**3GPP TSG-SA5 Meeting #158 *S5-24xxxx***

**Orlando, USA, 18 - 22 November 2024**

**Source: Samsung, Nokia, DTAG, Huawei, NTT DOCOMO**

**Title: New WID on Closed Control Loop Management**

**Document for: Approval**

**Agenda Item: 6.2.2**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title:

New WID on Closed Control Loop Management

Acronym:

CCLM

Unique identifier:

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-19

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  | X | X |  |
| No | X | X |  |  | X |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a

|  |  |
| --- | --- |
|  | Study  |
| X | Normative – Stage 1 |
| X | Normative – Stage 2 |
| X | Normative – Stage 3 |
|  | Normative – Other\* |

## 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| FS\_CCLM | SA5 | 1020009 | Study on closed control loop management |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 850026 | Closed loop SLS Assurance | The Rel-16 work item in SA5 on closed loop SLS assurance |
| 870030 | Enhanced Closed loop SLS Assurance | The Rel-17 work item in SA5 on enhanced closed loop SLS assurance |
| 1050032 | Management of planned configurations | The Rel-19 work item in SA5 on Plan management. |

# 3 Justification

In Rel-17 TS 28.535 and 28.536, the following content is specified for closed loop SLS assurance

* Concept of using closed control loop for communication service assurance.
* Assurance management NRM fragment supporting the use case and requirements

Based on above content specified in Rel-17, TR 28.867 has studied following aspects and recommended to do the normative work

* Dynamic CCL creation: This requires CCL MnS Producer to support a capability enabling the MnS consumer to request for a CCL (instance) to be composed from a set management services. Required NRM extensions to support the capability are studied and concluded to be feasible solutions.
* Triggered CCL: This requires CCL MnS Producer to support a capability enabling MnS consumer to provide trigger conditions that can be used to instantiate, update, delete or execute a CCL. A trigger can be based on changes related to network performance, network configurations or network faults.
* CCL creation based on historical data: This requires consumer to be able to query for historical CCL information that can be used to instantiate new CCL. The information includes (not limited to) CCL identification, configured goals/targets and the related status, scope of the CCL, conflict information. This can be specified as a generic capability not restricted to CCLs.
* CCLs can be instantiated for a specific purpose (e.g., assurance, fault management, problem recovery) and on specific resources (e.g., NetworkSlice, gNB, etc.):
	+ CCL for problem recovery: This requires capability to allow the MnS consumer to request a CCL for resolving the network problems identified in the MDA report and get the result of the resolution process. The solution proposed includes required NRM extensions to be defined in order indicating the problem received from MDA and the reporting for the recovery process.
	+ CCL for fault management: This requires capability to identify the root cause and take actions using closed control loop to mitigate or solve the root cause
* CCL Conflict management: This requires capabilities to avoid, detect and resolve potential or actual conflicts within and/or among CCL(s). Solutions have been proposed where interactions between a coordination entity and the CCL instances is performed to avoid, detect, or resolve conflicts on the CCL goals and goal targets; on the actions derived by the CCLs, on the execution times of the CCL actions and on the performance metrics that are affected by the CCLs.
* CCL Scope extensions: The existing eCOSLA has the defined CCL scope as control of network slices. In addition to this, the scope of the CCL may be based on time, network domain, geography, network elements, resources and purpose. The CCL can be created with the combination of any of the scope element.
* CCL action impact assessment and feedback: This requires the 3GPP management system to support means that enable CCLs to provide feedback to an actor CCL on how satisfied or affected they are for the actions taken by the actor CCL. The feedback may be called an Action Quality Indicator (AQI), say in the range [0,10] where "0" indicates that the action was completely unacceptable and should never be reused in that context while "10" indicates that the action had very good outcomes for the reporting CCL.
* CCL decision escalation: This requires 3GPP management system to support functionality for a CCL (called the escalating CCL) to escalate the decided configuration changes to an escalation entity (e.g. another CCL, called the escalation recipient) when the escalating CCL lacks the confidence in the decided configuration changes. This further includes specifying mechanism for escalation recipient to provide guidance for computing new configuration changes.
* Performance of CCL: This enables authorized consumer to assess the performance of a particular CCL. The performance can be measured based on e.g number of occurrences of an assurance goal breach, time taken by CCL to meet a breached goal, number of conflicts occurred by a CCL.

# 4 Objective

The objective of this work item is to enhance the closed control loop management based on conclusions and recommendations documented in TR 28.867. It includes:

WT-1: Specify the capability enabling LCM of a CCL instance including composition (using existing MnSs), triggering, creating, updating and deleting.

WT-2: Specify additional CCL information that need to be maintained and how to enable use of that information for instantiating a new CCL. The information includes CCL identification, configured goals/targets and the related status, scope of the CCL, conflict information.

WT-3: Specify means to enable management of a CCLs for a specific purpose, CCL for network problem recovery indicated in an MDA report and fault management.

WT-4: Specify the required NRM extensions to enable avoidance, detection and resolution of conflict on CCL goals and goal targets; on actions derived by the CCLs, on execution times of the CCL actions and on performance metrics that are affected by the CCLs. This also includes mechanisms to coordinate CCLs with other management services and functions, e.g. MDA.

WT-5: Specify elements for the scope of CCL and required NRM extensions for managing the scope of the CCLs for monitoring and configurations. The scope can be based on time, network domain, geography, network elements, resources and purpose.

WT-6: Specify the mechanism to enable CCLs report on the impacts of the actions taken by another CCL. This also includes specifying mechanism, for a consumer to provide evaluation/feedback of actions and their impacts.

WT-7: Specify the mechanism to enable a CCL to escalate the configuration changes to an escalation recipient or producer when the CCL lacks the confidence in the decided configuration changes. This further includes specifying mechanism for the escalation recipient to accept or reject new configuration changes.

WT-8: Specify related performance measurement and KPI to assess the performance of a CCL.

WT-9: Specify informative procedures for each of the functionalities, proposed above, depicting the entire flow of the solution.

## TU estimates and dependencies

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| --- | --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **SA Dependency****(Yes/No/Maybe)** | **Non-3GPP Dependency** |
| WT-1 | 0 | 0.4 | No | No | No |
|  |  |  |  |  |  |
| WT-2 | 0 | 0.2 | No | No | No |
| WT-3 | 0 | 0.2 | No | No | No |
| WT-4 | 0 | 0.6 | No | No | No |
| WT-5 | 0 | 0.3 | No | No | No |
| WT-6 | 0 | 0.3 | No | No | No |
| WT-7 | 0 | 0.3 | No | No | No |
| WT-8 | 0 | 0.2 | No | No | No |
| WT-9 | 0 | 0.5 | No | No | No |

# 5 Expected Output and Time scale

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| --- |
| New specifications |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 28.535 | Add new specification Level Requirements and use cases | Sep 2025 (SA#109) |  |
| TS 28.536 | Add required NRM extensions and proceduresAdd new PMs for CCL performance managementAdd new KPIs for CCL performance management | Sep 2025 (SA#109) |  |
| TS 28.622 | Add required extensions to generic NRM | Sep 2025 (SA#109) |  |
| TS 32.161 | Add required jex extensions | Sep 2025 (SA#109) |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA WG5

# 8 Aspects that involve other WGs

None

# 9 Supporting Individual Members

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| Supporting IM name |
| Samsung |
| Nokia |
| DTAG |
| Huawei |
| NTT DOCOMO |
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