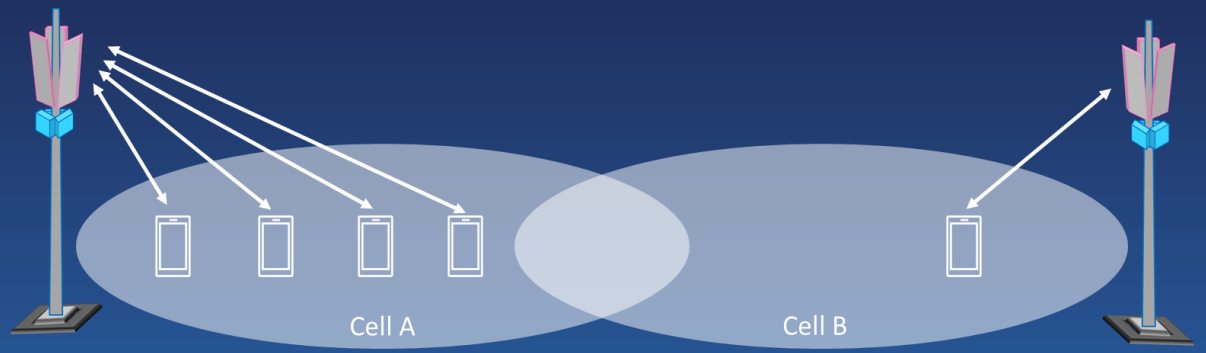


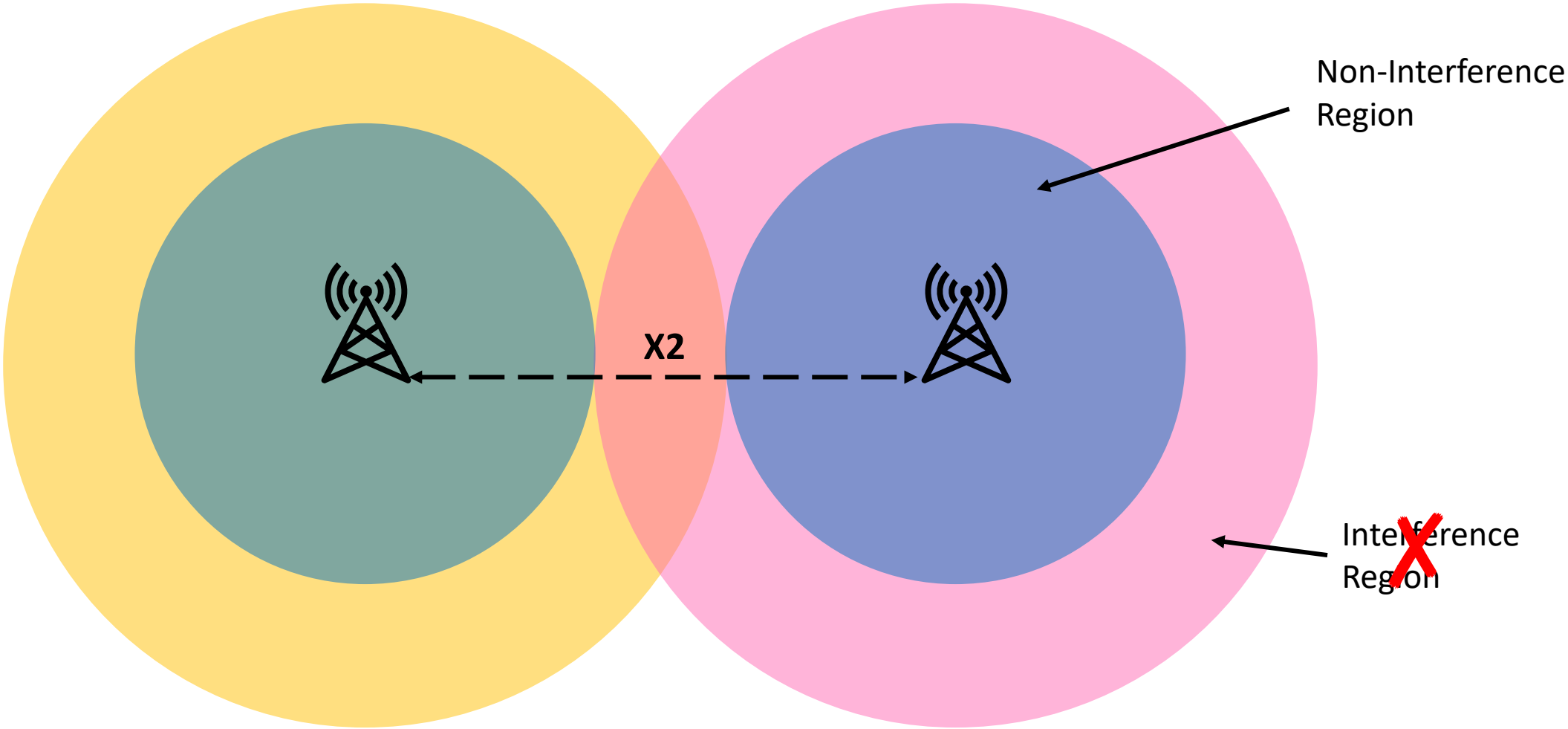
3GPP SON Series:

