5G NR: Radio Access Networks

RANDOM ACCESS

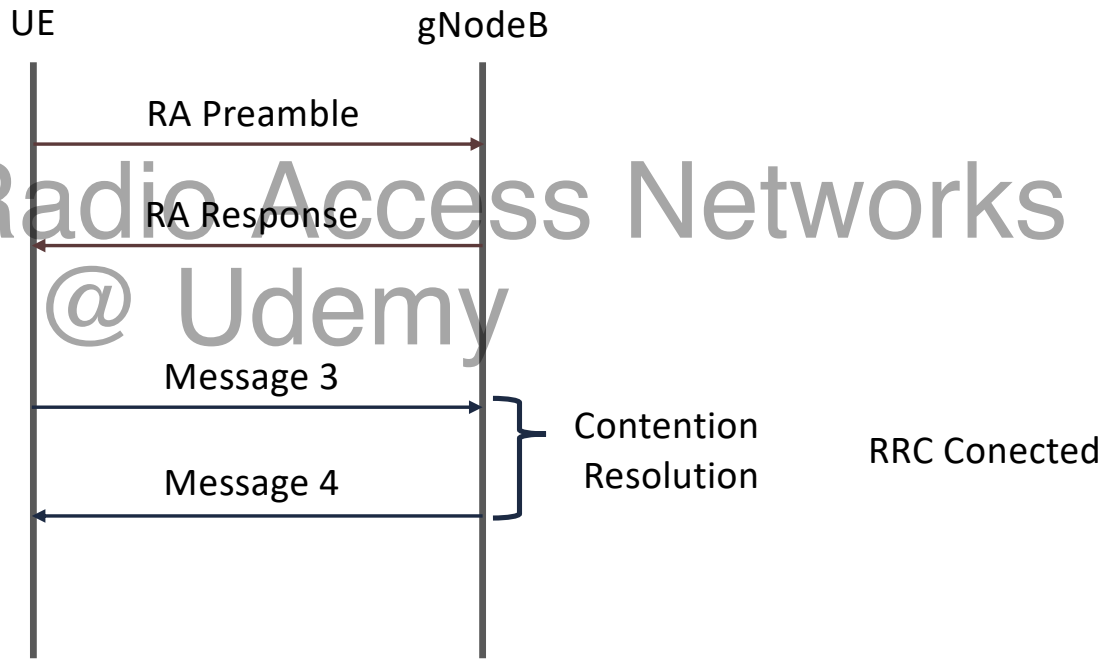
Random Access Procedure

Triggers:

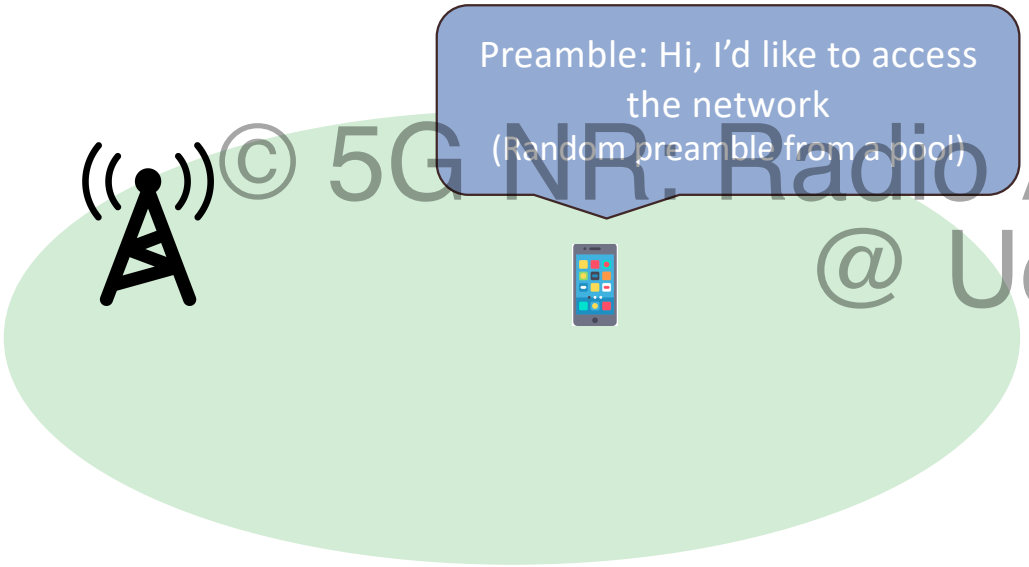
- RRC Idle to RRC Connected
- Uplink data
- Sync lost
- Sync during Handover

