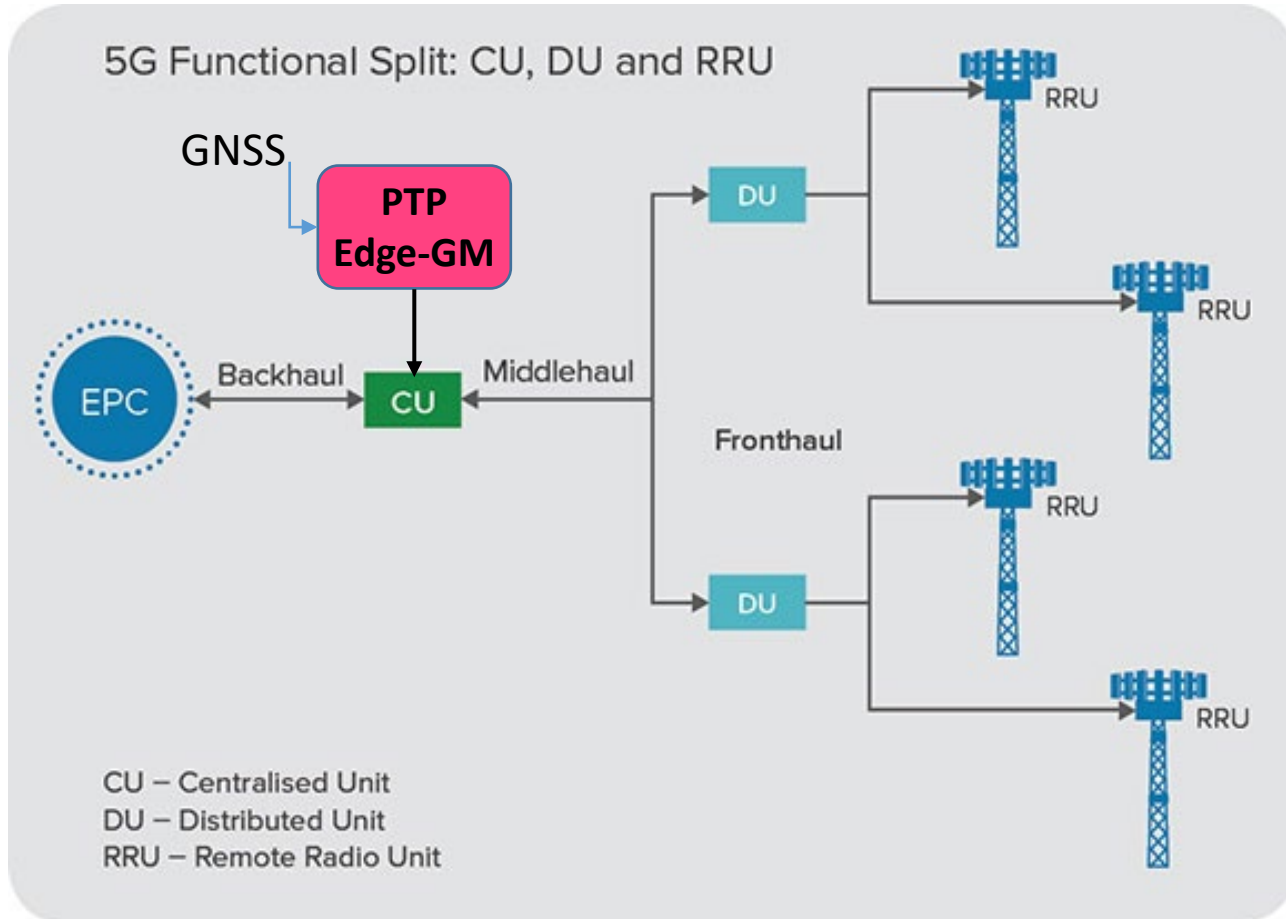


- Network**
- Variable latency, loss and jitter, etc.

Timing & Synchronisation

- 5G Standalone (SA) and DSS driving new PTP deployment
- What's the right Architecture? Profile? Accuracy?
- Are there other new challenges/issues?