Mobility Load Balancing

(MLB)

@3g4gUK

Typical Cell Layout with ICIC

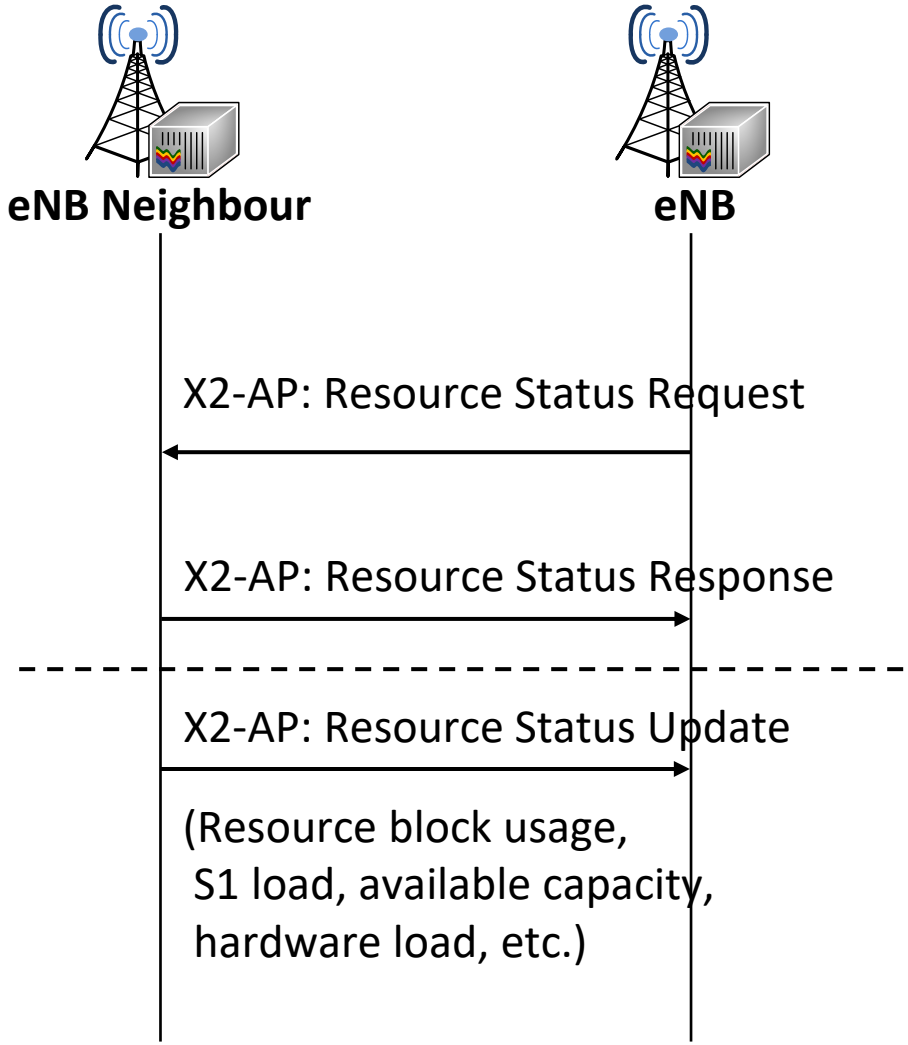


The goal of Inter-Cell Interference Coordination (ICIC) is to ensure there is no interference in overlapping areas between cells

