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UNI

The uni module implements the ATM Forum Technical Committee ATM User-Network Interface (UNI) signaling specification version 3.1 and partially version 4.0. UNI point-to-point features are based on the ITU-T draft recommendation Q.2931. Additionally, UNI includes signaling specifications for unidirectional point-to-multipoint connections.

Introduction

UNI signaling protocol offers services for managing connection establishment and release with reliable error detection. It operates above a SAAL sub-layer SSCOP using its UNI-SSCF interface. UNI provides services for e.g. call control applications.

The package contains an interface, sigif (for Signalling Interface), for applications using UNI signaling procedures.

UNI signaling procedures in the user end are a little different from the procedures in the network. The implementation uses two modes initialized at start-up time to handle this situation. In this document we are concentrated to the network part of the signaling.

Architecture

Architecture of the UNI implementation depends on the use of the multipoint features in the connection: are they used or not. Let's consider a simple point-to-point connection and the corresponding conduits model. This is illustrated in the figure 1.



Figure 1.

An overall structure of protocol implementation can be seen from the figure, as well as interfaces and cooperating protocols:

Upper module:CC (Call control)Upper interface:sigifModule:UNI (including Co-ord, RRN, RSN, and MUX, F)Lower interface:uaalifLower protocol:usscfProtocolUses:saal (saalConnection)Used by:Use

Implementation details

UNI protocol implementation for point-to-point connections consist of four protocol conduit objects: UNI, Co-ord, RRN, and RSN. In the figure 2 we can see how these are related to each other. Also, all message transportation routes are shown, as well as timer events. Messages are shown in table 1.



Figure 2.

No	Primitive/Message	Function
1	sigSETUPind	Indicates receive of SETUP pdu
1.	sigSETUPconf	Indicates receive of CONNECT pdu
	sigSETUP_COMPLETEind	
	sigPROCEEDINGind	Indicates receive of PROCEEDING pdu
	sigRELEASEind	Indicates receive of RELEASE pdu
	sigRELEASEconf	Indicates that signaling is terminated
	sigRESETind	
	sigRESETconf	
	sigRESET_ERRORind	
2.	sigSETUPreq	Causes call setup to begin \rightarrow SETUP pdu will be sent
	sigSETUPresp	Sent after call is ready \rightarrow CONNECT pdu will be sent
	sigPROCEEDINGred	After call is connected \rightarrow CONNECT ACK pdu will be sent
	sigRELEASEreq	Causes a call release process to be started \rightarrow RELEASE pdu
	sigRELEASEresp	Sent after releasing call is $OK \rightarrow REI EASE COMPLETE ndu$
	sigNELELASLicsp	Sent arter releasing can is OK 7 KEEEASE_COWI EETE pau
	sigNESETreep	
	sigRESET_ERRORresp	SAAL link will be tried up
	sigLINK_ESTABLISHIEq	SAAL link will be shut down
2	uniRESETind	State link will be shut down
3.	uniRESETconf	
	uniRESET ERRORind	
	uniRESETreq	
	uniRESETresp	
	uniRESET_ERRORresp	
	uniLINK ESTABLISHreq	
	uniLINK_ESTABLISHind	
	uniLINK_ESTABLISHconf	
	uniLINK_ESTABLISHerror	
	uniLINK_RELEASEreq	
	uniLINK_RELEASEconi	
	uniSETUPpdu	
	uniCALL_PROCEEDINGpdu	
	uniCONNECTpdu	
	uniCONNECT_ACKpdu	
	uniRELEASEpdu	
	uniRELEASE_COMPLETEPdu	
	uniSTATUS ENOURYpdu	
4.	uniRESETind uniRESETreep	
	uniRESET_FREQRind	
	uniRESET_ERRORresp	
	uniRESTARTpdu	
	uniRESTART_ACKpdu	
	uniSTATUSpdu	
5.	uniRESETreq	
	uniRESET_EDDOD: 1	
	UniRESET_ERRORING	
	unikestaktpdu unikestakt ACKrdu	
	uniSTATUSpdu	
6	uaalESTABLISHrea	Request for SAAL to establish signaling connection
0.	uaalRELEASEreq	Request for SAAL to release signaling connection
	uaalDATAreq	Request for SAAL to send data over signaling connection
7	uaalESTABLISHind	Indication for signaling connection establishment
1 ' '	uaalESTABLISHconf	Indication for requested signaling connection establishment
	uaalRELEASEind	Indication for signaling connection release

uaalRELEASEconf	Indication for requested signaling connection release
uaalDATAind	Indication for received data
uaalUNITDATAind	Not used

Table 1.

