

**Open Service Access (OSA);
Application Programming Interface (API);
Part 7: Terminal Capabilities SCF**



Reference

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Keywords

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN), and is now submitted for the ETSI standards Membership Approval Procedure.

The present document is part 7 of a multi-part deliverable covering Open Service Access (OSA); Application Programming Interface (API), as identified below. The API specification (ES 202 915) is structured in the following parts:

- Part 1: "Overview";
- Part 2: "Common Data Definitions";
- Part 3: "Framework";
- Part 4: "Call Control";
- Part 5: "User Interaction SCF";
- Part 6: "Mobility SCF";
- Part 7: "Terminal Capabilities SCF";**
- Part 8: "Data Session Control SCF";
- Part 9: "Generic Messaging SCF";
- Part 10: "Connectivity Manager SCF";
- Part 11: "Account Management SCF";
- Part 12: "Charging SCF";
- Part 13: "Policy Management SCF";
- Part 14: "Presence and Availability Management SCF".

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

The present document forms part of the Parlay 4.1 set of specifications.

The present document is equivalent to 3GPP TS 29.198-7 V5.3.0 (Release 5).

1 Scope

The present document is part 7 of the Stage 3 specification for an Application Programming Interface (API) for Open Service Access (OSA).

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

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

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

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

2 References

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

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

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

3 Definitions and abbreviations

3.1 Definitions

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

3.2 Abbreviations

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

4 Terminal Capabilities SCF

The following clauses describe each aspect of the Terminal Capabilities Capability Feature (SCF).

The order is as follows:

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

4.1 General requirements on support of methods

An implementation of this API which supports or implements a method described in the present document, shall support or implement the functionality described for that method, for at least one valid set of values for the parameters of that method.

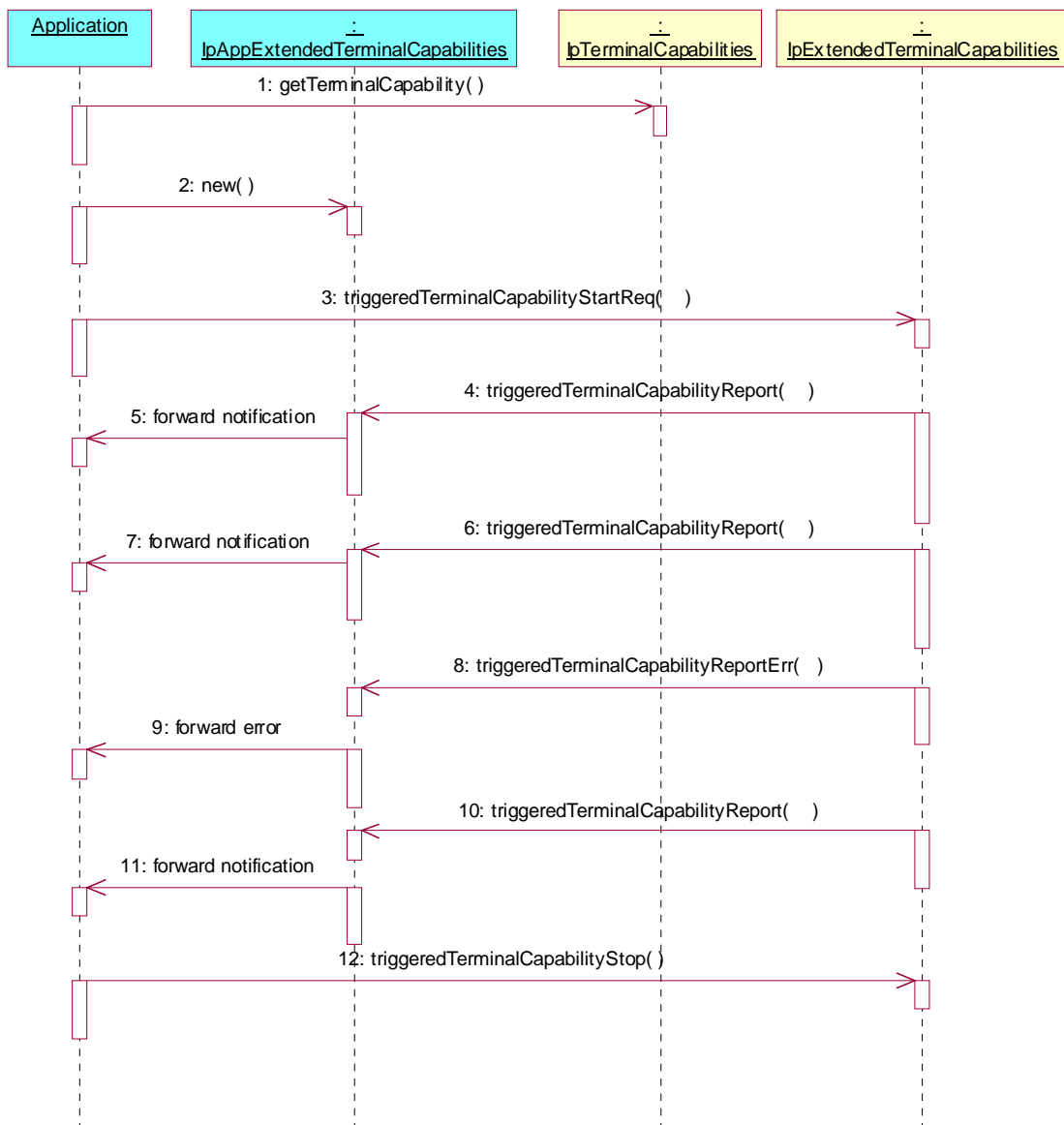
Where a method is not supported by an implementation of a Service interface, the exception `P_METHOD_NOT_SUPPORTED` shall be returned to any call of that method.

