**3GPP TSG-SA5 Meeting #148e S5-234xyz**

**E-meeting, 17 - 25 April 2023**

**Source: SA5 Vice chair (Huawei)**

**Title: Collection of Rel-18 3GPP SA5 OAM WoP**

**Document for: Approval**

**Agenda Item: 6.1**

**This document takes the following inputs from rapporteurs:**

* S5-222396 (6.4.1) Rel-18 3GPP\_SA5 OAM WoP \_RANSC
* S5-222558 (6.4.2) Add Rel-18 3GPP\_SA5 OAM WoP for NSRULE
* S5-222559 (6.4.3) WoP for 6.4.3 AdNRM\_ph2
* S5-222100 (6.4.4) WoP proposal for eECM
* S5-222317 (6.4.5) WoP Proposal for Rel-18 Work Item on Enhancements of EE for 5G Phase 2
* S5-222127 (6.5.1) Discussion on WoP of FS\_eANL
* S5-222122 (6.5.2) Discussion on WoP of FS\_ANLEVA
* S5-222257 (6.5.3) Rel-18 3GPP\_SA5 OAM WoP\_FS\_eIDMS\_MN
* S5-222550 (6.5.4) Rel-18 3GPP\_SA5 OAM WoP FS\_NETSLICE\_IDMS
* S5-222187 (6.5.5) WoPs for AI-ML management study
* S5-222067 (6.5.6) DP on WoPs of FS\_MANWDAF
* S5-222372 (6.5.7) Discussion on Rel-18 3GPP SA5 OAM WoP of FS\_FSEV
* S5-222349 (6.5.8) Rel-18 WoP FS\_eSBMA
* S5-222529 (6.5.9) Work Packages (WoPs) for Study on Basic SBMA enabler enhancements (FS\_eSBMAe)
* S5-222318 (6.5.10) WoP of FS\_URLLC\_Mgt
* S5-222305 (6.5.11) WoP of FS\_5GLAN\_Mgt
* S5-222557 (6.5.12) WoP of FS\_MCVNF
* S5-222319 (6.5.13) Wop of FS\_MANS\_ph2
* S5-222561 (6.5.14) WoP proposal for 6.5.14 FS\_CICDNS
* S5-222212 (6.5.15) Work Packages (WoPs) for SID on further Enhancements of Management of Trace/MDT (FS\_5GMDT\_Ph2)
* S5-222562 (6.5.16) WoP proposal for 6.5.16 FS\_YANG
* S5-222273 (6.5.17) Rel-18 3GPP\_SA5 OAM WoP\_FS\_OAM\_eNPN
* S5-222306 (6.5.18) WoP Proposal for Rel-18 Study on 5G energy efficiency phase 2
* S5-222106 (6.5.19) FS\_NSOEU Work Package (WoP) Proposal
* S5-222110 (6.5.20) Wop of FS\_KQI\_5G
* S5-222104 (6.5.21) Wop of FS\_DCSA
* S5-222563 (6.5.22) WoP proposal for 6.5.22 FS\_NSCE
* S5-222331 (6.5.23) Wop of FS\_MEC\_ECM
* S5-232767 New Rel-18 WID on Intent driven Management Service for Mobile Network phase 2
* S5-232773 New WID on Enhancement of the Management Aspects related to NWDAF
* S5-232809 New WID on Management Aspects of NTN
* S5-233144 New WID on Enhancement of service based management architecture
* S5-233145 New WID on Management Aspect of 5GLAN
* S5-231199 AI/ML management
* S5-232811 New WID on enhanced management of non-public networks

This document is the revision based on S5-232012 Collection of Rel-18 3GPP SA5 OAM WoP

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| **WoP Item** | **WoP description** |
| **Intelligence and Automation** |
|  | **Self-Configuration of RAN NEs (RANSC)** **(China Mobile,Huawei) (SP-211431)****Target: SA5#152/ SA#102 (Dec 2023)** |
| **RANSC\_WoP#1** | 1. Specify concepts, use cases and requirements for Self-configuration management and ARCF data handling of RAN NEs. |
| **RANSC\_WoP#2** | 2. Specify the procedure of self-configuration management and ARCF data handling of RAN NEs; |
| **RANSC\_WoP#3** | 3. Specify the management services for self-configuration management and ARCF data handling of RAN NEs which may include the management operations and management information. |
|  | **Enhancement of Management Data Analytics phase 2(eMDAS\_Ph2) (Intel, NEC) (S5-224384)****Target: SA5#152/SA#102 (Dec 2023)** |
| **eMDAS\_Ph2\_WoP#1** | Definition of recommended actions related to non-3GPP domain where relevant (e.g., recommended interactions with ETSI NFV MANO or other domains based on the existing operations defined by the corresponding SDOs) |
| **eMDAS\_Ph2\_WoP#2** | Analytics (statistics and/or predictions) for an existing management data, like PM (Ref. TS 28.552), KPI (Ref. TS 28.554) and alarm (Ref. TS 28.532) |
| **eMDAS\_Ph2\_WoP#3** | Coordination between MDAFs (e.g., cross-domain MDAF and domain specific MDAF) for the specific cases where needed |
| **eMDAS\_Ph2\_WoP#4** | Control of MDA process (the process for making analytics for the request from a consumer) without impacting the network and services and without disclosing the vendor’s proprietary analytics algorithm |
| **eMDAS\_Ph2\_WoP#5** | Interaction and coordination between MDAF and other functions acting as MDAS consumer, including COSLA and SON |
| **eMDAS\_Ph2\_WoP#6** | Enhancement of existing MDA capabilities, in terms of the use cases, requirements and data definitions |
| **eMDAS\_Ph2\_WoP#7** | Use cases, requirements, enabling data, MDA types and MDA outputs for the MDA capabilities related to resource related analytics |
|  | **Intent driven Management Service for Mobile Network phase 2 (IDMS\_MN\_ph2) (Huawei, Ericsson) (S5-232767)****Target: SA5#152/SA#102 (Dec 2023)** |
| **IDMS\_MN\_ph2\_WoP#1** | Improve and correct the existing solutions for generic intent model in TS 28.312. |
| **IDMS\_MN\_ph2\_WoP#2** | Specify requirements and solutions for new scenarios for intent driven management for 3gpp network and services, including: # Intent driven approach for RAN energy saving # Intent driven approach for radio capacity assurance # Intent driven approach for 5GC management, specifically 5GC network delivering |
