**3GPP TSG- Meeting # *rev2***

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | The RESTful HTTP based solution defined using the OpenAPI specification (REST SS) is the stage 3 solution applicable for all Management Services in SA5. The REST SS is provided for all Management Services. Other stage 3 solutions shall be introduced only based on specific requirements and for defined management areas only. A NETCONF/YANG solution was introduced for configuration download to NR and 5GC nodes based on a study on integration of ONAP and 3GPP. However, the reason why the NETCONF/YANG solution was introduced, is not described in normative standards, only in the TR, leading to confusion in the industry, where NETCONF/YANG is applicable and where not. |
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| ***Summary of change:*** | This CR desribes why NETCONF/YANG was introduced and where it is applicable. |
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| ***Consequences if not approved:*** | The existing confusion about applicability of stage 3 solutions remains. |
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| ***Clauses affected:*** | 2, 12.0 (new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First modification** |

# 2 References

- The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.526: "Telecommunication management; Life Cycle Management (LCM) for mobile networks that include virtualized network functions; Procedures".

[3] 3GPP TS 28.541: "Management and orchestration ; 5G Network Resource Model (NRM); Stage 2 and stage3".

[4] ITU-T Recommendation X.733 (02/92): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[5] 3GPP TS 28.531: "Management and orchestration ; Provisioning; ".

[6] 3GPP TS 28.554: "Management and orchestration ; 5G end to end Key Performance Indicators (KPI)".

[7] 3GPP TS 22.261: "Technical Specification Group Services and System Aspects; Service requirements for the 5G system; Stage 1".

[8] 3GPP TS 23.501: "Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Stage 2".

[9] 3GPP TS 23.003: "Technical Specification Group Core Network and Terminals; Numbering, addressing and identification".

[10] ETSI GS NFV-IFA 013 V2.4.1 (2018-02) "Network Function Virtualization (NFV); Management and Orchestration; Os-Ma-nfvo Reference Point - Interface and Information Model Specification".

[11] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[12] ETSI GS NFV-IFA 015 (V2.4.1): "Network Function Virtualisation (NFV); Management and Orchestration; Report on NFV Information Model".

[13] 3GPP TS 28.533: "Management and orchestration; Architecture framework"

[14] ITU-T Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems management: Event report management function".

[15] 3GPP TS 32.158: "Management and orchestration; Design rules for REpresentational State Transfer (REST) Solution Sets (SS)".

[16] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".

[17] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[18] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[19] 3GPP TS 32.401: "Telecommunication management; Perfomance Measurement (PM); Concept and requirements".

[20] ISO 8601:2004: "Data elements and interchange formats – Information interchange – Representation of dates and times".

[21] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/_downloads/2c2b5962df52a0c1f2862f3bba3d67c7/CommonEventFormat_30.1_ONAP.json>, accessed 21.03.2019.

[22] Figure Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the figure: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/ves7_1spec.html?highlight=heartbeatIntervalChange#resource-structure>, accessed 21.03.2019).

[23] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/VESEventListener_7_0_1.html?highlight=ves%207#naming-standards-for-eventname>, accessed 11.04.2019).

[24] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/VESEventListener_7_0_1.html?highlight=ves%207#datatype-commoneventheader>, accessed 11.04.2019).

[25] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects ".

[26] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".

[27] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".

[28] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

[29] W3C REC-xml-names-19990114: "Namespaces in XML".

[30] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: https://onap.readthedocs.io/en/latest/submodules/vnfrqts/requirements.git/docs/Chapter8/ves7\_1spec.html#datatype-heartbeatfields, accessed 06.11.2019).

[31] 3GPP TS 32.111-2: " Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[32] IETF RFC 6241 "Network Configuration Protocol (NETCONF)".

[33] 3GPP TS 32.160 " Management and orchestration; Management service template ".

[34] IETF RFC 7950 "The YANG 1.1 Data Modeling Language".

[35] OpenAPI: "OpenAPI 3.0.1 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md>.

[36] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[37] IETF RFC 7396: "JSON Merge Patch".

[x] 3GPP TS 28.623 "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

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| **Next modification** |

# 12 Management services – Stage 3

## 12.0 Introduction

The RESTful HTTP based Solution Set (REST SS) is the stage 3 solution for all Management Services. It is defined using the OpenAPI specification [35] and published in OpenAPI documents. The design rules specified in 3GPP TS 32.158 [15] are applicable.

A single stage 3 solution ensures interoperability between all MnS producers and MnS consumers involved in the management and orchestration of telecommunication networks. This is especially important in a SBMA, where MnS producers can interact with any MnS consumer. For example, a network node may notify a management function (MF), that is tasked with configuring the node, about changes of configurable attributes or state attributes, but, in addition, a MF responsible for service assurance or a MF responsible for slice management may be subscribed to the same notifications as well. Vice versa, all three MFs may configure the network node by consuming the Provisioning MnS produced by the node, for example to establish data collection jobs or to create subscriptions for notifications they are interested in.

A single/common solution for stage 3 is less relevant in a reference-point-based architecture, where the entities communicating with each other are pre-determined and restricted by the architecture, and where a specific stage 3 solution can be selected in specific deployments for each interface (consumer/producer pair).

For this reason, alternative solutions for the REST SS are specified only when clear justifications and explicit requirements exist. Alternatives are defined only for specific management areas and not as a general alternative to the REST SS. These alternative solutions may be introduced also for a limited time for interim solutions only (e.g. to enable smooth transitions from sub-optimal and non-open solutions to the REST SS).

One such alternative solution is to specify the download of configuration changes for NR and 5GC network nodes based on the NETCONF protocol [32] and the YANG data modeling language [34]. The corresponding requirements are related to ONAP. It was concluded after a study on integration of ONAP and 3GPP management for 5G networks that integration with ONAP controllers based on NETCONF/YANG shall be enabled.

In this context a YANG definition for the NR NRM and 5GC NRM is introduced in 3GPP TS 28.541 [3], including a YANG definition for the Generic NRM in 3GPP TS 28.623 [x] for the name-containment tree starting at "ManagedElement". A "ManagedElemet" instance is the root object for object diagrams exhibited by network nodes. In addition, the operations of the provisioning service defined in stage 2 are mapped to a well-defined subset of NETCONF functions in stage 3.

## 12.1 Generic provisioning management service

### 12.1.1 RESTful HTTP-based solution set

#### 12.1.1.1 Mapping of operations

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| **End of modification** |