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Open Service Access (OSA); Application Programming Interface (API); Part 13: Policy management SCF

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 13 of a multi-part deliverable covering Open Service Access (OSA); Application Programming Interface (API), as identified below. The API specification (ES 202 915) is structured in the following parts:

Part 1: "Overview";

Part 2: "Common Data Definitions";

Part 3: "Framework";

Part 4: "Call Control";

Part 5: "User Interaction SCF";

Part 6: "Mobility SCF";

Part 7: "Terminal Capabilities SCF";

Part 8: "Data Session Control SCF";

Part 9: "Generic Messaging SCF";

Part 10: "Connectivity Manager SCF";

Part 11: "Account Management SCF";

Part 12: "Charging SCF";

Part 13: "Policy Management SCF";

Part 14: "Presence and Availability Management SCF".

The present document has been defined jointly between ETSI, The Parlay Group (http://www.parlay.org) and the 3GPP, in co-operation with a number of JAIN™ Community (http://www.java.sun.com/products/jain) member companies.

The present document forms part of the Parlay 4.0 set of specifications.

The present document is equivalent to 3GPP TS 29.198-13 V5.1.0 (Release 5).

1 Scope

The present document is part 13 of the Stage 3 specification for an Application Programming Interface (API) for Open Service Access (OSA).

The OSA specifications define an architecture that enables application developers to make use of network functionality through an open standardised interface, i.e. the OSA APIs.

The present document specifies the Policy Management Service Capability Feature (SCF) aspects of the interface. All aspects of the Policy Management SCF are defined here, these being:

- Sequence Diagrams
- Class Diagrams
- Interface specification plus detailed method descriptions
- State Transition diagrams
- Data Definitions
- IDL Description of the interfaces

The process by which this task is accomplished is through the use of object modelling techniques described by the Unified Modelling Language (UML).

2 References

The references listed in clause 2 of ES 202 915-1 contain provisions which, through reference in this text, constitute provisions of the present document.

ETSI ES 202 915-1: "Open Service Access (OSA); Application Programming Interface (API); Part 1: Overview".

ETSI ES 202 915-2: "Open Service Access (OSA); Application Programming Interface (API); Part 2: Common Data Definitions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ES 202 915-1 apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in ES 202 915-1 apply.

4 Policy Management SCF

It is expected that more and more OSA services will use policies to express operational criteria. It is also expected that network providers will host policy-enabled services that have been written by 3rd party application service providers. In order to manage policy information and control access to it a policy management service is needed. Consistent with this, a policy management service interface manager, IpPolicyManager, has been defined. All policy management interfaces are accessible from IpPolicyManager.

A number of APIs have been defined to obtain services from a policy management service. These include APIs to create, update or view policy information. Additionally APIs have been defined to facilitate interactions between clients (e.g. a 3rd party application) and any policy enabled service. These include APIs to view policy events, to subscribe to policy events and for the generation of events by clients. All APIs conform to an underlying policy information model.

Clients that perform administrative tasks, e.g. create, update or delete policy information must obtain access to IpPolicyManager using the family of obtainInterface() methods supported by the IpAccess interface. Administrative tasks may be performed through methods supported by IpPolicyManager.

Clients that need to interact with a specific policy enabled service (for non-administrative tasks) can obtain access to that service's interface directly via the selectService() method supported by the IpAccess interface. It should be noted that specific policy enabled services may support additional interfaces and methods that are not defined below. Examples of policy enabled services include: A load balancing service that uses policies to manage application loads on the network, a charging service that determines charging criteria based on policies, a call management service that uses policies to direct end-user calls to appropriate call agents, etc.

The order is as follows:

