SA2 Rel-19 23Q3 moderated discussion - TSC/URLLC/TRS enhancements - Version 0.0.2

SA2

https://nwm-trial.etsi.org/#/documents/8584

Source: Moderator of TSC/URLLC/TRS enhancements

Title: SA2 Rel-19 23Q3 moderated discussion - TSC/URLLC/TRS enhancements

1 Introduction

There are 10+ companies showing interest on TSC/URLLC/TRS related topics and the starting points of the WTs are shown in SP-230759.

Table 1:

TSC/URLLC/TRS enhancements	1. User plane redundancy (packet replication, elimination and ordering function) at the UPF within the data network on N6; 2. DetNet controller outside of the 5GS, or a DetNet controller within the 5GS operated by the 3GPP operator URLLC enhancements 3. Capacity and latency performance improvement (e.g. avoid padding transmission) 4. Support BAT adjustment and survival time in UE-to-UE scenario 5. Native support for duplication redundancy Time synchronization enhancements: 6. Access Stratum based time synchronization enhancements for subscribed time synchronization coverage area for UEs in RRC_IDLE and RRC_INACTIVE. 7. Impact on connected mode mobility due to time synchronization service. 8. Support time synchronization service for ad-hoc cooperative group and service assurance for high accuracy time synchronization service 9. Improved TSC time sync (Smaller 5G time sync budget 700-800 ns with two (2) wireless links on the path of time synchronization messages) Mechanisms to support traffic with stringent latency, reliability or redundancy requirements in an optimized manner with network control: 1. 3GPP system-controlled replication procedure. 2. Selective duplication rules of low latency traffic; Multi-UE URSP rules to influence devices with two UE(s) for establishing one or two PDU Sessions for a certain application. Other: 1. Support integration of 5G VN and legacy LAN 2. How to enable support for dynamic routing among multiple SMF domains 3. How to enable support for SEI requirements that are not implemented in Rel-18, specifically exposure of specific information regarding UE status, as per the SA1 req 4. Sidelink support for TSC communication, including SNPN 5. Enhancements for 5GS as logical bridge (Support of netconf/YANG; Loop prevention/support of spanning tree protocols) 6. Distributed TSN Stream Establishment 7. Exposure enhancements (Access to Network Exposure Function (NEF) to be provided at the UE ** ADDED FROM TIMING AS A SERVICE NB-IoT and eMTC (both terrestrial and non-terrestrial) offer a significantly larger global coverage. However, NB-IoT and eMTC do not support timing as a service. Specifically, NB-IoT/eMTC do not support providing reference time selectively to UEs based on subscription information and do not support providing clock quality information to UEs. The objectives of this study are as follows: • WT#1: Study how to enable selective reference time and clock quality information delivery based on subscription for NB-IoT and eMTC (terrestrial and non-terrestrial) • Subscription enhancements in HSS for control of reference time delivery and control of clock quality delivery to the UE • MME enhancements to inform eNBs about need for reference time delivery and clock quality information delivery for

The contributions are SWS-230054, SWS-230068, SWS-230012, SWS-230015, SWS-230030, SWS-230036, SWS-230034, SWS-230035, SWS-230045, SWS-230058, SWS-230060, SWS-230031, SWS-230070. Besides, there are some proposals from SA2#157 for information on TSC/URLLC/TRS related topics: S2-2306440, S2-2307093, S2-2307358, S2-2307214, S2-2307216 and S2-2306675.

The following objectives/work tasks have been categorized based on the proposals. The Source Tdocs from the SA workshop are shown in the third column. The WTs with the same descrption or the same reference have been merged already. If the proposed objectives/work task are not the same wording as the Source Tdocs, the original texts are also shown in the third column.

NOTE: SWS-230015 and SWS-230068 show common interest on TSC/URLLC/TRS enhancements, e.g. "Continue work on Time Synchronization optimizations, and enhancements to support IIoT and applications with stringent latency, reliability or redundancy requirements" thus no specific WT refers to SWS-230015 or SWS-230068.

Table 2:

	Proposed objectives/work tasks	Source Tdocs in the SA workshop
1	**Time Synchronization enhancements**	
1.1	Access Stratum based time synchronization enhancements considering AF requested time synchronization coverage area and/or subscribed time synchronization coverage area for UEs in RRC_IDLE and RRC_INACTIVE.	**SWS-230036** **SWS-230054**
1.2	Impact on connected mode mobility due to time synchronization service.	**SWS-230036** **SWS-230054**
1.3	How to support time synchronization service for ad-hoc cooperative group and service assurance for high accuracy time synchronization service	**SWS-230035** **SWS-230045**

1.4	UE reporting internal inaccuracies for time synchronization service to be fulfilled.	**SWS-230054** See S2-2307358 (WT 1.3)
1.5	Study how to enable selective reference time and clock quality information delivery based on subscription for NB-IoT and eMTC (terrestrial and non-terrestrial) Subscription enhancements in HSS for control of reference time delivery and control of clock quality delivery to the UE MME enhancements to inform eNBs about need for reference time delivery and clock quality information delivery for individual UEs eNB support for delivery of reference time and clock quality information for individual UEs NOTE: The solution defined in Rel-18 for selective reference time and clock quality information	**SWS-230012**
1.6	Study how to support propagation delay compensation for NB-IoT and eMTC	**SWS-230012**
1.7	Smaller 5G time sync budget 700-800 ns with two (2) wireless links on the path of time synchronization messages.	**SWS-230070**
1.8	Time as a Service – GNSS backup	**SWS-230031**
2	**General URLLC enhancements**	

2.1	Support for 3GPP system-controlled (3GPP native) replication (e.g. FRER)	**SWS-230036** 3GPP system-controlled replication procedure. **SWS-230045** Native support for duplication redundancy **SWS-230054** See S2-2307358 (WT 2.1) **SWS-230034** Architecture enhancement to natively support the FRER in the 5GS.
2.2	How to improve efficiency of transmission capacity (e.g. avoid padding transmission)	**SWS-230035** Key Objectives from SIDs [S2-2307093, Huawei] and [S2-2307358/6851, Nokia] How to improve efficiency of transmission capacity and the URLLC performance (lower latency and higher reliability) in the industry scenario **SWS-230045** Capacity and latency performance improvement (e.g. avoid padding transmission)
2.3	Selective duplication rules of low latency traffic; Multi-UE URSP rules to influence devices with two UE(s) for establishing one or two PDU Sessions for a certain application.	**SWS-230036** **SWS-230054** See S2-2307358 (WT 2.2, WT 2.3)
2.4	Support BAT adjustment and survival time in UE-to-UE scenario	**SWS-230045**

2.5	Study on user plane redundancy for IP redundant paths in 5GS using multiple UEs (23.501 Annex F) or dual connectivity (23.501 clause 5.33.2.1); PREOF (packet replication, elimination and ordering function) at the UPF within the data network on N6; PREOF at the terminal device or at a host behind the terminal device; DetNet controller outside of the 5GS, or a DetNet controller within the 5GS operated by the 3GPP operator.	**SWS-230060**
2.6	Support the Industrial Ethernet topology and protocol, i.e. HSR/PRP	**SWS-230034**
2.7	Enhancements for 5GS as logical bridge, including Support of netconf/YANG. Loop prevention/support of spanning tree protocols Potential enhancements for, e.g. dynamic addition of new VN members, large numbers of VLANs/UEs, multiple VLANS/TSN streams per UE, multiple devices behind UE	**SWS-230070**
2.8	Interworking of 5GS with distributed protocols of IEEE 802.1 networks (e.g. LRP, RAP) in order to support deployments using distributed TSN stream establishment.	**SWS-230070**
3	**Side link related enhancement**	

