3GPP TSG CN Plenary Meeting #19 **NP-030028**
12- 14 March 2003, Birmingham, UK

Source: **CN5 (OSA)**

Title: **Rel-5 CRs 29.198-03 OSA API Part 3: Framework**

Agenda item: **8.2**

Document for: **APPROVAL**

Doc-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Doc-2nd-Level	Workitem
NP-030028	29.198-03	068	-	Rel-5	Correction to Application's requirements for supporting methods	F	5.1.0	N5-020882	OSA2
NP-030028	29.198-03	069	-	Rel-5	Correction of status of methods to interfaces in clause 7.3	F	5.1.0	N5-020897	OSA2
NP-030028	29.198-03	070	-	Rel-5	Correction of status of methods to interfaces in clause 8.3	F	5.1.0	N5-020898	OSA2
NP-030028	29.198-03	071	-	Rel-5	Correction of status of methods to interfaces in clause 6.3	F	5.1.0	N5-021143	OSA2
NP-030028	29.198-03	075	-	Rel-5	Adding the appAvailStatusInd() and svcAvailStatusInd() methods	F	5.1.0	N5-030046	OSA2
NP-030028	29.198-03	076	-	Rel-5	Remove race condition in signServiceAgreement	F	5.1.0	N5-030082	OSA2
NP-030028	29.198-03	077	-	Rel-5	Change reference to deprecated method "authenticate" in TpAuthMechanism to "challenge"	F	5.1.0	N5-030083	OSA2

CR-Form-v7

CHANGE REQUEST

⌘ 29.198-03 CR 068 ⌘rev - ⌘ Current version: 5.1.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network X

Title: ⌘	Correction to Application's requirements for supporting methods	
Source: ⌘	N5	
Work item code: ⌘	OSA2	**Date:** ⌘ 27/09/2002
Category: ⌘	F	**Release:** ⌘ REL-5

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change: ⌘	It is not clear in the specification what methods an application should or should not support. This may lead to interworking problems where different application developers choose options which will not interwork.
Summary of change: ⌘	Clarify what an application has to support.
Consequences if not approved: ⌘	Interworking problems may arise.

Clauses affected: ⌘	4 Overview of the Framework			
Other specs affected: ⌘	**Y**	**N**		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4 Overview of the Framework

This clause explains which basic mechanisms are executed in the OSA Framework prior to offering and activating applications.

The Framework API contains interfaces between the Application Server and the Framework, and between Network Service Capability Server (SCS) and the Framework (these interfaces are represented by the yellow circles in the figure below). The description of the Framework in the present document separates the interfaces into two distinct sets: Framework to Application interfaces and Framework to Service interfaces.

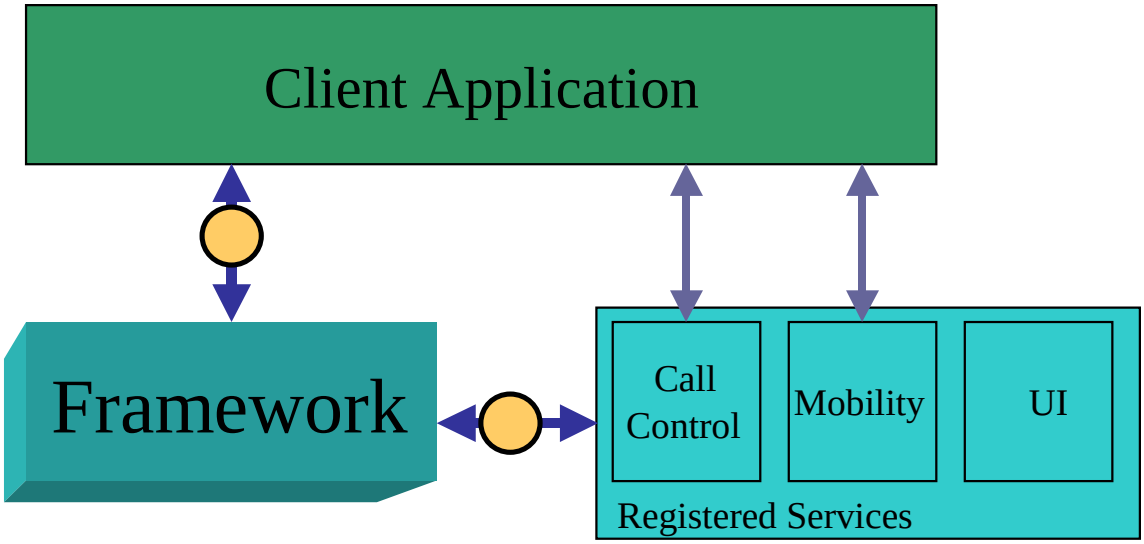

Figure:

Some of the mechanisms are applied only once (e.g. establishment of service agreement), others are applied each time a user subscription is made to an application (e.g. enabling the call attempt event for a new user).

Basic mechanisms between Application and Framework:

- **Authentication:** Once an off-line service agreement exists, the application can access the authentication interface. The authentication model of OSA is a peer-to-peer model, but authentication does not have to be mutual. The application must be authenticated before it is allowed to use any other OSA interface. It is a policy decision for the application whether it must authenticate the framework or not. It is a policy decision for the framework whether it allows an application to authenticate it before it has completed its authentication of the application.

- **Authorisation:** Authorisation is distinguished from authentication in that authorisation is the action of determining what a previously authenticated application is allowed to do. Authentication shall precede authorisation. Once authenticated, an application is authorised to access certain SCFs.

- **Discovery of Framework and network SCFs:** After successful authentication, applications can obtain available Framework interfaces and use the discovery interface to obtain information on authorised network SCFs. The Discovery interface can be used at any time after successful authentication.

- **Establishment of service agreement:** Before any application can interact with a network SCF, a service agreement shall be established. A service agreement may consist of an off-line (e.g. by physically exchanging documents) and an on-line part. The application has to sign the on-line part of the service agreement before it is allowed to access any network SCF.

- **Access to network SCFs:** The Framework shall provide access control functions to authorise the access to SCFs or service data for any API method from an application, with the specified security level, context, domain, etc.

Basic mechanism between Framework and Service Capability Server (SCS):

- **Registering of network SCFs**. SCFs offered by a SCS can be registered at the Framework. In this way the Framework can inform the Applications upon request about available SCFs (Discovery). For example, this mechanism is applied when installing or upgrading an SCS.

The following clauses describe each aspect of the Framework in the following order:

- The *sequence diagrams* give the reader a practical idea of how the Framework is implemented.
- The *class diagrams* clause shows how each of the interfaces applicable to the Framework 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 Framework. 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 of the present document (29.198-2).

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 Framework or Service interface, the exception P_METHOD_NOT_SUPPORTED shall be returned to any call of that method. Where a method is not supported by an implementation of an Application interface, a call to that method shall be possible, and no exception shall be returned.

CR-Form-v7

CHANGE REQUEST

⌘ 29.198-03 CR 077 ⌘rev - ⌘ Current version: 5.1.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network X

Title:	⌘	Change reference to deprecated method "authenticate" in TpAuthMechanism to "challenge"
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	31/01/2003
Category:	⌘	F
Release:	⌘	*REL-5*

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Change reference to deprecated method "authenticate" in TpAuthMechanism to "challenge"
Summary of change:	⌘	Changed reference to deprecated method "authenticate" in TpAuthMechanism to "challenge".
Consequences if not approved:	⌘	Inconsistent specification, interoperability issues

Clauses affected:	⌘	10.3.13

Other specs affected: ⌘	Y	N		⌘
		✓	Other core specifications	
		✓	Test specifications	
		✓	O&M Specifications	

Other comments: ⌘

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10.3.13 TpAuthMechanism

This data type is identical to a TpString. It identifies an authentication mechanism to be used for API Level Authentication. The following values are defined:

String Value	Description
P_OSA_MD5	Authentication is based on the use of MD5 (RFC 1321) hashing algorithm to generate a response based on a shared secret and a challenge received via challenge~~authenticate~~() method. The capability to use this algorithm is required to be supported when using CHAP (RFC 1994) but its use is not recommended.
P_OSA_HMAC_SHA1_96	Authentication is based on the use of HMAC-SHA1 (RFC 2404) hashing algorithm to generate a response based on a shared secret and a challenge received via challenge~~authenticate~~ () method.
P_OSA_HMAC_MD5_96	Authentication is based on the use of HMAC-MD5 (RFC 2403) hashing algorithm to generate a response based on a shared secret and a challenge received via ~~authenticate~~ challenge() method.

CR-Form-v7

CHANGE REQUEST

⌘ **29.198-03** **CR** **076** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Remove race condition in signServiceAgreement
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	31/01/2003
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	A race condition was identified in the service agreement interaction.
Summary of change:	⌘	An appropriate exception is identified that indicates to an application that a race condition was encountered.
Consequences if not approved:	⌘	Occurence of the race condition could result in unexpected behavior.

Clauses affected:	⌘	7.3.3.2.1

	Y	N		
Other specs affected: ⌘		✓	Other core specifications	⌘
		✓	Test specifications	
		✓	O&M Specifications	

Other comments:	⌘	

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7.3.3.2.1 Method signServiceAgreement()

After the framework has called signServiceAgreement() on the application's IpAppServiceAgreementManagement interface, this method is used by the client application to request that the framework sign the service agreement, which allows the client application to use the service. A reference to the service manager interface of the service is returned to the client application. The service manager returned will be configured as per the service level agreement. If the framework uses service subscription, the service level agreement will be encapsulated in the subscription properties contained in the contract/profile for the client application, which will be a restriction of the registered properties. If the client application is not allowed to access the service, then an error code (P_SERVICE_ACCESS_DENIED) is returned. If the client application invokes this method before the processing (i.e. digital signature verification) the reponse of signServiceAgreement() on the application's IpAppServiceAgreementManagement interface completed, a TpCommonExceptions with ExceptionType P_INVALID_STATE may be raised to indicate that this method is currently unable to complete the method due to a race condition. In this case, the TpCommonExceptions with ExceptionType P_INVALID_STATE suggests the application to retry the method invocation after a reasonable amount of time has passed.

Returns <signatureAndServiceMgr> : This contains the digital signature of the framework for the service agreement, and a reference to the service manager interface of the service.

```
structure TpSignatureAndServiceMgr {
        digitalSignature: TpOctetSet;
            serviceMgrInterface: IpServiceRef;
        };
```

The digitalSignature contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is the agreement text given by the client application. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the agreement text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention.

The serviceMgrInterface is a reference to the service manager interface for the selected service.

Parameters

`serviceToken : in TpServiceToken`

This is the token returned by the framework in a call to the selectService() method. This token is used to identify the service instance requested by the client application. If the serviceToken is invalid, or has expired, an error code (P_INVALID_SERVICE_TOKEN) is returned.

`agreementText : in TpString`

This is the agreement text that is to be signed by the framework using the private key of the framework. If the agreementText is invalid, then an error code (P_INVALID_AGREEMENT_TEXT) is returned.

`signingAlgorithm : in TpSigningAlgorithm`

This is the algorithm used to compute the digital signature. It shall be identical to the one chosen by the framework in response to IpAccess.selectSigningAlgorithm(). If the signingAlgorithm is not the chosen one, is invalid, or unknown to the framework, an error code (P_INVALID_SIGNING_ALGORITHM) is returned. The list of possible algorithms is as specified in the TpSigningAlgorithm table. The identifier used in this parameter must correspond to the digestAlgorithm and signatureAlgorithm fields in the SignerInfo field in the digitalSignature (see below).

Returns

`TpSignatureAndServiceMgr`

Raises

`TpCommonExceptions,P_ACCESS_DENIED,P_INVALID_AGREEMENT_TEXT,P_INVALID_SERVICE_TOKEN,P_INVALID_SIGNING_ALGORITHM,P_SERVICE_ACCESS_DENIED`

CR-Form-v5

CHANGE REQUEST

⌘ **29.198-03** **CR** **075** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Adding the appAvailStatusInd() and svcAvailStatusInd() methods
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	21/01/03
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
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Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Currently, the appUnavailableInd and svcUnavailableInd methods on IpFaultManager, IpAppFaultManager, IpFWFaultManager and IpSvcFaultManager all imply that the application or service instance is broken, can't be fixed, and is to be killed. This is corrected in the CR N5-020692. The functionality of the new methods used in both the IpFwFaultManager and IpAppFaultManager is to enable the Service to both inform the Framework and Application when it becomes unavailable but as well when it becomes available again. The different unavailable reasons indicate to the Framework and Application if this problem will last a shorter or a longer time. It is then up to the Application to make a decision to stop using this Service and to sign up for another Service or wait for some time to get the availability status event. An error was also found in 8.1.4.7 where the diagram showed that the service instance was called using appUnavailableInd(). According to the method descriptions in 8.3.2.1 this is not correct. svcUnavailableInd() shall be used for this.
Summary of change:	⌘	Deprecate the appUnavailableInd() in IpFaultManager and IpSvcFaultManager and deprecate svcUnavailableInd() in IpFwFaultManager and IpAppFaultManager. Instead the appAvailStatusInd() and the svcAvailStatusInd() methods are added. The corresponding diagrams are also corrected. Two new types are added. TpAppAvailStatusReason and TpSvcAvailStatusReason. Finally an error was found in chapter 8.1.4.7, where the call to the Services was done with the wrong method.
Consequences if not approved:	⌘	The ability to support the ideas in the CR N5-020692 will not work fully. This will enable the service and application to become available again and to inform the other of that.

Clauses affected:	⌘	7, 8
Other specs	⌘	☐ Other core specifications ⌘

affected:	☐ Test specifications ☐ O&M Specifications	
Other comments: ⌘		

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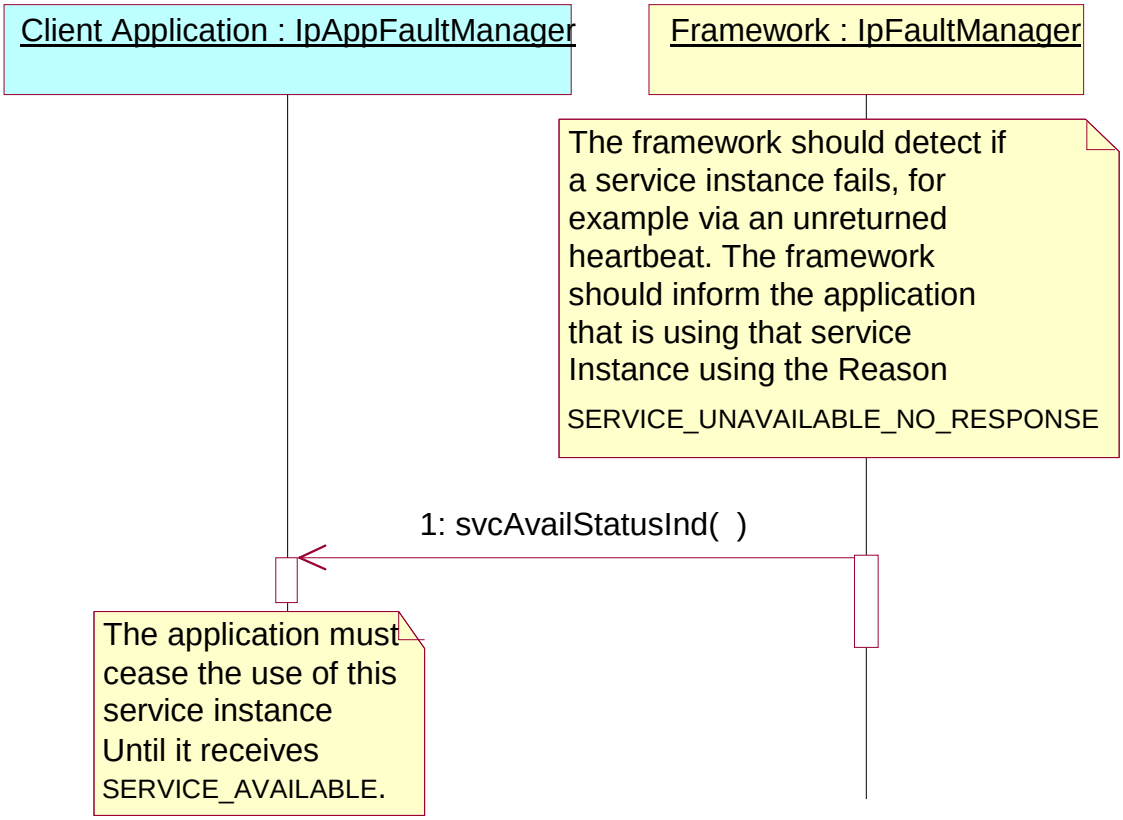
7.1.2.7 Fault Management: Framework detects a Service failure

The framework has detected that a service instance has failed (probably by the use of the heartbeat mechanism). The framework updates its own records and informs the client application using the service instance to stop.



1: The framework informs the client application that is using the service instance that the service is unavailable. The client application is then expected to abandon use of this service instance and possibly access a different service instance via the usual means (e.g. discovery, selectService etc.) The client application may also wait to receive a new call to the svcAvailStatusInd with the reason SERVICE_AVAILABLE when the Service has become available again. The different Unavailability reasons used by the Framework (TpSvcAvailStatusReason) guides the client application developers to make the decision. The client application should not need to re-authenticate in order to discover and use an alternative service instance. The framework will also need to make the relevant updates to its internal records to make sure the service instance is removed from service and no client applications are still recorded as using it.

****

7.2 Class Diagrams

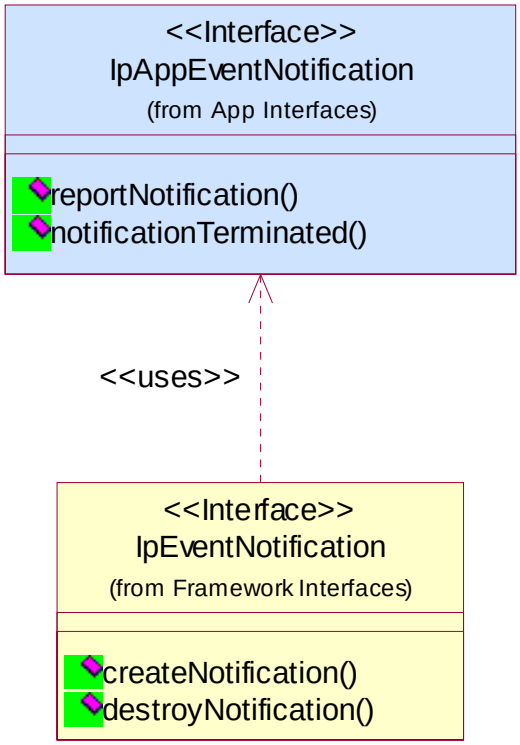


Figure: Event Notification Class Diagram

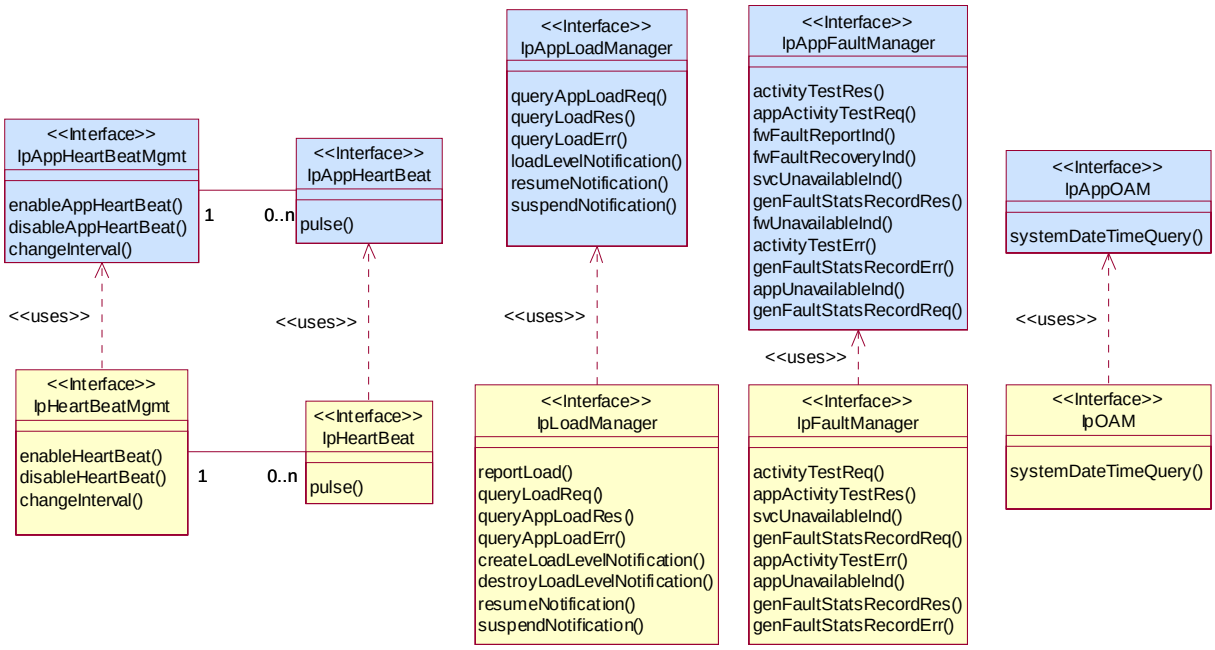


Figure: Integrity Management Package Overview

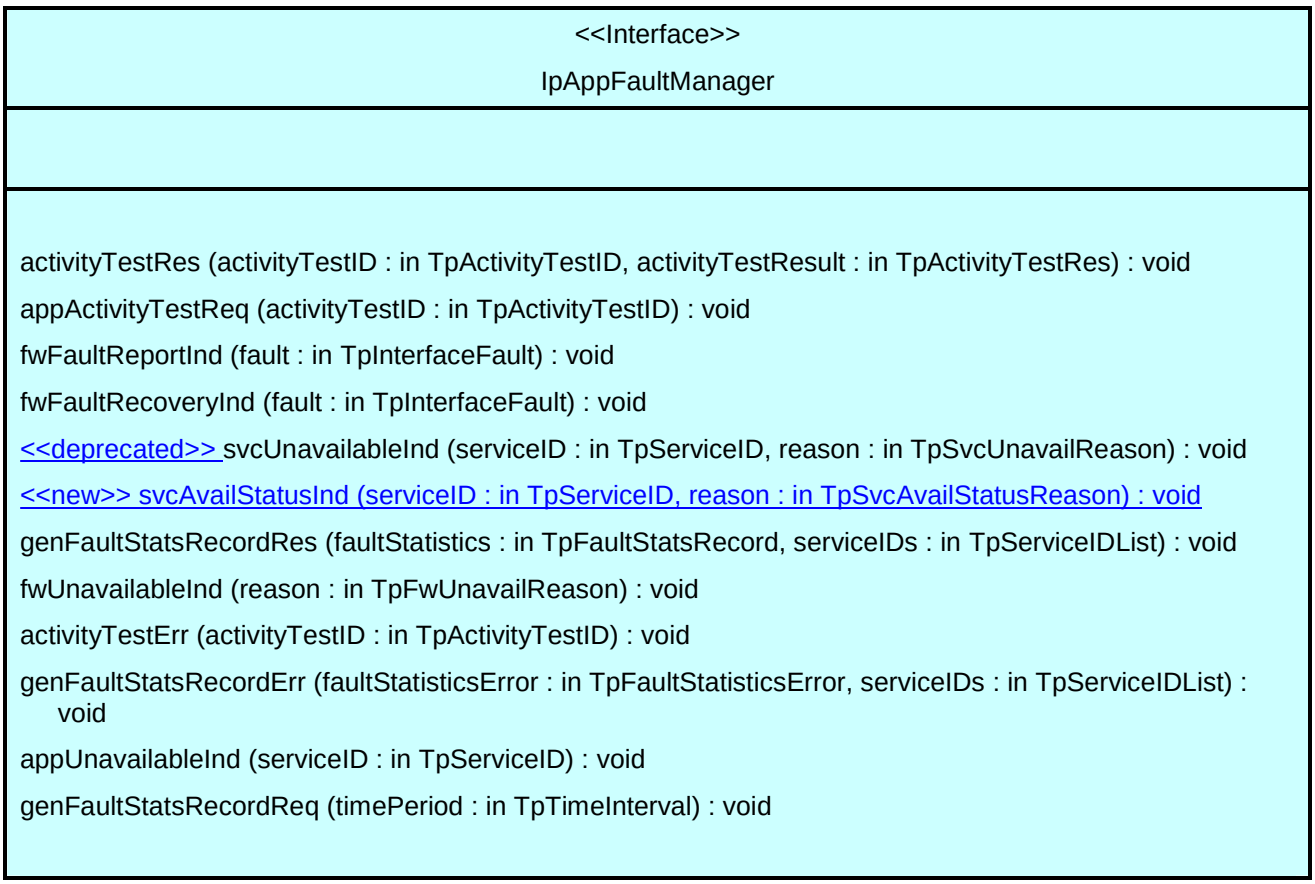
N.B The figure above must be edited to deprecate the appUnavailableInd and to add the appAvailStatusInd in the IpFaultManager interface. As well as to deprecate the svcUnavailableInd and to add the svcAvailStatusInd in the IpAppFaultManager.

****

7.3.2.1 Interface Class IpAppFaultManager

Inherits from: IpInterface.

This interface is used to inform the application of events that affect the integrity of the Framework, Service or Client Application. The Fault Management Framework will invoke methods on the Fault Management Application Interface that is specified when the client application obtains the Fault Management interface: i.e. by use of the obtainInterfaceWithCallback operation on the IpAccess interface



7.3.2.1.1 Method activityTestRes()

The framework uses this method to return the result of a client application-requested activity test.

Parameters

`activityTestID : in TpActivityTestID`

Used by the client application to correlate this response (when it arrives) with the original request.

`activityTestResult : in TpActivityTestRes`

The result of the activity test.

7.3.2.1.2 Method appActivityTestReq()

The framework invokes this method to test that the client application is operational. On receipt of this request, the application must carry out a test on itself, to check that it is operating correctly. The application reports the test result by invoking the appActivityTestRes method on the IpFaultManager interface.

Parameters

`activityTestID : in TpActivityTestID`

The identifier provided by the framework to correlate the response (when it arrives) with this request.

7.3.2.1.3 Method fwFaultReportInd()

The framework invokes this method to notify the client application of a failure within the framework. The client application must not continue to use the framework until it has recovered (as indicated by a fwFaultRecoveryInd).

Parameters

fault : in TpInterfaceFault

Specifies the fault that has been detected by the framework.

