Avaya Specs for UUI Transport

Note: The signaling formats shown are for ISDN. With SIP, only the bytes from the protocol discriminator on are signaled (see page 8 and 11 for examples).

UUI in ISDN SETUP Message

General UUI IE Format

ISDN PRI Codeset 0 IE included with the SETUP message (also supported with H.323 IP trunking (tunnels ISDN PRI))

Byte/Octet	7	6	5	4	3	2	1	0
1	UUI IE Codepoint – 01111110 [hex 7E]							
2	Length of information element contents (binary) – set to total length of IE – 2 bytes							
3	Protocol Discriminator – set to user specific – 00000000 [x00]							
...	User information data (maximum 128 bytes)							

ASAI User Data included in non-shared [Service Provider] UUI IE

Byte/Octet	7	6	5	4	3	2	1	0
1	UUI IE Codepoint – 01111110 [hex 7E]							
2	Length of information element contents (binary) – set to total length of IE – 2 bytes							
3	Protocol Discriminator – set to user specific – 00000000 [x00] or IA5 – 00000100 [x04]							
4 ...	ASAI user info data bytes 2 through x (up to 96 bytes)							

Shared UUI (Information Forwarding)

General Shared UUI IE ISDN Format

Byte/Octet	7	6	5	4	3	2	1	0
1	UUI IE Codepoint – 01111110 [hex 7E]							
2	Length of information element contents (binary) – set to total length of IE minus 2 bytes							
3	Protocol Discriminator – set to user specific – 00000000 [x00]							
4	Application Identifier for data1							
5	Length of Application Information for data1							
6 to n	Data1 Information							
n+1	Application Identifier for data2							
n+2	Length of Application Information for data2							
n+3 to m	Data2 Information							
...								

Shared UUI Application Identifiers (op codes)

Application (shown in default priority order)	Identifier		Maximum Information Length in Bytes	ISDN Message UUI Included in	SIP Message UUI Included in
	Decimal	Hex			
UCID (optional) of current call	250	FA	8 fixed	SETUP	INVITE or REFER
UCID2 (optional) of parent call on hold	251	FB	8 fixed	SETUP	INVITE or REFER
ASAI User Data (optional) (up to 96 ASCII bytes)	200	C8	96	SETUP, DISCONNECT or RELEASE	INVITE or REFER
LAI/BSR – In VDN Time (netintime in seconds up to 9999)	247	F7	2 fixed	SETUP	INVITE or REFER
LAI/BSR – Collected Digits (number of digits plus up to 16 digits in packed BCD)	248	F8	9	SETUP	INVITE or REFER
LAI/BSR – VDN Name (up to 15 ASCII characters)	245	F5	15	SETUP	INVITE or REFER
LAI/BSR – Other LAI Info (queue-priority, interflow type, in-queue time-stamp)	244	F4	4 fixed	SETUP	INVITE or REFER
BSR – Reply Best Data (EWT, WAT, adjust-by, AIT, Skill Level, AOC)	246	F6	10 fixed	DISCONNECT or RELEASE	183 followed by 487

Format of UCID (current call and parent call[1]) included in Shared UUI

UCID will be coded in a Codeset 0 UUI IE as part of the ISDN PRI SETUP message using Avaya's "shared UUI" format as follows:

Byte/Octet	7	6	5	4	3	2	1	0
4	Application Identifier for UCID – set to 250 – 11111010 (xFA)							
5	Length of Application Information for UCID in bytes – set to 8 – 00001000 (x08)							
6	UCID byte 1 Upper byte of NN (highest bit always 0)							
7	UCID byte 2 Lower byte of NN							
8	UCID byte 3 Upper byte of SS							
9	UCID byte 4 Lower byte of SS							
10	UCID byte 5 Highest byte of the time stamp							
11	UCID byte 6							
12	UCID byte 7							
13	UCID byte 8 Lowest byte of the time stamp							

[1] The parent (original) call UCID will be included as a second UCID element (UCID2) immediately following the current call UCID if an agent is placing a call to another CM while a call is on hold for potential conference or transfers starting with CM 5.2 for cradle-to-grave reporting when transport of UCID is active for the trunk group.

