

**3GPP TSG CN Plenary Meeting #14
Kyoto, Japan, 12-14 December 2001**

NP-010601

Source: CN5 (OSA)
Title: Rel-4 CRs 29.198-08
Agenda item: 8.5
Document for: Decision

Doc-1st-Level	Spec	CR	Pha	Subject	Cat	Ver Cur	Ver -New	Doc-2nd-Level	Workitem
NP-010601	29.198-08	003	Rel-4	Replace Out Parameters with Return Types	F	4.2.0	4.3.0	N5-010568	OSA1
NP-010601	29.198-08	004	Rel-4	Corrections and alignment additions to the Data Session Control SCF	F	4.2.0	4.3.0	N5-011244	OSA1

CR-Form-v4

CHANGE REQUEST

⌘ **29.198-08 CR 003** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

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

Title:	⌘ Replacing Out Parameters with Return Types in OSA R4		
Source:	⌘ CN5		
Work item code:	⌘ OSA1	Date:	⌘ 19/07/2001
Category:	⌘ F	Release:	⌘ REL-4
	<i>Use one of the following categories:</i> 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 .		<i>Use one of the following releases:</i> 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:	⌘ At CN5 and CN it was agreed that Out-parameters should be removed from methods as a means of returning information, to be replaced by Return Types, in line with commonly used programming practice
Summary of change:	⌘ For each method, replace the return parameter TpResult with: 'void' if the method has no out-parameter; or the type of the out-parameter if the method has an out-parameter, and delete the out-parameter from the method.
Consequences if not approved:	⌘ If this particular CR is not agreed, TS 29.198-8 is out of sync. with the other parts of TS 29.198. If the related batch of CRs is not agreed, OSA will have a limited acceptance among the application development community, since it will be more difficult to implement. This presents a risk to the return on investment in development of OSA.

Clauses affected:	⌘ 7, 8, Annex B		
Other specs affected:	⌘ <input checked="" type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	All other parts of TS 29.198 Rel-4
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/3G_Specs/CRs.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 The Service Interface Specifications

7.1 Interface Specification Format

This section defines the interfaces, methods and parameters that form a part of the API specification. The Unified Modelling Language (UML) is used to specify the interface classes. The general format of an interface specification is described below.

7.1.1 Interface Class

This shows a UML interface class description of the methods supported by that interface, and the relevant parameters and types. The Service and Framework interfaces for enterprise-based client applications are denoted by classes with name `Ip<name>`. The callback interfaces to the applications are denoted by classes with name `IpApp<name>`. For the interfaces between a Service and the Framework, the Service interfaces are typically denoted by classes with name `IpSvc<name>`, while the Framework interfaces are denoted by classes with name `IpFw<name>`

7.1.2 Method descriptions

Each method (API method "call") is described. All methods in the API return a value of type `TpResult`, indicating, amongst other things, if the method invocation was successfully executed or not.

Both synchronous and asynchronous methods are used in the API. Asynchronous methods are identified by a 'Req' suffix for a method request, and, if applicable, are served by asynchronous methods identified by either a 'Res' or 'Err' suffix for method results and errors, respectively. To handle responses and reports, the application or service developer must implement the relevant `IpApp<name>` or `IpSvc<name>` interfaces to provide the callback mechanism.

7.1.3 Parameter descriptions

Each method parameter and its possible values are described. Parameters described as 'in' represent those that must have a value when the method is called. Those described as 'out' are those that contain the return result of the method when the method returns.

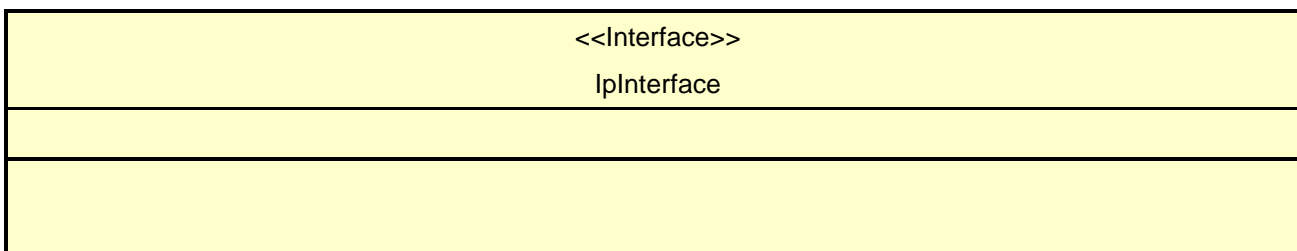
7.1.4 State Model

If relevant, a state model is shown to illustrate the states of the objects that implement the described interface.

7.2 Base Interface

7.2.1 Interface Class IpInterface

All application, framework and service interfaces inherit from the following interface. This API Base Interface does not provide any additional methods.



7.3 Service Interfaces

7.3.1 Overview

The Service Interfaces provide the interfaces into the capabilities of the underlying network - such as call control, user interaction, messaging, mobility and connectivity management.

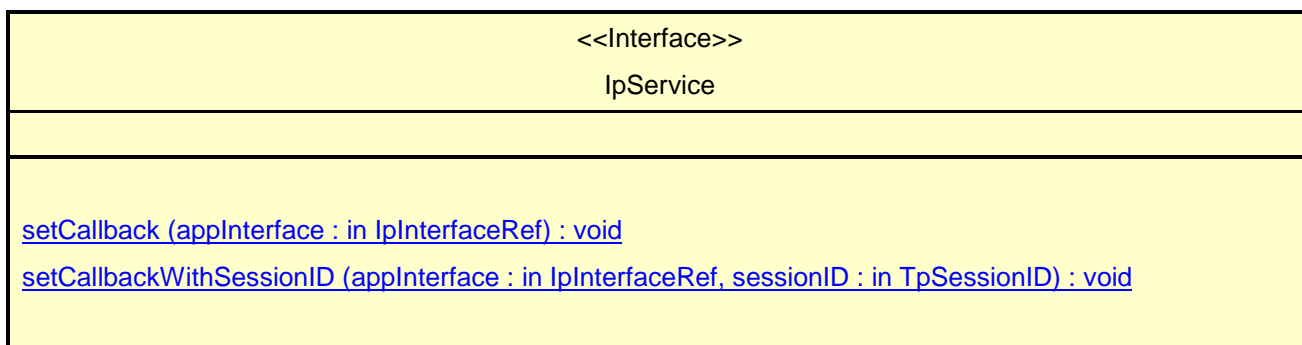
The interfaces that are implemented by the services are denoted as "Service Interface". The corresponding interfaces that must be implemented by the application (e.g. for API callbacks) are denoted as "Application Interface".

7.4 Generic Service Interface

7.4.1 Interface Class IpService

Inherits from: IpInterface

All service interfaces inherit from the following interface.



Method

setCallback()

This method specifies the reference address of the callback interface that a service uses to invoke methods on the application. It is not allowed to invoke this method on an interface that uses SessionID's.

Parameters

appInterface : in IpInterfaceRef

Specifies a reference to the application interface, which is used for callbacks

Raises

TpCommonExceptions

Method

setCallbackWithSessionID()

This method specifies the reference address of the application's callback interface that a service uses for interactions associated with a specific session ID: e.g. a specific call, or call leg. It is not allowed to invoke this method on an interface that does not uses SessionID's.

*Parameters***appInterface : in IpInterfaceRef**

Specifies a reference to the application interface, which is used for callbacks

sessionID : in TpSessionID

Specifies the session for which the service can invoke the application's callback interface.

*Raises***TpCommonExceptions, P_INVALID_SESSION_ID**

8 Data Session Control Interface Classes

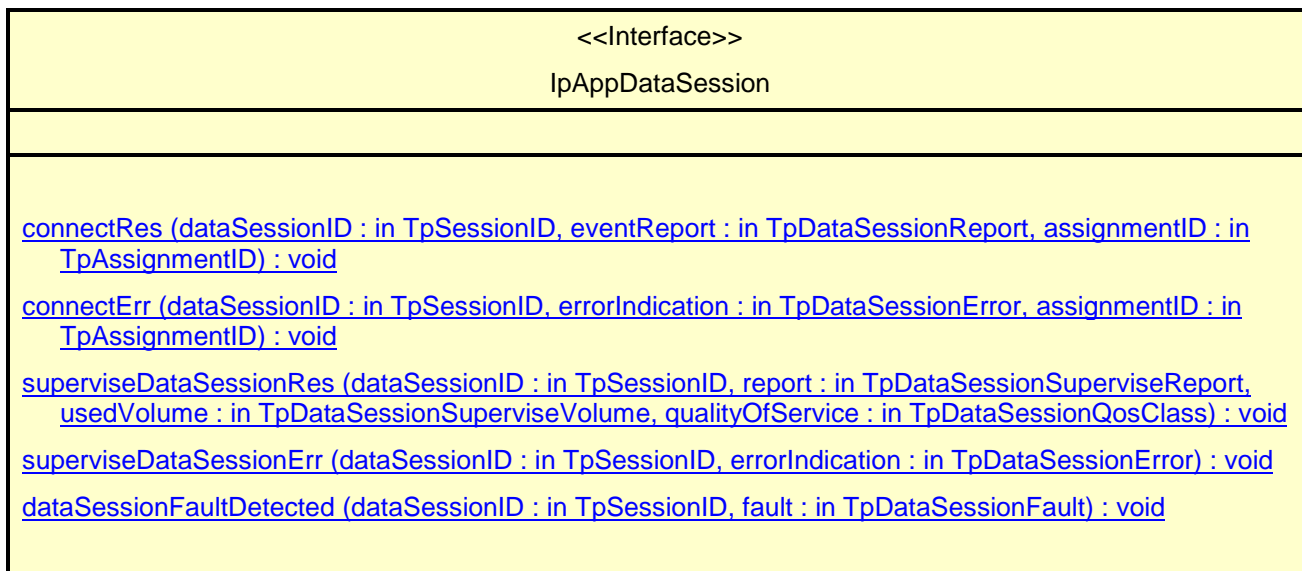
The Data Session Control provides a means to control per data session basis the establishment of a new data session. This means especially in the GPRS context that the establishment of a PDP session is modelled not the attach/detach mode. Change of terminal location is assumed to be managed by the underlying network and is therefore not part of the model. The underlying assumption is that a terminal initiates a data session and the application can reject the request for data session establishment, can continue the establishment or can continue and change the destination as requested by the terminal.

