



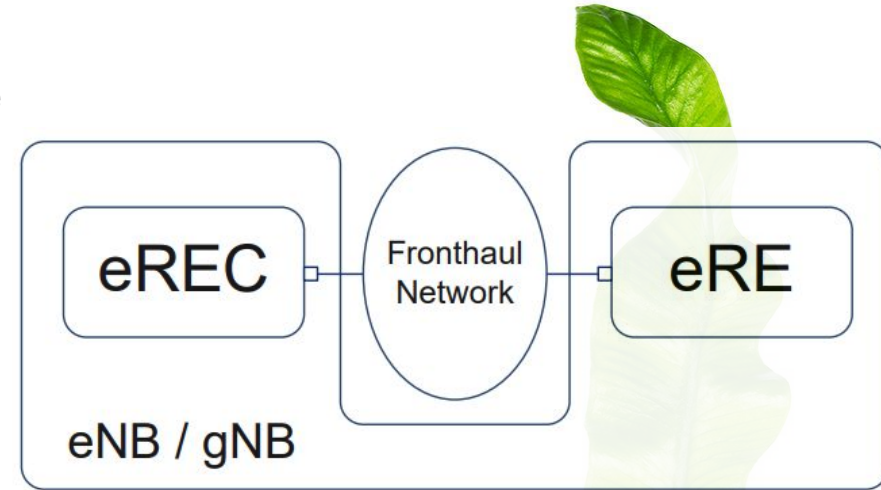
6G Goals and Transport Considerations

ITU-T SG-15 Plenary
July 7, Montreal QC



Mobile transport evolution

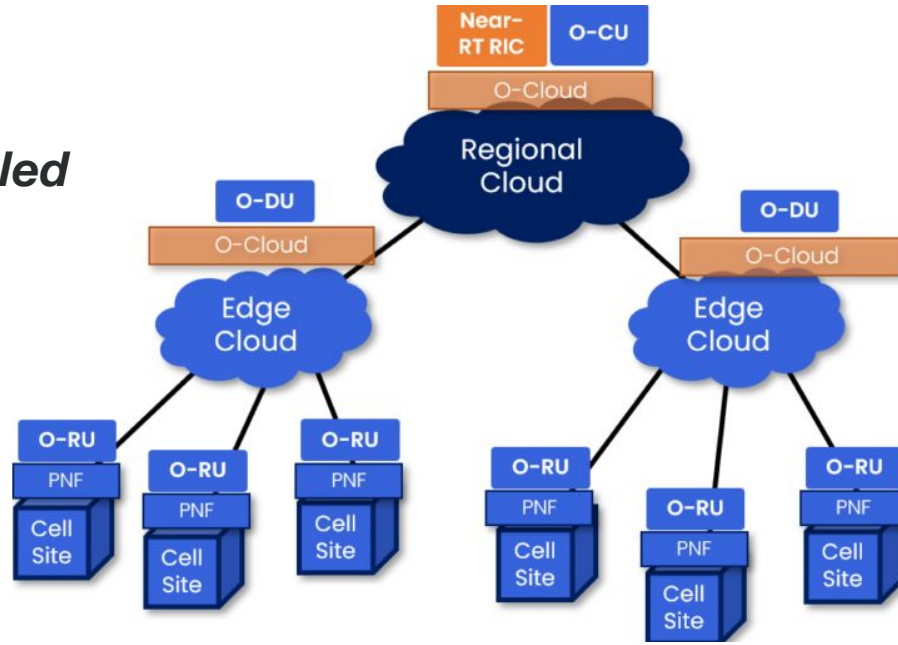
- Increasing speeds on fibre infrastructure
 - 100M, 1G, 10G, 25G
- More centralization
 - nodeB/eNodeB -> RU
 - RAN -> C-RAN -> O-RAN
- Less exotic network infrastructure
 - CPRI -> Ethernet
 - Specialized devices -> volume chipsets / routers
- O-RAN fronthaul now driving network evolution
 - Latency, timing, rates, features
 - Common platforms with access network?



