ETSI GS NFV-SOL 012 V3.7.1 (2022-12)

Network Functions Virtualisation (NFV) Release 3; Protocols and Data Models; RESTful protocols specification for the Policy Management Interface

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Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Network Functions Virtualisation (NFV).

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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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1 Scope

The present document specifies a RESTful protocol and data model fulfilling the requirements specified in the following Group Specifications for the policy management interfaces used over the NFV-MANO reference points:

- ETSI GS NFV-IFA 005 [1]
- ETSI GS NFV-IFA 006 [2]
- ETSI GS NFV-IFA 007 [3]
- ETSI GS NFV-IFA 008 [4]
- ETSI GS NFV-IFA 013 [5]
- ETSI GS NFV-IFA 030 [6]

A data model for policy content is out of scope of the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI GS NFV-IFA 005: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Or-Vi reference point - Interface and Information Model Specification".

[2] ETSI GS NFV-IFA 006: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Vi-Vnfm reference point - Interface and Information Model Specification".

[3] ETSI GS NFV-IFA 007: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Or-Vnfm reference point - Interface and Information Model Specification".

[4] ETSI GS NFV-IFA 008: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Ve-Vnfm reference point - Interface and Information Model Specification".

[5] ETSI GS NFV-IFA 013: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Os-Ma-Nfvo reference point - Interface and Information Model Specification".

[6] ETSI GS NFV-IFA 030: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Multiple Administrative Domain Aspect Interfaces Specification".

[7] ETSI GS NFV-SOL 013: "Network Functions Virtualisation (NFV) Release 3; Protocols and Data Models; Specification of common aspects for RESTful NFV MANO APIs".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI GR NFV 003: "Network Functions Virtualisation (NFV); Terminology for Main Concepts in NFV".

[i.2] ETSI GR NFV-IFA 023: "Network Functions Virtualisation (NFV); Management and Orchestration; Report on Policy Management in MANO; Release 3".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI GR NFV 003 [i.1] apply.

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3.2 Symbols

Void.

3.3 Abbreviations

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For the purposes of the present document, the abbreviations given in ETSI GR NFV 003 [i.1] and the following apply:

PF	Policy Function
REST	Representational State Transfer
URI	Uniform Resource Identifier

4 General aspects

4.1 Overview

The present document defines the protocol and data model for the policy management interface used over the following reference points, in the form of RESTful Application Programming Interfaces (APIs) specifications:

- Os-Ma-nfvo reference point (interface produced by the NFVO towards the OSS/BSS)
- Or-Vnfm reference point (interface produced by the VNFM towards the NFVO)
- Ve-Vnfm-em reference point (interface produced by the VNFM towards the EM)
- Or-Vi reference point (interface produced by the VIM towards the NFVO)
- Vi-Vnfm reference point (interface produced by the VIM towards the VNFM)
- Or-Or reference point (interface produced by NFVO-N towards NFVO-C)

The design of the protocol and data model for the policy management interface is based on the information model and requirements defined in ETSI GS NFV-IFA 005 [1], ETSI GS NFV-IFA 006 [2], ETSI GS NFV-IFA 007 [3], ETSI GS NFV-IFA 008 [4], ETSI GS NFV-IFA 013 [5] and ETSI GS NFV-IFA 030 [6].

In clause 4, general aspects are specified that apply to the policy management interface over different reference points. In addition, the provisions in clauses 4, 5, 6, 8 and 9 of ETSI GS NFV-SOL 013 [7] define common aspects of RESTful NFV-MANO APIs, and shall apply for all APIs defined in the present document.

In clause 5, the protocol and data model for the policy management interface is specified. The resource structure with associated HTTP methods is defined and applicable flows are provided. Further, the resources and the data model are specified in detail.

4.2 Common data types

The structured data types and simple data types defined in clause 7 of ETSI GS NFV-SOL 013 [7] shall apply in the present document.

5 Policy Management interface

5.1 Description

This interface allows the API consumer to invoke policy management operations towards the API producer, to subscribe to notifications regarding policy changes and any detected policy conflicts and to retrieve API version information.

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The operations provided through this interface are:

- Transfer Policy
- Delete Policy
- Query Policy
- Activate Policy
- Deactivate Policy
- Associate Policy
- Disassociate Policy
- Subscribe
- Query Subscription Information
- Terminate Subscription
- Notify

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NOTE: The association feature (i.e. the associate policy and disassociate policy operations) applies when the Policy Function (PF) that enforces the policy is NFVO, NFVO-N or VNFM.

5.2 API version

For the policy management interface as specified in the present document, the MAJOR version field shall be 1, the MINOR version field shall be 0 and the PATCH version field shall be 0 (see clause 9.1 of ETSI GS NFV-SOL 013 [7] for a definition of the version fields). Consequently, the {apiMajorVersion} URI variable shall be set to "v1".

5.3 Resource structure and method

All resource URIs of the API shall use the base URI specification defined in clause 4.1 of ETSI GS NFV-SOL 013 [7]. The string "nfvpolicy" shall be used to represent {apiName}. All resource URIs in the clauses below are defined relative to the above base URI.

