

## 1 Introduction

The intent of this document is to define the Work Tasks for the “Enhancements to Traffic Management/Monitoring” Study Item.

The following inputs from the SA Rel-19 workshop have been taken into account:

- SWS-230034 ZTE View on R19 content
- SWS-230060 SA Rel-19 scoping, Ericsson initial view
- SWS-230073 Apple’s views on Rel-19 topics in SA2

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## 2 Scoping

### 2.1 Work Tasks based on input to and outcome of the Workshop

The initial set of Work Tasks for discussion are based on the input to the workshop, SP-230759, and the following documents:

- SID: SP-231122 and PPT: SP-231121 (Ericsson, Apple): Study of MASQUE for Enhanced Traffic Management
- SID: S2-2307362 (Apple): Study on Enhancements to QoS framework
- SID: S2-2307211 (ZTE): Study on QoS Enhancements for supporting QUIC traffic

This corresponds to the “Traffic Management (Monitoring + MASQUE + QUIC)” topic listed in SP-230759 from SA#100.

Based on the above documents, the initial set of Work Tasks are as follows:

**WT-1:** Study whether and how to use the MASQUE capabilities in the 5GC user plane for improved traffic management (i.e. generalize beyond ATSSS, to single-access PDU Sessions). This includes the following aspects (based on SP-231122):

- **WT-1a:** The relevant information to be exchanged between UE and UPF on fully encrypted traffic for use with traffic management (e.g. QoS, and charging) in 5GC.
- **WT-1b:** The information that needs to be provided to the UE to use MASQUE capabilities in the 5GC user plane, e.g. MASQUE proxy address.
- **WT-1c:** Enhancements in the PCC framework, if any.
- **WT-1d:** Study whether the information identified in WT-1a can be used for other 5GC functions, e.g. reporting of user plane data as input to analytics.

#### Assumptions for WT-1:

- The solutions should consider user plane transmission efficiency.
- The solutions should not be limited to work with QUIC traffic. They should work on all type of MASQUE deployments i.e. one or two-proxies, where the second proxy is run by a third party that is deployed on the DN.
- HR roaming scenarios are out of scope.
- If any extensions are needed on top of IETF MASQUE WG RFCs, they should preferably be described in 3GPP so that they can be candidates for MASQUE extensions defined in IETF.

#### WT-2: Enhancements for traffic multiplexing in QUIC:

- **WT-2a:** The objective of this work item is to study whether and how to enhance the 5G system to identify the QUIC traffic and provide QoS handling at QUIC connection granularity. (based on S2-2307211)
- **WT-2b:** Study whether and how to enhance the 5GS QoS framework including the Packet Filter Set definition and Packet Flow Description to be able to identify QUIC streams and provide differentiated QoS for different QUIC streams within the same PDU session. Proposed solutions shall be based on IETF protocols or extension of such protocols, if available in IETF. (based on S2-2307362)
- **WT-2c:** Study how to enhance Reflective QoS to create packet filters corresponding to the enhancements defined in WT-2a and WT-2b. (based on S2-2307362)

#### WT-3: Enhancements for Reflective QoS (based on S2-230736):

- **WT-3a:** Study whether and how to relax the per-packet processing requirements for Reflective QoS so that the UE can sustain higher throughput for the SDF.
- **WT-3b:** Study whether and how to extend the UE capability signalling for Reflective QoS to indicate ability to handle different transport protocols.

## 2.1 Relation to already approved SIDs

The moderator has identified a potential overlap with an already approved SID: 5GS XRM Phase 2 (SP-231198) includes a WT#2 that addresses QoS handling enhancements for XRM services. More specifically:

”WT#2.1 Study whether and what enhancements are needed for traffic detection and QoS Flow mapping for different media types multiplexed data flows within a single end-to-end transport connection.”

The now proposed “WT-2: Enhancements for traffic multiplexing in QUIC” in this document intends to study enhancements for two specific ways of multiplexing data flows within a single end-to-end transport connection. The objective potentially overlaps with that of XRM Phase 2 WT-2, which addresses the issue in a more generic way.