7.3.2.1.4 Method fwFaultRecoveryInd()

The framework invokes this method to notify the client application that a previously reported fault has been rectified. The application may then resume using the framework.

Parameters

fault : in TpInterfaceFault

Specifies the fault from which the framework has recovered.

7.3.2.1.5 Method <<deprecated>> svcUnavailableInd()

This method is deprecated and will be removed in a later release. It is strongly recommended not to implement this method. The new method svcAvailStatusInd shall be used instead, using the new type of reason parameter to inform the Service the reason why the Application is unavailable and also when the application becomes available again.

The framework invokes this method to inform the client application that it can no longer use its instance of the indicated service. On receipt of this request, the client application must act to reset its use of the specified service (using the normal mechanisms, such as the discovery and authentication interfaces, to stop use of this service instance and begin use of a different service instance).

Parameters

serviceID : in TpServiceID

Identifies the affected service.

reason : in TpSvcUnavailReason

Identifies the reason why the service is no longer available

7.3.2.1.6 Method <<new>> svcAvailStatusInd()

The framework invokes this method to inform the client application about the Service instance availability status, i.e. that it can no longer use its instance of the indicated service according to the reason parameter but as well information when the Service Instance becomes available again. On receipt of this request, the client application either acts to reset its use of the specified service (using the normal mechanisms, such as the discovery and authentication interfaces, to stop use of this service instance and begin use of a different service instance). The client application can also wait for the problem to be solved and just stop the usage of the service instance until the svcAvailStatusInd() is called again with the reason SERVICE_AVAILABLE.

Parameters

serviceID : in TpServiceID

Identifies the affected service.

reason : in TpSvcAvailStatusReason

Identifies the reason why the service is no longer available or that it has become available again.

~~7.3.2.1.6~~7.3.2.1.7 Method genFaultStatsRecordRes()

This method is used by the framework to provide fault statistics to a client application in response to a genFaultStatsRecordReq method invocation on the IpFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

serviceIDs : in TpServiceIDList

Specifies the framework or services that are included in the general fault statistics record. If the serviceIDs parameter is an empty list, then the fault statistics are for the framework.

~~7.3.2.1.7~~7.3.2.1.8 Method fwUnavailableInd()

The framework invokes this method to inform the client application that it is no longer available.

Parameters

reason : in TpFwUnavailReason

Identifies the reason why the framework is no longer available

~~7.3.2.1.8~~7.3.2.1.9 Method activityTestErr()

The framework uses this method to indicate that an error occurred during an application-initiated activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the application to correlate this response (when it arrives) with the original request.

~~7.3.2.1.9~~7.3.2.1.10 Method genFaultStatsRecordErr()

This method is used by the framework to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

serviceIDs : in TpServiceIDList

Specifies the framework or services that were included in the general fault statistics record request. If the serviceIDs parameter is an empty list, then the fault statistics were requested for the framework.

~~7.3.2.1.10~~7.3.2.1.11 Method appUnavailableInd()

The framework invokes this method to indicate to the application that the service instance has detected that it is not responding. On receipt of this indication, the application must end its current session with the service instance.

Parameters

serviceID : in TpServiceID

Specifies the service for which the indication of unavailability was received.

~~7.3.2.1.11~~7.3.2.1.12 Method genFaultStatsRecordReq()

This method is used by the framework to solicit fault statistics from the client application, for example when the framework was asked for these statistics by a service instance by using the genFaultStatsRecordReq operation on the IpFwFaultManager interface. On receipt of this request, the client application must produce a fault statistics record, for the application during the specified time interval, which is returned to the framework using the genFaultStatsRecordRes operation on the IpFaultManager interface.

Parameters

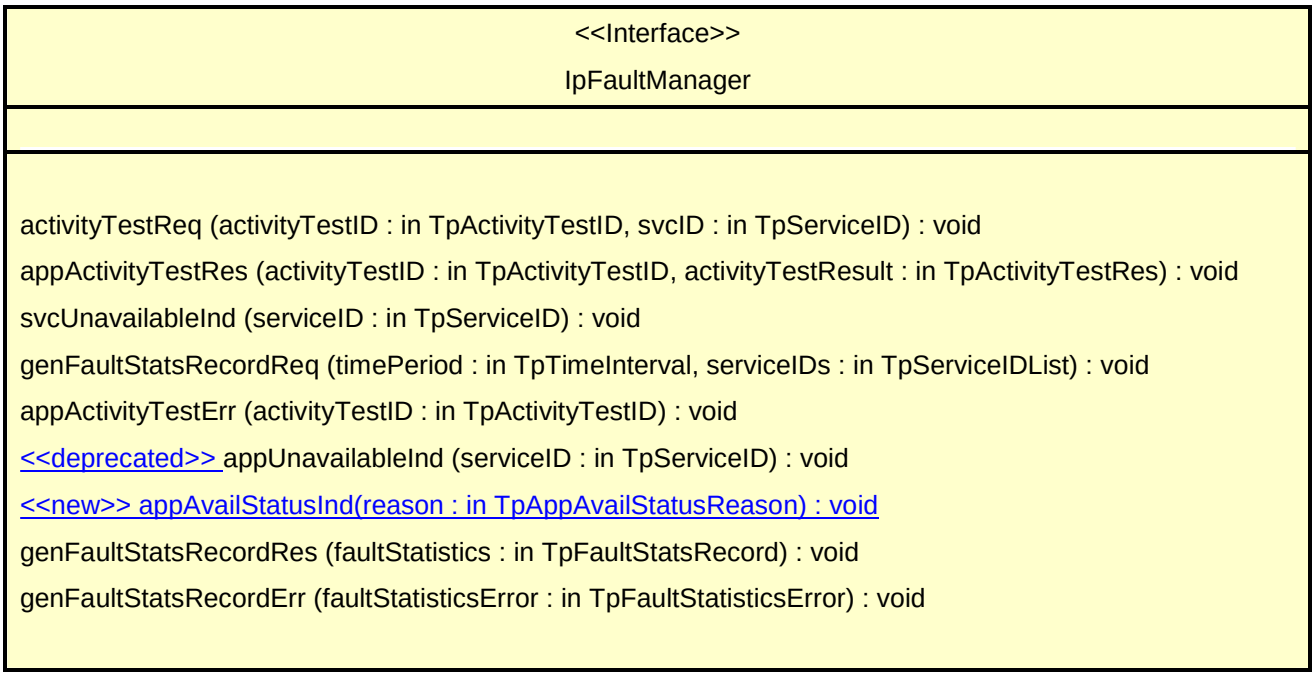
timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. A null value leaves this to the discretion of the client application.

7.3.2.2 Interface Class IpFaultManager

Inherits from: IpInterface.

This interface is used by the application to inform the framework of events that affect the integrity of the framework and services, and to request information about the integrity of the system. The fault manager operations do not exchange callback interfaces as it is assumed that the client application supplies its Fault Management callback interface at the time it obtains the Framework's Fault Management interface, by use of the obtainInterfaceWithCallback operation on the IpAccess interface.



7.3.2.2.1 Method activityTestReq()

The application invokes this method to test that the framework or its instance of a service is operational. On receipt of this request, the framework must carry out a test on itself or on the client's instance of the specified service, to check that it is operating correctly. The framework reports the test result by invoking the activityTestRes method on the IpAppFaultManager interface. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

For security reasons the client application has access to the service ID rather than the service instance ID. However, as there is a one to one relationship between the client application and a service, i.e. there is only one service instance of the specified service per client application, it is the obligation of the framework to determine the service instance ID from the service ID.

Parameters

activityTestID : in TpActivityTestID

The identifier provided by the client application to correlate the response (when it arrives) with this request.

svcID : in TpServiceID

Identifies either the framework or a service for testing. The framework is designated by a null value.

Raises

TpCommonExceptions,P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.2 Method appActivityTestRes()

The client application uses this method to return the result of a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

Raises

TpCommonExceptions,P_INVALID_SERVICE_ID,P_INVALID_ACTIVITY_TEST_ID

7.3.2.2.3 Method svcUnavailableInd()

This method is used by the client application to inform the framework that it can no longer use its instance of the indicated service (either due to a failure in the client application or in the service instance itself). On receipt of this request, the framework should take the appropriate corrective action. The framework assumes that the session between this client application and service instance is to be closed and updates its own records appropriately as well as attempting to inform the service instance and/or its administrator. Attempts by the client application to continue using this session should be rejected. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

serviceID : in TpServiceID

Identifies the service that the application can no longer use.

Raises

TpCommonExceptions ,P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.4 Method genFaultStatsRecordReq()

This method is used by the application to solicit fault statistics from the framework. On receipt of this request the framework must produce a fault statistics record, for either the framework or for the client's instances of the specified services during the specified time interval, which is returned to the client application using the genFaultStatsRecordRes operation on the IpAppFaultManager interface. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. A null value leaves this to the discretion of the framework.

serviceIDs : in TpServiceIDList

Specifies either the framework or services to be included in the general fault statistics record. If this parameter is not an empty list, the fault statistics records of the client's instances of the specified services are returned, otherwise the fault statistics record of the framework is returned.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.5 Method appActivityTestErr()

The client application uses this method to indicate that an error occurred during a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

7.3.2.2.6 Method appUnavailableInd()

This method is used by the application to inform the framework that it is ceasing its use of the service instance. This may a result of the application detecting a failure. The framework assumes that the session between this client application and service instance is to be closed and updates its own records appropriately as well as attempting to inform the service instance and/or its administrator.

Parameters

serviceID : in TpServiceID

Identifies the affected application.

Raises

TpCommonExceptions

7.3.2.2.7 Method <<new>> appAvailStatusInd()

This method is used by the application to inform the framework that of its availability status. If the Application has detected a failure it uses one of the APP_UNAVAILABLE reason types to indicate the problem and that it is ceasing its use of all of its subscribed service instances. When the Application is working again it shall call this method again with the APP_AVAILABLE reason to inform the Framework that it is working properly again. The Framework shall also attempt to inform all of the service instances used by the specific application and/or its administrator about the problem.

Parameters

reason : in TpAppAvailStatusReason

Identifies the reason why the application is no longer available. APP_AVAILABLE is used to inform the Framework and the Service that the Application is available again.

Raises

TpCommonExceptions

7.3.2.2.8 Method genFaultStatsRecordRes()

This method is used by the client application to provide fault statistics to the framework in response to a genFaultStatsRecordReq method invocation on the IpAppFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

Raises

TpCommonExceptions

7.3.2.2.9 Method genFaultStatsRecordErr()

This method is used by the client application to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpAppFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

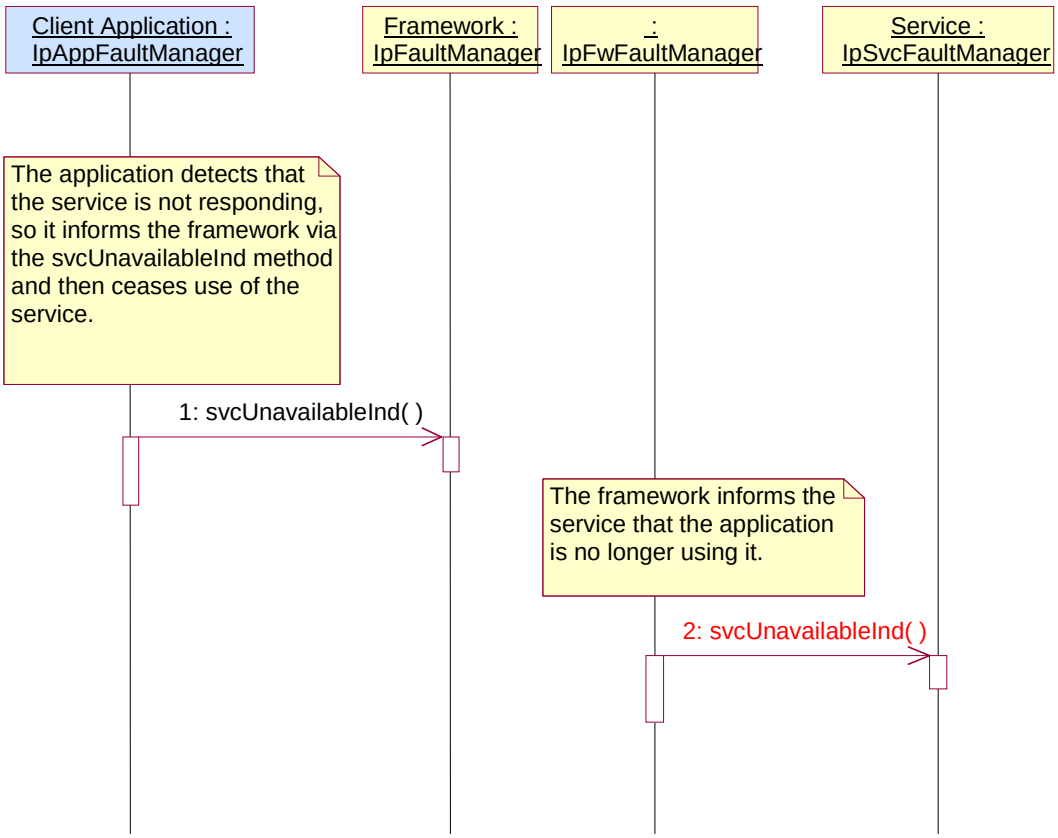
Raises

TpCommonExceptions

****

In the following diagram the appUnavailableInd() is swapped to the svcUnavailableInd(), i.e. according to the description of the methods in chapter 8.3.4.2 below.

8.1.4.7 Fault Management: Application detects service is unavailable



1: The client application detects that the service instance is currently not available, i.e. the service instance is not responding to the client application in the normal way, so it informs the framework and takes action to stop using this service instance and change to a different one (via the usual mechanisms, such as discovery, selectService etc.). The client application should not need to re-authenticate in order to discover and use an alternative service instance.

2: The framework informs the service instance that the client application was unable to get a response from it and has ceased to be one of its users. The framework and service instance must carry out the appropriate updates to remove the client application as one of the users of this service instance. The service or framework may then decide to carry out an activity test to see whether there is a general problem with the service instance that requires further action.

****

8.2 Class Diagrams

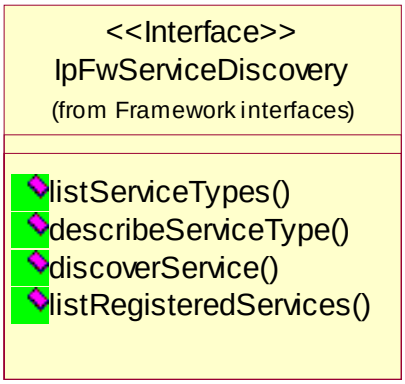


Figure: Service Discovery Package Overview

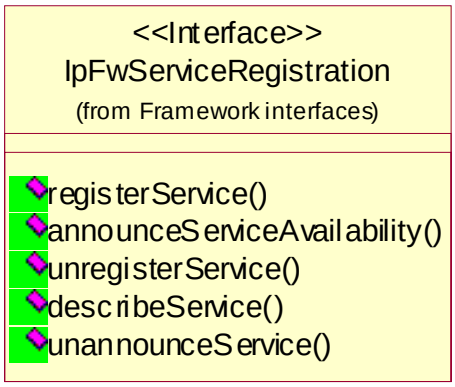


Figure: Service Registration Package Overview

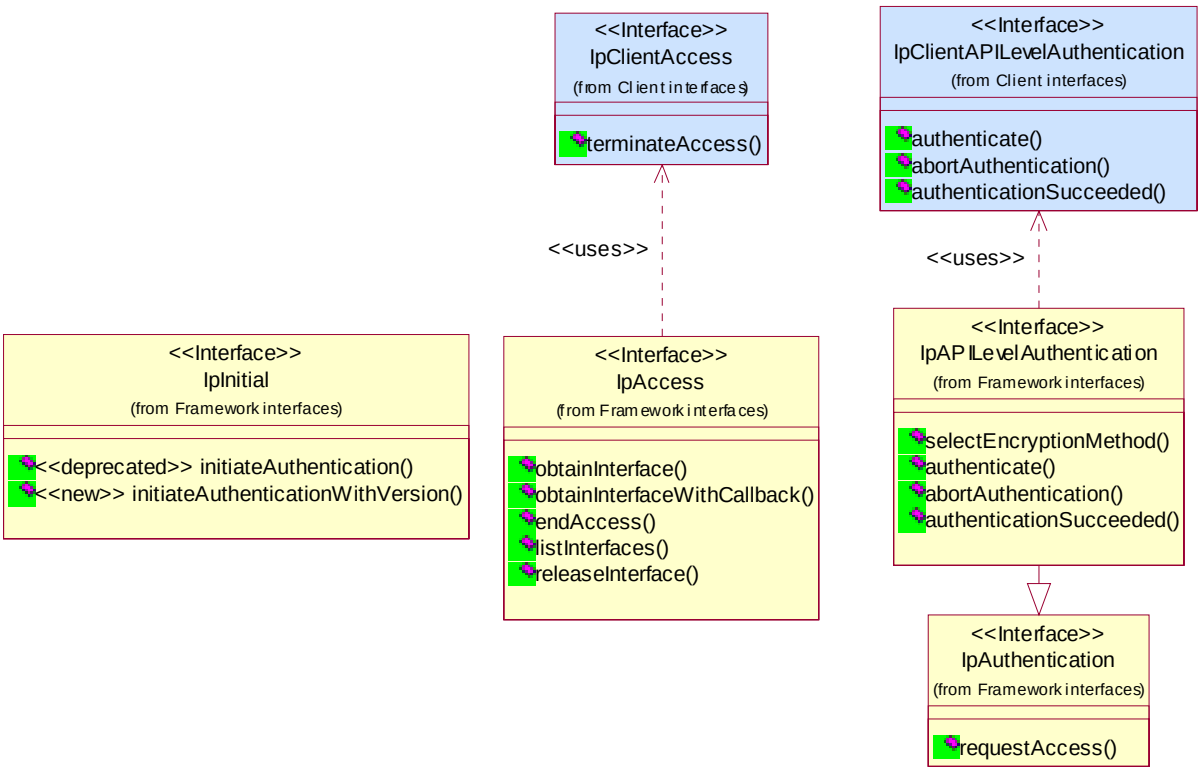


Figure: Trust and Security Management Package Overview

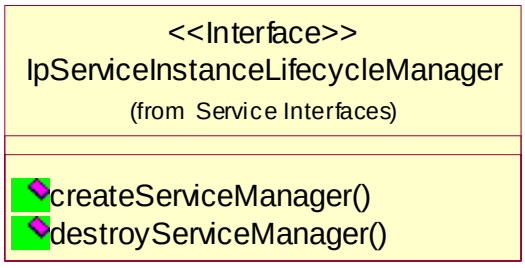


Figure: Service Instance Lifecycle Manager Package Overview

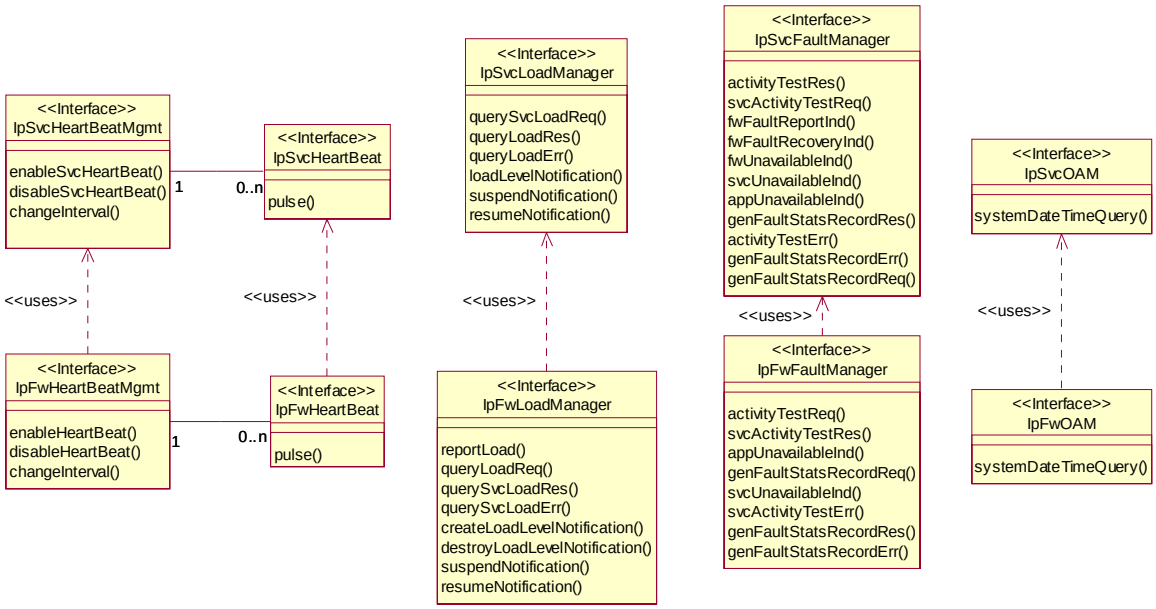


Figure: Integrity Management Package Overview

N.B The figure above must be edited to deprecate the appUnavailableInd and add the appAvailStatusInd in the IpSvcFaultManager interface. As well as to deprecate the svcUnavailableInd and to add the svcAvailStatusInd in the IpFwFaultManager.

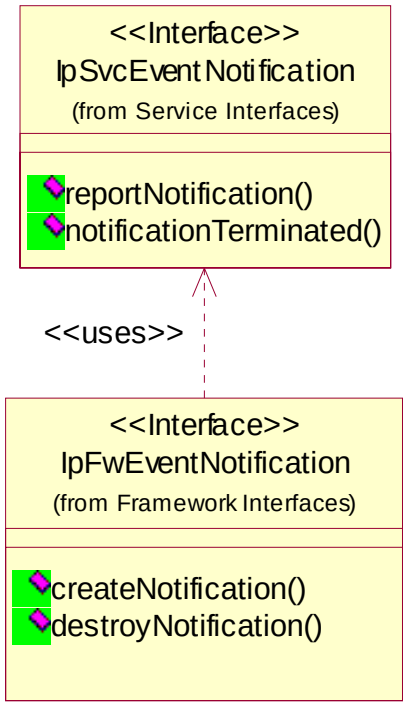
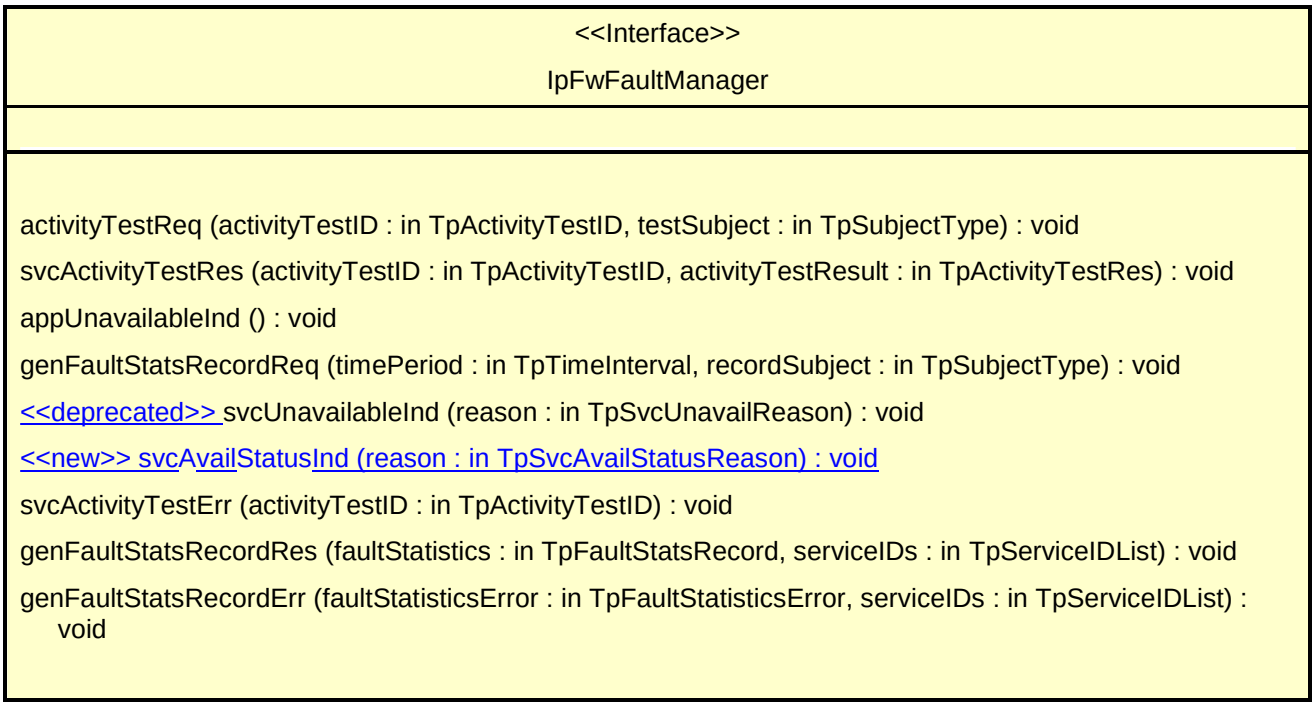


Figure: Event Notification Package Overview

8.3.2.1 Interface Class IpFwFaultManager

Inherits from: IpInterface.

This interface is used by the service instance to inform the framework of events which affect the integrity of the API, and request fault management status information from the framework. The fault manager operations do not exchange callback interfaces as it is assumed that the service instance has supplied its Fault Management callback interface at the time it obtains the Framework's Fault Management interface, by use of the obtainInterfaceWithCallback operation on the IpAccess interface.



8.3.2.1.1 Method activityTestReq()

The service instance invokes this method to test that the framework or the client application is operational. On receipt of this request, the framework must carry out a test on itself or on the application, to check that it is operating correctly. The framework reports the test result by invoking the activityTestRes method on the IpSvcFaultManager interface.

Parameters

`activityTestID : in TpActivityTestID`

The identifier provided by the service instance to correlate the response (when it arrives) with this request.

`testSubject : in TpSubjectType`

Identifies the subject for testing (framework or client application).

