SA2 Rel-19 23Q3 moderated discussion - UPEAS Enhancement - Version 0.0.2

SA2

https://nwm-trial.etsi.org/#/documents/8572

1 Introduction

The following documents in SA#100 workshop proposed that the UPF enhancement should be included in Release 19.

SWS-230021 ETRI, SK Telecom, KT, LG Uplus

SWS-230013 TELECOM ITALIA S.p.A.

SWS-230018 Dish Network

SWS-230019 Rakuten Mobile, Inc

SWS-230008 SK Telecom

SWS-230035 Samsung

SWS-230068 China Mobile

The following documents in SA2#157 meeting proposed that the UPF enhancement and SBA phase 2 in Release 19.

S2-2307346 Study on UPF enhancement for Exposure and SBA Phase 2. Vodafone

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: Study enhanced UPF event exposure service(s) that would support QoS related information exposure to AF/NEF and NWDAF, to satisfy requirements from XRM, AIML, direct subscription to UPF for analytics targeting a specific UE or PDU session

WT-2: Study modular design and deployment of user plane, including

WT-2.1 Supporting design of new modules/functions, e.g. data storage, and data processing.

WT-2.2 Supporting splitting of existing UPF modules/functions e.g. NAT, application detection.

WT-3: Study enhancing the interface between UPF and AF by using User Plane (UP) based SBI, e.g. in-band control signalling between UPF and AF via N6.

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WT-4: Study on modularized UPF services taking advantage of cloud-native, programmability, and flexible deployment

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

1 – VODAFONE Group Plc

WT-1, as modified in relevant section, shall be included

WT-3 as proposed to be modified shall be included

2 – Meta USA

For WT#3, just want to voice our view that we do like to see how N6 could be used to support UPF-AF interaction for a given target like UE, and the revised wording does not exclude that scenario. Hence, we are fine with the TMobile/VF suggestions.

3 – MediaTek Inc.

On WT-1, the scope is rather wide, without any clear focus. It covers a diverse set of topics (eNA, XRM, AIML...). It is not clear what is missing and why they can not be covered in related individual studies in Rel-19? Rel-18 showed us, inter-dependency between multiple SIs makes it rather complicated on how to specify features. We prefer to avoid this in Rel-19.

4 – Nokia Germany

Hi all,

A few comments from our side on the initially proposed WTs (further comments below in the next feedback forms):

1) WT-1: UPEAS in Rel. 18 describes how UPF exposes information to consumers of its exposure service. What information is exposed is handled in the relevant WID. We believe the same approach should be followed in Rel. 19 as the answer to the ”what” question requires detailed knowledge of each specific WID. In other words, if anything is missing on what is exposed it should be handled in the relevant Rel. 19 SID. WT-1 further proposes direct subscription to UPF for analytics targeting a specific UE or PDU session. Implicit subscription via SMF was decided in Rel. 18 to alleviate a consumer of the UPF Exposure Service to handle UPF changes due to e.g. mobility. It is not clear what is the added value of the enhancement proposed. Overall, we do not see the need for WT-1.

2) WT-2, 4 propose modular UPF deployment. In our opinion, deployment details should not be addressed by 3GPP. Further modular UPF design is proposed. Example modules are data storage and data processing. Why do we want to study this? Is it the purpose to define an interface between these modules? If yes, that would imply severe impact to the UPF latency and performance, whereas such a modular design is not excluded today in an implementation manner. Further modules proposed are NAT, application detection. Such modules could be considered as functions of a service function chain. 5GC enhancements for SFC are also recently addressed in Rel. 18. Overall, we do not see the need for WT-2, 4.

3) WT-3 is not clear to us: What does it mean User Plane based SBI? ”In-band control signalling between UPF and AF via N6” might bypass the single in 5GC policy control point? Looks confusing to us as a WT and we do not see the need for it.

5 – Nokia Germany

Hi all,

Just a clarification to the previous comment: WT-2, 4 refers to both WT-2 and WT-4.