CONTENTION BASED RANDOM ACCESS (CBRA)

CBRA

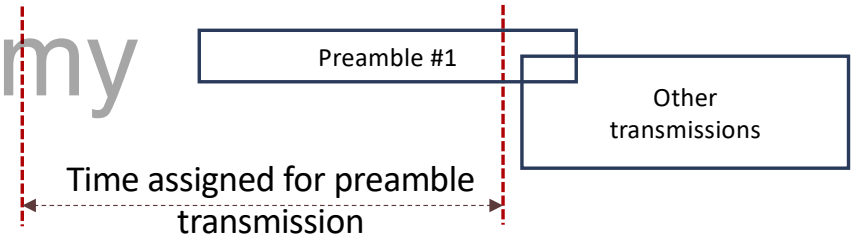


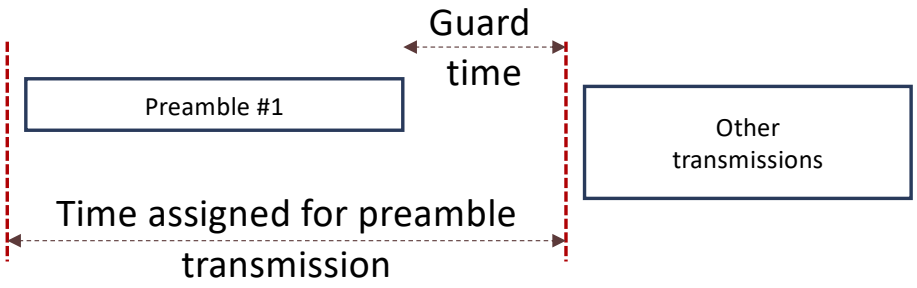
Step 1: Random Access Preamble (PRACH)



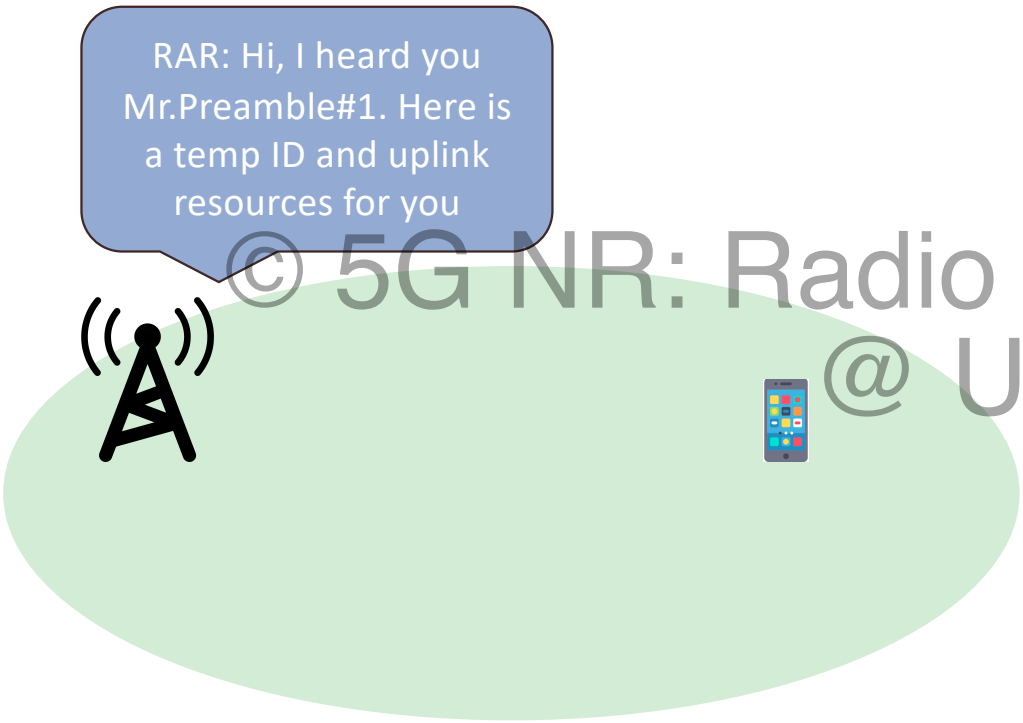
Timing Adjustment
- Estimate based on SS Block