| **IDMS\_MN\_ph2\_WoP#3** | Specify new capabilities and solutions for intent driven management, including: # Intent report, including report intent fulfilment information and achieved value for expectation targets. # Intent conflict management, specifically priority information for intent, and notify/report intent conflict information. # Enablers for Intent Fulfilment, specifically mapping of Intents to MLEntities capabilities. # Intent fulfilment feasibility checks # Intent handling capability obtaining (i.e. allow MnS consumer know what expectation targets and expectation objects can be supported by MnS producer) |
| **IDMS\_MN\_ph2\_WoP#4** | Improve the existing solutions and specify new solutions for the requirements documented in TS 28.312: # Radio service intent expectations # Enhancement of radio network intent expectations |
| **IDMS\_MN\_ph2\_WoP#5** | Describe collaboration with other SDOs in the Annex of TS 28.312, including deployment scenarios for intent interface, and comparison of management operations and processes for intent management. |
|  | **New WID on Enhancement of the Management Aspects related to NWDAF ( MANWDAF) (China Telecom) (S5-232773)**Target:  **SA5#152/SA#102 (Dec 2023)** |
| **MANWDAF\_WoP#1** | 1 For the NWDAF applying for all deployment scenarios: 1.1. Specifying enhancement to support providing performance of the data collection actions initiated by NWDAF and data management services provided by NWDAF, including 1.1.1. the statistic information about how frequently the NWDAF collects data and service successful rate; 1.1.2. the statistic information about how frequently the data management services are requested and service successful rate. |
| **MANWDAF\_WoP#2** | 2. For the deployment scenario supporting multiple NWDAFs and coordination between multiple NWDAFs: 2.1. Specifying enhancement to support providing performance of the analytic services requested by the Aggregator NWDAF for aggregating the analytics information from the other NWDAFs, including 2.1.1. the statistic information about how frequently a specific analytic service is requested and the service successful rate. |
| **MANWDAF\_WoP#3** | 3. For the deployment scenario including NWDAF with logical decomposition: 3.1. Specifying enhancement to 3GPP NRMs to support management of NWDAF supporting logical decomposition, i.e. the NWDAF which is deployed with only MTLF (Model Training Logical Function) or with only AnLF (Analytics Logical Function) or both MTLF and AnLF; 3.2. Specifying enhancement to support providing performance of the analytic services provided by NWDAF which contains AnLF, including 3.2.1. the statistic information about how frequently a specific analytic service is requested and the service successful rate; 3.2.2. performance of NWDAF about time consumed by NWDAF to provide a specific analytic service and analytics generation failures related to timing attributes specified in the analytics subscription/request; 3.3. Specifying enhancement to support providing performance of the ML model provisioning services provided by NWDAF which contains MTLF, including 3.3.1. the statistic information about how frequently a ML model specified for an analytic is requested and the service successful rate; |
|  | **AI/ML management (AIML\_MGMT) (Intel,NEC) (S5-231199)**Target:  **SA5#152/SA#102 (Dec 2023)** |
| **AIML\_MGMT\_WoP#1** | To specify the AI/ML management capabilities, including use cases, requirements and solutions for each phase of the AI/ML operational workflow for managing the AI/ML capabilities in 5GS (i.e., management and orchestration (e.g., MDA defined in TS 28.104), 5GC (e.g., NWDAF defined in TS 23.288) and NG-RAN (e.g., RAN intelligence defined in TS 38.300 and TS 38.401)), including- Management capabilities for ML training phase, which includes control of producer-initiated ML training, data management for ML training, performance evaluation for ML training, ML entity validation, ML context management, ML entity capability discovery, ML entity testing;- Management capabilities for ML deployment phase, including management of ML entity loading; and- Management capabilities for AI/ML inference phase. |
| **AIML\_MGMT\_WoP#2** | To describe the deployment scenarios of the AI/ML management capabilities, with consideration of alignment with other relevant 3GPP WGs (e.g., RAN3, SA2) and ETSI ISG ZSM. |
| **Management Architecture and Mechanisms** |
|  | **Network slicing provisioning rules (NSRULE)** **(Ericsson) (SP-211449)****Target: SA5#149/SA#100(Jun 2023)** |
| **NSRULE\_WoP#1** | 1.Extend allocation and modification use cases and procedures to allow the MnS consumer to provide a list of additional rules as part of the requirements to be fulfilled in request towards network slice or network slice subnet provisioning MnS producer. |
| **NSRULE\_WoP#2** | 2.The list of rules provided by the consumer should be able to include different kinds of rules to guide MnS producer decisions, supporting:* Ability to control NetworkSlice or NetworkSliceSubnet instance sharing
* Ability to control sharing/isolation of resources based on different types and granularities
* Ability to express that sharing is required in addition to allowed or not allowed
* Ability to indicate a group, restricting mandatory or optional sharing expressed in the rule to set of profiles for which the same group was indicated in the allocation or modification request.