## 2.1 Work Task Feedback Forms

The following Feedback forms are intended to capture company input on whether a work task should be in the scope of Rel-19, and can also be used eg to provide input on whether a work task can be merged with another, propose re-wording of the work task, or propose that a WT-X should be part of another study/work item.

### **Feedback Form 1: Should WT-1 (WT-1a, WT-1b, WT-1c, WT-1d) be in the scope of Rel-19?**

<p><b>1 – MediaTek Inc.</b></p> <p>WT-1 can be considered in scope of Rel-19.</p>
<p><b>2 – China Mobile Com. Corporation</b></p> <p>WT-1a should be removed, since this is overlapping with XRM-Ph2 WTs. And XRM-Ph2 will start the work to discuss this topic in Q3.</p>
<p><b>3 – ZTE Corporation.</b></p> <p>WT#1 seems to be solution oriented. More justification is needed to clarify what is the issue, considering that the encrypted traffic handling will be addressed in XRM_Ph2.</p>
<p><b>4 – Nokia France</b></p> <p>Providing from the UE to the PSA UPF some form of information of the application that is running on an IP flow is *of course* interesting. But this objective should made more crisp: Aim is to provide assistance information from UE to UPF to enable traffic differentiation, e.g. allowing to apply differentiated service delivery/QoS even <u>when the traffic is ciphered end to end</u>.</p> <p>About the use of <u>both</u> the ingress and egress proxy, the latter in the DN, this needs further clarification. What is the use case behind? Hiding the target address of the user traffic for privacy reason can of course be considered but some applications know much more about the privacy of the end user .... This kind of deployment implies that a double header size (HTTP3/QUIC, UDP and MASQUE) which may be costly over radio and create MTU issues over N3 and N9.</p>

There is potential overlap between this WT-1 and the \*approved\* XR study (i.e. WT1.2 in XR SID). Do we need a separate SID for this activity?

#### **5 – Qualcomm CDMA Technologies**

A few aspects are missing that also need to be studied: subscription control for use of MASQUE for traffic management, how to handle capability aspects (UE and NW support of the feature, etc.), how the network can influence/control which information the UE provides to the UPF.

The assumption "The solutions should not be limited to work with QUIC traffic." is too generic. It should be clarified which other traffic types are to be studied. Also, the wording of the WT should be updated so that it is an exhaustive list of sub-work tasks ("includes the following" is too open).

#### **6 – Huawei Technologies France**

- Firstly as commented at Sep plenary, MASQUE is kind of solution and not the problem to be resolved, any texts related to MASQUE has to be removed.

- Secondly the target of WT#1 is not clear, as commented at Sep plenary as well. If the intent is to identify encrypted traffic then it overlaps with WT1.2 of XRM, we didn't see the value to do similar study in two SIDs in parallel. For reporting user data for analytics, it is unclear what kind of data and scenarios it is going to address.

- Thirdly if there is intention to request the UE to provide application level information to the network for QoS and Charging purpose, then we see issues with user privacy since the user may be reluctant to expose the application he/she is accessing. Further the network cannot trust and rely on the UE to provide the application information for QoS control and charging.

In short, we don't see the need to do the study as described in this WT.

#### **7 – Ericsson LM**

We support WT-1 to be included in Rel-19. The "traditional" traffic differentiation for traffic managements of MBB traffic is challenged by Initiatives like encrypted client-hello, encrypted DNS and usage of CDNs, or over the top Relay services. Encryption and new types of deployments make classification (even L3-based) very hard. This problem is not part of the XRM agreed scope. XRM addresses different problems: XRM WT1.2 addresses the specific problem of PDU Set identification for PDUs in the DL on N6, and XRM WT#2.1 the specific case of multiplexed data flows within a single end-to-end transport connection.