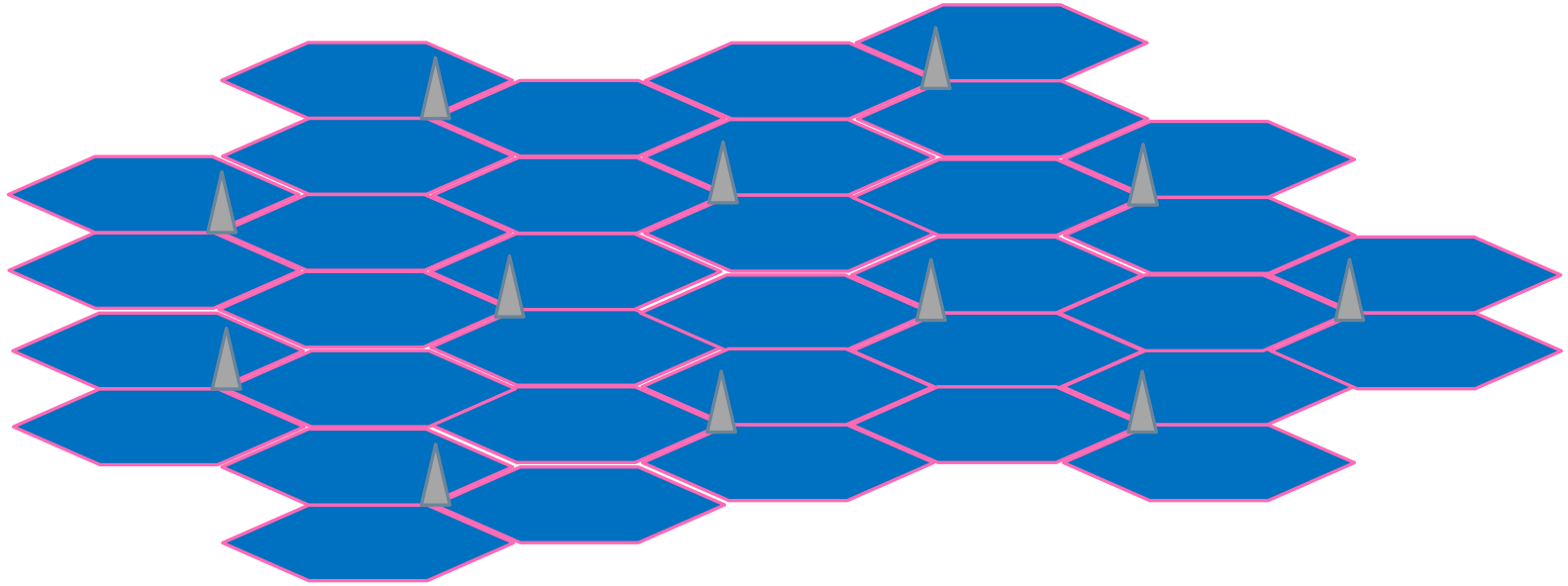
Mobility Load Balancing (MLB)

- eNB's can co-operate to balance load between them, thereby increasing network capacity

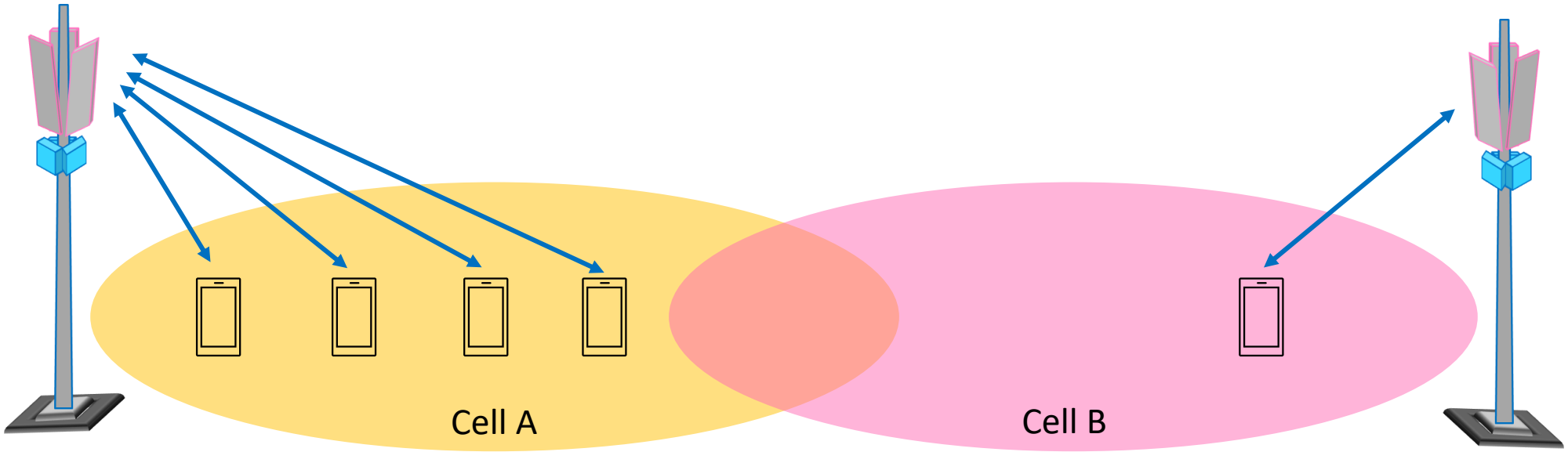
- Even though this procedure was introduced part of Rel-8, there were enhancements in Rel-9 and Rel-10 that has made this procedure much more useful.