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|  | **Additional NRM features Phase 2 (AdNRM\_ph2)****(Nokia, Nokia Shanghai Bell) (SP-220351)****Target: SA5#153/SA#103(Mar 2024)** |
| **AdNRM\_ph2\_WoP#1** | 1.5GC NRM enhancement for UPF/PCF/UDM.2.leftover of Rel17 NRM, including NR\_feMIMO related attributes, stage 3 enhancement and generic NRM enhancement |
| **AdNRM\_ph2\_WoP#2** | 3.5GC NRM enhancement for UDM, UDR, NSSF.4. leftover of Rel17 NRM enhancement |
| **AdNRM\_ph2\_WoP#3** | 5.5GC NRM enhancement for NSSF/NEF/NWDAF and other Core NF.6.Enhance NRM to support features, including architecture enhancements for the support of 5G core System Enhancement, and enhancement for NR |
| **AdNRM\_ph2\_WoP#4** | 7. 5GC NRM enhancement for AUSFFunction/UDSFFunction/NSACFFunction 8. 5GC NRM enhancement for NRFFunction/LMFFunction/SEPPFunction/SCPFunction/DDNMFFunction and other core NF |
|  | **Enhanced Edge Computing Management (eECM)****(Samsung, Intel) (SP-220154)****Target: SA5#152/SA#102(Dec 2023)** |
| **eECM\_WoP#1** | 1. Specifying the leftovers from Rel-17 WID on edge computing management, including updates to NRM, enhancement for PA and FS and support for the asynchronous mode of operations for LCM. |
| **eECM\_WoP#2** | 2.GSMA driven new use cases and requirements |
| **eECM\_WoP#3** | 3.Solutions for GSMA driven use cases and requirements |
| **Completed** | **Enhancement of QoE Measurement Collection (eQoE)****(Ericsson) (SP-200193)****Target: SA5#147/SA#99(Mar 2023)** |
| **eQoE\_WoP#1** | WoP1: Remaining items from Rel-17  |
| **eQoE\_WoP#2** | WoP2: Alignment with RAN groups |
|  | **Access control for management service (MSAC) (Nokia) (SP-210859)****Target: SA5#152/SA#102(Dec 2023)** |
| **MSAC\_WoP#x** | 0. add authentication and authorization services in service based management architecture, and refine interactions between MnS producer and MnS consumer to include authentication and authorization steps |
| **MSAC\_WoP#1** | 1. Enhance generic Network Resource Model to support access control NRM fragment and stage 3 implementation |
| **MSAC\_WoP#2** | 2. Specify the access control service for authentication and authorization, including stage 3 |
| **MSAC\_WoP#3** | 3. (reserved for possible open issues) Finalize access control NRM and access control service. |
| **MSAC\_WoP#4** | 4. Single TS to specify the access control service |
|  | **Enhancements of 5G performance measurements and KPIs phase 2 (** **PM\_KPI\_5G\_Ph3)****(China Telecom, Intel) (SP-220690/** **S5-233143)****Target: SA5#152/SA#102 (Dec 2023)** |
| **PM\_KPI\_5G\_Ph3\_ WoP#1** | 1. To define the 5G performance measurements and KPIs for the following features:- Further Enhancement on MIMO;- Multi-carrier enhancements;- NR small data transmissions in INACTIVE state;- Enhancement to the 5GC LoCation Services;- Access Traffic Steering, Switch and Splitting support in the 5G system architecture;- Enhanced Service Enabler Architecture Layer for Verticals. |
| **PM\_KPI\_5G\_Ph3\_WoP#2** | 2. To define the 5G performance measurements and KPIs that are still missing for monitoring the features that have been covered by TS 28.552 and 28.554 in Rel-17. |
| **PM\_KPI\_5G\_Ph3\_WoP#3** | 3. To further enhance performance data streaming and specify GPB serialization format. |
| **PM\_KPI\_5G\_Ph3\_WoP#4** | 4, Define the performance measurements required to support AI/ML enabled NG RAN. The measurements include data collected from UE, serving nodes, and neighbouring nodes that are to support the following RAN intelligence functions:- Network Energy Saving- Load Balancing- Mobility Optimization |
| **Completed** | **Methodology for deprecation (OAM\_MetDep) (Ericsson) (S5-225616)****Target: SA5#147/SA#99(Mar 2023)** |
| **OAM\_MetDep\_WoP#1** | Specify the methodology for how deprecation shall be used in SA5 TSs. |
|  | **Management of Trace/MDT phase 2 (5GMDT\_Ph2) (Nokia) (SP-221163)****Target: SA5#152/SA#102 (Dec 2023)** |
| **5GMDT\_Ph2\_WoP#1** | 1. Specify adaptations and enhancements of TraceJob to align with PerfMetricJob |
| **5GMDT\_Ph2\_WoP#2** | 2. Specify enhancements for Trace/MDT necessary due to SBMA framework. |
| **5GMDT\_Ph2\_WoP#3** | 3. Specify enhancements for Management of Data Collection of MDT |
| **5GMDT\_Ph2\_WoP#4** | 4. Define the enhancements needed such that management system can support the features specified in Rel-18 RAN WI "NR\_ENDC\_SON\_MDT\_enh2-Core". |
| **5GMDT\_Ph2\_WoP#5** | 5. Specify MDT enhancements to allow collection of newly specified RAN3 data such as resource status prediction or energy efficiency prediction. |
|  | **Management Aspects of NTN (OAM\_NTN) (China Unicom, CATT)) (S5-232809)****Target: SA5#152/SA#102 (Dec 2023)** |
| **OAM\_NTN\_WoP#1** | 1. Specifying the concept, use case and requirements associated with business roles and service for 3GPP management system with integrated satellite IoT component(s); |
| **OAM\_NTN\_WoP#2** | 2. Specifying enhancement to 3GPP NRMs supporting IoT NTN; |
| **OAM\_NTN\_WoP#3** | 3. Specifying appropriate performance measurements and KPIs for IoT NTN. |
|  | **Enhancement of service based management architecture (SBMA\_Ph2) (Huawei, Ericsson, Nokia) (S5-233144)****Target: SA5#153/SA#103 (Jan 2024)** |
| **SBMA\_Ph2\_WoP#1** | 1. Improvement on the existing TS 28.533 description of SBMA including improving the overview of SBMA series specifications based on Rel-18 work progress. |
| **SBMA\_Ph2\_WoP#2** | 2. Address the architecture enhancement based on the collaboration with other industry groups (e.g GSMA OPG etc.). |