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.

5 Sequence Diagrams

5.1 Terminal capabilities example

The following example sequence diagram illustrates how the terminal capabilities can be retrieved and their changes monitored.



- 1: The application retrieves the terminal capability of a terminal.
- 2: The application creates an object to implement IpAppExtendedTerminalCapabilities.
- 3: The terminal capabilities changes are started to be monitored.
- 4: The terminal capabilities have changed and they are reported as requested.
- 5: The report is forwarded internally to the application.
- 6: The terminal capabilities have changed and they are reported as requested.
- 7: The report is forwarded internally to the application.
- 8: An error has happened in the monitoring and it is reported.
- 9: The error report is forwarded internally to the application.
- 10: The terminal capabilities have changed and they are reported as requested.

11: The report is forwarded internally to the application.

12: The terminal capability monitoring is stopped.

6 Class Diagrams

Terminal Capabilities Class Diagram:

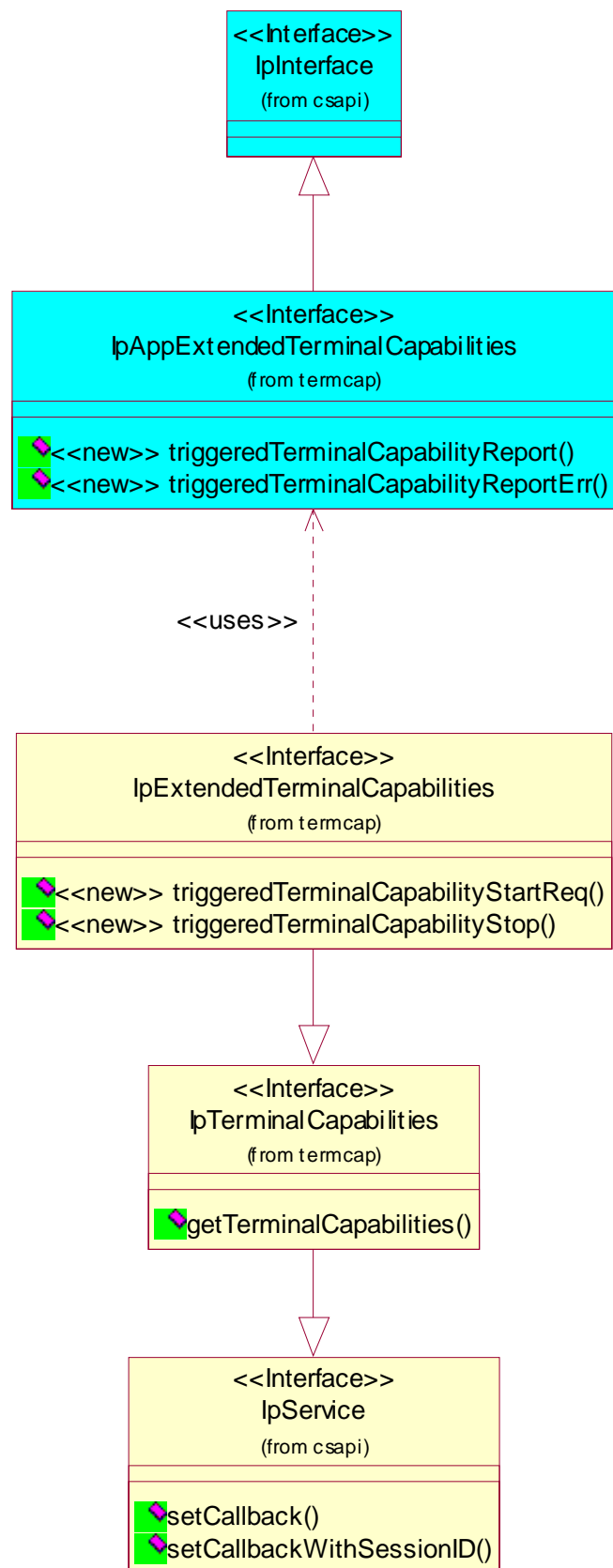


Figure 1: Terminal Capabilities Class Diagram

7 The Service Interface Specifications

7.1 Interface Specification Format

This clause 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. 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

7.4.1.1 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 SessionIDs.

Parameters

appInterface : in IpInterfaceRef

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

*Raises***TpCommonExceptions, P_INVALID_INTERFACE_TYPE****7.4.1.2 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 use SessionIDs.

