ORAN - Impact on Telecom Eco-system

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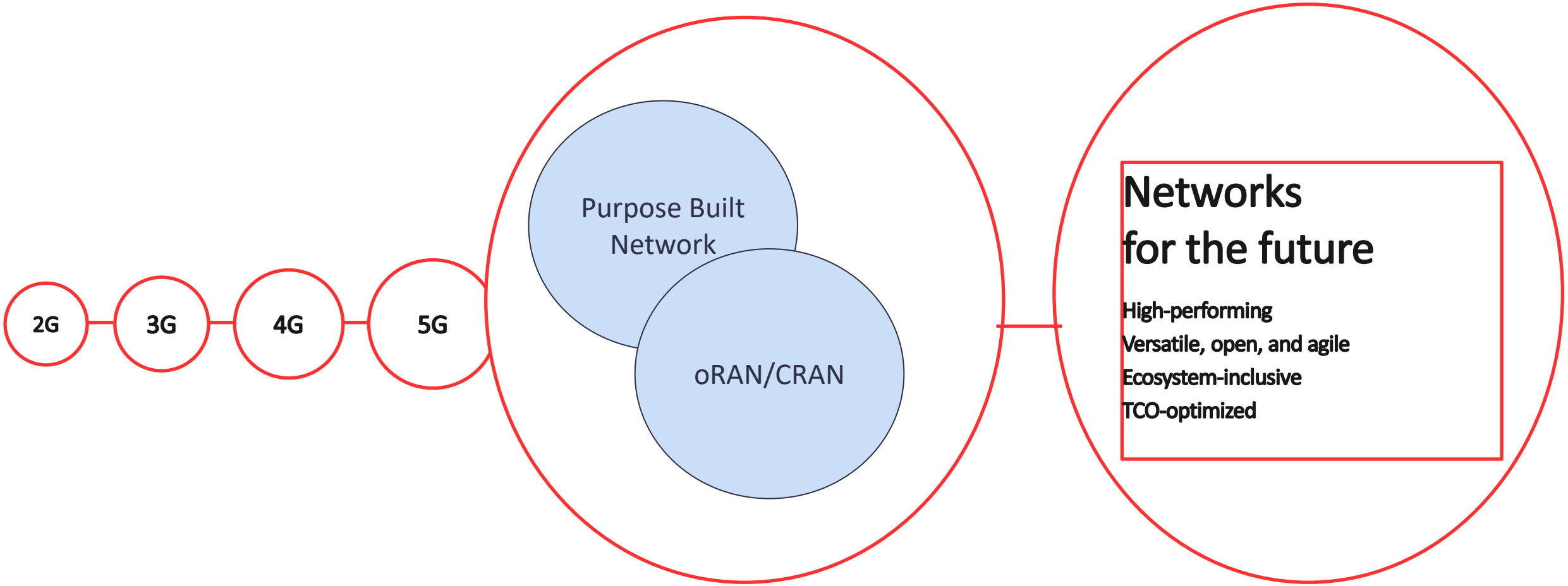
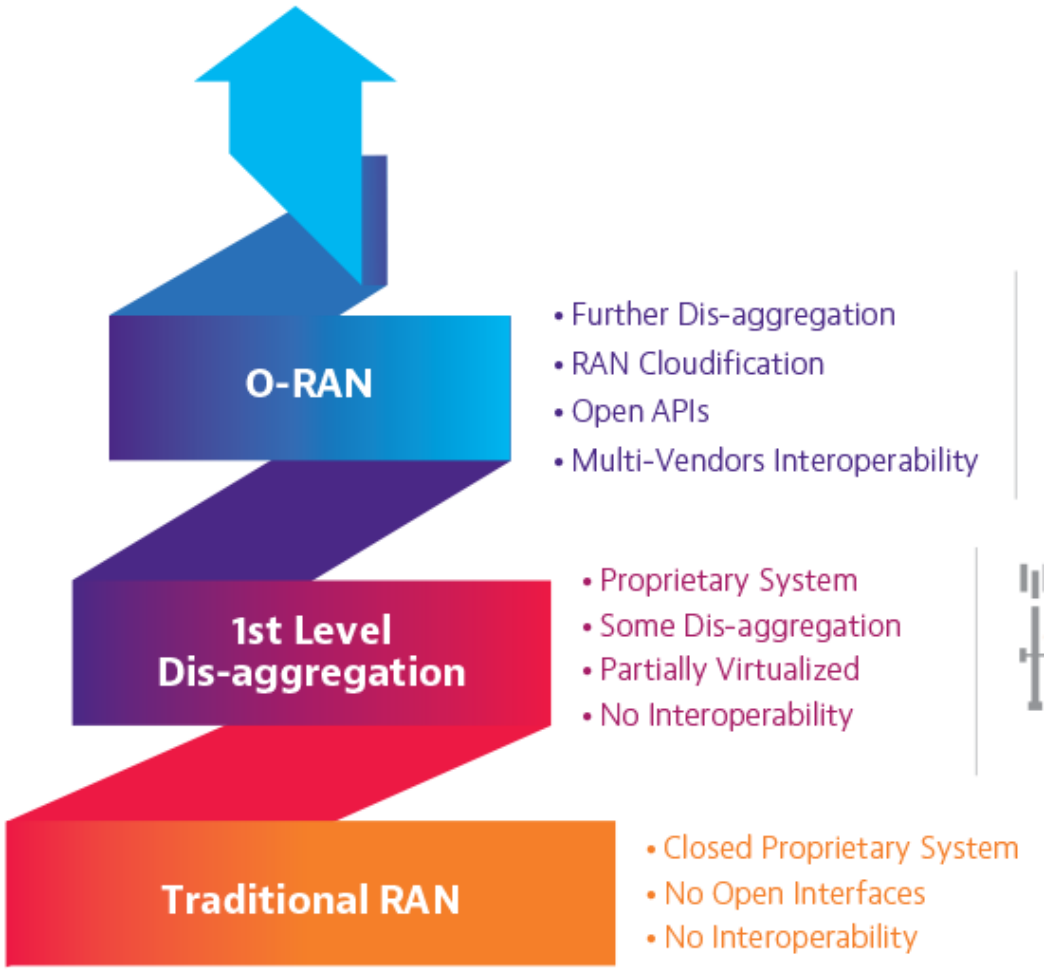
Agenda

