**3GPP TSG-CT WG3 Meeting #117e C3-214540**

**E-Meeting, 18th – 27th August 2021**

**Source: China Mobile**

**Title: Revised WID on BEst Practice of PFCP**

**Document for: Agreement**

**Agenda Item: 17.1.1**

**3GPP TSG-CT WG4 Meeting #105-eC4-214865**

**E-Meeting, 17th – 27th August 2021**

**Source: China Mobile**

**Title: Revised WID on BEst Practice of PFCP**

**Document for: Agreement**

**Agenda Item: 5**

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: BEst Practice of PFCP

Acronym: BEPoP

Unique identifier: 880014

Potential target Release: Rel-17

1 Impacts

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

2 Classification of the Work Item and linked work items

2.1 Primary classification

This work item is a

|  |  |
| --- | --- |
| X | **Feature** |
|  | **Building Block** |
|  | *Work Task* |
|  | **Study Item** |

2.2 Parent Work Item

|  |  |  |  |
| --- | --- | --- | --- |
| **Parent Work / Study Items** | | | |
| **Acronym** | **Working Group** | **Unique ID** | **Title (as in 3GPP Work Plan)** |
|  |  |  |  |

2.3 Other related Work Items and dependencies

|  |  |  |  |
| --- | --- | --- | --- |
| **Other related Work Items (if any)** | | | |
| **Unique ID** | **Title** | **Nature of relationship** |
|  |  |  |

3 Justification

PFCP was first developed in Rel-14 to support CP and UP separation feature in EPC. From Rel-15 PFCP has been reused for the interface between SMF and UPF in 5GC. Though being developed for three releases, interoperability issues between CP and UP can still be identified in several aspects:

- Multiple technical choices lead to deviation between different implementations (non-exhaustive list):

- End Marker generation. End Marker can be generated either by CP function or UP function. This may cause similar issue as TEID allocation.

- UE IP address allocation. Similar as the TEID, UE IP address can be allocated by either CP function or UP function. When one UP function is controlled by multiple CP functions, UE IP address allocation by CP function may require more coordination between UP function and multiple CP functions.

- Downlink Buffering. Both CP function and UP function may support DL buffering. However, for simplification, some implementations may only support one of the DL buffering mechanisms.

- HTTP redirection. For EPC, the traffic redirection may be enforced in the CP function or in the UP function, this leads interoperability problem.

- Some widely used features are not fully standardized (non-exhaustive list):

- Some information (e.g. RAT type, roaming indication) is used for network statistics and performance measurement, while not defined in PFCP yet.

- Tethering control is not defined (\*).

- Header enrichment is not fully defined for some use cases in the field e.g. when HTTPS is used, the additional information may be included in the TLS level.

- L2TP tunneling over SGi/N6 to third party DN is not supported (\*).

L2TP is a common technology used (e.g. by POS/ATM machine) to establish secured connection with its server. After CP/UP separation, it is difficult for the UP function to get necessary parameters (e.g. username, password, etc.) to set up the tunnel to the third party server.

(\*) Stage 2 requirements and call flows (including security aspects for L2TP) are missing. Only 5GC is considered for these features.

All those issues will break the interoperability between CP and UP. Unfortunately interoperability between SMF and UPF is one of the key factors from the operator’s point of view:

- Vertical market is estimated to be the most important use case of 5G, where UPF is very likely to be deployed locally on the customer side. Considering centralized SMF deployment, interoperability between SMF and UPF is mandatory.

- WI ETSUN was created to develop solution (I-SMF, N16a) to support PDU session continuity when the UE moves between different SMF serving areas. PFCP IEs are signalled over N16a, thus the interoperability regarding PFCP between the SMF and the I-SMF is mandatory.

One additional point is operators may have requirements to customize a set of CP function and UP function to only have minimized features for specific services, e.g. simplest CIoT service. In order to support such kind of customization, some guidance is preferred.

Taking into account the above truths, it is now really important to provide guidance for the PFCP implementers and to update PFCP protocol if needed, so as to improve the interoperability of PFCP between CP and UP functions from different vendors.

4 Objective

The objectives of this work item are:

- to study the PFCP interoperability issues identified and foreseen;

- to study different use cases and the necessary functionality set of PFCP for each case;

- to study whether it is needed to enhance how the SMF discovers the features supported by UPFs, in particular for deployments mixing UPFs with different PFCP capabilities;

- to update TS 29.244:

- for the cases where multiple choices are provided, to recommend one of them, and to deprecate/remove options where possible,

- to define protocol extensions if certain features are seen as important but not yet defined (provided they do not require stage 2 work or that corresponding stage 2 requirements are defined), and/or to provide further recommendations on the features to be supported. New PFCP features are defined only for the interface between SMF and UPF.

- to update TS 29.244 and/or TS 29.510 to enhance how the SMF discovers the features supported by UPFs, if needed

- to update TS 29.061 and TS 29.561 to specify relevant requirements related to L2TP tunnel and L2TP session feature support over SGi/N6 interface with third party DN.

5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **New specifications** | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Rapporteur |
| TR | 29.820 | Study on BEst Practice of PFCP | TSG#94 | TSG#95 | Song Yue,  China Mobile,  songyue@chinamobile.com |

|  |  |  |  |
| --- | --- | --- | --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| 29.244 | Impacts on PFCP | TSG#95(March, 2022) | CT4 responsibility |
| 29.510 | Potential impacts on Nnrf services for discovery of the features supported by UPFs | TSG#95(March, 2022) | CT4 responsibility |
| 29.061 | Potential impacts on L2TP tunnel and L2TP session feature support in SGi interface. | TSG#95(March, 2022) | CT3 responsibility |
| 29.561 | Potential impacts on L2TP tunnel and L2TP session feature support in N6 interface. | TSG#95(March, 2022) | CT3 responsibility |

6 Work item Rapporteur(s)

Song Yue,

China Mobile,

songyue@chinamobile.com

7 Work item leadership

CT4

8 Aspects that involve other WGs

None.

9 Supporting Individual Members

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| --- |
| **Supporting IM name** |
| China Mobile |
| China Telecom |
| China Unicom |
| ZTE |
| CATT |
| Nokia |
| Nokia Shanghai Bell |
| T-Mobile USA |
| Ericsson |
| Deutsche Telekom |