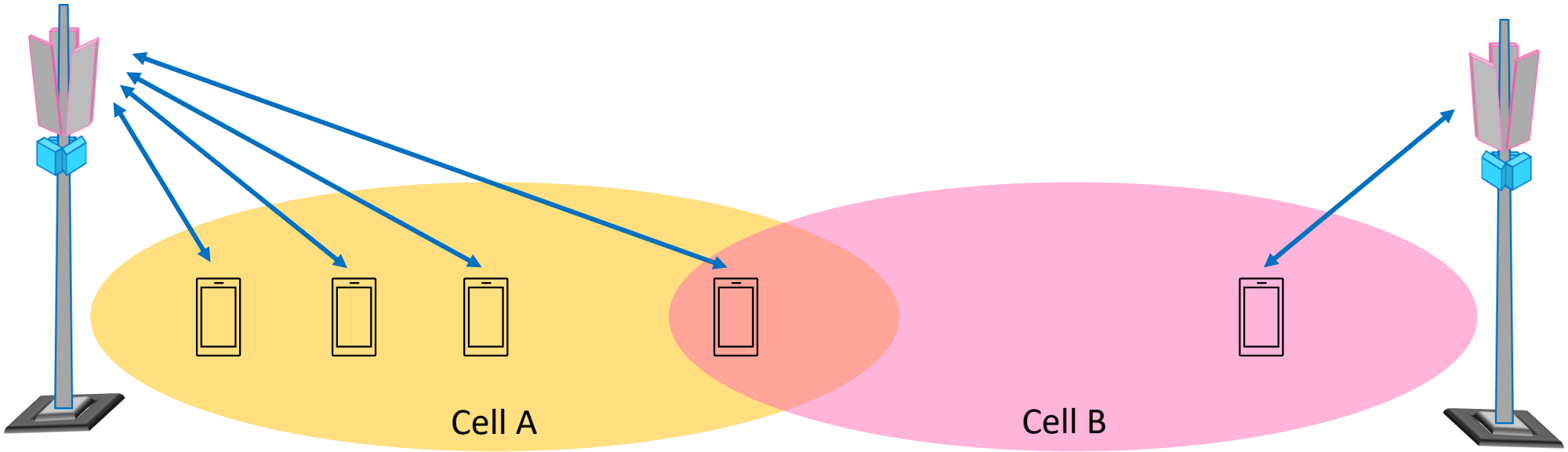
3 Sectored Cell Sites



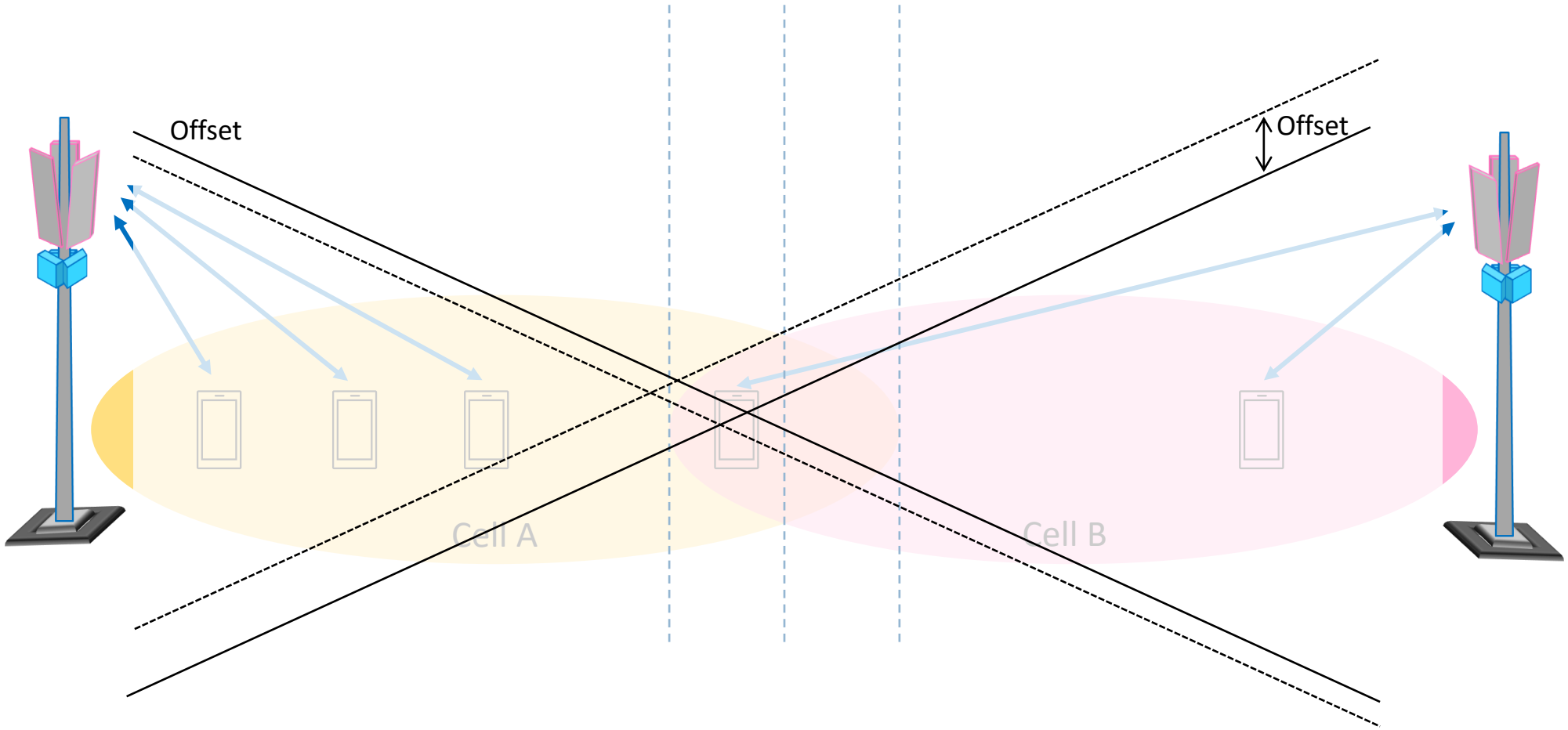
Understanding MLB Scenario



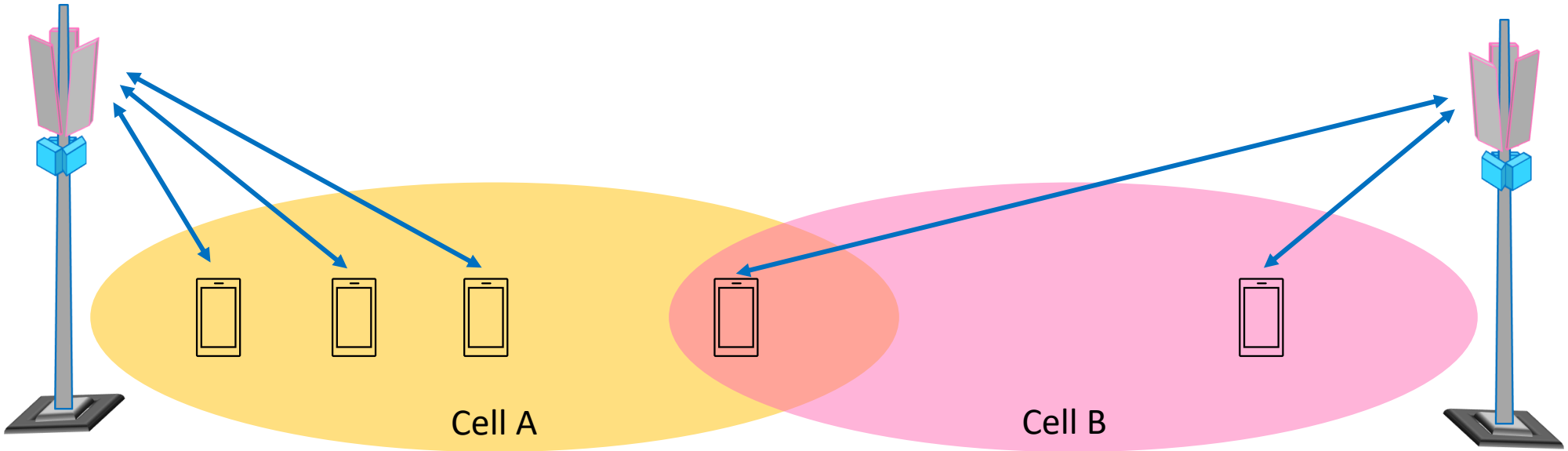
Understanding MLB Scenario



