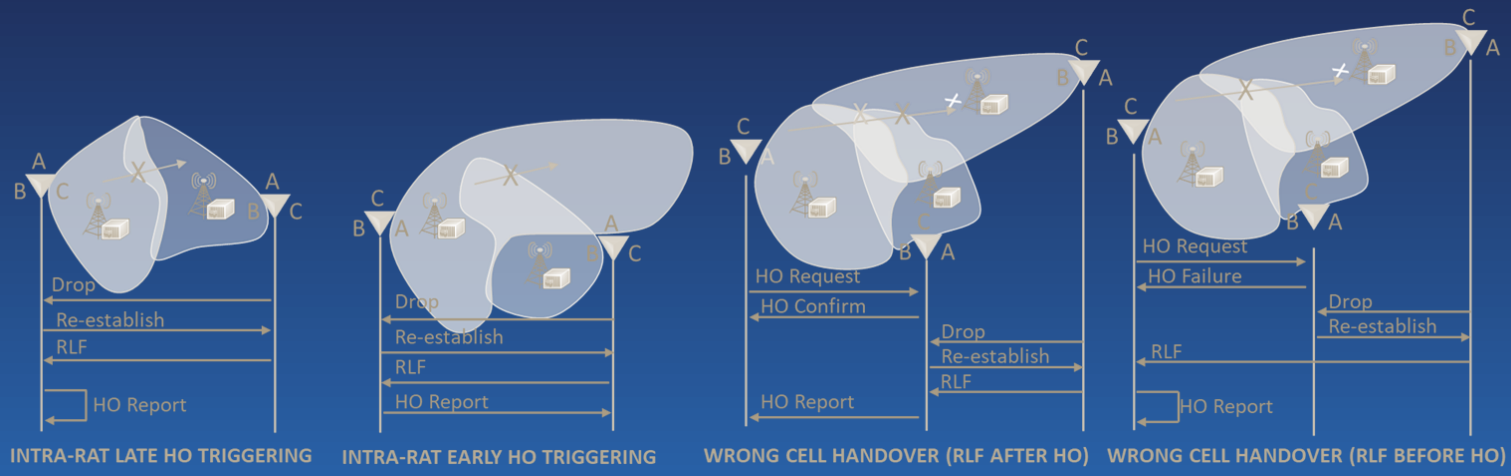


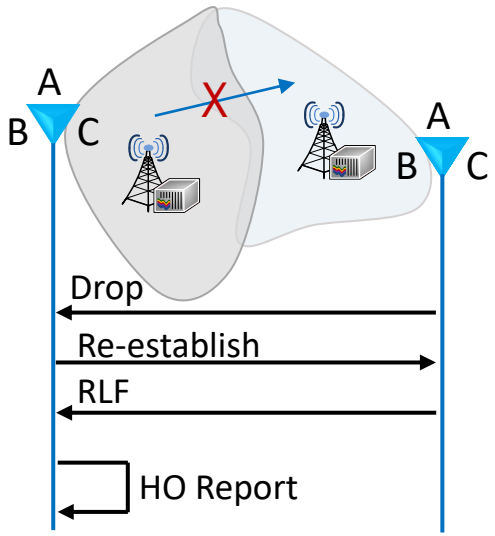
3GPP SON Series:

Mobility Robustness Optimization *(MRO)*

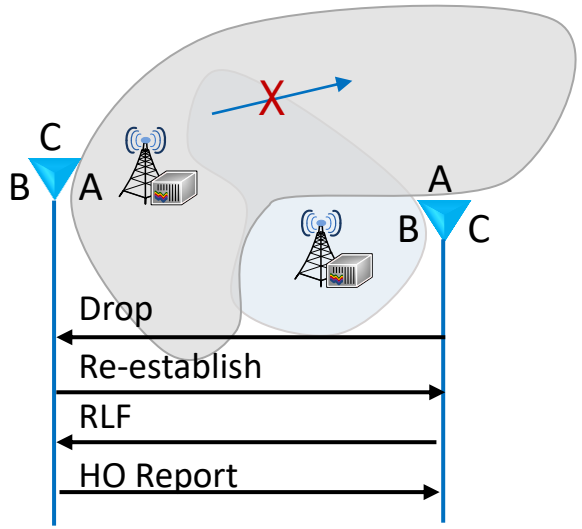
@3g4gUK

Mobility Robustness Optimization (MRO)