3.1	Support stage 1 requirements for: Clock synchronization to a group of UEs via ProSe direct/indirect communication Support TSC communication via ProSe direct/indirect communication	**SWS-230058** Support stage 1 requirements for: • Clock synchronization to a group of UEs via ProSe direct/indirect communication • Support TSC communication via ProSe direct/indirect communication SWS-230030 Sidelink aspects, Pre-Rel-19 Stage1
3.2	Support Prose Direct/Indirect communication in private networks (SNPN, PNI-NPN)	**SWS-230058**
3.3	Support of direct device communication/NR sidelink communication with Industrial IoT (IIoT) KPIs for IIoT/factory applications in Standalone NPNs Support of direct device communication/NR sidelink for IIoT/-factory applications in standalone NPNs. Support of Industrial IoT (IIoT) KPIs over sidelink (99.999% communication service availability, 1-5 ms max latency, <1 µs time sync accuracy). 5G-VN support, unicast/multicast communication UE-to-UE Relay in case of limited transmission range	**SWS-230070**
4	**Generic group management, exposure and communication enhancements**	
4.1	How to support integration of 5G VN and legacy LAN, how to integrate 5GS and Ethernet configuration and IP routing support	**SWS-230035** How to support integration of 5G VN and legacy LAN, how to integrate 5GS and Ethernet configuration and IP routing support **SWS-230045** How to support integration of 5G VN and legacy LAN

4.2	How to enable support for dynamic routing among multiple SMF domains	**SWS-230035**
4.3	How to enable support for SEI requirements that are not implemented in Rel-18, specifically exposure of specific information regarding UE status, as per the SA1 requirements.	**SWS-230035**
4.4	Extended capability exposure framework to allow Application Function to discover, request or influence selective duplication, 5GS reliability and redundancy functionality.	**SWS-230054** See S2-2307358 (WT 2.4)
4.5	Enhancements for QoS Monitoring, including Provision of 5G communication services end-to-end within 5GS Further QoS monitoring enhancements (functionalities, additional parameters)	**SWS-230070**
4.6	Enhancements for Network Exposure, including Access to Network Exposure Function (NEF) to be provided at the UE (provide NEF access via UE's R reference point to an application, Provide AAA framework that bars unauthorized requests to NEF (fine-grained).	**SWS-230070**

2 Scoping

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

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

WT-1: Time Synchronization enhancements

https://nwm-trial.etsi.org/#/documents/8584

WT-1.1: Access Stratum based time synchronization enhancements considering AF requested time synchronization coverage area and/or subscribed time synchronization coverage area for UEs in RRC_IDLE and RRC_INACTIVE.

WT-1.2 Impact on connected mode mobility due to time synchronization service.

WT-1.3 How to support time synchronization service for ad-hoc cooperative group and service assurance for high accuracy time synchronization service

WT-1.4 UE reporting internal inaccuracies for time synchronization service to be fulfilled.

WT-1.5 Study how to enable selective reference time and clock quality information delivery based on subscription for NB-IoT and eMTC (terrestrial and non-terrestrial)

- Subscription enhancements in HSS for control of reference time delivery and control of clock quality delivery to the UE

- MME enhancements to inform eNBs about need for reference time delivery and clock quality information delivery for individual UEs

- eNB support for delivery of reference time and clock quality information for individual UEs

NOTE: The solution defined in Rel-18 for selective reference time and clock quality information

WT-1.6 Study how to support propagation delay compensation for NB-IoT and eMTC

WT-1.7 Support for smaller 5G time sync budget 700-800 ns with two (2) wireless links on the path of time synchronization messages.

WT-1.8 Support for Time as a Service – GNSS back-up

********WT#1 is derived from SP-230759, and SWS-230036, SWS-230054, SWS-230035, SWS-230045, SWS-230012, SWS-230070, SWS-230031********

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WT-2: General URLLC enhancements

WT-2.1 Support for 3GPP system-controlled (3GPP native) replication (e.g. FRER).

WT-2.2 How to improve efficiency of transmission capacity (e.g. avoid padding transmission)

WT-2.3 Selective duplication rules of low latency traffic; Multi-UE URSP rules to influence devices with two UE(s) for establishing one or two PDU Sessions for a certain application.

WT-2.4 Support BAT adjustment and survival time in UE-to-UE scenario.

WT-2.5 Study on user plane redundancy for IP:

- Redundant paths in 5GS using multiple UEs (see TS 23.501 Annex F) or dual connectivity (see TS 23.501 clause 5.33.2.1);

- PREOF (packet replication, elimination and ordering function) at the UPF within the data network on N6;

- PREOF at the terminal device or at a host behind the terminal device;

- DetNet controller outside of the 5GS, or a DetNet controller within the 5GS operated by the 3GPP operator.

WT-2.6 Support the Industrial Ethernet topology and protocol, i.e. HSR/PRP.

WT-2.7 Enhancements for 5GS as logical bridge, including

- Support of netconf/YANG.

- Loop prevention/support of spanning tree protocols

- Potential enhancements for, e.g. dynamic addition of new VN members, large numbers of VLANs/UEs, multiple VLANS/TSN streams per UE, multiple devices behind UE

WT-2.8 Interworking of 5GS with distributed protocols of IEEE 802.1 networks (e.g. LRP, RAP) in order to support deployments using distributed TSN stream establishment.

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********WT#2 is derived from SP-230759, and SWS-230036, SWS-230045, SWS-230054, SWS-230034, SWS-230035, SWS-230060, SWS-230070********

WT-3: Side-link related enhancement

WT-3.1 Support stage 1 requirements for:

- Clock synchronization to a group of UEs via ProSe direct/indirect communication.

- Support TSC communication via ProSe direct/indirect communication.

WT-3.2 Support Prose Direct/Indirect communication in private networks (SNPN, PNI-NPN).

WT-3.3 Support of direct device communication/NR sidelink communication with Industrial IoT (IIoT) KPIs for IIoT/factory applications in Standalone NPNs

- Support of direct device communication/NR sidelink for IIoT/factory applications in standalone NPNs.

- Support of Industrial IoT (IIoT) KPIs over sidelink (99.999% communication service availability, 1-5 ms max latency, <1 µs time sync accuracy).

- 5G-VN support, unicast/multicast communication.

- UE-to-UE Relay in case of limited transmission range.

********WT#3 is derived from SP-230759, and SWS-230058, SWS-230070********

WT-4: Generic group management, exposure and communication enhancements

WT-4.1 How to support integration of 5G VN and legacy LAN, how to integrate 5GS and Ethernet configuration and IP routing support.

WT-4.2 How to enable support for dynamic routing among multiple SMF domains.

WT-4.3 How to enable support for SEI requirements that are not implemented in Rel-18, specifically exposure

of specific information regarding UE status, as per the SA1 requirements.

WT-4.4 Extended capability exposure framework to allow Application Function to discover, request or influence selective duplication, 5GS reliability and redundancy functionality.

WT-4.5 Enhancements for QoS Monitoring, including

- Provision of 5G communication services end-to-end within 5GS.

- Further QoS monitoring enhancements (functionalities, additional parameters).

WT-4.6 Enhancements for Network Exposure, including

- Access to Network Exposure Function (NEF) to be provided at the UE (provide NEF access via UE's R reference point to an application.

