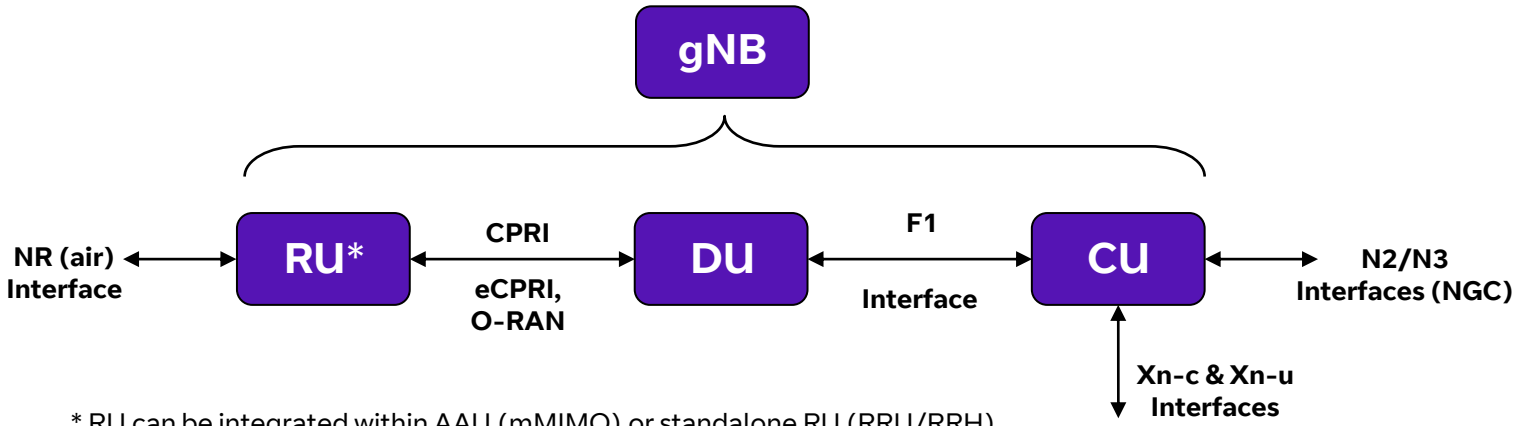
BT's case for MOPA Pluggables

ECOC 2023 Workshop: MOPA optics for Wireless

Albert Rafel (BT optical networks research)
Richard MacKenzie (BT wireless research)
Adrian Sharples (BT wireless research)
Andy Sutton (BT mobile backhaul principal architect)