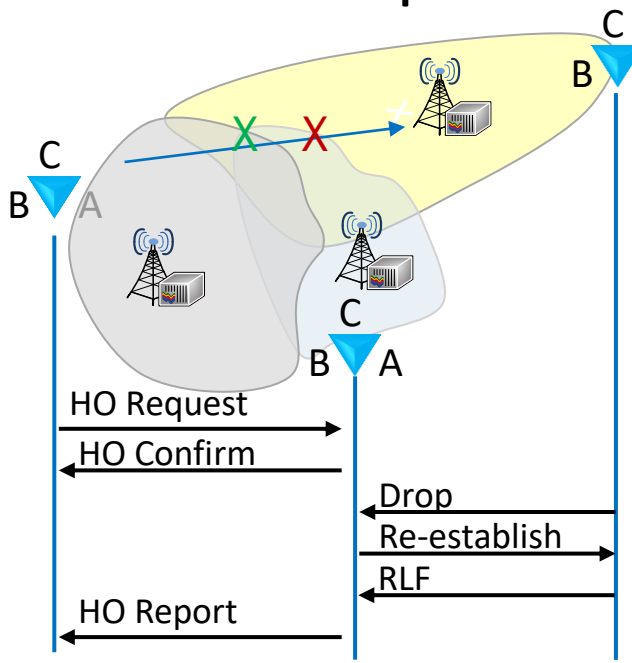
- MRO was introduced in Rel-9
- MRO helps eNB to find the problems in handover and then by using this information, it can adjust the thresholds
- Three main causes of failures can be seen in the pictures



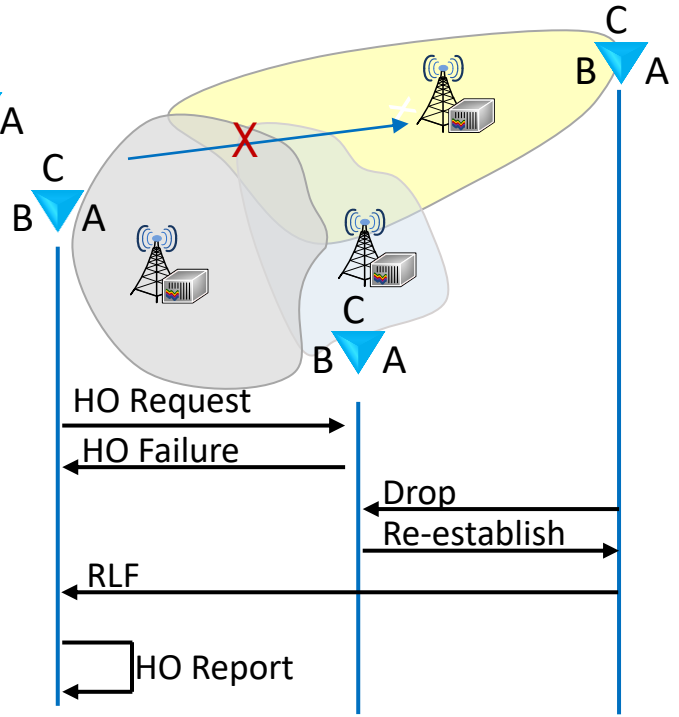
INTRA-RAT LATE HO TRIGGERING



INTRA-RAT EARLY HO TRIGGERING



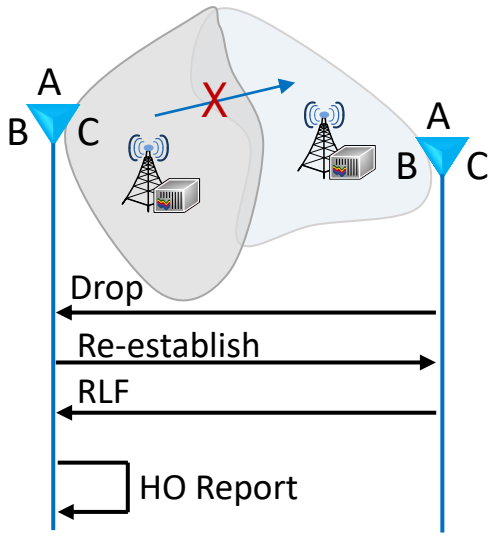
WRONG CELL HANDOVER (RLF AFTER HO)



