

Supporting Technical Information for SONIC Labs



Technical Streams for this Programme

Technical Stream 1

Aim: To replace/add some vendor RU, DU, CU and RIC in existing reference network at scale and identify:

- Challenges in adding/replacing an existing multi-vendor O-RAN network with more vendors
- Performance, capacity, mobility/handover in reference network
- Service downtime when multi-vendor O-RAN products are added or replaced in network
- Service differences due to vendor additions or replacements
- Seamless handovers between existing reference network with new vendor products

Technical Stream 2

Aim: To replace 2 vendor products to the updated network of Stream 1 where more vendors have already been added to multi-vendor networks and identify:

- Adaptability to easily replace vendor products in existing reference networks
- Performance, capacity, mobility/handover in reference network
- Service downtime when multi-vendor O-RAN products are replaced in recently updated network



Background of Site 3 and 4

Site 3

Site 3 is an indoor reference 5G SA network which is available on Floor 8 and Floor 9 of Digital Catapult office in Euston Road, London. There will be friendly customers from Digital Catapult who will be using this reference network once this is commissioned. This reference network hosts an O-RAN based radio network comprising one CU, three DUs and nine 9 RUs operating over 100 MHz within the range of 3.3 to 4.0 GHz to cover the entire office indoor. It has a capacity to host 1000 subscribers and support up to 3 Gbps data throughput across these 9 radio units.

Not in Scope: Currently the reference network along with Cohorts will work as a standalone network, and is not planned to service any friendly MNOs subscribers. Thus, it will not be able to serve MNO subscribers through this reference network.

The network architecture for Site 3 is shown in Figure 1.

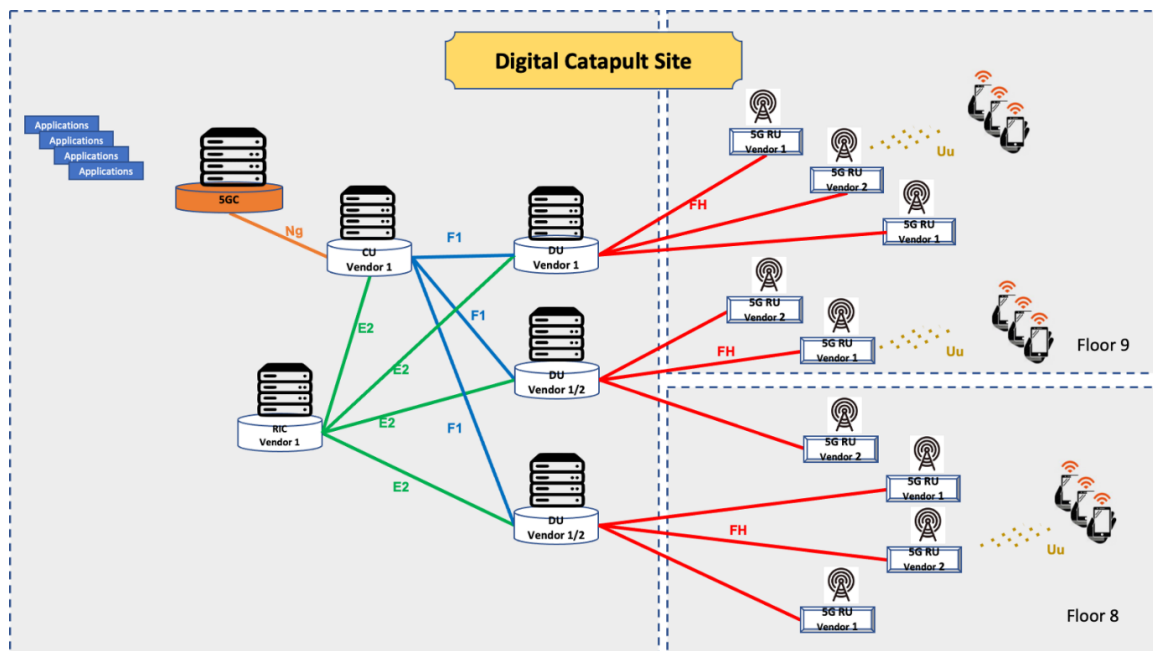


Figure 1 Network Architecture for Site 3

One, out of nine RUs of Site 3, is placed inside the lab so that it can be easily used for any RU swapping for Site 3.