- Provide AAA framework that bars unauthorized requests to NEF (fine-grained).

********WT#4 is derived from SP-230759, and SWS-230035, SWS-230045, SWS-230054, SWS-230070********

Feedback Form 1: Which of the above Work Tasks should be in scope of Rel-19?

1 – VODAFONE Group Plc

WT1.5 and possibly WT 1.6 -> Many customers for "timing as a service" will require a wide geographic availability of this service and hence will adopt a non-3GPP solution (e.g. see Hellen Systems) unless 3GPP can provide "full coverage".

As many parts of the world (e.g. Africa - due to high cost of NR devices compared to [second hand] LTE devices) are very likely to have incomplete NR coverage it is important that "timing as a service" is also available in normal LTE (WB-EUTRAN) EPC coverage as well as NR-5GC coverage. Study on the use of IoT-NTN to provide this timing service would also be interesting.

2 – Nokia Corporation

Following is our view, we segregate WT into three groups; WTs that we support, WTs that we okay with (nice to have), WTs that we prefer to de-prioritize.

WTs that we support

WT-1.1, WT-1.4, WT-2.3

WT-2.1

Additionally for this WT, we recommend rewording to the following text

Support for 3GPP system-controlled (3GPP native) replication (e.g. FRER).

- Replication and elimination performed within 3GPP system for a single registration, two different PDU Sessions for a single UE.

- Replication and elimination performed within 3GPP system for two different PDU Sessions, one per UE, assuming UE is independently registered.

- Ability to trigger replication is within the 3GPP system, protocol aspects to replicate/eliminate.

- Extended capability exposure framework to allow Application Function to discover, request or influence selective duplication, 5GS reliability and redundancy functionality.

WTs that we are ok with (nice to have)

WT-1.2, WT-1.3, WT-2.4

WT-1.7 existence must be decided based on feasibility to support this accuracy over NR, if it is mainly about Uu error budget considering UE-UE (two wireless link) aspect, then this is ok to specify in SA2 directly however if there is additional RAN1 impact to support better accuracy, then the decision to support this must be based on RAN1 feedback thus the decision may belong to TSG RAN.

WT-2.2

For DL, the current compression techniques in 3GPP are only for header compression. However, for UL, there is UL data compression available. So, we would like to understand if the proposal is to extend this to Downlink or looking for an efficient solution specific for Ethernet or other protocols. Otherwise, we would like to support this WT.

WT-2.5

Study on user plane redundancy for IP:

- Generic replication/elimination

Also we propose this to be merged to WT-2.1

WT-3

We in general are okay with the side link aspects, however, prefer to have the other time synchronization aspects prioritized above these.

WTs that we prefer to de-prioritize

WT-1.5 and WT-1.6:

Existence of these two WT must be decided only based on TSG RAN support for Time Sync in NB-IoT and eMTC.

WT-1.8

Release 18 supports GNSS back-up (timing resiliency), exact delta must be clarified.

WT-2.6

Considering huge # of WTs (and lack of market uptake in this area), we recommend that this is NOT a priority.

WT-2.7

Considering huge # of WTs (and lack of market uptake in this area), we recommend that this is NOT a priority.

WT-2.8

Do not prefer this WT to be part of Rel-19. Our understanding is that IEEE TSN work is not yet ready to support to have the same made available in the 3GPP.

WT-4

We do NOT prefer that these WTs be part of Rel-19.

3 – Ericsson Hungary Ltd

Ericsson view on WT-2 and WT-4:

WT-2.1: We support this WT if the solution is extensible end-to-end. There is a benefit for operators to provide 5GS controlled redundancy, but only if this can be integrated into system solutions that may span further over the end to end path. There is no need for yet another redundancy solution that is completely 3GPP specific and cannot integrate with other IETF protocols e2e. That is because redundancy is best provided end to end; if redundancy solutions are limited to single hops in the end to end path, they are not so efficient. For customers that require redundancy for their critical infrastructure, they want to avoid points of failure that would occur if redundancy is terminated at the 5GS boundary unnecessarily. Therefore, we think WT-2.1 should be merged with WT-2.5.

WT-2.2: We do not support this WT. Such general, not well specified WT should be avoided. If efficiency of transmission is required, the motivation should come from RAN first as a result of a RAN study.

WT-2.3: This WT suggestion should rather be considered as a potential solution for WT-2.1, we do not support it as a separate WT.

The concept of multe-UE URSP rules appears like a solution, which may be part of the study as a company proposed solution for WT-2.1. Could also be considered as merged into WT-2.1.

WT-2.4: We do not support this WT.

There is no sufficient market adoption behind these technologies.

WT-2.5: We support this WT.

This WT can be merged into WT-2.1. The same solution framework should be able to work both within the 5GS, or possibly span outside of 5GS, if possible e2e. Redundancy is best performed end to end for critical infrastructure.

WT-2.6: We do not support this WT.

The plethora of filedbuses resulted in a plethora of descendent Ethernet-based (aka real-time Ethernet) solutions, most of them have their own consortia. It is not beneficial for 3GPP to enter such market fragmentation, especially in the era of network convergence. The direction industrial automation is going is that IEEE 802.1 Time-Sensitive Networking TSN is becoming the common denominator for the various real-time Ethernet solutions, which is reflected by, e.g., the IEC/IEEE 60802 TSN Profile for Industrial Automation. 3GPP already supports TSN since Release 16. The various consortia have their own solution for their own real-time Ethernet over TSN. Therefore, 3GPP should not enter standardization effort specific to either of the real-time Ethernet variant.

WT-2.7: We do not support this WT.

Topics in this WT appear to be general enhancements for all traffic (also best effort), not clear why they are put under URLLC. The current description is too vague, not sufficient to understand the study proposal.

WT-2.8: We do not support this WT.

RAP will not be an approved standards in time for Release 19; therefore, the Release 19 3GPP standards will not be able to refer to it. The P802.1Qdd RAP project is still at an early phase with significant technical gaps. P802.1Qdd is still at Task Group ballot, which is the first review stage, to be followed by Working group ballot and then IEEE Standards Association ballot. We also do not see sufficient market interest.

WT-4: We do not support the WTs listed under WT-4. There is no sufficient explanation and justification, and we do not see sufficient market demand for these solutions at this time.

4 – Qualcomm CDMA Technologies

From our perspective only work tasks 1.5 and 1.6 should be in scope of Rel-19.

We do not support the other WTs for the following reasons:

WT-1.1 points at (de)activating SIB9-based time delivery based on requested coverage area. This was discussed in Rel-18 and for Rel-18 it was concluded to support coverage area for time synch for RRC-based time delivery. It is not clear what has changed and why this would need to be reopened.

WT-1.2: It is not clear to us which issue needs to be solved for mobility with time synchronization.

WT-1.3: Nothing is missing to support ”Time synchronization service for ad-hoc cooperative group” as 5GS already supports creating PTP instances on UEs and the network dynamically. For ”high accuracy”: what of this is in SA2’s scope? This aspect seems to be targeting RAN.

WT-1.4: This was concluded to not be needed in the previous release because the client network budgets all inaccuracies in the UE and behind the UE. Letting the UE report its own error is not going to help because the client network still needs to budget all other errors behind the UE in order to determine which accuracy is needed from the network. In industrial setups. This was a conscious decision in the previous release. No new requirements have been agreed, hence there is no need to reopen this.

WT-1.7: We are not aware of any SA1 requirement to support 700-800ns synch budget. Also, none of this this seems to be actionable in SA2.