1 October 2023

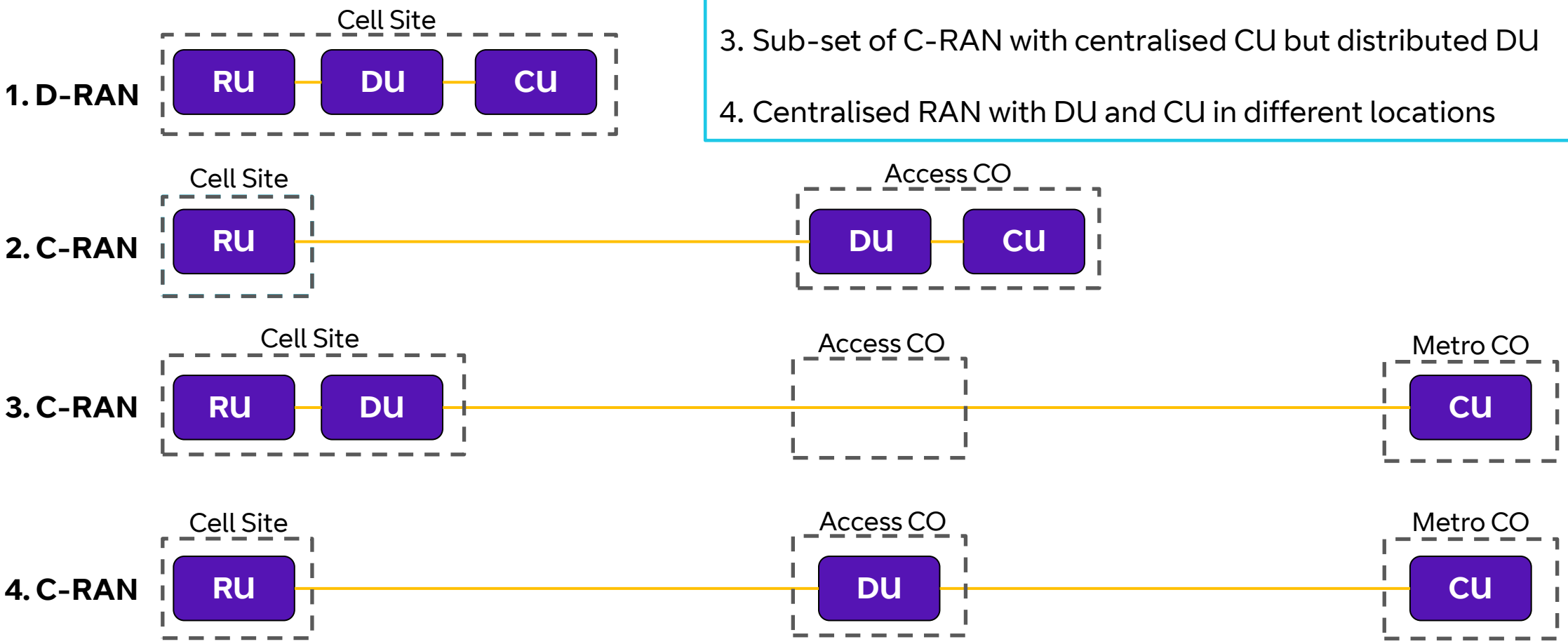
gNB and RAN functional decomposition



AAU: Active Antenna Unit

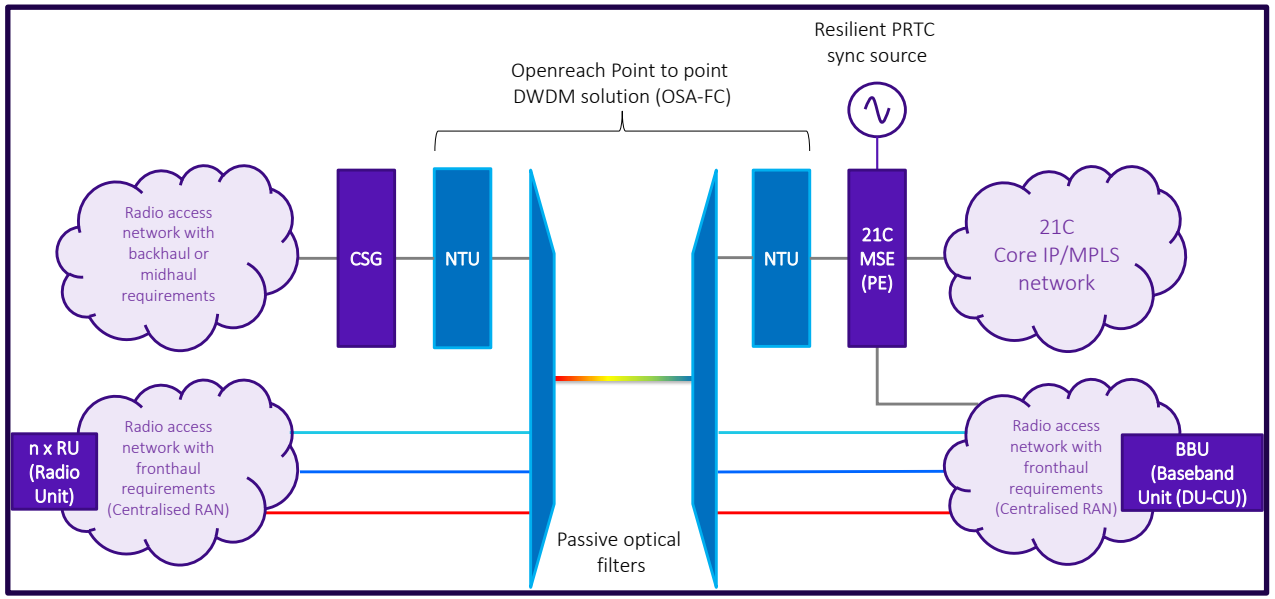
RAN Architectures

1. Distributed RAN (D-RAN): traditional RAN architecture with all functions located at the radio cell site
2. Centralised RAN (C-RAN), common DU-CU/BBU for multiple remote radio units (cell-sectors)
3. Sub-set of C-RAN with centralised CU but distributed DU
4. Centralised RAN with DU and CU in different locations