6 – Ericsson LM

Hi all,

- We believe WT#1, WT#2 and WT#3, as defined above or in the versions provided in Form #3, should not be in Rel-19 scope. We have provided our feedback in Form 3.

- WT#4 refers again to modularization and shares the concerns we have expressed for WT#2 in Form 3. In addition, we do not see a need to work now on studying additional UPF services.

7 – Qualcomm Incorporated

For WT-1, it needs to clearly identify what is missing in UPEAS of Rel-18 to support XRM and AI/ML. These should be evaluated and identified by XRM and AI/ML, instead of generated by UPEAS.

For WT-2, why SA2 need a new modular design and implementation of user plane in Rel-19 (near the end of 5G) ? What's the impact to the overall user plane functionality and interfaces?

The requirement of WT-3, i.e., new interface between UPF and AF need to be clarified. How can UPF authenticate and authorize AF request? How can AF discover the proper UPF?

WT-4 can be merged into WT-2 (if WT-2 is agreeable).

8 – HUAWEI TECHNOLOGIES Co. Ltd.

It is unclear on what is the concrete task to be studied in WT#1 and WT#3, i.e. what is the missed issue or related usecase to drive this WT. Hence WT#1, WT#3 we do not see the need for it now.

WT#2, WT#4 are related to the implementation issue. We do not see it need be in the scope.

9 – vivo Mobile Communication Co.

From vivo

WT 1, WT 2 and WT 3 may have some value to study in R19, but some needs details clarification.

For WT 1, that it better to have a scenario to describe what information should be expose. Just a example, for example, some information in AIML of member selection? or other information. WT 1 now is wide,

but I am ok that during the TR phase, both of the scenario assumption and solution can be put forward together. It is important.

For WT2, can be sum up as new function support in UPF.

For WT 3, enhance the interface is a little bit unclear. it seems that we want to control the traffic volumn between UPF and AF? But compare with the wording interface enhancement, it is too solution, and also,

the UPF expose the information to AF is control plane, and the user plane we didn't have such definition, and also, why control the traffic to AF is unclear.

10 – ZTE Corporation.

WT#1 and WT#3 can be included in the study if they are reworded as follows:

"WT-1: Study enhanced UPF event exposure service(s) that would support QoS related information exposure to AF/NEF and NWDAF, direct subscription to UPF for analytics targeting a specific UE or PDU session"

WT-3: Study system enhancement to support AF control the UPF via SBI interface

For WT#2, it is unclear the benefit to further decouple the UPF. Therefore it is better not to include WT#2.

11 – Samsung Electronics Co.

WT-1 (should be modified)

- Not only QoS related information but also other information, e.g. charging information, so adding more NFs, e.g. CHF
- Adding targeting a specific QoS
- Also, in case of indirect subscription, more intermediate NFs should be included (in Rel-18, SMF only)
- It may include discovery procedure a serving UPF for a specific UE, PDU session, or QoS flow

WT-2 (need to be modified)

- We can consider new event exposure service(s) which are supported by user plane modules/functions and not standardized functions, such as NAT

WT-3 (optional)

- We may discuss basic protocol aspects which are not mainly scope of SA2
- We can give some hint to Stage-3 guys

12 – China Mobile Com. Corporation

We support the WT1(reworded by VDF), WT2(Agree WT4 can be merged into WT2), WT3.

For WT1, this is a left issue from R18, since the main idea of this WT in R19 is based on current R18 XR-M/AIML logic, i.e. no new feature introduced in UPEAS Ph2, but to study whether the direct subscription to UPF can be used or not for specific UE/PDU session. So there is no dependency between different topics in R19.

For WT2, we do see the need to evaluate and re-consider the granularity design for UPF. We need the UPF consisted of specific UPF service, which can make the UPF more easier to be customized and deployed.

For WT3, it is better to study whether there is new way to support the AF-UPF subscription for information exposure, not go through the AF->NEF->PCF->SMF->UPF.