The modelling is hold similar to the Generic Call Control but assuming a simpler underlying state model. An IpDataSessionManager and IpData Session object are the interfaces used by the application, whereas the IpAppDataSessionManager and the IpAppDataSession interfaces are implemented by the application.

8.1 Interface Class IpAppDataSession

Inherits from: IpInterface.

The application side of the data session interface is used to handle data session request responses and state reports.

*Method***connectRes ()**

This asynchronous method indicates that the request to connect a data session with the destination party was successful, and indicates the response of the destination party (e.g. connected, disconnected).

*Parameters***dataSessionID : in TpSessionID**

Specifies the session ID of the data session.

eventReport : in TpDataSessionReport

Specifies the result of the request to connect the data session. It includes the network event, date and time, monitoring mode, negotiated quality of service and event specific information such as release cause.

assignmentID : in TpAssignmentID*Method***connectErr()**

This asynchronous method indicates that the request to connect a data session with the destination party was unsuccessful, e.g. an error detected in the network or the data session was abandoned.

*Parameters***dataSessionID : in TpSessionID**

Specifies the session ID.

errorIndication : in TpDataSessionError

Specifies the error which led to the original request failing.

assignmentID : in TpAssignmentID*Method***superviseDataSessionRes()**

This asynchronous method reports a data session supervision event to the application. In addition, it may also be used to notify the application of a newly negotiated set of Quality of Service parameters during the active life of the data session.

*Parameters***dataSessionID : in TpSessionID**

Specifies the data session.

report : in TpDataSessionSuperviseReport

Specifies the situation, which triggered the sending of the data session supervision response.

usedVolume : in TpDataSessionSuperviseVolume

Specifies the used volume for the data session supervision (in the same unit as specified in the request).

qualityOfService : in TpDataSessionQosClass

Specifies the newly negotiated Quality of Service parameters for the data session.

*Method***superviseDataSessionErr ()**

This asynchronous method reports a data session supervision error to the application.

Parameters

dataSessionID : in TpSessionID

Specifies the data session ID.

errorIndication : in TpDataSessionError

Specifies the error which led to the original request failing.

*Method***dataSessionFaultDetected ()**

This method indicates to the application that a fault in the network has been detected which can't be communicated by a network event, e.g., when the user aborts before any establishment method is called by the application.

The system purges the Data Session object. Therefore, the application has no further control of data session processing. No report will be forwarded to the application.

Parameters

dataSessionID : in TpSessionID

Specifies the data session ID of the Data Session object in which the fault has been detected

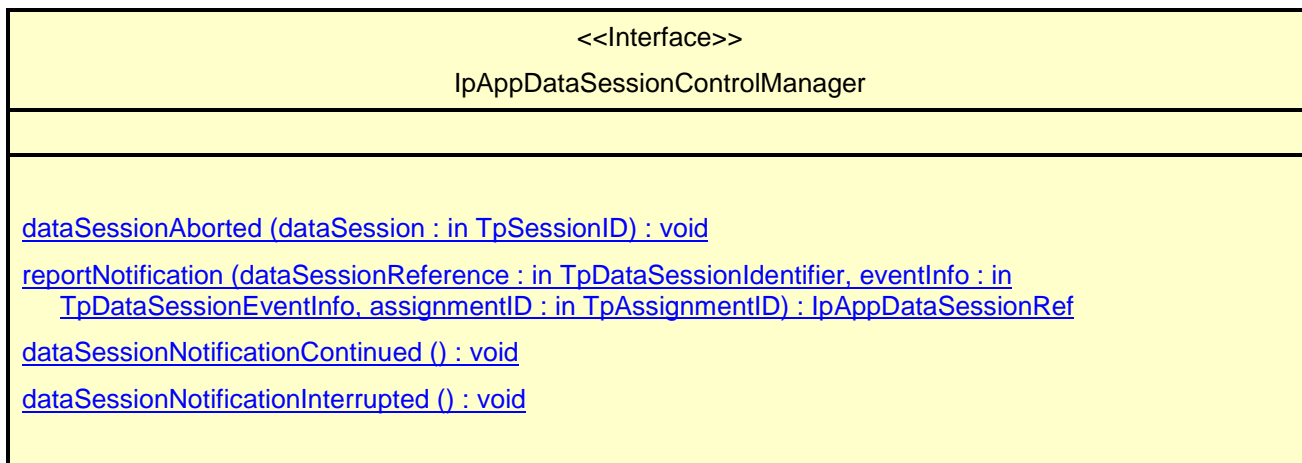
fault : in TpDataSessionFault

Specifies the fault that has been detected.

8.2 Interface Class IpAppDataSessionControlManager

Inherits from: IpInterface.

The data session control manager application interface provides the application data session control management functions to the data session control SCF.



*Method***dataSessionAborted()**

This method indicates to the application that the Data Session object has aborted or terminated abnormally. No further communication will be possible between the Data Session object and the application.

Parameters

dataSession : in TpSessionID

Specifies the session ID of the data session that has aborted or terminated abnormally.

*Method***reportNotification()**

[This method notifies the application of the arrival of a data session-related event.](#)

[Returns appDataSession : Specifies a reference to the application object which implements the callback interface for the new data session.](#)

Parameters

dataSessionReference : in TpDataSessionIdentifier

Specifies the session ID and the reference to the Data Session object to which the notification relates.

eventInfo : in TpDataSessionEventInfo

Specifies data associated with this event. This data includes the destination address provided by the end-user and the quality of service requested or negotiated for the data session.

assignmentID : in TpAssignmentID

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

Returns

[IpAppDataSessionRef](#)

*Method***dataSessionNotificationContinued()**

This method indicates to the application that all event notifications are resumed.

Parameters

No Parameters were identified for this method

*Method***dataSessionNotificationInterrupted()**

This method indicates to the application that event notifications will no longer be sent (for example, due to faults detected).

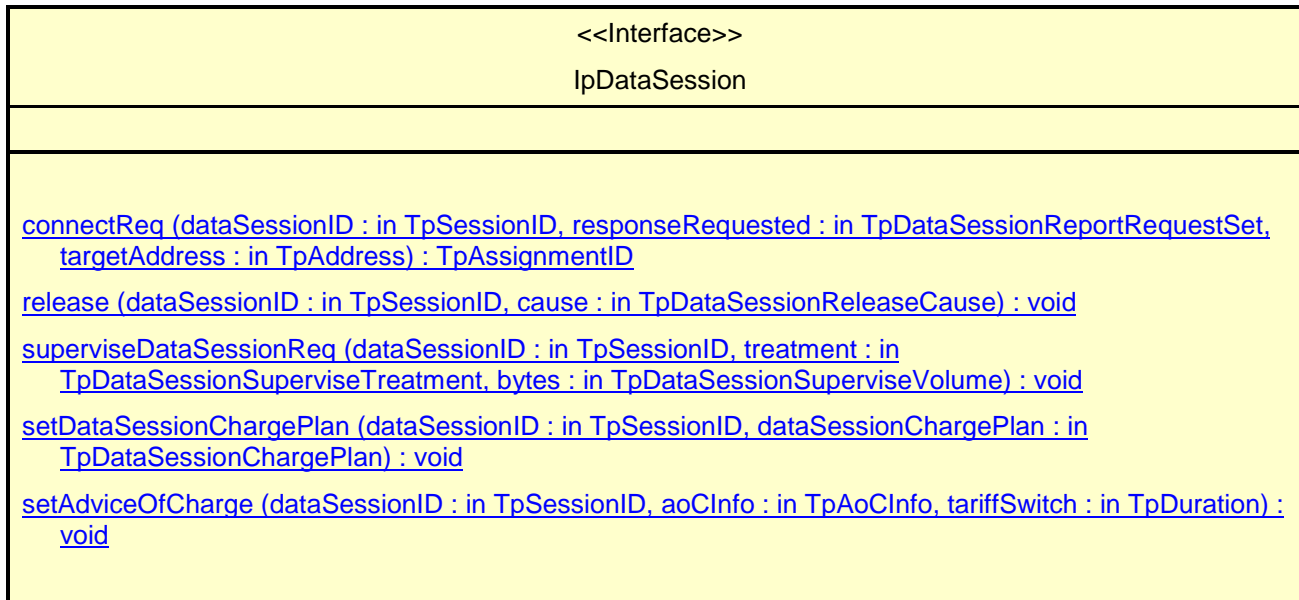
Parameters

No Parameters were identified for this method

8.3 Interface Class IpDataSession

Inherits from: IpService.

The Data Session interface provides basic methods for applications to control data sessions.



Method

connectReq ()

[This asynchronous method requests the connection of a data session with the destination party \(specified in the parameter TargetAddress\). The Data Session object is not automatically deleted if the destination party disconnects from the data session.](#)

[Returns assignmentID : Specifies the ID assigned to the request. The same ID will be returned in the connectRes or Err. This allows the application to correlate the request and the result.](#)

Parameters

dataSessionID : in TpSessionID

Specifies the session ID.

responseRequested : in TpDataSessionReportRequestSet

Specifies the set of observed data session events that will result in a connectRes() being generated.

targetAddress : in TpAddress

Specifies the address of destination party.