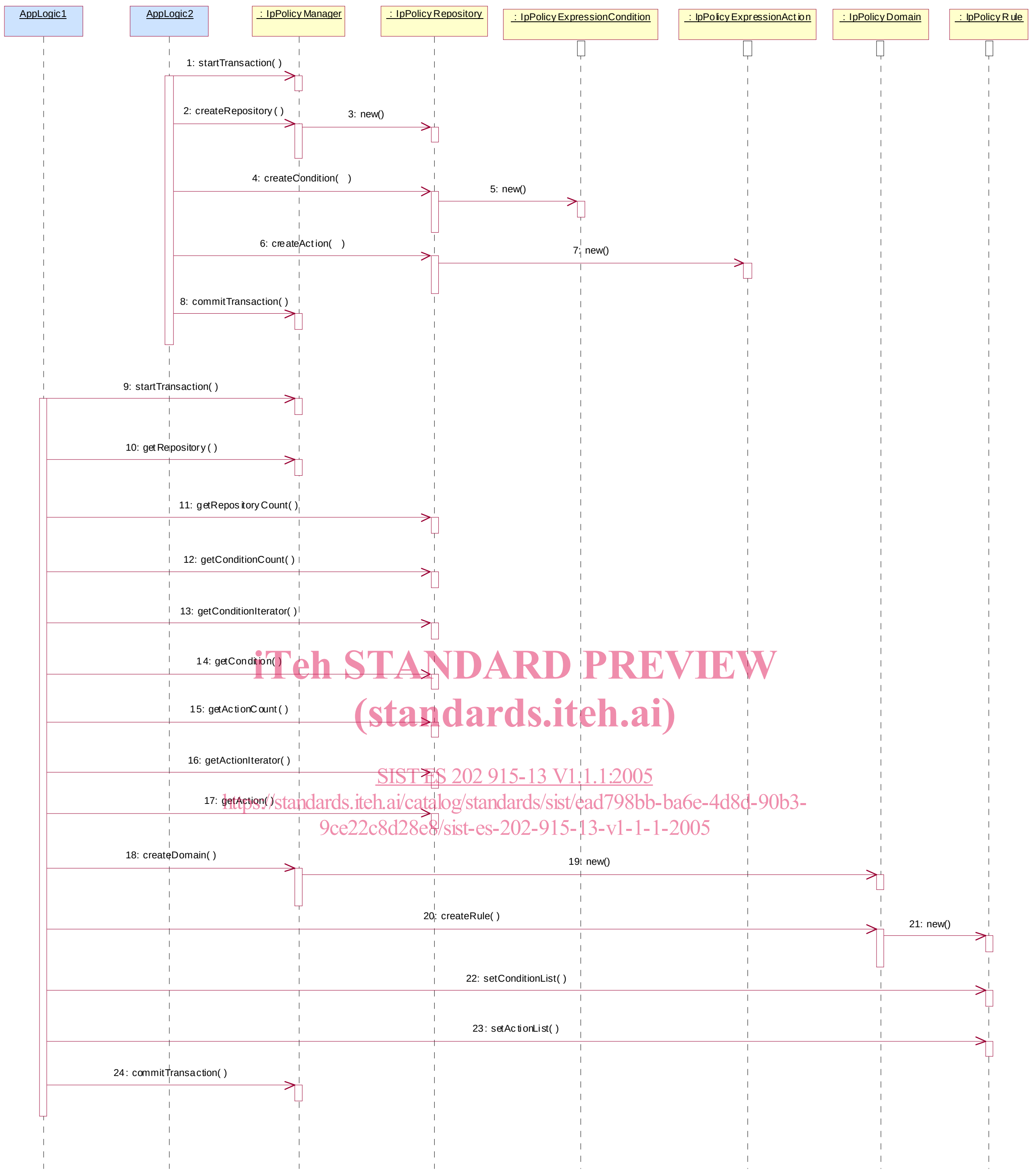
- The Sequence diagrams give the reader a practical idea of how each of the SCF is implemented.
- The Class relationships clause show how each of the interfaces applicable to the SCF, relate to one another.
- The Interface specification clause describes in detail each of the interfaces shown within the Class diagram part.
- The State Transition Diagrams (STD) show the transition between states in the SCF. The states and transitions are well-defined; either methods specified in the Interface specification or events occurring in the underlying networks cause state transitions.
- The Data Definitions clause shows a detailed expansion of each of the data types associated with the methods within the classes. Note that some data types are used in other methods and classes and are therefore defined within the Common Data types part ES 202 915-2.

An implementation of this API which supports or implements a method described in the present document, shall support or implement the functionality described for that method, for at least one valid set of values for the parameters of that method. Where a method is not supported by an implementation of a Service interface, the exception P_METHOD_NOT_SUPPORTED shall be returned to any call of that method.

5 Sequence Diagrams

5.1 Use of Policy Repository

The example shown here shows the use of a Policy Repository. The repository is meant to hold unattached conditions and actions. The Network Operator can populate the repository with the conditions and actions that it can support. These may indeed be based on 'off-line' negotiations with the application developer. The application developer uses the conditions and actions in the Policy Repository to create rules for his own application. In the example application logic represented by AppLogic1 belongs to the Network Operator, whereas the application logic represented by AppLogic2 belongs to the ASP. This example uses the same conditions, actions, and rules as the ASP example.



1: The creation of the repository by the Network Operator takes place within one transaction.

2: The method createRepository is invoked on the IpPolicyManager interface to create a new repository.

3: As a result of the createRepository method a new instance of the IpPolicyRepository interface is created. Its interface reference is returned as return parameter of the createRepository method.

4: The Network Operator creates an unattached condition in the new repository by invoking the createCondition method. For simplicity reasons, this is the same condition as in sequence 8 of the ASP example. The same condition attributes apply.

5: A new instance of the IpPolicyExpressionCondition interface is created.

