**3GPP TSG-CT WG4 Meeting #110-eC4-223401**

**E-Meeting, 12th – 20th May 2022 C4-223200**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.556** | **CR** | **0003** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Using FQDN Pattern Matching Rule for fqdnPatternList | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | C4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eEDGE\_5GC | | | | |  | ***Date:*** | | | 2022-05-19 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | CT3 and CT4 are including either arrays of FQDNs or FQDN regular expressions in their APIs in order to provide the receiver Network Function the list of FQDN(s) against which a matching is required.  The use of arrays of FQDNs requires that the Network Function needs to provide each specific FQDN.  This can be avoided with the use of regular expressions.  However, this is considered an overkilled solution, although regular expression is versatile and flexible, it may have a big impact in performance for UPF/EASDF and may cause faulty situations.  Especially when a DNS Context or a PFCP session include multiple DNS matching template or PDRs using regular expression to match, it is possible that multiple templates or multiple PDRs get matched, **which leads completely different results than originally intended,** e.g. forward the DNS message to a wrong DNS server.  These DNS Matching Templates in the DNS rule or Packet Detection Information in the PDRs are generated upon the request from DIFFERENT AFs, it would be heavy task or even impossible for SMF or PCF to validate and ensure there is no overlapping DNS template or PDRs when regular expression is used, the same for UPF/EASDF. There is a huge risk that an unexpected PDR or DNS template is matched and leads complete wrong result.  This CR proposes that the fqdnPatternList attribute encoded with an array of new data type, FqdnPatternMatchingRule, as defined in TS 29.571, where a FQDN Pattern is either described by a StringMatchingRule or a Regular Expression, where the StringMatchingRule shall be used preferrably whenever possible to optimize the matching process and reduce processing load, e.g. in the UPF or EASDF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Propose to map fqdnPatternList to an array of the new data type FqdnPatternMatchingRule as specified in clause 5.2.4.a of 3GPP TS 29.571. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misaligned specifications and suboptimal system design, high risk to lead error situation, e.g. forward a DNS request to a wrong DNS server | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.1.6.1, 6.1.6.2.5, 6.1.6.2.6, A2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 29.571 CR 0362 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR is a backwards compatible feature in the OpenAPI file of the Neasdf\_DNSContext API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* First 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] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[7] 3GPP TR 21.900: "Technical Specification Group working methods".

[8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[9] IETF RFC 6749: "The Oauth 2.0 Authorization Framework".

[10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[11] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

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

[14] 3GPP TS 23.548: "5G System Enhancements for Edge Computing; Stage 2".

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

[16] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[17] Void.

[18] IETF RFC 7871: "Client Subnet in DNS Queries".

[19] 3GPP TS 23.003: "Numbering, addressing and identification".

\* \* \* \* Next change \* \* \* \*

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Neasdf\_DNSContext service based interface protocol.

Table 6.1.6.1-1: Neasdf\_DNSContext specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| DnsContextCreateData | 6.1.6.2.2 | Data in DNS Context Create request |  |
| DnsContextCreatedData | 6.1.6.2.3 | Data in DNS Context Create response |  |
| DnsRule | 6.1.6.2.4 | DNS handling rule |  |
| DnsQueryMdt | 6.1.6.2.5 | DNS Query Message Detection Template |  |
| DnsRspMdt | 6.1.6.2.6 | DNS Response Message Detection Template |  |
| Ipv4AddressRange | 6.1.6.2.7 | IPv4 addresses range |  |
| Ipv6PrefixRange | 6.1.6.2.8 | IPv6 addresses range |  |
| Action | 6.1.6.2.9 | Action to apply to DNS messages matching a message detection template |  |
| DnsContextNotification | 6.1.6.2.10 | DNS context notification |  |
| ForwardingParameters | 6.1.6.2.11 | Forwarding instructions |  |
| EcsOption | 6.1.6.2.12 | ECS Option information |  |
| DnsContextEventReport | 6.1.6.2.13 | DNS context Event report |  |
| DnsQueryReport | 6.1.6.2.14 | DNS Query Event Report |  |
| DnsRspReport | 6.1.6.2.15 | DNS Response Event Report |  |
| EcsOptionInfo | 6.1.6.2.16 | ECS option information |  |
| DnsServerAddressInfo | 6.1.6.2.17 | DNS Server address information |  |
| BaselineDnsMdtId | 6.1.6.2.18 | Baseline DNS Message Detection Template Identifier |  |
| BaselineDnsAitId | 6.1.6.2.19 | Baseline DNS Action Information Template Identifier |  |
| BaselineDnsQueryMdtInfo | 6.1.6.2.20 | Baseline DNS Query MDT ID and  optionally associated information |  |
| BaselineDnsRspMdtInfo | 6.1.6.2.21 | Baseline DNS Response MDT ID and  optionally associated information |  |
| ApplyAction | 6.1.6.3.3 | Action to apply to the DNS packet |  |

Table 6.1.6.1-2 specifies data types re-used by the Neasdf service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Neasdf\_DNSContext service based interface.