Figure 5.3-1 shows the overall resource URI structure defined for the policy management interface.

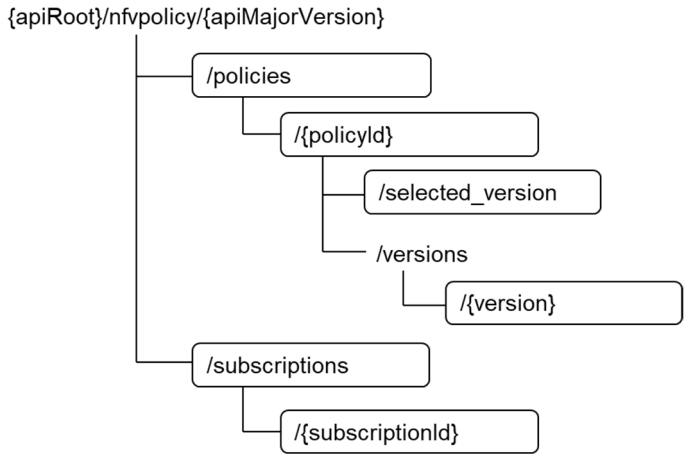

Figure 5.3-1: Resource URI structure of the policy management interface

Table 5.3-1 lists the individual resources defined, and the applicable HTTP methods.

The API producer shall support responding to requests for all HTTP methods on the resources in table 5.3-1 that are marked as "M" (mandatory) in the "Cat" column. The API producer shall also support the "API versions" resource as specified in clause 9.3.2 of ETSI GS NFV-SOL 013 [7].

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Table 5.3-1: Resources and methods overview of the policy management interface

Resource name	Resource URI	HTTP Method	Cat	Meaning
Policies	/policies	POST	M	Create a new individual policy resource.
		GET	M	Query multiple policies.
Individual policy	/policies/{policyId}	GET	M	Read an individual policy.
		PATCH	M	Activate/deactivate, or modify the associations, or change the selected version of an individual policy.
		DELETE	M	Delete an individual policy.
Selected version of an individual policy	/policies/{policyId}/selected_version	GET	M	Read the selected version of an individual policy.
Particular version of an individual policy	/policies/{policyId}/versions/{version}	GET	M	Read a particular version of an individual policy.
		PUT	M	Transfer the content of a particular version of an individual policy.
		DELETE	M	Delete a particular version of an individual policy.
Subscriptions	/subscriptions	POST	M	Subscribe to notifications of policy changes or conflicts.
		GET	M	Query multiple subscriptions.
Individual subscription	/subscriptions/{subscriptionId}	GET	M	Read an individual subscription resource.
		DELETE	M	Terminate a subscription.
Notification endpoint	(client-provided)	POST	See note	Notify about policy changes or conflicts. See note.
		GET	See note	Test the notification endpoint. See note.
NOTE: The API producer shall support invoking the HTTP methods defined for the "Notification endpoint" resource exposed by the API consumer. If the API consumer supports invoking the POST method on the "Subscriptions" resource towards the API producer, it shall also support responding to the HTTP requests defined for the "Notification endpoint" resource.				

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5.4 Sequence diagrams (informative)

5.4.1 Flow of creating a policy

This clause describes a sequence for creating an individual policy resource.

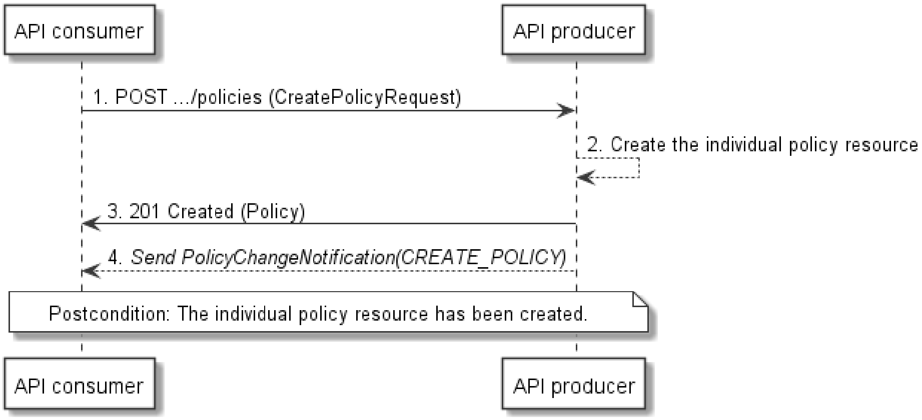

Figure 5.4.1-1: Flow of policy creation

Policy creation, as illustrated in figure 5.4.1-1, consists of the following steps.

Precondition: none.

1) The API consumer sends a POST request to the "Policies" resource, including one data structure of type "CreatePolicyRequest" in the payload body.

2) The API producer creates an individual policy resource in CREATED/DEACTIVATED state.

3) The API producer returns a "201 Created" response to the API consumer, and includes in the payload body a representation of the policy, and provides the URI of the newly-created individual policy resource in the "Location" HTTP header.

4) The API producer sends a policy change notification (see clause 5.4.8) to the API consumer to indicate the creation of the individual policy resource.

