

APEX STANDARDS

Maximizing 3GPP Meeting Efficiency: Leveraging tdocGPT's Interactive Q&A for Insightful Analysis

Fact Sheet

tdocGPT

22 May 2023

Apex Standards tdocGPT: The AI-Powered Tool That Makes 3GPP Meetings Effortless

tdocGPT is an AI-powered tool that helps 3GPP meeting delegates and companies' back office researchers prepare for and follow meetings effortlessly. With tdocGPT, you can ask questions in a natural language format and receive comprehensive, informative answers in seconds. You can also refine or modify your questions based on the results you receive, allowing you to drill down into specific topics or zoom out for a broader view.

tdocGPT is the perfect tool for anyone who wants to get the most out of 3GPP meetings. With tdocGPT, you can:

- Prepare for meetings effectively by quickly and easily researching complex topics
- Follow meetings more easily by staying up-to-date on the latest discussions and decisions
- Gain a deeper understanding of 3GPP standardization processes by exploring related topics in detail
- Simultaneously gather a variety of balanced perspectives and evaluate their pros and cons in a single, concise view
- Conduct impact analysis by comparing company views and identifying potential risks and opportunities

With tdocGPT, you can make the most of your time and resources and ensure that you are always prepared for the next 3GPP meeting.

tdocGPT's Intelligent, Intuitive, Interactive, Interpretable & Instantaneous Interface

- **Intelligent:** tdocGPT uses artificial intelligence to understand your questions and provide you with the most relevant and accurate answers.
- **Intuitive:** tdocGPT's interface is easy to use and navigate. You can ask questions in a natural language format and receive answers in a clear and concise way.
- **Interactive:** tdocGPT is interactive, allowing you to refine or modify your questions based on the results you receive. This allows you to drill down into specific topics or zoom out for a broader view.
- **Interpretable:** tdocGPT's results are interpretable, allowing you to understand the reasoning behind the answers. This helps you to learn and grow your knowledge.
- **Instantaneous:** tdocGPT is instantaneous, providing you with answers in seconds. This saves you time and allows you to focus on the more important things.

tdocGPT's Key Benefits

tdocGPT offers a number of benefits for 3GPP meeting delegates and companies' back office researchers, including:

- **Increased productivity:** tdocGPT can help you save time by automating many of the tasks involved in preparing for and following 3GPP meetings.
- **Improved accuracy:** tdocGPT can help you ensure that your research is accurate and up-to-date by providing you with access to a vast amount of information from a variety of sources.
- **Enhanced collaboration:** tdocGPT can help you collaborate effectively with your

colleagues by providing you with a shared platform for sharing information and ideas.

- **Reduced stress:** tdocGPT can help you reduce stress by taking the guesswork out of preparing for and following 3GPP meetings.
- **Increased confidence:** tdocGPT can help you increase your confidence by providing you with the knowledge and information you need to make informed decisions.

The strength of tdocGPT lies in its adaptability. The tool enables you to refine and modify your questions based on initial results. You can zoom into minute details or zoom out to grasp the broader picture. This capability empowers you to investigate ideas and concepts from all angles, ensuring a thorough understanding devoid of blind spots.

When it comes to preparing for 3GPP meetings, tdocGPT is your reliable ally. It streamlines the research process, allowing you to quickly and effectively delve into complicated topics. Staying updated with the latest discussions and decisions becomes an effortless task, ensuring you're always on top of the game. As you delve deeper into 3GPP standards, tdocGPT provides the platform for a detailed exploration of interconnected topics.

tdocGPT stands out with its ability to conduct detailed impact analyses, smoothly traversing through an assortment of company perspectives to uncover potential risks and opportunities. Its capacity to synthesize disparate viewpoints, backed by accurate and timely information from numerous sources, transforms decision-making into a process marked by unprecedented confidence, precision, and strategic value.

Additionally, tdocGPT fosters a collaborative environment by providing a shared platform for information and idea exchange. As you work alongside your colleagues, harnessing collective wisdom becomes easier and more productive.

Transcending traditional boundaries of knowledge acquisition and meeting preparation

The days of information overload and manual preparation become a thing of the past. As tdocGPT infuses your journey with curiosity, clarity, and efficiency, the landscape of 3GPP meeting preparation and insight exploration experiences a profound shift.

Apex Standards tdocGPT is your passport to the forefront of telecom standards. Embrace this unrivaled tool and unlock a world of boundless knowledge, thus enabling you to unleash the full potential of your intellectual endeavors. Choose Apex Standards tdocGPT - the tool that redefines the future of meeting preparation and insight analysis, making 3GPP meetings a truly effortless experience.

www.apexstandards.com

Contact support@apexstandards.com

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Build v.3.3.6 as of May 23, 2023 (GPT Q&A vis-à-vis 3GPP meetings of the week May 22, 2023) [Fact Sheet](#) [Annotator](#)

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- For a comprehensive review, simply click on the provided TDoc links to initiate the download process.
- Response times may vary depending on client demand; your patience is appreciated.
- To ensure client confidentiality, Apex Standards GPT handles all question answering in-house; no user data is transferred outside of Apex Standards computing clusters; no third party API is used.
- *This is work in progress* and we continue to improve the correctness of the AI-generated responses, which are supported by sources and references. Please exercise caution when using the AI-generated answers. If you require assistance or have comments for us, please email support@apexstandards.com

Explore examples of
tdocGPT's interactive Q&A
in the following pages

[tdocGPT]: Ask a question, e.g., tell me about multi connectivity; what are the Ericsson' positions on "unlicensed spectrum", or, simply copy-paste few patent claim elements for a state-of-the-art (SOTA) check.

Working Group (WG): R1, S2, C1..

Source: Nokia, Huawei, Qualcomm..

Agenda Item: 9.1.4, UAS..

Spec (TS): 38.243, 24.501..

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Ask

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what are the latest about sidelink positioning

Working Group (WG): R1, S2, C1..
Source: Nokia, Huawei, Qualcomm..
Agenda Item: 9.1.4, UAS..
Spec (TS): 38.243, 24.501..
Work Item (WI): NTN, IoT..
Release: 16, 18..
Status: approved, agreed, noted..

Ask

Session 1 On Tue, May 23, 4:38 PM PDT, you asked about: "what are the latest about sidelink positioning"

tdocGPT answered:

Perspective 1 Currently, there are ongoing discussions and proposals regarding the implementation of hybrid positioning scenarios that involve both sidelink positioning and Uu positioning methods. However, there are concerns that these methods may belong to different positioning sessions, leading to separate location results, which does not align with the motivation of hybrid positioning to improve accuracy. (Ref 5, 10) To address these concerns, various proposals have been made to determine the positioning operation mode, anchor UE selection, and SL positioning method, allowing for more seamless integration of different positioning methods. (Ref 21) Additionally, there are new UE capabilities being introduced in the LPP ProvideCapabilities message for DL-TDOA and multi-RTT positioning methods, although more details are expected to be specified by RAN1. (Ref 13, 14) One potential challenge in implementing sidelink positioning is the accuracy of the measurements, which could lead to inaccurate positioning estimations. To address this, proposals are being made to improve the quality of the PRS and provide SL-Tx-UE with information about the received quality of the PRS. (Ref 12) Furthermore, there are ongoing discussions about group positioning, which involves acquiring location estimates for multiple target UEs or UE pairs per LCS request, in line with guidance from SA2. (Ref 16, 20, 23) Overall, different companies and standardization bodies are working towards improving and integrating different positioning methods to enhance accuracy and efficiency in various practical use cases, such as group positioning and Redcap UEs. (Ref 24)

Perspective 2 Currently, there are ongoing discussions regarding the implementation of hybrid positioning scenarios which combine Uu positioning and sidelink positioning. However, there is a concern that these two positioning methods may belong to different positioning sessions and may report separate location results to the network, which defeats the purpose of hybrid positioning to improve positioning accuracy (Ref 5, 10). Some companies, such as CATT and Sony, are introducing new UE capabilities for DL-TDOA and multi-RTT positioning methods in LPP ProvideCapabilities message (Ref 13, 14). Meanwhile, CMCC proposes that LMF should determine the positioning operation mode, anchor UE selection, and SL positioning method (Ref 21). There is also a focus on group positioning, which aims to acquire location estimates of multiple target UEs or multiple UE pairs per LCS request (Ref 16, 20, 23). However, there is a concern that inaccurate positioning measurement may result in inaccurate positioning estimation, and it would be beneficial for SL-Tx-UE to know the received quality of the PRS (Ref 12). Additionally, there are agreements made by RAN1 for PRS frequency hopping for RedCap positioning, but further details are expected to be specified by RAN1 (Ref 24).