Table 6.1.6.1-2: Neasdf\_DNSContext re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| IPv4Addr | 3GPP TS 29.571 [16] | IPv4 address |  |
| IPv6Prefix | 3GPP TS 29.571 [16] | IPv6 prefix |  |
| Dnn | 3GPP TS 29.571 [16] | DNN |  |
| Uri | 3GPP TS 29.571 [16] | URI |  |
| Uint32 | 3GPP TS 29.571 [16] | Unsigned 32-bit integer |  |
| IpAddr | 3GPP TS 29.571 [16] | IP address |  |
| IPv6Addr | 3GPP TS 29.571 [16] | IPv6 address |  |
| SupportedFeatures | 3GPP TS 29.571 [16] | Supported features |  |
| DateTime | 3GPP TS 29.571 [16] | Date and time |  |
| PatchResult | 3GPP TS 29.571 [16] |  |  |
| FqdnPatternMatchingRule | 3GPP TS 29.571 [16] | FQDN Pattern Matching Rule. |  |

\* \* \* \* Next change \* \* \* \*

##### 6.1.6.2.5 Type: DnsQueryMdt

Table 6.1.6.2.5-1: Definition of type DnsQueryMdt

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| label | string | O | 0..1 | DNS Query MDT's label  (NOTE 2) |  |
| sourceIpv4Addr | Ipv4Addr | O | 0..1 | UE IPv4 address (NOTE 1) |  |
| sourceIpv6Prefix | Ipv6Prefix | O | 0..1 | UE IPv6 prefix (NOTE 1) |  |
| fqdnPatternList | array(FqdnPatternMatchingRule) | O | 1..N | List of FQDN patterns, where each FQDN pattern is described by a FQDN Pattern Matching Rule.  An FQDN value is considered part of the template if and only if the FQDN in the Queries field in the DNS Query message fully matches at least one FQDN pattern.  (NOTE X) |  |
| NOTE 1: If neither the sourceIpv4Addr IE nor the sourceIpv6Prefix IE is present, the UE IP address in the DNS Context Data shall be assumed.  NOTE 2: This attribute may contain free information describing the scope of the DNS Query MDT. It may be used e.g. for trouble-shooting.  NOTE X: The list of FQDN patterns may encode some FQDN patterns with a string matching rule and others with a regular expression (when the FQDN patterns can not be described by a string matching rule). | | | | | |

\* \* \* \* Next change \* \* \* \*

##### 6.1.6.2.6 Type: DnsRspMdt

Table 6.1.6.2.6-1: Definition of type DnsRspMdt

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| label | string | O | 0..1 | DNS Response MDT's label  (NOTE 1) |  |
| fqdnPatternList | array(FqdnPatternMatchingRule) | O | 1..N | List of FQDN patterns, where each FQDN pattern is described by a FQDN Pattern Matching Rule.  An FQDN value is considered part of the template if and only if the FQDN in the Queries field in the DNS Response message fully matches at least one FQDN pattern.  (NOTE X) |  |
| easIpv4AddrRanges | array(Ipv4AddressRange) | O | 1..N | List of EAS IPv4 addresses ranges |  |
| easIpv6PrefixRanges | array(Ipv6PrefixRange) | O | 1..N | List of EAS IPv6 prefixes ranges |  |
| NOTE 1: This attribute may contain free information describing the scope of the DNS Response MDT. It may be used e.g. for trouble-shooting.  NOTE X: The list of FQDN patterns may encode some FQDN patterns with a string matching rule and others with a regular expression (when the FQDN patterns can not be described by a string matching rule). | | | | | |

\* \* \* \* Next change \* \* \* \*

## A.2 Neasdf\_DNSContext API

openapi: 3.0.0

info:

version: '1.0.0-alpha.7'

title: 'Neasdf\_DNSContext'

description: |

EASDF DNS Context Service.

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externalDocs:

description: 3GPP TS 29.556 V17.0.0; 5G System; Edge Application Server Discovery Services; Stage3

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.556/

servers:

- url: '{apiRoot}/neasdf-dnscontext/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

**...Skipped for clarity...**

DnsQueryMdt:

description: DNS Query message detection template

type: object

properties:

label:

type: string

sourceIpv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

sourceIpv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

fqdnPatternList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/FqdnPatternMatchingRule'

minItems: 1

DnsRspMdt:

description: DNS Response message detection template

type: object

properties:

label:

type: string

fqdnPatternList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/FqdnPatternMatchingRule'

minItems: 1

easIpv4AddrRanges:

type: array

items:

$ref: '#/components/schemas/Ipv4AddressRange'

minItems: 1

easIpv6PrefixRanges:

type: array

items:

$ref: '#/components/schemas/Ipv6PrefixRange'

minItems: 1

**...Skipped for clarity...**

\* \* \* \* End of changes \* \* \* \*