**3GPP TSG- Meeting #0**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HELP***](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:*** | Rel-19 CR 28.537 Add details for MnS API versioning | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***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 can be 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | The eSBMA architecture defines mechanisms to provided detailed information about each MnS, i.e. the MNSInfo of a particular MnS Producer in the MnS Registry. The MNSInfo version value comprises multiple elements. It is important to clarify which part(s) are recommended for use when constructing the “MnSVersion” defined as part of the URI structure. | | | | | | | | |
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| ***Summary of change:*** | | Add API versioning handling details to URI structure. | | | | | | | | |
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| ***Consequences if not approved:*** | | Inconsistencies in MnS API version handling can cause interoperability issues. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.4, 4.4.1, 4.4.2, 4.4.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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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| **1st Change** |

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] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

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

[4] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[5] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[6] IETF RFC 7159: " The JavaScript Object Notation (JSON) Data Interchange Format".

[7] draft-bhutton-json-schema-01 (June 2022): "JSON Schema: A Media Type for Describing JSON Documents".

Note: The above document is an individual draft from IETF. It cannot be formally referenced until it is published as an RFC. It is available from the following link: <https://datatracker.ietf.org/doc/html/draft-bhutton-json-schema-01>.

[8] draft-bhutton-json-schema-validation-01 (June 2022): "JSON Schema Validation: A Vocabulary for Structural Validation of JSON".

Note: The above document is an individual draft from IETF. It cannot be formally referenced until it is published as an RFC. It is available from the following link: <https://datatracker.ietf.org/doc/html/draft-bhutton-json-schema-validation-01>.

[9] draft-handrews-json-schema-hyperschema-02 (September 2019): "JSON Hyper-Schema: A Vocabulary for Hypermedia Annotation of JSON.

Note: The above document is an individual draft from IETF. It cannot be formally referenced until it is published as an RFC. It is available from the following link: <https://datatracker.ietf.org/doc/html/draft-handrews-json-schema-hyperschema-02>.

[10] OpenAPI Specification (<https://github.com/OAI/OpenAPI-Specification>)

[11] IETF RFC 5789: "PATCH Method for HTTP".

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

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

[14] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

[15] XML Path Language (XPath) Version 1.0, W3C Recommendation 16 November 1999 (<https://www.w3.org/TR/xpath-10/>)

[16] 3GPP TS 32.160: "Management and orchestration; Management service template".

[17] IETF RFC 4918: "HTTP Extensions for Web Distributed Authoring and Versioning (WebDAV)"

[18] IETF RFC 6585: "Additional HTTP Status Codes"

[19] IETF RFC 7807: "Problem Details for HTTP APIs"

[20] IETF RFC 7725: "An HTTP Status Code to Report Legal Obstacles"

[21] 3GPP TS 32.161: "JSON expressions (Jex)"

[x] 3GPP TS 32.533: ”Management and orchestration; Architecture framework”

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| **2nd Change** |

4.4 URI structure

4.4.1 Introduction

MnS producers can be divided into two categories. The first category exposes MnS(s) to manipulate resources representing managed object instances. In this case the URI structure is governed by the mapping rules defined in clause 4.2.3. The second category exposes MnS(s) to manipulate resources not representing managed object instances. In this case the DN concept is not relevant. The URI structure for both categories is different.

4.4.2 URI structure for resources representing managed object instances

URIs identifying resources representing managed object instances shall follow, when being used as a target URI in HTTP requests, the structure given by

{scheme}://{URI-DN-prefix}/{root}/{MnSName}/{MnSVersion}/{URI-LDN}

with:

{scheme} Scheme component "http" or "https"

{URI-DN-prefix} Authority component (host identifier and optional TCP port), the host name is constructed from the DN prefix as defined in clause 4.2.3.

{root} Part of the path component, allows specifying one or more optional path segments for structuring the resource hierarchy on a HTTP server. The DN or parts thereof shall not be mapped to this path component.

{MnSName} Part of the path component, allows specifying an optional MnS name in a single path segment.

{MnSVersion} Part of the path component, allows specifying an optional MnS API version in a single path segment.

{URI-LDN} Part of the path component, constructed from the LDN as defined in clause 4.2.3, containing zero, one or more path segments.

As seen above, to construct the URI from a DN, it is necessary to map the "DNPrefixPlusRDNSeparator" as defined in clause 7.3 of TS 32.300 [3], the “LocalDN” as defined in clause 7.3 of TS 32.300 [3], and to add the additional optional path segments "/{root}/{MnSName}/{MnSVersion}".

To allow for a predictive mapping from an URI to the original DN it is necessary to specify "/{MnSName}/{MnSVersion}" in such a way that the beginning of the "LocalDN" can be unambigously identified.