Returns

[TPAssignmentID](#)

Raises

**TPCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE, P_INVALID_ADDRESS,
P_INVALID_SESSION_ID**

*Method***release()**

This method requests the release of the data session and associated objects.

Parameters

dataSessionID : in TPsessionID

Specifies the session.

cause : in TPDataSessionReleaseCause

Specifies the cause of the release.

Raises

**TPCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

*Method***superviseDataSessionReq()**

The application calls this method to supervise a data session. The application can set a granted data volume for this data session. If an application calls this function before it calls a connectReq() or a user interaction function the time measurement will start as soon as the data session is connected. The Data Session object will exist after the data session has been terminated if information is required to be sent to the application at the end of the data session

Parameters

dataSessionID : in TPsessionID

Specifies the data session.

treatment : in TPDataSessionSuperviseTreatment

Specifies how the network should react after the granted data volume has been sent.

bytes : in TPDataSessionSuperviseVolume

Specifies the granted number of bytes that can be transmitted for the data session.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

*Method***setDataSessionChargePlan()**

Allows an application to include charging information in network generated CDR.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

dataSessionChargePlan : in TpDataSessionChargePlan

Specifies the charge plan used.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

*Method***setAdviceOfCharge()**

This method allows the application to determine the charging information that will be send to the end-users terminal.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

aoCInfo : in TpAoCInfo

Specifies two sets of Advice of Charge parameter according to GSM.

tariffSwitch : in TpDuration

Specifies the tariff switch that signifies when the second set of AoC parameters becomes valid.

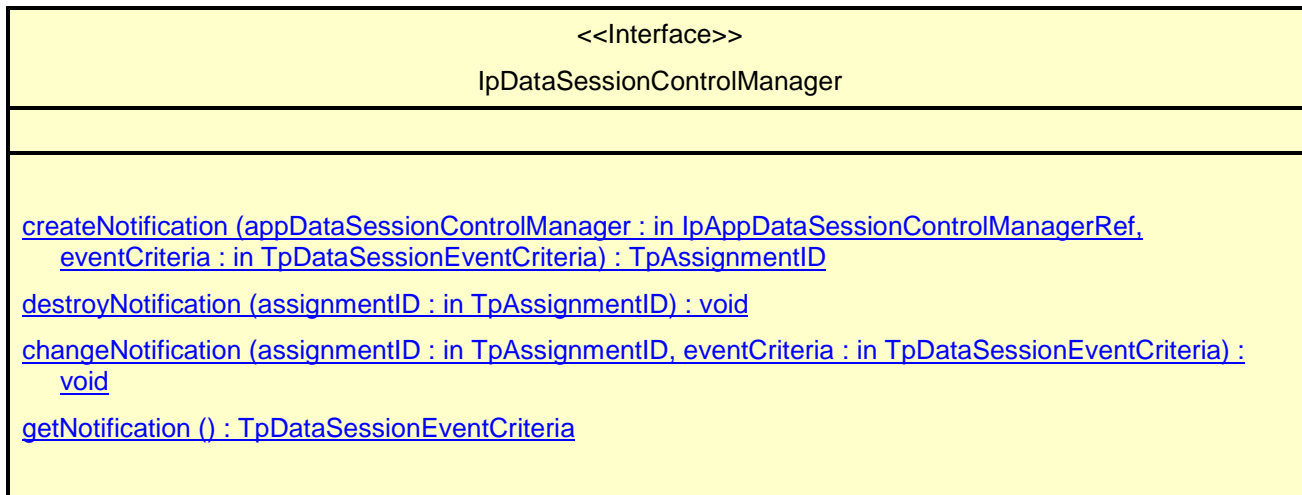
Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_TIME_AND_DATE_FORMAT**

8.4 Interface Class IpDataSessionControlManager

Inherits from: IpService.

This interface is the SCF manager' interface for Data Session Control.



Method

createNotification()

[This method is used to enable data session notifications.](#)

[Returns assignmentID : Specifies the ID assigned by the Data Session Manager object for this newly-enabled event notification.](#)

Parameters

appDataSessionControlManager : in IpAppDataSessionControlManagerRef

If this parameter is set (i.e. not NULL) it specifies a reference to the application interface which is used for callbacks. If set to NULL, the application interface defaults to the interface specified via the setCallback() method.

eventCriteria : in TpDataSessionEventCriteria

Specifies the event specific criteria used by the application to define the event required. Individual addresses or address ranges may be specified for destination and/or origination. Examples of events are "Data Session set up".

Returns

[TpAssignmentID](#)

Raises

TpCommonExceptions, P_SERVICE_INFORMATION_MISSING, P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE, P_INVALID_ADDRESS, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE

Method

destroyNotification()

This method is used by the application to disable data session notifications.

*Parameters***assignmentID : in TpAssignmentID**

Specifies the assignment ID given by the data session manager object when the previous createNotification() was done.

*Raises***TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_ASSIGNMENT_ID***Method***changeNotification()**

This method is used by the application to change the event criteria introduced with the createNotification method. Any stored notification request associated with the specified assignmentID will be replaced with the specified events requested.

*Parameters***assignmentID : in TpAssignmentID**

Specifies the ID assigned by the manager interface for the event notification.

eventCriteria : in TpDataSessionEventCriteria

Specifies the new set of event criteria used by the application to define the event required. Only events that meet these criteria are reported.

*Raises***TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_ASSIGNMENT_ID, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE***Method***getNotification()**

[This method is used by the application to query the event criteria set with createNotification or changeNotification.](#)

[Returns eventCriteria : Specifies the event criteria used by the application to define the event required. Only events that meet these requirements are reported.](#)

Parameters

No Parameters were identified for this method

Returns

[TpDataSessionEventCriteria](#)

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE**

=====Next changed section=====

B.3 All Interfaces

All methods on IpApp interfaces no longer throw exceptions.

All methods on the other interfaces throw TpCommonExceptions and individual, identified exceptions

[All methods now return void or the former out parameter.](#)

CHANGE REQUEST

⌘ **29.198-08 CR 004** ⌘ rev **-** ⌘ Current version: **4.2.0** ⌘

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

Title:	⌘ Corrections and alignment additions to the Data Session Control SCF		
Source:	⌘ CN5		
Work item code:	⌘ OSA1	Date:	⌘ 30/11/2001
Category:	⌘ F	Release:	⌘ REL-4
	<i>Use <u>one</u> of the following categories:</i> 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 .		<i>Use <u>one</u> of the following releases:</i> 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:	⌘ A number of errors still exist in the Data Session Control SCF specification, as well as misalignments with analogous functionality in other Service Capability Feature specifications and definitions.
Summary of change:	⌘ Several corrections have been made: – correction of sequence diagram – removal of reference to R99, since applicable to R4 and onward as well – editorial corrections Several alignment additions have been made: – addition of deassignDataSession – addition of continueProcessing – method description updates – STD updates Removed Tp..Ref and Ip..RefRef types which are misleading and not used.
Consequences if not approved:	⌘ Incorrect specification and misalignment with analogous functionality in other SCF interface specifications. Parlay and ETSI have already corrected these issues - they need to be corrected in 29.198 to ensure synchronisation between groups and allow development of common applications across 3 platforms

Clauses affected:	⌘ 5.2, 6, 8, 8.2, 8.3, 8.4, 9, 11, B.3		
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
Other comments:	⌘		