WRONG CELL HANDOVER (RLF BEFORE HO)

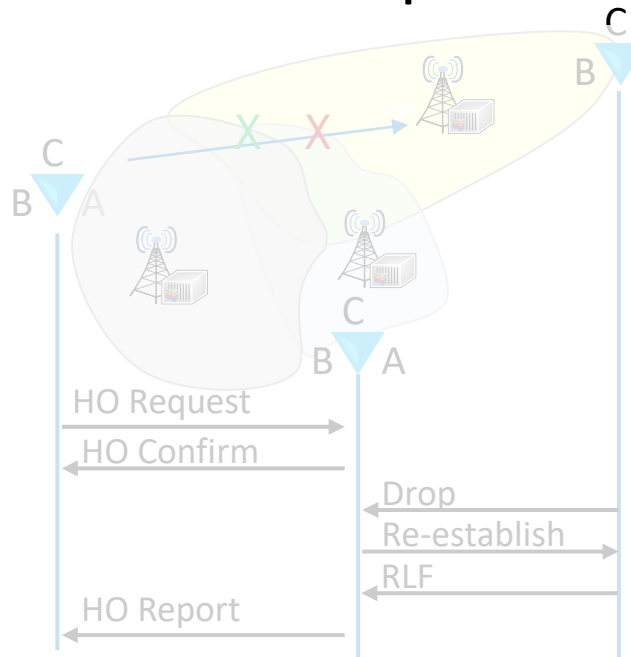
Mobility Robustness Optimization (MRO)

- MRO was introduced in Rel-9
- MRO helps eNB to find the problems in handover and then by using this information, it can adjust the thresholds
- Three main causes of failures can be seen in the pictures

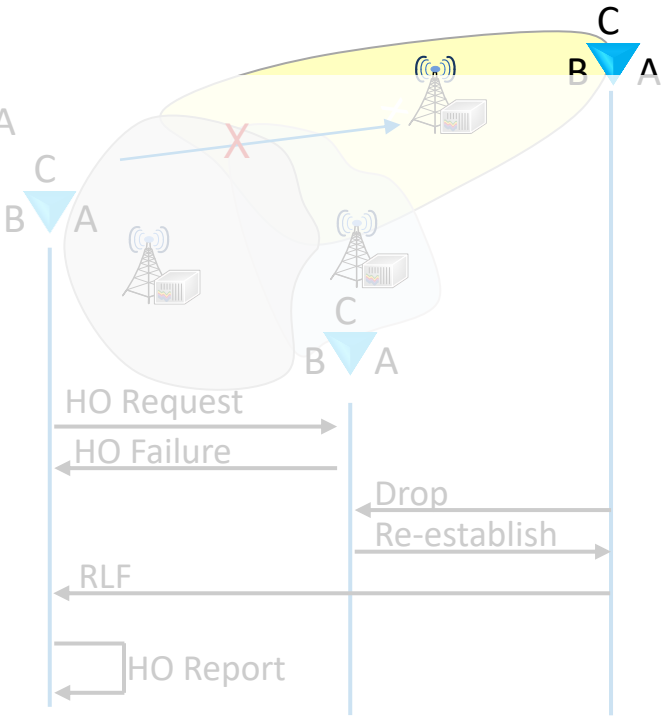


INTRA-RAT LATE HO TRIGGERING

INTRA-RAT EARLY HO TRIGGERING



WRONG CELL HANDOVER (RLF AFTER HO)

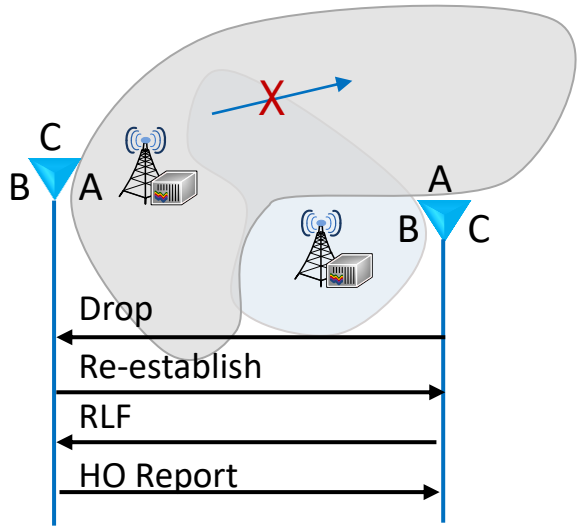


WRONG CELL HANDOVER (RLF BEFORE HO)