Raises

`TpCommonExceptions`

8.3.2.1.2 Method svcActivityTestRes()

The service instance uses this method to return the result of a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

Raises

TpCommonExceptions,P_INVALID_ACTIVITY_TEST_ID

8.3.2.1.3 Method appUnavailableInd()

This method is used by the service instance to inform the framework that the client application is not responding. On receipt of this indication, the framework must act to inform the client application that it should cease use of this service instance.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.1.4 Method genFaultStatsRecordReq()

This method is used by the service instance to solicit fault statistics from the framework. On receipt of this request, the framework must produce a fault statistics record, for the framework or for the application during the specified time interval, which is returned to the service instance using the genFaultStatsRecordRes operation on the IpSvcFaultManager interface.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. A null value leaves this to the discretion of the framework.

recordSubject : in TpSubjectType

Specifies the subject to be included in the general fault statistics record (framework or application).

Raises

TpCommonExceptions

8.3.2.1.5 Method <<deprecated>> svcUnavailableInd()

This method is deprecated and will be removed in a later release. It is strongly recommended not to implement this method. The new method svcAvailStatusInd() shall be used instead, using the new and updated reason parameter to inform the Framework the reason why the Service has become unavailable and also when the Service instance becomes available again.

This method is used by the service instance to inform the framework that it is about to become unavailable for use. The framework should inform the client application that is currently using this service instance that it is unavailable for use (via the svcUnavailableInd method on the IpAppFaultManager interface).

Parameters

reason : in TpSvcUnavailReason

Identifies the reason for the service instance's unavailability.

Raises

TpCommonExceptions

8.3.2.1.6 Method <<new>> svcAvailStatusInd()

This method is used by the service instance to inform the framework that it is about to become unavailable for use according to the provided reason and as well to inform the Framework when the Service instance becomes available again. The framework should inform the client applications that are currently using this service instance that it is unavailable and as well when it becomes available again for use (via the svcAvailStatusInd method on the IpAppFaultManager interface).

Parameters

reason : in TpSvcAvailStatusReason

Identifies the reason for the service instance's unavailability and also the reason SERVICE_AVAILABLE to be used to inform the Framework when the Service instance becomes available again.

Raises

TpCommonExceptions

~~8.3.2.1.6~~8.3.2.1.7 Method svcActivityTestErr()

The service instance uses this method to indicate that an error occurred during a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

~~8.3.2.1.7~~8.3.2.1.8 Method genFaultStatsRecordRes()

This method is used by the service to provide fault statistics to the framework in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

serviceIDs : in TpServiceIDList

Specifies the services that are included in the general fault statistics record. The serviceIDs parameter is not allowed to be an empty list.

Raises

TpCommonExceptions

~~8.3.2.1.8~~8.3.2.1.9 Method genFaultStatsRecordErr()

This method is used by the service to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

serviceIDs : in TpServiceIDList

Specifies the services that were included in the general fault statistics record request. The serviceIDs parameter is not allowed to be an empty list.

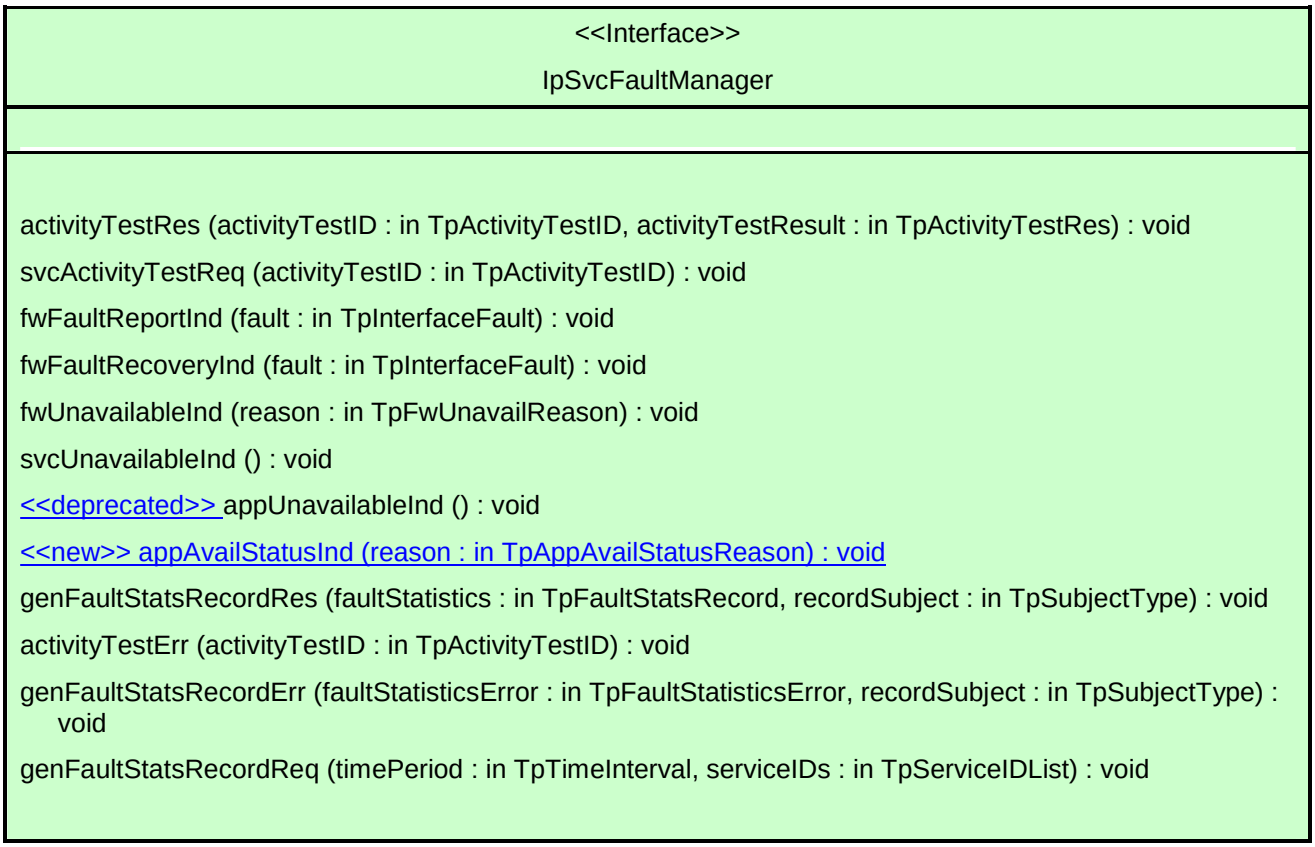
Raises

TpCommonExceptions

8.3.2.2 Interface Class IpSvcFaultManager

Inherits from: IpInterface.

This interface is used to inform the service instance of events that affect the integrity of the Framework, Service or Client Application. The Framework will invoke methods on the Fault Management Service Interface that is specified when the service instance obtains the Fault Management Framework interface: i.e. by use of the obtainInterfaceWithCallback operation on the IpAccess interface



8.3.2.2.1 Method activityTestRes()

The framework uses this method to return the result of a service-requested activity test.

Parameters

`activityTestID : in TpActivityTestID`

Used by the service to correlate this response (when it arrives) with the original request.

`activityTestResult : in TpActivityTestRes`

The result of the activity test.

Raises

`TpCommonExceptions,P_INVALID_ACTIVITY_TEST_ID`

8.3.2.2.2 Method svcActivityTestReq()

The framework invokes this method to test that the service instance is operational. On receipt of this request, the service instance must carry out a test on itself, to check that it is operating correctly. The service instance reports the test result by invoking the svcActivityTestRes method on the IpFwFaultManager interface.

Parameters

`activityTestID : in TpActivityTestID`

The identifier provided by the framework to correlate the response (when it arrives) with this request.

Raises

`TpCommonExceptions`

8.3.2.2.3 Method fwFaultReportInd()

The framework invokes this method to notify the service instance of a failure within the framework. The service instance must not continue to use the framework until it has recovered (as indicated by a fwFaultRecoveryInd).

Parameters

`fault : in TpInterfaceFault`

Specifies the fault that has been detected by the framework.

Raises

`TpCommonExceptions`

8.3.2.2.4 Method fwFaultRecoveryInd()

The framework invokes this method to notify the service instance that a previously reported fault has been rectified. The service instance may then resume using the framework.

Parameters

`fault : in TpInterfaceFault`

Specifies the fault from which the framework has recovered.

Raises

`TpCommonExceptions`

8.3.2.2.5 Method fwUnavailableInd()

The framework invokes this method to inform the service instance that it is no longer available.

Parameters

reason : in TpFwUnavailReason

Identifies the reason why the framework is no longer available

Raises

TpCommonExceptions

8.3.2.2.6 Method svcUnavailableInd()

The framework invokes this method to inform the service instance that the client application has reported that it can no longer use the service instance (either due to a failure in the client application or in the service instance itself). The service should assume that the client application is leaving the service session and the service should act accordingly to terminate the session from its own end too.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.2.7 Method <<deprecated>> appUnavailableInd()

This method is deprecated and will be removed in a later release. It is strongly recommended not to implement this method. The new method appAvailStatusInd shall be used instead, using the new reason parameter to inform the Service the reason why the Application is unavailable and also when the application becomes available again.

The framework invokes this method to inform the service instance that the client application is ceasing its current use of the service. This may be a result of the application reporting a failure. Alternatively, the framework may have detected that the application has failed: e.g. non-response from an activity test, failure to return heartbeats.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.2.8 Method <<new>> appAvailStatusInd()

The framework invokes this method to inform the service instance that the client application is no longer available using different reasons for the unavailability. This may be a result of the application reporting a failure. Alternatively, the framework may have detected that the application has failed: e.g. non-response from an activity test, failure to return

heartbeats, using the reason APP_UNAVAILABLE_NO_RESPONSE. When the application becomes available again the reason APP_AVAILABLE shall be used to inform the Service about that.

Parameters

reason : in TpAppAvailStatusReason

Identifies the reason why the application is no longer available. APP_AVAILABLE is used to inform the Service that the Application is available again.

Raises

TpCommonExceptions

8.3.2.2.9 Method genFaultStatsRecordRes()

This method is used by the framework to provide fault statistics to a service instance in response to a genFaultStatsRecordReq method invocation on the IpFwFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

recordSubject : in TpSubjectType

Specifies the entity (framework or application) whose fault statistics record has been provided.

Raises

TpCommonExceptions

8.3.2.2.10 Method activityTestErr()

The framework uses this method to indicate that an error occurred during a service-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the service instance to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

8.3.2.2.11 Method genFaultStatsRecordErr()

This method is used by the framework to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpFwFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

recordSubject : in TpSubjectType

Specifies the entity (framework or application) whose fault statistics record was requested.

Raises

TpCommonExceptions

8.3.2.2.12 Method genFaultStatsRecordReq()

This method is used by the framework to solicit fault statistics from the service, for example when the framework was asked for these statistics by the client application using the genFaultStatsRecordReq operation on the IpFaultManager interface. On receipt of this request the service must produce a fault statistics record, for either the framework or for the client's instances of the specified services during the specified time interval, which is returned to the framework using the genFaultStatsRecordRes operation on the IpFwFaultManager interface. If the framework does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. A null value leaves this to the discretion of the service.

serviceIDs : in TpServiceIDList

Specifies the services to be included in the general fault statistics record. This parameter is not allowed to be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

****

10.4.8 TpSvcUnavailReason

Defines the reason why a SCF is unavailable.

Name	Value	Description
SERVICE_UNAVAILABLE_UNDEFINED	0	Undefined
SERVICE_UNAVAILABLE_LOCAL_FAILURE	1	The Local API software or hardware has failed
SERVICE_UNAVAILABLE_GATEWAY_FAILURE	2	The gateway API software or hardware has failed
SERVICE_UNAVAILABLE_OVERLOADED	3	The SCF is fully overloaded
SERVICE_UNAVAILABLE_CLOSED	4	The SCF has closed itself (e.g. to protect from fraud or malicious attack)

10.4.9 TpSvcAvailStatusReason

Defines the reason why a SCF is unavailable.

Name	Value	Description
SERVICE_UNAVAILABLE_UNDEFINED	0	Undefined
SERVICE_UNAVAILABLE_LOCAL_FAILURE	1	The Local API software or hardware has failed. Normally take longer time to correct
SERVICE_UNAVAILABLE_GATEWAY_FAILURE	2	The gateway API software or hardware has failed Normally take longer time to correct
SERVICE_UNAVAILABLE_OVERLOADED	3	The SCF is fully overloaded Normally a temporary problem
SERVICE_UNAVAILABLE_CLOSED	4	The SCF has closed itself (e.g. to protect from fraud or malicious attack) Normally take longer time to correct
SERVICE_UNAVAILABLE_NO_RESPONSE	5	The Framework has detected that the service has failed: e.g. non-response from an activity test, failure to return heartbeats
SERVIVE_UNAVAILABLE_SW_UPGRADE	6	The Service is unavailable due to SW upgrade or other similar maintenance Normally a temporary problem
SERVICE_AVAILABLE	7	The Service has become available again

10.4.10 TAppAvailStatusReason

Defines the reason why the Application is unavailable.

Name	Value	Description
APP_UNAVAILABLE_UNDEFINED	0	Undefined
APP_UNAVAILABLE_LOCAL_FAILURE	1	A local failure in the Application has been detected Normally take longer time to correct
APP_UNAVAILABLE_REMOTE_FAILURE	2	A remote failure to the application has been detected, e.g. a database is not working Normally take longer time to correct
APP_UNAVAILABLE_OVERLOADED	3	The Application is fully overloaded Often a temporary problem
APP_UNAVAILABLE_CLOSED	4	The Application has closed itself (e.g. to protect from fraud or malicious attack) Normally take longer time to correct
APP_UNAVAILABLE_NO_RESPONSE	5	The Framework has detected that the application has failed: e.g. non-response from an activity test, failure to return heartbeats
APP_UNAVAILABLE_SW_UPGRADE	6	The Application is unavailable due to SW upgrade or other similar maintenance Often a temporary problem
APP_AVAILABLE	7	The Application has become available

CR-Form-v7

CHANGE REQUEST

⌘ **29.198-03** **CR** **071** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of status of methods to interfaces in clause 6.3
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	31/10/2002
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There is no requirement in the standard about the necessity to implement all or only some of the methods defined for an interface.
Summary of change:	⌘	Clarify which methods are mandatory and which are optional.
Consequences if not approved:	⌘	Application developers will not know which methods will actually be available.
Clauses affected:	⌘	6.3.1 Trust and Security Management Interface Classes

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.3 Interface Classes

6.3.1 Trust and Security Management Interface Classes

The Trust and Security Management Interfaces provide:

- the first point of contact for a client to access a Framework provider;
- the authentication methods for the client and Framework provider to perform an authentication protocol;
- the client with the ability to select a service capability feature to make use of;
- the client with a portal to access other Framework interfaces.

The process by which the client accesses the Framework provider has been separated into 3 stages, each supported by a different Framework interface:

1) Initial Contact with the Framework;
2) Authentication;
3) Access to Framework and Service Capability Features.

6.3.1.1 Interface Class IpClientAPILevelAuthentication

Inherits from: IpInterface.

If the IpClientAPILevelAuthentication interface is implemented by a client, authenticate(), challenge(), abortAuthentication() and authenticationSucceeded() methods shall be implemented.

<<Interface>> IpClientAPILevelAuthentication
<<deprecated>> authenticate (challenge : in TpOctetSet) : TpOctetSet abortAuthentication () : void authenticationSucceeded () : void <<new>> challenge (challenge : in TpOctetSet) : TpOctetSet

6.3.1.1.1 Method <<deprecated>> authenticate()

This method is deprecated and replaced by challenge(). It shall only be used when the deprecated method initiateAuthentication() is used on the IpInitial interface instead of initiateAuthenticationWithVersion(). This method will be removed in a later release of the specification.

This method is used by the framework to authenticate the client. The challenge will be encrypted using the mechanism prescribed by selectEncryptionMethod. The client must respond with the correct responses to the challenges presented by the framework. The number of exchanges is dependent on the policies of each side. The authentication of the client is deemed successful when the authenticationSucceeded method is invoked by the Framework.

The invocation of this method may be interleaved with authenticate() calls by the client on the IpAPILevelAuthentication interface. The client shall respond immediately to authentication challenges from the Framework, and not wait until the Framework has responded to any challenge the client may issue.

Returns <response> : This is the response of the client application to the challenge of the framework in the current sequence. The response will be based on the challenge data, decrypted with the mechanism prescribed by selectEncryptionMethod().

Parameters

`challenge : in TpOctetSet`

The challenge presented by the framework to be responded to by the client. The challenge mechanism used will be in accordance with the IETF PPP Authentication Protocols - Challenge Handshake Authentication Protocol [RFC 1994, August1996]. The challenge will be encrypted with the mechanism prescribed by selectEncryptionMethod().

Returns

`TpOctetSet`

6.3.1.1.2 Method abortAuthentication()

The framework uses this method to abort the authentication process where the client is authenticating the Framework. This method is invoked if the framework wishes to abort the authentication process before it has been authenticated by the client, (unless the client responded incorrectly to a challenge in which case no further communication with the client should occur.) Calls to this method after the Framework has been authenticated by the client shall not result in an immediate removal of the Framework's authentication (the client may wish to authenticate the Framework again, however).

Parameters

No Parameters were identified for this method

6.3.1.1.3 Method authenticationSucceeded()

The Framework uses this method to inform the client of the success of the authentication attempt. The client may invoke requestAccess on the Framework's APILevelAuthentication interface following invocation of this method.

Parameters

No Parameters were identified for this method

6.3.1.1.4 Method <<new>> challenge()

This method is used by the framework to authenticate the client. The client must respond with the correct responses to the challenges presented by the framework. The number of exchanges is dependent on the policies of each side. The authentication of the client is deemed successful when the authenticationSucceeded method is invoked by the Framework.

The invocation of this method may be interleaved with challenge() calls by the client on the IpAPILevelAuthentication interface. The client shall respond immediately to authentication challenges from the Framework, and not wait until the Framework has responded to any challenge the client may issue.

This method shall only be used when the method initiateAuthenticationWithVersion() is used on the IpInitial interface.

Returns <response> : This is the response of the client application to the challenge of the framework in the current sequence. The formatting of this parameter shall be according to section 4.1 of RFC 1994. A complete CHAP Response packet shall be used to carry the response string. The Response packet shall make the contents of this returned parameter. The Name field of the CHAP Response packet shall be present but not contain any useful value.

Parameters

`challenge : in TpOctetSet`

The challenge presented by the framework to be responded to by the client. The challenge format used will be in accordance with the IETF PPP Authentication Protocols - Challenge Handshake Authentication Protocol [RFC 1994, August1996].

The formatting of the challenge value shall be according to section 4.1 of RFC 1994. A complete CHAP Request packet shall be used to carry the challenge value. The Name field of the CHAP Request packet shall be present but not contain any useful value.

Returns

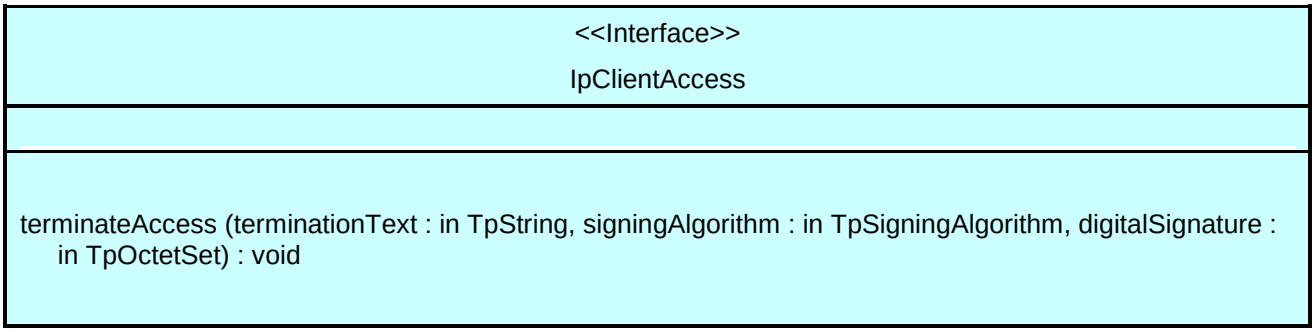
`TpOctetSet`

6.3.1.2 Interface Class IpClientAccess

Inherits from: IpInterface.

IpClientAccess interface is offered by the client to the framework to allow it to initiate interactions during the access session.

This interface and the terminateAccess() method shall be implemented by a client.



6.3.1.2.1 Method terminateAccess()

The terminateAccess operation is used by the framework to end the client's access session.

After terminateAccess() is invoked, the client will no longer be authenticated with the framework. The client will not be able to use the references to any of the framework interfaces gained during the access session. Any calls to these interfaces will fail. Also, all remaining service instances created by the framework either directly in this access session or on behalf of the client during this access session shall be terminated. If at any point the framework's level of confidence in the identity of the client becomes too low, perhaps due to re-authentication failing, the framework should terminate all outstanding service agreements for that client, and should take steps to terminate the client's access session WITHOUT invoking terminateAccess() on the client. This follows a generally accepted security model where the framework has decided that it can no longer trust the client and will therefore sever ALL contact with it.

Parameters

`terminationText : in TpString`

This is the termination text describes the reason for the termination of the access session.

`signingAlgorithm : in TpSigningAlgorithm`

This is the algorithm used to compute the digital signature. It shall be identical to the one chosen by the framework in response to IpAccess.selectSigningAlgorithm(). If the signingAlgorithm is not the chosen one, is invalid, or unknown to the client, the P_INVALID_SIGNING_ALGORITHM exception will be thrown. The list of possible algorithms is as

specified in the TpSigningAlgorithm table. The identifier used in this parameter must correspond to the digestAlgorithm and signatureAlgorithm fields in the SignerInfo field in the digitalSignature (see below).

`digitalSignature : in TpOctetSet`

This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is made of the termination text. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the termination text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. The framework uses this to confirm its identity to the client. The client can check that the terminationText has been signed by the framework. If a match is made, the access session is terminated, otherwise the P_INVALID_SIGNATURE exception will be thrown.

Raises

`TpCommonExceptions, P_INVALID_SIGNING_ALGORITHM, P_INVALID_SIGNATURE`

6.3.1.3 Interface Class IpInitial

Inherits from: IpInterface.

The Initial Framework interface is used by the client to initiate the authentication with the Framework.

This interface shall be implemented by a Framework. The initiateAuthentication() and the initiateAuthenticationWithVersion() methods shall be implemented.

<<Interface>> IpInitial
<<deprecated>> initiateAuthentication (clientDomain : in TpAuthDomain, authType : in TpAuthType) : TpAuthDomain <<new>> initiateAuthenticationWithVersion (clientDomain : in TpAuthDomain, authType : in TpAuthType, frameworkVersion : in TpVersion) : TpAuthDomain

6.3.1.3.1 Method <<deprecated>> initiateAuthentication()

This method is deprecated in this version, this means that it will be supported until the next major release of this specification.

This method is invoked by the client to start the process of authentication with the framework, and request the use of a specific authentication method.

Returns <fwDomain> : This provides the client with a framework identifier, and a reference to call the authentication interface of the framework.

```
structure TpAuthDomain {
    domainID:       TpDomainID;
    authInterface:  IpInterfaceRef;
    };
```

The domainID parameter is an identifier for the framework (i.e. TpFwID). It is used to identify the framework to the client.

The authInterface parameter is a reference to the authentication interface of the framework. The type of this interface is defined by the authType parameter. The client uses this interface to authenticate with the framework.

Parameters

clientDomain : in TpAuthDomain

This identifies the client domain to the framework, and provides a reference to the domain's authentication interface.

```
structure TpAuthDomain {
    domainID:       TpDomainID;
    authInterface:  IpInterfaceRef;
};
```

The domainID parameter is an identifier either for a client application (i.e. TpClientAppID) or for an enterprise operator (i.e. TpEntOpID), or for an instance of a registered service (i.e. TpServiceInstanceID) or for a service supplier (i.e. TpServiceSupplierID). It is used to identify the client domain to the framework, (see authenticate() on IpAPILevelAuthentication). If the framework does not recognise the domainID, the framework returns an error code (P_INVALID_DOMAIN_ID).

The authInterface parameter is a reference to call the authentication interface of the client. The type of this interface is defined by the authType parameter. If the interface reference is not of the correct type, the framework returns an error code (P_INVALID_INTERFACE_TYPE).

authType : in TpAuthType

This identifies the type of authentication mechanism requested by the client. It provides operators and clients with the opportunity to use an alternative to the API level Authentication interface, e.g. an implementation specific authentication mechanism like CORBA Security, using the IpAuthentication interface, or Operator specific Authentication interfaces. OSA API level Authentication is the default authentication mechanism (P_OSA_AUTHENTICATION). If P_OSA_AUTHENTICATION is selected, then the clientDomain and fwDomain authInterface parameters are references to interfaces of type Ip(Client)APILevelAuthentication. If P_AUTHENTICATION is selected, the fwDomain authInterface parameter references to interfaces of type IpAuthentication which is used when an underlying distribution technology authentication mechanism is used.

Returns

TpAuthDomain

Raises

TpCommonExceptions, P_INVALID_DOMAIN_ID, P_INVALID_INTERFACE_TYPE, P_INVALID_AUTH_TYPE

6.3.1.3.2 Method <<new>> initiateAuthenticationWithVersion()

This method is invoked by the client to start the process of authentication with the framework, and request the use of a specific authentication method using the new method with support for backward compatibility in the framework. The returned fwDomain authInterface will be selected to match the proposed version from the Client in the Framework response. If the Framework can't work with the proposed framework version the framework returns an error code (P_INVALID_VERSION).

Returns <fwDomain> : This provides the client with a framework identifier, and a reference to call the authentication interface of the framework.

```
structure TpAuthDomain {
    domainID:       TpDomainID;
    authInterface:  IpInterfaceRef;
    };
```

The domainID parameter is an identifier for the framework (i.e. TpFwID). It is used to identify the framework to the client.

The authInterface parameter is a reference to the authentication interface of the framework. The type of this interface is defined by the authType parameter. The client uses this interface to authenticate with the framework.

Parameters

clientDomain : in TpAuthDomain

This identifies the client domain to the framework, and provides a reference to the domain's authentication interface.

```
structure TpAuthDomain {
    domainID:       TpDomainID;
    authInterface:  IpInterfaceRef;
};
```

The domainID parameter is an identifier either for a client application (i.e. TpClientAppID) or for an enterprise operator (i.e. TpEntOpID), or for an instance of a registered service (i.e. TpServiceInstanceID) or for a service supplier (i.e. TpServiceSupplierID). It is used to identify the client domain to the framework, (see challenge() on IpAPILevelAuthentication). If the framework does not recognise the domainID, the framework returns an error code (P_INVALID_DOMAIN_ID).