WT-1.8: WT is not needed since this is what has been already addressed in Rel-18.

WT-2.1: Replication functionality can be kept outside 5GS, i.e. can be supported by Ethernet switches that support FRER that are deployed in on the UE-side network or the UPF-side network. It is specifically not useful to specify a 3GPP ”home-grown” replication solution as proposed in 0036) because then the replication only covers the 3GPP network but the replication may also be needed in wired parts of e.g. a factory network. A 3GPP home-grown solution naturally cannot support that.

WT-2.2: The wording it too generic (”e.g.”) but in general we do not see a strong for this optimization.

WT-2.3: We don’t see the need to work on this since there is no need to support replication protocols in 5GS directly as they can run on top of 5GS. The proposal to support this for ”certain applications” is also not clear since these redundancy features are not needed for applications running on a UE but for traffic from/to devices behind the UE.

WT-2.4: We do not see a use case for BAT adjustment for UE-to-UE scenario. For survival time we do not see the need for enhancements for UE-to-UE scenarios. This proposal was already discussed for Rel-18 and was rejected because frame loss can also happen on wired parts of the network and cannot be detected by the RAN (even if only a single wireless link is involved).

WT-2.5: PREOF (Packet Replication, Elimination and Ordering Function) can be kept outside 5GS and still be managed by an operator DetNet controller and offered as an operator service.

WT-2.6: HSR is essentially using Ethernet frames with a specific EtherType and can hence run on top of the 3GPP system, no need to specify further integration with 5GS. PRP requires two completely separate networks from source to sink (frames are replicated by the source and received by the sink). There is nothing specific for 5GS to do to support this.

WT-2.7:

- Support of NetConf/Yang: Details of protocols supported by TSN AF were considered out of scope of 3GPP in the past. NetConf/Yang can be supported by TSN AF already but this is up to TSN AF implementation. The benefit of mandating certain protocols is not clear since the related functionality is anyway not subject to 3GPP RAN5 compliance testing.

- Loop prevention/support of spanning tree protocols: This was discussed in earlier releases, but companies could not agree. What has changed? In general it could be left to UPF implementation in our view.

WT-2.8: Distributed model work in IEEE (RAP, etc.) is still on task group level, i.e., not ready yet to start work in 3GPP for this.

WT-3 (all sub work-tasks): ProSe/sidelink is not a realistic alternative to a planned base station deployment in automation deployments where reliability requirements are high.

WT-4.1: 5G VN and legacy LAN integration can be supported by various types on tunneling protocols that are available from IETF and typically implemented on UPFs. Nothing further is needed for this in our view.

WT-4.2: This has been studied in Rel-18 and companies could not agree on a solution. There is no point doing the same study again now.

WT-4.3: This has been studied in Rel-18 and companies could not agree on further SEI aspects. There is no point doing the same study again now.

WT-4.4: This is not a stand-alone WT but related to WT-2.1. As indicated for WT-2.1, we do not consider this useful (see reply for WT-2.1 for further details).

WT-4.5: This is very open-ended. From the WT description it is not clear what is missing.

WT-4.6: The need for the UE to access NEF services is not clear. NEF security is in scope of SA3.

5 – MediaTek Inc.

The following sub-task in WT-1 should be deprioritized from Rel-19

WT-1.1: this is implement-specific issue, not general problem for Rel-19

WT-1.2: this is not clear what kind of mobility is mentioned here

WT-1.3: this is not clear what the ad-hoc cooperative group is and what service assurance is needed for what kind of service

WT-1.4: this is not clear why UE needs to report internal inaccuracies

WT-2 (all sub-tasks) should be deprioritized from Rel-19 scope

The existing URLLC mechanisms (specified in clause 5.33.2) can work to support reliable transmission for URLLC traffic

WT-3 (all sub-tasks) should be deprioritized from Rel-19 scope

For supporting TSC communication, time sync is critical. side-link cannot ensure the time sync accuracy and deterministic.

6 – Ericsson LM

On WT#1 and its subtasks, for WT1.5, this needs to be discussed together with RAN whether continued evolution to EPS/LTE is still desirable and beneficial. Rest of the WTs we do not see clear requirements or well described why the work is needed and as such we do not see any urgency to address them in Rel-19 nor in many cases that there needs to be any 3GPP work, some explanation already provided by Qualcomm.

On WT#3 and subtasks, we do not see any benefit nor requirements to include this work. In addition, some are not really in scope of the topic either.

7 – Motorola Mobile Com Technology

Lenovo supports WT3 and its sub-work tasks.

There are stage 1 requirements for supporting ProSe (sidelink) communication for cyber-physical control application since Release 17 in 3GPP TS 22.104. Such requirements have not been addressed in stage 2. There were also relevant discussions between 5G-ACIA and 3GPP SA/RAN (SP-221302, SP-221322, RP-230724).

To concerns raised that sidelink cannot meet the latency requirements:

- Lenovo's view is that the clock synchronisation requirements can be supported by the existing PC5 QoS framework.

- RAN can additionally carry out a feasibility study to introduce URLLC for sidelink.

This work task is self-contained and can be treated separately to other WTs (e.g. a separate study/TEI work).

8 – HuaWei Technologies Co.

Huawei view on WT-2 and WT-3:

- WT 2.1, 2.2 and 2.4 should be in the scope of R19 SID.
    - WT 2.1 gives 3GPP the capability to support replication without relying on application layer. This is required as not all the
    - WT 2.2 is to support more UEs with URLLC/TSC services in general. OK to reword it to focus on specific aspects. The typical scenarios could be 1) There could be lots of paddings in Ethernet Frames and padding do not bring any information. Transferring them will not bring values but it will have big impact on the capacity, i.e. some part of the payload are not necessary to be transferred within 5GS. 2) The payload of the industry services will not change frequently and the same payload is just for keeping the service alive and will not bring any new information. Transferring them will not bring values but it will have big impact on the capacity, i.e. some of the payload are not necessary to be transferred within 5GS. 3) When the application does not need duplication transmission, the duplication mechanism in 5GS will just waste the resource. Transferring the duplicated packets will not bring values but it will have big impact on the capacity, i.e. it is not necessary to always transfer the service twice within 5GS. So, it is proposed to reword it as "Support for avoid transferring unnecessary payloads or duplicated transmission in 5GS to improve the efficiency of transmission capacity". Thus, WT 2.3 can be merged into WT 2.2. Hope this also answer some questions above.

- WT 2.5 implies a solution with a special protocol of WT 2.1. It can be merged into 2.1.
- WT 2.6 seems like to support loop related protocols, it could be considered in WT4 on interworking with legacy LAN.
- WT 2.7 needs more clarification. Some of the issues seem already been solved when 5GS is a bridge, i.e. CNC will manage the bridge based on IEEE specs. Some of the issues perhaps can be merged into WT#4 after clarification.
- WT 2.8 could be considered as low priority.

- WT 3 is not fully in the scope of TSC, e.g. the support of NPN for PC5. There is also related discussion in ProSe. Need to avoid duplicated discussion.

9 – HuaWei Technologies Co.

- Feedback to above comments on WT 2.4
  - WT 2.4 is focusing on UE2UE scenario. In the real deployment, the proportion of UE2UE scenario is about 20%. In R18, we have also discussed this UE2UE support for DetNet. S2-2307093 shows the rationale: For BAT adjustment in the UE2UE scenario, if the RAN(s) provides the feedback (e.g. BAT offset) independently, the gap between the two RANs may not be synchronized, and thus the adjustment cannot be performed correctly. For Survival Time in the UE2UE scenario, it is unclear how the RAN node(s) coordinate the packet loss, especially the packet is lost in the second air interface. For the packet loss in wire network, it is out of 3GPP scope.