| **SBMA\_Ph2\_WoP#3** | 3. Restructure the specifications for Fault supervision. |
| **SBMA\_Ph2\_WoP#4** | 4. Update 32.300 "Name convention for Managed Objects" to include SBMA. |
| **SBMA\_Ph2\_WoP#5** | 5. Update 32.404 " Performance Management (PM); Performance measurements; Definitions and template " to be valid for SBMA |
| **SBMA\_Ph2\_WoP#6** | 6. Add node selection mechanism (inspired by XPath) for targeted notification subscriptions |
| **SBMA\_Ph2\_WoP#7** | 7. Update stage 2 definitions of the Prov MnS based on the update proposals documented in clause 4.3 and 4.4 of TR 28.831. |
|  | **Management Aspect of 5GLAN (5GLAN\_Mgt) (CMCC) (S5-232145)****Target: SA5#152/SA#102 (Dec 2023)** |
| **5GLAN\_Mgt\_WoP#1** | Specifying the enhanced NRM to support the management of 5G LAN-type services, including configuration management of 5G NF. |
| **5GLAN\_Mgt\_WoP#2** | Specifying enhancements in the management system of new performance measurement, related KPIs and attributes at the VN group level. |
| **Support of new services** |
|  | **Enhancements of EE for 5G Phase 2 ( EE5GPLUS\_Ph2) (Huawei) (SP-211441)****Target: SA5#152/ SA#102(Dec 2023)** |
| **EE5GPLUS\_Ph2\_WoP#1** | 1.Address the cross-WGs/SDOs issues related to energy efficiency / energy savingAddress any remaining solutions from pending Rel-17 itemsConsider conclusions from the companion Rel-18 Study on new aspects of EE for 5G networks Phase 2Specify new use cases, requirements and solutions for energy saving,Provide OA&M solutions, if needed, to energy saving use cases and requirements expressed by other 3GPP working groups |
| **EE5GPLUS\_Ph2\_WoP#2** | 2.Defines new KPIs |
|  | **Network slice provisioning enhancement (eNETSLICE\_PRO) (Samsung) (SP-211434)****Target: SA5#152 / SA#102(Dec 2023)** |
| **eNETSLICE\_PRO\_WoP#1** | 1. Update procedures and operations in TS 28.531 to support asynchronous mode of operation. |
| **eNETSLICE\_PRO\_WoP#2** | 2. Add or update stage 3 OpenAPI and YANG solution sets where needed. |
|  | **New WID on enhanced management of non-public networks (OAM\_eNPN) (Huawei) (S5-232811)****Target: SA5#152/SA#102 (Dec 2023)** |
| **OAM\_eNPN\_WoP#1** | - Specify enhanced management of SNPN and PNI-NPN. For example, new requirements and solutions (e.g. NRM modelling, provisioning procedures) to support SA1, SA2 and RAN3 normative work for NPN. |
| **OAM\_eNPN\_WoP#2** | - Specify requirements and solutions for management of the related information for NPN service customer context information, which can be applied by NPN service provider to restrict the management capabilities and corresponding managed network resources exposed to NPN service customer. |
| **OAM\_eNPN\_WoP#3** | - Specify requirements and solutions for fault management capabilities scoping NPN and 5G industry terminals, taking 5G ACIA requirements (such as requirements on network monitoring and network configuration and maintenance for 5G NPN, see 5G-ACIA White Paper: Exposure of 5G Capabilities for Connected Industries and Automation Applications) into account. |
| **OAM\_eNPN\_WoP#4** | - Specify requirements and solutions for SLA monitoring and evaluation in NPN scenarios. |
| **Intelligence and Automation** |
|  | **Study on enhancement of autonomous network levels (FS\_eANL) (China Mobile, Huawei)(SP-211446)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_eANL\_WoP#1** | 1.Identify the additional generic MnS requirements of generic autonomous network level for network optimization, RAN NE deployment and fault management defined in Rel-17. |
| **FS\_eANL\_WoP#2** | 2.Study the potential solutions for generic MnS requirements identified in WoP#1. |
| **FS\_eANL\_WoP#3** | 3.Identify the enhanced autonomy capabilities corresponding to different autonomous network levels for additional management use cases which is not defined in Rel-17. |
| **FS\_eANL\_WoP#4** | 4.Study the concrete enhanced autonomy requirements and potential solutions for the enhanced autonomy capabilities identified in WoP#3. |
|  | **Study on evaluation of autonomous network levels(FS\_ANLEVA)(China Mobile, Huawei)(SP-211445)****Target: SA5#152/SA#102(Dec 2023)** |
| **FS\_ANLEVA\_WoP#1** | 1.Study the generic methodology for quantitatively evaluating the autonomous network levels. |
| **FS\_ANLEVA\_WoP#2** | 2.Study the key effectiveness indicators (KEI) for evaluating the effects of achieving each autonomous network level for each identified scenarios from network management perspective. |
| **FS\_ANLEVA\_WoP#3** | 3.Study the process of autonomous network levels evaluation for the use cases defined in Rel-17. |
| **FS\_ANLEVA\_WoP#4** | 4.Identify the potential autonomy requirements for corresponding management services with evaluation of autonomous network levels.  |
|  | **Study on enhanced intent driven management services for mobile networks (FS\_eIDMS\_MN)****(Huawei, Ericsson) (SP-211450)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_eIDMS\_MN\_WoP#1** | 1.Investigate the new requirements for intent driven management for 3gpp network and services in the multi-vendor environment. |
| **FS\_eIDMS\_MN\_WoP#2** | 2.Investigate the new generic capabilities for intent driven management, which includes but not limited to:* Intent capability obtaining, allowing MnS consumer to obtain which intent expectation capability (e.g. coverage target and corresponding value range, RAN UE throughput target and corresponding value range, recommendations regarding partial or best effort fulfilling of the target) can be fulfilled by MnS producer.