The authInterface parameter is a reference to call the authentication interface of the client. The type of this interface is defined by the authType parameter. If the interface reference is not of the correct type, the framework returns an error code (P_INVALID_INTERFACE_TYPE).

authType : in TpAuthType

This identifies the type of authentication mechanism requested by the client. It provides operators and clients with the opportunity to use an alternative to the API level Authentication interface, e.g. an implementation specific authentication mechanism like CORBA Security, using the IpAuthentication interface, or Operator specific Authentication interfaces. OSA API level Authentication is the default authentication mechanism (P_OSA_AUTHENTICATION). If P_OSA_AUTHENTICATION is selected, then the clientDomain and fwDomain authInterface parameters are references to interfaces of type Ip(Client)APILevelAuthentication. If P_AUTHENTICATION is selected, the fwDomain authInterface parameter references to interfaces of type IpAuthentication that is used when an underlying distribution technology authentication mechanism is used.

frameworkVersion : in TpVersion

This identifies the version of the Framework implemented in the client. The TpVersion is a String containing the version number. Valid version numbers are defined in the respective framework specification.

Returns

TpAuthDomain

Raises

TpCommonExceptions, P_INVALID_DOMAIN_ID, P_INVALID_INTERFACE_TYPE, P_INVALID_AUTH_TYPE, P_INVALID_VERSION

6.3.1.4 Interface Class IpAuthentication

Inherits from: IpInterface.

The Authentication Framework interface is used by client to request access to other interfaces supported by the Framework. The authentication process should in this case be done with some underlying distribution technology authentication mechanism, e.g. CORBA Security.

At least one of IpAuthentication or IpAPILevelAuthentication interfaces shall be implemented by a Framework as a minimum requirement. The requestAccess() method shall be implemented in each.

<<Interface>> IpAuthentication
requestAccess (accessType : in TpAccessType, clientAccessInterface : in IpInterfaceRef) : IpInterfaceRef

6.3.1.4.1 Method requestAccess()

Once the client has been authenticated by the framework, the client may invoke the requestAccess operation on the IpAuthentication or IpAPILevelAuthentication interface. This allows the client to request the type of access they require. If they request P_OSA_ACCESS, then a reference to the IpAccess interface is returned. (Operators can define their own access interfaces to satisfy client requirements for different types of access.)

If this method is called before the client has been successfully authenticated, then the request fails, and an error code (P_ACCESS_DENIED) is returned.

This method may be invoked by the client immediately on IpAuthentication, when API Level authentication is not being used, since there is no indication to the client at API level that it is authenticated with the Framework.

Returns <fwAccessInterface> : This provides the reference for the client to call the access interface of the framework.

Parameters

`accessType : in TpAccessType`

This identifies the type of access interface requested by the client. If the framework does not provide the type of access identified by accessType, then an error code (P_INVALID_ACCESS_TYPE) is returned.

`clientAccessInterface : in IpInterfaceRef`

This provides the reference for the framework to call the access interface of the client. If the interface reference is not of the correct type, the framework returns an error code (P_INVALID_INTERFACE_TYPE).

Returns

`IpInterfaceRef`

Raises

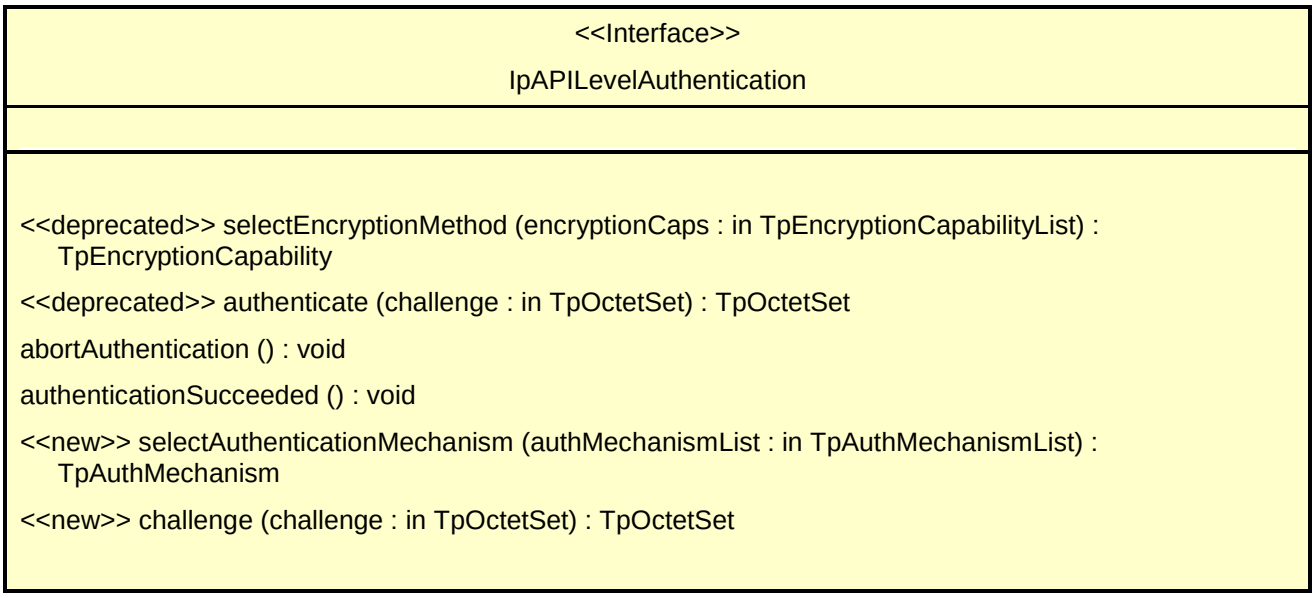
`TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_ACCESS_TYPE, P_INVALID_INTERFACE_TYPE`

6.3.1.5 Interface Class IpAPILevelAuthentication

Inherits from: IpAuthentication.

The API Level Authentication Framework interface is used by the client to authenticate the Framework. It is also used to initiate the authentication process.

If the IpAPILevelAuthentication interface is implemented by a Framework, then selectEncryptionMethod(), selectAuthenticationMechanism(), authenticate(), challenge(), abortAuthentication() and authenticationSucceeded () shall be implemented. IpAPILevelAuthentication inherits the requirements of IpAuthentication, therefore requestAccess() shall be implemented.



6.3.1.5.1 Method <<deprecated>> selectEncryptionMethod()

This method is deprecated and replaced by selectAuthenticationMechanism(). It shall only be used when the IpAPILevelAuthentication interface is obtained by using the deprecated method initiateAuthentication() instead of initiateAuthenticationWithVersion() on the IpInitial interface. This method will be removed in a later release.

The client uses this method to initiate the authentication process. The framework returns its preferred mechanism. This should be within capability of the client. If a mechanism that is acceptable to the framework within the capability of the client cannot be found, the framework throws the P_NO_ACCEPTABLE_ENCRYPTION_CAPABILITY exception. Once the framework has returned its preferred mechanism, it will wait for a predefined unit of time before invoking the client's authenticate() method (the wait is to ensure that the client can initialise any resources necessary to use the prescribed encryption method).

Returns <prescribedMethod> : This is returned by the framework to indicate the mechanism preferred by the framework for the encryption process. If the value of the prescribedMethod returned by the framework is not understood by the client, it is considered a catastrophic error and the client must abort.

Parameters

encryptionCaps : in TpEncryptionCapabilityList

This is the means by which the encryption mechanisms supported by the client are conveyed to the framework.

Returns

TpEncryptionCapability

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_NO_ACCEPTABLE_ENCRYPTION_CAPABILITY

6.3.1.5.2 Method <<deprecated>> authenticate()

This method is deprecated and replaced by challenge(). It shall only be used when the IpAPILevelAuthentication interface is obtained by using the deprecated method initiateAuthentication() instead of initiateAuthenticationWithVersion() on the IpInitial interface. This method will be removed in a later release.

This method is used by the client to authenticate the framework. The challenge will be encrypted using the mechanism prescribed by selectEncryptionMethod. The framework must respond with the correct responses to the challenges

presented by the client. The domainID received in the initiateAuthentication() can be used by the framework to reference the correct public key for the client (the key management system is currently outside of the scope of the OSA APIs). The number of exchanges is dependent on the policies of each side. The authentication of the framework is deemed successful when the authenticationSucceeded method is invoked by the client.

The invocation of this method may be interleaved with authenticate() calls by the framework on the client's APILevelAuthentication interface.

Returns <response> : This is the response of the framework to the challenge of the client in the current sequence. The response will be based on the challenge data, decrypted with the mechanism prescribed by selectEncryptionMethod().

Parameters

challenge : in TpOctetSet

The challenge presented by the client to be responded to by the framework. The challenge mechanism used will be in accordance with the IETF PPP Authentication Protocols - Challenge Handshake Authentication Protocol [RFC 1994, August1996]. The challenge will be encrypted with the mechanism prescribed by selectEncryptionMethod().

Returns

TpOctetSet

Raises

TpCommonExceptions, P_ACCESS_DENIED

6.3.1.5.3 Method abortAuthentication()

The client uses this method to abort the authentication process where the framework is authenticating the client. This method is invoked if the client no longer wishes to continue the authentication process, (unless the framework responded incorrectly to a challenge in which case no further communication with the framework should occur.) If this method has been invoked before the client has been authenticated by the Framework, calls to the requestAccess operation on IpAPILevelAuthentication will return an error code (P_ACCESS_DENIED), until the client has been properly authenticated. If this method is invoked after the client has been authenticated by the Framework, it shall not result in the immediate removal of the client's authentication. (The Framework may wish to authenticate the client again, however).

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions,P_ACCESS_DENIED

6.3.1.5.4 Method authenticationSucceeded()

The client uses this method to inform the framework of the success of the authentication attempt. Calls to this method have no impact on the client's rights to call requestAccess(), which depend exclusively on the framework's successful authentication of the client.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions, P_ACCESS_DENIED

6.3.1.5.5 Method <<new>> selectAuthenticationMechanism()

The client uses this method to inform the Framework of the different authentication mechanisms it supports as part of API level Authentication. The Framework will select one of the suggested authentication mechanisms and that mechanism shall be used for authentication by both Framework and Client. The authentication mechanism chosen as a result of the response to this method remains valid for an instance of IpAPILevelAuthentication and until this method is re-invoked by the client. If a mechanism that is acceptable to the framework within the capability of the client cannot be found, the framework throws the P_NO_ACCEPTABLE_AUTHENTICATION_MECHANISM exception.

This method shall only be used when the IpAPILevelAuthentication interface is obtained by using initiateAuthenticationWithVersion() on the IpInitial interface.

Returns: selectedMechanism. This is the authentication mechanism chosen by the Framework. The chosen mechanism shall be taken from the list of mechanisms proposed by the Client.

Parameters

authMechanismList : in TpAuthMechanismList

The list of authentication mechanisms supported by the client.

Returns

TpAuthMechanism

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_NO_ACCEPTABLE_AUTHENTICATION_MECHANISM

6.3.1.5.6 Method <<new>> challenge()

This method is used by the client to authenticate the framework. The framework must respond with the correct responses to the challenges presented by the client. The number of exchanges is dependent on the policies of each side. The authentication of the framework is deemed successful when the authenticationSucceeded method is invoked by the client.

The invocation of this method may be interleaved with challenge() calls by the framework on the client's APILevelAuthentication interface.

This method shall only be used when the IpAPILevelAuthentication interface is obtained by using initiateAuthenticationWithVersion() on the IpInitial interface.

Returns <response> : This is the response of the framework to the challenge of the client in the current sequence. The formatting of this parameter shall be according to section 4.1 of RFC 1994. A complete CHAP Response packet shall be used to carry the response string. The Response packet shall make the contents of this returned parameter. The Name field of the CHAP Response packet shall be present but not contain any useful value.

Parameters

challenge : in TpOctetSet

The challenge presented by the client to be responded to by the framework. The challenge format used will be in accordance with the IETF PPP Authentication Protocols - Challenge Handshake Authentication Protocol [RFC 1994, August1996].

The formatting of the challenge value shall be according to section 4.1 of RFC 1994. A complete CHAP Request packet shall be used to carry the challenge value. The Name field of the CHAP Request packet shall be present but not contain any useful value.

Returns

TpOctetSet

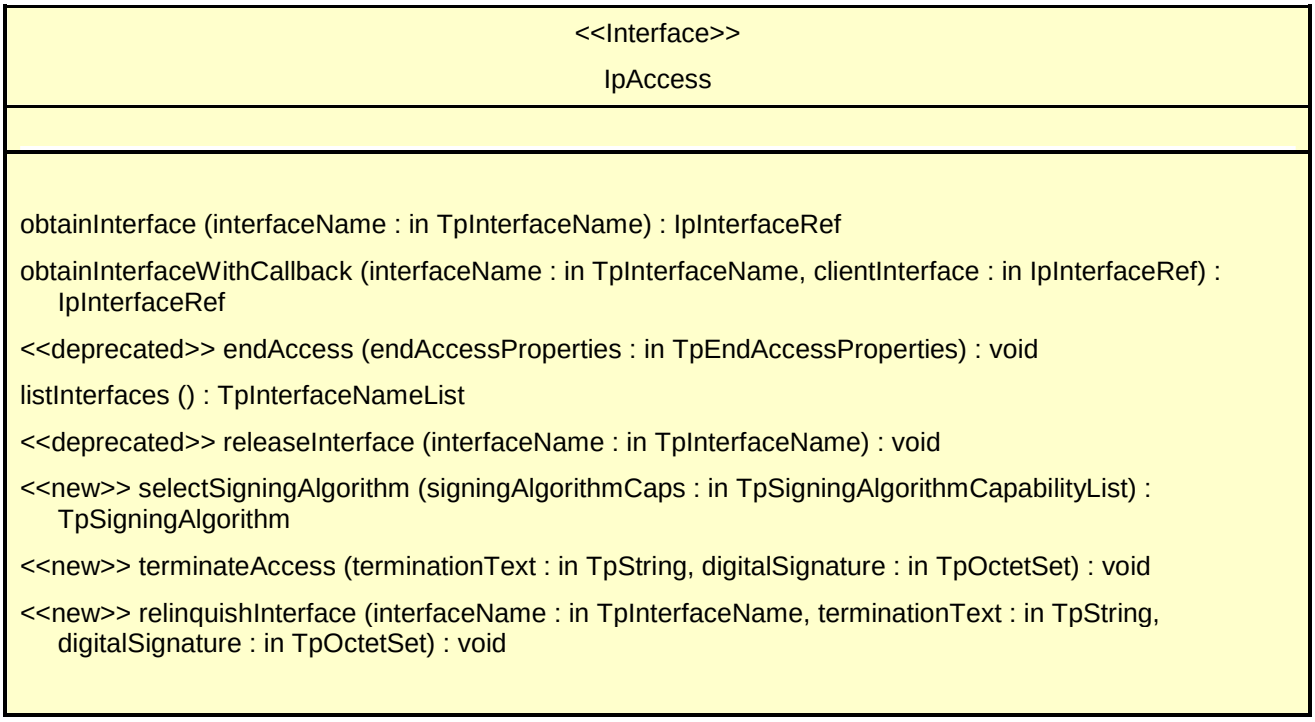
Raises

TpCommonExceptions, P_ACCESS_DENIED

6.3.1.6 Interface Class IpAccess

Inherits from: IpInterface.

This interface shall be implemented by a Framework. As a minimum requirement the obtainInterface() and obtainInterfaceWithCallback(), selectSigningAlgorithm() and terminateAccess() methods shall be implemented.



6.3.1.6.1 Method obtainInterface()

This method is used to obtain other framework interfaces. The client uses this method to obtain interface references to other framework interfaces. (The obtainInterfaceWithCallback method should be used if the client is required to supply a callback interface to the framework.)

Returns <fwInterface> : This is the reference to the interface requested.

Parameters

interfaceName : in TpInterfaceName

The name of the framework interface to which a reference to the interface is requested. If the interfaceName is invalid, the framework returns an error code (P_INVALID_INTERFACE_NAME).

Returns

IpInterfaceRef

Raises

TpCommonExceptions,P_ACCESS_DENIED,P_INVALID_INTERFACE_NAME

6.3.1.6.2 Method obtainInterfaceWithCallback()

This method is used to obtain other framework interfaces. The client uses this method to obtain interface references to other framework interfaces, when it is required to supply a callback interface to the framework. (The obtainInterface method should be used when no callback interface needs to be supplied.)

Returns <fwInterface> : This is the reference to the interface requested.

Parameters

interfaceName : in TpInterfaceName

The name of the framework interface to which a reference to the interface is requested. If the interfaceName is invalid, the framework returns an error code (P_INVALID_INTERFACE_NAME).

clientInterface : in IpInterfaceRef

This is the reference to the client interface, which is used for callbacks. If a client interface is not needed, then this method should not be used. (The obtainInterface method should be used when no callback interface needs to be supplied.) If the interface reference is not of the correct type, the framework returns an error code (P_INVALID_INTERFACE_TYPE).

Returns

IpInterfaceRef

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_INTERFACE_NAME, P_INVALID_INTERFACE_TYPE

6.3.1.6.3 Method <<deprecated>> endAccess()

This method is deprecated and will be removed in a later release. It is replaced with terminateAccess. The endAccess operation is used by the client to request that its access session with the framework is ended. After it is invoked, the client will no longer be authenticated with the framework. The client will not be able to use the references to any of the framework interfaces gained during the access session. Any calls to these interfaces will fail.

Parameters

endAccessProperties : in TpEndAccessProperties

This is a list of properties that can be used to tell the framework the actions to perform when ending the access session (e.g. existing service sessions may be stopped, or left running). If a property is not recognised by the framework, an error code (P_INVALID_PROPERTY) is returned.

Raises

TpCommonExceptions,P_ACCESS_DENIED, P_INVALID_PROPERTY

6.3.1.6.4 Method listInterfaces()

The client uses this method to obtain the names of all interfaces supported by the framework. It can then obtain the interfaces it wishes to use using either obtainInterface() or obtainInterfaceWithCallback().

Returns <frameworkInterfaces> : The frameworkInterfaces parameter contains a list of interfaces that the framework makes available.

Parameters

No Parameters were identified for this method

Returns

TpInterfaceNameList

Raises

TpCommonExceptions, P_ACCESS_DENIED

6.3.1.6.5 Method <<deprecated>> releaseInterface()

This method is deprecated and will be removed in a later release. It is replaced with relinquishInterface. The client uses this method to release a framework interface that was obtained during this access session.

Parameters

interfaceName : in TpInterfaceName

This is the name of the framework interface which is being released. If the interfaceName is invalid, the framework throws the P_INVALID_INTERFACE_NAME exception. If the interface has not been given to the client during this access session, then the P_TASK_REFUSED exception will be thrown.

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_INTERFACE_NAME

6.3.1.6.6 Method <<new>> selectSigningAlgorithm()

The client uses this method to inform the Framework of the different signing algorithms it supports for use in all cases where digital signatures are required. The Framework will select one of the suggested algorithms. This method shall be the first method invoked by the client on IpAccess. The algorithm chosen as a result of the response to this method remains valid for an instance of IpAccess and until this method is re-invoked by the client. If an algorithm that is acceptable to the framework within the capability of the client cannot be found, the framework throws the P_NO_ACCEPTABLE_SIGNING_ALGORITHM exception.

Returns: selectedAlgorithm. This is the signing algorithm chosen by the Framework. The chosen algorithm shall be taken from the list proposed by the Client.

Parameters

signingAlgorithmCaps : in TpSigningAlgorithmCapabilityList

The list of signing algorithms supported by the client.

Returns

TpSigningAlgorithm

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_NO_ACCEPTABLE_SIGNING_ALGORITHM

6.3.1.6.7 Method <<new>> terminateAccess()

The terminateAccess method is used by the client to request that its access session with the framework is ended. After it is invoked, the client will no longer be authenticated with the framework. The client will not be able to use the references to any of the framework interfaces gained during the access session. Any calls to these interfaces will fail. Also, all remaining service instances created by the framework either directly in this access session or on behalf of the client during this access session shall be terminated.

Parameters

terminationText : in TpString

This is the termination text describes the reason for the termination of the access session.

digitalSignature : in TpOctetSet

This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is made of the termination text. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the termination text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. The client uses this to confirm its identity to the framework. The framework can check that the terminationText has been signed by the client. If a match is made, the access session is terminated, otherwise the P_INVALID_SIGNATURE exception will be thrown.

Raises

TpCommonExceptions, P_INVALID_SIGNATURE

6.3.1.6.8 Method <<new>> relinquishInterface()

The client uses this method to release an instance of a framework interface that was obtained during this access session.

Parameters

interfaceName : in TpInterfaceName

This is the name of the framework interface which is being released. If the interfaceName is invalid, the framework throws the P_INVALID_INTERFACE_NAME exception. If the interface has not been given to the client during this access session, then the P_TASK_REFUSED exception will be thrown.

terminationText : in TpString

This is the termination text describes the reason for the release of the interface. This text is required simply because the digitalSignature parameter requires a terminationText to sign.

digitalSignature : in TpOctetSet

This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is made of the termination text. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the termination text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. The client uses this to confirm its identity to the framework. The framework can check that the terminationText has been signed by the client. If a match is made, the interface is released, otherwise the P_INVALID_SIGNATURE exception will be thrown.

Raises

TpCommonExceptions, P_INVALID_SIGNATURE, P_INVALID_INTERFACE_NAME

CR-Form-v7

CHANGE REQUEST

⌘ **29.198-03** **CR** **070** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of status of methods to interfaces in clause 8.3
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	27/09/2002
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There is no requirement in the standard about the necessity to implement all or only some of the methods defined for an interface.
Summary of change:	⌘	Clarify which methods are mandatory and which are optional.
Consequences if not approved:	⌘	Application developers will not know which methods will actually be available.
Clauses affected:	⌘	8.3 Interface Classes

Other specs affected: ⌘

Y	N	
	X	Other core specifications
	X	Test specifications
	X	O&M Specifications

⌘

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.3 Interface Classes

8.3.1 Event Notification Interface Classes

8.3.1.1 Interface Class IpFwEventNotification

Inherits from: IpInterface.

The event notification mechanism is used to notify the service of generic events that have occurred.

If Event Notifications are supported by a Framework, this interface and ~~all its~~the createNotification() and destroyNotification() methods shall be supported.

<<Interface>> IpFwEventNotification
createNotification (eventCriteria : in TpFwEventCriteria) : TpAssignmentID destroyNotification (assignmentID : in TpAssignmentID) : void

8.3.1.1.1 Method createNotification()

This method is used to install generic notifications so that events can be sent to the service.

Returns <assignmentID> : Specifies the ID assigned by the framework for this newly installed event notification.

Parameters

`eventCriteria : in TpFwEventCriteria`

Specifies the event specific criteria used by the service to define the event required.

Returns

`TpAssignmentID`

Raises

`TpCommonExceptions,P_INVALID_EVENT_TYPE,P_INVALID_CRITERIA`

8.3.1.1.2 Method destroyNotification()

This method is used by the service to delete generic notifications from the framework.

Parameters

`assignmentID : in TpAssignmentID`

Specifies the assignment ID given by the framework when the previous createNotification() was called. If the assignment ID does not correspond to one of the valid assignment IDs, the framework will return the error code P_INVALID_ASSIGNMENT_ID.

Raises

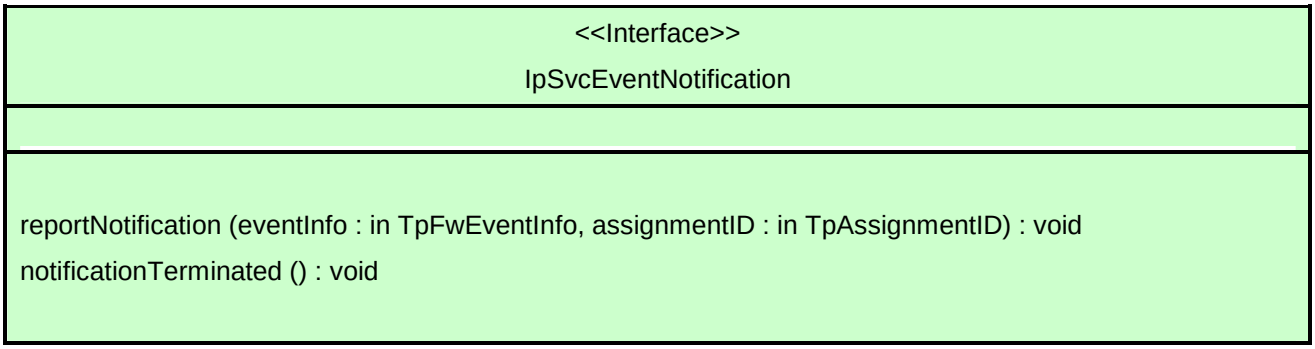
TpCommonExceptions,P_INVALID_ASSIGNMENT_ID

8.3.1.2 Interface Class IpSvcEventNotification

Inherits from: IpInterface.

This interface is used by the framework to inform the service of a generic event. The Event Notification Framework will invoke methods on the Event Notification Service Interface that is specified when the Event Notification interface is obtained.

If Event Notifications are supported by a Service, this interface and ~~all its~~the reportNotification() and notificationTerminated() methods shall be supported.



8.3.1.2.1 Method reportNotification()

This method notifies the service of the arrival of a generic event.

Parameters

eventInfo : in TpFwEventInfo

Specifies specific data associated with this event.

assignmentID : in TpAssignmentID

Specifies the assignment id which was returned by the framework during the createNotification() method. The service can use the assignment id to associate events with event specific criteria and to act accordingly.

Raises

TpCommonExceptions,P_INVALID_ASSIGNMENT_ID

8.3.1.2.2 Method notificationTerminated()

This method indicates to the service that all generic event notifications have been terminated (for example, due to faults detected).

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2 Integrity Management Interface Classes

8.3.2.1 Interface Class IpFwFaultManager

Inherits from: IpInterface.

This interface is used by the service instance to inform the framework of events which affect the integrity of the API, and request fault management status information from the framework. The fault manager operations do not exchange callback interfaces as it is assumed that the service instance has supplied its Fault Management callback interface at the time it obtains the Framework's Fault Management interface, by use of the obtainInterfaceWithCallback operation on the IpAccess interface.