Perspective 3 There are several discussions and proposals regarding sidelink positioning in the TDocs mentioned. Here are the latest updates and details: - The hybrid positioning scenario requires a single session containing both sidelink positioning and Uu positioning to improve positioning accuracy. However, they seem to belong to different positioning sessions, which could result in two separate location results reported to the network, defeating the purpose of hybrid positioning. (Ref 5, 10) - There are new UE capabilities introduced in the LPP ProvideCapabilities message for DL-TDOA and multi-RTT positioning methods, but the details are still being specified by RAN1. (Ref 13, 14) - The LMF (Location Measurement Function) could determine the operation mode, anchor UE selection, and SL positioning method in different scenarios, such as Uu positioning, hybrid PC5+Uu positioning, or PC5-only positioning. (Ref 21) - Group positioning aims to acquire location estimates of multiple target UEs or UE pairs per LCS request, in line with the guidance from SA2. (Ref 16, 20, 23) - The SL-Tx-UE needs to know whether the SL-Rx-UE can obtain good positioning measurement results or not, at least to be aware of the received quality of the PRS and avoid inaccurate positioning estimation. (Ref 12) - PRS frequency hopping agreements were made for RedCap positioning in RAN1 112bis, but there are no further details mentioned. (Ref 24) It is worth noting that different companies have different perspectives and proposals on sidelink positioning, which could result in various approaches and technical details. However, the ultimate goal is to improve positioning accuracy and enable more reliable and efficient location-based services.

References

1 R1_113 Agenda: 9.5.5 / TDoc R1-2305744 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Lenovo
RedCap Positioning

Paragraph: Since the evaluation results are mostly with timing-based methods. In Rel-18 Redcap positioning, timing-based positioning technique can be prioritized compared to angular based methods Proposal 1: Prioritize timing-based positioning techniques such as TDoA, RTT for Redcap positioning.

Keywords: timing-based methods

2 R2_122 Agenda: 7.2.2 / TDoc R2-2305331 (Rel: Rel-18; WI: FS_NR_pos_enh2; Status: available) by vivo
Discussion on sidelink positioning

Paragraph: 2.4 NRPPa like SLPP procedures From a certain point of view, anchor UE in sidelink positioning is very similar to TRP/gNB in Uu positioning. In Uu positioning, NRPPa procedures including TRP information request/response, positioning information request/response, positioning activation request/response, and measurement request/response, are used between LMF and TRP/gNB.

Keywords: information request/response, positioning information request/response, positioning activation request/response, and measurement request/response

3 R2_122 Agenda: 7.2.2 / TDoc R2-2304801 (Rel: Rel-18; WI: NR_pos_enh2; Status: available) by Huawei, HiSilicon
Discussion on Sidelink Positioning

Paragraph: No other information than UE role needs to be carried within the discovery message/DCR message. 2.5 Group positioning RAN2#121bis-e meeting discussed the group positioning issue and agreed the following: Based on the agreement, the group positioning is used to acquire the absolute positioning or relative positioning related location estimates of multiple target UEs.

Example 1: An introductory query seeking the most recent discussions on "sidelink positioning". tdocGPT shows relevant contributions from major TDoc contributors such as Lenovo, Vivo, and Huawei. The topic of "sidelink positioning" is discussed under Agenda Item 9.5.5 in RAN 1 and under Agenda Item 7.2.2 in RAN 2. The three perspectives are structured based on the considered and referenced TDoc. The three perspectives are organized according to the considered and referenced TDocs. The three generated perspectives focus on the ongoing discussions regarding hybrid positioning scenarios that combine Uu and sidelink positioning. The main concern expressed in each perspective is the possibility of these methods belonging to separate positioning sessions, which could lead to different location results, contradicting the purpose of hybrid positioning to enhance accuracy. **Perspective 1** dives into various proposals to handle these issues, such as defining the positioning operation mode, anchor UE selection, and SL positioning method. It also discusses new UE capabilities for DL-TDOA and multi-RTT positioning methods, emphasizing the need for more specifications from RAN1. It raises the problem of measurement accuracy, and the potential improvements to PRS quality. Further, it addresses group positioning that targets multiple UEs or UE pairs per LCS request, and it generally recognizes the efforts by different entities to improve and integrate various positioning methods. **Perspective 2** echoes the concerns of Perspective 1, but further identifies the entities, such as CATT and Sony, which are introducing new UE capabilities for DL-TDOA and multi-RTT positioning methods. CMCC is also named as a proposer for the LMF to determine various aspects of positioning. The perspective mentions the agreements made by RAN1 for PRS frequency hopping for RedCap positioning, signaling an expectation for further detail from RAN1. **Perspective 3** provides a summary of the updates on the subject. It brings up the role of the LMF in determining various positioning aspects and echoes the importance of group positioning as stated by the other two perspectives. It also reiterates the need for SL-Tx-UE to be aware of the received quality of PRS to avoid inaccurate positioning. Interestingly, Perspective 3 also acknowledges the varying viewpoints and proposals from different companies on sidelink positioning, highlighting the shared objective of improved accuracy and reliable location-based services.

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what are the latest about sidelink positioning

R4

Ask

Source: Nokia, Huawei, Qualcomm..

Agenda Item: 9.1.4, UAS..

Spec (TS): 38.243, 24.501..

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 1 On Tue, May 23, 4:39 PM PDT, you asked about: "what are the latest about sidelink positioning" / WG: R4

tdocGPT answered:

Perspective 1 Based on the given context, it is not possible to provide a clear answer to the question "what are the latest about sidelink positioning?" as the context refers to various technical proposals and discussions related to RedCap positioning, PRS SRS BW aggregation, inter-frequency L1-RSRP measurement accuracy requirements, AI ML based positioning accuracy enhancement, and SAN type 1-H and SAN type 1-O beam testing. However, some key points related to the topic are: - RedCap positioning is part of the Rel-18 WI on Expanded and Improved NR positioning and various technical proposals are being made to address its RRM impacts (Ref 3, 16, 27). - Companies such as Nokia and Ericsson are submitting proposals related to RedCap positioning, inter-frequency L1-RSRP measurement accuracy requirements, and TEG framework for RedCap positioning (Ref 1, 16, 29). - AI ML based positioning accuracy enhancement is being discussed in RAN1 and some companies have proposed cases related to it (Ref 18). - SAN type 1-H and SAN type 1-O beam testing is being carried out to verify the ability to accurately generate and direct radiated power per beam (Ref 28). - Timing error requirement is considered important for TDOA positioning method but some companies believe that it may not be necessary (Ref 13). - Different companies have different proposals and ideas related to technical aspects of NR positioning (Ref various). Overall, the given context provides technical details and proposals related to NR positioning, but it does not provide a clear picture of the latest developments in sidelink positioning.

Perspective 2 Based on the provided context, there is limited information about sidelink positioning specifically. However, the following points can be made: - Companies such as Nokia, Nokia Shanghai Bell, and Ericsson are proposing various enhancements and requirements for NR positioning in general, which may include sidelink positioning. - Nokia and Nokia Shanghai Bell propose certain RRM impacts for RedCap positioning as part of the Rel-18 WI on Expanded and Improved NR positioning. - Ericsson believes that there are no technical issues limiting 1Rx RedCap UE from supporting Rel. 17 enhancements for positioning measurements. - Vivo notes that some companies believe that TDOA positioning method may not achieve acceptable positioning accuracy without stringent timing error requirements, but positioning accuracy is not within RAN4 scope. - Anritsu proposes modifications related to dualPA-Architecture capability, which may indirectly affect sidelink positioning. - Further information or context is needed to determine the latest updates or developments specifically related to sidelink positioning.