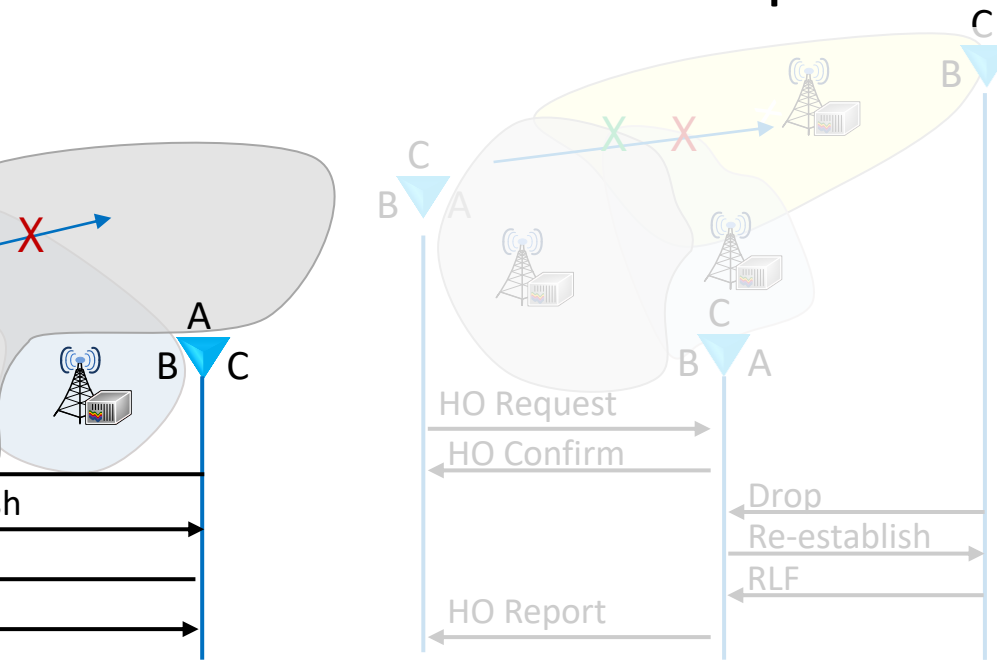
Mobility Robustness Optimization (MRO)

- MRO was introduced in Rel-9
- MRO helps eNB to find the problems in handover and then by using this information, it can adjust the thresholds
- Three main causes of failures can be seen in the pictures

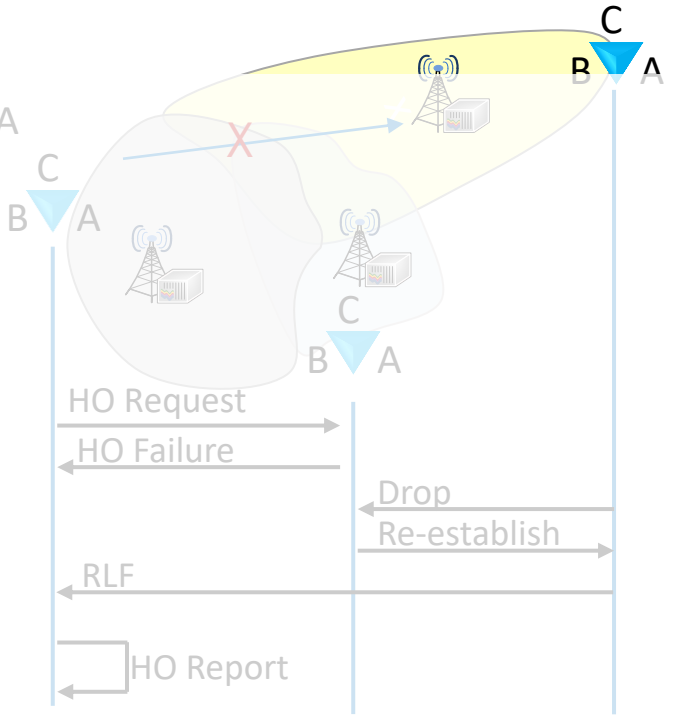
INTRA-RAT LATE HO TRIGGERING



INTRA-RAT EARLY HO TRIGGERING



WRONG CELL HANDOVER (RLF AFTER HO)