Note it may be required when specifying a MnS to clearly identify the last RDN of "{URI-LDN}" and to use the following instead of "{URI-LDN}"

{URI-LDN-first-part}/{RDN}

or

{URI-LDN-first-part}/{className}={id}.

For the sake of brevity, "MnSRoot" is introduced that includes the "{scheme}" part, the colon (":"), the two slash characters ("//"), the "{authority}" part, a single slash character ("/") and the "{root}" part.

{MnSRoot} := {scheme}://{URI-DN-prefix}/{root}

When using "{MnSRoot}" the abbreviated URI structure is given by

{MnSRoot}/{MnSName}/{MnSVersion}/{URI-LDN}

or

{MnSRoot}/{MnSName}/{MnSVersion}/{URI-LDN-first-part}/{className}={id}

It is recommended to use this abbreviated form of the URI structure when defining Management Services.

The path segment "MnSVersion" allows access to resources with different MnS API versions. As defined in [x] clause 5.X the “MnSVersion” comprises several components. For example, “19.0.0+vendorX.2025-01”.

It is recommended that the first field of “MnSVersion” be used to differentiate between API releases, for example:

http://operatorA.com/ProvMnS/v18/SubNetwork=south/.../Cell=1

http://operatorA.com/ProvMnS/v19/SubNetwork=south/.../Cell=1

Additional fields of “MnSVersion” such as vendor build information can be included in “MnSRoot” to further differentiate between API releases, for example:

http://operatorA.com/vendorX/ProvMnS/v18/SubNetwork=south/.../Cell=1

http://operatorA.com/vendorX/ProvMnS/v19/SubNetwork=south/.../Cell=1

Note that both URIs, though different as to the path segment indicating the API version number of the ProvMnS, identify the same resource that is identified by the canonical URI:

http://operatorA.com/SubNetwork=south/.../Cell=1

and whose DN is:

DC=operatorA.com,SubNetwork=south,...,Cell=1

The optional path component "/{root}" may be used to separate the name space for 3GPP management from the name space for other domains:

http://operatorA.com/3gppManagement/ProvMnS/v16/SubNetwork=south/.../Cell=1

or to provide dedicated URIs on the same host for different tasks:

http://operatorA.com/3gppManagement/cm/ProvMnS/v16/SubNetwork=south/.../Cell=1

http://operatorA.com/3gppManagement/fm/ProvMnS/v16/SubNetwork=south/.../Cell=1

Note that when different hosts are used for different management tasks, like in

http://cm.operatorA.com/3gppManagement/ProvMnS/v16/SubNetwork=south/.../Cell=1

http://fm.operatorA.com/3gppManagement/ProvMnS/v16/SubNetwork=south/.../Cell=1

then also the resources are different and identifierd by the canonical URIs

http://cm.operatorA.com/SubNetwork=south/.../Cell=1

http://fm.operatorA.com/SubNetwork=south/.../Cell=1

or the DNs

DC=cm.operatorA.com,SubNetwork=south,...,Cell=1

DC=fm.operatorA.com,SubNetwork=south,...,Cell=1

In the example above, it is assumed that both resources represent the same cell in the network. This information cannot be derived from the DN or canonical URI, though.

4.4.3 URI structure for resources not representing managed object instances

URIs identifying other resources shall follow, when being used as a target URI in HTTP requests, the structure given by

{scheme}://{authority}/{root}/{MnSName}/{MnSVersion}/{MnSResourcePath}

with:

{scheme} Scheme component "http" or "https"

{authority} Authority component (host identifier and optional TCP port)

{root} Part of the path component, allows specifying optional path segments for structuring the resource hierarchy on a HTTP server.

{MnSName} Part of the path component, specifies the mandatory MnS name in a single path segment.

{MnSVersion} Part of the path component, specifies the mandatory MnS API version in a single path segment.

{MnSResourcePath} Part of the path component, one or more path segments, specifies a resource of the MnS

For the sake of brevity, {MnSRoot} is introduced that includes the "{scheme}" part, the two slash characters ("//"), the "{authority}" part, a single slash character ("/") and the "{root}" part. When using "{MnSRoot}" the abbreviated URI structure is given by

{MnSRoot}/{MnSName}/{MnSVersion}/{MnSResourcePath}

It is recommended to use this abbreviated form of the URI structure when defining Management Services.

4.4.4 Resource "../{MnSName}/{MnSVersion}"

The resource identified by "../{MnSName}/{MnSVersion}" is called NRM root. It represents the conceptual parent of the top-level managed object instances. It is created by the MnS Producer. A MnS Consumer cannot create or delete this resource.

The resource is the target resource for many HTTP requests, such as requests to retrieve all top-level managed object instances in case there are multiple top-level managed object instances, or for requests to create objects in case there are no manged object instances yet and the creation request needs to be directed to the parent of the resource to be created.

Attempts to read the NRM root only shall return "204 No Content".