- Overview
- Impact Areas
- OpCo Expectations

Technology Evolution



ORAN Enablers



Dis-aggregation of RAN HW

Inclusive

Innovation with industry partners and 3rd party solutions

Flexibility

HW/SW disaggregation enables choice in cloud infrastructure options

Multidomain orchestration

Joint RAN, Transport, Core, orchestration

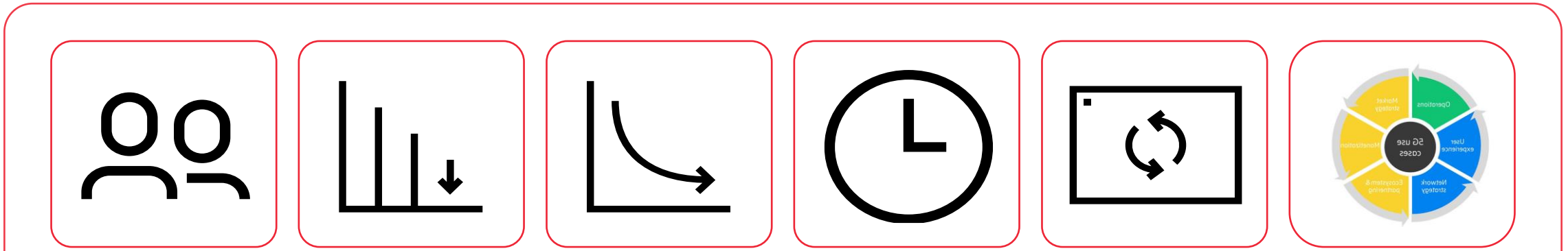
RAN programmability

Foster network automation and support for Non-RT RIC

Automation

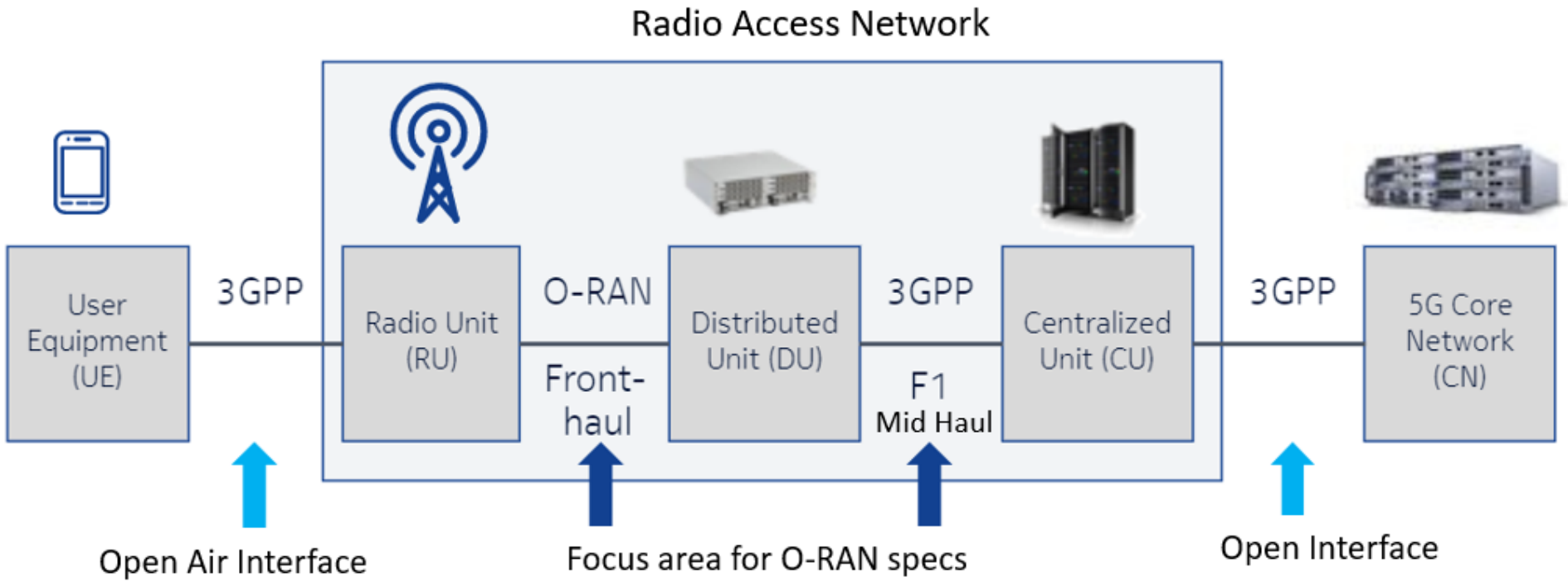
Adoption of open interfaces enabling automation