Power Control
- Estimate based on SS Block
- Power Ramping





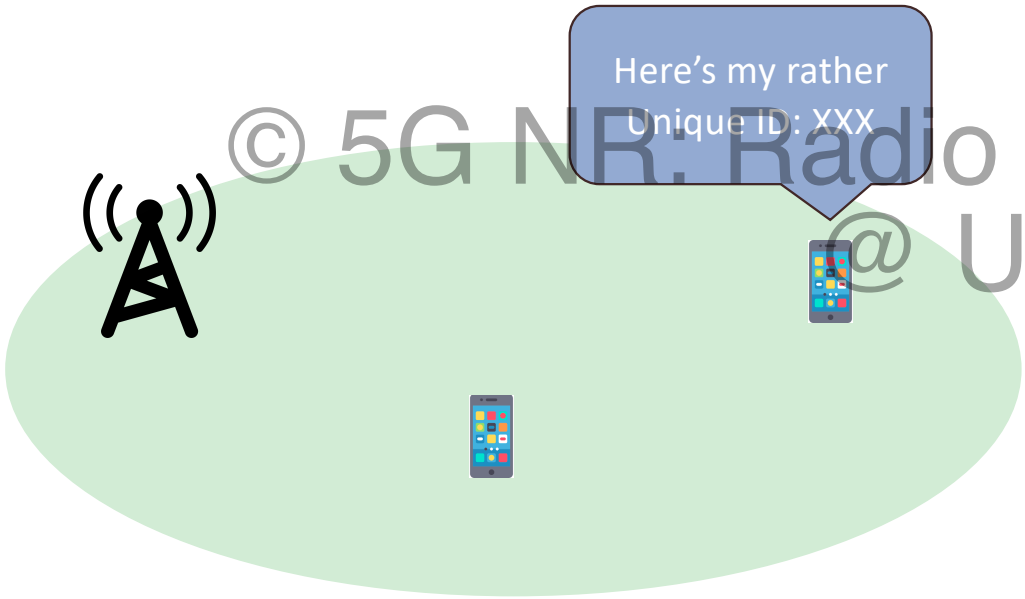
Step 2: Random Access Response (RAR)



Random Access Response

- Address: Random Access Preamble Identifier
- Timing correction
- Scheduling Grant (RARG)
- TC-RNTI