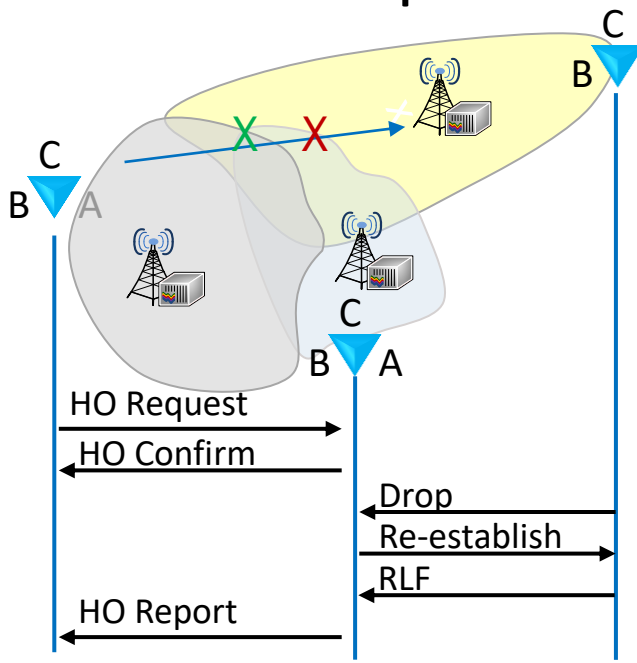
WRONG CELL HANDOVER (RLF BEFORE HO)

Mobility Robustness Optimization (MRO)

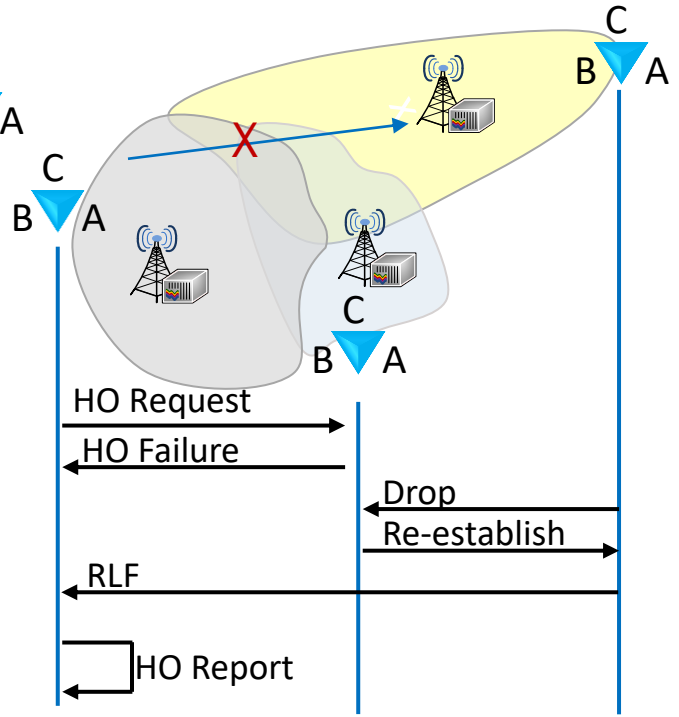
- MRO was introduced in Rel-9
- MRO helps eNB to find the problems in handover and then by using this information, it can adjust the thresholds
- Three main causes of failures can be seen in the pictures