10 – Samsung Electronics Co.

WT-4 : We do prefer that these WTs be part of Rel-19, as many SEI compaines also want as described in SWS-230064.

11 – Huawei Technologies France

Huawei view on WT-1 and WT-4: for WT-1, 1.1, 1.2, 1.3. 1.4 are essentials to be in scope of Rel-19, for WT-4, 4.1, 4.2 are essentials to be in scope of Rel-19

- WT 1.1 The WT is leftover from R18, and its motivation is to optimize the area the PLMN needs to provide the timing service, considering the UE connectivity. The WT is essential.
- WT 1.2 TConsidering not all gNB in the PLMN will be upgraded to support timing service, it is possible a UE may not be able receive timing service after handover to another PLMN. The WT is to study timing service endurance due to UE mobility. The WT is essential.
- WT 1.3 This WT is justified by SA1 work “SOBOT”. It extends the timing service use case to industrial area, which is important for timing service business. The WT is essential.
- WT 1.4 The WT is leftover from R18, which is useful to further improve the timing service accuracy. Considering more stringent E2E accuracy (e.g. 250ns for smart grid) was proposed for R18, the internal inaccuracy of nodes cannot be ignored. The WT is essential.

- WT 1.5 TWritten in TS 36.331, it is supported by SIB16-NB to broadcast reference time info, which means an NB-IOT UE can receive time information from network already. However, it is not clear what accuracy is expected to achieve for this WT. This is very important because the sub-bullets are all aiming for a high accuracy purpose. For example, PDC. The network control (subscription aspect) only makes sense for high-accuracy timing service, because the "free to have" option via SIB is already possible. The WT is NOT essential without the clarification on the timing service accuracy
- WT 1.6 Same comment as for the previous WT. PDC is used to achieve a better / higher accuracy, so the question is what accuracy is required? The WT is NOT essential without the clarification on the timing service accuracy.
- WT 1.7 Needs to check with RAN R17 conclusion what the current accuracy can be achieved for two wireless link.
- WT 1.8 The WT is too general to work on. The objectives should be covered by WT 1.5. The WT is NOT essential.

- .WT 4.1 aims to enable 5G VN integrate with legacy LAN (including Ethernet LAN or L3 sub-network, either on UE side or DN side), in order to achieve this, it needs to study:

  1) Integration architecture: e.g. cross-site tunnel (between UPFs, between UPF and router in local DC) establishment and release, QoS provisioning and monitoring for cross-site tunnel, intelligent traffic steering on cross-site tunnel, exposure for reporting and configuration mapping

  2) Management of the DN side devices and the UE side devices as 5G VN group members in order to enable the 5GC be aware of the existing of the devices in the legacy LAN so to control the traffic routing for such devices in the group communication

  3) Support loop-free Ethernet topology in the case of Ethernet PDU Sessions

  4) Extended capability exposure via NEF about 5G capabilities to fulfil the request of industrial Application Function
- WT 4.2 This objective can be merged with 4.1 after listing the details of WT4.1
- WT 4.3 In general, this objective can be merged with 4.1 exposure enhancement. But firstly it is not clear what the specific information regarding UE status needs to decide case by case when the information is clear.
- WT 4.4 This objective is related with WT#2, can move to WT#2
- WT 4.5 1st sub-bullet can be merged as part of the for Extended capability exposure in WT#4.1, 2nd bullet is not clear what other enhancements it refers to
- WT 4.6 This objective can be merged with 4.1

12 – CICT

[From CATT]

WT-1.1, WT-1.2, WT-1.3, WT-3.1 should be in the scope of Rel-19.

WT-1.1 and WT-1.2 are essential enhancements based on Rel-18.

WT-1.3 and WT-3.1 are the requirements from SA1.

For WT-3.1, it may be a big topic to study. We prefer to study "Clock synchronization to a group of UEs via ProSe direct/indirect communication" in Rel-19. And the other aspect can be deprioritized.

WT- 2.1 is ok to be included if time permits.

WT-2.5 can be merged into WT-2.1.

13 – Nokia Corporation

We would like to additionally comment on section 4

WT-4: We consider that these WT(s) shall not be part of Rel-19.

(WT-4.4 is already recommended to be merged with WT-2.1 with the reworded text shared)

WT-4.1 Our comments remain the same that we recommend this is not part of Rel-19. This is DN architecture defined in IETF/IEEE and is not required by 3GPP to engage on this front.

WT-4.2 has already been **concluded as part of R18** that due to the very high complexity of the dynamic control of connections between UPFs controlled by different SMF (sets) when static control is already enabled, the whole feature of 5G VN groups is still trying to take off.

WT-4.3 We would like to have more precision on what are the gaps.

14 – Beijing Xiaomi Mobile Software

We Support WT 2.1 and 2.2, and WT-2.4 as the high priority WTs in the scope of Rel-19.

15 – Nubia Technology Co.

(from ZTE)

•Support WT#1.1, #1.2

- WT#1.3 check whether the exist mechanism has already covered this

- WT#1.4, similar with Qualcomm

- WT#1.7, SA1 requirement is 1 µs between the sync master and any sync device of the clock domain. Check if existing spec has already support this subWT.

- WT#1.8, WT#1.8, need to clarify what is not covered by TRS/URLLC KI#1.

•Support WT#2.1, #2.3, #2.5, #2.6 (#2.1, #2.3, #2.5 can be merged into one general 3GPP enabled packet replication/ elimination)

- WT#2.7 merged into #4.1

- WT#2.2/#2.4/#2.8, not essential in the R19.

•WT#3, nice to have, but let RAN discuss and make decision first.

•Support WT#4.1, #4.2, #4.4

- WT#4.4 merged into WT#2.1

- WT#4.3, #4.5, #4.6 not essential in the R19.

16 – China Unicom

WT-2.4 should be in the scope of Rel-19 study.

For 5G practical deployment in IIoT, UE2UE scenario is one of the high interested scenarios. In our trial with vertical customer, robot PLC to I/O in valve terminal is one of the typical UE2UE scenarios. In this scenario, necessary coordination for two RANs should be supported to integrate two traffic flow as one complete procedure. Specifically, BAT adjustment and survival time are the essential aspects since the issue that how to coordinate two RANs in UE2UE cases has not been resolved in previous releases, and further enhancements are needed in Rel-19.

17 – China Mobile Com. Corporation

WT 2.1,WT2.2,WT2.4,WT2.6 should be included in R19 scope.

WT2.1 is the high priority in China Mobile side. And we see the need of network reliability improvement without big impact for UE.

18 – Siemens AG

We support **WT-1.7, WT-2.7, WT-2.8, WT-3, WT-4.5, WT-4.6.**

In general, Siemens supports 5G TSN integration to be continuously enhanced in Rel-19 to fulfill the requirements of Industrial Communication use cases and requirements (specifically addressed in TS 22.104).

WT-1.7 requires some coordination with RAN, the smaller 5G time sync budget (700-800ns) is considered as essential to realize the Industrial use case e.g. mobile manufacturing robots. Besides the time sync budget with two wireless links, the impact of smaller time sync budget on the architecture also needs to be investigated.