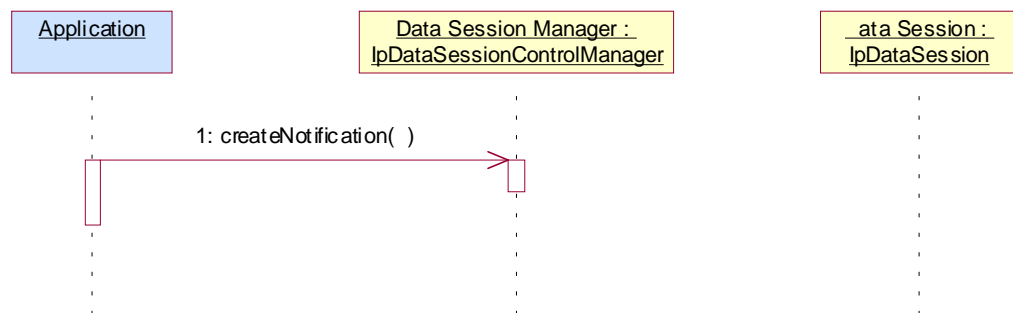
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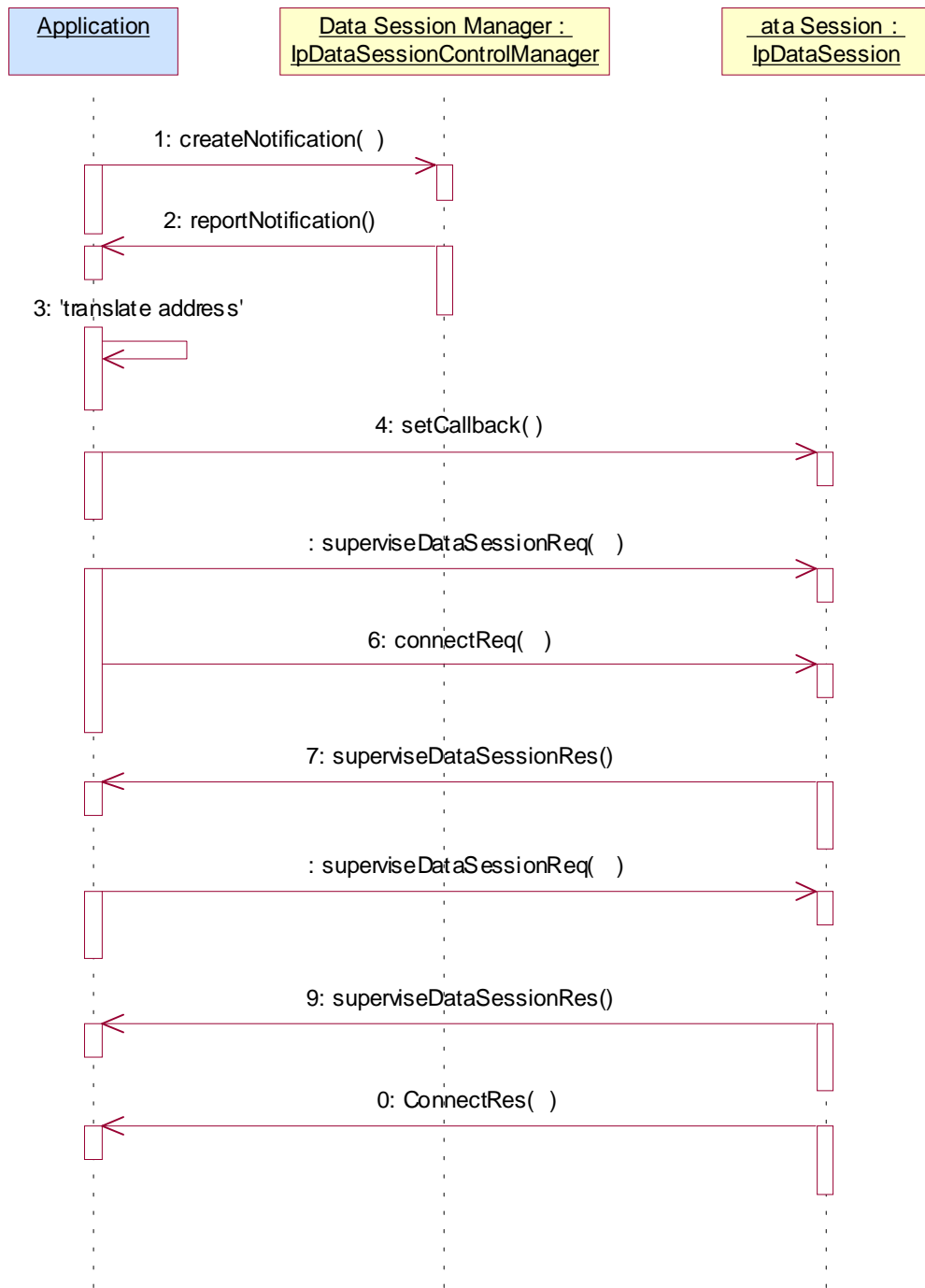
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- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to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

5 Sequence Diagrams

5.1 Enable Data Session Notification



5.2 Address Translation With Charging



6 Class Diagrams

Data Session Control Class Diagram:

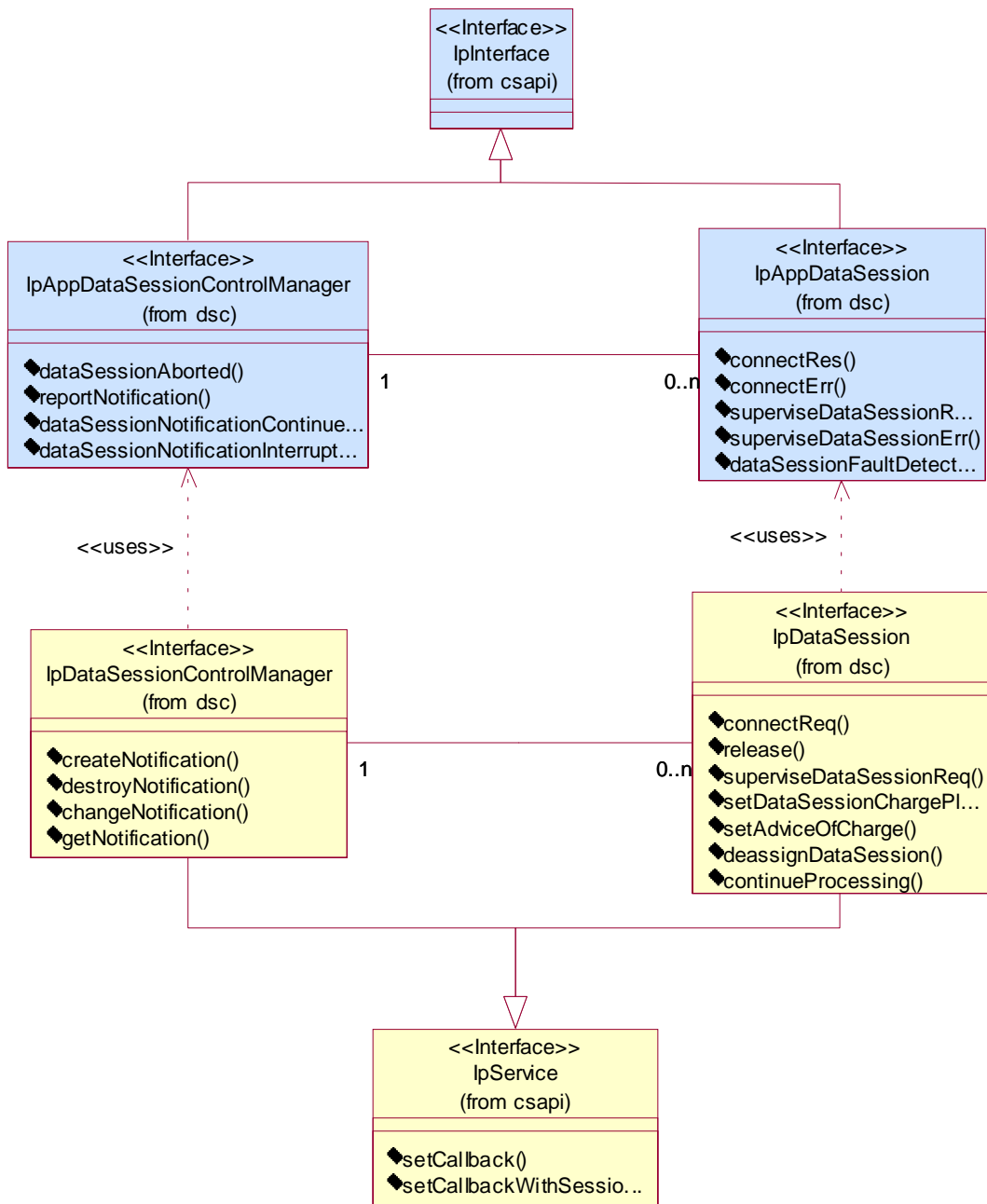


Figure: Package Overview

7 The Service Interface Specifications

7.1 Interface Specification Format

This section defines the interfaces, methods and parameters that form a part of the API specification. The Unified Modelling Language (UML) is used to specify the interface classes. The general format of an interface specification is described below.

7.1.1 Interface Class

This shows a UML interface class description of the methods supported by that interface, and the relevant parameters and types. The Service and Framework interfaces for enterprise-based client applications are denoted by classes with name `Ip<name>`. The callback interfaces to the applications are denoted by classes with name `IpApp<name>`. For the interfaces between a Service and the Framework, the Service interfaces are typically denoted by classes with name `IpSvc<name>`, while the Framework interfaces are denoted by classes with name `IpFw<name>`

7.1.2 Method descriptions

Each method (API method "call") is described. All methods in the API return a value of type `TpResult`, indicating, amongst other things, if the method invocation was successfully executed or not.

Both synchronous and asynchronous methods are used in the API. Asynchronous methods are identified by a 'Req' suffix for a method request, and, if applicable, are served by asynchronous methods identified by either a 'Res' or 'Err' suffix for method results and errors, respectively. To handle responses and reports, the application or service developer must implement the relevant `IpApp<name>` or `IpSvc<name>` interfaces to provide the callback mechanism.

7.1.3 Parameter descriptions

Each method parameter and its possible values are described. Parameters described as 'in' represent those that must have a value when the method is called. Those described as 'out' are those that contain the return result of the method when the method returns.

7.1.4 State Model

If relevant, a state model is shown to illustrate the states of the objects that implement the described interface.

7.2 Base Interface

7.2.1 Interface Class `IpInterface`

All application, framework and service interfaces inherit from the following interface. This API Base Interface does not provide any additional methods.

<<Interface>> IpInterface

7.3 Service Interfaces

7.3.1 Overview

The Service Interfaces provide the interfaces into the capabilities of the underlying network - such as call control, user interaction, messaging, mobility and connectivity management.

The interfaces that are implemented by the services are denoted as "Service Interface". The corresponding interfaces that must be implemented by the application (e.g. for API callbacks) are denoted as "Application Interface".

7.4 Generic Service Interface

7.4.1 Interface Class IpService

Inherits from: IpInterface

All service interfaces inherit from the following interface.

<<Interface>> IpService
setCallback (appInterface : in IpInterfaceRef) : void setCallbackWithSessionID (appInterface : in IpInterfaceRef, sessionID : in TpSessionID) : void

Method

setCallback()

This method specifies the reference address of the callback interface that a service uses to invoke methods on the application. It is not allowed to invoke this method on an interface that uses SessionID's.