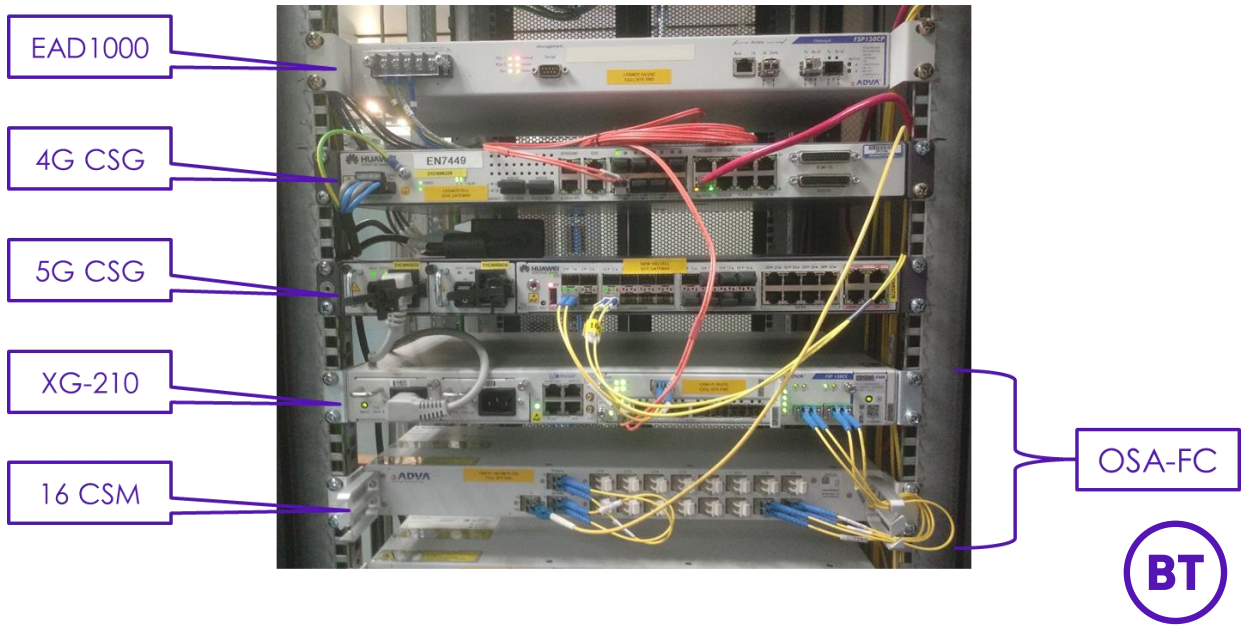
BT Current Deployment

- D-RAN in Macro-sites
- BT trialling small cell C-RAN deployments



Openreach Products for Mobile Transport

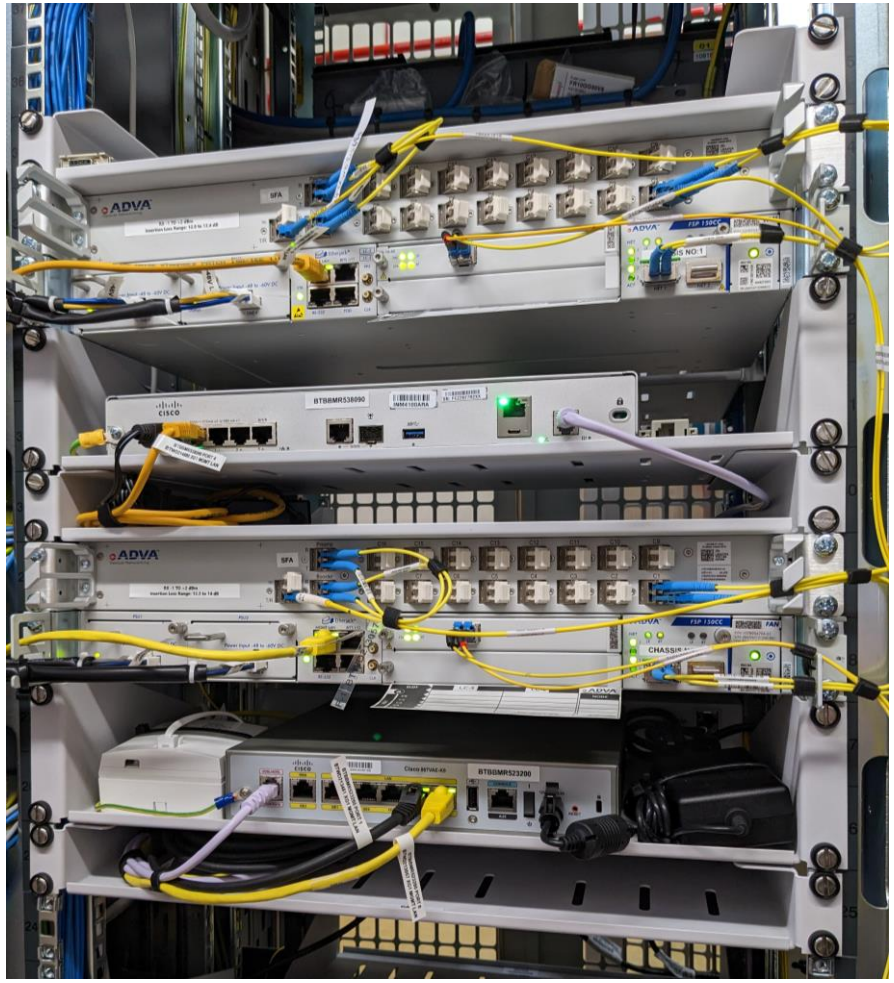
- Optical Spectrum Access – Filter Connect (OSA-FC)
  - where required for capacity or future-proofing…
- Ethernet Access Direct (EAD) 10G or 1G
  - used as appropriate
- Street Access (SA1G) for small cells
- Standard reach products up to 25km, extended reach up to 40km



Note: Photo from lab environment, doesn't represent actual deployed configuration