INTRA-RAT LATE HO TRIGGERING

INTRA-RAT EARLY HO TRIGGERING

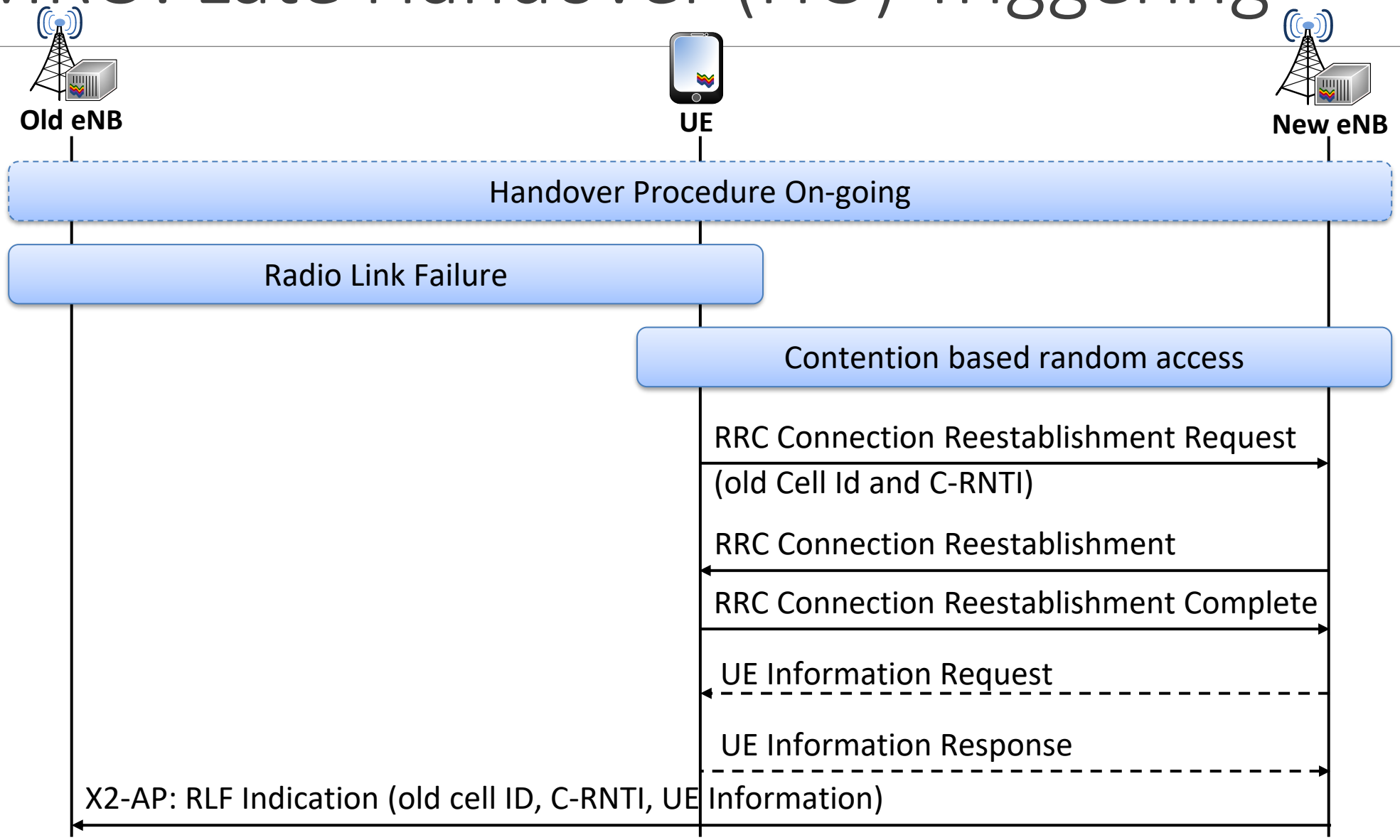


WRONG CELL HANDOVER (RLF AFTER HO)