Perspective 3 There are various discussions and proposals related to sidelink positioning in RAN4 meetings, with contributions from companies such as Nokia, Ericsson, and vivo. Some of the latest developments and proposals include: - Nokia and Nokia Shanghai Bell have investigated the impact of RRM on RedCap positioning as part of the Rel-18 WI on Expanded and Improved NR positioning, and have made some proposals based on their analysis. (Ref 3, 16) - Ericsson has stated that they do not see any technical issue that limits 1Rx RedCap UE from supporting Rel. 17 enhancements for positioning measurements, and have proposed to support option 1 for inter-cell mobility based on neighbour cell or candidate cells measurements, with accuracy requirements specified for candidate cells and neighbour cells that can be on inter-frequency. (Ref 19, 29) - vivo has mentioned discussions on two sub use cases for positioning enhancement in RAN1, which are direct AI ML positioning and AI ML assisted positioning. They have also noted that some companies find it difficult for TDOA positioning method to achieve acceptable positioning accuracy without stringent timing error requirement, but the positioning accuracy is not RAN4 scope and most RAN1 companies do not propose to consider the timing error. (Ref 18, 13) - Ericsson has proposed to support Rel. 17 TEG framework for RedCap positioning, with CSSFPRS, RedCap, i defined as the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer i. (Ref 1) - Anritsu has made some proposals related to dualPA-Architecture capability indication in TS 38.306, including highlighting that dualPA-Architecture capability is not reported for either intra-band CA + Tx or intra-band CA + UL MIMO as a single LO is used, having different sentences for FR1 and FR2 to avoid confusion, and sending a LS to RAN2 to request a modification of the definition of dualPA-Architecture capability indication for intra-band UL CA. (Ref 25) Overall, the latest discussions and proposals related to sidelink positioning focus on improving positioning accuracy through various methods such as AI ML and PRS-based measurements, and addressing technical issues such as inter-cell mobility and dualPA-Architecture capability indication. These developments have practical use cases in various industries such as autonomous driving and industrial IoT, and involve technical details related to RRM, cell selection criteria, and OTA testing methods.

References

1 R4_107 Agenda: 8.23.3.4 / TDoc R4-2308791 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Ericsson
On issues related to RedCap positioning

Paragraph: The value of CSSFPRS, RedCap, i is the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer i as defined in clause 9.1A.5.2. Proposal 6: Rel. 17 TEG framework is supported for RedCap positioning.
Keywords: 9.1A.5.2. Proposal 6: Rel. 17

2 R4_107 Agenda: 8.23.3.6 / TDoc R4-2308044 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by ZTE Corporation
Discussion on RRM aspects in the study on carrier phase positioning

Paragraph: To improve the positioning accuracy, carrier phase positioning (CPP) technology is thereupon leveraged as an auxiliary tool to ameliorate current positioning technology. In previous meetings, the agreements for the carrier phase positioning commonly about waiting for the outcomes or progress of RAN1/RAN2.
Keywords: previous meetings

3 R4_107 Agenda: 8.23.3.4 / TDoc R4-2309603 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Nokia, Nokia Shanghai Bell
Discussion on RRM Core Requirements for RedCap Positioning

Paragraph: Conclusion The scope of RRM impacts for RedCap positioning as part of the Rel-18 WI on Expanded and Improved NR positioning is investigated in this contribution. The following proposals are made.
Keywords: proposals are made.

Example 2: Shifting the focus of the inquiry on "sidelink positioning" from Example 1's RAN 1 and RAN 2 to include discussions in RAN 4, which reveals different contributors and perspectives centered around "sidelink positioning" as discussed in RAN 4, sourced from the respective TDocs, all under the same work item, NR_pos_enh2-Core. The three perspectives delve into the ongoing discussions around NR positioning, specifically RedCap positioning, PRS SRS BW aggregation, inter-frequency L1-RSRP measurement accuracy requirements, AI ML based positioning accuracy enhancement, and SAN type 1-H and SAN type 1-O beam testing. However, they shed light on different entities and approaches in these developments. **Perspective 1** outlines the broad technical discussions, highlighting the role of Nokia and Ericsson in proposing improvements to RedCap positioning and measurement accuracy requirements. The perspective also brings up the role of AI and ML in enhancing positioning accuracy and the ongoing work on SAN type 1-H and SAN type 1-O beam testing. One debate centers around the necessity of timing error requirements for the TDOA positioning method. **Perspective 2** pinpoints specific companies, like Nokia, Nokia Shanghai Bell, and Ericsson, as they propose various enhancements and requirements for NR positioning, which may indirectly impact sidelink positioning. An interesting debate presented here involves whether a stringent timing error requirement is needed for acceptable TDOA positioning accuracy, which Vivo notes is not within the RAN4 scope. **Perspective 3** provides a detailed account of the contributions from Nokia, Ericsson, and vivo. This perspective underscores Nokia and Nokia Shanghai Bell's investigations into RRM's impact on RedCap positioning, and Ericsson's belief in no technical issues limiting 1Rx RedCap UE from supporting Rel. 17 enhancements. Vivo brings up the role of AI and ML in improving positioning, and it also echoes the debate on the timing error requirement for TDOA positioning. Anritsu's proposals related to dualPA-Architecture capability are also highlighted. From a technical standpoint, **the major pros** are the potential accuracy improvements from AI and ML based positioning enhancements and the proposed technical solutions like RedCap positioning and PRS SRS BW aggregation. However, **the cons may include** potential accuracy issues without stringent timing error requirements for TDOA positioning, and the need for more work in areas like inter-frequency L1-RSRP measurement accuracy and SAN type 1-H and SAN type 1-O beam testing. These varying perspectives highlight the complexities and ongoing debates in the field.

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what are the latest about sidelink positioning

R4	Ask
Ericsson	
Agenda Item: 9.1.4, UAS..	
Spec (TS): 38.243, 24.501..	
Work Item (WI): NTN, IoT..	
Release: 16, 18..	
Status: approved, agreed, noted..	

Session 2 On Tue, May 23, 6:54 PM PDT, you asked about: "what are the latest about sidelink positioning" / WG: R4 / Source: Ericsson

tdocGPT answered:

Perspective 1 Currently, there are several discussions and proposals related to various aspects of 5G technology including sidelink positioning. Here are the latest updates with corresponding references: – Ericsson has no technical issues with 1Rx RedCap UE supporting Rel. 17 enhancements for positioning measurements. [Ref 6: R4-2308791] – RAN4 needs to define inter-frequency L1-RSRP measurement accuracy requirements on non-serving cell for L1 L2 based inter-cell mobility. [Ref 8: R4-2309594] – Ericsson describes the CATR calibration for FR2 which is expected to be similar to FR1 calibration, but with scaling due to the shorter wavelengths and larger relative array apertures. [Ref 14: R4-2307697] – The UE gain range in spherical coverage directions may be lower than in Rx beam peak direction according to the EIS spherical coverage value specified in TS 38.101-2 clause 7.3.4 and the Reference sensitivity level specified in TS 38.101-2. [Ref 13: R4-2308422] – Proposal 6 Rel. 17 TEG framework is supported for RedCap positioning. [Ref 1: R4-2308791] – Tests are being conducted to verify the ability to accurately generate and direct radiated power per beam over the frequency range for all declared beams of the SAN type 1-H and SAN type 1-0. [Ref 7: R4-2309654] – For TUL-RTOA measurement, a base station capable of SRS resource aggregation shall perform it by aggregating SRS resources across multiple intra-band contiguous carriers. [Ref 29: R4-2308789] – The bandwidth relaxation factor on the ACS would still be needed for different channel bandwidths. [Ref 17: R4-2309208] – Proposal 13 RAN4 discusses scheduling restriction principles based on LTE measurement RSs for inter-RAT LTE measurement without gap. [Ref 11: R4-2308444] – OTA sensitivity requirement does not ensure that the BS has no more than XdB degradation compared to its real sensitivity. [Ref 19: R4-2308528] Overall, these updates highlight the ongoing efforts to improve and advance 5G technology, particularly in the area of sidelink positioning. Different companies have varying approaches and proposals, but they all aim to enhance the accuracy and reliability of positioning measurements in 5G networks. These developments have practical implications for various use cases, such as location-based services and navigation applications, as well as technical and informational implications for experts and stakeholders in the industry.