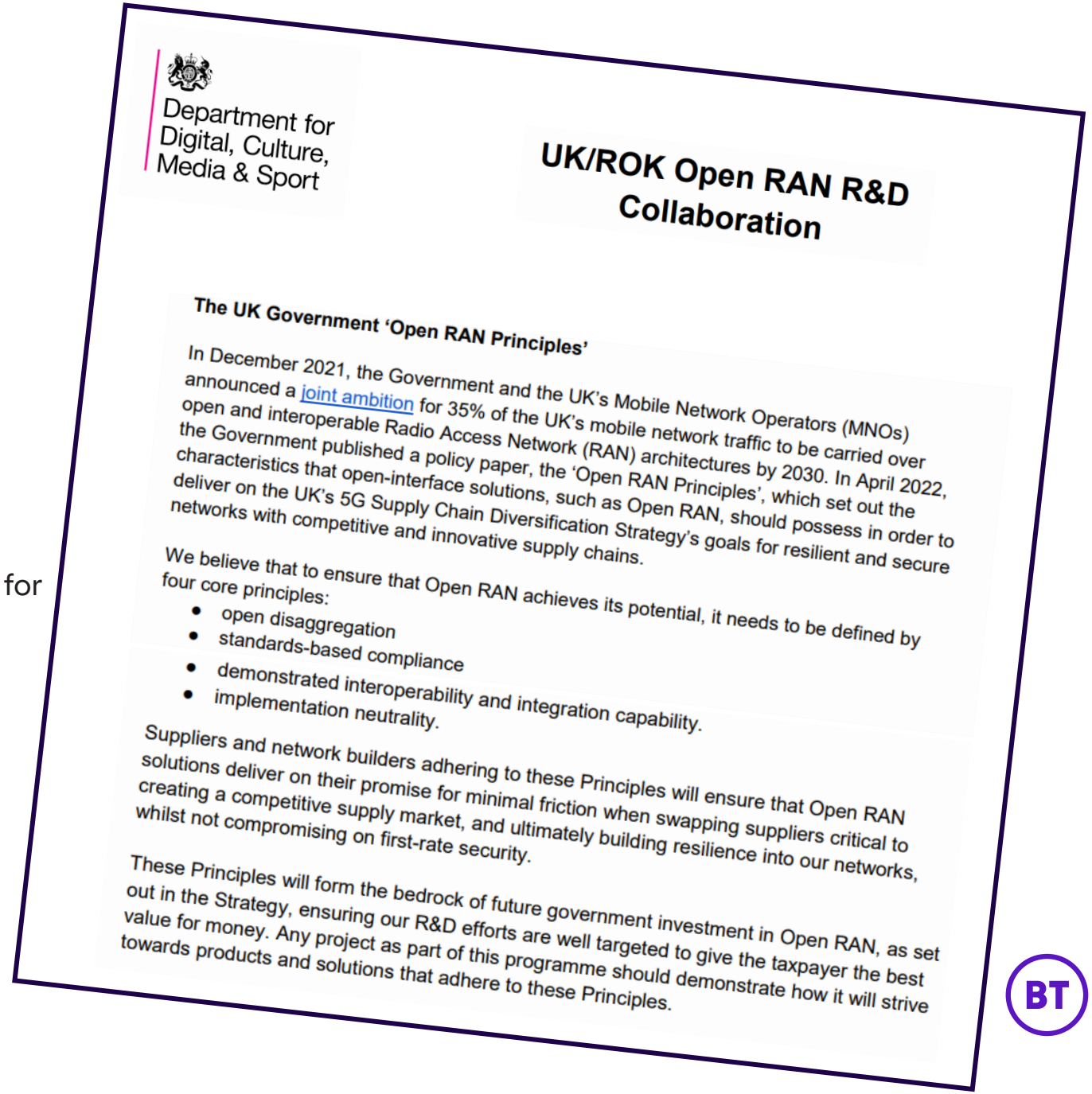
Openreach OSA-FC
Mobile Transport Product

- Optical Spectrum Access – Filter Connect (OSA-FC)
- Point to point Openreach optical access product
- DWDM in the optical C-band
- Single fibre working solution with 16 circuits available, utilising 32 wavelengths
- Configured with 1 or 2 x 10GE grey interfaces in typical configuration
- Some systems have an additional 2 x 10G coloured optical interfaces implemented in support of trials of radio access network architecture evolution…
- Approx. 5,600 systems deployed for mobile backhaul