* Improvements for Intent LCM automation (e.g. around detection of conflicting requirements and their resolution), improvements for common Intent model and model extensions
 |
| **FS\_eIDMS\_MN\_WoP#3** | 3. Investigate the solution (including enhance the intent information model based on R17 generic intent information model) to support Rel-17 leftover requirements (including intent expectation and intent report for radio network coverage performance to be assured and RAN UE throughput performance to be assured, IntentExpectation for radio service). |
| **FS\_eIDMS\_MN\_WoP#4** | 4. Collaboration/alignment for intent driven management (e.g. model federation) with other SDOs (e.g. ETSI ZSM, TM Forum) should be considered. |
| **FS\_eIDMS\_MN\_WoP#5** | 5. Conclusion and recommendation |
|  | **Study on intent-driven management for network slicing (FS\_NETSLICE\_IDMS)** **(Huawei, Ericsson) (****[SP-220278](https://www.3gpp.org/ftp/tsg_sa/TSG_SA/TSGS_95E_Electronic_2022_03/Docs/SP-220278.zip%22%20%5Ct%20%22_blank))****Target: SA5#149/SA#100(Jun 2023)** |
| **FS\_NETSLICE\_IDMS\_WoP#1** | 1. Potential mapping of slice management concepts, use cases and operations in TS 28.531 and related specifications to corresponding intent-driven management concepts, use cases and operations in TS 28.312. Both deployment and assurance are in scope. Domains include e2e for network slices, and RAN (NR) and CN (5GC) for network slice subnets. Areas where gaps exist, or where for other reason enhancements to the intent-driven framework would be needed should also be identified and potential new requirements and use cases should be proposed |
| **FS\_NETSLICE\_IDMS\_WoP#2** | 2. Investigation of how input requirements currently captured in service and slice profile attributes could instead be expressed as intent expectations including requirements, goals and constraints. |
| **FS\_NETSLICE\_IDMS\_WoP#3** | 3 Study of how standardized expectations for slicing can be combined with expectations based on types defined locally by operator or vendor. This is expected to be based on generic extension mechanisms for intents and expectations and should be coordinated with any related work done as part of ongoing work items, e g IDMS\_MN. |
| **FS\_NETSLICE\_IDMS\_WoP#4** | 4. With intent-driven management, the MnS consumer is providing input mainly via intent expectations and receiving output mainly via intent reports. Thus, the study should consider what parts of existing solution for network slicing might still be applicable and what parts are not. In addition, if still applicable, the study should further describe the possible relationship. This includes the following management components:a) NRM entities such as NetworkSlice and NetworkSliceSubnetb) Components used for reporting of slicing related data |
| **FS\_NETSLICE\_IDMS\_WoP#5** | 5 Conclusions and recommendations for further work |
|  | **Study on AI/ ML management (FS\_AIML\_MGMT)****(Intel, NEC) (SP-211443)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_AIML\_MGMT\_WoP#1** | General aspects (including scope, background, concept and overview, etc.) |
| **FS\_AIML\_MGMT\_WoP#2** | Use cases and potential requirements for management of AI/ML capabilities for the AI/ML-enabled functions. |
| **FS\_AIML\_MGMT\_WoP#3** | Possible solutions for management of AI/ML capabilities for the AI/ML-enabled functions. |
| **FS\_AIML\_MGMT\_WoP#4** | .Investigation of coordination between the AI/ML management capabilities and the AI/ML capabilities in 5GC |
| **FS\_AIML\_MGMT\_WoP#5** | Relation between AI/ML management and other services/functions/entities (including MnSs and network functions/entities) |
| **FS\_AIML\_MGMT\_WoP#6** | Investigation of deployment scenarios where the solutions are needed for AI/ML model training and each of the AI/ML model management capability mentioned in objective 1) |
| **FS\_AIML\_MGMT\_WoP#7** | Conclusion and recommendations |
|  | **Study on Enhancement of the management aspects related to NWDAF (FS\_MANWDAF)****(China Telecom) (SP-211435/S5-232624)****Target: SA5#149/SA#100(Jun 2023)** |
| **FS\_MANWDAF\_WoP#1** | 1.Investigate whether the NRM of NWDAF needs to be enhanced to support the logical decomposition of NWDAF and the deployment of multiple NWDAF in a hierarchy/tree with a flexible number of layers/branches, and how; |
| **FS\_MANWDAF\_WoP#2** | 2.Investigate and provide the performance management of the NWDAF on the following aspects:(1).Interaction aspect, such as quantifying the requests, subscriptions, responses and notifications received and/or generated by NWDAF.(2).Data collection aspect, such as quantifying data collection.(3).Output KPI aspect, such as measuring response time and training times, indicating model accuracy.(4).Efficiency aspect, such as estimating the usage of compute resource for treating the request/subscription, etc.  |
|  | **Study on Fault Supervision Evolution (FS\_FSEV) (China Mobile, Huawei)(SP-220153)****Target: SA5#149/SA#100(Jun 2023)** |
| **FS\_FSEV\_WoP#1** | 1. The relationship between fault supervision evolution and other aspect, e.g. performance management |
| **FS\_FSEV\_WoP#2** | 2. How fault supervision evolution supports 5G use cases, such as 5G SLS deterioration, risk prediction |
| **FS\_FSEV\_WoP#3** | 3. Relation and interaction with eMDAS and eCOSLA for evolved fault supervision, e.g., how to take advantage of and integrate eMDAS capabilities into the solutions and if any, recommended capabilities needed for eMDAS enhancements.4. Whether there are use cases in eMDAS and eCOSLA that are not covered by the existing Fault Supervision.5. Whether new capabilities and additional alarm data are needed to support eMDAS and eCOSLA.  |
|  | **Study on measurement data collection to support RAN intelligence (FS\_MEDACO\_RAN)****(Intel, China Mobile)****Target: SA5#146/SA#98(Dec 2022)** |
| **FS\_MEDACO\_RAN\_WoP#1** | 1. Specify skeleton, concept and overview for measurement data collection for AI/ML enabled RAN. |
| **FS\_MEDACO\_RAN\_WoP#2** | 2. Specify  use cases, requirements, and potential solutions  for measurement data collection for AI/ML enabled RAN. |
| **FS\_MEDACO\_RAN\_WoP#3** | 3.   Specify  use cases, requirements, potential solutions and conclusion  for  measurement data collection for AI/ML enabled RAN. |
| **Management Architecture and Mechanisms** |