Parameters

appInterface : in IpInterfaceRef

Specifies a reference to the application interface, which is used for callbacks

Raises

TpCommonExceptions

*Method***setCallbackWithSessionID()**

This method specifies the reference address of the application's callback interface that a service uses for interactions associated with a specific session ID: e.g. a specific call, or call leg. It is not allowed to invoke this method on an interface that does not uses SessionID's.

Parameters

appInterface : in IpInterfaceRef

Specifies a reference to the application interface, which is used for callbacks

sessionID : in TpSessionID

Specifies the session for which the service can invoke the application's callback interface.

Raises

TpCommonExceptions, P_INVALID_SESSION_ID

8 Data Session Control Interface Classes

The Data Session Control provides a means to control per data session basis the establishment of a new data session. This means especially in the GPRS context that the establishment of a PDP session is modelled not the attach/detach mode. Change of terminal location is assumed to be managed by the underlying network and is therefore not part of the model. The underlying assumption is that a terminal initiates a data session and the application can reject the request for data session establishment, can continue the establishment or can continue and change the destination as requested by the terminal.

The modelling is hold similar to the Generic Call Control but assuming a simpler underlying state model. An IpDataSessionManager and IpData Session object are the interfaces used by the application, whereas the IpAppDataSessionManager and the IpAppDataSession interfaces are implemented by the application.

8.1 Interface Class IpAppDataSession

Inherits from: IpInterface.

The application side of the data session interface is used to handle data session request responses and state reports.

<<Interface>> IpAppDataSession
<p>connectRes (dataSessionID : in TpSessionID, eventReport : in TpDataSessionReport, assignmentID : in TpAssignmentID) : void</p> <p>connectErr (dataSessionID : in TpSessionID, errorIndication : in TpDataSessionError, assignmentID : in TpAssignmentID) : void</p> <p>superviseDataSessionRes (dataSessionID : in TpSessionID, report : in TpDataSessionSuperviseReport, usedVolume : in TpDataSessionSuperviseVolume, qualityOfService : in TpDataSessionQosClass) : void</p> <p>superviseDataSessionErr (dataSessionID : in TpSessionID, errorIndication : in TpDataSessionError) : void</p> <p>dataSessionFaultDetected (dataSessionID : in TpSessionID, fault : in TpDataSessionFault) : void</p>

Method

connectRes ()

This asynchronous method indicates that the request to connect a data session with the destination party was successful, and indicates the response of the destination party (e.g. connected, disconnected).

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

eventReport : in TpDataSessionReport

Specifies the result of the request to connect the data session. It includes the network event, date and time, monitoring mode, negotiated quality of service and event specific information such as release cause.

assignmentID : in TpAssignmentID

Method

connectErr ()

This asynchronous method indicates that the request to connect a data session with the destination party was unsuccessful, e.g. an error detected in the network or the data session was abandoned.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID.

errorIndication : in TpDataSessionError

Specifies the error which led to the original request failing.

assignmentID : in TpAssignmentID

*Method***superviseDataSessionRes ()**

This asynchronous method reports a data session supervision event to the application. In addition, it may also be used to notify the application of a newly negotiated set of Quality of Service parameters during the active life of the data session.

*Parameters***dataSessionID : in TpSessionID**

Specifies the data session.

report : in TpDataSessionSuperviseReport

Specifies the situation, which triggered the sending of the data session supervision response.

usedVolume : in TpDataSessionSuperviseVolume

Specifies the used volume for the data session supervision (in the same unit as specified in the request).

qualityOfService : in TpDataSessionQosClass

Specifies the newly negotiated Quality of Service parameters for the data session.

*Method***superviseDataSessionErr ()**

This asynchronous method reports a data session supervision error to the application.

*Parameters***dataSessionID : in TpSessionID**

Specifies the data session ID.

errorIndication : in TpDataSessionError

Specifies the error which led to the original request failing.

*Method***dataSessionFaultDetected ()**

This method indicates to the application that a fault in the network has been detected which can't be communicated by a network event, e.g., when the user aborts before any establishment method is called by the application.

The system purges the Data Session object. Therefore, the application has no further control of data session processing. No report will be forwarded to the application.

*Parameters***dataSessionID : in TpSessionID**

Specifies the data session ID of the Data Session object in which the fault has been detected

fault : in TpDataSessionFault

Specifies the fault that has been detected.

8.2 Interface Class IpAppDataSessionControlManager

Inherits from: IpInterface.

The data session control manager application interface provides the application data session control management functions to the data session control SCF.

<<Interface>> IpAppDataSessionControlManager
<pre> dataSessionAborted (dataSession : in TpSessionID) : void reportNotification (dataSessionReference : in TpDataSessionIdentifier, eventInfo : in TpDataSessionEventInfo, assignmentID : in TpAssignmentID) : IpAppDataSessionRef dataSessionNotificationContinued () : void dataSessionNotificationInterrupted () : void </pre>

Method

dataSessionAborted()

This method indicates to the application that the Data Session object has aborted or terminated abnormally. No further communication will be possible between the Data Session object and the application.

Parameters

dataSession : in TpSessionID

Specifies the session ID of the data session that has aborted or terminated abnormally.

Method

reportNotification()

This method notifies the application of the arrival of a data session-related event.

Returns appDataSession : Specifies a reference to the application object which implements the callback interface for the new data session.

Parameters

dataSessionReference : in TpDataSessionIdentifier

Specifies the session ID and the reference to the Data Session object to which the notification relates. This parameter will be null if the notification is being given in NOTIFY mode.

eventInfo : in TpDataSessionEventInfo

Specifies data associated with this event. This data includes the destination address provided by the end-user and the quality of service requested or negotiated for the data session.

assignmentID : in TpAssignmentID

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

*Returns***IpAppDataSessionRef***Method***dataSessionNotificationContinued()**

This method indicates to the application that all event notifications are resumed.

Parameters

No Parameters were identified for this method

*Method***dataSessionNotificationInterrupted()**

This method indicates to the application that event notifications will no longer be sent (for example, due to faults detected).

Parameters

No Parameters were identified for this method

8.3 Interface Class IpDataSession

Inherits from: IpService.

The Data Session interface provides basic methods for applications to control data sessions.

<<Interface>> IpDataSession
connectReq (dataSessionID : in TpSessionID, responseRequested : in TpDataSessionReportRequestSet, targetAddress : in TpAddress) : TpAssignmentID release (dataSessionID : in TpSessionID, cause : in TpDataSessionReleaseCause) : void superviseDataSessionReq (dataSessionID : in TpSessionID, treatment : in TpDataSessionSuperviseTreatment, bytes : in TpDataSessionSuperviseVolume) : void setDataSessionChargePlan (dataSessionID : in TpSessionID, dataSessionChargePlan : in TpDataSessionChargePlan) : void setAdviceOfCharge (dataSessionID : in TpSessionID, aoCInfo : in TpAoCInfo, tariffSwitch : in TpDuration) : void <u>deassignDataSession (dataSessionID : in TpSessionID) : void</u> <u>continueProcessing (dataSessionID : in TpSessionID) : void</u>

*Method***connectReq ()**

This asynchronous method requests the connection of a data session with the destination party (specified in the parameter TargetAddress). The Data Session object is not automatically deleted if the destination party disconnects from the data session.

Returns assignmentID : Specifies the ID assigned to the request. The same ID will be returned in the connectRes or Err. This allows the application to correlate the request and the result.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID.

responseRequested : in TpDataSessionReportRequestSet

Specifies the set of observed data session events that will result in a connectRes() being generated.

targetAddress : in TpAddress

Specifies the address of destination party.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_SERVICE_INFORMATION_MISSING, P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE, P_INVALID_ADDRESS, P_INVALID_SESSION_ID

*Method***release()**

This method requests the release of the data session and associated objects.

Parameters

dataSessionID : in TpSessionID

Specifies the session.

cause : in TpDataSessionReleaseCause

Specifies the cause of the release.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

*Method***superviseDataSessionReq()**

The application calls this method to supervise a data session. The application can set a granted data volume for this data session. If an application calls this function before it calls a connectReq() or a user interaction function the time measurement will start as soon as the data session is connected. The Data Session object will exist after the data session has been terminated if information is required to be sent to the application at the end of the data session

Parameters

dataSessionID : in TpSessionID

Specifies the data session.

treatment : in TpDataSessionSuperviseTreatment

Specifies how the network should react after the granted data volume has been sent.

bytes : in TpDataSessionSuperviseVolume

Specifies the granted number of bytes that can be transmitted for the data session.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

*Method***setDataSessionChargePlan()**

Allows an application to include charging information in network generated CDR.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

dataSessionChargePlan : in TpDataSessionChargePlan

Specifies the charge plan used.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_SESSION_ID**

Method

setAdviceOfCharge()

This method allows the application to determine the charging information that will be send to the end-users terminal.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

aoCInfo : in TpAoCInfo

Specifies two sets of Advice of Charge parameter according to GSM.

tariffSwitch : in TpDuration

Specifies the tariff switch that signifies when the second set of AoC parameters becomes valid.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_TIME_AND_DATE_FORMAT**

Method

deassignDataSession()

This method requests that the relationship between the application and the data session and associated objects be de-assigned. It leaves the data session in progress, however, it purges the specified data session object so that the application has no further control of data session processing. If a data session is de-assigned that has event reports, data session information reports requested, then these reports will be disabled and any related information discarded.

The application should always either release or deassign the data session when it is finished with the data session, unless dataSessionFaultDetected is received by the application.

Parameters

dataSessionID : in TpSessionID

Specifies the session ID of the data session.

RaisesTpCommonExceptions, P_INVALID_SESSION_IDMethod**continueProcessing()**

This operation continues processing of the data session. Applications can invoke this operation after session handling was interrupted due to detection of a notification or event the application subscribed its interest in.