UK Government Supporting Open RAN Solutions

- UK's Department for Science, Innovation and Technology (DSIT) incentivising open supply chains through funding,
  - which eventually will support the delivery of improved public services, and the growth of the economy
- The UK government announced in Dec 2021 the ambition for 35% of the UK mobile traffic to be carried over open and interoperable RAN by 2030



Department for Digital, Culture, Media & Sport

UK/ROK Open RAN R&D Collaboration

The UK Government 'Open RAN Principles'

In December 2021, the Government and the UK's Mobile Network Operators (MNOs) announced a joint ambition for 35% of the UK's mobile network traffic to be carried over open and interoperable Radio Access Network (RAN) architectures by 2030. In April 2022, the Government published a policy paper, the 'Open RAN Principles', which set out the characteristics that open-interface solutions, such as Open RAN, should possess in order to deliver on the UK's 5G Supply Chain Diversification Strategy's goals for resilient and secure networks with competitive and innovative supply chains.

We believe that to ensure that Open RAN achieves its potential, it needs to be defined by four core principles:

- open disaggregation
- standards-based compliance
- demonstrated interoperability and integration capability.
- implementation neutrality.

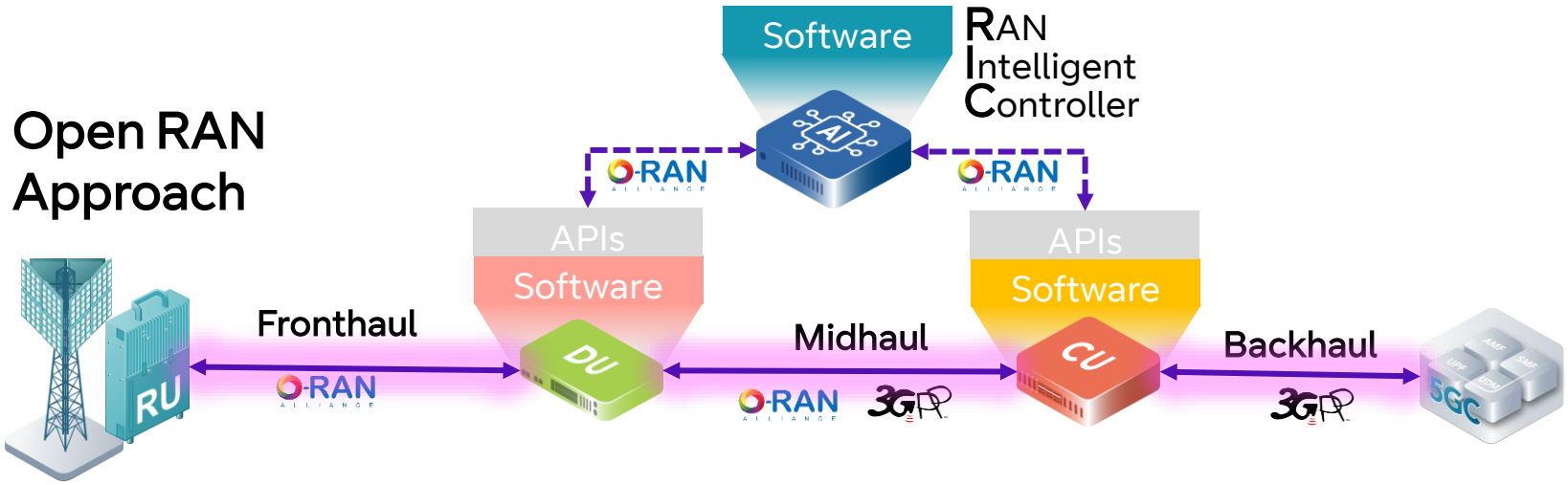
Suppliers and network builders adhering to these Principles will ensure that Open RAN solutions deliver on their promise for minimal friction when swapping suppliers critical to creating a competitive supply market, and ultimately building resilience into our networks, whilst not compromising on first-rate security.