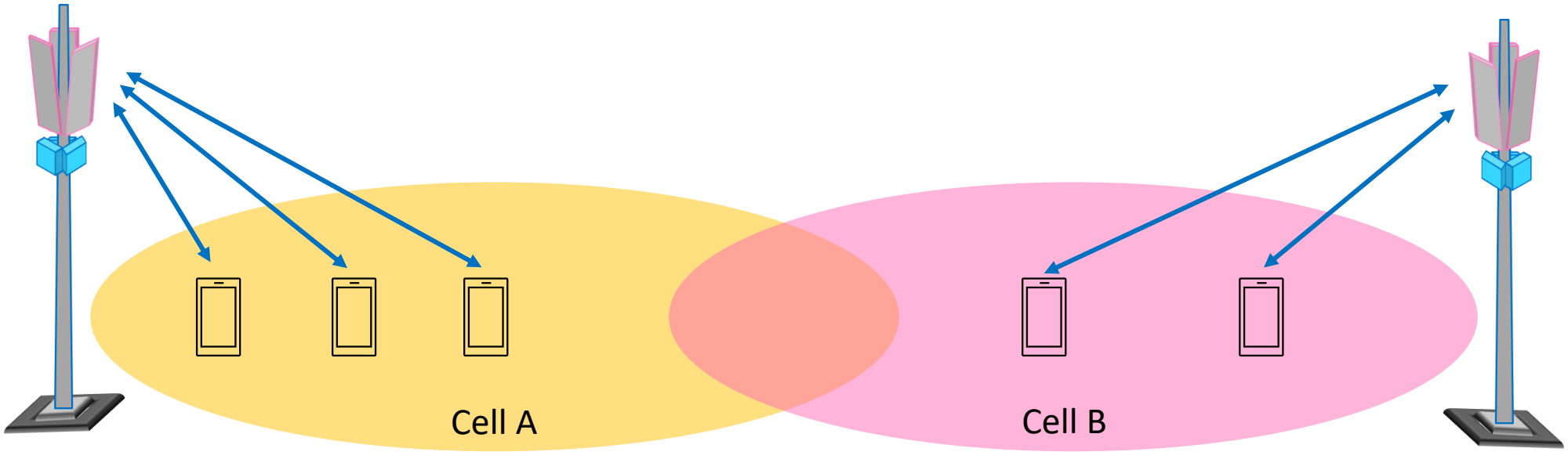
Understanding MLB Scenario



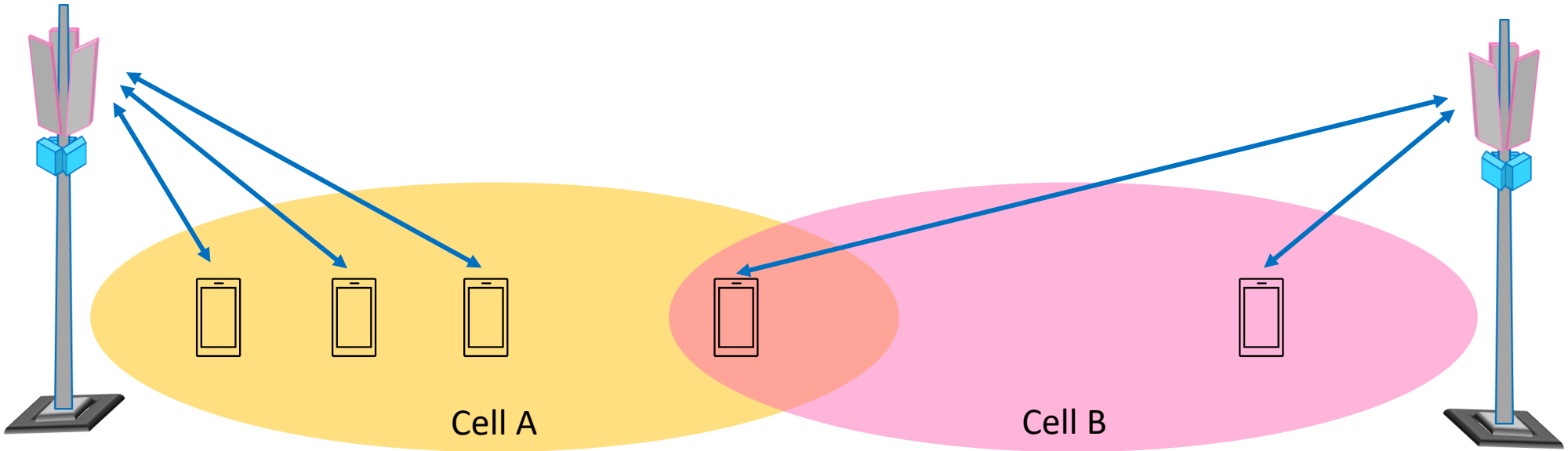
Understanding MLB Scenario



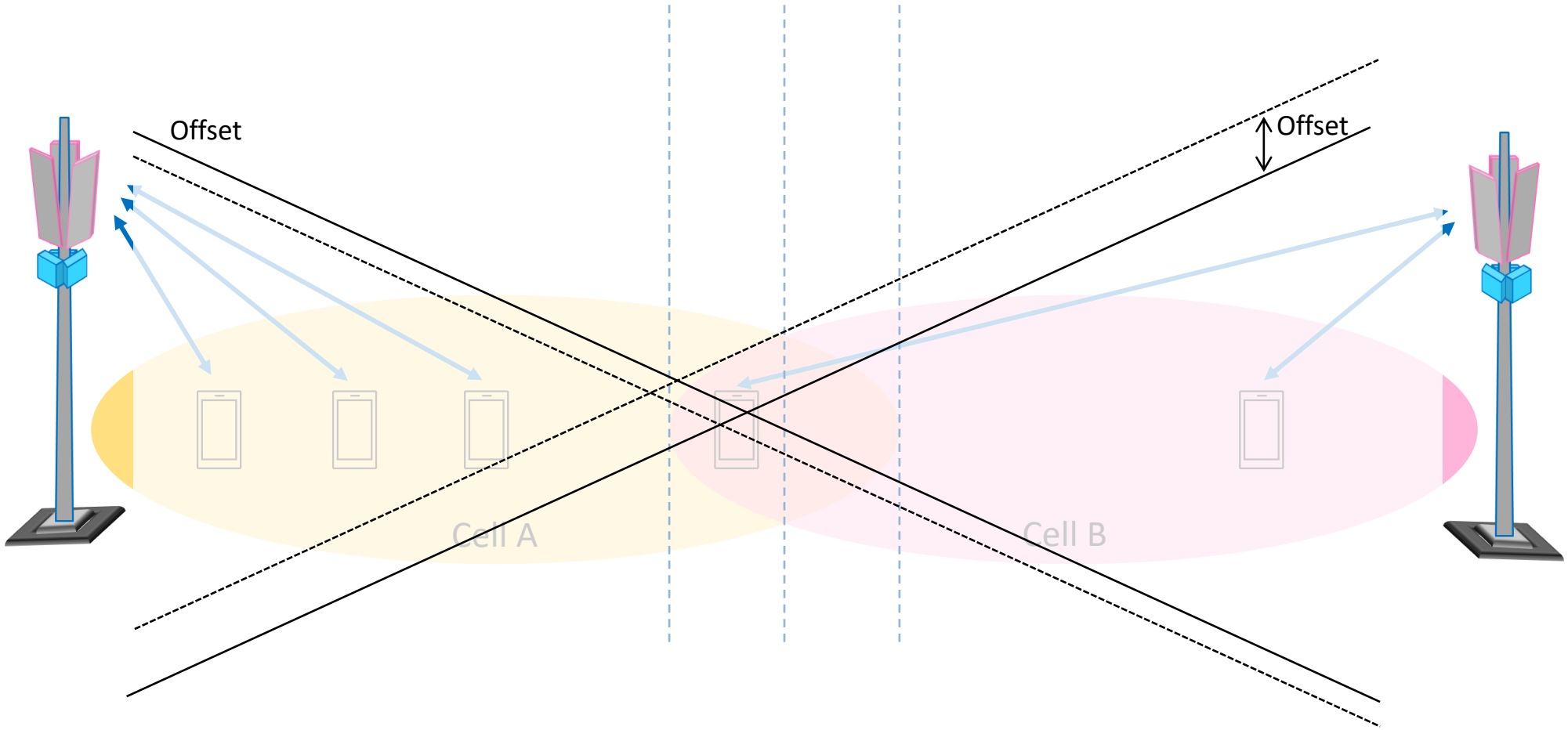
Understanding MLB Scenario



Understanding MLB Scenario