#### **8 – Dish Network**

Yes, it's an interesting topic.

#### **9 – Ericsson LM**

We support WT#1 when it assumes MASQUE for this WT. With this approach, the WT needs a very low number of TUs; MASQUE is already supported in 5GC and it has already been studied.

**10 – Apple Distribution Intl Ltd**

We support WT#1 in the context of MASQUE. As MASQUE is already supported in 5GC and it has been already studied for MA PDU, we can re-use and generalize such previous work for single-access PDU Sessions. For the statement on "solutions should not be limited to work with QUIC traffic", it needs to be clarified what else is in scope, if any.

**Feedback Form 2: Should WT-2 (WT-2a, WT-2b, WT-2c) be in the scope of Rel-19?**

**1 – MediaTek Inc.**

WT-2a and WT-2b can be merged. Strong motivation for the study should be justified.

WT-2c already discussed in the past releases. Improving Reflective QoS is not feasible at this Stage of 5G cycle.

**2 – ZTE Corporation.**

Agree WT-2a and WT-2b can be merged. We support to study it in R19 since more and more applications are using QUIC traffic and 5GC should provide more granularity QoS handling for QUIC traffic.

**3 – Nokia France**

Isn't WT2 a bit of a subset of WT1 ? (would appear of lower priority than WT1)

In general, this WT2 appears to be of a lower priority when compared to other SIDs (while R19 will be overloaded)

**4 – Qualcomm CDMA Technologies**

In our view this WT is not needed since this work can already be addressed as part of WT#2.1 of the approved FS\_XRM Ph2 study.

**5 – Huawei Technologies France**

For WT#2, we could understand the intent, but it overlaps with WT2 in XRM SID, especially with WT2.1. Similarly, we don't think it is the right way to do the same study in two SIDs at the same time. It is better to wait for XRM study and then see what's missing.

We propose study issues of WT-2 under XRM Ph2.

**6 – Ericsson LM**

WT#2 overlaps with XRM Phase 2 WT#2.1. In this particular case, QUIC streams/connections are used to multiplex data flows with different QoS needs in the same end-to-end transport connection.

**7 – Apple Distribution Intl Ltd**

We support WT#2 and agree WT-2a and WT-2b can be merged. XRM Phase-2 WT#2.1 is in the context of XRM traffic and there is no mention of QUIC there. This is a generic WT focusing on traffic multiplexing

specifically in QUIC. If the 2 WTs produce similar / overlapping solutions, corresponding conclusions can reflect that.

WT-2c is also needed to reflect the results of WT-2a/WT-2b for Reflective QoS.

**Feedback Form 3: Should WT-3 (WT-3a, WT-3b) be in the scope of Rel-19?**

**1 – MediaTek Inc.**

Same comment as WT-2c. Improving Reflective QoS is not feasible at this Stage of 5G cycle.

**2 – Nokia France**

While we do not see much support of the baseline feature, and R19 will be overloaded, it is questionable whether we should be spending time on this activity that requires baseline UE changes in one of the last release of the Generation.

in short In general, this WT3 appears to be of a lower priority when compared to other SIDs (while R19 will be overloaded).

**3 – Qualcomm CDMA Technologies**

On WT-3a: Even though we agree on the underlying issue we are not sure it is worth studying this again given that it has been discussed before without conclusion.

**4 – Huawei Technologies France**

For WT#3 about optimization on reflective QoS, we propose proceed it separately as TEI19.

**5 – Apple Distribution Intl Ltd**

We support WT#3. Solution was proposed for this problem as TEI18 (S2-2204191/S2-2206944/S2-2206946) but it was not accepted (Huawei suggested to do a proper Rel-19 study instead of TEI18).

## 2.2 Additional Work Tasks

As well as the initial set of Work Tasks in section 2.1 companies can request to add additional Work Tasks. The naming of these additional Work Tasks should follow the format: WT-company name-# (eg WT-Samsung-1) so that other participants can reference them.

