

3GPP TSG RAN Rel-19 workshop  
Taipei, June 15 - 16, 2023

RWS-230411

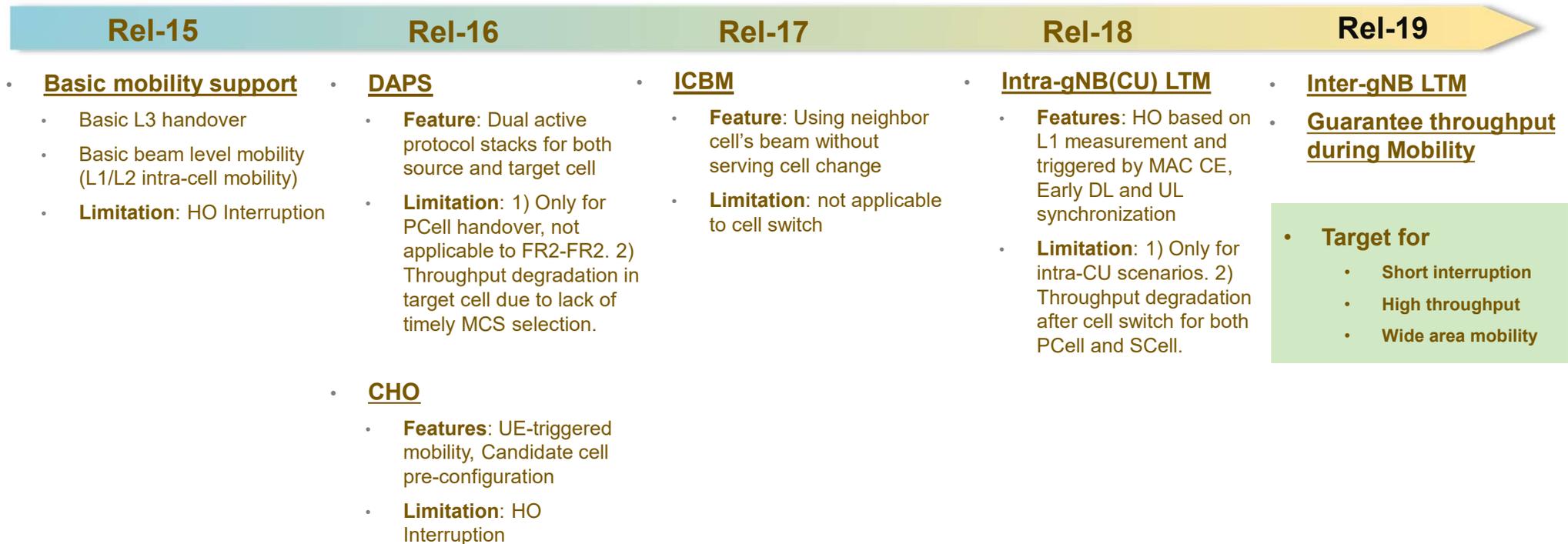
# Mobility enhancements in Rel-19

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# Evolution of Mobility in NR



# Motivation for Mobility enhancements

## Rel-18 Status

- LTM and DAPS can achieve short handover interruption time. However, restrictions still exist:
  - Limited scenario: For LTM, it is only applicable to intra-gNB(CU) scenarios. When UE moves across gNBs, it still suffers from long interruption time.
  - Throughput degradation:
    - For LTM, early beam refinement, TRS tracking and CSI acquisition are not supported. The UE cannot use narrow beam and suitable MCS for transmission immediately after PCell and SCell switch.
    - For DAPS, the target gNB cannot schedule the UE with appropriate MCS immediately after cell switch, which leads to throughput degradation.

## Rel-19 Proposal

- LTM support in broader scenarios
  - To support immersive XR/Metaverse services in outdoor, e.g. in car or train, handover approach with short interruption and high throughput in broader area is essential. In Rel-19, inter-gNB LTM shall be supported.
- Mobility enhancements to avoid throughput degradation
  - To maintain the user's experience, the throughput performance shall be guaranteed for both LTM and DAPS handover.

# Key directions to support mobility enhancements

## Inter-gNB LTM

- **Xn interaction design**
  - To support inter-gNB LTM, essential Xn interactions including preparation of candidate cells across gNBs, and information exchange during cell switch shall be specified.
- **Enhanced L1 report framework**
  - Optimized L1 measurement and report framework to reduce complexity of supporting multiple interactions over Xn/F1 interfaces (due to the association between the neighbor cell's RS and its report resource).
- **L2 handling mechanism**
  - To support inter-gNB LTM, security update and essential L2 handling shall be specified.

## Guarantee throughput during mobility

- **Early CSI-RS measurement for target cell**
  - To support data communication with narrow beams and appropriate MCS immediately after cell switch in LTM, early CSI-RS measurement for early beam refinement, TRS tracking and CSI acquisition for target PCell can be specified.
- **Enhanced SCell switch in LTM**
  - To maintain high throughput in CA scenarios, early DL/UL synchronization, early CSI measurement and report for SCell can be specified.
- **Target gNB timely applies appropriate MCS to the UE in DAPS**
  - To help target gNB to ensure suitable MCS applied to the UE in a timely manner.

# Proposal for Work Item Objectives

- To specify mechanism and procedures of Inter-gNB(CU) LTM for mobility latency reduction:
  - Configuration and maintenance for multiple candidate cells across gNBs, including Xn interface signaling, F1 interface signaling if needed [RAN2, RAN3]
  - Necessary information exchange between source gNB and target gNB during LTM procedure, e.g. beam indication [RAN3, RAN2]
  - Layer-2 handling in Inter-gNB LTM, including security update, layer-2 protocol reset, etc. [RAN2]
    - *Note 1: RRC-based L2 behavior indication specified in Rel-18 can be the starting point.*
  - Enhanced L1 measurement and report framework to report L1 measurement results via common uplink resource [RAN1, RAN2, RAN3]

*Note 2: Subsequent LTM shall be supported in Inter-gNB LTM.*

*Note 3: Early DL and UL synchronization shall be supported in Inter-gNB LTM. The method specified in Rel-18 can be the starting point.*

- To specify mechanism and procedures to guarantee throughput during Mobility (including LTM and DAPS):
  - Early beam refinement, TRS tracking and CSI acquisition during LTM for both PCell and SCell switch. [RAN1, RAN2]
  - Optimize RRM requirements for SCell switch in LTM. [RAN4]
  - Target gNB timely applies appropriate MCS to the UE in DAPS. [RAN2, RAN3]