Features implemented

Support of demand (switched) channel connections M 5.1.2.1 Ves. Support of point-to-multipoint channel connections - 5.1.2.2 No Support of point-to-multipoint channel connections - 5.1.2.2 No Support of Connection/Call Seup signaling function M 5.1.2.5 Yes Support of Connection/Call Anwer signaling function M 5.1.2.5 Yes Support for Connection/Call Anwer signaling function M 5.1.2.5 Yes Support for Connection/Call Carlower signaling function M 5.1.2.1 Yes Support of Cason for Clearing signaling function M 5.1.2.10 Yes Support of Cason for Clearing signaling function M 5.1.2.10 Yes Support of error recovery M 5.1.2.10 Yes Support of reform recovery M 5.1.2.10 Yes Support for Instance densages regardless of state M Yes Support of reform recovery M Yes Yes Support of Instange regardless of state M Yes Yes Support	Protocol Feature	Status	Reference	Support
Support of permanent channel connections - 5.12.2.2 No Support of multipoint-to-multipoint channel connections - 5.12.2.2 No Support of Connection(Call Request signaling function M 5.12.5 Yes Support of Connection(Call Request signaling function M 5.12.5 Yes Support of Connection(Call Charms signaling function M 5.12.5 Yes Support of Connection(Call Charms signaling function M 5.12.5 Yes Support of Connection(Call Charms signaling function M 5.12.9 Yes Support of Conson for Clarms signaling function M 5.12.9 Yes Support of functions (Class C ATM transport services M 5.12.9 Yes Support of runs segae verify M Yes Yes Support of Ion Sassae verify M Yes Yes Support of Single signaling segaments M Yes Yes Support of Ion Sassae verify M Yes Yes Support of Ion Sassae verify M Yes Yes Support of Ion Sa	Support of demand (switched) channel connections	М	5.1.2.1	Yes
Support of point-to-multipoint channel connections M 5.1.2.2.2 No Support of Top Connection(Call Setup signaling function M 5.1.2.2 No Support of Connection(Call Setup signaling function M 5.1.2.5 Yes Support of Connection(Call Anwer signaling function M 5.1.2.5 Yes Support of Connection(Call Charing signaling function M 5.1.2.5 Yes Support of Conscion(Call Charing signaling function M 5.1.2.5 Yes Support of Cons of Band Signaling signaling function M 5.1.2.10 Yes Support of Cons of Band Signaling signaling function M 5.1.2.10 Yes Support of or too Band Signaling signaling function M 5.1.2.10 Yes Support of the State signaling function M 5.1.2.10 Yes Support of the State signaling function M 5.1.2.10 Yes Support of the State signaling function M Yes Support of the State signaling function M Yes Support of the State signaling function M Yes Support of the State signaling function <td>Support of permanent channel connections</td> <td>-</td> <td>5.1.2.1</td> <td>No</td>	Support of permanent channel connections	-	5.1.2.1	No
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Support for Connection/Call Secure signaling function M 5.1.2.5 Yes Support for Connection/Call Answer signaling function M 5.1.2.5 Yes Support for Connection/Call Answer signaling function M 5.1.2.5 Yes Support for Connection/Call Claving signaling function M 5.1.2.5 Yes Support for Claving signaling function M 5.1.2.5 Yes Support of Claves X, Clave A, and Class C ATM transport services M 5.1.2.6 Yes Support for the signaling function M 5.1.2.6 Yes Support for the signaling function M 5.1.2.10 Yes Support for the signaling function M 5.1.2.6 Yes Support for the signaling function M 5.1.2.6 Yes Support for the signaling function M Yes Support for the signaling function Support for the signaling function M Yes Support for the signaling function M Yes Support for the signaling function M Yes Support for the signaling funcion No Yes	Support of multipoint-to-multipoint channel connections	-	5.1.2.2.2	No
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Support for Out of Band Signaling signaling function M 5.1.2.5 Yes Support of Cases X, Class A, and Class C ATM transport services M 5.1.2.9 Yes Support of error recovery M 5.1.2.6 Yes Support of error recovery M 5.1.2.0 Yes Support for message verify M Yes M Capable to handle all types of messages regardless of state M Yes Support for T.E.164 numbering M Nes Yes Support for B.S.BARAP addressing M Nes Yes Support for T.E.164 numbering M Nes Yes Support for T.E.164 numbering M Yes Yes Construct or the state stat	Support for Reason for Clearing signaling function	М	5.1.2.5	Yes
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Acronyms

RRN	Reset Response (Network)
RSN	Reset Sent (Network)
SAAL	Signaling ATM Adaption Layer
SSCF	Service Specific Coordination Function
SSCOP	Service Specific Connection Oriented Protocol
UNI	User-Network Interface