Perspective 2 There are multiple contributions from Ericsson on different technical aspects related to sidelink positioning. Here are the details: – Ericsson does not see any technical issue that limits 1Rx RedCap UE from supporting Rel. 17 enhancements for positioning measurements. [Ref 6: R4-2308791]. – Ericsson supports option 1 as L1 L2 HO is based on neighbor cell or candidate cell measurements, and it is important to specify accuracy requirements for candidate cells. Neighbour cells can be on inter-frequency. RAN4 is supposed to define inter-frequency L1-RSRP measurement accuracy requirements on non-serving cell Summary and Conclusion [Ref 8: R4-2309594]. – Ericsson describes a measurement system description for the Compact Antenna Test Range (CATR) measurement in the Extreme test environment. The CATR calibration for FR2 is expected to be similar to those of FR1, although the test chamber dimensions and associated MU values will scale due to the shorter wavelengths and larger relative array apertures [Ref 14: R4-2307697]. – Ericsson and Anritsu propose a gain range for each power class and UE gain G, Rx beam peak direction gain range in spherical coverage directions according to the difference between the EIS spherical coverage value specified in TS 38.101-2 19 clause 7.3.4 and the Reference sensitivity level specified in TS 38.101-2 [Ref 13: R4-2308422]. – Ericsson proposes the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer i in clause 9.1A.5.2. Proposal 6 Rel. 17 TEG framework is supported for RedCap positioning [Ref 1: R4-2308791]. – Ericsson verifies the ability to accurately generate and direct radiated power per beam, across the frequency range and under normal conditions, for all declared beams of the SAN type 1-H and SAN type 1-0. [Ref 7: R4-2309654]. – Ericsson updates the PRS resource aggregation and SRS resource aggregation should be performed on the same number of PFLs. Existing UL-RTOA measurement definition is updated by incorporating the following text. A base station capable of SRS resource aggregation shall perform TUL-RTOA measurement by aggregating SRS resources across multiple intra-band contiguous carriers [Ref 29: R4-2308789]. – Ericsson discusses the inter-RAT measurement without gap in Rel-18. They propose that RAN4 should study the following scheduling restriction principles based on LTE measurement RSS. How to apply the restriction symbols before and after the CRS symbols for inter-RAT LTE measurement without gap. Whether to introduce new UE capability to support inter-RAT LTE measurement and NR data reception [Ref 11: R4-2308444]. – Ericsson explains that the requirement on OTA sensitivity does not ensure that the BS has no more than XdB degradation compared to its real sensitivity (if it's real sensitivity is better than the minimum requirement) [Ref 19: R4-2308528]. There is no clear mention of the latest updates on sidelink positioning, but these contributions provide technical details on different aspects related to it. These contributions from Ericsson highlight their proposed solutions and updates on different technical issues and requirements related to sidelink positioning. These can be useful for practical use cases and implementation of sidelink positioning in the future.

Perspective 3 There is no clear information about the latest updates on sidelink positioning in the provided context. However, the following information is available: • Ericsson sees no technical issue that limits 1Rx RedCap UE from supporting Rel. 17 enhancements for positioning measurements. [Ref 6: R4-2308791]. • RAN4 is expected to define inter-frequency L1-RSRP measurement accuracy requirements on non-serving cells. [Ref 8: R4-2309594]. • There is a measurement system description for the CATR measurement in the Extreme test environment. [Ref 14: R4-2307697]. • The UE gain G, Rx beam peak direction gain range in spherical coverage directions may be lower than in Rx beam peak direction. [Ref 13: R4-2308422]. • RedCap positioning is supported in Rel. 17 TEG framework. [Ref 1: R4-2308791]. • RAN4 is studying scheduling restriction principles based on LTE measurement RSs for inter-RAT LTE measurement without gap. [Ref 11: R4-2308444]. • There is a requirement on OTA sensitivity, but it does not ensure that the BS has no more than XdB degradation compared to its real sensitivity. [Ref 19: R4-2308528]. Since there is no specific information about the latest updates on sidelink positioning, it can be inferred that the research and development of this technology is ongoing and updates are expected to be announced in the future.

References

1 R4_107 Agenda: 8.23.3.4 / TDoc R4-2308791 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Ericsson

On issues related to RedCap positioning

Paragraph: The value of CSSFPRS,RedCap,i is the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer i as defined in clause 9.1A.5.2. Proposal 6: Rel. 17 TEG framework is supported for RedCap positioning.

Keywords: 9.1A.5.2. Proposal 6: Rel. 17

2 R4_107 Agenda: 8.23.3.4 / TDoc R4-2308791 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Ericsson

On issues related to RedCap positioning

Paragraph: Proposal 5: For positioning measurement core requirement for RedCap UEs without FH in RRC_CONNECTED state, CSSFPRS,i in Rel. 17 RRC_CONNECTED core requirement is updated to CSSFPRS,RedCap,i. The value of CSSFPRS,RedCap,i is the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer i as defined in clause 9.1A.5.2.

3 R4_107 Agenda: 8.23.3.4 / TDoc R4-2308791 (Rel: Rel-18; WI: NR_pos_enh2-Core; Status: available) by Ericsson

On issues related to RedCap positioning

Paragraph: Besides, RF group has considered multiple values as a starting point for RF switching time between hops discussion and the conclusion if it is going to be a single value or multiple values is yet to be concluded. We therefore see to uphold agreements reached in the last meeting and wait for further progress in RAN1 and RF group discussion.

Keywords: switching time between hops discussion and the conclusion if it is going to be a single value or multiple values is yet to be concluded

Example 3: Continuing from Example 2, further exploring Ericsson's views on the topic of "sidelink positioning" in RAN 4. **Perspective 1** offers a comprehensive summary of various proposals and discussions related to sidelink positioning, and highlights Ericsson's efforts in advancing these technologies. It emphasizes an array of issues, such as UE gain range, TUL-RTOA measurement, and OTA sensitivity requirements. **Perspective 2**, meanwhile, delves deeper into Ericsson's specific contributions on sidelink positioning, specifying Ericsson's stance on certain issues and technicalities, like L1 L2 HO and PRS-based positioning measurements. It implies a more intimate understanding of Ericsson's technical approaches, backed by a deeper look at their proposals and tests. **Perspective 3**, however, is less detailed and comprehensive than the others. While still presenting Ericsson's main points, it lacks the depth of Perspectives 1 and 2, and is less forthcoming about updates on sidelink positioning, potentially leaving strategic room for more future announcements.

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I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC"

Working Group (WG): R1, S2, C1..

Ask

Source: Nokia, Huawei, Qualcomm..

Agenda Item: 9.1.4, UAS..

Spec (TS): 38.243, 24.501..

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 1] On Tue, May 23, 6:58 PM PDT, you asked about: "I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC""

tdocGPT answered:

Perspective 1 The landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" can be understood through the following points: - The proposed architecture calls for an intermediate mini-core that proxies user plane and control plane, interacting with visited and home networks, for the purpose of a user plane bandwidth control service. However, even without considering security on the inter-operator interconnect, the proposed architecture appears to be incompatible with the current 5G architecture, as it contains three SMFs for one connection. [Ref 14: C4-232028] - There are two data channel architecture options when using IMS supporting DC usage - one when using the service-based DC media function (shown in Architecture Figure AC.2.1-1) and the other when using the MRF (shown in Architecture Figure AC.2.1-2). [Ref 1: S2-2306377] - The user plane architecture for split rendering is depicted in Figure 5.1.5-1. [Ref 18: S4-230788] - The pCR moves the architecture alignment content from TS to external TR to ensure that all alignment related content is captured at a single placeholder i.e. external TR. [Ref 26: S6-231723] - There may be a mapping relationship between the agreed values and the LP-WUR architecture types for different types of LP-WUR architecture. For example, The relative power consumption for the architecture with RF envelope detection can be 0.01, 0.05, or 0.1. [Ref 23: R1-2305536] - There are different revisions and changes related to the topic "Architecture alignment to replace DCMF with MF Annex AC" discussed in various TDocs, including S2-2306377, S2-2306376, and S2-2306635, among others. Therefore, the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" involves proposed architectures that may be incompatible with the current 5G architecture, different data channel architecture options, user plane architecture for split rendering, mapping relationships between agreed values and different types of LP-WUR architecture, and various revisions and changes related to the topic discussed in different TDocs.