13 – Deutsche Telekom AG

Deutsche Telekom supports WT1(reworded), and merged and reworded WT2/WT4

14 – AT&T

WT#2, WT#3, would be of higher priority for us

15 – Dish Network

WT#1: any further work for the existing or new UPF exposure (for example, NAT exposure we see the use case the AF ask private and need to return the public)

WT#2, WT#4 (can be merged)

16 – SK Telecom

WT#1, 2, 3, 4 supports with rewording

17 – NTT

For WT-2.1, customization modules such as security, DPI, and cache are likely good candidates. We also assume that making such customization easy is an object for discussion.

18 – Cisco Systems

WT1 – This already studied in R18. The scope is very generic and wide and it is not very clear what is missing that needs to be studied. Also, there is proposal for separate AI/ML WID on 5GC which would overlaps with this one, unless you clearly specify the scope of UPEAS study w.r.t to AI/ML here.

WT2, WT3 and WT4- We support this item with right scoping.

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

1 – ZTE Corporation.

WT-4 is smilar with WT-2, suggest to merge WG-4 into WG-2

2 – T-Mobile USA

TMUS agrees with the ZTE proposal to merge WT2 into WT4 (modularized UPF services taking advantage of cloud-native…). In SA2, we focus on the UPF services and service interfaces. Deployment and implementation issues (e.g., whether functionality such as NAT, appl detection are created modularly) are out of scope of SA2. This also agrees with Ericsson's similar comment in feedback form 3.

3 – Qualcomm Incorporated

WT-4 should be merged into WT-2 (if WT-2 is agreeable).

4 – Samsung Electronics Co.

WT-4 needs to be merged with WT-2

5 – Cisco Systems

Agree with the proposal to merge WT2 and WT-4

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

1 – T-Mobile Austria GmbH

WT-3 already describes a solution. The following text would be acceptable, which describes the actual task to solve:

Study enhancing the interface between UPF and AF SBI

As always, solutions can be brought in and evaluated, but it would not be correct to directly state in the WT description what the concluded solution should be. Unless otherwise it is proposed to turn this WT into a TEI19.

2 – VODAFONE Group Plc

I find the proposal acceptable. The WT-3 is worded as a solution and should be reworded as proposed:

Study enhancing the interface between UPF and AF SBI

In this way, it accomodates some tasks proposed in the docs presented in the workshop (e.g. SWS-230008)

3 – VODAFONE Group Plc

In addition, WT-1 would be worth rewording. The information exposed should be generalised as to enrich different services (timing, charging, analytics...). Proposal is to reword WT-1 as:

WT-1: Study enhanced UPF event exposure service(s) to support information exposure to AF/NEF, NWDAF and other NFs~~,~~ to satisfy requirements on XRM, AIML, charging, traffic management, etc and related to a

specific UE(s) or PDU session

4 – Ericsson LM

- A WT#1 as in text proposed in this discussion thread was already addressed in Release'18. We may have missed, if any, enhancements on UPF Event Exposure service required by other Release'18 SIs since those ones were specified in parallel. Shouldn't WT#1 be more specific and focus on identifying and studying those ones? In addition, subscription has just been discussed a lot in Release'18. We have just agreed the procedures for the different scenarios. What has changed in order to propose (as in WT#1 original text) that SA2 revisits Direct Subscription again?

- WT#2 seems to propose that 3GPP studies (and maybe specifies?) a UPF implementation. Shouldn't the proposal be more specific on the benefits that we want to achieve? What is missing in the architecture for that purpose?

- WT#3 new proposed phrasing is too vague. Why should we study enhancements on that interface? Have any use cases been identified for which enhancements are needed and will add value? Original WT#3 text also lacked some use case motivation.

5 – HUAWEI TECHNOLOGIES Co. Ltd.

We share the view from Ericsson.

For WT#1, this is the work we do in Rel-18 on the related information exposed to the AF/NEF , NWDAF. It need be clarified on what is the missed and need be enhanced.

For WT#2, how to design the UPF is the implementation issue. So we do not know what is to be standardized?

