Potential Requirements for NGFI Transport Networks

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Background

- Background
  - Discussion on scenarios and architectures almost done

- This contribution
  - To initiate the discussion on requirement
  - Basic methodology: refer to requirements on current transport networks & take into account 5G requirements

- Note:
  - some values/figures here are just for initial discussion
  - Some requirements are proposed even without any number (just act as placeholder)

- A survey test on the delay capability of CMCC's current transport network
  - 4 cities in Fujian province
  - Link delay from BS to aggregation ring
  - More than 1000 links
  - result: in all cases, round trip delay < 3ms

R0: Requirement imposed by wireless: delay

// placeholder here, The delay requirement
    should be developed in line with
    the CoS definition

- The delay of NGFI II network should be less than xxms

- The delay of NGFI I network should be less than xx (e.g. 100) us.
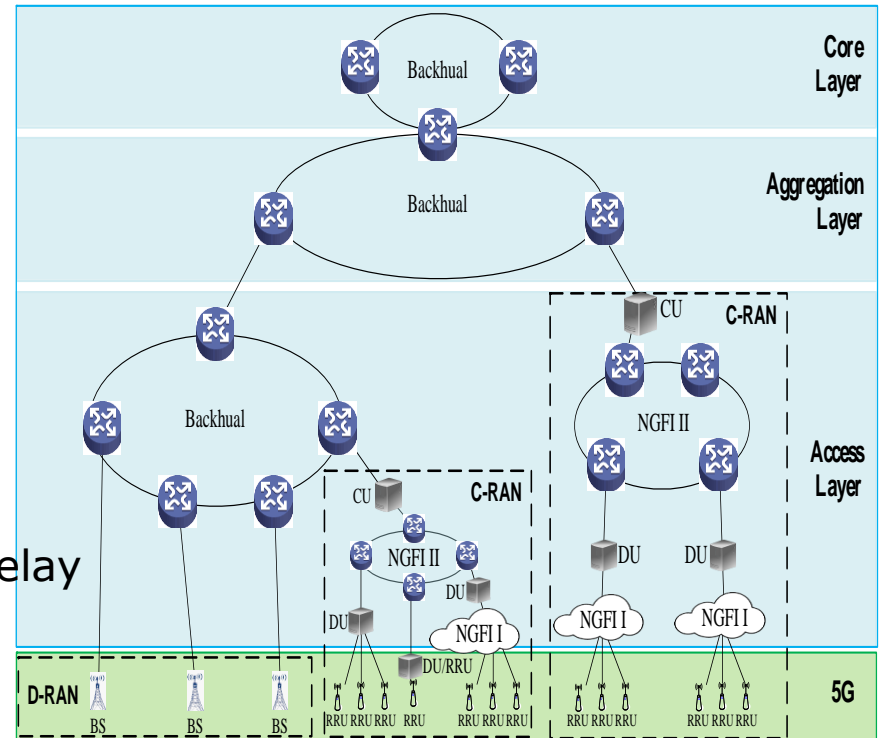
R0: Requirement imposed by wireless: synchronization

- The NGFI NW b/w CU and DU should be of time synchronization accuracy of 400ns.
  - TD-LTE & TD-SCDMA: +/-1.5µs; CP length: 4.6us
  - Discussion on CP length now in 3GPP, various options, related to subcarrier space
  - Subcarrier space: 3.75,7.5, 15, 30, 60, 120kHz,
  - Simple estimate: proportionate change on CP, and therefore, the time synchronization requirement
  - When subcarrier space is 60kHz => CP length: 1.17us => +/-390ns synchronization

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R1: Service provision

- The NGFI NW should not be providing only NGFI FH service. Instead, it should be able to provide multiple services including Fronthaul, backhaul, Enterprise private network etc. using the same physical transport network.

(Note: should we elaborate the services in the spec.? E.g ATM, fronthaul, backhaul etc., IP etc.)

- Furthermore, the NGFI NW should be able to provide QoS provision for different services.

- When it comes to FH service, the NGFI NW should further be able to provide various FH services with differentiated QoS requirements.

R2: Topology & Networking

- The NGFI NW should support various topology including ring, star, daisy chain and so on. In particular, ring topology shall be supported for protection purpose. In addition, multi-level ring structure should be supported for regions of large area.

- The NGFI NW should be able to support networking with the following parameters.
    - The NGFI NW should be able to support a CU-DU link of up to xx (e.g. 20) km.
    - It is recommended that the number of NGFI II nodes in a ring be less than xx (e.g. 8);
    - It is recommended that the number of NGFI I nodes in a ring should be less than xx (e.g. 10)

    (Note: a NGFI II node is a node in an NGFI II network b/w DU and CU while NGFI I node is a node in an NGFI I network b/w DU and RRU)

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R3: Protection

- The NGFI NW should provide protection functionality, including ring protection and linear protection. In particular, the following protection modes should be supported: 1:1, 1+1, 1:N

    (Note: the exact modes to be discussed.)

- The protection should be able to be triggered by either command/instruction from O&M systems, or by triggering events such as link break-down.

- The protection reversion time should be less than xxms.

- The protection link should be able to provide the same QoS as original working link.

R4: O&M

// to be added later

R5: Network slicing

// to be discussed, one of the key thing here: do we require resources to be "physically separated"?

Security

// to be added

Interoperability

// to be added;

Thank you!