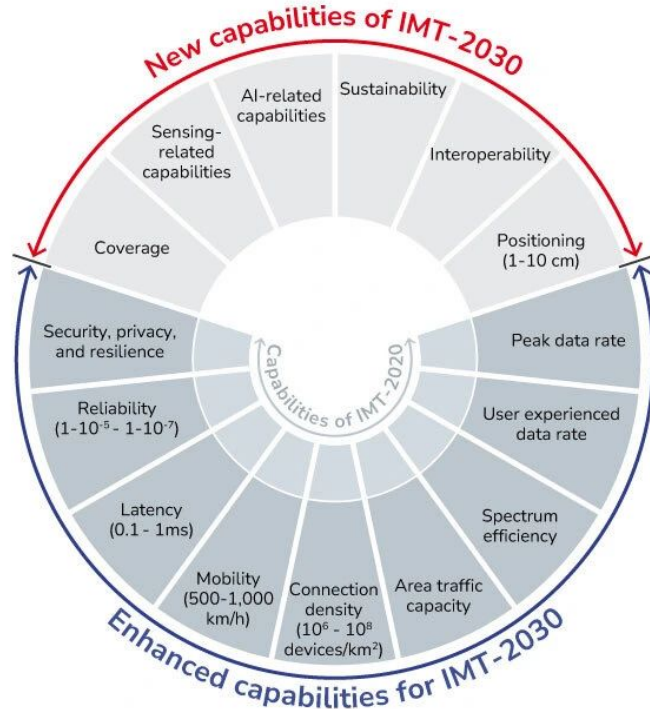
O-RAN is 5.5G Investment

- Ongoing technology investments in O-RAN architecture
- Upgradable, evolvable, interoperable, efficient, performant
- Several km fronthaul radius enables multi-site coordination

Transport enabled



Diverse 6G Goals call for Flexibility



Several goals imply transport demands:

- Density
- Capacity
- Real / peak data rates

Some have direct trade-offs:

- Latency
- Spectral efficiency
- Reliability

6G standards should take physical infrastructure / transport realities into account

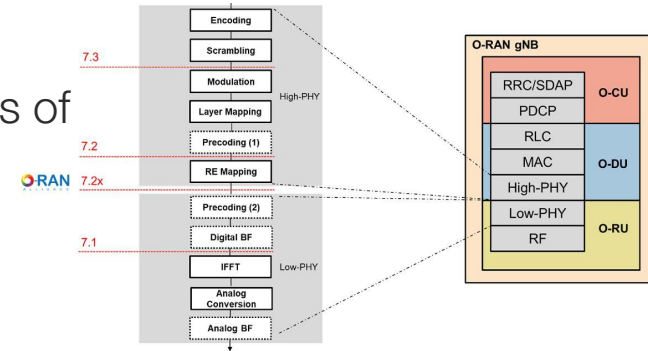
- Flexible operating points
- Self-tune for diverse infrastructure & applications

NOTE: The range of values given for capabilities are estimated targets for research and investigation of IMT-2030.

Source: International Telecommunication Union (ITU) Proprietary

6G & O-RAN Evolution

- Higher fronthaul speeds to support higher rates, more beams, new bands
 - Rate reduction on O-RAN fronthaul via compressive sensing?
- xhaul support on wider set of network technologies
 - Integrated access & PON scheduling
 - 6G driven coherent PON development
- In-system wireless xhaul – should this be part of O-RAN?
 - Integrated access and midhaul?
 - Integrated access and fronthaul?
- New FEC / HARQ approaches to improve boundaries of reliability / latency / performance trade-off
 - Little room to reduce transport time:
 - 10 μ s RTT per km fibre
 - ~50 μ s for wide O-RAN layout
 - Air interface must use it better



6G & O-RAN Evolution (cont)

- Can regional device-to-device links reduce latency?
 - UE to UE cut-through at DU-level– no PDCP decode or core involvement
 - Eg UE-RU-DU-(DU-)RU-UE
 - Extended version of in-cell device-to-device
 - Meaningful at a DU aggregation level
 - May simplify some first responder, campus, IoT use cases
- High band architecture may be less centralized, but more dense
 - Back / mid haul vs fronthaul - minimal xhaul data-rate overhead
 - Low interference concern & high data-rates
 - Small coverage radius & high data rates drive transport need
 - Challenges from coordinated, unified low-band & very distributed high band?

let's make the future friendly™