Site 4

Site 4 is an outdoor reference 5G SA network which is available in Hammersmith and Fulham, London. There will be friendly customers who will be using this reference network once this is commissioned. This reference network hosts an O-RAN based radio network comprising 14 Micro cell RUs and 2 Macro cell RUs with a total of 16 cells, 5 DUs and 2 CUs. This reference network operates on 100 MHz spectrum in a range of 3.8 to 3.9 GHz to cover the entire stretch of an outdoor zone of 1 km squared. Currently it is a standalone reference network and does not yet interface with any other MNO network. It has a capacity to host 1000 subscribers and support up to 3 Gbps data throughput across these 16 cells.

Not in Scope: Currently the reference network along with Cohorts will work as a standalone network, and is not planned to service any friendly MNOs subscribers. Thus, it will not service MNO subscribers through this reference network.

The network architecture for Site 4 is shown in Figure 2.

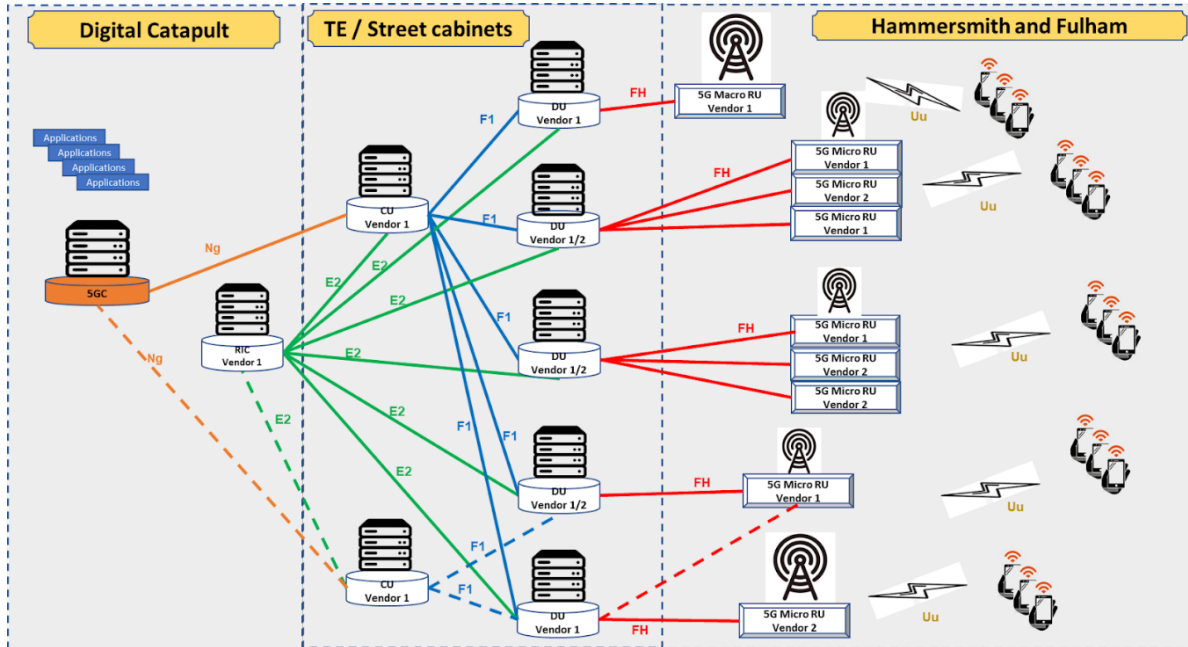


Figure 2 Network Architecture for Site 4

None of the RUs of this network are placed in the lab. However, here different vendor **RUs can be swapped** with the RUs that are already installed in the reference network.. Additional CUs and DUs can be added to this reference network.

Digital Catapult will explore the eligibility after applicants have submitted their applications. This application questionnaire will look for the products’ technical features ensuring the right fit between them and the themes/streams proposed by Digital Catapult.

Programme Setup Coexistence on Site 3

RU vendor addition: Setup for Site 3 has one O-RU on a desk in the lab. Other RUs are ceiling mounted and cannot be swapped, but there are placeholders in the ceiling to add new RUs in this site, though this can be as the last resort due to health and safety reasons.

New RUs cannot be connected to existing DUs, as only 3 DUs are installed in this setup and all the 3 DUs are already serving the maximum number of RUs a single DU can support. Thus, the only option for adding another vendor RU in this site are the following:

- Swap the RU deployed on the desk in the lab with a new vendor RU. This RU can still be connected to the same DU
- Existing reference network RU connected to newly added DU

- New vendor RUs can be deployed and connected to existing reference network DU and connecting the already deployed RUs to new vendor DUs and thus friendly users connecting to new vendor RU can be served by either the existing reference network or new vendor CU and DU.

