**3GPP TSG-SA5 Meeting #155S5-243120**

**27 - 31 May 2024, Jeju, South Korea revision of S5-242335**

**Source: Nokia, Samsung**

**Title:** **pCR 28.867 CCL conflicts management**

**Document for: Approval**

**Agenda Item: 6.19.4**

# 1 Decision/action requested

**Discuss and agree on the text**

# 2 References

[1] 3GPP TR 28.867-010 “Closed control loop management”.

# 3 Rationale

Multiple CCLs acting along each other in the same environment are expected to affect one another i.e., there may be conflicts which need to be detected and the according to resolutions executed. This pCR introduces the different kinds of conflicts and requirements on the detection of any such conflicts.

# 4 Detailed proposal

***Start of First change***

# 5. Use Cases

5.X1 Use case X1: CCL conflicts management

5.X1.1 Description

Multiple CCLs could co-exist and concurrently act within the same environment. The CCLs can affect one another, in the worst cases leading to conflicts. The different kinds of conflicts are summarized by Table 5.X1.1-1.

5.X1.1-1: Types of potential conflicts among CCL instances for goals g1, g2 and g3

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| --- | --- | --- | --- | --- |
| Conflict Type | Description | CCL-A | CCL-B | Comments |
| Target Conflict | For CCLs C1 and C2, when same at least 1 target of a goal is present in both CCL asking for different outcomes on that target on same controlled entity (ME1). | Control Scope: ME1Goal targets: * Load > 90% (to maximize resource utilization)
* latency < 10ms
 | Control Scope: ME1Goal target: * Load < 90% (to avoid congestion)
 | Conflict among the targets within the goals - due to different required target outcomes |
| Action Conflict | For CCLs C1 and C2, when both C1 and C2 is trying to configure the same characteristics of same target entity (gNB-g1) in contradiction. | **Example 1** | Conflict due to configuration actions at execution step because both CCL want different contradicting value for a particular characteristic of gNB-g1.Effect: even when executed at different times, the value may ping-pong continuously. |
| Goals target:* Throughput > 10gbps

Actions: * Target Entity: gNB-g1
* Target Change: scale-out virtual resource
 | Goals target:* EC is < 10KVA

Actions: * Target Entity: gNB-g1
* Target Change: scale-in virtual resource
 |
| **Example 2** |
| Goal target: * HO failure is < 2%

Actions: * Target Entity: gNB-g1
* Target Change: set CIO to a small **positive** value{to guarantee HOs with low chances of HO failure}
 | Goal target: * Load < 80%

Actions: * Target Entity: gNB-g1
* Target Change: set CIO to a small negative value [to advance HOs and move load to other cells]
 |
| Indirect target conflict | For CCLs C1 and C2, when C1 [optimize handover] and C2 [minimize interference] have different goals but the actions of C1 affect the goals of C2  | Goal target: * HO failure is < 2%

Actions: * Target Entity: gNB-g1
* Target Change: reduce CIO {to reduce chances of HO failure}
 | Goal target: * SINR > 10dB

Actions: * Target Entity: gNB-g1
* Target Change: lower antenna tilt
 | By reducing antenna tilt to minimize interference C2 effect the HO goal target of C1 |
| Action Execution Time Conflict | For CCLs C1 and C2, When both C1 and C2 is trying to configure the same characteristics of same target entity (gNB-g1) in contradiction. | Goals:* Throughput > 10gbps

Actions: * Target Entity: gNB-g1
* Target Change: scale-out
* Target Time: 04:00
 | Goals:* EC is < 10KVA

Actions: * Target Entity: gNB-g1
* Target Change: scale-in
* Target Time: 04:00
 | Conflict due to the time of executing the configuration actions at the execution step  |
| Scope conflict | For CCLs C1 and C2, C1 and C2 have different goals and actions but their scopes are overlapping – e.g. C1’s control scope (i.e. the controlled entities in the network) is part of C2’s measurement scope (i.e. the measured entities in the network) | Measurement scope: cells g1 Control Scope: g1Goal targets: * EC/bit is < 1WA

Actions: * Target Entity: gNB-g2
* Target Change: switch off g2
 | Measurement scope: cells g1, g2, g3, g4Control Scope: g2Goals: * Load < 80%

Actions: * Target Entity: gNB-g2
* Target Change: change CIO
 | By switching off g2, C1 affects the scope which C2 reads for its load distribution measurements |

The CCL may detect or observe events that identify the possibility of any one of the above conflicts. The conflict can be avoided using some information or the policies (e.g., priority) provided by the consumer. If the conflict actually occurs, the CCL MnS producer should support services to inform MnS consumers the confirmed detected conflicts. This may also include informing MnS consumer about the potential conflict.

5.X1.3 Potential Requirements

REQ-CCL-CONFLICT-1: The MnS Producer for CCL management should support a capability to detect a potential or actual conflict.

Note: A potential conflict is where some events are observed that indicate that there may be a conflict, but the CCL MnS Producer cannot conclude that it is a conflict. So, the CCL can indicate this so that some other entity e.g. the MnS consumer takes responsibility to confirm the conflict.

REQ-CCL-CONFLICT-2: The MnS Producer for CCL management should support a capability to inform an authorized MnS consumer about a potential conflict that has been detected.

REQ-CCL-CONFLICT-3: The MnS Producer for CCL management should support a capability to confirm a detected potential goal, action, indirect target, action execution time, scope conflict.

REQ-CCL-CONFLICT-4: The MnS Producer for CCL management should support a capability to resolve a goal, action, indirect target, action execution time, scope conflict that has been detected.

REQ-CCL-CONFLICT-4: The MnS Producer for CCL management should enable authorized MnS consumers to provide information that can be used to avoid the conflict.

REQ-CCL-CONFLICT-5: The MnS Producer for CCL management should enable authorized MnS consumers to provide information that can be used to resolve the conflict.

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| **End of modifications** |