|  | **Study on Enhancement of service based management architecture (** **FS\_eSBMA )** **(Huawei, Ericsson)(SP-211451)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_eSBMA\_WoP#1** | 1. Investigate the content in TS 32.101 which is applicable for 5G management architecture. 2. Study on illustration of how management reference model in TS 32.101 can be supported with management services defined in SBMA specified in TS 28.533. |
| **FS\_eSBMA\_WoP#2** | 3. Investigation on whether there are more information in other IRP specifications that should be moved or converted to support SBMA. |
| **FS\_eSBMA\_WoP#3** | 4. Study and clarify how SBMA could support the management of 5G SA and NSA scenarios. |
| **FS\_eSBMA\_WoP#4** | 5. Study management architectures and frameworks specified in other relevant SDOs and open source projects, and investigate whether and how they can be supported by SBMA.  |
| **FS\_eSBMA\_WoP#5** | 6. Investigate the principles for standardizing management of Management Functions (which types of Management Functions needs to be managed, is configuration and performance counters etc. needed).7. Make a recommendation of which Management Functions shall be managed and what management information is needed, especially for Management Functions that already have some management (e.g. objects and attributes).  |
| **FS\_eSBMA\_WoP#6** | 8. Investigate if new management mechanisms for managing Management Functions are needed. |
|  | **Study on Basic SBMA enabler enhancements (FS\_eSBMAe) (Nokia)(SP-220145)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_eSBMAe\_WoP#1** | 1.Investigate how the stage 2 definitions of the Fault Supervision MnS in TS 28.532 can be enhanced (with potential impact on TS 28.622/28.623) |
| **FS\_eSBMAe\_WoP#2** | 2.Investigate how the stage 2 definitions of the Prov MnS in TS 28.532 can be enhanced (to reflect mainly CM capabilities available already in the REST SS and NETCONF SS) |
| **FS\_eSBMAe\_WoP#3** | 3.Investigate if new capabilities should be added to the Provisioning MnS, for example the concept of creating and removing attributes of managed object instances, or filter profiles |
| **FS\_eSBMAe\_WoP#4** | 4.Investigate how the notification subscription mechanism in TS 28.622 can be enhanced (to allow for more targeted subscriptions, e.g. for changes of single attributes) |
| **FS\_eSBMAe\_WoP#5** | 5.Study versioning concepts (to allow forversioning independent of the TS version number) |
| **FS\_eSBMAe\_WoP#6** | 6.Study backwads compatability concepts |
| **FS\_eSBMAe\_WoP#7** | 7.Investigate how the logging capability in the IRP framework (TS 32.332) can be moved to SBMA, and potentially be benhanced to include e.g. also operations  |
| **FS\_eSBMAe\_WoP#8** | 8.Investigate how the transaction capability in the IRP framework (TS 32.612) can be moved to SBMA, and potentially be enhanced |
| **FS\_eSBMAe\_WoP#9** | 9.Study the need for generic triggers for starting and stopping functions based on specific events |
| **FS\_eSBMAe\_WoP#10** | 10.Study enhancements for the specification methodology (e.g. introduction of a Presence Qualifier, specification template for NRM fragments, introduction of common stage 2 data type definitions, naming conventions for e.g. attributes, object classes and data types) |
|  | **Study on Management Aspects of URLLC (FS\_URLLC\_Mgt) (ChinaUnicom)(SP-220146)****Target: SA5#149/SA#100(Jun 2023)** |
| **FS\_URLLC\_Mgt\_WoP#1** | 1. Study potential requirements related to management of URLLC serviced-based features in RAN network; |
| **FS\_URLLC\_Mgt\_WoP#2** | 2. Study the potential configuration management requirements when eMBB and URLLC are deployed in RAN with different coexistence modes; |
| **FS\_URLLC\_Mgt\_WoP#3** | 3. Study whether new performance measurements and new key indicators needs to be introduced to TS 28.552 and TS 28.554 to evaluate the performance of URLLC service. |
| **FS\_URLLC\_Mgt\_WoP#4** | 4. Specify which performance measurements defined in TS 28.552 should be reported on a per-service granularity to evaluate services respectively. |
|  | **Study on Management Aspects of 5GLAN (FS\_5GLAN\_Mgt) (China Mobile) (SP-220324)****Target: SA5#147/SA#99(Mar 2023)** |
| **FS\_5GLAN\_Mgt\_WoP#1** | 1.Use cases and potential requirements for 5G management system which supports 5G LAN-type services |
| **FS\_5GLAN\_Mgt\_WoP#2** | 2.Investigate potential enhancement of network configuration to support 5G LAN-type services (e.g. configuration of service area where 5G VN group communication is applicable to the UEs) |
| **FS\_5GLAN\_Mgt\_WoP#3** | 3.Investigate potential enhancement of performance measurement in VN group level |
| **FS\_5GLAN\_Mgt\_WoP#4** | 4.Investigate the new end-to-end network KPIS in VN group level to evaluate the consistence of group UE experience |
|  | **Study on Management of Cloud Native Virtualized Network Functions (FS\_MCVNF)** **(China Mobile) (SP-220150)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_MCVNF\_WoP#1** | 1.The use cases for the management of cloud-native virtualized network functions The potential requirements for the management of cloud-native virtualized network functions. |
| **FS\_MCVNF\_WoP#2** | 2.The potential impacts on the 3GPP management system |
| **FS\_MCVNF\_WoP#3** | 3.The potential solution(s) for the management of cloud-native virtualized network functions |
|  | **Study on Management Aspects of 5G MOCN Network Sharing Phase2 (FS\_MANS\_ph2)** **(China Unicom)(SP-220151)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_MANS\_ph2\_WoP#1** | 1. Study the requirements between Participating Operator(POP) and Master Operator(MOP), and impact on interaction between Master Operator(MOP) and Network Equipment Provider(NEP); |
| **FS\_MANS\_ph2\_WoP#2** | 2. Study the management architecture of 5G MOCN network sharing; |
| **FS\_MANS\_ph2\_WoP#3** | 3. Study more performance measurements for 5G MOCN network sharing. |
|  | Study on continuous integration continuous delivery support for 3GPP NFs (FS\_CICDNS) (Lenovo) (SP-211427)**Target: SA5#143e/SA#96(Jun 2022)** |
| **FS\_CICDNS\_WoP#1** | 1.Automation of the CI-CD pipeline (Overall process) |
| **FS\_CICDNS\_WoP#2** | 2.Multi-vendor joint testing environment including testing of NFs in operational environment (including as part of NSSI or NSI instances)(Test Orchestration) |