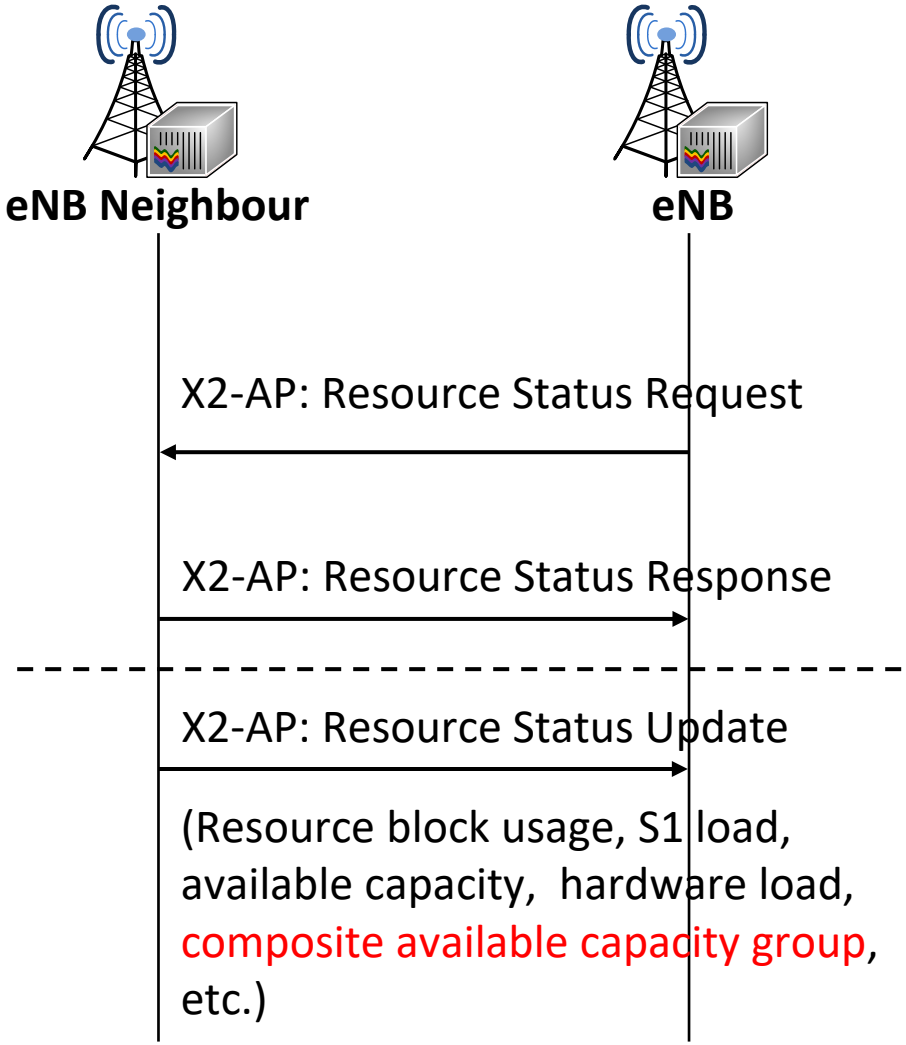
Understanding MLB Scenario



MLB Enhancements in Rel-9

Two enhancements have been added in Rel-9:

- The neighbour eNB now reports a fourth field in its Resource Status Update, the ‘composite available capacity group’, which indicates the capacity that it has available for load balancing purposes on the uplink and downlink. The original eNB can use this information to assist its handover decision.