WT-2.7: In integrated IEEE-802.1-based/5G networks, the 5GS is integrated as logical bridge. The 5GS as logical bridge needs to react on the control and management messages from the IEEE-802-1-based network as expected by the non-3GPP part of the integrated industrial communication network. Topics related to virtual networks / 5G-VN are especially important. They provide the basis for the industrial communication.

Support of NETCONF/YANG - The 5GS as logical bridge needs to be able to interpret NETCONF/YANG configurations from the IEEE-802.1-based network and to translate them in corresponding configuration of the 5GS.

Loop prevention/support of spanning tree protocols - The 5GS as logical bridge needs to be able to participate in the loop prevention of the integrated network (support of corresponding IEEE-802.1-based mechanisms/spanning tree protocols).

Enhancements of 5G-VN capabilities are needed for improved integration into operational industrial settings:

- Dynamic addition of new VN members
- Large numbers of VLANs (>1000 VLANs), many UEs
- Multiple VLANs/TSN streams per UE
- Multiple non-3GPP devices behind a UE

WT-4.5 and **WT-4.6** should include studies corresponding to the gap analysis from 5G-ACIA for 5G capabilities exposure for factories of the future (S2-2210183).

19 – Deutsche Telekom AG

We support WT-2.1 (including merged WT-2.5), and WT-4.1

We prefer WT-1.5, WT-1.6, WT-2.4, WT-2.6, all WT-3.x, and WT-4.6 being de-prioritized for Rel19

20 – NOVAMINT

We support WT 4.3 & WT 4.2

21 – Dish Network

We support WT2-1, W2-5

22 – Nubia Technology Co.

(from ZTE)

We also support WT#4.5

23 – Nubia Technology Co.

(from ZTE)

We are fine with WT#1.3. This WT needs to be rephrased to make the scenario clearer.

Feedback Form 2: Can any of the Work Tasks above be combined/merged?

1 – Ericsson Hungary Ltd

WT-2.1 and 2.5 should be merged. We should avoid the situation where we have separate solutions for redundancy within the 5GS and end to end. Instead, we need to combine the different scenarios into a single solution framework, so that operators can pick the right configuration for a given deployment, and if later needed, the solution is further extensible.

2 – Qualcomm CDMA Technologies

WT-4.4 is not a stand-alone WT but should be merged with WT-2.1.

3 – Nubia Technology Co.

(from ZTE)

#2.1, #2.3, #2.5, #4.4 can be merged into one general 3GPP enabled packet replication/ elimination

WT#2.7 can be merged into #4.1

4 – Siemens AG

We support WT-3 and agree that there needs to be coordination between TSC/URLLC/TRS enhancements and Proximity Services enhancements.

WT-3.2 and first bullet of WT-3.3 (direct device communication in standalone NPNs) might be better dealt with in Proximity Services discussion.

Second and third bullet of WT-3.3 fit into TSC/URLLC/TRS enhancements in our opinion.

Feedback Form 3: Should any of the Work Tasks above be reworded?If so, propose the required rewording.

1 – VODAFONE Group Plc

For WT 1.5 and WT1.6 change eMTC to ”WB-EUTRAN” so that it includes normal LTE. And in WT 1.5 change ”subscription” to ”EPS-subscription” to avoid any misunderstanding that this might be 5GC-LTE related.

2 – Samsung Electronics Co.

Regarding WT-4.3, SWS-230064 needs to be considered in addition to SWS-230035.

The following is proposed.

WT-4.3 How to enable support for SEI requirements that are not implemented in Rel-18, specifically ex-

posure of specific information regarding UE status, as per the SA1 requirements.

- Expose network analytics information for a UE including RAT type that is serving a UE, cell ID, RAN quality of signal information and assigned frequency band;

- Expose QoS policy for LAN-VN to an authorized 3rd party, including changes in this policy over time;

- Expose performance information for a LAN-VN to an authorized 3rd party;

- Expose specific UE subscription parameters to an authorized third party including LAN-VN group configuration and static IP address configuration.

- Expose a mechanism for an authorized third party to reqest subscription parameter changes including LAN-VN group configuration and static IP address configuration.

3 – DOCOMO Communications Lab.

WT-1.1: further clarification is needed; The problem is that if the UE is in RRC-Idle, the RAN is not aware of the UE, and does not know whether the RTI should be enabled or disabled.

WT-1.2: further clarification is needed; Not clear what is the issue. The motivation seems to come from SWS-230036: ”Time sync service continuity when UE moves from gNBs supported by one time domain to another”. What is meant by the time domain support in gNB?

WT-1.7: does this have RAN dependency? Is it mainly RAN feature?

WT-1.8: further clarification is needed; what is this?

WT-2.1: further clarification is needed; It should be clarified if this is FRER or can be something else as well? FRER applies only to ethernet bridges. So if this replication is for IP PDU Sessions, FRER is not suitable solution. It should be clarified if this replication is on flow basis, rather than PDU Sessions basis (see SWS-230036). WT 4 has similar feature but controlled by AF, consider to merge or add a dependency.

WT-2.5, redundant paths: further clarification is needed; what is the new requirement compared to the current solutions in the specs?

WT-2.5, PREOF for N6: Is this done in the N6 transport, it is out of scope of 3GPP?

WT-2.5, PREOF at the terminal: this seems to be related to WT2.1 if it applies to IP PDU Sessions? Consider to merge?

WT-2.5, detnet controller outside of the 5GS: is this only about the authentication/authorization of the controller?

WT-2.5, detnet controller within the 5GS: what is the new requirement compared to R18?

WT-2.6: Are HSR and PRP applicable for IEEE TSN?

WT-2.7: what is ”dynamic addition of new VN members”, something related to 5G-LAN?

WT-2.8: IEEE dependency, what is the expected completion date of the IEEE specs?

WT-4.4: could be merged with 2.1 or 2.5?

WT-4.5, Provision of 5G communication services end-to-end within 5GS: e2e here means that two PDU sessions are considered at once in the AF request for the UE-UE case?

WT-4.5, Further QoS monitoring enhancements: should be more precise what attributes are needed?

WT-4.6: what is R-reference point? Application in the UE can access to the NEF using the regular NEF API, what is the new requirement, is it only about the application authentication? In that case, it looks the same as the topic that SA6 SNAAPP, and SA3 SNAAPPY are addressing in Rel-18 (enhancing CAPIF capability) If there are any remaining tasks, those are better to be treated directly in Rel-19 SA3 (or SA6 if any architectural enhancement is needed).

4 – Nokia Corporation

WT-2.1

W*e recommend rewording to the following text*

Support for 3GPP system-controlled (3GPP native) replication (e.g. FRER).

- Replication and elimination performed within 3GPP system for a single registration, two different PDU Sessions for a single UE.
- Replication and elimination performed within 3GPP system for two different PDU Sessions, one per UE, assuming UE is independently registered.
- Ability to trigger replication is within the 3GPP system, protocol aspects to replicate/eliminate.
- Extended capability exposure framework to allow Application Function to discover, request or influence selective duplication, 5GS reliability and redundancy functionality.

WT-2.5

We suggest rewording to the following text

Study on user plane redundancy for IP:

- Generic replication/elimination

5 – Qualcomm CDMA Technologies

We would be ok with the proposals by Vodafone for WT 1.5 6 ”change eMTC to ”WB-EUTRAN” and for WT 1.5 ”change ’subscription’ to ”EPS-subscription”.

In multiple work tasks ”e.g.” is used. This should be removed since work tasks need to be clear and not open-ended.

In WT-4.1 Ethernet and IP routing support has been combined. These are not related and would need to be split into different work tasks.