If the IpFwFaultManager interface is implemented by a Framework, at least one of these methods shall be implemented. If the Framework is capable of invoking the IpSvcFaultManager.svcActivityTestReq() method, it shall implement svcActivityTestRes() and svcActivityTestErr() in this interface. If the Framework is capable of invoking IpSvcFaultManager.genFaultStatsRecordReq(), it shall implement genFaultStatsRecordRes() and genFaultStatsRecordErr() in this interface. If the Framework is capable of invoking IpSvcFaultManager.generateFaultStatsRecordReq(), it shall implement generateFaultStatsRecordRes() and generateFaultStatsRecordErr() in this interface.

<<Interface>> IpFwFaultManager
activityTestReq (activityTestID : in TpActivityTestID, testSubject : in TpSubjectType) : void svcActivityTestRes (activityTestID : in TpActivityTestID, activityTestResult : in TpActivityTestRes) : void appUnavailableInd () : void genFaultStatsRecordReq (timePeriod : in TpTimeInterval, recordSubject : in TpSubjectType) : void svcUnavailableInd (reason : in TpSvcUnavailReason) : void svcActivityTestErr (activityTestID : in TpActivityTestID) : void <<deprecated>> genFaultStatsRecordRes (faultStatistics : in TpFaultStatsRecord, serviceIDs : in TpServiceIDList) : void <<deprecated>> genFaultStatsRecordErr (faultStatisticsError : in TpFaultStatisticsError, serviceIDs : in TpServiceIDList) : void <<new>> generateFaultStatsRecordRes (faultStatistics : in TpFaultStatsRecord) : void <<new>> generateFaultStatsRecordErr (faultStatisticsError : in TpFaultStatisticsError) : void

8.3.2.1.1 Method activityTestReq()

The service instance invokes this method to test that the framework or the client application is operational. On receipt of this request, the framework must carry out a test on itself or on the application, to check that it is operating correctly. The framework reports the test result by invoking the activityTestRes method on the IpSvcFaultManager interface.

Parameters

`activityTestID : in TpActivityTestID`

The identifier provided by the service instance to correlate the response (when it arrives) with this request.

`testSubject : in TpSubjectType`

Identifies the subject for testing (framework or client application).

Raises

TpCommonExceptions

8.3.2.1.2 Method svcActivityTestRes()

The service instance uses this method to return the result of a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

Raises

TpCommonExceptions,P_INVALID_ACTIVITY_TEST_ID

8.3.2.1.3 Method appUnavailableInd()

This method is used by the service instance to inform the framework that the client application is not responding. On receipt of this indication, the framework must act to inform the client application.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.1.4 Method genFaultStatsRecordReq()

This method is used by the service instance to solicit fault statistics from the framework. On receipt of this request, the framework must produce a fault statistics record, for the framework or for the application during the specified time interval, which is returned to the service instance using the genFaultStatsRecordRes operation on the IpSvcFaultManager interface.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. Supplying both a start time and stop time as empty strings leaves the time period to the discretion of the framework.

recordSubject : in TpSubjectType

Specifies the subject to be included in the general fault statistics record (framework or application).

Raises

TpCommonExceptions

8.3.2.1.5 Method svcUnavailableInd()

This method is used by the service instance to inform the framework that it is about to become unavailable for use. The framework should inform the client application that is currently using this service instance that it is unavailable for use (via the svcUnavailableInd method on the IpAppFaultManager interface).

Parameters

reason : in TpSvcUnavailReason

Identifies the reason for the service instance's unavailability.

Raises

TpCommonExceptions

8.3.2.1.6 Method svcActivityTestErr()

The service instance uses this method to indicate that an error occurred during a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

8.3.2.1.7 Method <<deprecated>> genFaultStatsRecordRes()

This method is deprecated and will be removed in a later release. It cannot be used as described, since the serviceIDs parameter has no meaning. It is replaced with generateFaultStatsRecordRes().

This method is used by the service to provide fault statistics to the framework in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

serviceIDs : in TpServiceIDList

Specifies the services that are included in the general fault statistics record. The serviceIDs parameter is not allowed to be an empty list.

Raises

TpCommonExceptions

8.3.2.1.8 Method <<deprecated>> genFaultStatsRecordErr()

This method is deprecated and will be removed in a later release. It cannot be used as described, since the serviceIDs parameter has no meaning. It is replaced with generateFaultStatsRecordErr().

This method is used by the service to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

serviceIDs : in TpServiceIDList

Specifies the services that were included in the general fault statistics record request. The serviceIDs parameter is not allowed to be an empty list.

Raises

TpCommonExceptions

8.3.2.1.9 Method <<new>> generateFaultStatsRecordRes()

This method is used by the service to provide fault statistics to the framework in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

Raises

TpCommonExceptions

8.3.2.1.10 Method <<new>> generateFaultStatsRecordErr()

This method is used by the service to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpSvcFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

Raises

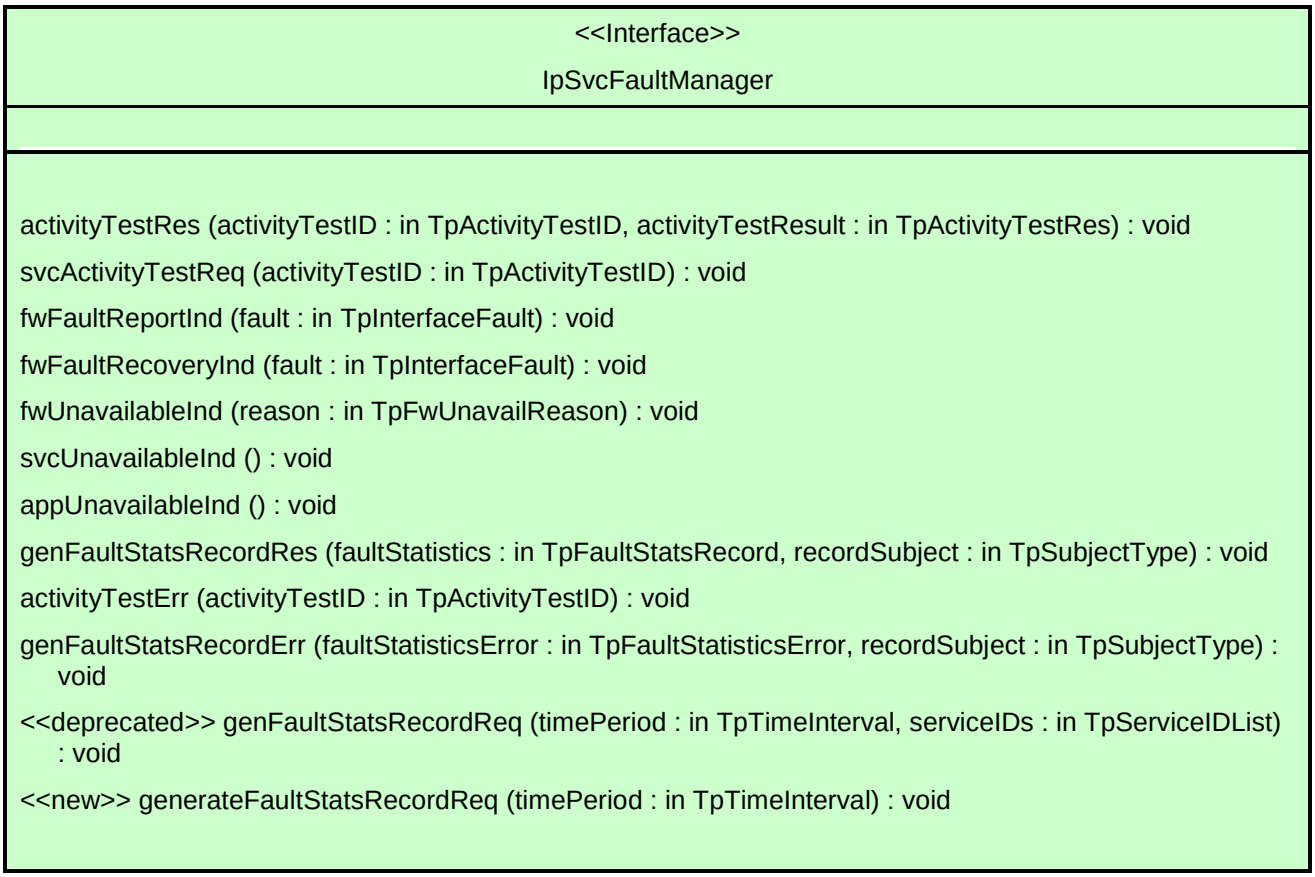
TpCommonExceptions

8.3.2.2 Interface Class IpSvcFaultManager

Inherits from: IpInterface.

This interface is used to inform the service instance of events that affect the integrity of the Framework, Service or Client Application. The Framework will invoke methods on the Fault Management Service Interface that is specified when the service instance obtains the Fault Management Framework interface: i.e. by use of the obtainInterfaceWithCallback operation on the IpAccess interface

If the IpSvcFaultManager interface is implemented by a Service, at least one of these methods shall be implemented. If the Service is capable of invoking the IpFwFaultManager.activityTestReq() method, it shall implement activityTestRes() and activityTestErr() in this interface. If the Service is capable of invoking IpFwFaultManager.genFaultStatsRecordReq(), it shall implement genFaultStatsRecordRes() and genFaultStatsRecordErr() in this interface.



8.3.2.2.1 Method activityTestRes()

The framework uses this method to return the result of a service-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the service to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

Raises

TpCommonExceptions,P_INVALID_ACTIVITY_TEST_ID

8.3.2.2.2 Method svcActivityTestReq()

The framework invokes this method to test that the service instance is operational. On receipt of this request, the service instance must carry out a test on itself, to check that it is operating correctly. The service instance reports the test result by invoking the svcActivityTestRes method on the IpFwFaultManager interface.

Parameters

activityTestID : in TpActivityTestID

The identifier provided by the framework to correlate the response (when it arrives) with this request.

Raises

TpCommonExceptions

8.3.2.2.3 Method fwFaultReportInd()

The framework invokes this method to notify the service instance of a failure within the framework. The service instance must not continue to use the framework until it has recovered (as indicated by a fwFaultRecoveryInd).

Parameters

fault : in TpInterfaceFault

Specifies the fault that has been detected by the framework.

Raises

TpCommonExceptions

8.3.2.2.4 Method fwFaultRecoveryInd()

The framework invokes this method to notify the service instance that a previously reported fault has been rectified. The service instance may then resume using the framework.

Parameters

fault : in TpInterfaceFault

Specifies the fault from which the framework has recovered.

Raises

TpCommonExceptions

8.3.2.2.5 Method fwUnavailableInd()

The framework invokes this method to inform the service instance that it is no longer available.

Parameters

reason : in TpFwUnavailReason

Identifies the reason why the framework is no longer available

Raises

TpCommonExceptions

8.3.2.2.6 Method svcUnavailableInd()

The framework invokes this method to inform the service instance that the client application has reported that it can no longer use the service instance.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.2.7 Method appUnavailableInd()

The framework invokes this method to inform the service instance that the framework may have detected that the application has failed: e.g. non-response from an activity test, failure to return heartbeats.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.2.8 Method genFaultStatsRecordRes()

This method is used by the framework to provide fault statistics to a service instance in response to a genFaultStatsRecordReq method invocation on the IpFwFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

recordSubject : in TpSubjectType

Specifies the entity (framework or application) whose fault statistics record has been provided.

Raises

TpCommonExceptions

8.3.2.2.9 Method activityTestErr()

The framework uses this method to indicate that an error occurred during a service-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the service instance to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

8.3.2.2.10 Method genFaultStatsRecordErr()

This method is used by the framework to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpFwFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

recordSubject : in TpSubjectType

Specifies the entity (framework or application) whose fault statistics record was requested.

Raises

TpCommonExceptions

8.3.2.2.11 Method <<deprecated>> genFaultStatsRecordReq()

This method is deprecated and will be removed in a later release. It cannot be used as described, since the serviceIDs parameter has no meaning. It is replaced with generateFaultStatsRecordReq().

This method is used by the framework to solicit fault statistics from the service, for example when the framework was asked for these statistics by the client application using the genFaultStatsRecordReq operation on the IpFaultManager interface. On receipt of this request the service must produce a fault statistics record, for either the framework or for the client's instances of the specified services during the specified time interval, which is returned to the framework using the genFaultStatsRecordRes operation on the IpFwFaultManager interface. If the framework does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. Supplying both a start time and stop time as empty strings leaves the time period to the discretion of the service.

serviceIDs : in TpServiceIDList

Specifies the services to be included in the general fault statistics record. This parameter is not allowed to be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

8.3.2.2.12 Method <<new>> generateFaultStatsRecordReq()

This method is used by the framework to solicit fault statistics from the service instance, for example when the framework was asked for these statistics by the client application using the genFaultStatsRecordReq operation on the IpFaultManager interface. On receipt of this request the service instance must produce a fault statistics record during the specified time interval, which is returned to the framework using the genFaultStatsRecordRes operation on the IpFwFaultManager interface.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. Supplying both a start time and stop time as empty strings leaves the time period to the discretion of the service.

Raises

TpCommonExceptions

8.3.2.3 Interface Class IpFwHeartBeatMgmt

Inherits from: IpInterface.

This interface allows the initialisation of a heartbeat supervision of the framework by a service instance.

If the IpFwHeartBeatMgmt interface is implemented by a Framework, as a minimum enableHeartBeat() and disableHeartBeat() shall be implemented.

<<Interface>> IpFwHeartBeatMgmt
enableHeartBeat (interval : in TpInt32, svcInterface : in IpSvcHeartBeatRef) : void disableHeartBeat () : void changeInterval (interval : in TpInt32) : void

8.3.2.3.1 Method enableHeartBeat()

With this method, the service instance instructs the framework to begin sending its heartbeat to the specified interface at the specified interval.

Parameters

interval : in TpInt32

The time interval in milliseconds between the heartbeats.

svcInterface : in IpSvcHeartBeatRef

This parameter refers to the callback interface the heartbeat is calling.

Raises

TpCommonExceptions,P_INVALID_INTERFACE_TYPE

8.3.2.3.2 Method disableHeartBeat()

Instructs the framework to cease the sending of its heartbeat.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.3.3 Method changeInterval()

Allows the administrative change of the heartbeat interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

Raises

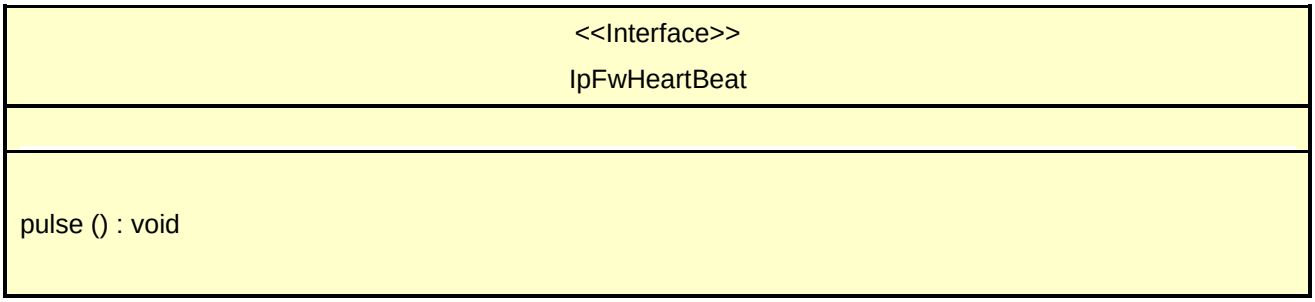
`TpCommonExceptions`

8.3.2.4 Interface Class IpFwHeartBeat

Inherits from: IpInterface.

The service side framework heartbeat interface is used by the service instance to send the framework its heartbeat.

If a Framework is capable of invoking IpSvcHeartBeatMgmt.enableHeartBeat(), it shall implement IpFwHeartBeat and the pulse() method.



8.3.2.4.1 Method pulse()

The service instance uses this method to send its heartbeat to the framework. The framework will be expecting a pulse at the end of every interval specified in the parameter to the IpSvcHeartBeatMgmt.enableSvcHeartbeat() method. If the pulse() is not received within the specified interval, then the service instance can be deemed to have failed the heartbeat.

Parameters

No Parameters were identified for this method

Raises

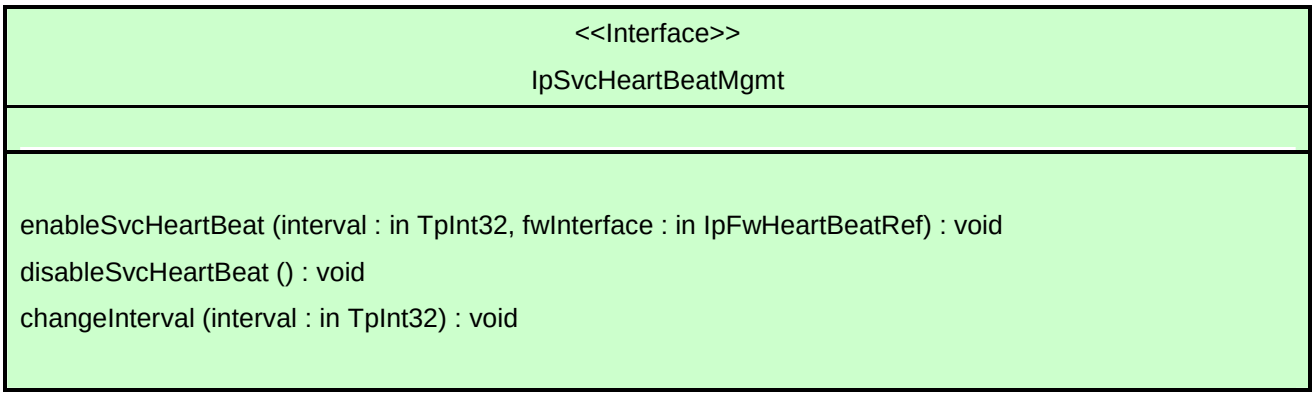
`TpCommonExceptions`

8.3.2.5 Interface Class IpSvcHeartBeatMgmt

Inherits from: IpInterface.

This interface allows the initialisation of a heartbeat supervision of the service instance by the framework.

If the IpSvcHeartBeatMgmt interface is implemented by a Service, as a minimum enableHeartBeat() and disableHeartBeat() shall be implemented.



8.3.2.5.1 Method enableSvcHeartBeat()

With this method, the framework instructs the service instance to begin sending its heartbeat to the specified interface at the specified interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

`fwInterface : in IpFwHeartBeatRef`

This parameter refers to the callback interface the heartbeat is calling.

Raises

`TpCommonExceptions,P_INVALID_INTERFACE_TYPE`

8.3.2.5.2 Method disableSvcHeartBeat()

Instructs the service instance to cease the sending of its heartbeat.

Parameters

No Parameters were identified for this method

Raises

`TpCommonExceptions`

8.3.2.5.3 Method changeInterval()

Allows the administrative change of the heartbeat interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

Raises

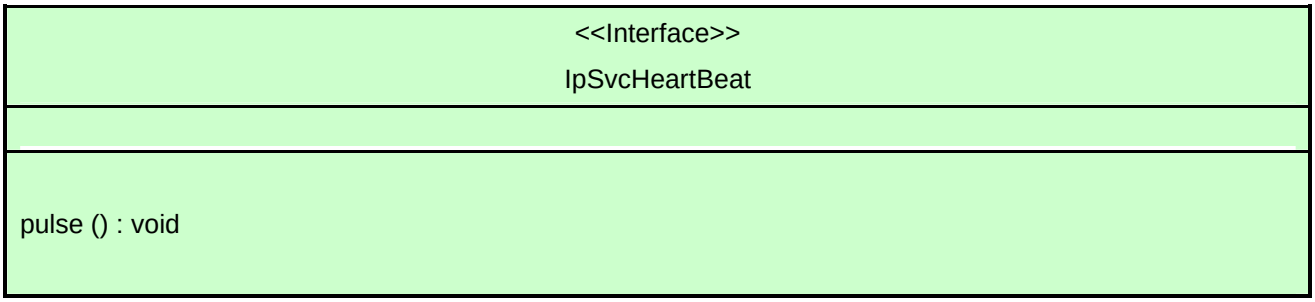
`TpCommonExceptions`

8.3.2.6 Interface Class IpSvcHeartBeat

Inherits from: IpInterface.

The service heartbeat interface is used by the framework to send the service instance its heartbeat.

If a Service is capable of invoking IpFwHeartBeatMgmt.enableHeartBeat(), it shall implement IpSvcHeartBeat and the pulse() method.



8.3.2.6.1 Method pulse()

The framework uses this method to send its heartbeat to the service instance. The service will be expecting a pulse at the end of every interval specified in the parameter to the IpFwHeartBeatMgmt.enableHeartbeat() method. If the pulse() is not received within the specified interval, then the framework can be deemed to have failed the heartbeat.

Parameters

No Parameters were identified for this method

Raises

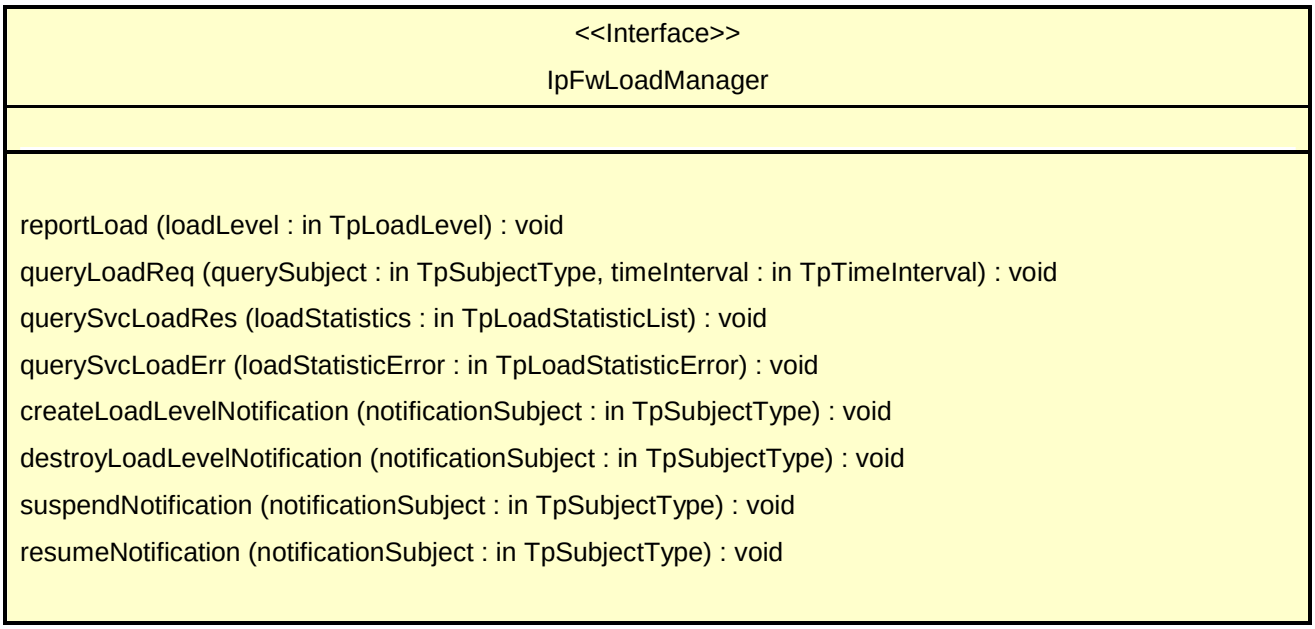
`TpCommonExceptions`

8.3.2.7 Interface Class IpFwLoadManager

Inherits from: IpInterface.

The framework API should allow the load to be distributed across multiple machines and across multiple component processes, according to a load management policy. The separation of the load management mechanism and load management policy ensures the flexibility of the load management services. The load management policy identifies what load management rules the framework should follow for the specific service. It might specify what action the framework should take as the congestion level changes. For example, some real-time critical applications will want to make sure continuous service is maintained, below a given congestion level, at all costs, whereas other services will be satisfied with disconnecting and trying again later if the congestion level rises. Clearly, the load management policy is related to the QoS level to which the application is subscribed. The framework load management function is represented by the IpFwLoadManager interface. To handle responses and reports, the service developer must implement the IpSvcLoadManager interface to provide the callback mechanism.

If the IpFwLoadManager interface is implemented by a Framework, at least one of the methods shall be implemented as a minimum requirement. If load level notifications are supported, the createLoadLevelNotification() and destroyLoadLevelNotification() methods shall be implemented. If suspendNotification() is implemented, then resumeNotification() shall be implemented also. If a Framework is capable of invoking the IpSvcLoadManager.querySvcLoadReq() method, then it shall implement querySvcLoadRes() and querySvcLoadErr() methods in this interface.



8.3.2.7.1 Method reportLoad()

The service instance uses this method to report its current load level (0,1, or 2) to the framework: e.g. when the load level on the service instance has changed.

At level 0 load, the service instance is performing within its load specifications (i.e. it is not congested or overloaded). At level 1 load, the service instance is overloaded. At level 2 load, the service instance is severely overloaded.

Parameters

`loadLevel : in TpLoadLevel`

Specifies the service instance's load level.

Raises

`TpCommonExceptions`

8.3.2.7.2 Method queryLoadReq()

The service instance uses this method to request the framework to provide load statistics records for the framework or for the application that uses the service instance.

Parameters

`querySubject : in TpSubjectType`

Specifies the entity (framework or application) for which load statistics records should be reported.

`timeInterval : in TpTimeInterval`

Specifies the time interval for which load statistics records should be reported.

Raises

`TpCommonExceptions`

8.3.2.7.3 Method querySvcLoadRes()

The service instance uses this method to send load statistic records back to the framework that requested the information; i.e. in response to an invocation of the querySvcLoadReq method on the IpSvcLoadManager interface.

Parameters

loadStatistics : in TpLoadStatisticList

Specifies the service-supplied load statistics.

Raises

TpCommonExceptions

8.3.2.7.4 Method querySvcLoadErr()

The service instance uses this method to return an error response to the framework that requested the service instance's load statistics information, when the service instance is unsuccessful in obtaining any load statistic records; i.e. in response to an invocation of the querySvcLoadReq method on the IpSvcLoadManager interface.

Parameters

loadStatisticError : in TpLoadStatisticError

Specifies the error code associated with the failed attempt to retrieve the service instance's load statistics.

Raises

TpCommonExceptions

8.3.2.7.5 Method createLoadLevelNotification()

The service instance uses this method to register to receive notifications of load level changes associated with the framework or with the application that uses the service instance.

Parameters

notificationSubject : in TpSubjectType

Specifies the entity (framework or application) for which load level changes should be reported.

Raises

TpCommonExceptions

8.3.2.7.6 Method destroyLoadLevelNotification()

The service instance uses this method to unregister for notifications of load level changes associated with the framework or with the application that uses the service instance.