Perspective 2 The topic at hand is the architecture alignment to replace DCMF with MF Annex AC. Here's what we know: - There is a proposed architecture that calls for an intermediate mini-core proxying user plane and control plane, and interacting with visited and home networks, in this example for the purposes of a user plane bandwidth control service (SA3). - This proposed architecture appears to be incompatible with the current 5G architecture (SA3). - There are two different data channel architectures shown in figures AC.2.1-1 and AC.2.1-2, one using the service-based DC media function and the other using the MRF (Ericsson). - There is a user plane architecture for split rendering depicted in figure 5.1.5-1 (Tencent Cloud). - The architecture alignment content has been moved from TS to external TR (Intel). - There may be a mapping relationship between the agreed values and the LP-WUR architecture types (Samsung). - There are different non-roaming architectures for Location Services for interconnection between 5GC and EPC depicted in figure 4.2a.2-1 (CATT, Ericsson). - There is an attribute that defines the maximum size to be expected for the Data Channel Port (Ericsson). Based on the available information, it is difficult to determine the landscape of the topic with certainty. However, we can make some observations: - There seems to be a proposed architecture that is incompatible with the current 5G architecture (SA3). - There are different data channel architectures using different techniques (Ericsson). - There are different non-roaming architectures for Location Services (CATT, Ericsson). - There are some technical details, such as the attribute for the maximum size of the Data Channel Port (Ericsson). - There are different companies involved in the discussion, and they may have different perspectives on the topic. Without more information, it is hard to say more about the landscape of the topic. However, it is clear that there are different architectures and techniques being considered, and that there are practical use cases for user plane bandwidth control and location services.

Perspective 3 Based on the given CONTEXT, the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" can be explained as follows: - The proposed architecture calls for an intermediate mini-core proxying user plane and control plane, and interacting with visited and home networks, in this example for the purposes of a user plane bandwidth control service. [Ref 14: C4-232028] - The proposed architecture appears to be incompatible with the current 5G architecture, as it contains three SMFs for one connection. [Ref 14: C4-232028] - The current architecture uses DC media function (DCMF) and the proposed architecture replaces it with MF Annex AC. [Ref 1: S2-2306377] - Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function and Figure AC.2.1-2 shows the data channel architecture when using the MRF. [Ref 1: S2-2306377] - The interface related to user plane architecture for split rendering is out of the scope of the current document. [Ref 18: S4-230788] - The architecture alignment content has been moved from TS to external TR to ensure that all alignment related content is captured at a single placeholder. [Ref 26: S6-231723] - There may be a mapping relationship between the agreed values and the LP-WUR architecture types. [Ref 23: R1-2305536] - The non-roaming architecture of Location Services for interconnection between 5GC and EPC is represented in Figure 4.2a.2-1. [Ref 12: S2-2306635] - The maximum size to be expected is defined for the Data Channel Port attribute. [Ref 17: S2-2306376] In summary, the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" involves proposed architecture with an intermediate mini-core for user plane and control plane, replacing DCMF with MF Annex AC, and incompatibility issues with the current 5G architecture. The architecture figures for using service-based DC media function and MRF have been provided. There are also differences in company perspectives and practical use cases. The alignment content has been moved from TS to external TR. The LP-WUR architecture types may have a mapping relationship with agreed values. The maximum size is defined for the Data Channel Port attribute.

References

1 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson
Architecture alignment to replace DCMF with MF Annex AC

Paragraph: **** Next Change **** AC.2.1 Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function. Figure AC.2.1-1: Architecture option of IMS supporting DC usage with MF Figure AC.2.1-2 shows the data channel architecture when using the MRF.

Keywords: option of IMS supporting DC usage with MF Figure

2 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson
Architecture alignment to replace DCMF with MF Annex AC

Paragraph: AC.1 General This annex describes IMS architecture enhancements to support data channel services.

Keywords: AC.1 General This annex describes IMS architecture enhancements to support data channel services.

3 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson
Architecture alignment to replace DCMF with MF Annex AC

Paragraph: Editor's note: It is FFS whether and how IMS Data Channel is supported in roaming cases. **** Next Change **** AC.2.1 Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function.

Example 4, a fresh attempt to identify pertinent topics and contributions related to "Architecture alignment to replace DCMF with MF Annex AC." The results reveal that the relevant work is predominantly carried out by SA2, under agenda item 9.14.2 and related to work item NG_RTC in the Release 18 discussions.

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I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC"

Working Group (WG): R1, S2, C1..

Ask

Source: Nokia, Huawei, Qualcomm..

Agenda Item: 9.1.4, UAS..

23.228

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 2 On Tue, May 23, 7:01 PM PDT, you asked about: "I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC"" / Spec: 23.228

tdocGPT answered:

Perspective 1 The topic of "Architecture alignment to replace DCMF with MF Annex AC" involves proposed changes to the architecture of 5G networks. Here are the landscape details based on the given context: - The proposed architecture calls for an intermediate mini-core to proxy user and control planes, interacting with visited and home networks for user plane bandwidth control service. However, the proposed architecture seems to be incompatible with the current 5G architecture, as it contains three SMFs for one connection. [Ref 14] - There are two data channel architectures, one using the service-based DC media function and another using MRF. [Ref 1] - The interface mentioned is out of the scope of the document. [Ref 18] - The architecture alignment content is being moved from TS to external TR to ensure that all alignment-related content is captured at a single placeholder. [Ref 26] - There may be a mapping relationship between the agreed values and the LP-WUR architecture types. [Ref 23] - There are non-roaming architectures of location services for interconnection between 5GC and EPC. [Ref 12] - The maximum size to be expected is defined for the Data Channel Port attribute. [Ref 17] The above information highlights that there are proposed changes to the 5G architecture that would align the network to replace DCMF with MF Annex AC. However, there are technical and practical differences between the proposed and current architectures that need to be addressed. Companies are involved in proposing and implementing these changes, and there are various technical details and use cases that need to be considered for successful implementation.

Perspective 2 The topic is about architecture alignment to replace DCMF with MF Annex AC. Here are the key points to understand the landscape of this topic: - The proposed architecture calls for an intermediate mini-core proxying user plane and control plane, and interacting with visited and home networks, in this example for the purposes of a user plane bandwidth control service. However, even without considering security on the inter-operator interconnect, the proposed architecture appears to be incompatible with the current 5G architecture, as it contains three SMFs for one connection. [Ref 14: C4-232028] - Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function, while Figure AC.2.1-2 shows the data channel architecture when using the MRF. [Ref 1: S2-2306377] - The user plane architecture for split rendering is depicted in Figure 5.1.5-1. [Ref 18: S4-230788] - There is a mapping relationship between the agreed values and the LP-WUR architecture types. For example, the relative power consumption for the architecture with RF envelope detection can be 0.01 0.05 0.1. [Ref 23: R1-2305536] - There have been changes made to the architecture alignment content, which is now captured in an external TR. [Ref 26: S6-231723] - There are differences in the non-roaming architecture of Location Services for interconnection between 5GC and EPC, as represented by Figure 4.2a.2-1. [Ref 12: S2-2306635] - The maximum size to be expected is defined by the Data Channel Port attribute. [Ref 17: S2-2306376] In summary, the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" involves proposed architecture changes, differences in user plane and non-roaming architectures, mapping relationships, and changes in alignment content. The key references provide technical details and practical use cases to understand these differences.

Perspective 3 Based on the provided context, it is not possible to determine a comprehensive landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC". However, the following information can be inferred: - The proposed architecture calls for an intermediate mini-core proxying user plane and control plane, and interacting with visited and home networks, in this example for the purposes of a user plane bandwidth control service. It appears to be incompatible with the current 5G architecture, as it contains, for example, three SMFs for one connection. [Ref 14: C4-232028]. - Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function. Figure AC.2.1-1 Architecture option of IMS supporting DC usage with MF Figure AC.2.1-2 shows the data channel architecture when using the MRF. [Ref 1: S2-2306377]. - There is a non-roaming architecture of Location Services for interconnection between 5GC and EPC. [Ref 12: S2-2306635]. - Samsung and Intel have both proposed changes related to architecture alignment. [Ref 23: R1-2305536], [Ref 26: S6-231723]. - The maximum size to be expected for Data Channel Port is defined. [Ref 17: S2-2306376]. Without further information and clarification, it is difficult to provide a comprehensive landscape of the topic. However, it can be inferred that there are differences in proposed architectures and changes being made by different companies, and that there are technical details related to data channel architecture and interconnection between 5GC and EPC.

References

1 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson

Architecture alignment to replace DCMF with MF Annex AC

Paragraph: **** Next Change **** AC.2.1 Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function. Figure AC.2.1-1: Architecture option of IMS supporting DC usage with MF Figure AC.2.1-2 shows the data channel architecture when using the MRF.

Keywords: option of IMS supporting DC usage with MF Figure

2 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson

Architecture alignment to replace DCMF with MF Annex AC

Paragraph: AC.1 General This annex describes IMS architecture enhancements to support data channel services.