*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, P_INVALID_INTERFACE_TYPE**

8 Terminal Capabilities Interface Classes

The Terminal Capabilities SCF enables the application to retrieve the terminal capabilities of the specified terminal. Additionally it is possible for the application to request notifications when the capabilities of the terminal change in some way. The Terminal Capabilities service provides SCF interfaces IpTerminalCapabilities and IpExtendedTerminalCapabilities. The application side interface for the reporting is called IpAppExtendedTerminalCapabilities.

8.1 Interface Class IpTerminalCapabilities

Inherits from: IpService.

The Terminal Capabilities SCF interface IpTerminalCapabilities contains the synchronous method getTerminalCapabilities. The application has to provide the terminalIdentity as input to this method. The result indicates whether or not the terminal capabilities are available in the network and, in case they are, it will return the terminal capabilities (see the data definition of TpTerminalCapabilities for more information). The network may override some capabilities that have been indicated by the terminal itself due to network policies or other restrictions or modifications in the supported capabilities.

This interface, or IpExtendedTerminalCapabilities shall be implemented by a Terminal Capabilities SCF as a minimum requirement. If this interface is implemented, the getTerminalCapabilities() method shall be implemented as a minimum requirement.

<<Interface>> IpTerminalCapabilities
getTerminalCapabilities (terminalIdentity : in TpString) : TpTerminalCapabilities

8.1.1 Method getTerminalCapabilities()

This method is used by an application to get the capabilities of a user's terminal. Direction: Application to Network.

