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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project Technical Specification Group Services and System Aspects Management and orchestration of networks, as identified below:

TS 28.555: Policy management for 5G mobile networks; Stage 1 [2].

TS 28.556: Policy management for 5G mobile networks; Stage2 and Stage3 [3].

1 Scope

The present document specifies the concepts, requirements and use cases for network policy management in 5G networks.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.555: "Management and orchestration; Network policy management for 5G mobile networks; Stage 1".

[3] 3GPP TS 28.556: "Management and orchestration; Network policy management for 5G mobile networks; Stage 2 and Stage 3".

[4] ETSI GR NFV-IFA 023 (V3.1.1): "Network Functions Virtualisation (NFV); Management and Orchestration; Report on Policy Management in MANO; Release 3".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

4 Concepts and Background

4.1 Policy MnS

Introduction of service-based architecture for 5G, expanding the scope of policy management, the policy management for 5G will be built on service-based management architecture.

A Policy MnS producer has the following capabilities:

- Storing the defined network policy.
- Detecting policy conflict, reporting the conflict information and give suggestions for solving the conflict.
- Making the policy execution decisions, which means it take the decision to trigger or perform an action.
- Evaluating the effectiveness of the network policy execution.

The MnS of various kinds are specified for deployment over many standardized reference interfaces. So, the policy MnS could in principle, be specified for deployment over the same set of standardized reference interfaces, as a replacement of or as an addition to the policy related driven MnS.

4.2 Policy conflict detection and resolution

There may be policy conflict problem, which is a new activated policy may be conflict with an existing activated policy.

When the Policy MnS producer detects the conflict, it can report the conflict information and give suggestions to solve it. ETSI GR NFV-IFA 023 [4] descripts policy conflict detection UCs and how to resolve them.

There are multiple scenarios for policy conflict, for example:

1) If the events are the same and the same condition are triggered (e.g. scaling policy on a VNF), but two policies have different actions, the conflict should be detected and resolved.
2) If the event and condition of two policies are not be the same, but the different actions (e.g. scaling policy vs. termination policy on a VNF) are towards the same entity. The conflict should be detected and resolved.
3) If scenario 1) or 2) is enforced by different Policy MnS producers. The conflict should be detected and resolved.

5 Business level requirements

5.1 Requirements

REQ-POM_ND-CON-1 3GPP management system should be able to support the capability about the network policy management.

5.2 Use cases

5.2.1 Deploy IMS network functions in centralized or edge DC's

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	According to the network deployment policy, 3GPP system use the policy to deploy the corresponding network.	
Actors and Roles	Policy MnS consumer is responsible for creating the IMS deployment policy and evaluating the policy execution. Policy MnS producer is responsible for executing the IMS deployment policy and can store the policy.	

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Telecom resources	3GPP management system, NFV MANO (NFVO, VNFM)	
Assumptions	1. The operator has two types' DCs, core DCs are centralized in some individual region and edge DCs are distributed in most cities. 2. The operator determines core DC supports the control plane network function which handles signalling, determines CSCF should be deployed in core DC. 3. The operator determines edge DC supports the media plane or forwarding plane network function which handles session service and data service, determines SBC should be in edge DC.	
Pre conditions	1. The operator designs the IMS network deployment requirement and need deploy the network based on the requirement. 2. Management systems (i.e. 3GPP management system and NFV-MANO system) are running normally.	
Begins when	The Policy MnS consumer requests the Policy MnS producer to create the deploy policy (IMS network and determine CSCF should be deployed in core DC and SBC should be in edge DC).	
Step 1 (M)	The Policy MnS consumer activates the policy and notifies related Policy MnS producer.	
Step 2 (M)	The Policy MnS producer follows the policy to design the IMS network then the IMS network is instantiated by the management system.	
Step 3 (M)	The Policy MnS producer informs the Policy MnS consumer the policy has been executed.	
Ends when	The Policy MnS consumer evaluates the effectiveness of the policy execution if needed. The Policy MnS consumer evaluates the effectiveness of the policy according to the result of the policy execution. In this case the effectiveness is CSCF(s) and SBC(s) in the IMS network are deployed in appropriate DCs and on appropriate hardware resource.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The IMS network is correctly configured and normally running.	
Traceability	REQ-POM_ND-CON-1	