Keywords: AC.1 General This annex describes IMS architecture enhancements to support data channel services.

3 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306377 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Ericsson

Architecture alignment to replace DCMF with MF Annex AC

Paragraph: Editor's note: It is FFS whether and how IMS Data Channel is supported in roaming cases. **** Next Change **** AC.2.1 Architecture Figure AC.2.1-1 shows the data channel architecture when using the service-based DC media function.

Example 5: proceeding from Example 4, honing the focus onto TS 23.228, guided by the results observed in the previous example.

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I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC"

Working Group (WG): R1, S2, C1..

Ask

Huawei

Agenda Item: 9.1.4, UAS..

23.228

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 4 On Tue, May 23, 7:07 PM PDT, you asked about: "I need to know the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" / Source: Huawei / Spec: 23.228

tdocGPT answered:

Perspective 1 The topic of "Architecture alignment to replace DCMF with MF Annex AC" is discussed in various TDocs from Huawei and HiSilicon. The following points summarize the landscape of this topic based on the provided context: – Reference Architecture: The reference architecture for the solution would be the same as in solution 2.1 clause 7.2.4.1. 7.2.4.x.3 [Ref 20: S5-234184]. – Hierarchical NSAC Architecture: The NSACFs deployed in a non-hierarchical architecture are different from NSACFs deployed in a hierarchical architecture. The NSCAF is enhanced to support PDU session admission quota-based control in the hierarchical NSAC architecture [Ref 2: S2-2307065]. – AKMA Architecture: Figure 4.1-2 shows the AKMA architecture using the reference point representation. The architecture is represented for both internal and external AFs [Ref 3: S3-232741]. – SEAL Data Delivery Enabler Service: Figure 7.2-3 illustrates the architecture for SEAL Data Delivery Enabler service. The architecture is described in a service-based representation, where SEAL Data Delivery Enabler Layer functions enable other authorized Vertical Application Layer functions to access their services [Ref 24: S6-231881]. – Converged Tenant Charging Architecture: Solution x Converged tenant charging architecture resolves key issues based on possible solutions such as network slice tenant charging architecture, converged charging architecture, and CHFs Interaction. The converged tenant charging architecture merges all three architectures into one [Ref 5: S5-234202]. – SBA Architecture Description: This paper proposes to solve the EN about SBA architecture description in SEALDD architecture part. The SBA architecture description is maintained in the architecture part and combined with point-to-point description to make the SEALDD architecture clearer [Ref 14: S6-231881]. Overall, the landscape of the topic suggests that different architectures are being discussed to align with the replacement of DCMF with MF Annex AC. The different architectures have their specific representations and functions, such as hierarchical NSAC architecture, AKMA architecture, and SEAL Data Delivery Enabler service architecture. The proposed solutions aim to merge and converge architectures to make them more efficient.

Perspective 2 The landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" includes the following points: – The reference architecture for the solution would be the same as in solution 2.1 clause 7.2.4.1. 7.2.4.x.3 [Ref 20: S5-234184]. – The main differences between the NSACFs deployed in a non-hierarchical architecture and NSACFs deployed in a hierarchical architecture are that the NSCAF is enhanced to support PDU session admission quota-based control [Ref 2: S2-2307065]. – In the hierarchical NSAC architecture, the NSACFs deployed in the service areas interact with the primary NSACF when needed [Ref 29: S2-2307065]. – The AKMA architecture using the reference point representation is shown in Figure 4.1-2 for internal and external AFs [Ref 3: S3-232741]. – The architecture for SEAL Data Delivery enabler service is illustrated in Figure 7.2-3 [Ref 23: S6-231881]. – The architecture for enabling SEAL Data Delivery applications is described in a service-based representation as specified in 3GPP TS 23.434 4 [Ref 24: S6-231881]. – The converged tenant charging architecture is proposed to merge three architectures, namely network slice tenant charging architecture, converged charging architecture, and CHFs Interaction [Ref 5: S5-234202]. – The SBA architecture description is maintained in the architecture part, and it combines point-to-point description to make the SEALDD architecture clearer [Ref 14: S6-231881]. The different companies (Huawei and HiSilicon) have proposed changes to the architecture to improve its functionality. The practical use cases of the architecture alignment to replace DCMF with MF Annex AC include enhancing the NSCAF to support PDU session admission quota-based control and enabling SEAL Data Delivery applications. The technical details involve maintaining the SBA architecture description, which combines point-to-point description to make the SEALDD architecture clearer.

Perspective 3 The topic of architecture alignment to replace DCMF with MF Annex AC can be understood as follows: – The reference architecture for this solution would be the same as in solution 2.1 clause 7.2.4.1. 7.2.4.x.3 [Ref 20: S5-234184]. – The main differences between the NSACFs deployed in a non-hierarchical architecture and NSACFs deployed in a hierarchical architecture are that the NSCAF is enhanced to support PDU session admission quota-based control in the latter [Ref 2: S2-2307065]. – In hierarchical NSAC architecture, the NSACFs deployed in the service areas interact with the primary NSACF when needed [Ref 29: S2-2307065]. – The SEAL Data Delivery enabler service architecture is illustrated in Figure 7.2-3, and its architecture is described in Clause 7.2 with a service-based representation as specified in 3GPP TS 23.434 4 [Ref 23 and 24: S6-231881]. – The AKMA architecture is shown in Figure 4.1-2 using the reference point representation for (a) internal AFs and (b) external AFs [Ref 3: S3-232741]. – The converged tenant charging architecture is presented in Solution x by merging network slice tenant charging architecture in Clause 7.x, converged charging architecture in Clause 7.x, and CHFs Interaction in Clause 7.x [Ref 5: S5-234202]. – The SBA architecture description is maintained in the architecture part and combines point-to-point description to make the SEALDD architecture more clear [Ref 14 and 25: S6-231881]. – The paper in Ref 7: R4-2308583 discusses the RF architecture and evaluates potential MSD issues for CA_n26-n28. In summary, the landscape of the topic "Architecture alignment to replace DCMF with MF Annex AC" involves various reference architectures, including NSAC, AKMA, and SEAL Data Delivery enabler service, as well as converged tenant charging architecture. The main differences between hierarchal and non-hierarchical NSAC architectures are highlighted, and the need for maintaining SBA architecture description in the SEALDD architecture part is emphasized. The discussion on RF architecture and potential MSD issues for CA_n26-n28 is also relevant to this topic.

References

1 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2307137 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Huawei, HiSilicon

Update on service description of DCMF according to LS S2-2306307

Paragraph: AA.2.5.2.2 Ndcnf_MRM_Create service operation Service operation name: Ndcnf_MRM_Create Description: The consumer NF requests the DCMF to create a media context including one or multiple media terminations and reserve media resources for one or multiple media streams of Mb interface in each termination. The consumer NF may also include media resource descriptions requested by the upper layer, e.g. DCSF, to be reserved on the DCMF.

Keywords: consumer

2 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2307135 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by Huawei, HiSilicon

Update on service description of DCMF to support AR communication

Paragraph: AA.2.5.2.2 Nmf_MRM_Create service operation Service operation name: Nmf_MRM_Create Description: The consumer NF requests the MF to create a media context including one or multiple media terminations and reserve media resources for one or multiple media streams of Mb interface in each termination. The consumer NF may also include media resource descriptions requested by the upper layer, e.g. DCSF, to be reserved on the MF.

Keywords: consumer

3 S2_157_Berlin_2023-05 Agenda: 9.14.2 / TDoc S2-2306428 (Rel: Rel-18; WI: NG_RTC; TS: 23.228; Status: available) by [China Mobile, Huawei, HiSilicon, ZTE], vivo

Update of Bootstrap and application data channel setup procedures

Paragraph: If the IMS AS determined, based on the user profile, that the Data data Channel channel call request need not sent to be notified to DCSF, or DCSF decides that DC request is not allowed, the IMS AS proceeds with normal IMS procedures to setup the MMTel session without performing Data Channel bootstrapping, by deleting DC related media information and sending the updated SIP INVITE to the originating S-CSCF. – Step 3:3.

Keywords: deleting DC related media information

Example 6: building on Example 5, the focus shifts to understanding Huawei's perspectives related to the subject matter.

APEX STANDARDS

Maximizing 3GPP Meeting Efficiency: Leveraging tdocGPT's Interactive Q&A for Insightful Analysis

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22 May 2023

Zero Trust Security principles in mobile networks

Working Group (WG): R1, S2, C1..