6 – Nubia Technology Co.

(from ZTE)

#2.1, #2.3, #2.5, #4.4 can be a general preof (packet replication, elimination and ordering**), it can be rephrased like**

WT-X: support 5GS native support preof ()

- **- X.1 overall architecture and functionality to support preof**
- **- X.2 procedure enhancement to support preof**
- **- X.3 5GS capability exposure for preof**

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-# (e.g. 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?

Feedback Form 5: If there are any additional Work Tasks required, describe them

3 Dependencies

These feedback forms will help define the dependencies between Work Tasks, dependencies of Work Tasks on other Working Groups (SA, RAN or CT), and dependencies on other potential SA2 Rel-19 SIDs and WIDs.

The Work Tasks can be from the list in section 2.1, or any additional Work Tasks identified in the feedback in section 2.2.

Feedback Form 6: Describe the dependencies that any of the Work Tasks have on other 3GPP Working Groups

1 – VODAFONE Group Plc

WT1.5 probably needs RAN 2 / RAN 3 to copy some Rel 17 NR RRC and NGAP functionality across to LTE-RRC and S1-AP.

WT 1.6 might impact RAN 2 and RAN 1.

2 – Qualcomm CDMA Technologies

Some WTs require cooperation with RAN and SA3.

3 – Ericsson LM

WT# 1.5 must be agreed together with RAN, if to be progressed. Other WTs also may have RAN dependency/impacts depending on interpretation.

4 – Nubia Technology Co.

(from ZTE)

#1.5, #1.6 and #3 has RAN depency

5 – Nokia Corporation

As we described in the earlier sections, WT-1.5,WT-1.6,WT-1.7 have dependency on the RAN.

Feedback Form 7: Describe dependencies between the Work Tasks

Feedback Form 8: Describe any dependencies on potential work/study items that might be created as a result of the other Q3 moderated discussions.

1 – HuaWei Technologies Co.

WT 3 has dependencies with the ProSe discussion.

2 – Beijing Xiaomi Mobile Software

WT-3 is proposed to remove to "Proximity Services enhancements" for the discussion.

3 – Nubia Technology Co.

(from ZTE)

•**Part of #2.7 has dependency on the "UE identity".**

•Enhancements for 5GS as logical bridge, including, …..multiple devices behind UE

4 – CICT

[From CATT]

WT-3 has dependencies with the Proximity Services enhancements (WT-14, 15).

4 Partitioning

These questions will help determine whether there is one, or more than one, Study Item, Work Item or TEI-19 item to be created from these Work Tasks.

Feedback Form 9: Should there be more than one SID, WID or TEI-19 item created based on the Work Tasks?

1 – Ericsson Hungary Ltd

Yes. Studies related to redundancy (WT-2.1 and WT-2.5, which should be merged) should be studied separately from other studies mentioned in this document. We see there is a market interest for enhanced/additional redundancy solution, which do not depend on other items.

2 – Motorola Mobile Com Technology

WT#3 is self-contained and could be treated as a separate study/TEI.

3 – Nubia Technology Co.

(from ZTE)

prefer to have one SID

4 – CICT

[From CATT]

One SID is fine.

Feedback Form 10: If the answer to the above question is yes, describe how the Work Tasks should be partitioned into different items.

5 Summary from the Q3 discussions

5.1 General

There is no additional WTs proposed during the discussion. All the discussions are focusing on the original WTs in Section 2.1.

5.2 Summary from sections 2.1

Regarding "Which of the above Work Tasks should be in scope of Rel-19?" in Form 1, 21 responses were received from 17 companies.

Regarding "Can any of the Work Tasks above be combined/merged?" in Form 2, 4 responses were received from 4 companies.

Table 3 is the summary of the responses.

Table 3: Summary of responses in Form 1 and Form 2

	Vodafone	**Nokia**	**Ericsson**	**Qualcomm**	**MediaTek**	**Lenovo**	**Huawei**	**Samsung**	**CATT**	**Xiaomi**	**ZTE**	**CUCC**	**CMCC**	**Siemens**	**Deutsche Telekom**	**NTT DoCoMo**	**Dish VAMINT**	**Number of Y**	**Number of M**	**Number of N**
1.1		Y	N	N	N		Y		Y		Y							4		3
1.2		Y	N	N	N		Y		Y		Y							4		3

1.3		Y	N	N	N		Y		Y		Y, R NOTE 6							4		3
1.4		Y	N	N	N		Y				N							2		4
1.5	Y	N	N NOTE 3	Y			N								N			2		4
1.6	Y, R	N	N	Y			N								N			2		4
1.7		NOTE 3	N	N	N		N				N			Y				1		5
1.8		N	N	N	N		N				N							0		6
2.1		Y, R	Y	N	N		Y		Y	Y	Y		Y		Y		Y	9		2
2.2		Y, R	N	N	N		Y			Y	N		Y					4		4
2.3		Y	N, M	N	N		M				M							1	3	3
2.4		Y	N	N	N		Y			Y	N	Y	Y		N			5		5
2.5		M	M	N	N		M		M		M						Y	1	5	2
2.6		N	N	N	N		M				Y		Y		N			2	1	5
2.7		N	N	N	N		M				M			Y				1	2	4
2.8		N	N	N	N		N				N			Y				1		6
3.1		Y NOTE 2	N	N	N	Y			Y, NOTE 4		NOTE 3			Y	N			4 NOTE 4		4
3.2		Y NOTE 2	N	N	N	Y					NOTE 3			Y NOTE 5	N			3		4
3.3		Y NOTE 2	N	N	N	Y					NOTE 3			Y NOTE 5	N			3		4

4.1		N	N	N			Y	Y			Y				Y			4		3
4.2		N	N	N			Y	Y			Y					Y		4		3
4.3		N	N	N			M	Y			N					Y		2	1	4
4.4		N	N	N			M	Y			M							1	2	3
4.5		N	N	N			M	Y			Y NOTE 6			Y				3	1	4
4.6		N	N	N			M	Y			N			Y	N			2	1	5

NOTE 1: Y = support to study in R19; N = not support to study in R19; M = merge to other WT; R = with rewording or clarification NOTE 2: Low priority. NOTE 3: Need RAN study first NOTE 4: Only support for time																			

Regarding "Can any of the Work Tasks above be combined/merged?" in Form 3, 6 responses were received from 6 companies. Besides, some companies have suggested rewording already in Form 1.

Table 4: Summary of responses in Form 3

WT	Rewording proposal
1.1	DoCoMo asks questions for clarification.
1.2	DoCoMo asks questions for clarification.
1.5	Vodafone suggests to change eMTC to "WB-EUTRAN" so that it includes normal LTE and change "subscription" to "EPS-subscription". Qualcomm is OK with the above suggestion.
1.6	Vodafone suggests to change "subscription" to "EPS-subscription". Qualcomm is OK with the above suggestion.
1.7	DoCoMo asks questions for clarification.
1.8	DoCoMo asks questions for clarification.
2.1	DoCoMo asks questions for clarification. Nokia suggests rewording to describe the scenarios. (in Form 1 and Form 3) Qualcomm suggests to remove the "e.g." in the WT. ZTE suggests rewording to merge WT 2.1, WT 2.3, WT 2.5 and WT 4.4. Ericsson suggests to capture IETF protocols e2e. (in Form 1)
2.2	Qualcomm suggests to remove the "e.g." in the WT. Huawei suggests rewording to merge WT 2.3.(in Form 1)
2.3	ZTE suggests rewording to merge WT 2.1, WT 2.3, WT 2.5 and WT 4.4.
2.5	DoCoMo asks questions for clarification. Nokia suggests a general rewording to just focus on IP. ZTE suggests rewording to merge WT 2.1, WT 2.3, WT 2.5 and WT 4.4.