These Principles will form the bedrock of future government investment in Open RAN, as set out in the Strategy, ensuring our R&D efforts are well targeted to give the taxpayer the best value for money. Any project as part of this programme should demonstrate how it will strive towards products and solutions that adhere to these Principles.

What is “Open RAN”?

1. Disaggregation
2. Virtualisation
3. Cloudification
4. Multi-vendor
5. Open Interfaces

O-RAN not addressing optical interfaces

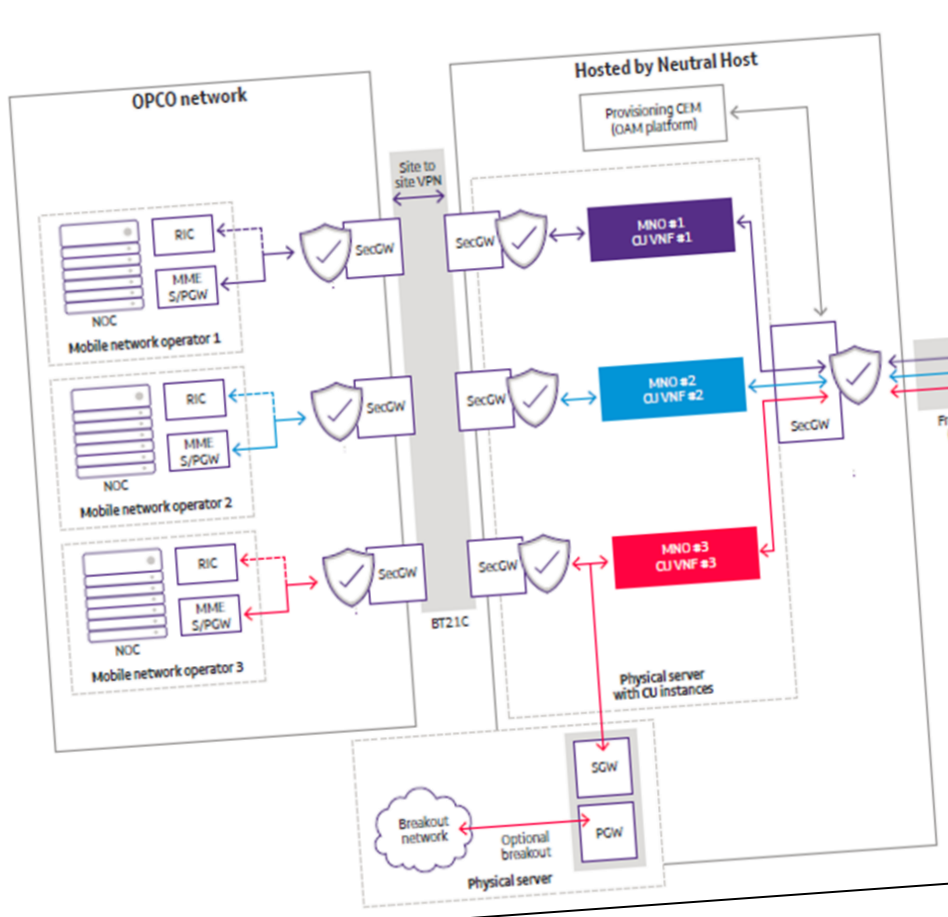


Interoperable MOPA Pluggable Optical Interfaces?

What are the early opportunities for Open RAN?