|  | **Study on Management of Trace/MDT phase 2 (FS\_5GMDT\_Ph2) (Nokia) (SP-220152)****Target: SA5#149/SA#100(June 2023)**  |
| **FS\_5GMDT\_Ph2\_WoP#1** | 1.Investigate potential benefits of aligning attributes of TraceJob and PerfMetricJob e.g. reporting control |
| **FS\_5GMDT\_Ph2\_WoP#2** | 2.Study further changes for Trace/MDT necessary due to SBMA framework (e.g. how to handle TraceJob in NRM in case of handover for signalling based activation, meaning of name containment for TraceJob) |
| **FS\_5GMDT\_Ph2\_WoP#3** | 3.Study on management of data collection enhancement of logged and immediate MDT specified by RAN2 and RAN3 |
| **FS\_5GMDT\_Ph2\_WoP#4** | 4.Study on management of MDT enhancements for NPN and RACH enhancements specified by RAN2 and RAN3. |
| **FS\_5GMDT\_Ph2\_WoP#5** | 5.Study on MR-DC related MDT configuration and reporting specified by RAN2 and RAN3 |
| **FS\_5GMDT\_Ph2\_WoP#6** | 6.Study on enhancement of reporting and internode communication specified in RAN2 and RAN3, e.g. RLF and accessibility measurements, Successful Handover reporting |
| **FS\_5GMDT\_Ph2\_WoP#7** | 7.Study on MDT enhancements to allow collection of newly specified RAN3 data such as resource status prediction or energy efficiency prediction.  |
| **FS\_5GMDT\_Ph2\_WoP#8** | 8.Derive recommendations for a normative work item. |
|  | **Study on YANG PUSH(FS\_YANG)** **(Ericsson) ( SP-200765)****Target: SA5#146/SA#98(Dec 2022) – Stopped in SA5#144e** |
| **FS\_YANG\_Wop#1** | Monitoring the progress of the CR for Data change notificationsMonitoring the progress of the CR for Data change notificationsIf this CR succeeds the study can be closed down. |
| **FS\_YANG\_Wop#2** | Specifying a notification solution for the YANG-Netconf solution set based on YANG-Push, CM Notifications |
| **FS\_YANG\_Wop#3** | Specifying a notification solution for the YANG-Netconf solution set based on YANG-Push, FM Notifications |
| **FS\_YANG\_Wop#4** | Specifying a notification solution for the YANG-Netconf solution set based on YANG-Push, PM Notifications |
| **FS\_YANG\_Wop#5** | Specifying a notification solution for the YANG-Netconf solution set based on YANG-Push, Heartbeat Notifications |
|  | **Study on Management Aspects of IoT NTN Enhancements****(FS\_IOT\_NTN) (China Unicom) (SP-220490)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_IOT\_NTN\_WoP#1** | 1. Add the use cases and requirements associated with service and network management of an IoT NTN enhancements;  |
| **FS\_IOT\_NTN\_WoP#2** | 2.  investigate specific IoT NTN related parameters which should be considered by O&M |
| **FS\_IOT\_NTN\_WoP#3** | 3.   Investigate NRM enhancement and performance measurement and related new KPIs of IOT NTN to support IOT NTN |
|  | Study on Data management phase 2 (FS\_MADCOL\_ph2)(Nokia) (S5-225617)Target:  **SA5#149/ SA#100 (June 2023)** |
| **FS\_MADCOL\_ph2\_WoP#1** | 1. study methods to discover stored (historical) management data |
| **FS\_MADCOL\_ph2\_WoP#2** | 2.study enhancements for existing methods to report and retrieve newly produced management data and stored (historical) management data. Model-driven solutions need to be considered |
| **FS\_MADCOL\_ph2\_WoP#3** | 3.study enhancements for existing methods to control management data production |
| **FS\_MADCOL\_ph2\_WoP#4** | 4.study methods to manage external management data |
| **Support of new services** |
|  | **Study on enhancement of management of non-public networks (FS\_OAM\_eNPN) (Huawei) (SP-211436/S5-232879)****Target: SA5#147/SA#99(Mar 2023)** |
| **FS\_OAM\_eNPN\_WoP#1** | 1. Study enhanced management of SNPN and PNI-NPN. For example, study new requirements and potential solutions of management capability exposure for SNPN and PNI-NPN, and how the mobile network operator and vertical customer cooperate to realize management and orchestration of network in MNO-Vertical Managed Mode for PNI-NPN and SNPN in TS 28.557. |
| **FS\_OAM\_eNPN\_WoP#2** | 2. Study management of vertical as an authorized NPN service customer, e.g. the management of authorized capability of utilizing management services and management data. |
| **FS\_OAM\_eNPN\_WoP#3** | 3. Study requirements and potential solutions to support end to end network management (including RAN domain and CN domain) in NPN scenarios. |
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|  | **Study on new aspects of EE for 5G networks Phase 2 (FS\_EE5G\_Ph2) (Huawei) (SP-211440)****Target: SA5#149/ SA#100 (June 2023)** |
| **FS\_EE5G\_Ph2\_WoP#1** | 1.On the energy consumption of Network Functions (Work Package 1):* Study whether additional virtual resource metrics provided by NFV MANO other than virtual CPU usage, such as e.g. virtual memory usage, virtual disk usage, etc., could participate to define VNF energy consumption,
* Study how the existing virtual CPU usage metric provided by NFV MANO could give more accurate measurements,
* Study a method to estimate the energy consumption of Containerized Network Functions (CNF) and elaborate corresponding energy consumption KPI(s) definition;

2.On the energy efficiency KPIs (Work Package 1):* Investigate on the definition of new EE KPIs which consider aspects such as e.g. coverage area, user experience, reliability of URLLC network slice,
* Investigate how to define the energy efficiency KPI for V2X type of network slice,
* Investigate further on definition of the Resource Efficiency KPI, in particular on the Useful Output of 5GC network functions,
* Investigate further for solutions to any outstanding issue from Rel-17;
 |
| **FS\_EE5G\_Ph2\_WoP#2** | 3.On energy saving (Work Package 2):* Study new use cases, requirements and solutions for energy saving, applying to NG-RAN and/or 5GC and/or network slicing, including AI/ML assisted energy saving. This study will focus on end-to-end energy saving use case(s) description and potential solution(s) leveraging the Rel-18 study on AI/ML management,
* Study OA&M support to other 3GPP WGs energy saving use cases and solutions, if any;

4.On digital sobriety (Work Package 2):* Study which forms digital sobriety could take in SA5, e.g. minimize the volume of OA&M data (number of operation parameters in MnS APIs, input data to MDAF, etc.) to be transported and/or stored,
* Study if any metrics can be defined to compare different alternative solutions with regards to digital sobriety.