OpenRAN Drivers



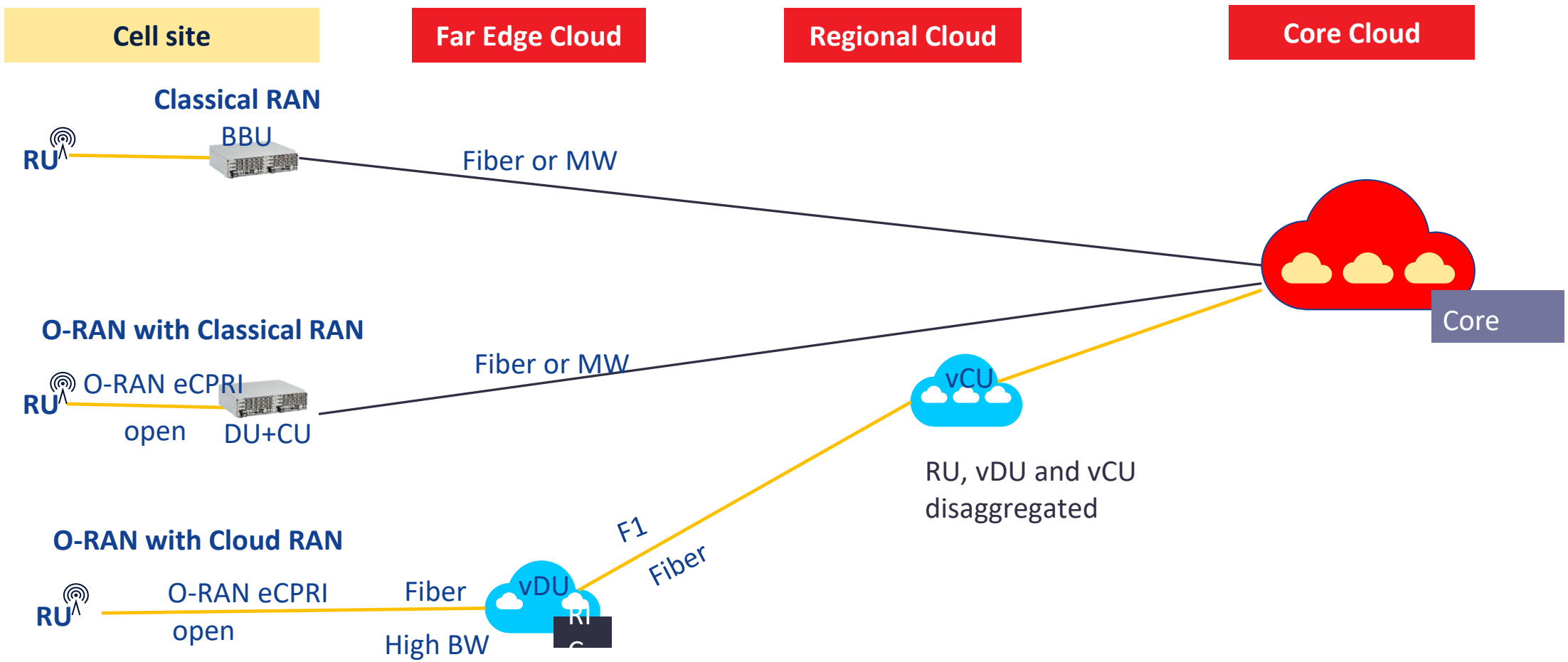
Increasing vendor choice	CAPEX reduction	Contain OPEX in the long-term	Decrease TTM	Increase software program-mability	New Use cases