Parameters

notificationSubject : in TpSubjectType

Specifies the entity (framework or application) for which load level changes should no longer be reported.

Raises

TpCommonExceptions

8.3.2.7.7 Method suspendNotification()

The service instance uses this method to request the framework to suspend sending it notifications associated with the framework or with the application that uses the service instance; e.g. while the service instance handles a temporary overload condition.

Parameters

notificationSubject : in TpSubjectType

Specifies the entity (framework or application) for which the sending of notifications by the framework should be suspended.

Raises

TpCommonExceptions

8.3.2.7.8 Method resumeNotification()

The service instance uses this method to request the framework to resume sending it notifications associated with the framework or with the application that uses the service instance; e.g. after a period of suspension during which the service instance handled a temporary overload condition.

Parameters

notificationSubject : in TpSubjectType

Specifies the entity (framework or application) for which the sending of notifications of load level changes by the framework should be resumed.

Raises

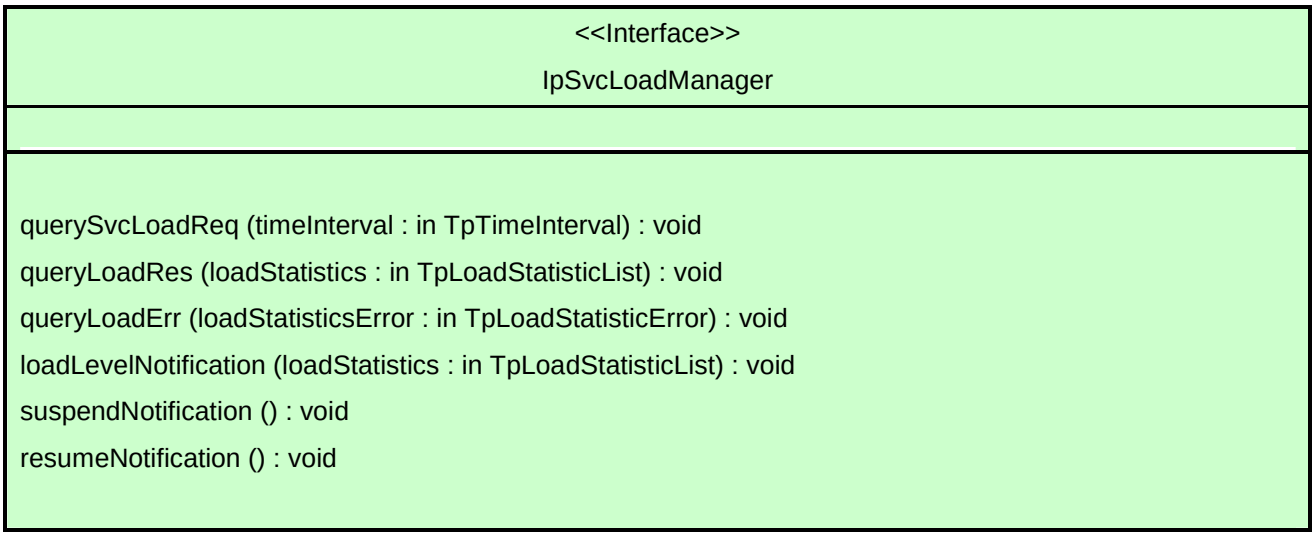
TpCommonExceptions

8.3.2.8 Interface Class IpSvcLoadManager

Inherits from: IpInterface.

The service developer supplies the load manager service interface to handle requests, reports and other responses from the framework load manager function. The service instance supplies the identity of its callback interface at the time it obtains the framework's load manager interface, by use of the obtainInterfaceWithCallback() method on the IpAccess interface.

If the IpSvcLoadManager interface is implemented by a Service, at least one of the methods shall be implemented as a minimum requirement. If load level notifications are supported, then loadLevelNotification() shall be implemented. If a the Service is capable of invoking the IpFwLoadManager.queryLoadReq() method, then it shall implement queryLoadRes() and queryLoadErr() methods in this interface.



8.3.2.8.1 Method querySvcLoadReq()

The framework uses this method to request the service instance to provide its load statistic records.

Parameters

`timeInterval : in TpTimeInterval`

Specifies the time interval for which load statistic records should be reported.

Raises

`TpCommonExceptions`

8.3.2.8.2 Method queryLoadRes()

The framework uses this method to send load statistic records back to the service instance that requested the information; i.e. in response to an invocation of the queryLoadReq method on the IpFwLoadManager interface.

Parameters

`loadStatistics : in TpLoadStatisticList`

Specifies the framework-supplied load statistics

Raises

`TpCommonExceptions`

8.3.2.8.3 Method queryLoadErr()

The framework uses this method to return an error response to the service that requested the framework's load statistics information, when the framework is unsuccessful in obtaining any load statistic records; i.e. in response to an invocation of the queryLoadReq method on the IpFwLoadManager interface.

Parameters

`loadStatisticsError : in TpLoadStatisticError`

Specifies the error code associated with the failed attempt to retrieve the framework's load statistics.

Raises

TpCommonExceptions

8.3.2.8.4 Method loadLevelNotification()

Upon detecting load condition change, (e.g. load level changing from 0 to 1, 0 to 2, 1 to 0, for the application or framework which has been registered for load level notifications) this method is invoked on the SCF.

Parameters

loadStatistics : in TpLoadStatisticList

Specifies the framework-supplied load statistics, which include the load level change(s).

Raises

TpCommonExceptions

8.3.2.8.5 Method suspendNotification()

The framework uses this method to request the service instance to suspend sending it any notifications: e.g. while the framework handles a temporary overload condition.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.8.6 Method resumeNotification()

The framework uses this method to request the service instance to resume sending it notifications: e.g. after a period of suspension during which the framework handled a temporary overload condition.

Parameters

No Parameters were identified for this method

Raises

TpCommonExceptions

8.3.2.9 Interface Class IpFwOAM

Inherits from: IpInterface.

The OAM interface is used to query the system date and time. The service and the framework can synchronise the date and time to a certain extent. Accurate time synchronisation is outside the scope of this API.

This interface and ~~its~~the systemDateTimeQuery() method are optional.

<<Interface>> IpFwOAM
systemDateTimeQuery (clientDateAndTime : in TpDateAndTime) : TpDateAndTime

8.3.2.9.1 Method systemDateTimeQuery()

This method is used to query the system date and time. The client (service) passes in its own date and time to the framework. The framework responds with the system date and time.

Returns <systemDateAndTime> : This is the system date and time of the framework.

Parameters

`clientDateAndTime : in TpDateAndTime`

This is the date and time of the client (service). The error code P_INVALID_DATE_TIME_FORMAT is returned if the format of the parameter is invalid.

Returns

`TpDateAndTime`

Raises

`TpCommonExceptions, P_INVALID_TIME_AND_DATE_FORMAT`

8.3.2.10 Interface Class IpSvcOAM

Inherits from: IpInterface.

This interface and ~~its~~the systemDateTimeQuery() method are optional.

<<Interface>> IpSvcOAM
systemDateTimeQuery (systemDateAndTime : in TpDateAndTime) : TpDateAndTime

8.3.2.10.1 Method systemDateTimeQuery()

This method is used by the framework to send the system date and time to the service. The service responds with its own date and time.

Returns <clientDateAndTime> : This is the date and time of the client (service).

Parameters

`systemDateAndTime : in TpDateAndTime`

This is the system date and time of the framework. The error code P_INVALID_DATE_TIME_FORMAT is returned if the format of the parameter is invalid.

Returns

`TpDateAndTime`

Raises

`TpCommonExceptions, P_INVALID_TIME_AND_DATE_FORMAT`

8.3.3 Service Discovery Interface Classes

This API complements the Service Registration functionality described in another clause.

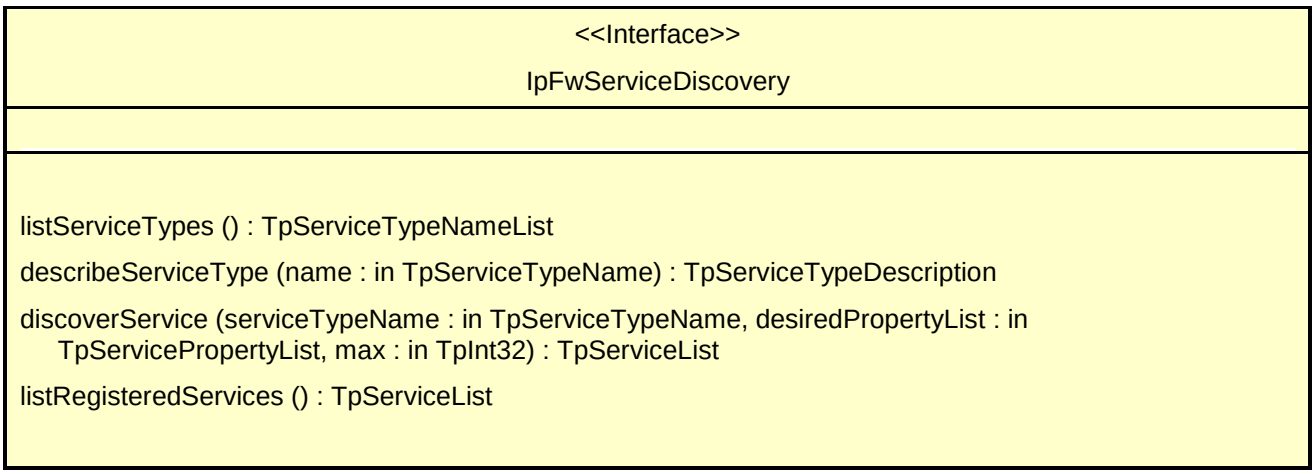
Before a service can be registered in the framework, the service supplier must know what "types" of services the Framework supports and what service "properties" are applicable to each service type. The "listServiceType()" method returns a list of all "service types" that are currently supported by the framework and the "describeServiceType()" method returns a description of each service type. The description of service type includes the "service-specific properties" that are applicable to each service type. Then the service supplier can retrieve a specific set of registered services that both belong to a given type and possess a specific set of "property values", by using the "discoverService()" method.

Additionally the service supplier can retrieve a list of all registered services, without regard to type or property values, by using the "listRegisteredServices()" method. However the scope of the list will depend upon the framework implementation; e.g. a service supplier may only be permitted to retrieve a list of services that the service supplier has previously registered.

8.3.3.1 Interface Class IpFwServiceDiscovery

Inherits from: IpInterface.

This interface shall be implemented by a Framework with as a minimum requirement the listServiceTypes(), describeServiceType() and discoverService() methods.



8.3.3.1.1 Method listServiceTypes()

This operation returns the names of all service types that are in the repository. The details of the service types can then be obtained using the describeServiceType() method.

Returns <listTypes> : The names of the requested service types.

Parameters
No Parameters were identified for this method

Returns

TpServiceTypeNameList

Raises

TpCommonExceptions

8.3.3.1.2 Method describeServiceType()

This operation lets the caller obtain the details for a particular service type.

Returns <serviceTypeDescription> : The description of the specified service type. The description provides information about: the service properties associated with this service type: i.e. a list of service property {name, mode and type} tuples, the names of the super types of this service type, and whether the service type is currently available or unavailable.

Parameters

name : in TpServiceTypeName

The name of the service type to be described. If the "name" is malformed, then the P_ILLEGAL_SERVICE_TYPE exception is raised. If the "name" does not exist in the repository, then the P_UNKNOWN_SERVICE_TYPE exception is raised.

Returns

TpServiceTypeDescription

Raises

TpCommonExceptions, P_ILLEGAL_SERVICE_TYPE, P_UNKNOWN_SERVICE_TYPE

8.3.3.1.3 Method discoverService()

The discoverService operation is the means by which the service supplier can retrieve a specific set of registered services that both belong to a given type and possess a specific set of "property values". The service supplier passes in a list of desired service properties to describe the service it is looking for, in the form of attribute/value pairs for the service properties. The service supplier also specifies the maximum number of matched responses it is willing to accept. The framework must not return more matches than the specified maximum, but it is up to the discretion of the Framework implementation to choose to return less than the specified maximum. The discoverService() operation returns a serviceID/Property pair list for those services that match the desired service property list that the service supplier provided.

Returns <serviceList> : This parameter gives a list of matching services. Each service is characterised by its service ID and a list of service properties {name and value list} associated with the service.

Parameters

serviceTypeName : in TpServiceTypeName

The name of the required service type. If the string representation of the "type" does not obey the rules for service type identifiers, then the P_ILLEGAL_SERVICE_TYPE exception is raised. If the "type" is correct syntactically but is not recognised as a service type within the Framework, then the P_UNKNOWN_SERVICE_TYPE exception is raised. The framework may return a service of a subtype of the "type" requested. A service sub-type can be described by the properties of its supertypes.

desiredPropertyList : in TpServicePropertyList

The "desiredPropertyList" parameter is a list of service properties {name and value list} that the required services should satisfy. These properties deal with the non-functional and non-computational aspects of the desired service. The property values in the desired property list must be logically interpreted as "minimum", "maximum", etc. by the framework (due to the absence of a Boolean constraint expression for the specification of the service criterion). It is suggested that, at the time of service registration, each property value be specified as an appropriate range of values, so that desired property values can specify an "enclosing" range of values to help in the selection of desired services.

max : in TpInt32

The "max" parameter states the maximum number of services that are to be returned in the "serviceList" result.

Returns

TpServiceList

Raises

TpCommonExceptions, P_ILLEGAL_SERVICE_TYPE, P_UNKNOWN_SERVICE_TYPE, P_INVALID_PROPERTY

8.3.3.1.4 Method listRegisteredServices()

Returns a list of services so far registered in the framework.

Returns <serviceList> : The "serviceList" parameter returns a list of registered services. Each service is characterised by its service ID and a list of service properties {name and value list} associated with the service.

Parameters

No Parameters were identified for this method

Returns

TpServiceList

Raises

TpCommonExceptions

8.3.4 Service Instance Lifecycle Manager Interface Classes

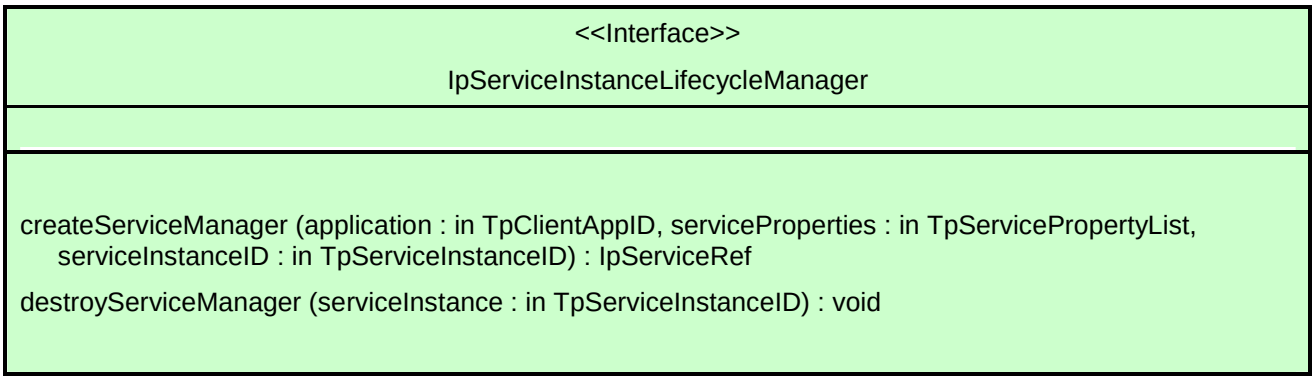
The IpServiceInstanceLifecycleManager interface allows the framework to get access to a service manager interface of a service. It is used during the signServiceAgreement, in order to return a service manager interface reference to the application. Each service has a service manager interface that is the initial point of contact for the service. E.g., the generic call control service uses the IpCallControlManager interface.

8.3.4.1 Interface Class IpServiceInstanceLifecycleManager

Inherits from: IpInterface.

The IpServiceInstanceLifecycleManager interface allows the Framework to create and destroy Service Manager Instances.

This interface and ~~all its~~the createServiceManager() and destroyServiceManager() methods shall be implemented by a Service.



8.3.4.1.1 Method createServiceManager()

This method returns a new service manager interface reference for the specified application. The service instance will be configured for the client application using the properties agreed in the service level agreement.

Returns <serviceManager> : Specifies the service manager interface reference for the specified application ID.

Parameters

application : in TpClientAppID

Specifies the application for which the service manager interface is requested.

serviceProperties : in TpServicePropertyList

Specifies the service properties and their values that are to be used to configure the service instance. These properties form a part of the service level agreement. An example of these properties is a list of methods that the client application is allowed to invoke on the service interfaces.

serviceInstanceID : in TpServiceInstanceID

Specifies the Service Instance ID that the new Service Manager is to be identified by.

Returns

IpServiceRef

Raises

TpCommonExceptions, P_INVALID_PROPERTY

8.3.4.1.2 Method destroyServiceManager()

This method destroys an existing service manager interface reference. This will result in the client application being unable to use the service manager any more.

Parameters

serviceInstance : in TpServiceInstanceID

Identifies the Service Instance to be destroyed.

Raises

TpCommonExceptions

8.3.5 Service Registration Interface Classes

Before a service can be brokered (discovered, subscribed, accessed, etc.) by an enterprise, it has to be registered with the Framework. Services are registered against a particular service type. Therefore service types are created first, and then services corresponding to those types are accepted from the Service Suppliers for registration in the framework. The framework maintains a repository of service types and registered services.

In order to register a new service in the framework, the service supplier must select a service type and the "property values" for the service. The service discovery functionality described in the previous clause enables the service supplier to obtain a list of all the service types supported by the framework and their associated sets of service property values.

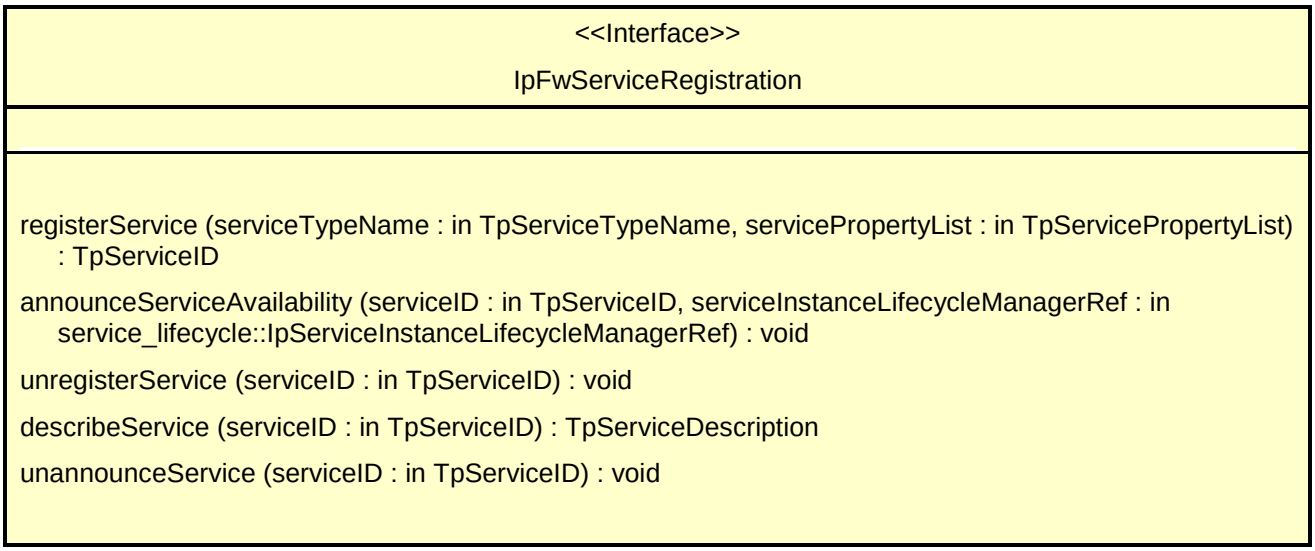
The Framework service registration-related interfaces are invoked by third party service supplier's administrative applications. They are described below. Note that these methods cannot be invoked until the authentication methods have been invoked successfully.

8.3.5.1 Interface Class IpFwServiceRegistration

Inherits from: IpInterface.

The Service Registration interface provides the methods used for the registration of network SCFs at the framework.

This interface and at least the methods registerService(), announceServiceAvailability(), unregisterService() and unannounceService() shall be implemented by a Framework.



8.3.5.1.1 Method registerService()

The registerService() operation is the means by which a service is registered in the Framework, for subsequent discovery by the enterprise applications. Registration can only succeed when the Service type of the service is known to the Framework (ServiceType is 'available'). A service-ID is returned to the service supplier when a service is registered in the Framework. When the service is not registered because the ServiceType is 'unavailable', a P_SERVICE_TYPE_UNAVAILABLE is raised. The service-ID is the handle with which the service supplier can identify the registered service when needed (e.g. for withdrawing it). The service-ID is only meaningful in the context of the Framework that generated it.

Returns <serviceID> : This is the unique handle that is returned as a result of the successful completion of this operation. The Service Supplier can identify the registered service when attempting to access it via other operations such as unregisterService(), etc. Enterprise client applications are also returned this service-ID when attempting to discover a service of this type.

Parameters

`serviceTypeName : in TpServiceTypeName`

The "serviceTypeName" parameter identifies the service type. If the string representation of the "type" does not obey the rules for identifiers, then an P_ILLEGAL_SERVICE_TYPE exception is raised. If the "type" is correct syntactically but the Framework is able to unambiguously determine that it is not a recognised service type, then a P_UNKNOWN_SERVICE_TYPE exception is raised.

`servicePropertyList : in TpServicePropertyList`

The "servicePropertyList" parameter is a list of property name and property value pairs. They describe the service being registered. This description typically covers behavioural, non-functional and non-computational aspects of the service. Service properties are marked "mandatory" or "readonly". These property mode attributes have the following semantics:

a. mandatory - a service associated with this service type must provide an appropriate value for this property when registering.

b. readonly - this modifier indicates that the property is optional, but that once given a value, subsequently it may not be modified.

Specifying both modifiers indicates that a value must be provided and that subsequently it may not be modified. Examples of such properties are those which form part of a service agreement and hence cannot be modified by service suppliers during the life time of service.

If the type or the semantics of the type of any of the property values is not the same as the declared type (declared in the service type), then a P_PROPERTY_TYPE_MISMATCH exception is raised. If the "servicePropertyList" parameter omits any property declared in the service type with a mode of mandatory, then a

P_MISSING_MANDATORY_PROPERTY exception is raised. If two or more properties with the same property name are included in this parameter, the P_DUPLICATE_PROPERTY_NAME exception is raised.

Returns

TpServiceID

Raises

TpCommonExceptions, P_PROPERTY_TYPE_MISMATCH, P_DUPLICATE_PROPERTY_NAME, P_ILLEGAL_SERVICE_TYPE, P_UNKNOWN_SERVICE_TYPE, P_MISSING_MANDATORY_PROPERTY, P_SERVICE_TYPE_UNAVAILABLE

8.3.5.1.2 Method announceServiceAvailability()

The registerService() method described previously does not make the service discoverable. The announceServiceAvailability() method is invoked after the service is authenticated and its service instance lifecycle manager is instantiated at a particular interface. This method informs the framework of the availability of "service instance lifecycle manager" of the previously registered service, identified by its service ID, at a specific interface. After the receipt of this method, the framework makes the corresponding service discoverable.

There exists a "service manager" instance per service instance. Each service implements the IpServiceInstanceLifecycleManager interface. The IpServiceInstanceLifecycleManager interface supports a method called the createServiceManager(application: in TpClientAppID, serviceProperties : in TpServicePropertyList, serviceInstanceID : in TpServiceInstanceID) : IpServiceRef. When the service agreement is signed for some serviceID (using signServiceAgreement()), the framework calls the createServiceManager() for this service, gets a serviceManager and returns this to the client application.

Parameters

serviceID : in TpServiceID

The service ID of the service that is being announced. If the string representation of the "serviceID" does not obey the rules for service identifiers, then an P_ILLEGAL_SERVICE_ID exception is raised. If the "serviceID" is legal but there is no service offer within the Framework with that ID, then an P_UNKNOWN_SERVICE_ID exception is raised.

serviceInstanceLifecycleManagerRef : in service_lifecycle::IpServiceInstanceLifecycleManagerRef

The interface reference at which the service instance lifecycle manager of the previously registered service is available.

Raises

TpCommonExceptions, P_ILLEGAL_SERVICE_ID, P_UNKNOWN_SERVICE_ID, P_INVALID_INTERFACE_TYPE

8.3.5.1.3 Method unregisterService()

The unregisterService() operation is used by the service suppliers to remove a registered service from the Framework. The service is identified by the "service-ID" which was originally returned by the Framework in response to the registerService() operation. The service must be in the SCF Registered state. All instances of the service will be deleted.

Parameters

serviceID : in TpServiceID

The service to be withdrawn is identified by the "serviceID" parameter which was originally returned by the registerService() operation. If the string representation of the "serviceID" does not obey the rules for service

identifiers, then an P_ILLEGAL_SERVICE_ID exception is raised. If the "serviceID" is legal but there is no service offer within the Framework with that ID, then an P_UNKNOWN_SERVICE_ID exception is raised.

Raises

TpCommonExceptions,P_ILLEGAL_SERVICE_ID,P_UNKNOWN_SERVICE_ID

8.3.5.1.4 Method describeService()

The describeService() operation returns the information about a service that is registered in the framework. It comprises, the "type" of the service , and the "properties" that describe this service. The service is identified by the "service-ID" parameter which was originally returned by the registerService() operation.

The SCS may register various versions of the same SCF, each with a different description (more or less restrictive, for example), and each getting a different serviceID assigned.

Returns <serviceDescription> : This consists of the information about an offered service that is held by the Framework. It comprises the "type" of the service , and the properties that describe this service.

Parameters

serviceID : in TpServiceID

The service to be described is identified by the "serviceID" parameter which was originally returned by the registerService() operation. If the string representation of the "serviceID" does not obey the rules for object identifiers, then an P_ILLEGAL_SERVICE_ID exception is raised. If the "serviceID" is legal but there is no service offer within the Framework with that ID, then a P_UNKNOWN_SERVICE_ID exception is raised.