2.6	DoCoMo asks questions for clarification.
2.7	DoCoMo asks questions for clarification. Qualcomm suggests to remove the “e.g.” in the WT.
2.8	Qualcomm suggests to remove the “e.g.” in the WT.
4.1	Qualcomm suggests to split the discussion of Ethernet and IP routing. Huawei suggests rewording to describe the scenarios and merge WT 4.2 WT 4.3 & WT 4.5 Bullet 1 & WT 4.6. (in Form 1)
4.3	Samsung suggests to add detailed description on SEI requirements.
4.4	DoCoMo asks questions for clarification. ZTE suggests rewording to merge WT 2.1, WT 2.3, WT 2.5 and WT 4.4.
4.5	DoCoMo asks questions for clarification.
4.6	DoCoMo asks questions for clarification.

Moderator Proposal:

There is no WT without “N”. For the sake of progress, it is proposed to have the draft SID(s) to be used as baseline for further discussion in SA2#159 based on the number of supporters. Considering a SID/WID/TEI should have at least 4 supporters, the WTs with less supporters (i.e. Y+M<4) will not be captured.

Please find the details in the Table 5:

IN* = Capture it in the draft SID(s) submitted in SA2#159 to have further discussion and final decision on whether including it or not..

M* = Merge it in other WT in the draft SID(s) submitted in SA2#159 to have further discussion and final decision on whether including it or not.

OUT = Not captured in the draft SID(s) submitted in SA2#159.

Table 5: Moderator proposal for each WT

	WT	**Moderator proposal**

Moderator Proposal#1	**1.1**	**IN***
Moderator Proposal#2	**1.2**	**IN***
Moderator Proposal#3	**1.3**	**IN*** It is proposed to differentiate WT 1.3 and WT 3.1 with a note (please see details in Moderator Proposal#17). **The rewording is as following:** How to support time synchronization service for ad-hoc cooperative group and service assurance for high accuracy time synchronization service NOTE: This WT does not consider Clock synchronization to a group of UEs via ProSe direct/indirect communication.
Moderator Proposal#4	**1.4**	**OUT**
Moderator Proposal#5	**1.5**	**OUT**
Moderator Proposal#6	**1.6**	**OUT**
Moderator Proposal#7	**1.7**	**OUT**
Moderator Proposal#8	**1.8**	**OUT**

Moderator Proposal#9	**2.1**	**IN*** It is propose to reword it based on suggestions in Table 4. It also needs to merge WT 2.3 and WT 2.5. **The rewording is as following:** Support for 3GPP system-controlled replication for both Ethernet and IP type PDU Sessions. • Replication and elimination performed within 3GPP system for a single registration, two different PDU Sessions for a single UE. • Replication and elimination performed within 3GPP system for two different PDU Sessions, one per UE, assuming UE is independently registered. • Ability to trigger replication is within the 3GPP system, protocol aspects to replicate/eliminate. • Extended capability exposure framework to allow Application Function to discover, request or influence selective duplication, 5GS reliability and redundancy functionality.
Moderator Proposal#10	**2.2**	**IN*** It is propose to reword it based on suggestions in Table 4. **The rewording is as following:** Support for avoid transferring unnecessary payloads to improve efficiency of transmission capacity.
Moderator Proposal#11	**2.3**	**M*** This is merged into WT 2.1.
Moderator Proposal#12	**2.4**	**IN***

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Moderator Proposal#13	**2.5**	**M*** This is merged into WT 2.1.
Moderator Proposal#14	**2.6**	**OUT**
Moderator Proposal#15	**2.7**	**OUT**
Moderator Proposal#16	**2.8**	**OUT**
Moderator Proposal#17	**3.1**	**IN*** It is proposed to only capture time synchronization as mentioned in NOTE 4 of Table 3. Then, it seems overlapping with WT 1.3. It is proposed to differentiate WT 1.3 and WT 3.1.
Moderator Proposal#18	**3.2**	**OUT**
Moderator Proposal#19	**3.3**	**OUT**

Moderator Proposal#20	**4.1**	**IN*** It is propose to reword it based on suggestions in Table 4. **The rewording is as following:** How to support integration of 5G VN and legacy LAN (including Ethernet LAN or L3 sub-network, either on UE side or DN side) • Integration architecture to support cross-site tunnel (between UPFs, between UPF and router in local DC) establishment and release, QoS provisioning and monitoring for cross-site tunnel, intelligent traffic steering on cross-site tunnel, exposure for reporting and configuration mapping. • Management of the DN side devices and the UE side devices as 5G VN group members in order to enable the 5GC be aware of the existing of the devices in the legacy LAN so to control the traffic routing for such devices in the group communication
Moderator Proposal#21	**4.2**	**IN***
Moderator Proposal#22	**4.3**	**OUT**
Moderator Proposal#23	**4.4**	**OUT**
Moderator Proposal#24	**4.5**	**IN***
Moderator Proposal#25	**4.6**	**OUT**

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5.3 Summary from sections 3

Regarding "Describe the dependencies that any of the Work Tasks have on other 3GPP Working Groups", there are 5 responses from 5 companies:

- 4 companies (Vodafone, Ericsson, ZTE, and Nokia) think WT 1.5 has RAN dependency. Ericsson thinks WT# 1.5 must be agreed together with RAN, if to be progressed.
- 3 companies (Vodafone, Ericsson, ZTE, and Nokia) think WT 1.6 has RAN dependency.
- ZTE thinks WT 3 has RAN dependency.
- 2 companies (Qualcomm and Ericsson) think some other WTs may have RAN dependency. Qualcomm further indicates the dependency with SA3

Regarding "Describe dependencies between the Work Tasks", there is no response.

Regarding "Describe any dependencies on potential work/study items that might be created as a result of the other Q3 moderated discussions", there are 4 responses from 4 companies:

- 3 companies think WT 3 has dependencies with ProSe.
- ZTE thinks WT 2.7 has dependencies with UE Identity.

Moderator proposal:

Considering generic group management, exposure and communication enhancements have no RAN dependency, it is proposed to add RAN dependency only for all TRS/URLLC related WTs.

Moderator Proposal#26: It is proposed to add RAN dependency as "yes" for WT 3.1. It is proposed to add RAN dependency as "maybe" for all other TRS/URLLC related WTs which are IN* in Section 5.2.

5.4 Summary from sections 4

Regarding "Should there be more than one SID, WID or TEI-19 item created based on the Work Tasks?", there are 4 responses from 4 companies.

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2 companies think one SID is OK.

Lenovo thinks WT 3 could be a separate SID.

Ericsson thinks WT 2.1 and WT 2.5 could be a separate SID.

Moderator proposal:

Lenovo (the original author) thinks WT 3 could be a separate SID. And 3 companies think WT 3 has dependencies with ProSe. It is proposed to have a separate SID for WT 3.1.

Considering TRS and URLLC are discussed in a single SID in R18, it is proposed to have one SID for all WTs which are IN* except for WT 3.1 in Section 5.2.

Moderator proposal #27:

It is proposed to have one SID for all WTs which are IN* except for WT 3.1 in Section 5.2.

It is proposed to have a separate SID for WT 3.1.