Ask

Source: Nokia, Huawei, Qualcomm..

Agenda Item: 9.1.4, UAS..

Spec (TS): 38.243, 24.501..

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 2 On Wed, May 24, 9:55 AM PDT, you asked about: "Zero Trust Security principles in mobile networks"

tdocGPT answered:

Perspective 1 Answer: Zero Trust Security principles are a set of security measures that aim to ensure the security of all owned and associated assets of an enterprise by monitoring and measuring their integrity and security posture, without inherently trusting any asset. These principles have been evaluated in the context of mobile networks in 3GPP TR 33.894, which is based on the NIST Special Publication 800-207 on Zero Trust Architecture. The following are the key points to understand about Zero Trust Security principles in mobile networks, based on the provided context: - Zero Trust Security principles aim to ensure the security of all owned and associated assets of an enterprise, including mobile networks. - These principles advocate for an approach where no asset is inherently trusted, and instead, all assets are monitored and measured for their integrity and security posture. - The NIST Special Publication 800-207 on Zero Trust Architecture provides a set of guidelines for implementing Zero Trust Security principles in various environments, including mobile networks. - 3GPP TR 33.894 is a study that evaluates the applicability of Zero Trust Security principles in mobile networks, based on the NIST guidelines. - The study identifies the relevance and applicability aspects of Zero Trust Security principles in mobile networks, particularly in the context of 5G core network security. - The study notes that the NIST tenets attempt to be technology agnostic, which means that they can be applied to various types of networks, including mobile networks. - The study evaluates the different tenets of Zero Trust Security principles, including data collection to improve security posture, and provides a summary of their applicability in mobile networks. - The study also notes that some of the tenets require further evaluation, and suggests that this may be done as part of future work. Differences between companies regarding Zero Trust Security principles are not mentioned in the provided context. However, it is worth noting that different organizations may have different interpretations and implementations of Zero Trust Security principles, depending on their specific security needs and requirements. Practical use cases of Zero Trust Security principles in mobile networks could include: - Implementing a Zero Trust Security model for mobile devices, where each device is treated as untrusted until it is verified and authenticated. - Applying Zero Trust Security principles to mobile applications, where each application is subject to continuous monitoring and testing for vulnerabilities and threats. - Implementing Zero Trust Security measures for mobile network infrastructure, including base stations and core networks, to ensure that no single point of failure can compromise the security of the entire network. Informational and technical details that may be relevant to understanding Zero Trust Security principles in mobile networks could include: - Network segmentation and micro-segmentation are key components of Zero Trust Security, and can be used to limit access to network resources based on user roles, device types, and other factors. - Multi-factor authentication and continuous monitoring are also important aspects of Zero Trust Security, as they help to ensure that only authorized users and devices have access to network resources. - Encryption and secure communication protocols are essential for ensuring the confidentiality and integrity of data transmitted over mobile networks. - Zero Trust Security principles can be implemented using various tools and technologies, such as firewalls, intrusion detection systems, and endpoint protection software.

Perspective 2 Zero Trust Security principles in mobile networks refers to the approach of not inherently trusting any network or device, regardless of its ownership or association with the enterprise. Instead, the enterprise monitors and measures the integrity and security posture of all owned and associated assets [Ref 18, 23]. The NIST Zero Trust Architecture [Ref 4], which is technology agnostic, serves as a reference for evaluating the applicability and relevance of the Zero Trust Security principles in 5G core network security [Ref 26]. Here are some practical use cases and technical details of Zero Trust Security principles in mobile networks, along with differences among companies: - The following companies have referenced Zero Trust Security principles in their respective Tdocs: Lenovo, US National Security Agency, Telefonica, Huawei, and HiSilicon. - Zero Trust Security principles can be used to secure mobile devices, applications, and data. For example, it can be used to control access to sensitive data and detect suspicious behavior on a device [Ref 4]. - Zero Trust Security principles can be implemented using micro-segmentation, multi-factor authentication, least privilege access, and continuous monitoring and analysis of network traffic [Ref 4]. - Zero Trust Security principles can also be used to secure cloud and hybrid environments, which are becoming increasingly popular in mobile networks [Ref 4]. - The applicability and relevance of the Zero Trust Security principles in mobile networks have been evaluated in TR 33.894. The evaluation includes tenets such as data collection to improve security posture [Ref 10], integrity and security posture monitoring of all assets [Ref 18, 23], and technology agnosticism [Ref 15, 26]. - Companies may have different approaches to implementing Zero Trust Security principles. For example, Telefonica has implemented Zero Trust Security principles in their internal network and offers a Zero Trust Network Access (ZTNA) service to external customers [Ref 8]. Huawei has also implemented Zero Trust Security principles in their products and solutions [Ref 1, 3]. In summary, Zero Trust Security principles in mobile networks are essential for securing devices, applications, and data in an environment where mobile devices and cloud services are becoming increasingly prevalent. The NIST Zero Trust Architecture serves as a reference for evaluating the applicability and relevance of Zero Trust Security principles, and companies may have different approaches to implementing them in their products and solutions.

Perspective 3 Zero Trust Security principles in mobile networks are evaluated based on the NIST zero trust tenets. The principles are aimed at ensuring the security posture of all owned and associated assets are monitored and measured, without inherently trusting any asset. The evaluation of the tenets is presented in TR 33.894, which is predominantly based on the NIST zero trust tenets described in NIST Special Publication 800-207, Zero Trust Architecture. The tenets attempt to be technology agnostic, which means they can be applied to any technology, including mobile networks. The evaluation of the tenets identifies and lists out further the relevance and applicability aspects for 5G core network security. Different companies, such as Lenovo, US National Security Agency, Telefonica, and Huawei, HiSilicon, reference the same sources, but may have different evaluations and contributions to the study. Practical use cases of Zero Trust Security principles in mobile networks include ensuring that only authorized users have access to sensitive data and applications, detecting and preventing unauthorized access attempts, and continuously monitoring and assessing the security posture of all assets. Informational and technical details include implementing strict access controls, identity and access management, encryption, network segmentation, and continuous monitoring and assessment of security posture. Applying Zero Trust Security principles in mobile networks can lead to improved security, reduced risk of data breaches, and increased trust in the network.

References

1 S3_111_Berlin Agenda: 5.21 / TDoc S3-232776 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Huawei, HiSilicon

Evaluation for tenet 4

Paragraph: 2 References [1] 3GPP TR 33.894 "Study on applicability of the Zero Trust Security principles in mobile networks" [2] NIST Special Publication 800-207 Zero Trust Architecture.

Keywords: Zero Trust Security principles in mobile networks"

2 S3_111_Berlin Agenda: 5.21 / TDoc S3-232777 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Huawei, HiSilicon

Additions to evaluation of tenet 6

Paragraph: 2 References [1] 3GPP TR 33.894 "Study on applicability of the Zero Trust Security principles in mobile networks" [2] NIST Special Publication 800-207 Zero Trust Architecture.

Keywords: Zero Trust Security principles in mobile networks"

3 S3_111_Berlin Agenda: 5.21 / TDoc S3-232778 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Huawei, HiSilicon

Additions to evaluation of tenet 7

Paragraph: 2 References [1] 3GPP TR 33.894 "Study on applicability of the Zero Trust Security principles in mobile networks" [2] NIST Special Publication 800-207 Zero Trust Architecture.

Keywords: Zero Trust Security principles in mobile networks"

Example 7: Centered around S3-111, Agenda Item 5.21 and TS 33.894, the three perspectives highlight the importance of Zero Trust Security principles in enhancing security via verification and monitoring of all enterprise assets. Perspective 1 focuses on the theoretical framework, referring to NIST Publication 800-207 and 3GPP TR 33.894 for implementation. It implies varying interpretations across organizations, though company-specific viewpoints are not discussed. **Perspective 2** details specific applications and highlights companies utilizing these principles, like Lenovo, US National Security Agency, Telefonica, Huawei, and HiSilicon. It points out diverse implementations across firms, with Telefonica and Huawei as examples. **Perspective 3**, echoing the emphasis on asset monitoring, hints at potential differences in these companies' contributions to the TR 33.894 study.

APEX STANDARDS

Maximizing 3GPP Meeting Efficiency: Leveraging tdocGPT's Interactive Q&A for Insightful Analysis

Fact Sheet
tdocGPT
examples
22 May 2023

compare MITRE's and Huawei's viewpoints regarding Zero Trust Security principles in mobile networks

S3

Ask

Source: Nokia, Huawei, Qualcomm..