Returns

TpServiceDescription

Raises

TpCommonExceptions,P_ILLEGAL_SERVICE_ID,P_UNKNOWN_SERVICE_ID

8.3.5.1.5 Method unannounceService()

This method results in the service no longer being discoverable by applications. It is, however, still registered and the service ID is still associated with it. Applications currently using the service can continue to use the service but no new applications should be able to start using the service. Also, all unused service tokens relating to the service will be expired. This will prevent anyone who has already performed a selectService() but not yet performed the signServiceAgreement() from being able to obtain a new instance of the service.

Parameters

serviceID : in TpServiceID

The service ID of the service that is being unannounced. If the string representation of the "serviceID" does not obey the rules for service identifiers, then an P_ILLEGAL_SERVICE_ID exception is raised. If the "serviceID" is legal but there is no service offer within the Framework with that ID, then an P_UNKNOWN_SERVICE_ID exception is raised.

Raises

TpCommonExceptions,P_ILLEGAL_SERVICE_ID,P_UNKNOWN_SERVICE_ID

CR-Form-v7

CHANGE REQUEST

⌘ **29.198-03** **CR** **069** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of status of methods to interfaces in clause 7.3
Source:	⌘	N5
Work item code:	⌘	OSA2
Date:	⌘	27/09/2002
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	There is no requirement in the standard about the necessity to implement all or only some of the methods defined for an interface.
Summary of change:	⌘	Clarify which methods are mandatory and which are optional.
Consequences if not approved:	⌘	Application developers will not know which methods will actually be available.

Clauses affected:	⌘	7.3 Interface Classes

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

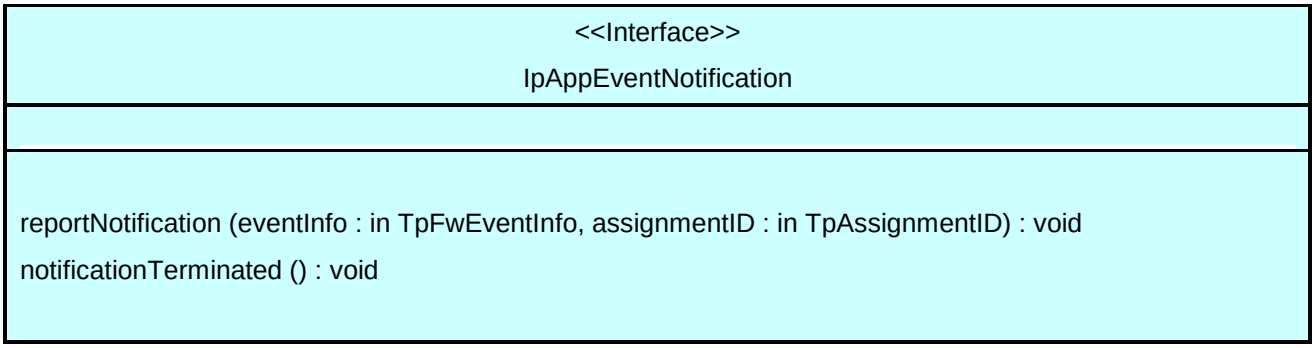
7.3 Interface Classes

7.3.1 Event Notification Interface Classes

7.3.1.1 Interface Class IpAppEventNotification

Inherits from: IpInterface.

This interface is used by the services to inform the application of a generic service-related event. The Event Notification Framework will invoke methods on the Event Notification Application Interface that is specified when the Event Notification interface is obtained.



7.3.1.1.1 Method reportNotification()

This method notifies the application of the arrival of a generic event.

Parameters

`eventInfo : in TpFwEventInfo`

Specifies specific data associated with this event.

`assignmentID : in TpAssignmentID`

Specifies the assignment id which was returned by the framework during the createNotification() method. The application can use assignment id to associate events with event specific criteria and to act accordingly.

7.3.1.1.2 Method notificationTerminated()

This method indicates to the application that all generic event notifications have been terminated (for example, due to faults detected).

Parameters

No Parameters were identified for this method

7.3.1.2 Interface Class IpEventNotification

Inherits from: IpInterface.

The event notification mechanism is used to notify the application of generic service related events that have occurred.

If Event Notifications are supported by a Framework, this interface and ~~all its~~the createNotification() and destroyNotification() methods shall be supported.

<<Interface>> IpEventNotification
createNotification (eventCriteria : in TpFwEventCriteria) : TpAssignmentID destroyNotification (assignmentID : in TpAssignmentID) : void

7.3.1.2.1 Method createNotification()

This method is used to enable generic notifications so that events can be sent to the application.

Returns <assignmentID> : Specifies the ID assigned by the framework for this newly installed notification.

Parameters

eventCriteria : in TpFwEventCriteria

Specifies the event specific criteria used by the application to define the event required.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE

7.3.1.2.2 Method destroyNotification()

This method is used by the application to delete generic notifications from the framework.

Parameters

assignmentID : in TpAssignmentID

Specifies the assignment ID given by the framework when the previous createNotification() was called. If the assignment ID does not correspond to one of the valid assignment IDs, the framework will return the error code P_INVALID_ASSIGNMENTID.

Raises

TpCommonExceptions,P_ACCESS_DENIED,P_INVALID_ASSIGNMENT_ID

7.3.2 Integrity Management Interface Classes

7.3.2.1 Interface Class IpAppFaultManager

Inherits from: IpInterface.

This interface is used to inform the application of events that affect the integrity of the Framework, Service or Client Application. The Fault Management Framework will invoke methods on the Fault Management Application Interface

that is specified when the client application obtains the Fault Management interface: i.e. by use of the obtainInterfaceWithCallback operation on the IpAccess interface

<<Interface>> IpAppFaultManager
activityTestRes (activityTestID : in TpActivityTestID, activityTestResult : in TpActivityTestRes) : void appActivityTestReq (activityTestID : in TpActivityTestID) : void fwFaultReportInd (fault : in TpInterfaceFault) : void fwFaultRecoveryInd (fault : in TpInterfaceFault) : void svcUnavailableInd (serviceID : in TpServiceID, reason : in TpSvcUnavailReason) : void genFaultStatsRecordRes (faultStatistics : in TpFaultStatsRecord, serviceIDs : in TpServiceIDList) : void fwUnavailableInd (reason : in TpFwUnavailReason) : void activityTestErr (activityTestID : in TpActivityTestID) : void genFaultStatsRecordErr (faultStatisticsError : in TpFaultStatisticsError, serviceIDs : in TpServiceIDList) : void appUnavailableInd (serviceID : in TpServiceID) : void genFaultStatsRecordReq (timePeriod : in TpTimeInterval) : void

7.3.2.1.1 Method activityTestRes()

The framework uses this method to return the result of a client application-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the client application to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

7.3.2.1.2 Method appActivityTestReq()

The framework invokes this method to test that the client application is operational. On receipt of this request, the application must carry out a test on itself, to check that it is operating correctly. The application reports the test result by invoking the appActivityTestRes method on the IpFaultManager interface.

Parameters

activityTestID : in TpActivityTestID

The identifier provided by the framework to correlate the response (when it arrives) with this request.

7.3.2.1.3 Method fwFaultReportInd()

The framework invokes this method to notify the client application of a failure within the framework. The client application must not continue to use the framework until it has recovered (as indicated by a fwFaultRecoveryInd).

Parameters

`fault : in TpInterfaceFault`

Specifies the fault that has been detected by the framework.

7.3.2.1.4 Method fwFaultRecoveryInd()

The framework invokes this method to notify the client application that a previously reported fault has been rectified. The application may then resume using the framework.

Parameters

`fault : in TpInterfaceFault`

Specifies the fault from which the framework has recovered.

7.3.2.1.5 Method svcUnavailableInd()

The framework invokes this method to inform the client application that it may experience difficulties using its instance of the indicated service.

Parameters

`serviceID : in TpServiceID`

Identifies the affected service.

`reason : in TpSvcUnavailReason`

Identifies the reason why the service is no longer available

7.3.2.1.6 Method genFaultStatsRecordRes()

This method is used by the framework to provide fault statistics to a client application in response to a genFaultStatsRecordReq method invocation on the IpFaultManager interface.

Parameters

`faultStatistics : in TpFaultStatsRecord`

The fault statistics record.

`serviceIDs : in TpServiceIDList`

Specifies the framework or services that are included in the general fault statistics record. If the serviceIDs parameter is an empty list, then the fault statistics are for the framework.

7.3.2.1.7 Method fwUnavailableInd()

The framework invokes this method to inform the client application that it is no longer available.

Parameters

reason : in TpFwUnavailReason

Identifies the reason why the framework is no longer available

7.3.2.1.8 Method activityTestErr()

The framework uses this method to indicate that an error occurred during an application-initiated activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the application to correlate this response (when it arrives) with the original request.

7.3.2.1.9 Method genFaultStatsRecordErr()

This method is used by the framework to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpFaultManager interface.

Parameters

faultStatisticsError : in TpFaultStatisticsError

The fault statistics error.

serviceIDs : in TpServiceIDList

Specifies the framework or services that were included in the general fault statistics record request. If the serviceIDs parameter is an empty list, then the fault statistics were requested for the framework.

7.3.2.1.10 Method appUnavailableInd()

The framework invokes this method to indicate to the application that the service instance has detected that it is not responding.

Parameters

serviceID : in TpServiceID

Specifies the service for which the indication of unavailability was received.

7.3.2.1.11 Method genFaultStatsRecordReq()

This method is used by the framework to solicit fault statistics from the client application, for example when the framework was asked for these statistics by a service instance by using the genFaultStatsRecordReq operation on the IpFwFaultManager interface. On receipt of this request, the client application must produce a fault statistics record, for the application during the specified time interval, which is returned to the framework using the genFaultStatsRecordRes operation on the IpFaultManager interface.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. Supplying both a start time and stop time as empty strings leaves the time period to the discretion of the client application.

7.3.2.2 Interface Class IpFaultManager

Inherits from: IpInterface.

This interface is used by the application to inform the framework of events that affect the integrity of the framework and services, and to request information about the integrity of the system. The fault manager operations do not exchange callback interfaces as it is assumed that the client application supplies its Fault Management callback interface at the time it obtains the Framework's Fault Management interface, by use of the obtainInterfaceWithCallback operation on the IpAccess interface.

If the IpFaultManager interface is implemented by a Framework, at least one of these methods shall be implemented. If the Framework is capable of invoking the IpAppFaultManager.appActivityTestReq() method, it shall implement appActivityTestRes() and appActivityTestErr() in this interface. If the Framework is capable of invoking IpAppFaultManager.genFaultStatsRecordReq(), it shall implement genFaultStatsRecordRes() and genFaultStatsRecordErr() in this interface.

<<Interface>> IpFaultManager
activityTestReq (activityTestID : in TpActivityTestID, svcID : in TpServiceID) : void appActivityTestRes (activityTestID : in TpActivityTestID, activityTestResult : in TpActivityTestRes) : void svcUnavailableInd (serviceID : in TpServiceID) : void genFaultStatsRecordReq (timePeriod : in TpTimeInterval, serviceIDs : in TpServiceIDList) : void appActivityTestErr (activityTestID : in TpActivityTestID) : void <<deprecated>> appUnavailableInd (serviceID : in TpServiceID) : void genFaultStatsRecordRes (faultStatistics : in TpFaultStatsRecord) : void genFaultStatsRecordErr (faultStatisticsError : in TpFaultStatisticsError) : void

7.3.2.2.1 Method activityTestReq()

The application invokes this method to test that the framework or its instance of a service is operational. On receipt of this request, the framework must carry out a test on itself or on the client's instance of the specified service, to check that it is operating correctly. The framework reports the test result by invoking the activityTestRes method on the IpAppFaultManager interface. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

For security reasons the client application has access to the service ID rather than the service instance ID. However, as there is a one to one relationship between the client application and a service, i.e. there is only one service instance of the specified service per client application, it is the obligation of the framework to determine the service instance ID from the service ID.

Parameters

`activityTestID : in TpActivityTestID`

The identifier provided by the client application to correlate the response (when it arrives) with this request.

`svcID : in TpServiceID`

Identifies either the framework or a service for testing. The framework is designated by an empty string.

Raises

TpCommonExceptions,P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.2 Method appActivityTestRes()

The client application uses this method to return the result of a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

activityTestResult : in TpActivityTestRes

The result of the activity test.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

7.3.2.2.3 Method svcUnavailableInd()

This method is used by the client application to inform the framework that it can no longer use its instance of the indicated service (either due to a failure in the client application or in the service instance itself). On receipt of this request, the framework should take the appropriate corrective action.

Parameters

serviceID : in TpServiceID

Identifies the service that the application can no longer use.

Raises

TpCommonExceptions ,P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.4 Method genFaultStatsRecordReq()

This method is used by the application to solicit fault statistics from the framework. On receipt of this request the framework must produce a fault statistics record, for either the framework or for the client's instances of the specified services during the specified time interval, which is returned to the client application using the genFaultStatsRecordRes operation on the IpAppFaultManager interface. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

timePeriod : in TpTimeInterval

The period over which the fault statistics are to be generated. Supplying both a start time and stop time as empty strings leaves the time period to the discretion of the framework.

serviceIDs : in TpServiceIDList

Specifies either the framework or services to be included in the general fault statistics record. If this parameter is not an empty list, the fault statistics records of the client's instances of the specified services are returned, otherwise the fault statistics record of the framework is returned.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.2.5 Method appActivityTestErr()

The client application uses this method to indicate that an error occurred during a framework-requested activity test.

Parameters

activityTestID : in TpActivityTestID

Used by the framework to correlate this response (when it arrives) with the original request.

Raises

TpCommonExceptions, P_INVALID_ACTIVITY_TEST_ID

7.3.2.2.6 Method <<deprecated>> appUnavailableInd()

This method is deprecated and will be removed in a later release. It is strongly recommended not to implement this method. Applications can indicate they no longer use a particular service instance using IpServiceAgreementManagement.terminateServiceAgreement(). Applications can indicate a fault with a particular service instance using IpFaultManager.svcUnavailableInd().

This method is used by the application to inform the framework that it is ceasing its use of the service instance. This may a result of the application detecting a failure. The framework assumes that the session between this client application and service instance is to be closed and updates its own records appropriately as well as attempting to inform the service instance and/or its administrator.

Parameters

serviceID : in TpServiceID

Identifies the affected application.

Raises

TpCommonExceptions

7.3.2.2.7 Method genFaultStatsRecordRes()

This method is used by the client application to provide fault statistics to the framework in response to a genFaultStatsRecordReq method invocation on the IpAppFaultManager interface.

Parameters

faultStatistics : in TpFaultStatsRecord

The fault statistics record.

Raises

TpCommonExceptions

7.3.2.2.8 Method genFaultStatsRecordErr()

This method is used by the client application to indicate an error fulfilling the request to provide fault statistics, in response to a genFaultStatsRecordReq method invocation on the IpAppFaultManager interface.

Parameters

`faultStatisticsError : in TpFaultStatisticsError`

The fault statistics error.

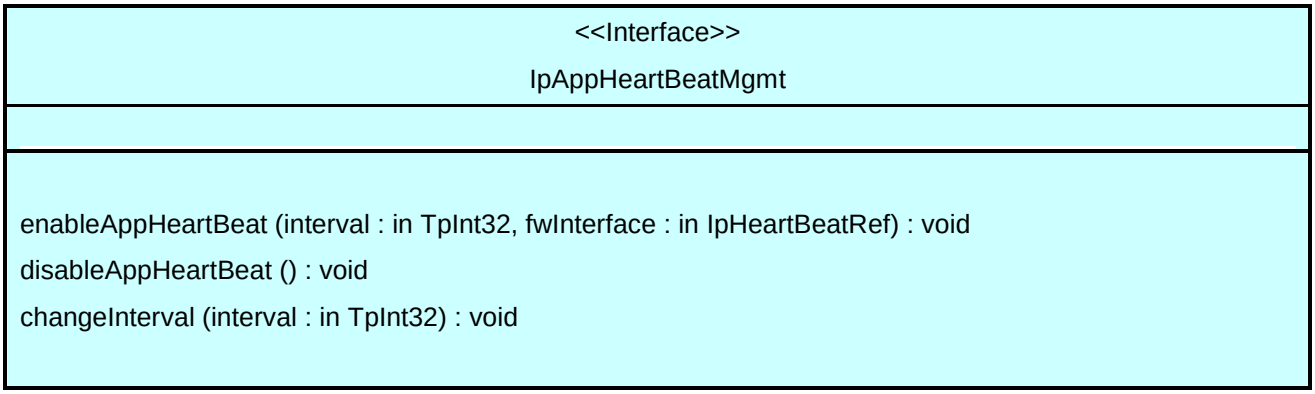
Raises

`TpCommonExceptions`

7.3.2.3 Interface Class IpAppHeartBeatMgmt

Inherits from: IpInterface.

This interface allows the initialisation of a heartbeat supervision of the client application by the framework.



7.3.2.3.1 Method enableAppHeartBeat()

With this method, the framework instructs the client application to begin sending its heartbeat to the specified interface at the specified interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

`fwInterface : in IpHeartBeatRef`

This parameter refers to the callback interface the heartbeat is calling.

7.3.2.3.2 Method disableAppHeartBeat()

Instructs the client application to cease the sending of its heartbeat.

Parameters

No Parameters were identified for this method

7.3.2.3.3 Method changeInterval()

Allows the administrative change of the heartbeat interval.

Parameters

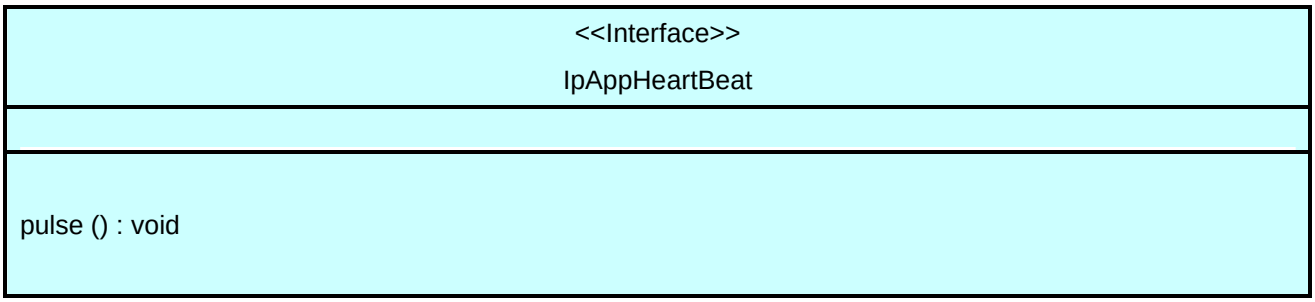
`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

7.3.2.4 Interface Class IpAppHeartBeat

Inherits from: IpInterface.

The Heartbeat Application interface is used by the Framework to send the client application its heartbeat.



7.3.2.4.1 Method pulse()

The framework uses this method to send its heartbeat to the client application. The application will be expecting a pulse at the end of every interval specified in the parameter to the IpHeartBeatMgmt.enableHeartbeat() method. If the pulse() is not received within the specified interval, then the framework can be deemed to have failed the heartbeat.

Parameters

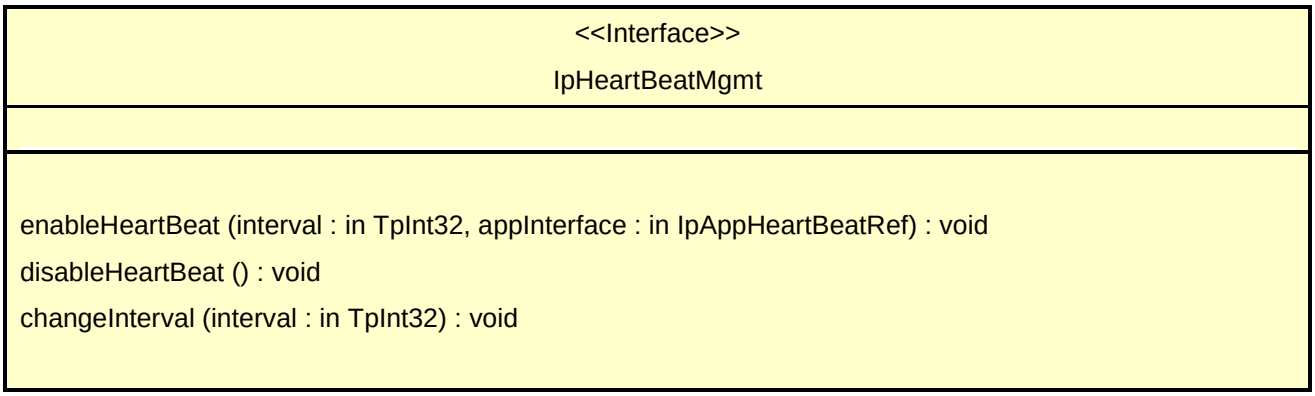
No Parameters were identified for this method

7.3.2.5 Interface Class IpHeartBeatMgmt

Inherits from: IpInterface.

This interface allows the initialisation of a heartbeat supervision of the framework by a client application.

If the IpHeartBeatMgmt interface is implemented by a Framework, as a minimum enableHeartBeat() and disableHeartBeat() shall be implemented.



7.3.2.5.1 Method enableHeartBeat()

With this method, the client application instructs the framework to begin sending its heartbeat to the specified interface at the specified interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

`appInterface : in IpAppHeartBeatRef`

This parameter refers to the callback interface the heartbeat is calling.

Raises

`TpCommonExceptions`

7.3.2.5.2 Method disableHeartBeat()

Instructs the framework to cease the sending of its heartbeat.

Parameters

No Parameters were identified for this method

Raises

`TpCommonExceptions`

7.3.2.5.3 Method changeInterval()

Allows the administrative change of the heartbeat interval.

Parameters

`interval : in TpInt32`

The time interval in milliseconds between the heartbeats.

Raises

`TpCommonExceptions`

7.3.2.6 Interface Class IpHeartBeat

Inherits from: IpInterface.

The Heartbeat Framework interface is used by the client application to send its heartbeat.

If a Framework is capable of invoking IpAppHeartBeatMgmt.enableHeartBeat(), it shall implement IpHeartBeat and the pulse() method.

<<Interface>> IpHeartBeat
pulse () : void

7.3.2.6.1 Method pulse()

The client application uses this method to send its heartbeat to the framework. The framework will be expecting a pulse at the end of every interval specified in the parameter to the IpAppHeartBeatMgmt.enableAppHeartbeat() method. If the pulse() is not received within the specified interval, then the client application can be deemed to have failed the heartbeat.

Parameters

No Parameters were identified for this method

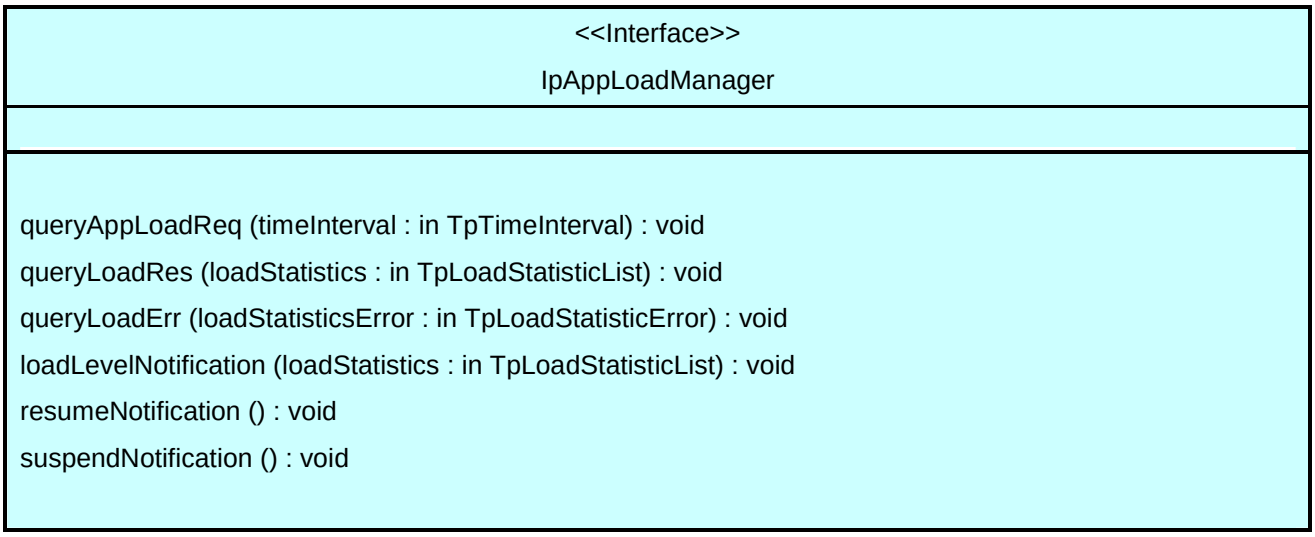
Raises

`TpCommonExceptions`

7.3.2.7 Interface Class IpAppLoadManager

Inherits from: IpInterface.

The client application developer supplies the load manager application interface to handle requests, reports and other responses from the framework load manager function. The application supplies the identity of this callback interface at the time it obtains the framework's load manager interface, by use of the obtainInterfaceWithCallback() method on the IpAccess interface.



7.3.2.7.1 Method queryAppLoadReq()

The framework uses this method to request the application to provide load statistics records for the application.

Parameters

`timeInterval : in TpTimeInterval`

Specifies the time interval for which load statistic records should be reported.

7.3.2.7.2 Method queryLoadRes()

The framework uses this method to send load statistic records back to the application that requested the information; i.e. in response to an invocation of the queryLoadReq method on the IpLoadManager interface.

Parameters

`loadStatistics : in TpLoadStatisticList`

Specifies the framework-supplied load statistics

7.3.2.7.3 Method queryLoadErr()

The framework uses this method to return an error response to the application that requested the framework's load statistics information, when the framework is unsuccessful in obtaining any load statistic records; i.e. in response to an invocation of the queryLoadReq method on the IpLoadManager interface.

Parameters

`loadStatisticsError : in TpLoadStatisticError`

Specifies the error code associated with the failed attempt to retrieve the framework's load statistics.

7.3.2.7.4 Method loadLevelNotification()

Upon detecting load condition change, (e.g. load level changing from 0 to 1, 0 to 2, 1 to 0, for the SCFs or framework which have been registered for load level notifications) this method is invoked on the application.

Parameters

`loadStatistics : in TpLoadStatisticList`

Specifies the framework-supplied load statistics, which include the load level change(s).

7.3.2.7.5 Method resumeNotification()

The framework uses this method to request the application to resume sending it notifications: e.g. after a period of suspension during which the framework handled a temporary overload condition.