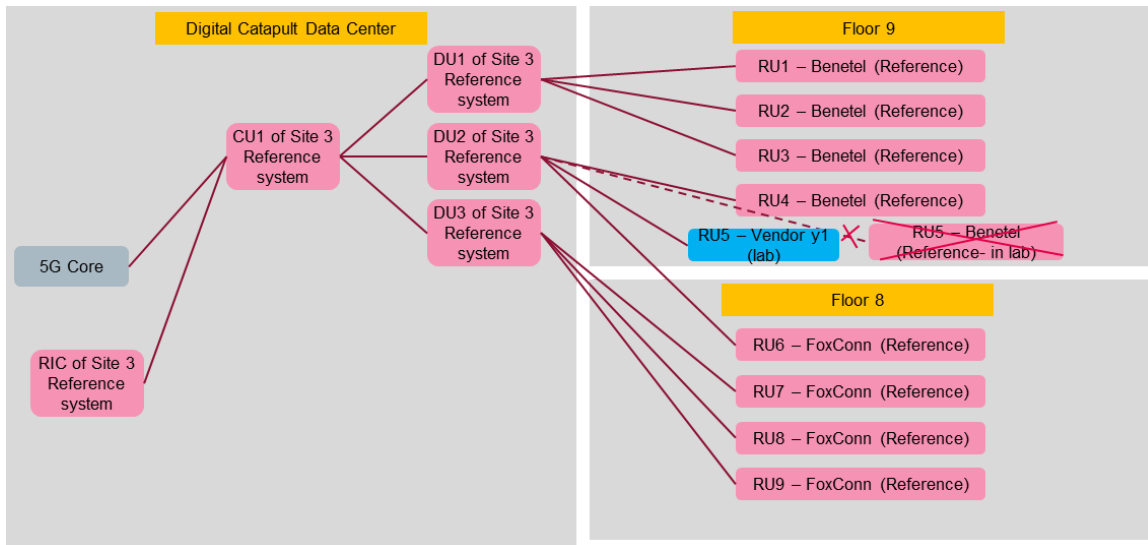


Figure 3 Setup when RU product is to be swapped

CU or DU vendor addition: Setup for Site 3 has some CUs and DUs already installed in the reference network. Additional vendor CU and DU can be installed in the same network. These can be made to interface with the same RUs that are already installed in the reference site.

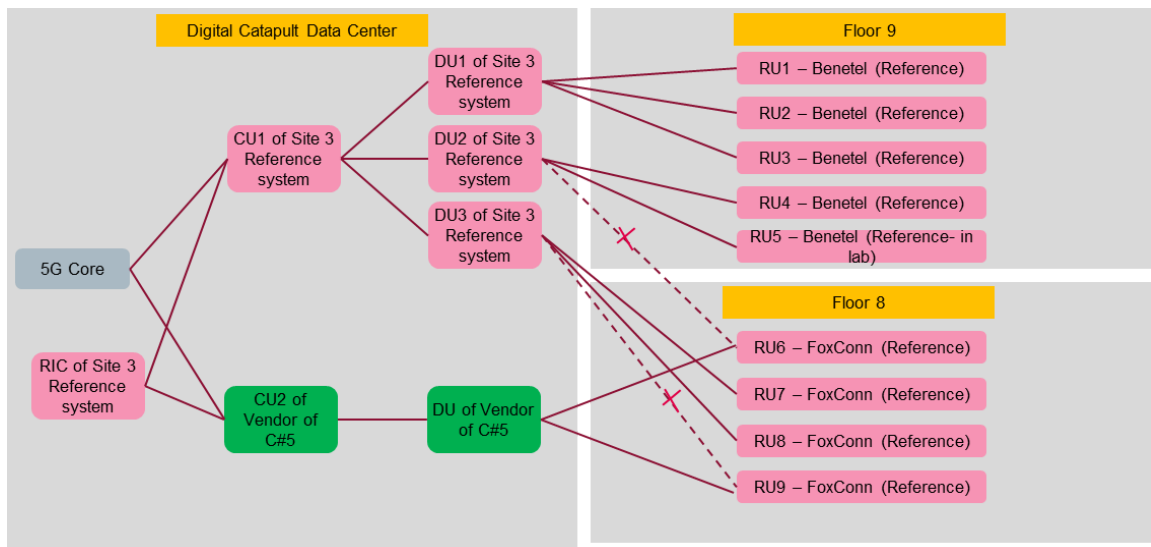


Figure 4 Setup for adding CU and DU vendor products

RIC addition: RICs are already installed in reference setup. In case additional vendor RICs products are brought in, in this programme, then new RICs can be additionally added to this setup. The additional RIC shall be made to interface with CU and DU of the reference network and with additional CU and DU added to this reference network from new vendors.