Open Interfaces in Mobile networks



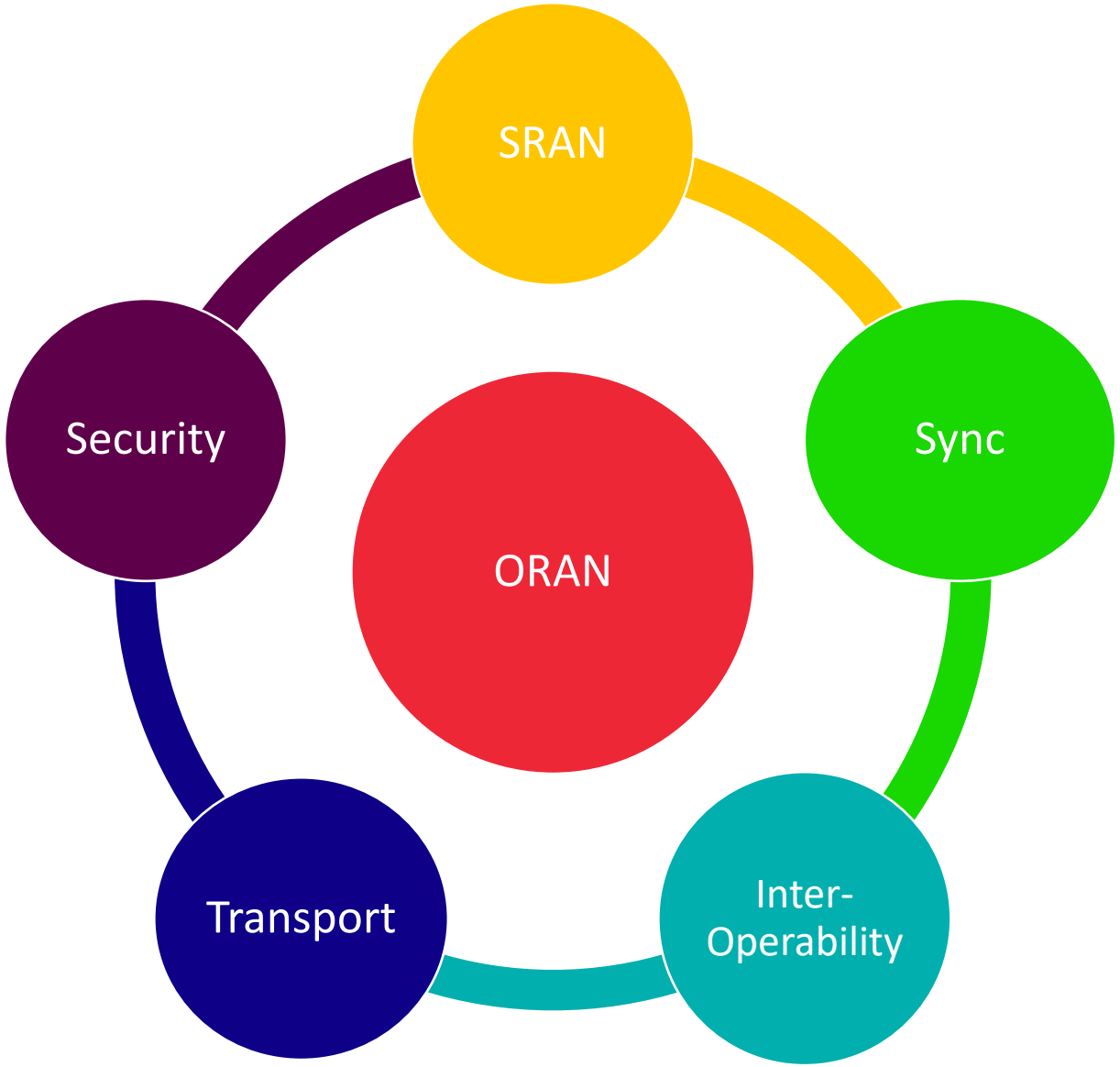
- ORAN introduced concept of open Interfaces to the Radio Access Network.

Radio Network Architecture evolution with ORAN



- Classical & ORAN implementations will co-exists in a network

ORAN Impact on Network Eco-System



Impact Areas - SRAN

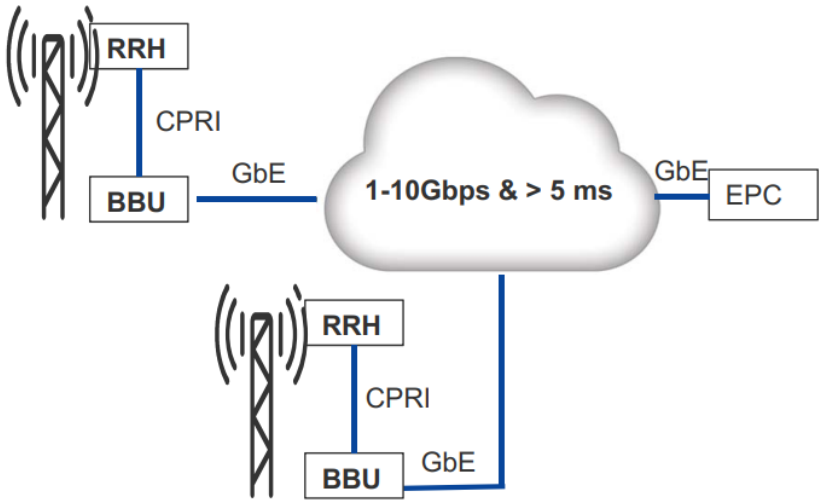
- Single multi-purpose platform which support multiple technologies in the same Hardware simultaneously.
- This is applicable for both Radio and Digital infrastructure at a sites.
- In India, Multiple technologies exists at a site in the same band
- For e.g in 900 MHz , - LTE , 2G , NR , NB-IoT etc.
- Current nature of oRAN products mostly support single technology like NR or LTE.