Returns result : Specifies the latest available capabilities of the user's terminal.

This information, if available, is returned as CC/PP headers as specified in W3C (see [6] in ES 202 915-1) and adopted in the WAP UAProf specification (see [9] in ES 202 915-1). It contains URLs; terminal attributes and values, in RDF format; or a combination of both.

Parameters

terminalIdentity: in TpString

Identifies the terminal. It may be a logical address known by the WAP Gateway/PushProxy.

Returns

TpTerminalCapabilities

Raises

TpCommonExceptions, P_INVALID_TERMINAL_ID

8.2 Interface Class IpExtendedTerminalCapabilities

Inherits from: IpTerminalCapabilities.

This interface can be used as an extended version of terminal capability monitoring. The application programmer can use this interface to request terminal capability reports that are triggered by their changes. Note that the underlying mechanisms for this network feature are currently not fully standardised.

This interface, or IpTerminalCapabilities, shall be implemented by a Terminal Capabilities SCF as a minimum requirement. The triggeredTerminalCapabilityStartReq() and triggeredTerminalCapabilityStop() methods shall be implemented as a minimum requirement. An implementation of IpExtendedTerminalCapabilities is not required to implement the minimum mandatory methods of IpTerminalCapabilities.

<<Interface>> IpExtendedTerminalCapabilities
<<new>> triggeredTerminalCapabilityStartReq (appTerminalCapabilities : in IpAppExtendedTerminalCapabilitiesRef, terminals : in TpAddressSet, capabilityScope : in TpTerminalCapabilityScope, criteria : in TpTerminalCapabilityChangeCriteria) : TpAssignmentID <<new>> triggeredTerminalCapabilityStop (assignmentID : in TpAssignmentID) : void

8.2.1 Method <<new>> triggeredTerminalCapabilityStartReq()

Request for terminal capability reports when the capabilities change or when the application obviously does not have the current terminal capability information when this method is invoked.

Returns: assignmentID

Specifies the assignment ID of the triggered terminal capability reporting request.

Parameters

appTerminalCapabilities : in IpAppExtendedTerminalCapabilitiesRef

Specifies the application interface for callbacks.

terminals : in TpAddressSet

Specifies the terminal(s) for which the capabilities shall be reported. TpAddress fields have the following use:

- Plan: Used to indicate the numbering plan
- AddrString: Used to indicate the subscriber address
- Name: Used to indicate the terminal identity. May be applied also together with AddrString to indicate subscriber's particular terminal. The precise format is not defined.
- Presentation: No defined use
- Screening: No defined use
- SubAddressString: No defined use

Hence it is possible to indicate the subscriber and/or the terminal identification. This terminal addressing is implementation specific e.g. subscriber identification may not always be sufficient information to get the capabilities of the terminal.

capabilityScope : in TpTerminalCapabilityScope

Specifies the scope of the capabilities that the application is interested in. The contents are implementation specific. One possibility is to use the CC/PP definitions as in TpTerminalCapabilities.

criteria : in TpTerminalCapabilityChangeCriteria

Specifies the trigger conditions for the reports e.g. software or hardware update.

*Returns***TpAssignmentID***Raises***TpCommonExceptions, P_INFORMATION_NOT_AVAILABLE,
P_INVALID_INTERFACE_TYPE, P_INVALID_CRITERIA, P_INVALID_TERMINAL_ID**

8.2.2 Method <<new>> triggeredTerminalCapabilityStop()

Stop reporting for terminal capability changes that were started by triggeredTerminalCapabilityStartReq().