Postcondition: Upon successful completion, the individual policy resource has been created.

Error handling: In case of failure, appropriate error information is provided in the response.

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5.4.2 Flow of transferring a policy

This clause describes a sequence for transferring a policy.

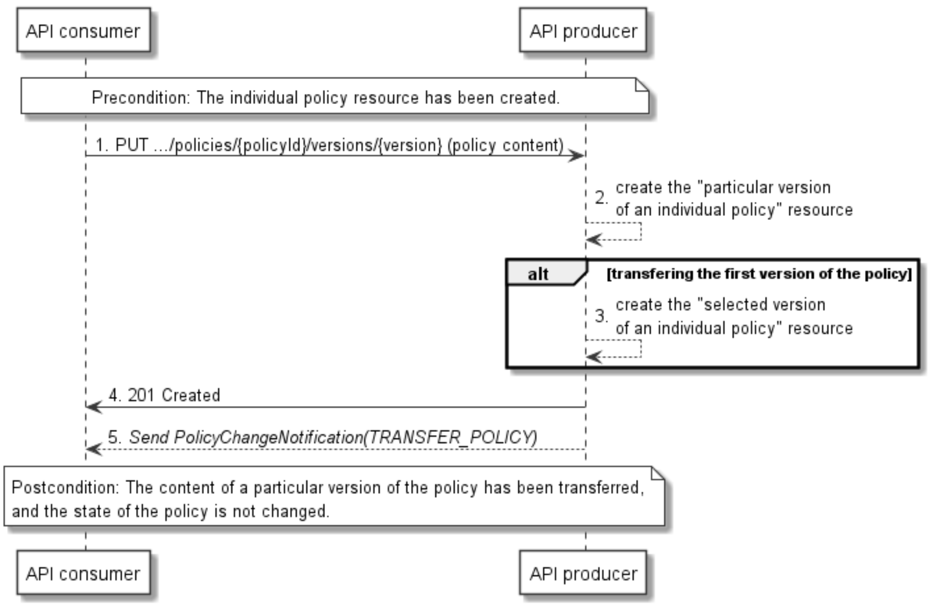

Figure 5.4.2-1: Flow of policy transfer

Policy transfer, as illustrated in figure 5.4.2-1, consists of the following steps.

Precondition: The individual policy resource has been created.

1) The API consumer sends a PUT request to the "particular version of an individual policy" resource addressed by the appropriate policy identifier and version identifier in its resource URI, and includes a copy of the policy content in the payload body. The version identifier in the URI is assigned by the API consumer, and cannot be overlapped with any existing version identifiers of the same policy on the API producer.

2) The API producer creates the "particular version of an individual policy" resource.

3) If the API consumer is transferring the first version of the policy, the API producer creates the "selected version of an individual policy" resource, sets the first version as the default selected version and changes the transferState of the policy to TRANSFERRED.

4) The API producer returns a "201 Created" response to the API consumer.

5) The API producer sends a policy change notification (see clause 5.4.8) to the API consumer to indicate the transfer of the policy content.

Postcondition: Upon successful completion, the content of a particular version of the policy has been transferred, and the state of the policy is not changed.

Error handling: In case of failure, appropriate error information is provided in the response.

5.4.3 Flow of querying/reading policies

This clause describes a sequence for querying/reading policies.

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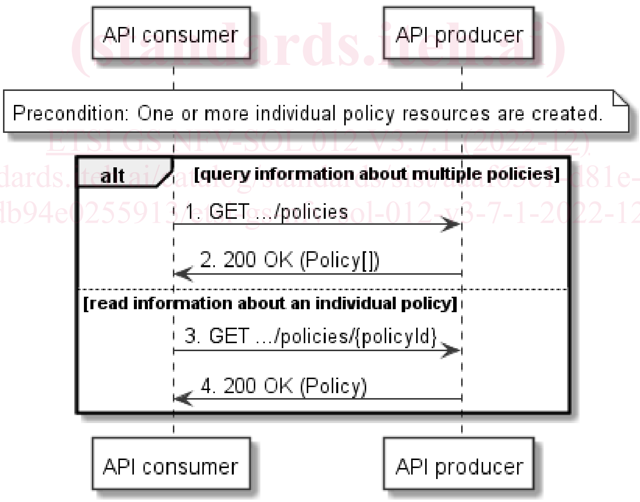

Figure 5.4.3-1: Flow of policy query/read

Policy query/read, as illustrated in figure 5.4.3-1, consists of the following steps.

Precondition: One or more individual policy resources are created.

1) If the API consumer intends to query multiple policies, it sends a GET request to the "policies" resource.

2) The API producer returns a "200 OK" response to the API consumer, and includes zero or more data structures of type "Policy" in the payload body.

3) If the API consumer intends to read information about an individual policy, it sends a GET request to the "individual policy" resource, addressed by the appropriate policy identifier in its resource URI.

4) The API producer returns a "200 OK" response to the API consumer, and includes one data structure of type "Policy" in the payload body.

Error handling: In case of failure, appropriate error information is provided in the response.