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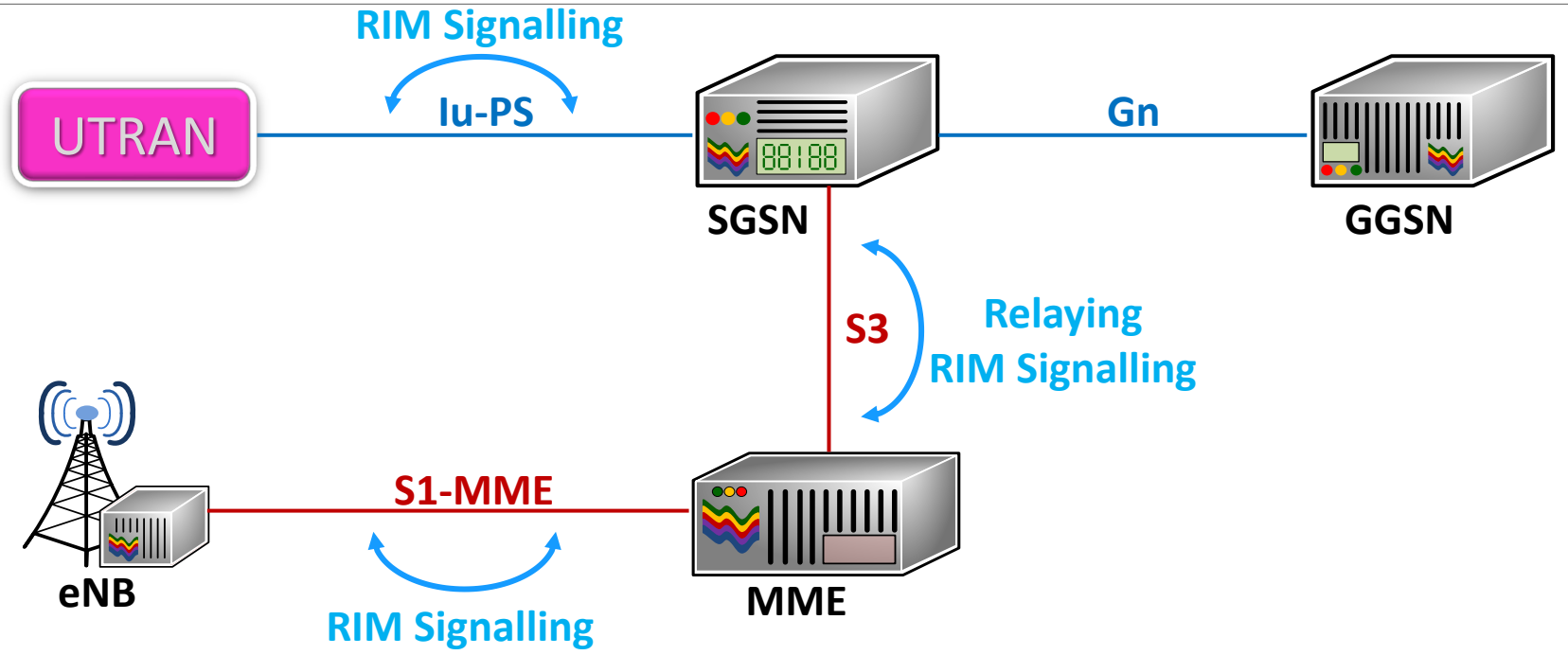
- There is also a risk that after such a handover that the new base station will hand the mobile straight back to the old one. To prevent this from happening, a new X2 procedure, known as mobility settings change has been introduced. Using this procedure, a base station can ask a neighbour to adjust the thresholds that it is using for measurement reporting, by means of the cell specific offsets. After the adjustment, the mobile should stay in the target cell, instead of being handed back.

MLB Enhancements in Rel-10



- In Rel-10, using S1 procedure direct information transfer, a base station can initiate the exchange of *radio access network information management* (RIM) information with a UMTS or GSM neighbour. The information includes the composite available capacity group in the case of an LTE cell and similar information known as the *cell load information group* in the case of the other technologies. In turn, this information can trigger a load balancing handover to a UMTS or GSM neighbour.

Further Reading on MLB

- Wiley Online Library: Self-optimization of handover parameters for dynamic small-cell networks (link)
- LTE SON Blog: Mobility Load Balancing Optimization (link)
- MMMap: Handoff Parameters (link)
- Researchgate: How ping pong effect is related to handover hysteresis in LTE netwroks? (link)
- From 4G to 5G: Self-organized Network Management meets Machine Learning by Jessica Moysen and Lorenza Giupponi (link)
- 3G4G: Self-Organizing Networks / Self-Optimizing Networks (link)
- The 3G4G Blog: SON (link)

Thank You

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