Parameters**dataSessionID : in TpSessionID**

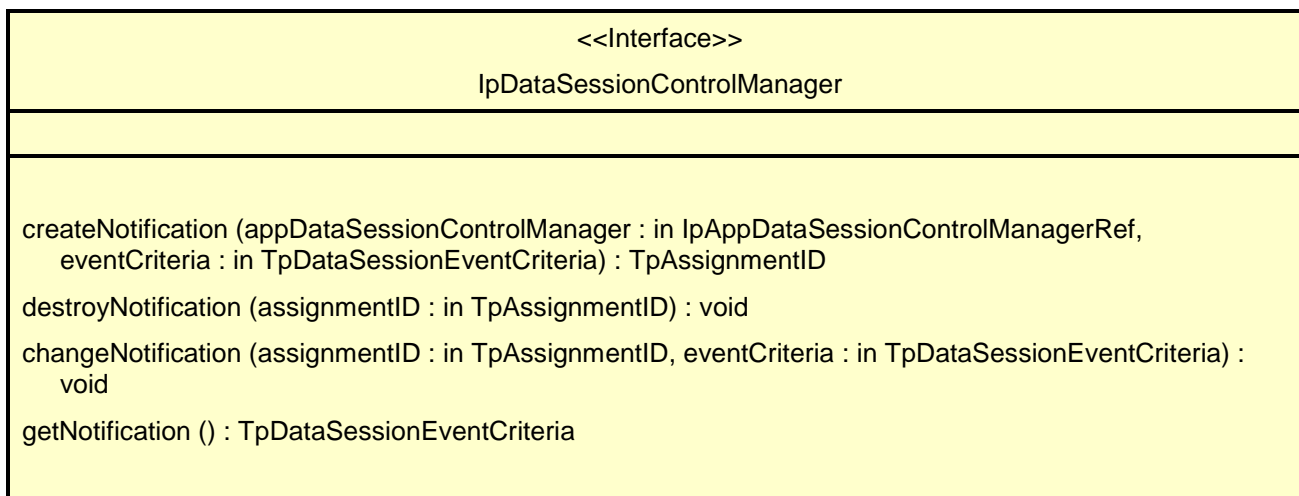
Specifies the session ID of the data session.

RaisesTpCommonExceptions, P_INVALID_SESSION_ID, P_INVALID_NETWORK_STATE

8.4 Interface Class IpDataSessionControlManager

Inherits from: IpService.

This interface is the SCF manager' interface for Data Session Control.

Method**createNotification()**

This method is used to enable data session notifications so that events can be sent to the application. This is the first step an application has to do to get initial notifications of data session happening in the network. When such an event happens, the application will be informed by reportNotification(). In case the application is interested in other events during the context of a particular data session it has to use the connectReq() method on the data session object. The application will get access to the data session object when it receives the reportNotification().

The createNotification method is purely intended for applications to indicate their interest to be notified when certain data session events take place. It is possible to subscribe to a certain event for a whole range of addresses, e.g. the application can indicate it wishes to be informed when a data session is setup to any number starting with 800.

If some application already requested notifications with criteria that overlap the specified criteria, the request is refused with P_INVALID_CRITERIA. The criteria are said to overlap if both originating and terminating ranges overlap and the same number plan is used.

If the same application requests two notifications with exactly the same criteria but different callback references, the second callback will be treated as an additional callback. Both notifications will share the same assignmentID. The gateway will always use the most recent callback. In case this most recent callback fails the second most recent is used. In case the createNotification contains no callback, at the moment the application needs to be informed the gateway will use as callback the callback that has been registered by setCallback().

Returns assignmentID : Specifies the ID assigned by the Data Session Manager object for this newly-enabled event notification.

Parameters

appDataSessionControlManager : in IpAppDataSessionControlManagerRef

If this parameter is set (i.e. not NULL) it specifies a reference to the application interface which is used for callbacks. If set to NULL, the application interface defaults to the interface specified via the setCallback() method.

eventCriteria : in TpDataSessionEventCriteria

Specifies the event specific criteria used by the application to define the event required. Individual addresses or address ranges may be specified for destination and/or origination. Examples of events are "Data Session set up".

Returns

TpAssignmentID

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE, P_INVALID_ADDRESS,
P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE**

Method

destroyNotification()

This method is used by the application to disable data session notifications.

Parameters

assignmentID : in TpAssignmentID

Specifies the assignment ID given by the data session manager object when the previous createNotification() was done.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_ASSIGNMENT_ID**

Method

changeNotification()

This method is used by the application to change the event criteria introduced with the createNotification method. Any stored notification request associated with the specified assignmentID will be replaced with the specified events requested.

Parameters

assignmentID : in TpAssignmentID

Specifies the ID assigned by the manager interface for the event notification.

eventCriteria : in TpDataSessionEventCriteria

Specifies the new set of event criteria used by the application to define the event required. Only events that meet these criteria are reported.

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE,
P_INVALID_ASSIGNMENT_ID, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE**

Method

getNotification()

This method is used by the application to query the event criteria set with createNotification or changeNotification.

Returns eventCriteria : Specifies the event criteria used by the application to define the event required. Only events that meet these requirements are reported.

Parameters

No Parameters were identified for this method

Returns

TpDataSessionEventCriteria

Raises

**TpCommonExceptions, P_SERVICE_INFORMATION_MISSING,
P_SERVICE_FAULT_ENCOUNTERED, P_INVALID_NETWORK_STATE**

9 State Transition Diagrams

9.1 State Transition Diagrams for IpDataSession

The state transition diagram shows the application view on the Data Session object.

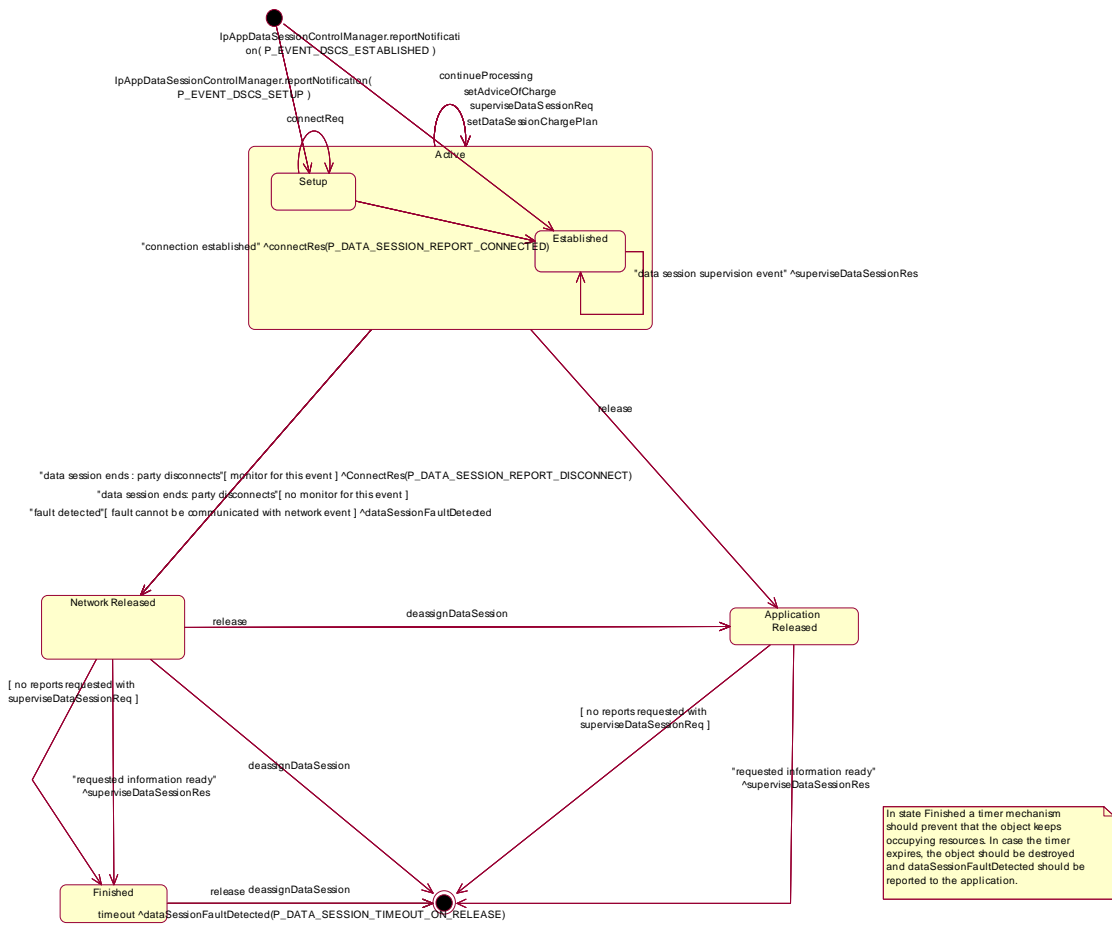


Figure : Application view on the Data Session object

9.1.1 Network Released State

In this state the data session has ended. In the case on a normal user disconnection the transition to this state is indicated to the application by the disconnect report of connectRes(). But this will only happen if the application requested monitoring of the disconnect event before. An abnormal disconnection is indicated by dataSessionFaultDetected(). The application may wait for outstanding superviseDataSessionRes().

9.1.2 Finished State

In this state the data session has ended and no further data session related information is to be send to the application. The application can only release the data session object. Calling the deassignDataSession() operation has the same effect. If the application fails to invoke release() within a certain period of time the gateway should automatically release the object and send a timeout indication to the application.

9.1.3 Application Released State

In this state the application has released the data session object. If supervision has been requested the gateway will collect the information and send superviseDataRes() to the application.