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|  | **Study on Network and Service Operations for Energy Utilities ( FS\_NSOEU) (Samsung) (SP-211622)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_NSOEU\_WoP#1** | 1. Agree to skeleton, scope, overview, supporting annex, WoP list. |
| **FS\_NSOEU\_WoP#2** | 2a.Capture users, roles, current practice, problem statement for (i)Motivation: This information will enable the Utility to proactively identify and respond to problems (e.g. to determine when to initiate a back-up communication service) and thereby achieve higher availability. |
| **FS\_NSOEU\_WoP#3** | 2b.i.Study how MNOs can provide standardized monitoring information corresponding to network performance problems to Energy Utility mobile telecommunication customers. Capture use cases, requirements |
| **FS\_NSOEU\_WoP#4** | 2c.Capture solutions for (i), with consideration of existing capabilities. |
| **FS\_NSOEU\_WoP#5** | 3a.Capture users, roles, current practice, problem statement for (ii) Motivation: This information will enable MNOs to leverage extensive performance information known to the customer in their own processes. It will potentially improve response time to resolve a communication system performance incident, as currently this information is not delivered in any standard manner. |
| **FS\_NSOEU\_WoP#6** | 3b.ii.Study how Energy Utility customers of MNOs can provide standardized reports of network performance problems to MNOs. |
| **FS\_NSOEU\_WoP#7** | 3c.Capture solutions for (ii) , with consideration of existing capabilities. |
| **FS\_NSOEU\_WoP#8** | 4a. Capture users, roles, current practice, problem statement for (iii) Motivation: Mobile telecommunications require energy, so will also suffer an outage when the energy system is interrupted. Currently disaster recovery plans are ‘static’ and data exchanged is not standards based. The Utility knows when and where recovery will occur and when communications are critically important for recovery. The MNO knows their uninterruptable power supply resources and the possibility of availability of the communication system to enable Energy system recovery. |
| **FS\_NSOEU\_WoP#9** | 4b.iii. Study how Energy Utility service providers and MNOs can exchange information in a standardized format related to an energy service interruption and how to resolve it.  Capture use cases, requirements  |
| **FS\_NSOEU\_WoP#10** | 4c.Capture solutions for (iii) , with consideration of existing capabilities. |
| **FS\_NSOEU\_WoP#11** | 5.Conduct an analysis to determine gaps in existing specifications and studies based on the identified requirements (2b, 3b, 4b) |
| **FS\_NSOEU\_WoP#12** | 6.Evaluate solutions proposed |
| **FS\_NSOEU\_WoP#13** | 7.Determine conclusions of the study |
|  | **New Study on Key Quality Indicators (KQIs) for 5G service experience** **(FS\_KQI\_5G) (Huawei) ( SP-211433)****Target: SA5#149/SA#100(Jun 2023)**  |
| **FS\_KQI\_5G\_WoP#1** | 1. Study the definition, scope and scenarios of the KQIs for 5G service experience. In this SI the KQIs of the typical services, e.g. services of Video Uploading, Remote Controlling and Cloud VR will be studied; |
| **FS\_KQI\_5G\_WoP#2** | 2. KQIs of the scenario of Video Uploading* Study the influencing factors for 5G service experience according to Video Uploading;
* Study the KQIs for Video Uploading; And the related KPIs which will influence the KQIs;
* Study the evaluation method and formula definition of related KQIs for Video Uploading ;
* Study the evaluation criterion of the KQIs for Video Uploading;
 |
| **FS\_KQI\_5G\_WoP#3** | 3. KQIs of the scenario of Remote Controlling* Study the influencing factors for 5G service experience according to Remote Controlling;
* Study the KQIs for Remote Controlling; And the related KPIs which will influence the KQIs;
* Study the evaluation method and formula definition of related KQIs for Remote Controlling;
* Study the evaluation criterion of the KQIs for Remote Controlling;
 |
| **FS\_KQI\_5G\_WoP#4** | 4. KQIs of the scenario of Cloud VR* Study the influencing factors for 5G service experience according to Cloud VR;
* Study the KQIs for Cloud VR; And the related KPIs which will influence the KQIs;
* Study the evaluation method and formula definition of related KQIs for Cloud VR;
* Study the evaluation criterion of the KQIs for Cloud VR;
 |
| **FS\_KQI\_5G\_WoP#5** | 5.Study the relation with the SLS requirements |
|  | **Study on Deterministic Communication Service Assurance (FS\_DCSA) (Huawei)(SP-211442)****Target: SA5#149/SA#100(Jun 2023)** |
| **FS\_DCSA\_WoP#1** | 1. Investigate the scenarios and procedures for deterministic communication services; |
| **FS\_DCSA\_WoP#2** | 2. Study the potential enhancement of provisioning of deterministic communication services, e.g., deployment of the related network functions according to the SLA requirements; |
| **FS\_DCSA\_WoP#3** | 3. Potential enhancements related to performance management and fault management to support deterministic communication services, e.g. potential new performance measurements related to clause 5 of TS 22.104, service quality degradation related fault management etc;4. Study if there are any gaps in the existing service profile and slice profile to support deterministic communication services; |
| **FS\_DCSA\_WoP#4** | 5. Study key issues and solutions for the operation and assurance of deterministic communication services; |
| **FS\_DCSA\_WoP#5** | 6. Relation and potential enhancements to eCOSLA MnS to support deterministic communication services; |
|  | **Study on Network Slice Management Capability Exposure (FS\_NSCE ) (Alibaba)(SP-220142)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_NSCE\_WoP#1** | 1. Identify use cases and requirements regarding exposure of management capabilities and management services to externals, e.g. verticals and service providers. |
| **FS\_NSCE\_WoP#2** | 2. Conduct an analysis to determine gaps in existing specifications and studies (such as FS\_MNSAC) based on the identified requirements (see bullet point one). |
| **FS\_NSCE\_WoP#3** | 3. Propose mechanisms needed for specifying and handling rules for exposure of management capabilities and management services to external MnS consumer, if not covered by existing specification and studies such as FS\_MNSAC. |
| **FS\_NSCE\_WoP#4** | 4. Recommendation and conclusion |
|  | **Study on alignment with ETSI MEC for Edge computing management (FS\_MEC\_ECM) (Huawei) (SP-220147)****Target: SA5#149/SA#100(June 2023)** |
| **FS\_MEC\_ECM\_WoP#1** | 1.Investigate the current egde application management in ETSI MEC, which includes but not limited to:* Edge application package management
* Edge application catalog management
 |
| **FS\_MEC\_ECM\_WoP#2** | 2.Investigate the NBI requirements from GSMA OPG to classify which SA5 solution can be re-used to fulfill them |

**Color Code:**

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| **Intelligence and Automation** |
| **Management Architecture and Mechanisms** |
| **Support of new services** |