For WT#3, not sure what is the meaning of the in-band control signaling? If this related to teh AF interaction with UPF, this is already studied at teh Rel-18. So similar as WT#1, it need clairfy on what is the missed part.

For WT#4, it is unclear on what is to be studied. If it is related to modular design, then it is same as WT#2, i.e. implementation issue.

6 – MediaTek Inc.

WT-1 needs rewording to clarify what is missing. Inter-SI dependency should be avoided.

7 – Nokia Germany

Hi all,

Further comments on the proposed re-wordings:

1) WT-1: The comments we provided to the first feedback form still hold.

2) WT-3: "*Study enhancing the interface between UPF and AF SBI*". It is not concrete at all to help us provide further feedback.

All in all comments in feedback form 1 are still valid from our point of view, and my understanding is that Ericsson and Huawei are commenting in the same spirit.

8 – Qualcomm Incorporated

We share the similar view as Ericsson and Huawei.

9 – VODAFONE Group Plc

WT-1 and 3 are drafted to accomodate use cases as proposed in the workshop by operators. There are scenarios in which rate-control needs to be applied to traffic based on packet headers and/or needing exposure based on traces/user plane info. Analytics as conceived in 5G do not provide the operations demand.

10 – ZTE Corporation.

WT#1 can be reworded to

"WT-1: Study enhanced UPF event exposure service(s) that would support QoS related information exposure to AF/NEF and NWDAF, ~~to satisfy requirements from XRM, AIML,~~ direct subscription to UPF for analytics targeting a specific UE or PDU session"

WT-3: Study system enhancement to support AF control the UPF via SBI interface~~enhancing the interface between UPF and AF by using User Plane (UP) based SBI, e.g. in-band control signalling between UPF and AF via N6~~

11 – Samsung Electronics Co.

- WT1, Study enhanced UPF and other NF event exposure service(s) that would support QoS/load related information exposure to/from AF/NEF and NWDAF, to satisfy UPF performance requirements from XRM, AIML, and direct subscription to UPF for analytics targeting a specific UE or PDU session

- In addition, please refer to Feedback Form 1

12 – VODAFONE Group Plc

Dear all,

I suggest WT-3 to be reworded to: "Study enhancing the interface between AF and 5GC to allow better handling of UPF for header enrichment, as well as detection and reporting/notifications. Analysis of existing and/or new exposure and provisioning functionality/interface(s) is expected"

13 – Nokia Germany

Hi all,

Nokia supports the reworded WT-3 as posted some time ago by Vodafone Group.

14 – Deutsche Telekom AG

We also support the reworded WT-3 from Vodafone in comment #12

15 – AT&T

As pointed out earlier by TMO and Vodafone WT#3 already describes a solution and maybe reworded as "*Study enhancing the interface between UPF and AF SBI using SBI*"

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?

1 – SK Telecom

WT#X: Study enhancing UPF event exposure service(s) that would support Charging related information exposure to CHF directly, reducing potential burdens of SMF and network topology path.

2 – VODAFONE Group Plc

I suggest merging your proposal with the reworded WT-1 i have proposed in the previous comment

3 – ZTE Corporation.

I agree with Vodafone since the reworded WT-1 includes the exposure of charging aspect.

4 – SK Telecom

Missed out from the SWS-230008

WT-X1 : Study on UPF SBA related redundancy, e.g., UPF Set / exposures to support reliabilities

WT-X2 : Study on UPF exposure for sampled/raw data/packet traces for analytics, pcf and charging

5 – HUAWEI TECHNOLOGIES Co. Ltd.

The UPF is controlled by the SMF. If the UPF is failure, the UE context can be rebuilt per the instruction from SMF. So what is the intention of the WT-X1?

For WT-X2 it is unclear on the related use case. For example the exposure the raw data, does it means that the UPF need detect the related raw packet and exposed it outside or what is the difference comparing to the existing data packet dection and event exposure? Also for the exposure to the PCF, what information to be exposed?