- Adding a radio for single technology only would not be a efficient and economical mode.

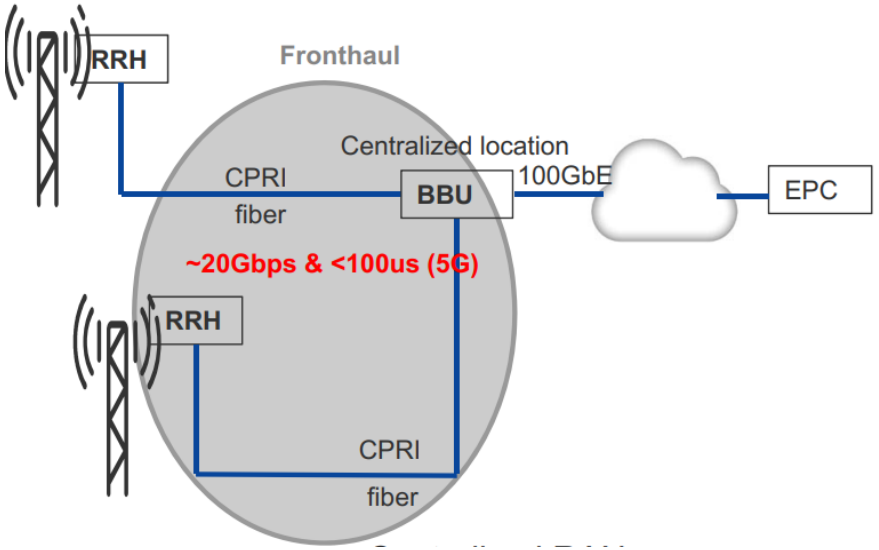
Source: Nokia

Impact Areas - Synchronization

- Cellular technologies relies heaving on the Synchronizations between the nodes.
- In 4G & 5G both Freq and Phase synchronization is required
- It is often delivered in traditional networks with GPS and PTP servers.



- Largely this is different from the typical cloud servers and thus regular solution in IT world cannot be adopted for this.



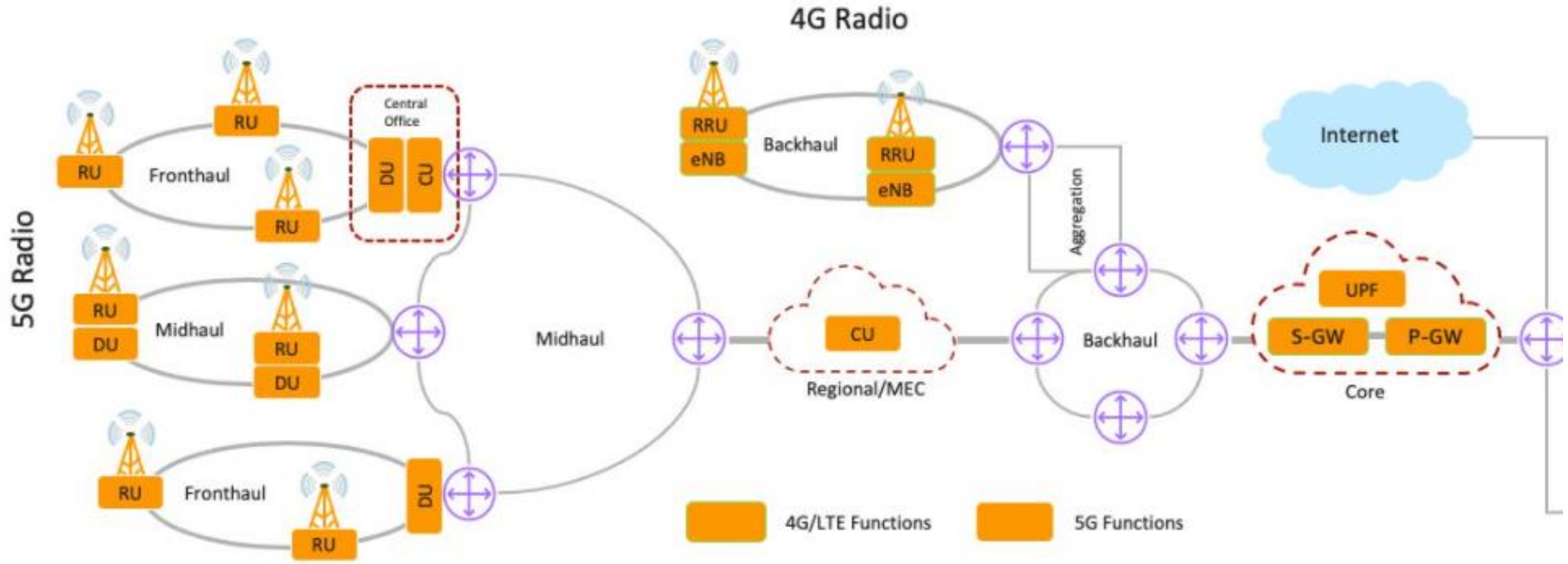
- Synchronization approaches shall be similar to what is available in traditional networks to provide KPIs.