**Feedback Form 4: Are there any additional Work Tasks that should be part of Rel-19?**

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### 3 Additional comments

Any additional input can be provided here.

**Feedback Form 5: Additional comments**

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### 4 Moderator Summary

The following is a summary of the NWM discussion for the Traffic Management study item proposal in Rel-19. This also contains moderator proposals based on the feedback from all the forms.

In total 9 companies provided comments on one or more Work Tasks : Apple, China Mobile, Dish Network, Ericsson, Huawei, Mediatek, Nokia, Qualcomm, ZTE (companies listed in alphabetical order).

#### 4.1 WT-1

**WT-1:** Study whether and how to use the MASQUE capabilities in the 5GC user plane for improved traffic management (i.e. generalize beyond ATSSS, to single-access PDU Sessions).

**Summary of comments for WT-1:**

- 9 companies commented: Apple, China Mobile, Dish Network, Ericsson, Huawei, Mediatek, Nokia, Qualcomm, ZTE
- WT-1 has some level of support from 6 companies, and 1 company expressed no support:
  - General support: Apple, Mediatek, Ericsson, Dish Network
  - Support in the specific context of MASQUE: Apple, Ericsson
  - Constructive input on rewording: Nokia, Qualcomm
  - No support: Huawei
- Two companies expressed concern that WT-1 assumes MASQUE (Huawei, ZTE) while two companies expressed support for WT-1 specifically in the context of MASQUE (Apple, Ericsson).
- Two companies expressed concern due to overlap with XRM: CMCC, ZTE.

### **Moderator proposal for WT-1:**

- Keep WT-1 for further discussion.
- Keep scope limited to MASQUE, also to allow a limited number of TUs to be used.
- Update wording according to comments, e.g. to clarify supported protocols, need for capability exchange between UE and network, add aspects regarding user consent.
- Overlap with XRM\_Ph2 needs to be further discussed. Moderator understanding is that XRM WT#1 and WT#2 solve different problems than this WT-1. XRM addresses the specific problems of PDU Set identification for PDUs in the DL on N6, and the specific case of multiplexed data flows within a single end-to-end transport connection. This WT-1 is addressing traffic differentiation for traffic management in more general use cases when not possible by existing means due to encryption and new deployments.

## 4.2 WT-2

### **WT-2: Enhancements for traffic multiplexing in QUIC**

#### **Summary of comments for WT-2:**

- 7 companies commented: Apple, Ericsson, Huawei, Mediatek, Nokia, Qualcomm, ZTE
- 2 companies expressed support, 1 company indicated low priority, and 3 companies indicated no support:
  - Support: Apple, ZTE
  - Low priority: Nokia
  - No support (due to that topic is already covered by XRM WT#2): Qualcomm, Ericsson, Huawei
- 3 companies commented that WT-2a and WT-2b can be merged: Mediatek, ZTE, Apple.

### **Moderator proposal for WT-2:**

- Keep WT-2 for further discussion, but discuss whether it can be removed from this SID and solutions will be studied as part of XRM WT#2.
- Merge WT-2a and WT-2b.

## 4.3 WT-3

**WT-3:** Enhancements for Reflective QoS.

### **Summary of comments for WT-3:**

- 5 companies commented: Apple, Huawei, Mediatek, Nokia, Qualcomm
- 1 company expressed support, 1 company proposed to handle it as TEI-19, and 3 companies expressed no support:
  - Support: Apple
  - No support: Mediatek, Nokia, Qualcomm
  - Handle as TEI-19: Huawei

### **Moderator proposal for WT-3:**

- Remove WT-3 due to limited support.

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## 5 Moderator Proposal

Proposal 1: WT-1 is included in the SID. Discuss further on the scope and clarify whether there is overlap with XRM.

Proposal 2: Discuss whether WT-2 can be removed from this SID and solutions will be studied as part of XRM WT#2.

Proposal 3: WT-3 is not included in the SID. It can be submitted as TEI-19, if desired.