9.1.4 Active State

In this state a data connection between two parties is being setup or established (refer to the substates for more details). The application can request the gateway for a certain type of charging by calling setDataSessionChargePlan(), send

advice of charge information by calling `setAdviceOfCharge()`, and request supervision of the data session by calling `superviseDataSessionReq()`.

9.1.5 Setup State

The Setup state is reached after a `reportNotification()` indicates to the application that a data session is interested in being connected. If the application is going to connect the two parties by invoking `connectReq()` it may call the charging or supervision methods before.

9.1.6 Established State

In this state the data connection is established. If supervision has been requested the application expects the corresponding `superviseDataSessionRes()`.

10 Data Session Control Service Properties

The following table lists properties relevant for the Data Session Control API.

Property	Type	Description/Interpretation
P_TRIGGERING_EVENT_TYPES	INTEGER_SET	Indicates the static event types supported by the SCS. Static events are the events by which applications are initiated.
P_DYNAMIC_EVENT_TYPES	INTEGER_SET	Indicates the dynamic event types supported by the SCS. Dynamic events are the events the application can request for during the context of a call.
P_ADDRESSPLAN	INTEGER_SET	Indicates the supported address plan (defined in TpAddressPlan.) E.g. P_ADDRESS_PLAN_IP.

The previous table lists properties related to the capabilities of the SCS itself. The following table lists properties that are used in the context of the Service Level Agreement, e.g. to restrict the access of applications to the capabilities of the SCS.

Property	Type	Description/Interpretation
P_TRIGGERING_ADDRESSES	ADDRESS_RANGE_SET	Indicates for which numbers the notification may be set. For terminating notifications it applies to the terminating number, for originating notifications it applies only to the originating number.
P_MONITOR_MODE	INTEGER_SET	Indicates whether the application is allowed to monitor in interrupt and/or notify mode. Set is: P_INTERRUPT P_NOTIFY
P_NUMBERS_TO_BE_CHANGED	INTEGER_SET	Indicates which numbers the application is allowed to change or fill for legs in an incoming call. Allowed value set: {P_TARGET_NUMBER}.
P_CHARGEPLAN_ALLOWED	INTEGER_SET	Indicates which charging is allowed in the setDataSessionChargePlan indicator. Allowed values: {P_CHARGE_PER_VOLUME, P_TRANSPARENT_CHARGING, P_CHARGE_PLAN}
P_CHARGEPLAN_MAPPING	INTEGER_INTEGER_MAP	Indicates the mapping of charge plans (we assume they can be indicated with integers) to a logical network charge plan indicator. When the P_CHARGEPLAN_ALLOWED property indicates P_CHARGE_PLAN, then only charge plans in this mapping are allowed.
P_CURRENCY_ALLOWED	STRING_SET	Indicates the currencies that are allowed to be set for the charge plan in the setDataSessionChargePlan. The valid values for the string set are according to ISO-4217:1995. E.g. {"EUR", "NLG"}.

11 Data Definitions

11.1 Data Session Control Data Definitions

IpAppDataSession

Defines the address of an IpAppDataSession Interface.

IpAppDataSessionRef

Defines a Reference to type IpAppDataSession

IpAppDataSessionRefRef

Defines a Reference to type IpAppDataSessionRef.

IpAppDataSessionControlManager

Defines the address of an IpAppDataSessionControlManager Interface.

IpAppDataSessionControlManagerRef

Defines a Reference to type IpAppDataSessionControlManager.

IpDataSession

Defines the address of an IpDataSession Interface.

IpDataSessionRef

Defines a Reference to type IpDataSession.

IpDataSessionRefRef

Defines a Reference to type IpDataSessionRef.

IpDataSessionControlManager

Defines the address of an IpDataSessionManager Interface.

IpDataSessionManagerRef

Defines a Reference to type IpDataSessionControlManager.

11.2 Event Notification data definitions

TpDataSessionEventName

Defines the names of events being notified with a new call request. The following events are supported. The values may be combined by a logical 'OR' function when requesting the notifications. Additional events that can be requested / received during the call process are found in the TpDataSessionReportType data-type.

Name	Value	Description
P_EVENT_NAME_UNDEFINED	0	Undefined
P_EVENT_DSCS_SETUP	1	The data session is going to be setup.
P_EVENT_DSCS_ESTABLISHED	2	The data session is established by the network.
P_EVENT_DSCS_QOS_CHANGED	4	A change in QoS class has taken place during the life of the data session.

TpDataSessionMonitorMode

Defines the mode that the call will monitor for events, or the mode that the call is in following a detected event.

Name	Value	Description
P_DATA_SESSION_MONITOR_MODE_INTERRUPT	0	The data session event is intercepted by the data session control service and data session establishment is interrupted. The application is notified of the event and data session establishment resumes following an appropriate API call or network event (such as a data session release)
P_DATA_SESSION_MONITOR_MODE_NOTIFY	1	The data session event is detected by the data session control service but not intercepted. The application is notified of the event and data session establishment continues
P_DATA_SESSION_MONITOR_MODE_DO_NOT_MONITOR	2	Do not monitor for the event

TpDataSessionEventCriteria

Defines the Sequence of Data Elements that specify the criteria for a event notification.

Of the addresses only the Plan and the AddrString are used for the purpose of matching the notifications against the criteria.

Sequence Element Name	Sequence Element Type	Description
DestinationAddress	TpAddressRange	Defines the destination address or address range for which the notification is requested.
OriginatingAddress	TpAddressRange	Defines the origination address or a address range for which the notification is requested.
DataSessionEventName	TpDataSessionEventName	Name of the event(s)
MonitorMode	TpDataSessionMonitorMode	Defines the mode that the Data Session is in following the notification. Monitor mode P_DATA_SESSION_MONITOR_MODE_DO_NOT_MONITOR is not a legal value here.

TpDataSessionEventInfo

Defines the Sequence of Data Elements that specify the information returned to the application in a Data Session event notification.

Sequence Element Name	Sequence Element Type	Description
DestinationAddress	TpAddress	Defines the destination address for which the notification is reported.
OriginatingAddress	TpAddress	Defines the origination address for which the notification is reported.
DataSessionEventName	TpDataSessionEventName	Name of the event(s)
MonitorMode	TpDataSessionMonitorMode	Defines the mode in which the Data Session is reporting the notification. Monitor mode P_DATA_SESSION_MONITOR_MODE_DO_NOT_MONITOR is not a legal value here.
QoSClass	TpDataSessionQoSClass	Defines the Quality of Service (QoS) class for the Data Session. QoSClass NULL is not a legal value when DataSessionEventName is set to P_EVENT_DSCS_QOS_CHANGED. For this particular event, the QoSClass defines the new QoS class effective after the change.

TpDataSessionQoSClass

Defines the Quality of Service (QoS) classes for a data session.

Name	Value	Description
P_DATA_SESSION_QOS_CLASS_CONVERSATIONAL	0	Specifies the Conversational QoS class, as specified in 3G TS 23.107.
P_DATA_SESSION_QOS_CLASS_STREAMING	1	Specifies the Streaming QoS class, as specified in 3G TS 23.107.
P_DATA_SESSION_QOS_CLASS_INTERACTIVE	2	Specifies the Interactive QoS class, as specified in 3G TS 23.107.
P_DATA_SESSION_QOS_CLASS_BACKGROUND	3	Specifies the Background QoS class, as specified in 3G TS 23.107.

TpDataSessionChargePlan

Defines the Sequence of Data Elements that specify the charge plan for the call.

Sequence Element Name	Sequence Element Type	Description
ChargeOrderType	TpDataSessionChargeOrder	Charge order
Currency	TpString	Currency unit according to ISO-4217:1995 [4]
AdditionalInfo	TpString	Descriptive string which is sent to the billing system without prior evaluation. Could be included in the ticket.

Valid Currencies are:

ADP, AED, AFA, ALL, AMD, ANG, AON, AOR, ARS, ATS, AUD, AWG, AZM, BAM,
 BBD, BDT, BEF, BGL, BGN, BHD, BIF, BMD, BND, BOB, BOV, BRL, BSD, BTN,
 BWP, BYB, BZD, CAD, CDF, CHF, CLF, CLP, CNY, COP, CRC, CUP, CVE, CYP,
 CZK, DEM, DJF, DKK, DOP, DZD, ECS, ECV, EEK, EGP, ERN, ESP, ETB, EUR,
 FIM, FJD, FKP, FRF, GBP, GEL, GHC, GIP, GMD, GNF, GRD, GTQ, GWP, GYD,
 HKD, HNL, HRK, HTG, HUF, IDR, IEP, ILS, INR, IQD, IRR, ISK, ITL, JMD,
 JOD, JPY, KES, KGS, KHR, KMF, KPW, KRW, KWD, KYD, KZT, LAK, LBP, LKR,
 LRD, LSL, LTL, LUF, LVL, LYD, MAD, MDL, MGF, MKD, MMK, MNT, MOP, MRO,
 MTL, MUR, MVR, MWK, MXN, MXV, MYR, MZM, NAD, NGN, NIO, NLG, NOK, NPR,
 NZD, OMR, PAB, PEN, PGK, PHP, PKR, PLN, PTE, PYG, QAR, ROL, RUB, RUR,
 RWF, SAR, SBD, SCR, SDD, SEK, SGD, SHP, SIT, SKK, SLL, SOS, SRG, STD,
 SVC, SYP, SZL, THB, TJR, TMM, TND, TOP, TPE, TRL, TTD, TWD, TZS, UAH,
 UGX, USD, USN, USS, UYU, UZS, VEB, VND, VUV, WST, XAF, XAG, XAU, XBA,
 XBB, XBC, XBD, XCD, XDR, XFO, XFU, XOF, XPD, XPF, XPT, XTS, XXX, YER,
 YUM, ZAL, ZAR, ZMK, ZRN, ZWD.