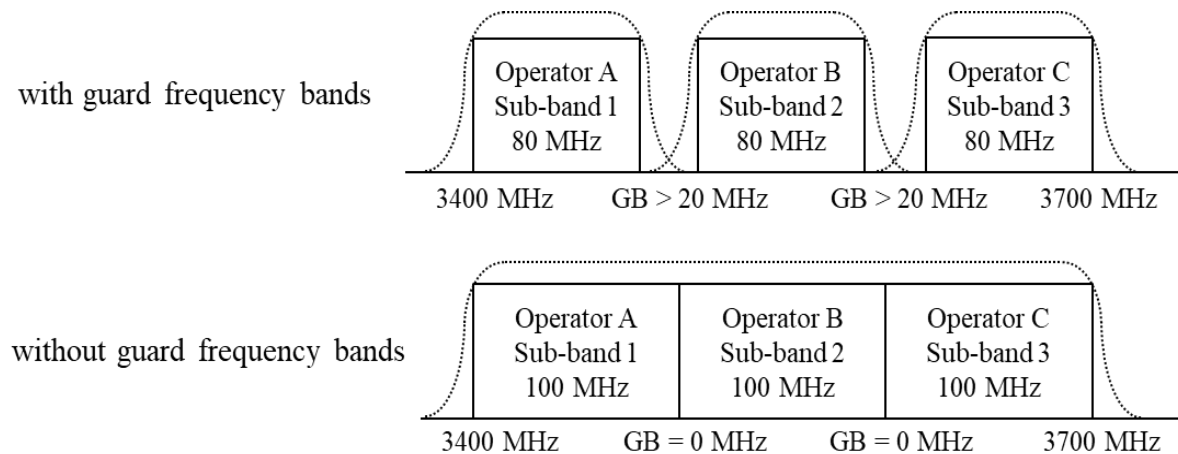
Example Deployment – Tier 1 Operator



- Max 2 Nodes between GM and Slave
- G.8275.1 used
- Plenty of headroom to meet $\pm 1.1\mu\text{s}$
- Need to deploy 1 Edge-GM per CU (\$\$)
- Other options:
 - Fewer GMs deeper in network
 - G.8275.2
 - Co-ordinated PRTC in Core

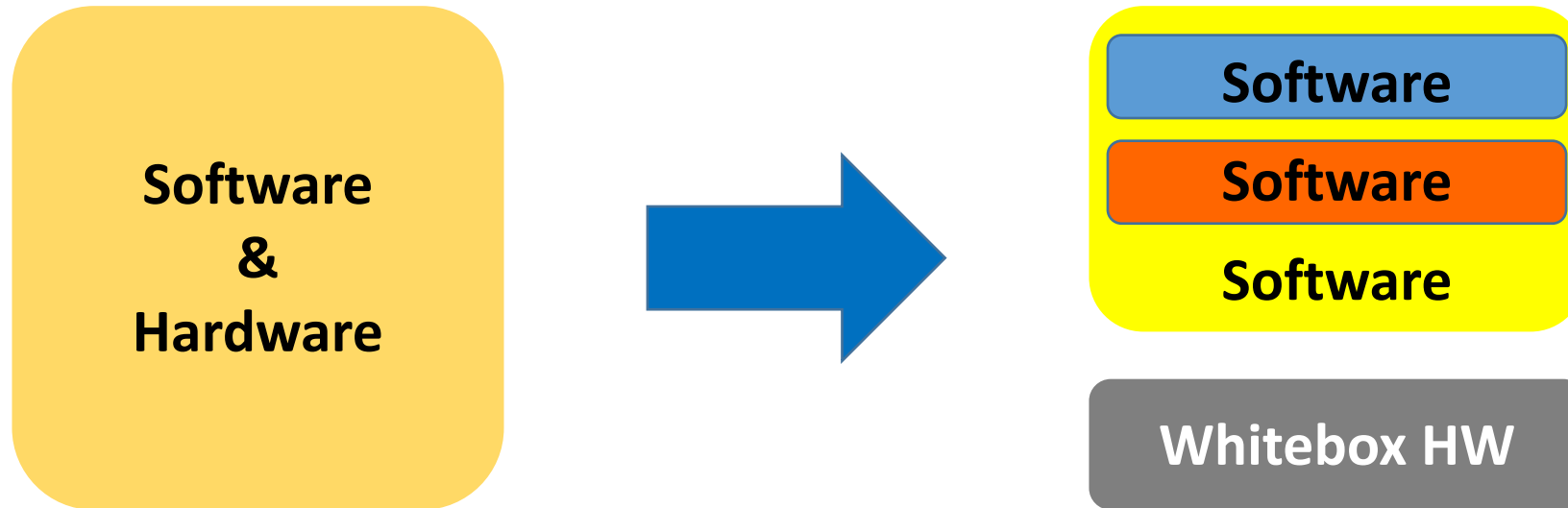
Other Challenges / Issues

- Removal of guard-bands to use full spectrum
 - Need to sync to the same reference
 - Need to ensure and check intra-operator sync



- RRUs can't do low-pass filtering and have greater environmental stress
 - Short-term clock wander issue – under discussion at standards bodies

Disaggregation / Virtualization



- Extensive Features
- Portfolio of Hardware options
- Integrated and Tested
- Single vendor support

- Faster SW Feature Development
- HW Independence
- New Deployment options
- New Operational options
- *(eventually)* Cost benefits

Disaggregation / Virtualization

- Who will integrate? Who will test? Who will support?



all members & players have a collective role

- Specifications, methodologies, plugfests, deployments

Summary – Consider these

- New xHaul architecture changes network parameters
- 5G SA is driving new timing deployments
 - Many options on architectures
- Some new gotchas for 5G timing
- 5G infrastructure will be Disaggregation in Datacenters
 - Collective effort to integrate, test, prove & deploy