

Handover xApp operation

The handover xApp enables the initiation of control actions to make handover requests with the following details:

- The handover request is sent to the mmWave cell located in the middle of the scenario.(Note: The handover xApp is a component of the full ES xApp, where the source and target cells are determined based on the KPM indication. Refer to section 4.3 for more details.)
- Each UE requires a separate control request.

1. Navigate to '/path/to/flexric/build/examples/ric/' and then run './nearRT-RIC'.
2. Navigate to '/path/to/ns-3-mmwave-oran' and then run './waf --run scratch/scenario-three.cc'

```
[INFO ] [E2AP] Received SETUP-RESPONSE-SUCCESS
+0.054214438s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 1 cellId 5 rnti 1
+0.054214525s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 2 cellId 5 rnti 2
+0.054214612s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 5 cellId 3 rnti 1
+0.054214786s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 7 cellId 4 rnti 1
+0.054214873s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 8 cellId 2 rnti 2
+0.054214960s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 9 cellId 4 rnti 2
+0.054215047s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 10 cellId 4 rnti 3
+0.059214438s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 3 cellId 2 rnti 1
+0.059214525s 7 McStatsCalculator:SwitchToMmWave(): [INFO ] imsi 4 cellId 5 rnti 3
```

[xapp] Send Handover Control message to move rnti 1,2 from cellId 2 to target cellId 5
as shown in the previous figure rnti 1 in cell 2 is **imsi 3** and rnti 2 in cell 2 is **imsi 8**

3. Navigate to '/path/to/flexric./build/examples/xApp/c/ctrl/xapp_rc_handover_ctrl' .and then run './xapp_rc_handover_ctrl'.

```
connected E2 nodes = 5
[xApp]: Send Handover Control message to move rnti 1 from cellId 2 to target cellId 5
[xApp]: CONTROL-REQUEST tx
[xApp]: CONTROL ACK rx
[xApp]: Successfully received CONTROL-ACK
[xApp]: CONTROL-REQUEST tx
[xApp]: CONTROL ACK rx
[xApp]: Successfully received CONTROL-ACK
[xApp]: CONTROL-REQUEST tx
```

```
[xApp]: Control Loop Latency for the first control message : 10000 us
[xApp]: Send Handover Control message to move rnti 2 from cellId 2 to target cellId 5
[xApp]: CONTROL-REQUEST tx
[xApp]: CONTROL ACK rx
[xApp]: Successfully received CONTROL-ACK
[xApp]: CONTROL-REQUEST tx
[xApp]: CONTROL ACK rx
[xApp]: Successfully received CONTROL-ACK
[xApp]: CONTROL-REQUEST tx
```