XXX is used for transactions where no currency is involved.

TpDataSessionChargeOrder

Defines the Tagged Choice of Data Elements that specify the charge plan for the call.

Tag Element Type	
	TpDataSessionChargeOrderCategory

Tag Element Value	Choice Element Type	Choice Element Name
P_DATA_SESSION_CHARGE_PER_VOLUME	TpChargePerVolume	ChargePerVolume
P_DATA_SESSION_CHARGE_NETWORK	TpString	NetworkCharge

TpDataSessionChargeOrderCategory

Name	Value	Description
P_DATA_SESSION_CHARGE_PER_VOLUME	0	Charge per volume
P_DATA_SESSION_CHARGE_NETWORK	1	Operator specific charge plan specification, e.g. charging table name / charging table entry

TpChargePerVolume

Defines the Sequence of Data Elements that specify the time based charging information. The volume is the sum of uplink and downlink transfer data volumes.

Sequence Element Name	Sequence Element Type	Description
InitialCharge	TpInt32	Initial charge amount (in currency units * 0.0001)
CurrentChargePerKilobyte	TpInt32	Current tariff (in currency units * 0.0001)
NextChargePerKilobyte	TpInt32	Next tariff (in currency units * 0.0001) after tariff switch. Only used in setAdviceOfCharge()

TpDataSessionIdentifier

Defines the Sequence of Data Elements that unambiguously specify the Data Session object

Sequence Element Name	Sequence Element Type	Sequence Element Description
DataSessionReference	IpDataSessionRef	This element specifies the interface reference for the Data Session object.
DataSessionSessionID	TpSessionID	This element specifies the data session ID of the Data Session.

TpDataSessionError

Defines the Sequence of Data Elements that specify the additional information relating to a call error.

Sequence Element Name	Sequence Element Type
ErrorTime	TpDateAndTime
ErrorType	TpDataSessionErrorType
AdditionalErrorInfo	TpDataSessionAdditionalErrorInfo

TpDataSessionAdditionalErrorInfo

Defines the Tagged Choice of Data Elements that specify additional Data Session error and Data Session error specific information.

Tag Element Type
TpDataSessionErrorType

Tag Element Value	Choice Element Type	Choice Element Name
P_DATA_SESSION_ERROR_UNDEFINED	NULL	Undefined
P_DATA_SESSION_ERROR_INVALID_ADDRESS	TpAddressError	DataSessionErrorInvalidAddress
P_DATA_SESSION_ERROR_INVALID_STATE	NULL	Undefined

TpDataSessionErrorType

Defines a specific Data Session error.

Name	Value	Description
P_DATA_SESSION_ERROR_UNDEFINED	0	Undefined; the method failed or was refused, but no specific reason can be given.
P_DATA_SESSION_ERROR_INVALID_ADDRESS	1	The operation failed because an invalid address was given
P_DATA_SESSION_ERROR_INVALID_STATE	2	The data session was not in a valid state for the requested operation

TpDataSessionFault

Defines the cause of the data session fault detected.

Name	Value	Description
P_DATA_SESSION_FAULT_UNDEFINED	0	Undefined
P_DATA_SESSION_USER_ABORTED	1	User has finalised the data session before any message could be sent by the application
P_DATA_SESSION_TIMEOUT_ON_RELEASE	2	This fault occurs when the final report has been sent to the application, but the application did not explicitly release data session object, within a specified time. The timer value is operator specific.
P_DATA_SESSION_TIMEOUT_ON_INTERRUPT	3	This fault occurs when the application did not instruct the gateway how to handle the call within a specified time, after the gateway reported an event that was requested by the application in interrupt mode. The timer value is operator specific.

TpDataSessionReleaseCause

Defines the Sequence of Data Elements that specify the cause of the release of a data session.

Sequence Element Name	Sequence Element Type
Value	TpInt32
Location	TpInt32
NOTE: the Value and Location are specified as in ITU-T Recommendation Q.850.	

TpDataSessionSuperviseVolume

Defines the Sequence of Data Elements that specify the amount of volume that is allowed to be transmitted for the specific connection.

Sequence Element Name	Sequence Element Type	Sequence Element Description
VolumeQuantity	<u> TpInt32 </u>	This data type is identical to a TpInt32, and defines the quantity of the granted volume that can be transmitted for the specific connection. The volume specifies the sum of uplink and downlink transfer data volumes.
VolumeUnit	<u> TpInt32 </u>	In Order to enlarge the range of the volume quantity value the exponent of a scaling factor ($10^{\wedge}\text{VolumeUnit}$) is provided. When the unit is for example in kilobytes, VolumeUnit shall be set to 3.

TpDataSessionSuperviseReport

Defines the responses from the data session control service for calls that are supervised. The values may be combined by a logical 'OR' function.

Name	Value	Description
P_DATA_SESSION_SUPERVISE_VOLUME_REACHED	01h	The maximum volume has been reached.
P_DATA_SESSION_SUPERVISE_DATA_SESSION_ENDED	02h	The data session has ended, either due to data session party to reach of maximum volume or calling or called release.
P_DATA_SESSION_SUPERVISE_MESSAGE_SENT	04h	A warning message has been sent.

TpDataSessionSuperviseTreatment

Defines the treatment of the call by the data session control service when the supervised volume is reached. The values may be combined by a logical 'OR' function.

Name	Value	Description
P_DATA_SESSION_SUPERVISE_RELEASE	01h	Release the data session when the data session supervision volume is reached.
P_DATA_SESSION_SUPERVISE_RESPOND	02h	Notify the application when the call supervision volume is reached.
P_DATA_SESSION_SUPERVISE_INFORM	04h	Send a warning message to the originating party when the maximum volume is reached. If data session release is requested, then the data session will be released following the message after an administered time period

TpDataSessionReport

Defines the Sequence of Data Elements that specify the data session report specific information.

Sequence Element Name	Sequence Element Type
MonitorMode	TpDataSessionMonitorMode
DataSessionEventTime	TpDateAndTime
DataSessionReportType	TpDataSessionReportType
AdditionalReportInfo	TpDataSessionAdditionalReportInfo

TpDataSessionAdditionalReportInfo

Defines the Tagged Choice of Data Elements that specify additional data session report information for certain types of reports.

Tag Element Type
TpDataSessionReportType

Tag Element Value	Choice Element Type	Choice Element Name
P_DATA_SESSION_REPORT_UNDEFINED	NULL	Undefined
P_DATA_SESSION_REPORT_CONNECTED	NULL	Undefined
P_DATA_SESSION_REPORT_DISCONNECT	TpDataSessionReleaseCause	DataSessionDisconnect

TpDataSessionReportRequest

Defines the Sequence of Data Elements that specify the criteria relating to data session report requests.

Sequence Element Name	Sequence Element Type
MonitorMode	TpDataSessionMonitorMode
DataSessionReportType	TpDataSessionReportType

TpDataSessionReportRequestSet

Defines a Numbered Set of Data Elements of TpDataSessionReportRequest.

TpDataSessionReportType

Defines a specific data session event report type.

Name	Value	Description
P_DATA_SESSION_REPORT_UNDEFINED	0	Undefined
P_DATA_SESSION_REPORT_CONNECTED	1	Data session established.
P_DATA_SESSION_REPORT_DISCONNECT	2	Data session disconnect requested by data session party

11 Exception Classes

The following are the list of exception classes, which are used in this interface of the API.

Name	Description
P_SERVICE_INFORMATION_MISSING	Information relating to the Data Session Control SCF could not be found
P_SERVICE_FAULT_ENCOUNTERED	Fault detected in the Data Session Control SCF

Each exception class contains the following structure:

Structure Element Name	Structure Element Type	Structure Element Description
ExtraInformation	TpString	Carries extra information to help identify the source of the exception, e.g. a parameter name

Annex A (normative): OMG IDL Description of Data Session Control SCF

The OMG IDL representation of this interface specification is contained in a text file (dsc.idl contained in archive 2919808IDL.ZIP) which accompanies the present document.

Annex B (informative): Differences between this draft and 3GPP TS 29.198 R99

B.1 Interface IpAppDataSessionControlManager

~~reportNotification~~~~dataSessionEventNotify~~ (dataSessionReference : in TpDataSessionIdentifier, eventInfo : in TpDataSessionEventInfo, assignmentID : in TpAssignmentID, appInterfaceDataSession : out IpAppDataSessionRefRef) : TpResult

B.2 Interface IpDataSessionControlManager

~~createNotification~~~~enableDataSessionNotification~~ (appDataSessionControlManagerInterface : in IpAppDataSessionControlManagerRef, eventCriteria : in TpDataSessionEventCriteria, assignmentID : out TpAssignmentIDRef) : TpResult

~~destroyNotification~~~~disableDataSessionNotification~~ (assignmentID : in TpAssignmentID) : TpResult

~~changeNotification~~ (assignmentID : in TpAssignmentID, eventCriteria : in TpDataSessionEventCriteria) : TpResult

~~getNotification~~ (eventCriteria : out TpDataSessionEventCriteriaRef) : TpResult

B.3 Interface IpDataSession

The following methods were added

deassignDataSession (dataSessionID : in TpSessionID) : void

continueProcessing (dataSessionID : in TpSessionID) : void

B.34 All Interfaces

All methods on IpApp interfaces no longer throw exceptions.

All methods on the other interfaces throw TpCommonExceptions and individual, identified exceptions

All methods now return void or the former out parameter.