Step 3: Scheduled Transmission / Contention Resolution



Only device – No collision

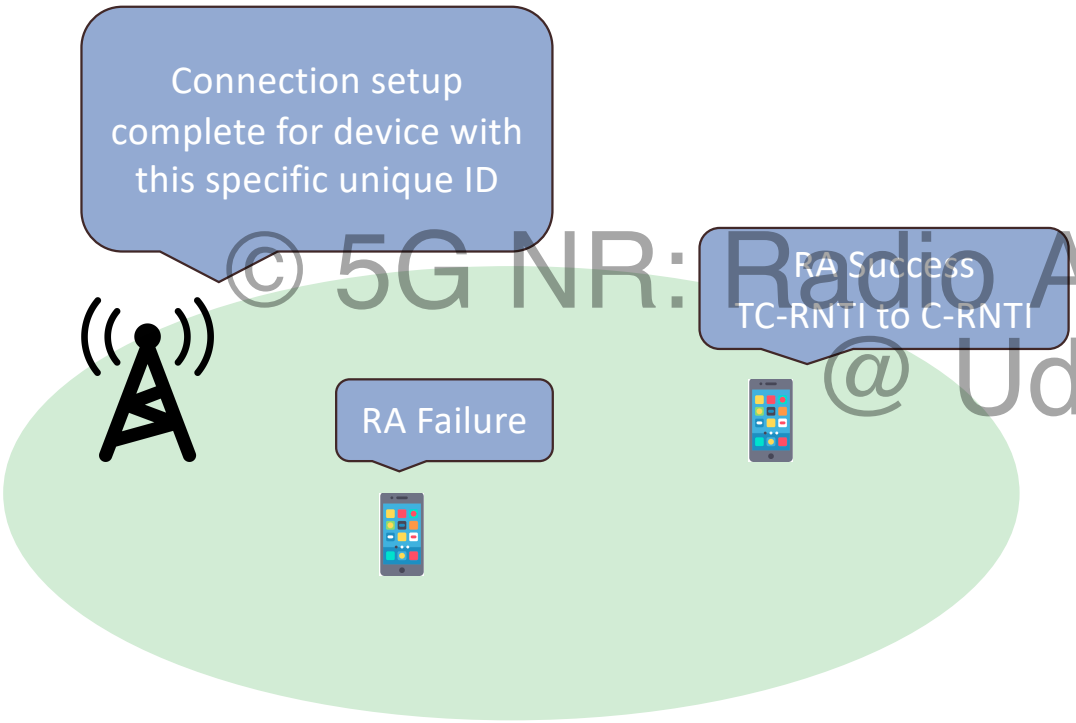
Two simultaneous Random Access

- Different Preamble -> Different TC-RNTI
- Same preamble –> TC-RNTI

RRC Connection Setup Request

- UE Contention Resolution Identity
- C-RNTI

Step 4: Contention Resolution and Connection Setup



Contention resolution

- Address: TC-RNTI
- Msg4: Unique ID

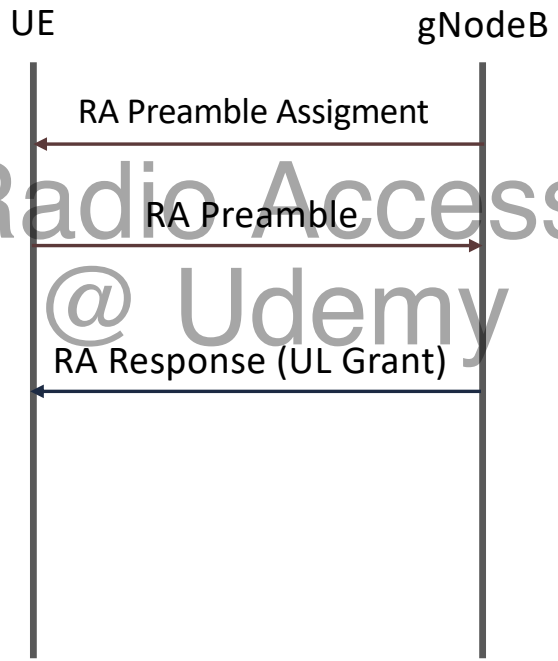
CONTENTION FREE RANDOM ACCESS (CFRA)