Impact Areas - Interoperability

- With ORAN there are many integration touch points with various vendors
- As an example , just for DU there are so many vendors involved to get a working DU
- There are similar things for RU , RIC , CU etc
- Need for few Pre-identified configurations are must to start for OpCos

- Server Chassis – Vendor A
- NIC card – Vendor B
- Processor Chipset – Vendor C
- GPS – Vendor D or
- Cell Site Router – Vendor E
- Accelarator Card – Vendor F
- FrontHaul Card – Vendor G
- IP 65 cabinet

Impact Areas - Transport



- With different topologies the transport requirements becomes more important
- Best optimizations are possible when there is pooling of the resources which can be done. i.e DU & CU together. This however poses extreme requirements on the FrontHaul between the cell sites and CU locations.
- This is not always possible and may only be possible for the some sites.
- The oRAN deployment options would be influenced by the transport architecture.

Impact Areas - Security

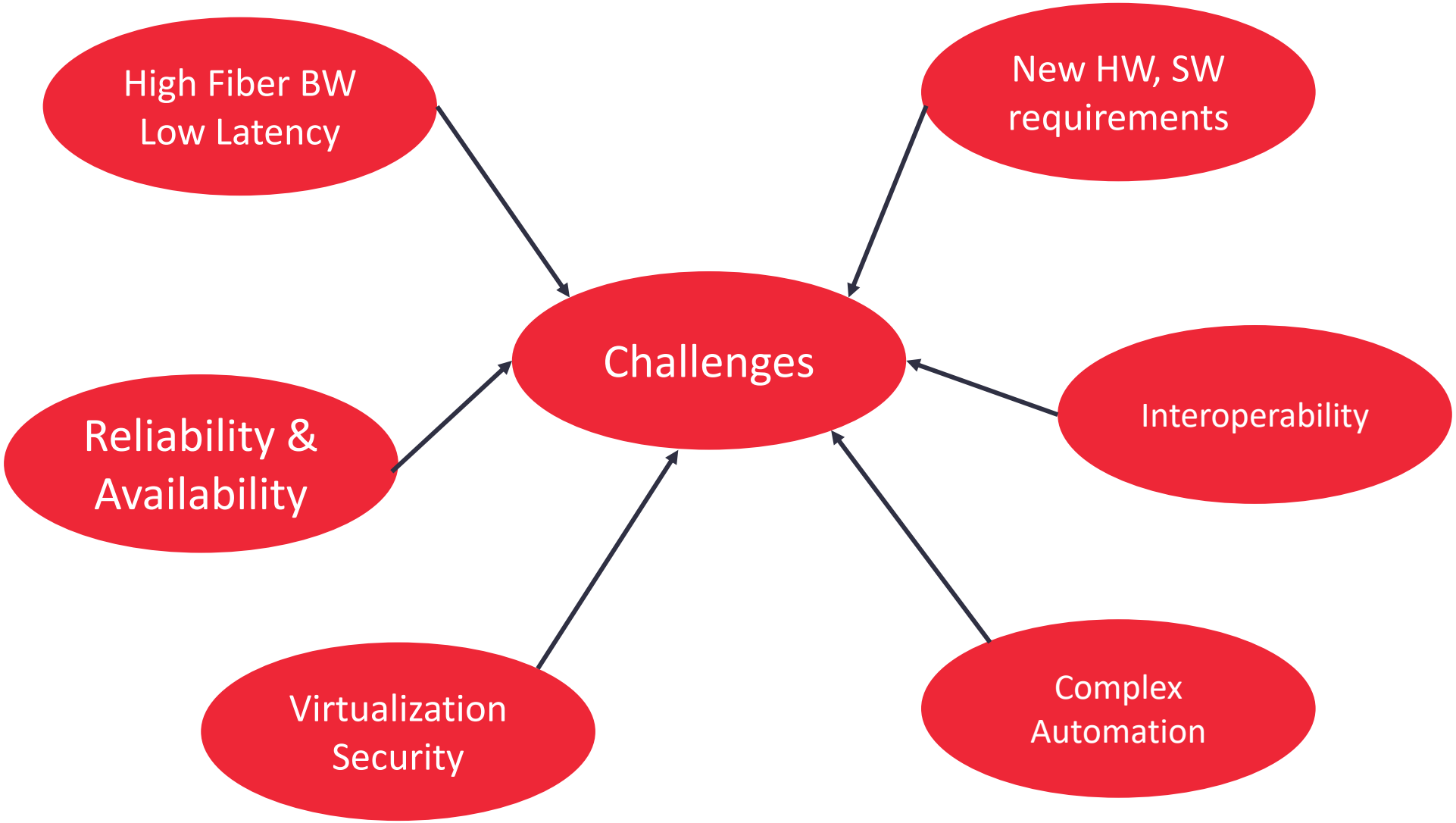
- All servers are connected like DU , CU
- IP Security of the nodes may be an area of interests in oRAN deployment.
- With openStack usages the need for baseline security needs to be applied to the Radio sites as well.