*Parameters***assignmentID: in TpAssignmentID**

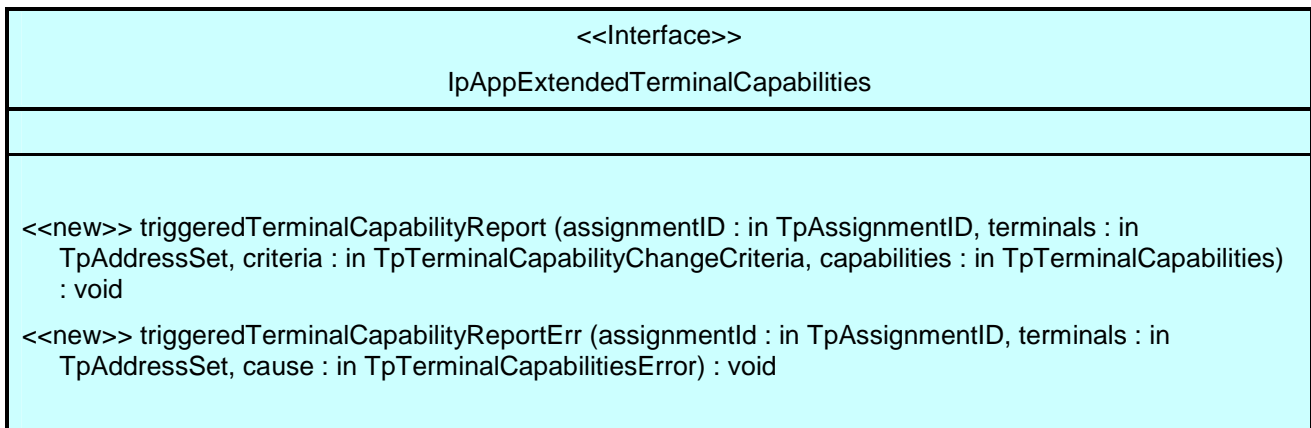
Specifies the assignment ID for the task to be stopped.

*Raises***TpCommonExceptions, P_INVALID_ASSIGNMENT_ID**

8.3 Interface Class IpAppExtendedTerminalCapabilities

Inherits from: IpInterface.

IpAppExtendedTerminalCapabilities interface is used to send triggered terminal capability reports. It is implemented by the client application developer.



8.3.1 Method <<new>> triggeredTerminalCapabilityReport()

This terminal capability report is issued when the capabilities of the terminal have changed in the way specified by the criteria parameter in the previously invoked triggeredTerminalCapabilityStartReq () method.

*Parameters***assignmentID: in TpAssignmentID**

Specifies the assignment ID of the report.

terminals:in TpAddressSet

Specifies the terminal(s) either by subscriber or terminal ID or both as described for the triggeredTerminalCapabilityStartReq () method.

criteria:in TpTerminalCapabilityChangeCriteria

Specifies the criteria that caused the report to be sent.

capabilities:in TpTerminalCapabilities

Specifies the capabilities of the terminal. The network may override some capabilities that have been indicated by the terminal itself due to network policies or other restrictions or modifications in the supported capabilities.

8.3.2 Method <<new>> triggeredTerminalCapabilityReportErr()

This method indicates that the requested reporting has failed. Note that errors may concern the whole assignment or just some terminals. In the former case no terminals are specified.

*Parameters***assignmentId:in TpAssignmentID**

Specifies the assignment ID.

terminals:in TpAddressSet

Specifies the terminal(s) either by subscriber or terminal ID or both as described for the triggeredTerminalCapabilityStartReq () method.

cause:in TpTerminalCapabilitiesError

Specifies the error that led to the failure.

9 State Transition Diagrams

There are no State Transition Diagrams for the Terminal Capabilities SCF.

10 Service Properties

The following table lists properties relevant for this SCF.

Property	Type	Description
P_TRIGGERED_REPORTING_SUPPORTED	BOOLEAN_SET	Value = TRUE : The triggered reporting of terminal capabilities is supported by the SCF. Value = FALSE : The triggered reporting of terminal capabilities is not supported by the SCF.

11 Terminal Capabilities Data Definitions

The constants and types defined in the following clauses are defined in the *org.csapi.termcap* package.

All data types referenced but not defined in this clause are common data definitions which may be found in ES 202 915-2.