6 – Nokia Germany

Hi all,

1) UPF exposing charging related information to CHF directly: The current established approach is well proven in the field. With enhancements in Rel. 16 and NIESGU in Rel. 17 a considerable effort is in place to replace legacy charging systems by the 5GC CHF for all UEs with proper subscription. Charging systems are not frequently changed in many operators' deployments. As such defining one more option will only jeopardise the ecosystem without any clear benefit. We do not support the idea of exposing directly from UPF to CHF charging related information.

2) Extrapolating the set concept on the UPF: First of such an extension will severely affect the UPF performance and latency. On top it might imply AN, AF impact like e.g. AN, AF reselect a UPF in a set if the UPF holding the N3, N6 termination points is not alive any more. At the same time today UPF redudancy and geo-redundancy are well deployed. As such we do not support the idea.

7 – Nokia Germany

Hi all,

Focusing on the proposed WT-X2: We have provided our opinion on exposing to CHF directly in the previous comment. On exposing to PCF: As mentioned by Huawei, what information is exposed and for which purpose? We do not support the proposed task.

8 – Ericsson LM

Hi all,

- With regards to WT-X, as in current specifications, CHF receives and manages charging useful information. SMF isolates CHF from the complexity of the session and the processing of UPF raw data. In addition, UPF N4 usage reporting is optimized to serve both policy and charging and so, we do not believe there are benefits in creating a parallel path only for charging. We do not think that this alternative needs to be studied.

- Regarding WT-X1, it is unclear what is meant by "UPF SBA related redundancy" and what we want to achieve. There are different levels of UP redundancy that are possible and supported already today in live deployments.

- Regarding WT-X2, it should be clarified which data the charging System and PCF need that they are not receiving today. N4 has been specified considering the needs of Policy and Charging. Same regarding UPF Event Exposure: it has been specified in Release'18 as needed by the Analytics use cases. Anything that has been missed? For which use case(s)?

9 – HUAWEI TECHNOLOGIES Co. Ltd.

For the Charging related enhancement(WT-X), we agree with the view from Nokia and Ericsson and not see the benefit to rebuilt another charging information collection path. Hence we do not see this charging part WT need be studied.

10 – Samsung Electronics Co.

Regarding WT-2, propose new UPF Event Exposure Service(s) which are provided by modules/functions

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

1 – SK Telecom

WT#X: Study enhancing UPF event exposure service(s) that would support Charging related information exposure to CHF directly, reducing potential burdens of SMF and network topology path.

2 – HUAWEI TECHNOLOGIES Co. Ltd.

The possbility to directly expose charging information to CHF need be checked first as the SMF does not transparently forward the related charging information to CHF.

3 – Samsung Electronics Co.

No

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

Modified WT-1 may need related studies in SA5 for charging related aspects. However, that depends on solutions being studied.

2 – Samsung Electronics Co.

No

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 – MediaTek Inc.

On WT-1, the scope is rather wide, without any clear focus. It covers a diverse set of topics (eNA, XRM, AIML).

2 – Qualcomm Incorporated

WT-1 has dependencies on XRM and AI/ML.

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 – VODAFONE Group Plc

One SID should be sufficient

2 – Samsung Electronics Co.

No

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

Regarding "Which of the above Work Tasks should be in scope of Rel-19?" in Form 1, 18 Responses were received from 17 companies. The following table is the summary of the responses.