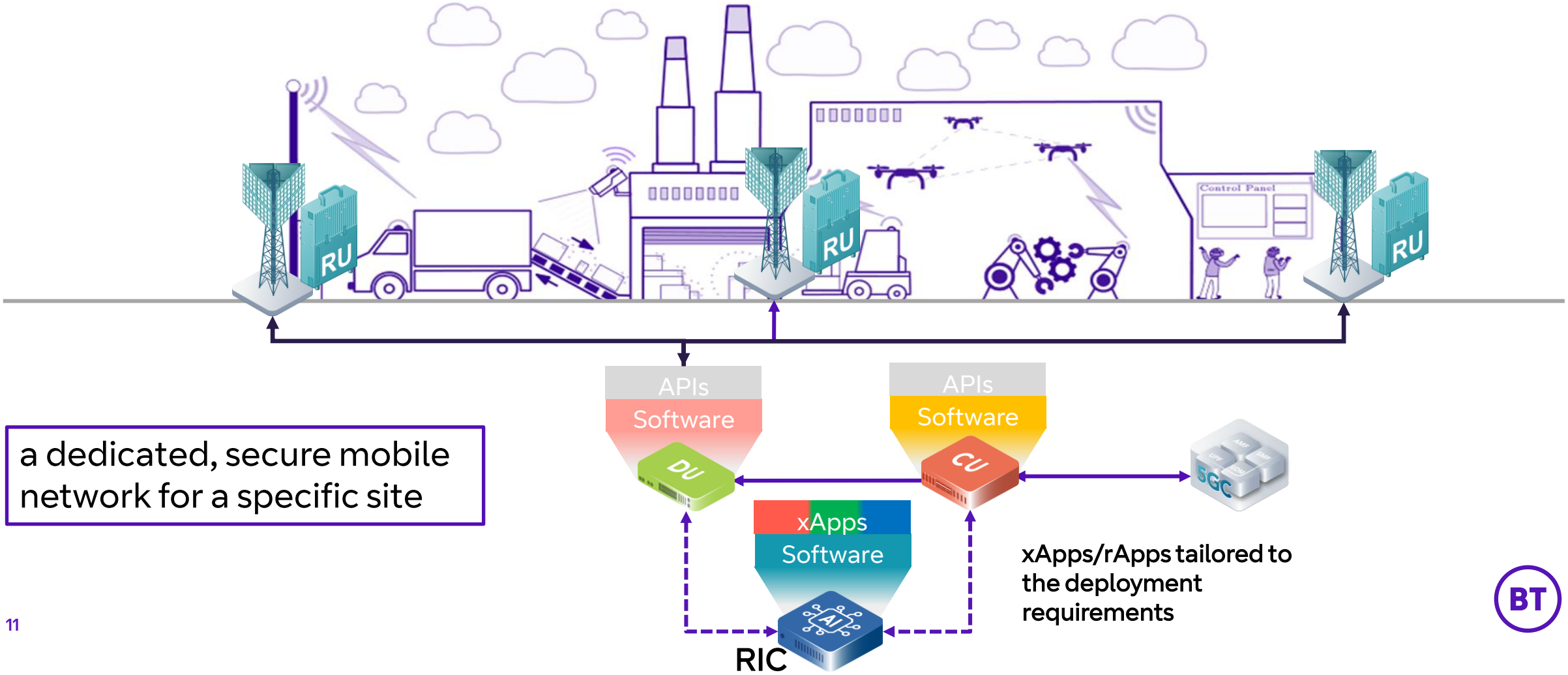
Neutral Host

Neutral Host small cells – the first compelling case for virtualisation



- **Independent Plug and Play** - Each MNO can have with their own configuration and parameter set for the RAN.
- **Mutually opposing QoS strategies** - QCI to DSCP marking per MNO depending on individual network strategy.
- **Ease of IP design and deployment** - No requirement for cross MNO discussion or IP address alignment between MNOs for the gateway design.
- **Independent network evolution and scaling** - Logically isolated end-to-end RAN, with ability to grow individually and independently.
- **Independent design and testing** - Ability to design and test solution E2E in your own labs
- **More efficient use of transport** – xRAN split architecture models ensure best use of available bandwidth
- **Open interfaces** - Fully open interfaces both on split architecture and OAM systems (O-RAN open data model)

Private Networks



a dedicated, secure mobile network for a specific site

xApps/rApps tailored to the deployment requirements