5.2.2 Deploy IMS network functions in different DC

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	According to the network deployment policy, 3GPP system use the policy to deploy the corresponding network.	
Actors and Roles	Policy MnS consumer is responsible for creating the IMS deployment policy and evaluating the policy execution. Policy MnS producer is responsible for executing the IMS deployment policy and can store the policy.	
Telecom resources	3GPP management system, NFV MANO (NFVO, VNFM),	
Assumptions	The operator determines to deploy one IMS network with 3 load sharing CSCFs. The operator determines it is not allowed to deploy more than 2 CSCFs in the same core DC.	
Pre conditions	1. The operator designs the IMS network deployment requirement and need deploy the network based on the requirement. 2. Management systems (i.e. 3GPP management system and NFV-MANO system) are running normally.	
Begins when	The Policy MnS consumer requests the Policy MnS producer to create the policy(deploy one IMS network with 3 load sharing CSCFs, it is not allowed to deploy more than 2 CSCFs in the same core DC).	
Step 1 (M)	The Policy MnS consumer activates the policy and notifies related Policy MnS producer.	
Step 2 (M)	The Policy MnS producer follows the deployment policy to design the IMS network then the IMS network is instantiated by the management system. Note: Whether and how NSD or VNFD supports the policy is out of scope of the present document.	
Step 3 (M)	The Policy MnS producer informs the Policy MnS consumer the policy has been executed.	
	The Policy MnS consumer evaluates the effectiveness of the policy execution if needed.	

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Ends when	The Policy MnS consumer evaluates the effectiveness of the policy execution if needed. The Policy MnS consumer evaluates the effectiveness of the policy according to the result of the policy execution. In this case the effectiveness is all CSCFs in the IMS network are deployed in appropriate DCs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The IMS network is correctly configured and normally running.	
Traceability	REQ-POM_ND-CON-1	

5.2.3 Deploy IMS network functions in a same DC

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	According to the network deployment policy, 3GPP system use the policy to deploy the corresponding network.	
Actors and Roles	Policy MnS consumer is responsible for creating the IMS deployment policy and evaluating the policy execution. Policy MnS producer is responsible for executing the IMS deployment policy and can store the policy.	
Telecom resources	3GPP management system, NFV MANO (NFVO, VNFM),	
Assumptions	1. The operator has two types' DCs, core DCs are centralized in some individual region and edge DCs are distributed in most cities. 2. The operator need deploy IMS network in one region and the EPC network has already been running.	
Pre conditions	1. The operator designs the IMS network deployment requirement and need deploy the network based on the requirement. 2. Management systems (i.e. 3GPP management system and NFV-MANO system) are running normally. 3. The Policy MnS producer has the adjacent location information of the data centre(s) and central office(s). Editor's note: How the Policy MnS producer gets the adjacent location information is out of scope of the present document.	
Begins when	The Policy MnS consumer requests the Policy MnS producer to create the policy(deploy IMS network in one region).	
Step 1 (M)	The Policy MnS consumer delivers the policy to Policy MnS producer and activates the policy if needed.	
Step 2 (M)	The Policy MnS producer follows the policy to design the IMS network and determine the virtualized SBC location after getting the SAE GW location.	
Step 3 (M)	The management systems follow the location constraint to design template (e.g. NSD or VNFD) and instantiate the IMS network.	
Ends when	The Policy MnS producer informs the Policy MnS consumer the policy has been executed.	
Exceptions	The Policy MnS consumer evaluates the effectiveness of the policy execution if needed. The Policy MnS consumer evaluates the effectiveness of the policy according to the result of the policy execution. In this case the effectiveness is the virtualized SBC is deployed adjacently to the running SAE GW.	
Post Conditions	The IMS network is correctly configured and normally running.	
Traceability	REQ-POM_ND-CON-1	

6 Specification level requirements

6.1 Requirements

REQ-POM-FUN-01

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to create the network policy.

REQ-POM-FUN-02

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to delete the network policy.

REQ-POM-FUN-03

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to update the network policy.

REQ-POM-FUN-04

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to query the network policy.

REQ-POM-FUN-05

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to activate the network policy.

REQ-POM-FUN-06

The Policy Management Service Producer shall provide the capability to allow the Policy Management Service Consumer to deactivate the network policy.

REQ-POM-FUN-07

The Policy Management Service Producer should notify the Policy Management Service Consumer when there is a network policy conflict.

REQ-POM-FUN-08

The Policy Management Service Producer should be able to support the capability to execute the activated network policy.

REQ-POM-FUN-09

The Policy Management Service Producer should be able to support the capability to verify whether the policy is executed correctly.

6.2 Use cases

6.2.1 Policy Creation

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To create a policy such as deploying the SBC from IMS and P-GW-C from5GC in the same Data Centre.	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	policy requirements such as deploying the SBC from IMS and P-GW-C from5GC in the same Data Centre is clearly defined.	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to create a policy.	
Step 1 (M)	The Policy Management Service Consumer makes a decision to create a network policy according to the network requirements, such as deploying the SBC.	
Step 2 (M)	After the completion of the policy creation process, the Policy Management Service Producer informs the Policy Management Service Consumer on the result of the process.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy is created and stored in the Policy Management Service Producer.	