CFRA

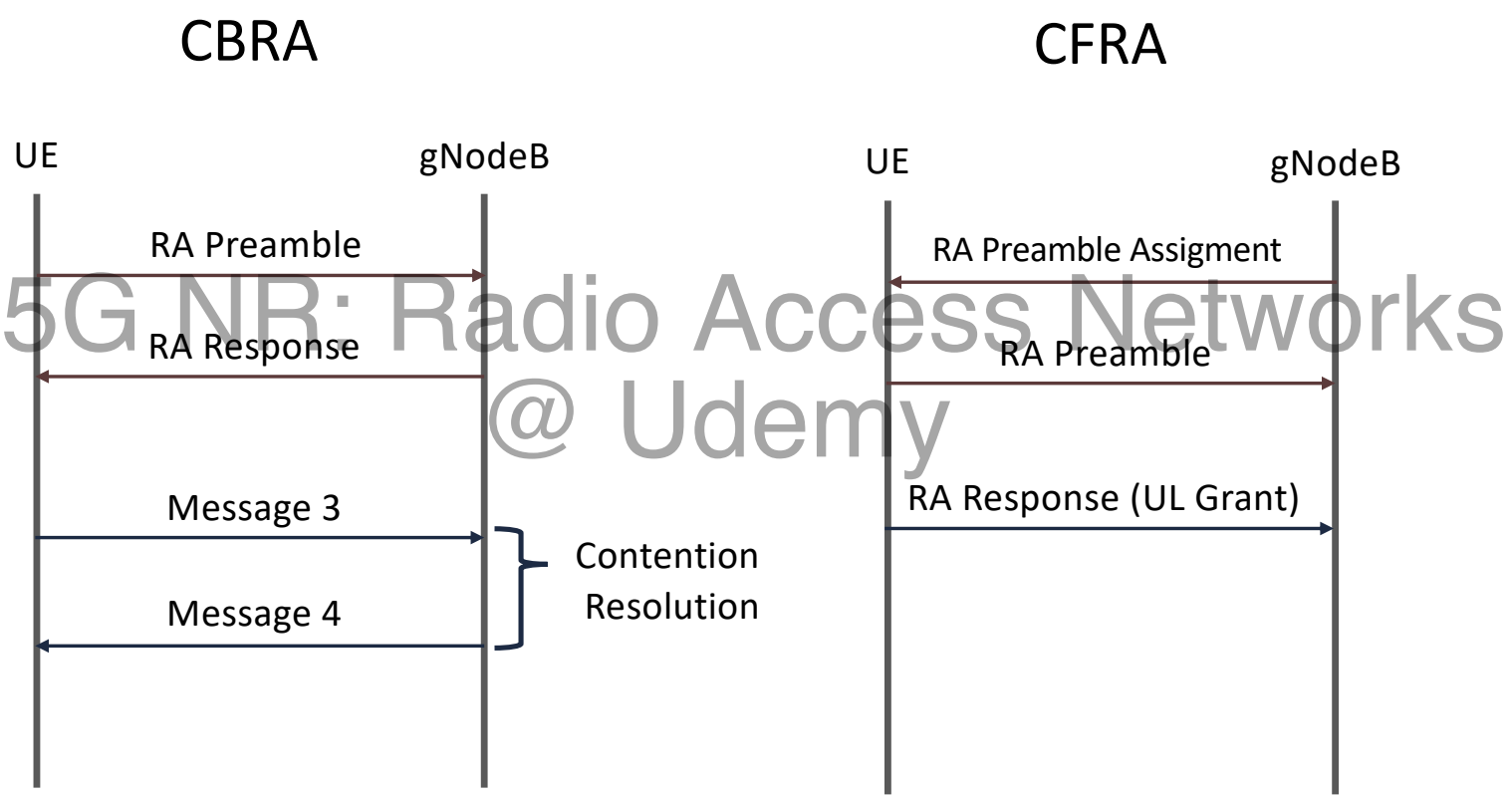
Triggers:

- Handover
- DL data for UE
- Non-stand alone mode, NR cell

CFRA



Summary



THANK YOU