6: The Network Operator creates an unattached action in the repository. Again, this is the same action as in sequence 10 of the ASP example. The same action attributes apply.

7: A new instance of the IpPolicyExpressionAction interface is created.

8: The Network Operator is finished with creating and populating the repository and closes the transaction.

9: Now that a repository exists, the ASP application can open a transaction to start creating a rule based on the conditions and actions stored in the repository.

10: The application invokes the getRepository to obtain a reference to the top-level repository. The returned reference in this case is the reference to the new repository just created by the Network Operator.

11: The application can invoke the getRepositoryCount method on the IpPolicyRepository interface to check whether there are any sub-repositories available. This is not the case for this example.

12: Before trying to obtain all available conditions in this repository the application retrieves the number of conditions by invoking the method getConditionCount.

13: The application can now invoke the getConditioniterator method to obtain the reference to an iterator that contains the names of each of the conditions contained by this repository that the application is authorized to see. As the previous method only return one available condition, this would be only one name, i.e. "SufficientCredit".

14: A reference to the condition can be obtained by invoking getCondition, with the condition name from the iterator as input parameter.

15: Similar to 12.

16: Similar to 13.

17: Similar to 14.

18: At this point in time the application has the names and references to the unattached condition and action from the repository it wants to use to create the rule. First a domain is created by invoking the createDomain method on the IpPolicyManager interface.

19: A new instance of the IpPolicyDomain interface is created.

20: The application invokes createRule to create a rule within the domain that was just created in flow 18 and 19.

21: A new instance of the IpPolicyRule interface is created.

22: By invoking the method setConditionList, the application can now apply the condition from the repository to this rule, by passing the condition reference, obtained by getCondition in flow 14, as an input parameter.

23: Similarly the application can apply the action to the rule by invoking setActionList.

24: Finally, once the rule is created using the condition and action from the policy repository, the transaction can be closed.

5.2 Introduce condition and action into rule

This sequence diagram describes how a specific policy rule is managed. A rule consists generally of conditions and of actions, the latter being evaluated if all conditions evaluate to true.

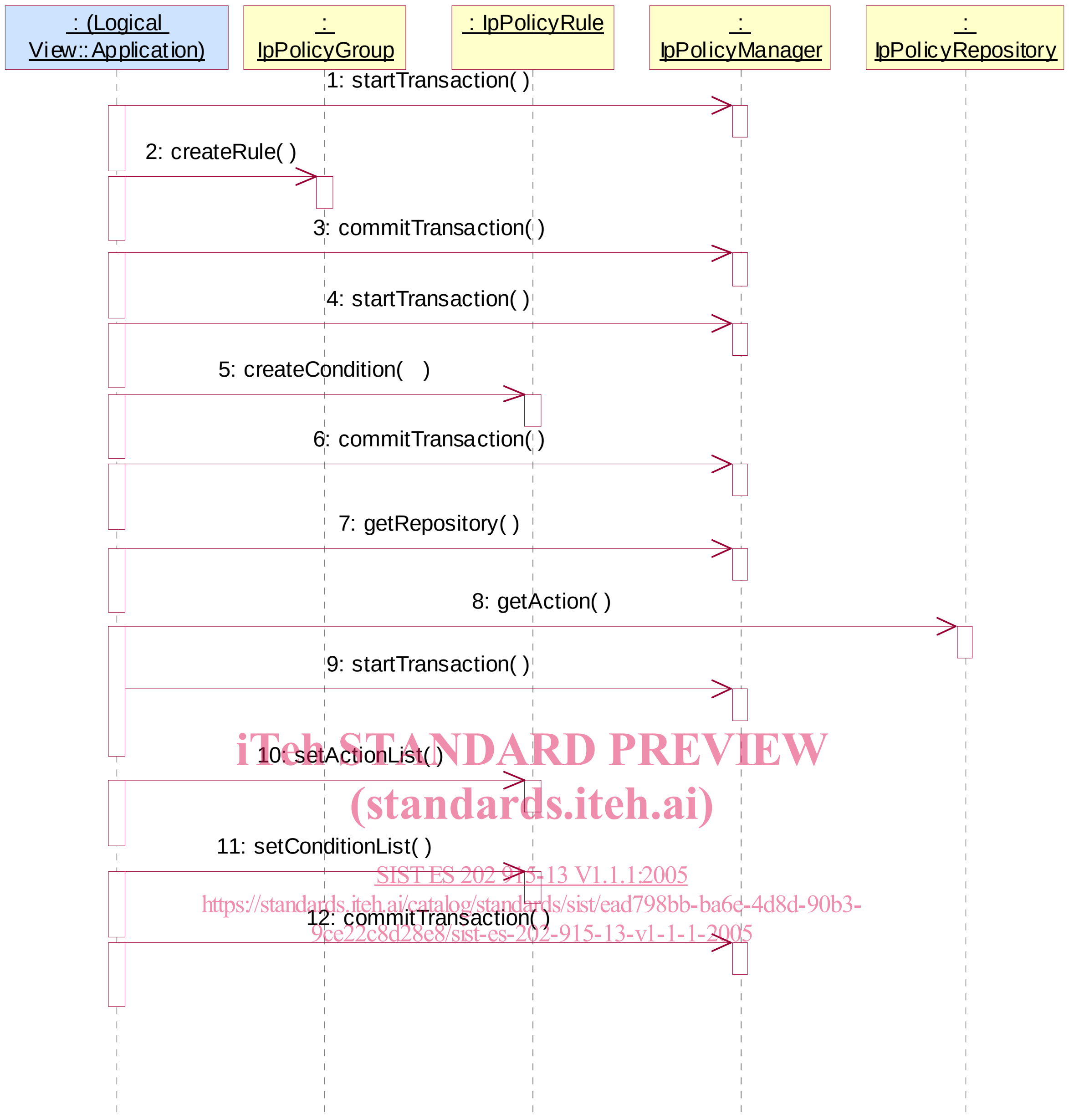
This sequence includes:

- creation of a condition and introduction of it into the rule;

- retrieval of an already defined action object from a repository and introduction into the rule;

- establishing a transaction bracket.

Presumption: the Application got a reference to the group, e.g. by having performed the sequence "create&modify" domain.



1: Opens the transaction bracket.

2: creates a rule object in the group by passing the name as parameter. The method returns the reference to the new rule object.

3: Closes the transaction bracket.

4: Opens the transaction bracket.

5: After having created the rule object one can "fill" it with actions and conditions. Here a condition is created on the rule object, thus becoming a part of the rule. Conditions defined in such a way cannot be reused in other rules. For this the repository approach should be used.

Parameters passed are the condition name and the condition type.

Returns a reference to this condition object.

As preliminary to the invocation of "createCondition", the application should perform the following activities:

1) Create a TpAttribute, with AttributeName: "Expression", AttributeType: P_STRING, AttributeValue:

"<the condition expression to be evaluated>"

2) Add the TpAttribute from 1) to a new TpAttributeSet as its sole element

After having performed these steps the application can call the method createCondition() on the appropriate repository or rule, passing in the name of the condition, the type of the condition IpPolicyExpressionCondition, and the TpAttributeSet created in 2). Note that this call may throw an exception if the expression defined in 1) is not parsable according to the published BNF.

Creating IpPolicyExpressionAction is done similarly.

6: Closes the transaction bracket.

7: Now we're using the repository approach, i.e. reusable condition or action objects. In this example we reuse an action.

For that purpose we ask at the IpPolicyManager interface for a reference to a named repository.

The repository name is passed.

Returns the reference to the repository.

8: If we know already the name of the action object one retrieves the action directly by passing the name as parameter. Otherwise one has to retrieve the name first by using an action iterator.

Returns a reference to the action object.

9: Opens the transaction bracket.

10: Now, the action(s) must be assigned to the rule. Furthermore and different to the conditions, one has to assign an ordering number to the action.

Passed parameter is the action list, which is a list of action reference/ sequence pairs.

11: After having created or retrieved all needed conditions they must be assigned to the rule. This is done by passing the list of condition to that method.

This is explicitly done by passing TpPolicyConditionList again consisting of TpPolicyConditionListElements which contains the reference the IpPolicyCondition object created with message 2.

If the rule is active, this will then cause the expression defined in the condition to be evaluated (as often as necessary). Note that the binding between the variables referenced in the expression and the instances of the variable available is done each time the expression is evaluated. That is, when evaluating a variable reference, each enclosing domain is searched in order (from closest to farthest) for a matching variable. If one is found, it is used. If no matching variable is set, the expression condition fails (evaluates to FALSE).

Activation of actions is done similarly.

12: Closes the transaction bracket.

5.3 Create and receive an event

This sequence shows how policy events are used.

For clarification we list the different policy related objects used:

- IpPolicyEventDefinition: The "template" used to define allowable events. The template is used to define formally a distinct type of rule condition and rule action, namely, IpPolicyEventCondition and IpPolicyEventAction.

- IpPolicyEventCondition: A special instance of a policy condition used in a rule. The condition evaluates to "True" on the occurrence of the event instance that is formally associated with it.- IpPolicyEventAction: A special instance of a policy action used in a rule. The action results in the generation of an instance of the formal event associated with it.

- TpPolicyEvent: This data type is passed as a parameter in the formal notification (to a client) of the occurrence of an instance of an event.

Presumption: the reference to a rule has been somehow retrieved.