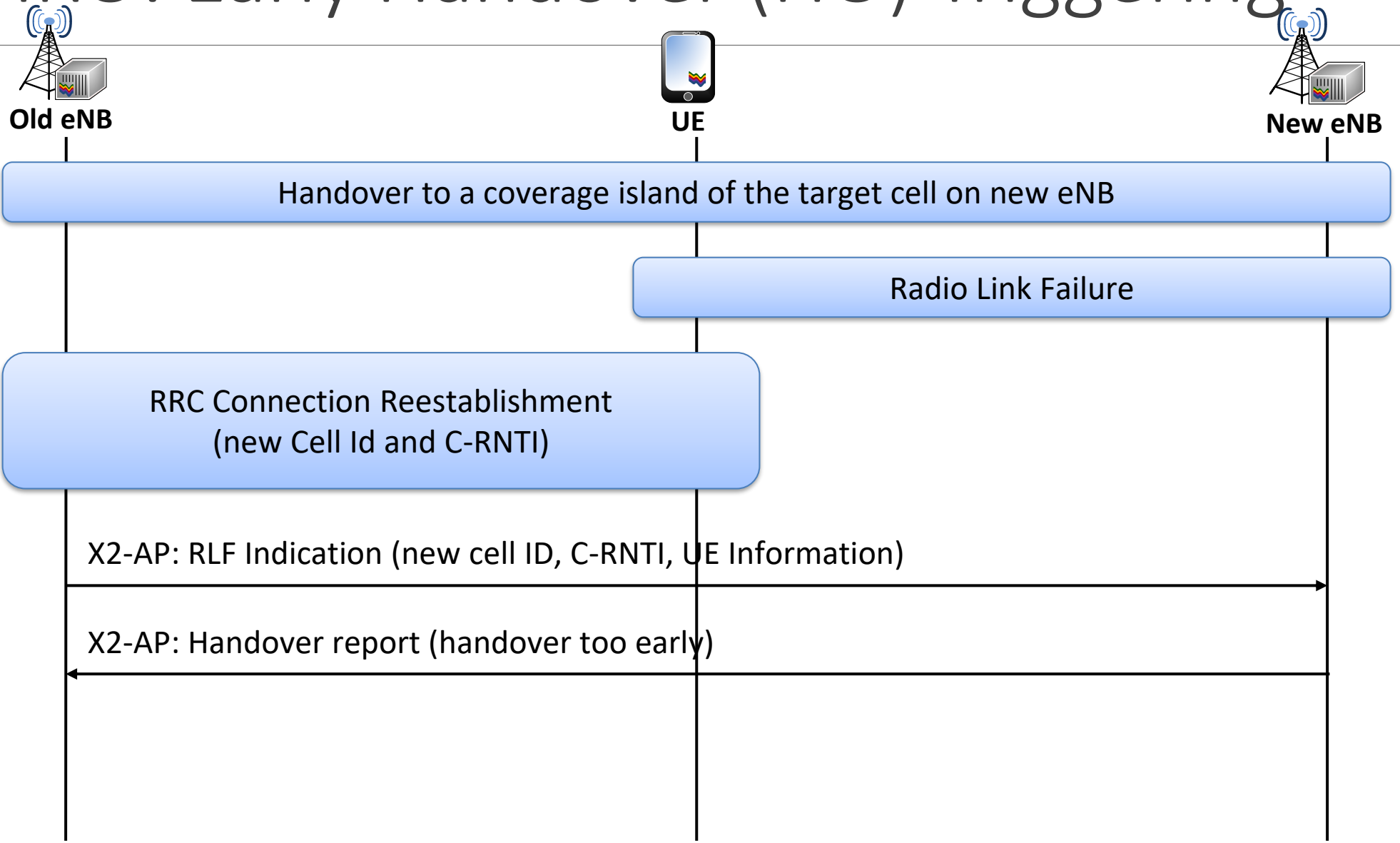


WRONG CELL HANDOVER (RLF BEFORE HO)