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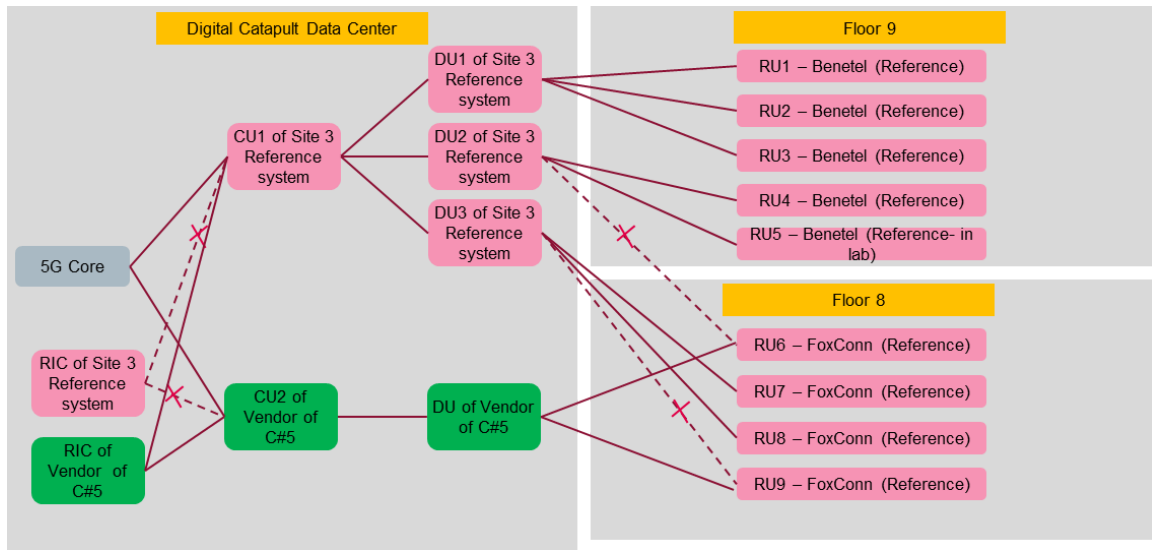


Figure 5 Setup for Adding RIC vendor products

Programme Setup Coexistence on Site 4

Setup in Site 4 has CUs and DUs installed in Site 4 where CUs and DUs are installed in Telephone Exchanges and RUs are installed in TEs and street cabinets respectively. Macro RUs are installed in the TEs, while the Micro RUs are installed in the street cabinets. Micro RUs can be swapped up to two times per year. New CUs can be added to the network by adding CU in Site 1 and connecting to site 4 network. One server shall already be placed in the telephone exchange where a new DU shall be allowed to be added. Existing RUs shall be connected to this DU. DUs cannot be swapped.

Given that RIC for Site 4 will be deployed in the DC data centre, where more hardware resources are available, additional RIC instances from different vendors can be added or swapped.

Execution flow for this Programme Site 3, RU swapping can be performed by swapping RU in the lab which is connected to Site 3.

For Site 3, CU and DU can be added by adding new vendor products and testing with relevant RUs in the lab first before connecting them to RUs of reference platform.

For Site 3, RIC can be added to the reference network and tested directly on Site 3 as RIC unavailability does not cause network unavailability.

For Site 4, additional vendor RU or RIC should be tested with CU and DU vendor products that are deployed in the reference network. Hence it is requested that the same vendor CU and DU as the reference network of site 4 should also be deployed in the lab for allowing it to be tested in a staged network before adding new RUs or RICs to field setup.

CU and DU of different vendors shall be added to this site.

So new vendor RU and RICs can be tested in the lab and then swapped with the RU and RIC of site 4.

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T&M Tools required for this Programme

Viavi UE simulator shall be used to test UE capacity per RU, DU and DU for Site 3. For this Viavi UE simulator shall be tested with RU installed in the lab.

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