11.1 terminalIdentity

Identifies the terminal.

Name	Type	Documentation
terminalIdentity	TpString	Identifies the terminal. It may be a logical address known by the WAP Gateway/PushProxy.

11.2 TpTerminalCapabilities

This data type is a Sequence of Data Elements that describes the terminal capabilities. It is a structured type that consists of:

Sequence Element Name	Sequence Element Type	Documentation
TerminalCapabilities	TpString	Specifies the latest available capabilities of the user's terminal. This information, if available, is returned as CC/PP headers as specified in W3C (see [6] in ES 202 915-1) and adopted in the WAP UAPProf specification (see [9] in ES 202 915-1). It contains URLs; terminal attributes and values, in RDF format; or a combination of both.
StatusCode	TpBoolean	Indicates whether or not the TerminalCapabilities are available.

11.3 TpTerminalCapabilitiesError

Defines an error that is reported by the Terminal Capabilities SCF.

Name	Value	Description
P_TERMPCAP_ERROR_UNDEFINED	0	Undefined.
P_TERMPCAP_INVALID_TERMINALID	1	The request can not be handled because the terminal id specified is not valid.
P_TERMPCAP_SYSTEM_FAILURE	2	System failure. The request cannot be handled because of a general problem in the terminal capabilities service or the underlying network.
P_TERMPCAP_INFO_UNAVAILABLE	3	The terminal capability information is not available.

11.4 TpTerminalCapabilityChangeCriteria

Defines the type of the terminal capability changes to be reported. The values may be combined by a logical 'OR' function.

Name	Value	Description
P_TERMINAL_CAPABILITY_CHANGE_CRITERIA_UNDEFINED	00h	Undefined
P_TERMINAL_CAPABILITY_CHANGE_CRITERIA_GENERAL	01h	Any change in the terminal capabilities.
P_TERMINAL_CAPABILITY_CHANGE_CRITERIA_HW_UPDATE	02h	The terminal device hardware has been modified or replaced completely.
P_TERMINAL_CAPABILITY_CHANGE_CRITERIA_SW_UPDATE	04h	The software of the terminal has been updated in any way. Also changes in configuration or preferences may be concerned.
P_TERMINAL_CAPABILITY_CHANGE_CRITERIA_INITIAL	08h	The initial device capabilities reported when monitoring has been started by an application.

11.5 TpTerminalCapabilityScopeType

Defines a specific type of the terminal capability scope definition.

Name	Value	Description
P_TERMINAL_CAPABILITY_SCOPE_TYPE_UNDEFINED	0	Undefined.
P_TERMINAL_CAPABILITY_SCOPE_TYPE_CCPP	1	Indicates that the terminal capability scope is expressed as CC/PP headers as specified in W3C (see [6] in ES 202 915-1) and adopted in the WAP UAProf specification (see [9] in ES 202 915-1). It contains URLs; terminal attributes and values, in RDF format; or a combination of both.

11.6 TpTerminalCapabilityScope

Defines the Sequence of Data Elements that specify the scope of the terminal capabilities.

Sequence Element Name	Sequence Element Type
ScopeType	TpTerminalCapabilityScopeType
Scope	TpString

12 Exception Classes

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

Name	Description
P_INVALID_TERMINAL_ID	The request can not be handled because the terminal id specified is not valid.

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 Terminal Capabilities SCF

The OMG IDL representation of this interface specification is contained in a text file (termcap.idl contained in archive es_20291507v010201m0.ZIP) which accompanies the present document.

Annex B (informative): W3C WSDL Description of Terminal Capabilities SCF

The W3C WSDL representation of this interface specification is contained in a text file (termcap.wsdl contained in archive es_20291507v010201m0.ZIP) which accompanies the present document.

Annex C (informative): Contents of 3GPP OSA R5 Terminal Capabilities

All of the present document is relevant for TS 129 198-7 V5 (Release 5).