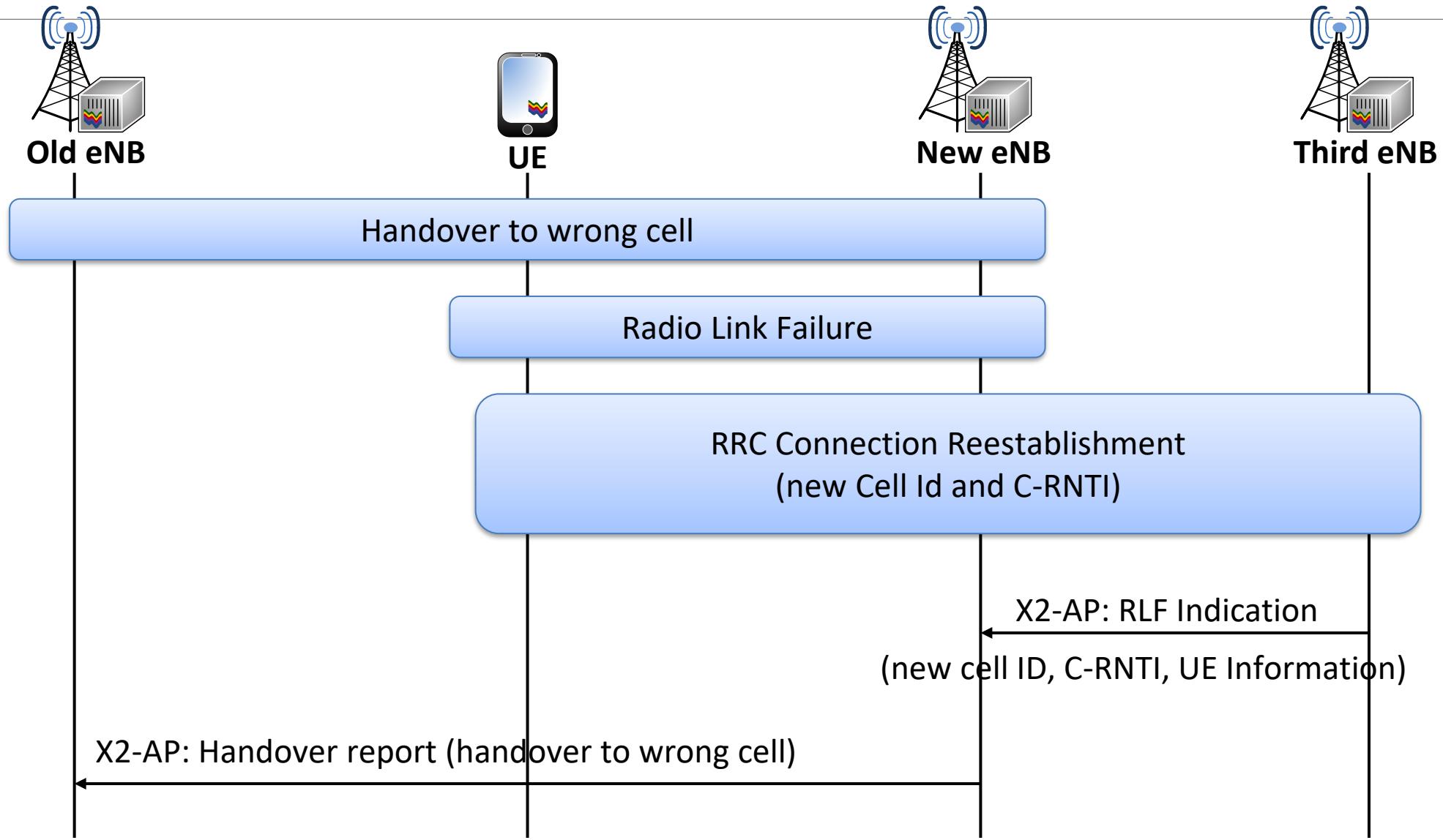
MRO: Late Handover (HO) Triggering



MRO: Early Handover (HO) Triggering



MRO: Handover (HO) to Incorrect Cell



MRO: Release-10 enhancements

- MRO was enhanced in Rel-10 to detect unnecessary inter-RAT (Radio Access Technology) handover.
- After handover to the other RAT, the new Access Network can configure LTE measurements for the nearby cells.
- If the power received is sufficiently high, the network can tell the old eNB that the handover was triggered unnecessarily.
- This is informed to the old eNB using the S1-AP direct transfer procedure.

Further Reading on MRO

- Wiley Online Library: Self-optimization of handover parameters for dynamic small-cell networks (link)
- An Introduction To LTE (2nd Edition), Christopher Cox (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 networks? (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

To learn more, visit:

3G4G Website – https://www.3g4g.co.uk/

3G4G Blog – https://blog.3g4g.co.uk/

Telecoms Infrastructure Blog – https://www.telecomsinfrastructure.com/

Operator Watch Blog – https://www.operatorwatch.com/

Connectivity Technology Blog – https://www.connectivity.technology/

Free 5G Training – https://www.free5gtraining.com/

Free 6G Training – https://www.free6gtraining.com/

Follow us on Twitter: https://twitter.com/3g4gUK

Follow us on Facebook: https://www.facebook.com/3g4gUK/

Follow us on LinkedIn: https://www.linkedin.com/company/3g4g

Follow us on SlideShare: https://www.slideshare.net/3G4GLtd

Follow us on YouTube: https://www.youtube.com/3G4G5G