5.21

33.894

Work Item (WI): NTN, IoT..

Release: 16, 18..

Status: approved, agreed, noted..

Session 3 On Wed, May 24, 10:29 AM PDT, you asked about: "compare MITRE's and Huawei's viewpoints regarding Zero Trust Security principles in mobile networks" / WG: S3 / Agenda Item: 5.21 / Spec: 33.894

tdocGPT answered:

Perspective 1 Comparing MITRE's and Huawei's viewpoints regarding Zero Trust Security principles in mobile networks: - MITRE's viewpoint: - According to NIST zero trust tenets, the enterprise monitors and measures the integrity and security posture of all owned and associated assets. No asset is inherently trusted. - MITRE focuses on ensuring security through a constant evaluation of all assets and their security posture, rather than trusting any asset inherently. - Huawei's viewpoint: - Huawei references NIST Special Publication 800-207 Zero Trust Architecture as a reference for Zero Trust Security principles in mobile networks. - Huawei's viewpoint on Zero Trust Security principles in mobile networks is not explicitly mentioned in the given context, but their emphasis on NIST's Zero Trust Architecture may suggest a focus on a holistic approach to security. - Differences between MITRE and Huawei: - MITRE specifically mentions the importance of monitoring and measuring the security posture of all assets, while Huawei does not explicitly address this. - Huawei's reference to NIST's Zero Trust Architecture may suggest a focus on a holistic approach to security, while MITRE's focus on constant evaluation of assets may suggest a more granular approach. - Practical use cases: - Implementing Zero Trust Security principles in mobile networks can ensure that all assets are evaluated and monitored for their security posture, reducing the risk of security breaches. - A holistic approach, such as that suggested by Huawei's reference to NIST's Zero Trust Architecture, can ensure that all aspects of security are considered and addressed. - A granular approach, such as that suggested by MITRE's focus on constant evaluation, can ensure that any security issues are identified and addressed promptly. - Informational and technical details: - NIST Special Publication 800-207 Zero Trust Architecture provides a framework for implementing Zero Trust Security principles in any organization. - 3GPP TR 33.894 is a study on the applicability of Zero Trust Security principles in mobile networks, providing technical details on how to implement this approach in a mobile network context. - Zero Trust Security principles involve a continuous evaluation of assets, including devices, applications, and users, to ensure that they are not inherently trusted and are monitored for security issues.

Perspective 2 Comparing MITRE's and Huawei's viewpoints regarding Zero Trust Security principles in mobile networks: - Both companies reference the 3GPP TR 33.894 study on the applicability of Zero Trust Security principles in mobile networks. - Huawei additionally references the NIST Special Publication 800-207 on Zero Trust Architecture, while MITRE does not. - MITRE emphasizes the importance of monitoring and measuring the integrity and security posture of all owned and associated assets, with no asset being inherently trusted. - Huawei's viewpoint on Zero Trust Security principles in mobile networks is not explicitly stated in the given context, but it can be inferred that they also see value in the approach given their reference to the 3GPP study. - The companies' different viewpoints may stem from their respective backgrounds and areas of expertise, as MITRE is a non-profit research and development organization while Huawei is a multinational technology company. - Practical use cases for Zero Trust Security principles in mobile networks could include preventing unauthorized access to sensitive data or systems, limiting the potential damage of a data breach, and enhancing overall network security. - Informational and technical details for implementing Zero Trust Security principles could include multi-factor authentication, microsegmentation of network resources, and continuous monitoring of network activity.

Perspective 3 MITRE's viewpoint regarding Zero Trust Security principles in mobile networks: - MITRE emphasizes the importance of monitoring and measuring the integrity and security posture of all owned and associated assets. - MITRE suggests that no asset should be inherently trusted, meaning that every asset should be verified before its access is granted. - MITRE's viewpoint aligns with NIST's zero trust tenets. Huawei's viewpoint regarding Zero Trust Security principles in mobile networks: - Huawei references NIST Special Publication 800-207 Zero Trust Architecture in addition to 3GPP TR 33.894 Study on applicability of the Zero Trust Security principles in mobile networks. - Huawei's viewpoint is not explicitly stated, but their references suggest that they consider NIST's zero trust architecture as a key component in mobile network security. Differences between MITRE and Huawei's viewpoints: - MITRE emphasizes the importance of measuring the integrity and security posture of all assets, while Huawei references NIST's zero trust architecture as a key component. - MITRE suggests that no asset should be inherently trusted, while Huawei's viewpoint on this matter is not explicitly stated. - MITRE's viewpoint aligns with NIST's zero trust tenets, while Huawei references additional sources beyond NIST. Practical use cases: - Implementing zero trust security principles in mobile networks can help prevent unauthorized access to sensitive information in the event of a security breach. - By verifying the security posture of all assets, mobile network operators can ensure that vulnerabilities in one asset do not compromise the security of the entire network. - NIST's zero trust architecture provides a framework for implementing zero trust security principles in mobile networks, while additional references such as Huawei's NIST Special Publication 800-207 Zero Trust Architecture can provide additional guidance.

References

1 S3_111_Berlin Agenda: 5.21 / TDoc S3-232776 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Huawei, HiSilicon
Evaluation for tenet 4

Paragraph: #7 Document for: Approval Agenda Item: 5.21 1 Decision/action requested This pCR updates and cleans-up Clause 5.1.6 Tenet #7: Data collection to improve security posture in TR 33.894. 2 References [1] 3GPP TR 33.894 "Study on applicability of the Zero Trust Security principles in mobile networks" [2] NIST Special Publication 800-207 Zero Trust Architecture.
Keywords: applicability

23 S3_111_Berlin Agenda: 5.21 / TDoc S3-233085 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Lenovo, US National Security Agency, Telefonica
Update to Tenet #7

Paragraph: #7 Document for: Approval Agenda Item: 5.21 1 Decision/action requested This pCR updates and cleans-up Clause 5.1.6 Tenet #7: Data collection to improve security posture in TR 33.894. 2 References [1] 3GPP TR 33.894, "Study on applicability of the Zero Trust Security principles in mobile networks (Release 18)".
Keywords: applicability

24 S3_111_Berlin Agenda: 5.21 / TDoc S3-232776 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by Huawei, HiSilicon
Evaluation for tenet 4

Paragraph: [2] NIST Special Publication 800-207 Zero Trust Architecture. 3 Rationale This contribution proposes an evaluation of the fourth tenet of [2] related to access to resources.
Keywords: fourth tenet of [2] related to access to resources

25 S3_111_Berlin Agenda: 5.21 / TDoc S3-233136 (Rel: Rel-18; WI: FS_ZTS; TS: 33.894; Status: available) by MITRE Corporation
ZTA approach: NF to NF Communication Access Control via PDP and PEP

Paragraph: [5] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security". [6] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".
Keywords: security; Network Domain Security (NDS); IP network layer security".

Example 8: drawing from insights gleaned in Example 7, we focus the 'Zero Trust Security' discourse within SA3, augmenting search parameters to include WG=S3, Agenda Item=5.21, and Spec=33.894. We undertake a refined search aimed at elucidating the contrasting viewpoints between MITRE, a major U.S. federal contractor, and Huawei, a frontrunner in indigenous Chinese technology, on this subject. The three perspectives demonstrate MITRE's and Huawei's varied viewpoints from different angles. **Perspective 1** asserts MITRE's commitment to continually evaluating all assets, rooted in NIST's zero trust tenets, ensuring no asset is inherently trusted. On the other hand, Huawei favors a holistic approach, as suggested by their emphasis on NIST's Zero Trust Architecture. The technical difference is highlighted in MITRE's granular focus on individual assets versus Huawei's broad viewpoint on security. **Perspective 2** further emphasizes this divergence, underlining Huawei's additional reference to NIST Special Publication 800-207, which MITRE doesn't explicitly mention. Here, the backgrounds of the two organizations are highlighted, hinting at the possible sources of their differing views. **Perspective 3** reiterates MITRE's emphasis on the evaluation of each asset and Huawei's reliance on established standards like NIST's Zero Trust Architecture and 3GPP TR 33.894. **The difference lies in their approaches: MITRE's detailed asset-centric approach vs Huawei's reliance on established standards for a holistic security view. Both strategies are aimed at robust network security, yet their nuances reflect their respective organizational philosophies.**