On xApp side

On simulator side

```
0.112982s LteEnbRrc::PerformHandoverToTargetCell(): [UNCOND] Initiate handover for Rnti 1 from CellId 2[DEBUG] **[E2AP ASN] Encoded success
fully, encoded size = 34
to CellId 5
Registered Cell ID: 1
Registered Cell ID: 2
Registered Cell ID: 3
Registered Cell ID: 4

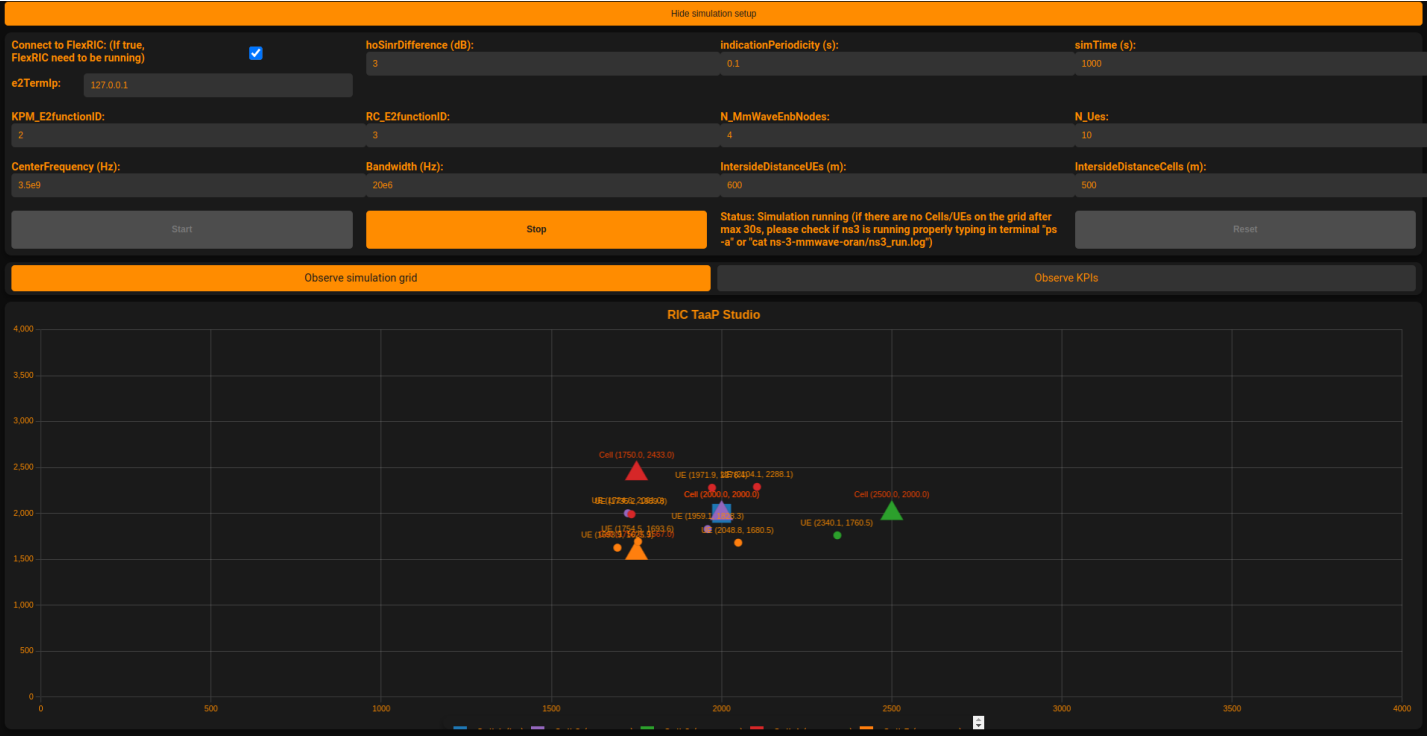
***** e2ap_handle_RICControlRequest End Print buffer *****
[DEBUG] in sctp send data func

[DEBUG] data.len is 34
[DEBUG] after getting sent_len

[INFO ] [SCTP] Sent E2-SERVICE-UPDATE
+0.116482160s 3 McStatsCalculator::SwitchToMmWave(): [INFO ] imsi 3 cellId 5 rnti 4
+0.117267856s 10 McStatsCalculator::SwitchToMmWave(): [INFO ] imsi 3 cellId 5 rnti 4
[DEBUG] [SCTP] Received new data of size 164
```

```
1.23375s LteEnbRrc::PerformHandoverToTargetCell(): [UNCOND] Initiate handover for Rnti 2 from CellId 2 to CellId 5
Registered Cell ID: 1
Registered Cell ID: 2
Registered Cell ID: 3
Registered Cell ID: 4
+1.237250019s 3 McStatsCalculator::SwitchToMmWave(): [INFO ] imsi 8 cellId 5 rnti 5
+1.238017856s 15 McStatsCalculator::SwitchToMmWave(): [INFO ] imsi 8 cellId 5 rnti 5
```

2. on the Ric_Taap GUI before handover operation



after handover operation