Table 1: Summary of company position on the Work Tasks

		WT-1	WT-2.1	WT-2.2	WT-3	WT-4
1	Vodafone	Y, as modified			Y, as modified	
2	Meta USA				Y, as modified	
3	MediaTek	N				
4	Nokia	N	N	N	N	N
5	Ericsson	N	N	N	N	N
6	Qualcomm	N, need focus	N, clarification needed	N, clarification needed	N, clarification needed	Merged into WT-2
7	Huawei	N	N	N	N	N
8	vivo	Y, clarification need	Y, clarification need	Y, clarification need	Y, clarification need	
9	ZTE	Y, as modified	N	N	Y, as modified	
10	Samsung	Y, as modified	Y, as modified	Y, as modified	Optional	
11	China Mobile	Y, as modified	Y, as modified	Y, as modified	Y, as modified	Merged into WT-2
12	Deutshe Telekom AG	Y, as modified	Y, as modified	Y, as modified		Merged into WT-2
13	AT&T		Y	Y	Y	
14	Dish Network	Y, as modified	Y	Y		Merged into WT-2
15	SK Telecom	Y, as modified	Y, as modified	Y, as modified	Y, as modified	Y, as modified
16	NTT		Y			
17	Cisco	N	Y	Y	Y	Merged into WT-2

For WT#1, WT#2 and WT#3, there are strong support from operators, but less interest from UE vendors and network vendors. Based on all the wording proposals given by companies, it is proposed to revise the WT#1,

https://nwm-trial.etsi.org/#/documents/8572

WT#2 and WT#3 as follows, and further discuss them during the F2F meeting.

WT#1:

WT-1: Study enhanced UPF and other NF event exposure service(s) to support ~~QoS/load~~ information exposure to /from AF/NEF, NWDAF and other NFs, to satisfy UPF requirements on XRM, AIML, charging, traffic management, etc and related to a specific UE(s) or PDU session

WT-2: Study modular design and deployment of user plane, including new event exposure services which are supported by existing UPF modules/functions e.g. NAT, application detection, or new modules/functions, e.g. data storage, and data processing.

WT#3: Study enhancing the interface between AF and 5GC to allow better handling of UPF for header enrichment, as well as AF subscription, detection and reporting/notifications. Analysis of existing and/or new exposure and provisioning functionality/interface(s) is expected

For WT#4, based on the responses it is proposed to merge it into WT#2.

There are some proposals on additional Working Tasks in feedback form 3.

Table 2: Proposals on additional Working Tasks

		Additional WT
1	SK Telecom	WT#X: Study enhancing UPF event exposure service(s) that would support Charging related information exposure to CHF directly, reducing potential burdens of SMF and network topology path.
2	SK Telecom	WT-X1 : Study on UPF SBA related redundancy, e.g., UPF Set / exposures to support reliabilities
3	SK Telecom	WT-X2 : Study on UPF exposure for sampled/raw data/packet traces for analytics, pcf and charging
4	Samsung	Regarding WT-2, propose new UPF Event Exposure Service(s) which are provided by modules/-functions

The proposal from Samsung may have impact on the wording of existing WT-2. This will be taken into account when a new version of SID is generated

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Regarding 3 proposals from SK Telecom, there are following responses:

Table 3: Response to new working tasks proposed by SK Telecom

1	Vodafone	I suggest merging your proposal with the reworded WT-1 i have proposed in the previous comment
2	ZTE	I agree with Vodafone since the reworded WT-1 includes the exposure of charging aspect.
3	HUAWEI	Do not support WT#X, WT-X1 and WT-X2
4	Nokia	Do not support WT#X, WT-X1 and WT-X2
5	Ericsson	Do not support WT#X, WT-X1 and WT-X2
6	Samsung	No additional working tasks

Based on the responses above, it is proposed not to introduce additional working tasks in this study item.

Regarding the Dependency in feedback Form 6, two responses are received.

Table 4:

1	Vodafone	Modified WT-1 may need related studies in SA5 for charging related aspects. However, that depends on solutions being studied.
2	Samsung	No

WT#1 may have dependency on SA5. This will be reflected in the SID.

2 responses are received for dependency between the SIDs.

Table 5:

1	MediaTek	On WT-1, the scope is rather wide, without any clear focus. It covers a diverse set of topics (eNA, XRM, AIML).

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2	Qualcomm	WT-1 has dependencies on XRM and AI/ML

Since it is very complicated if two SIDs are dependent. It is proposed that inter SID dependency should be avoided. This can be reflected in the SID by adding an NOTE.

Regarding the partitioning, based on the feedback it is concluded that only one SID is needed.