- Different interfaces and the mechanisms impact the security approaches.

Interface	Between nodes	Security mechanism	Specified by
E1	O-CU-CP and O-CU-UP	NDS/IP (IPSec) or DTLS	3GPP
Xn	Source gNB and Target gNB	NDS/IP (IPSec) or DTLS	3GPP
Backhaul	O-CU-CP and 5GC (N2) O-CU-UP and 5GC (N3)	NDS/IP (IPSec) or DTLS	3GPP
Midhaul (F1)	O-CU-CP and O-DU (F1-C) O-CU-UP and O-DU (F1-U)	NDS/IP (IPSec) or DTLS	3GPP
Open Fronthaul (M-Plane)	O-RU and O-DU/SMO	SSHv2, TLS	O-RAN WG4
Open Fronthaul (CUS-Plane)	O-DU and O-RU	Work in progress (Dec 2020)	O-RAN WG1 STG
O1	SMO and O-RAN Managed elements	Work in progress (Dec 2020)	O-RAN WG1 STG
E2	Near-RT RIC (xAPPs) and O-CU-CP	Work planned (1Q21)	O-RAN WG1 STG
A1	Near-RT RIC and Non-RT RIC	Work planned (1Q21)	O-RAN WG1 STG
O2	SMO and O-Cloud	Work planned (2Q21)	O-RAN WG1 STG

Key Expectations of OpCos

Be a realistic competition.	• Feature Parity with traditional suppliers • CAPEX reduction & Better TCO • SRAN functionality • Plug & play functionalities of various HW components for DU & Radios • HW & OS agnostic SW
Products	• High capacities • Concurrent support of 4G/5G on Radio,DU • 64T64R products for maMIMO. • Scale of Economics • TDD functionalities
Functionalities	• DSS 4G & 5G • RIC / SON functionalities • Dual IPv6 & IPv4 • NB-IoT

ORAN Architecture Challenges



Thanks