Annex D (informative): Record of changes

The following is a list of the changes made to the present document for each release. The list contains the names of all changed, deprecated, added or removed items in the specifications and not the actual changes. Any type of change information that is important to the reader is put in the final clause of this annex.

Changes are specified as changes to the prior major release, but every minor release will have its own part of the table allowing the reader to know when the actual change was made.

D.1 Interfaces

D.1.1 New

Identifier	Comments
Interfaces added in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
IpExtendedTerminalCapabilities	
IpAppExtendedTerminalCapabilities	
Interfaces added in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.1.2 Deprecated

Identifier	Comments
Interfaces deprecated in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Interfaces deprecated in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.1.3 Removed

Identifier	Comments
Interfaces removed in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Interfaces removed in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.2 Methods

D.2.1 New

Identifier	Comments
Methods added in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
IpExtendedTerminalCapabilities.triggeredTerminalCapabilityStartReq	
IpExtendedTerminalCapabilities.triggeredTerminalCapabilityStop	
IpAppExtendedTerminalCapabilities.triggeredTerminalCapabilityReport	
IpAppExtendedTerminalCapabiltiies.triggeredTerminalCapabilityReportErr	
Methods added in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.2.2 Deprecated

Identifier	Comments
Methods deprecated in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Methods deprecated in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.2.3 Modified

Identifier	Comments
Methods modified in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Methods modified in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.2.4 Removed

Identifier	Comments
Methods removed in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Methods removed in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.3 Data Definitions

D.3.1 New

Identifier	Comments
Data Definitions added in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
TpTerminalCapabilityChangeCriteria	
TpTerminalCapabilityScopeType	
TpTerminalCapabilityScope	
Data Definitions added in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.3.2 Modified

Identifier	Comments
Data Definitions modified in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
TpTerminalCapabilitiesError	extended with P_TERM_CAP_INFO_UNAVAILABLE
Data Definitions modified in ES 202 915-7 version 1.2.1 (Parlay 4.1)	
TpTerminalCapabilities	Order of elements modified to match IDL.

D.3.3 Removed

Identifier	Comments
Data Definitions removed in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Data Definitions removed in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.4 Service Properties

D.4.1 New

Identifier	Comments
Service Properties added in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
P_TRIGGERED_REPORTING_SUPPORTED	
Service Properties added in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.4.2 Deprecated

Identifier	Comments
Service Properties deprecated in ES 202 915-7 version 1.1.1 (Parlay 4.0)	
Service Properties deprecated in ES 202 915-7 version 1.2.1 (Parlay 4.1)	

D.4.3 Modified

Identifier	Comments
	Service Properties modified in ES 202 915-7 version 1.1.1 (Parlay 4.0)
	Service Properties modified in ES 202 915-7 version 1.2.1 (Parlay 4.1)

D.4.4 Removed

Identifier	Comments
	Service Properties removed in ES 202 915-7 version 1.1.1 (Parlay 4.0)
	Service Properties removed in ES 202 915-7 version 1.2.1 (Parlay 4.1)

D.5 Exceptions

D.5.1 New

Identifier	Comments
	Exceptions added in ES 202 915-7 version 1.1.1 (Parlay 4.0)
	Interfaces added in ES 202 915-7 version 1.2.1 (Parlay 4.1)

D.5.2 Modified

Identifier	Comments
	Exceptions modified in ES 202 915-7 version 1.1.1 (Parlay 4.0)
	Interfaces added in ES 202 915-7 version 1.2.1 (Parlay 4.1)

D.5.3 Removed

Identifier	Comments
	Exceptions removed in ES 202 915-7 version 1.1.1 (Parlay 4.0)
	Interfaces added in ES 202 915-7 version 1.2.1 (Parlay 4.1)

D.6 Others

History

Document history		
V1.1.1	January 2003	Publication
V1.2.1	June 2003	Membership Approval Procedure MV 20030801: 2003-06-03 to 2003-08-01