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Traceability	REQ-POM-FUN -01	

6.2.2 Policy Deletion

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To delete an existed policy in the Policy Management Service Producer.	
Actors and Roles	Policy Management Service Consumer as a user.	
Telecom resources	3GPP management system.	
Assumptions	There is a policy that will not be used.	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to delete the old policy.	
Step 1 (M)	The Policy Management Service Consumer request to delete the old policy.	
Step 2 (M)	After the completion of the policy deletion process, the Policy Management Service Producer informs the Policy Management Service Consumer on the result of the process.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy is deleted in the Policy Management Service Producer.	
Traceability	REQ-POM-FUN -02	

6.2.3 Policy Update

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To update the policy created.	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	There is a policy in the system but need to be updated	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to update the policy.	
Step 1 (M)	The Policy Management Service Consumer request to update the policy	
Step 2 (M)	After the completion of the policy update process, the Policy Management Service Producer informs the Policy Management Service Consumer on the result of the process.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy is updated and stored in the Policy Management Service Producer.	
Traceability	REQ-POM-FUN -03	

6.2.4 Policy Activation

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To activate the policy in the Policy Management Service Producer.	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	There is a policy.	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to activate the policy.	
Step 1 (M)	The Policy Management Service Consumer requests to activate the policy in the Policy Management Service Producer.	

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Step 2 (M)	After the completion of the policy activation process, the Policy Management Service Producer informs the Policy Management Service Consumer on the result of the process.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy is activated and ready to be executed.	
Traceability	REQ-POM-FUN -05、REQ-POM-FUN -08	

6.2.5 Policy Deactivation

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To deactivate the policy in the Policy Management Service Producer.	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	There is a policy is in activated state.	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to deactivate the policy.	
Step 1 (M)	The Policy Management Service Consumer requests to deactivate the policy in the Policy Management Service Producer.	
Step 2 (M)	After the completion of the policy deactivation process, the Policy Management Service Producer informs the Policy Management Service Consumer on the result of the process.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy is deactivated and ca not be used to be executed.	
Traceability	REQ-POM-FUN -06	

6.2.6 Policy Query

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To query policy information.	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	There is or not a created policy in the Policy Management Service Producer.	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer decides to query policy information.	
Step 1 (M)	The Policy Management Service Consumer sends specific filters that may or may not include information to know if the policy exists or no to the producer.	
Step 2 (M)	After the completion of the policy query process, the Policy Management Service Producer sends back the response with the policy to the Policy Management Service Consumer.	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy information is returned to the Policy Management Service Consumer if the corresponding policy exists.	
Traceability	REQ-POM-FUN -04	

6.2.7 Policy Conflicts Notification

Use Case Stage	Evolution / Specification	<<Uses>> Related use
Goal	To report policy conflicts	
Actors and Roles	Policy Management Service Consumer as a user	
Telecom resources	3GPP management system.	
Assumptions	There are two policies in the Policy Management Service Producer. For example, the policy A is to scale a VNF, the policy B is to delete the same VNF	
Pre-conditions	The systems is correctly configured and normally running.	
Begins when	The Policy Management Service Consumer makes a decision to run a network policy-B according to the network requirements while another network policy-A is running and the policies A & B have conflicting actions.	
Step 1 (M)	The Policy Management Service Consumer executed network policy-A based on some triggers.	
Step 2 (M)	The Policy Management Service Consumer makes a decision to run a network policy-B based on changes in the network conditions. The Policy Management Service Producer reports the policy conflicts to the Policy Management Service Consumer	
Ends when	Ends when the Policy Management Service Consumer is informed about the result of the processor when an exception occurs.	
Exceptions	One of the steps identified above fails.	
Post Conditions	The policy conflicts notification is returned to the Policy Management Service Consumer.	
Traceability	REQ-POM-FUN -07、REQ-POM-FUN -08	

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2020-08	SA5#132e	S5-204441				Skeleton	0.0.0
2020-08	SA5#132e	S5-204455 S5-204456 S5-204457 S5-204458 S5-204082 S5-204453 S5-204454				pCR 28.555 add skeleton pCR 28.555 add introduction pCR 28.555 add scope pCR 28.555 add Concepts and background pCR 28.555 add specification level requirements pCR 28.555 add business level requirements pCR 28.555 add high-level use cases	1.0.0
2020-09	SA5#132e					EditHelp improvement	1.0.1
2020-11						No technical change. Replacement of empty document in 3GPP server.	1.0.2
2020-11	SA5#134e	S5-206028 S5-206364				pCR 28.555 Editorial improvements pCR 28.555 add specification level use cases	1.1.0
2021-03	SA5#136	S5-212112 S5-212113 S5-212393 S5-212394 S5-212395 S5-212396				pCR 28.555 add specification level use case-policy deletion pCR 28.555 add specification level use case-policy update pCR 28.555 add specification level use case-policy activation pCR 28.555 add specification level use case-policy deactivation pCR 28.555 add specification level use case-policy query pCR 28.555 add specification level use case-policy conflicts notification	1.2.0
2021-05	SA5#137	S5-213016				pCR 28.555 add editorial improvements	1.3.0
2021-06	SA#92e	SP-210468				Presented for approval	2.0.0
2021-06	SA#92e					Edithelp review and upgrade to change control version	17.0.0
2024-04	-	-	-	-	-	Update to Rel-18 version (MCC)	18.0.0
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History

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