Parameters

No Parameters were identified for this method

7.3.2.7.6 Method suspendNotification()

The framework uses this method to request the application to suspend sending it any notifications: e.g. while the framework handles a temporary overload condition.

Parameters

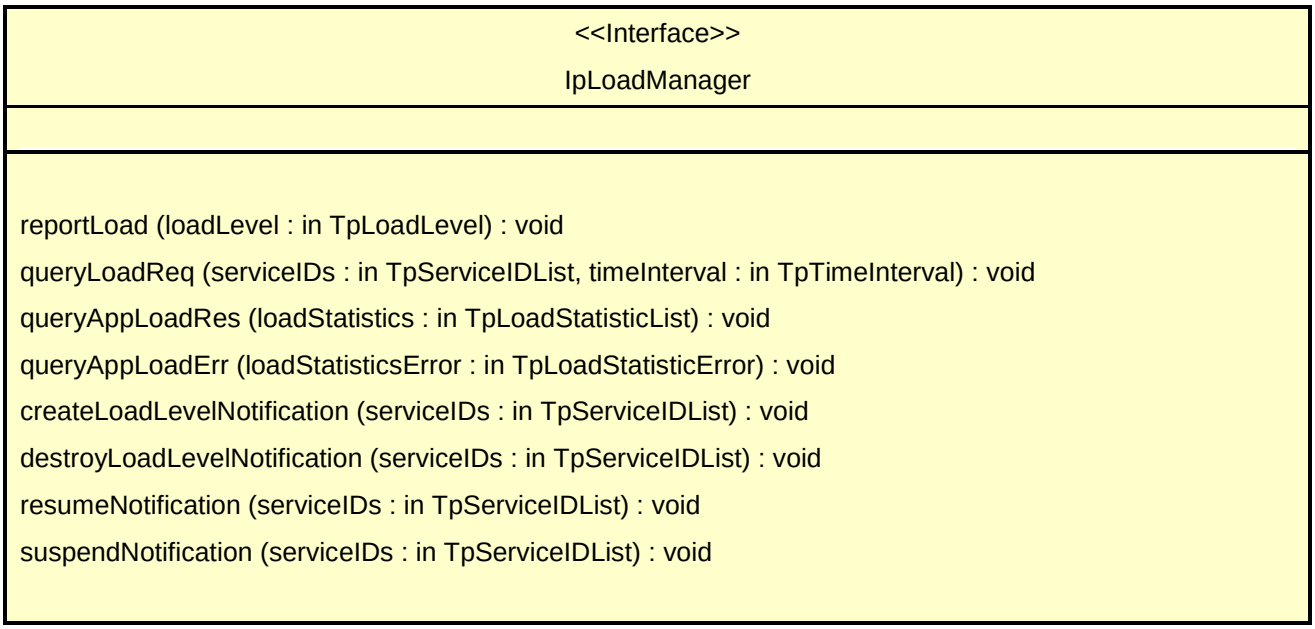
No Parameters were identified for this method

7.3.2.8 Interface Class IpLoadManager

Inherits from: IpInterface.

The framework API should allow the load to be distributed across multiple machines and across multiple component processes, according to a load management policy. The separation of the load management mechanism and load management policy ensures the flexibility of the load management services. The load management policy identifies what load management rules the framework should follow for the specific client application. It might specify what action the framework should take as the congestion level changes. For example, some real-time critical applications will want to make sure continuous service is maintained, below a given congestion level, at all costs, whereas other services will be satisfied with disconnecting and trying again later if the congestion level rises. Clearly, the load management policy is related to the QoS level to which the application is subscribed. The framework load management function is represented by the IpLoadManager interface. Most methods are asynchronous, in that they do not lock a thread into waiting whilst a transaction performs. To handle responses and reports, the client application developer must implement the IpAppLoadManager interface to provide the callback mechanism. The application supplies the identity of this callback interface at the time it obtains the framework's load manager interface, by use of the obtainInterfaceWithCallback operation on the IpAccess interface.

If the IpLoadManager interface is implemented by a Framework, at least one of the methods shall be implemented as a minimum requirement. If load level notifications are supported, the createLoadLevelNotification() and destroyLoadLevelNotification() methods shall be implemented. If suspendNotification() is implemented, then resumeNotification() shall be implemented also. If a Framework is capable of invoking the IpAppLoadManager.queryAppLoadReq() method, then it shall implement queryAppLoadRes() and queryAppLoadErr() methods in this interface.



7.3.2.8.1 Method reportLoad()

The client application uses this method to report its current load level (0,1, or 2) to the framework: e.g. when the load level on the application has changed.

At level 0 load, the application is performing within its load specifications (i.e. it is not congested or overloaded). At level 1 load, the application is overloaded. At level 2 load, the application is severely overloaded.

Parameters

`loadLevel : in TpLoadLevel`

Specifies the application's load level.

Raises

`TpCommonExceptions`

7.3.2.8.2 Method queryLoadReq()

The client application uses this method to request the framework to provide load statistic records for the framework or for its instances of the individual services. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

`serviceIDs : in TpServiceIDList`

Specifies the framework or the services for which load statistics records should be reported. If this parameter is not an empty list, the load statistics records of the client's instances of the specified services are returned, otherwise the load statistics record of the framework is returned.

`timeInterval : in TpTimeInterval`

Specifies the time interval for which load statistics records should be reported.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_SERVICE_NOT_ENABLED, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.8.3 Method queryAppLoadRes()

The client application uses this method to send load statistic records back to the framework that requested the information; i.e. in response to an invocation of the queryAppLoadReq method on the IpAppLoadManager interface.

Parameters

loadStatistics : in TpLoadStatisticList

Specifies the application-supplied load statistics.

Raises

TpCommonExceptions

7.3.2.8.4 Method queryAppLoadErr()

The client application uses this method to return an error response to the framework that requested the application's load statistics information, when the application is unsuccessful in obtaining any load statistic records; i.e. in response to an invocation of the queryAppLoadReq method on the IpAppLoadManager interface.

Parameters

loadStatisticsError : in TpLoadStatisticError

Specifies the error code associated with the failed attempt to retrieve the application's load statistics.

Raises

TpCommonExceptions

7.3.2.8.5 Method createLoadLevelNotification()

The client application uses this method to register to receive notifications of load level changes associated with either the framework or with its instances of the individual services used by the application. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

serviceIDs : in TpServiceIDList

Specifies the framework or SCFs to be registered for load control. To register for framework load control, the serviceIDs parameter must be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.8.6 Method destroyLoadLevelNotification()

The client application uses this method to unregister for notifications of load level changes associated with either the framework or with its instances of the individual services used by the application. If the application does not have

access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

serviceIDs : in TpServiceIDList

Specifies the framework or the services for which load level changes should no longer be reported. To unregister for framework load control, the serviceIDs parameter must be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.8.7 Method resumeNotification()

The client application uses this method to request the framework to resume sending it load management notifications associated with either the framework or with its instances of the individual services used by the application; e.g. after a period of suspension during which the application handled a temporary overload condition. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

serviceIDs : in TpServiceIDList

Specifies the framework or the services for which the sending of notifications of load level changes by the framework should be resumed. To resume notifications for the framework, the serviceIDs parameter must be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_SERVICE_NOT_ENABLED, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.8.8 Method suspendNotification()

The client application uses this method to request the framework to suspend sending it load management notifications associated with either the framework or with its instances of the individual services used by the application; e.g. while the application handles a temporary overload condition. If the application does not have access to a service instance with the specified serviceID, the P_UNAUTHORISED_PARAMETER_VALUE exception shall be thrown. The extraInformation field of the exception shall contain the corresponding serviceID.

Parameters

serviceIDs : in TpServiceIDList

Specifies the framework or the services for which the sending of notifications by the framework should be suspended. To suspend notifications for the framework, the serviceIDs parameter must be an empty list.

Raises

TpCommonExceptions, P_INVALID_SERVICE_ID, P_SERVICE_NOT_ENABLED, P_UNAUTHORISED_PARAMETER_VALUE

7.3.2.9 Interface Class IpOAM

Inherits from: IpInterface.

The OAM interface is used to query the system date and time. The application and the framework can synchronise the date and time to a certain extent. Accurate time synchronisation is outside the scope of the OSA APIs.

This interface and ~~its~~the systemDateTimeQuery() method are optional.

<<Interface>> IpOAM
systemDateTimeQuery (clientDateAndTime : in TpDateAndTime) : TpDateAndTime

7.3.2.9.1 Method systemDateTimeQuery()

This method is used to query the system date and time. The client application passes in its own date and time to the framework. The framework responds with the system date and time.

Returns <systemDateAndTime> : This is the system date and time of the framework.

Parameters

`clientDateAndTime : in TpDateAndTime`

This is the date and time of the client (application). The error code P_INVALID_DATE_TIME_FORMAT is returned if the format of the parameter is invalid.

Returns

`TpDateAndTime`

Raises

`TpCommonExceptions,P_INVALID_TIME_AND_DATE_FORMAT`

7.3.2.10 Interface Class IpAppOAM

Inherits from: IpInterface.

The OAM client application interface is used by the Framework to query the application date and time, for synchronisation purposes. This method is invoked by the Framework to interchange the framework and client application date and time.

<<Interface>> IpAppOAM
systemDateTimeQuery (systemDateAndTime : in TpDateAndTime) : TpDateAndTime

7.3.2.10.1 Method systemDateTimeQuery()

This method is used to query the system date and time. The framework passes in its own date and time to the application. The application responds with its own date and time.

Returns <clientDateAndTime> : This is the date and time of the client (application).

Parameters

systemDateAndTime : in TpDateAndTime

This is the system date and time of the framework.

Returns

TpDateAndTime

7.3.3 Service Agreement Management Interface Classes

7.3.3.1 Interface Class IpAppServiceAgreementManagement

Inherits from: IpInterface.

This interface and ~~all its~~the signServiceAgreement() and terminateServiceAgreement() methods shall be implemented by an application.

<<Interface>> IpAppServiceAgreementManagement
signServiceAgreement (serviceToken : in TpServiceToken, agreementText : in TpString, signingAlgorithm : in TpSigningAlgorithm) : TpOctetSet terminateServiceAgreement (serviceToken : in TpServiceToken, terminationText : in TpString, digitalSignature : in TpOctetSet) : void

7.3.3.1.1 Method signServiceAgreement()

Upon receipt of the initiateSignServiceAgrement() method from the client application, this method is used by the framework to request that the client application sign an agreement on the service. The framework provides the service agreement text for the client application to sign. The service manager returned will be configured as per the service level agreement. If the framework uses service subscription, the service level agreement will be encapsulated in the subscription properties contained in the contract/profile for the client application, which will be a restriction of the registered properties. If the client application agrees, it signs the service agreement, returning its digital signature to the framework.

Returns <digitalSignature> : This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is the agreement text given by the framework. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the agreement text). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. If the signature is incorrect the serviceToken will be expired immediately.

Parameters

serviceToken : in TpServiceToken

This is the token returned by the framework in a call to the selectService() method. This token is used to identify the service instance to which this service agreement corresponds. (If the client application selects many services, it can determine which selected service corresponds to the service agreement by matching the service token.) If the

serviceToken is invalid, or not known by the client application, then the P_INVALID_SERVICE_TOKEN exception is thrown.

agreementText : in TpString

This is the agreement text that is to be signed by the client application using the private key of the client application. If the agreementText is invalid, then the P_INVALID_AGREEMENT_TEXT exception is thrown.

signingAlgorithm : in TpSigningAlgorithm

This is the algorithm used to compute the digital signature. It shall be identical to the one chosen by the framework in response to IpAccess.selectSigningAlgorithm(). If the signingAlgorithm is not the chosen one, is invalid, or unknown to the client application, the P_INVALID_SIGNING_ALGORITHM exception is thrown. The list of possible algorithms is as specified in the TpSigningAlgorithm table. The identifier used in this parameter must correspond to the digestAlgorithm and signatureAlgorithm fields in the SignerInfo field in the digitalSignature (see below).

Returns

TpOctetSet

Raises

TpCommonExceptions, P_INVALID_AGREEMENT_TEXT, P_INVALID_SERVICE_TOKEN, P_INVALID_SIGNING_ALGORITHM

7.3.3.1.2 Method terminateServiceAgreement()

This method is used by the framework to terminate an agreement for the service.

Parameters

serviceToken : in TpServiceToken

This is the token passed back from the framework in a previous selectService() method call. This token is used to identify the service agreement to be terminated. If the serviceToken is invalid, or unknown to the client application, the P_INVALID_SERVICE_TOKEN exception will be thrown.

terminationText : in TpString

This is the termination text that describes the reason for the termination of the service agreement.

digitalSignature : in TpOctetSet

This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is the termination text. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the termination text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. The signing algorithm used is the same as the signing algorithm given when the service agreement was signed using signServiceAgreement(). The framework uses this to confirm its identity to the client application. The client application can check that the terminationText has been signed by the framework. If a match is made, the service agreement is terminated, otherwise the P_INVALID_SIGNATURE exception will be thrown.

Raises

TpCommonExceptions, P_INVALID_SERVICE_TOKEN, P_INVALID_SIGNATURE

7.3.3.2 Interface Class IpServiceAgreementManagement

Inherits from: IpInterface.

This interface and ~~all its~~the signServiceAgreement(), terminateServiceAgreement(), selectService() and initiateSignServiceAgreement() methods shall be implemented by a Framework.

<<Interface>> IpServiceAgreementManagement
signServiceAgreement (serviceToken : in TpServiceToken, agreementText : in TpString, signingAlgorithm : in TpSigningAlgorithm) : TpSignatureAndServiceMgr terminateServiceAgreement (serviceToken : in TpServiceToken, terminationText : in TpString, digitalSignature : in TpOctetSet) : void selectService (serviceID : in TpServiceID) : TpServiceToken initiateSignServiceAgreement (serviceToken : in TpServiceToken) : void

7.3.3.2.1 Method signServiceAgreement()

After the framework has called signServiceAgreement() on the application's IpAppServiceAgreementManagement interface, this method is used by the client application to request that the framework sign the service agreement, which allows the client application to use the service. A reference to the service manager interface of the service is returned to the client application. The service manager returned will be configured as per the service level agreement. If the framework uses service subscription, the service level agreement will be encapsulated in the subscription properties contained in the contract/profile for the client application, which will be a restriction of the registered properties. If the client application is not allowed to access the service, then an error code (P_SERVICE_ACCESS_DENIED) is returned.

Returns <signatureAndServiceMgr> : This contains the digital signature of the framework for the service agreement, and a reference to the service manager interface of the service.

```
structure TpSignatureAndServiceMgr {
        digitalSignature: TpOctetSet;
            serviceMgrInterface: IpServiceRef;
        };
```

The digitalSignature contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is the agreement text given by the client application. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the agreement text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention.

The serviceMgrInterface is a reference to the service manager interface for the selected service.

Parameters

`serviceToken : in TpServiceToken`

This is the token returned by the framework in a call to the selectService() method. This token is used to identify the service instance requested by the client application. If the serviceToken is invalid, or has expired, an error code (P_INVALID_SERVICE_TOKEN) is returned.

`agreementText : in TpString`

This is the agreement text that is to be signed by the framework using the private key of the framework. If the agreementText is invalid, then an error code (P_INVALID_AGREEMENT_TEXT) is returned.

`signingAlgorithm : in TpSigningAlgorithm`

This is the algorithm used to compute the digital signature. It shall be identical to the one chosen by the framework in response to IpAccess.selectSigningAlgorithm(). If the signingAlgorithm is not the chosen one, is invalid, or unknown

to the framework, an error code (P_INVALID_SIGNING_ALGORITHM) is returned. The list of possible algorithms is as specified in the TpSigningAlgorithm table. The identifier used in this parameter must correspond to the digestAlgorithm and signatureAlgorithm fields in the SignerInfo field in the digitalSignature (see below).

Returns

TpSignatureAndServiceMgr

Raises

TpCommonExceptions,P_ACCESS_DENIED,P_INVALID_AGREEMENT_TEXT,P_INVALID_SERVICE_TOKEN,P_INVALID_SIGNING_ALGORITHM,P_SERVICE_ACCESS_DENIED

7.3.3.2.2 Method terminateServiceAgreement()

This method is used by the client application to terminate an agreement for the service.

Parameters

serviceToken : in TpServiceToken

This is the token passed back from the framework in a previous selectService() method call. This token is used to identify the service agreement to be terminated. If the serviceToken is invalid, or has expired, an error code (P_INVALID_SERVICE_TOKEN) is returned.

terminationText : in TpString

This is the termination text that describes the reason for the termination of the service agreement.

digitalSignature : in TpOctetSet

This contains a CMS (Cryptographic Message Syntax) object (as defined in [RFC 2630]) with content type Signed-data. The signature is calculated and created as per section 5 of RFC 2630. The content is the termination text. The "external signature" construct shall not be used (i.e. the eContent field in the EncapsulatedContentInfo field shall be present and contain the termination text string). The signing-time attribute, as defined in section 11.3 of RFC 2630, shall also be used to provide replay prevention. The signing algorithm used is the same as the signing algorithm given when the service agreement was signed using signServiceAgreement().The framework uses this to check that the terminationText has been signed by the client application. If a match is made, the service agreement is terminated, otherwise an error code (P_INVALID_SIGNATURE) is returned.

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_SERVICE_TOKEN, P_INVALID_SIGNATURE

7.3.3.2.3 Method selectService()

This method is used by the client application to identify the service that the client application wishes to use. If the client application is not allowed to access the service, then the P_SERVICE_ACCESS_DENIED exception is thrown. The P_SERVICE_ACCESS_DENIED exception is also thrown if the client attempts to select a service for which it has already signed a service agreement for, and therefore obtained an instance of. This is because there must be only one service instance per client application.

Returns <serviceToken> : This is a free format text token returned by the framework, which can be signed as part of a service agreement. This will contain operator specific information relating to the service level agreement. The serviceToken has a limited lifetime. If the lifetime of the serviceToken expires, a method accepting the serviceToken will return an error code (P_INVALID_SERVICE_TOKEN). Service Tokens will automatically expire if the client application or framework invokes the endAccess method on the other's corresponding access interface.

Parameters

serviceID : in TpServiceID

This identifies the service required. If the serviceID is not recognised by the framework, an error code (P_INVALID_SERVICE_ID) is returned.

Returns

TpServiceToken

Raises

TpCommonExceptions, P_ACCESS_DENIED, P_INVALID_SERVICE_ID, P_SERVICE_ACCESS_DENIED

7.3.3.2.4 Method initiateSignServiceAgreement()

This method is used by the client application to initiate the sign service agreement process. This method shall be invoked following the application's call to selectService(), and before the signing of the service agreement can take place. If the client application is not allowed to initiate the sign service agreement process, the exception (P_SERVICE_ACCESS_DENIED) is thrown.

Parameters

serviceToken : in TpServiceToken

This is the token returned by the framework in a call to the selectService() method. This token is used to identify the service instance requested by the client application. If the serviceToken is invalid, or has expired, the exception (P_INVALID_SERVICE_TOKEN) is thrown.

Raises

TpCommonExceptions, P_INVALID_SERVICE_TOKEN, P_SERVICE_ACCESS_DENIED

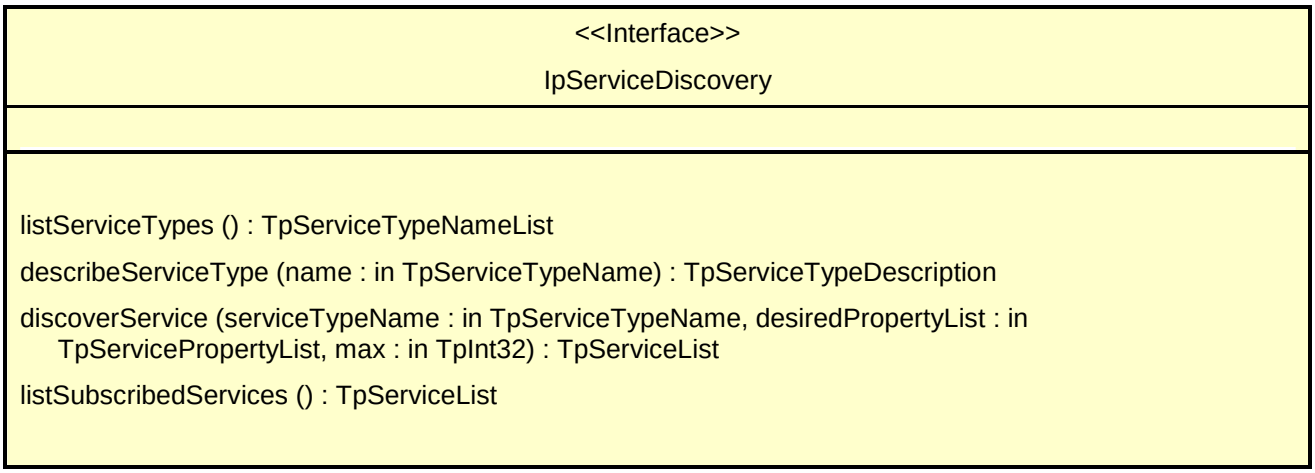
7.3.4 Service Discovery Interface Classes

7.3.4.1 Interface Class IpServiceDiscovery

Inherits from: IpInterface.

The service discovery interface, shown below, consists of four methods. Before a service can be discovered, the enterprise operator (or the client applications) must know what "types" of services are supported by the Framework and what service "properties" are applicable to each service type. The listServiceType() method returns a list of all "service types" that are currently supported by the framework and the "describeServiceType()" returns a description of each service type. The description of service type includes the "service-specific properties" that are applicable to each service type. Then the enterprise operator (or the client applications) can discover a specific set of registered services that both belong to a given type and possess the desired "property values", by using the "discoverService() method. Once the enterprise operator finds out the desired set of services supported by the framework, it subscribes to (a sub-set of) these services using the Subscription Interfaces. The enterprise operator (or the client applications in its domain) can find out the set of services available to it (i.e., the service that it can use) by invoking "listSubscribedServices()". The service discovery APIs are invoked by the enterprise operators or client applications. They are described below.

This interface shall be implemented by a Framework with as a minimum requirement the listServiceTypes(), describeServiceType() and discoverService() methods.



7.3.4.1.1 Method listServiceTypes()

This operation returns the names of all service types that are in the repository. The details of the service types can then be obtained using the describeServiceType() method.

Returns <listTypes> : The names of the requested service types.

Parameters

No Parameters were identified for this method

Returns

`TpServiceTypeNameList`

Raises

`TpCommonExceptions,P_ACCESS_DENIED`

7.3.4.1.2 Method describeServiceType()

This operation lets the caller obtain the details for a particular service type.

Returns <serviceTypeDescription> : The description of the specified service type. The description provides information about:

- the service properties associated with this service type: i.e. a list of service property {name, mode and type} tuples,
- the names of the super types of this service type, and
- whether the service type is currently available or unavailable.

Parameters

`name : in TpServiceTypeName`

The name of the service type to be described.

· If the "name" is malformed, then the P_ILLEGAL_SERVICE_TYPE exception is raised.

· If the "name" does not exist in the repository, then the P_UNKNOWN_SERVICE_TYPE exception is raised.

Returns

TpServiceTypeDescription

Raises

TpCommonExceptions,P_ACCESS_DENIED,P_ILLEGAL_SERVICE_TYPE,P_UNKNOWN_SERVICE_TYPE

7.3.4.1.3 Method discoverService()

The discoverService operation is the means by which a client application is able to obtain the service IDs of the services that meet its requirements. The client application passes in a list of desired service properties to describe the service it is looking for, in the form of attribute/value pairs for the service properties. The client application also specifies the maximum number of matched responses it is willing to accept. The framework must not return more matches than the specified maximum, but it is up to the discretion of the Framework implementation to choose to return less than the specified maximum. The discoverService() operation returns a serviceID/Property pair list for those services that match the desired service property list that the client application provided. The service properties returned will form a complete view of what the client application will be able to do with the service, as per the service level agreement. If the framework supports service subscription, the service level agreement will be encapsulated in the subscription properties contained in the contract/profile for the client application, which will be a restriction of the registered properties.

Returns <serviceList> : This parameter gives a list of matching services. Each service is characterised by its service ID and a list of service properties {name and value list} associated with the service.

Parameters

serviceTypeName : in TpServiceTypeName

The "serviceTypeName" parameter conveys the required service type. It is key to the central purpose of "service trading". It is the basis for type safe interactions between the service exporters (via registerService) and service importers (via discoverService). By stating a service type, the importer implies the service type and a domain of discourse for talking about properties of service.

· If the string representation of the "type" does not obey the rules for service type identifiers, then the P_ILLEGAL_SERVICE_TYPE exception is raised.

· If the "type" is correct syntactically but is not recognised as a service type within the Framework, then the P_UNKNOWN_SERVICE_TYPE exception is raised.

The framework may return a service of a subtype of the "type" requested. A service sub-type can be described by the properties of its supertypes.

desiredPropertyList : in TpServicePropertyList

The "desiredPropertyList"parameter is a list of service property {name, mode and value list} tuples that the discovered set of services should satisfy. These properties deal with the non-functional and non-computational aspects of the desired service. The property values in the desired property list must be logically interpreted as "minimum", "maximum", etc. by the framework (due to the absence of a Boolean constraint expression for the specification of the service criterion). It is suggested that, at the time of service registration, each property value be specified as an appropriate range of values, so that desired property values can specify an "enclosing" range of values to help in the selection of desired services.

The desiredPropertyList only contains service properties that are relevant for the application. If an application is not interested in the value of a certain service property, this service property shall not be included in the desiredPropertyList.

P_INVALID_PROPERTY is raised when an application includes an unknown service property name or invalid service property value.

max : in TpInt32

The "max" parameter states the maximum number of services that are to be returned in the "serviceList" result.

Returns

TpServiceList

Raises

TpCommonExceptions,P_ACCESS_DENIED,P_ILLEGAL_SERVICE_TYPE,P_UNKNOWN_SERVICE_TYPE,P_INVALID_PROPERTY

7.3.4.1.4 Method listSubscribedServices()

Returns a list of services so far subscribed by the enterprise operator. The enterprise operator (or the client applications in the enterprise domain) can obtain a list of subscribed services that they are allowed to access.

Returns <serviceList> : The "serviceList" parameter returns a list of subscribed services. Each service is characterised by its service ID and a list of service properties {name and value list} associated with the service.

Parameters

No Parameters were identified for this method

Returns

TpServiceList

Raises

TpCommonExceptions,P_ACCESS_DENIED