The UCID is a binary number defined for the call that must be unique over all calls that can possibly be active at the same time. When Avaya's CM system generates the UCID, it uses the following algorithm (note that CM and all applications **do not /should not** break down the UCID into its component parts once generated):

UCID = NNSSTTTT (an 8-byte number – usually expanded to a 20 digit decimal number which is a concatenated conversion of the binary values of the separate subfields into their respective decimal numbers)

where

NN= a 2 byte Network Node Identifier (a number assigned to the CM Server) – range is 0 – 32767 or 0000 to 7FFF

SS = a 2 byte sequence number

TTTT = a 4 byte timestamp (seconds since 12 AM 1/1/1970)

CM will never set the SS (sequence number) higher than 8192. The SS maps to the UCID bytes 3 and 4 in the diagram above. Therefore the upper nibble of the higher order bytes of SS (the upper 4 bits of UCID byte 3) will always be binary 0 ("0000") for a CM generated sequence number.

The 20 digit decimal number UCID can be converted to the 8 byte binary representation as follows:
NNNNNCCCCCTTTTTTTTTT

Decimal Digits	**As Generated by CM**	**Binary Representation in Hex**
Where		
NNNNN =	Network Node ID – 00001 to 32767	xNN
CCCCC =	Call Sequence Number – 00000 to 07000	xSS
TTTTTTTTTT	Timestamp – number of seconds since 12 am 1/1/1970	xTTTT

ASAI User Data included in Shared UUI

(shown as an addition following UCID)

Byte/Octet	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
14	ASAI user information Application Identifier – set to 200 [xC8]							
15	Length of Application Data for ASAI user info – max of x60							
16	ASAI user info byte 1							
17 …	ASAI user info data bytes 2 through x – maximum 96 bytes							

In-VDN Time included in Shared UUI

Byte/Octet	7	6	5	4	3	2	1	0
n + 1	In VDN Time (netintime) Application Identifier – dec 247 [xF7]							
n + 2	Length of Application Data for In VDN Time – 2 bytes = 2 [x02]							
n + 3	high byte for In VDN Time							
n + 4	low byte for In VDN Time (in seconds)							

Collected Digits included in Shared UUI

Byte/Octet	7	6	5	4	3	2	1	0
n + 1	Collected Digits Application Identifier – dec 248 [xF8]							
n + 2	Length of Application Data for Collected Digits = 1 + no. digits/2 – maximum 9 bytes for 16 digits							
n + 3	Number of digits maximum 16 digits (1 byte per two or 1 digits)							
n + 4	packed BCD for 2^{nd} and 1^{st} digits							
n + 5	packed BCD for 4^{th} and 3^{rd} digits							
	... (5^{th} through 14^{th} digit = 5 bytes)							
n + 11	packed BCD for 16^{th} and 15^{th} digits							

A 0 digit is coded as hex A. Also a # digit can appear as the first and only digit or as the last digit in the string (when dialed as the end of collect digits). The # digit is coded as hex C (e.g., collection of 123# would be coded in hex as: 21 C3.

VDN Name included in Shared UUI

Byte/Octet	7	6	5	4	3	2	1	0
n + 1	VDN Name Application Identifier – dec 245 [xF5]							
n + 2	Length of Application Information for VDN Name – maximum 15 bytes (for 15 characters)							
n + 3	VDN Name 1^{st} character [IA5 coded] 1 character per octet							
...	VDN Name characters 2 through z							

Other LAI Info included in Shared UUI

Byte/Octet	7	6	5	4	3	2	1	0
n + 1	Other LAI Application Identifier – dec 244 [xF4]							
n + 2	Length of Application Information for Other LAI Info – 4 bytes [x04]							
n + 3	1	Priority Level in binary				Type Interflow in binary		
n + 4	1		Time Stamp – Hours (5 bits) 0 to 23					
n + 5	1		Time Stamp – Minutes (6 bits) 0 – 59					
n + 6	1		Time Stamp – Seconds (6 bits) 0 – 59					

Priority Level (4 bits):

0000 = 0 – Was not in queue
0001 = 1 – Was in queue at Low priority
0010 = 2 – Was in queue at Medium priority
0011 = 3 – Was in queue at High priority
0100 = 4 – Was in queue at Top priority
0101 to 1111 = 5 to 15 reserved

Type Interflow (3 bits):

000 = 0 – reserved
001 = 1 – reserved
010 = 2 – Vectoring Interflow
011 to 111 = 3 to 7 reserved

Full ISDN UUI IE (in a SETUP) Example

UCID = 0019001038F725B3 (00025000160955721139), ASAI UUI = 528932, In-VDN Time = 65 seconds, Collected digits = 15049, VDN Name = BSR PRIMARY CON, Other LAI (Priority Level = low, Type Interflow = vectoring, Time Stamp = 11:15:20),

Byte / Octet	7	6	5	4	3	2	1	0	Hex Value
1	UUI IE Codepoint								7E
2	Length of IE (52 bytes)								34
3	Protocol discriminator								00
4	UCID App ID								FA
5	Length of UCID data in bytes (fixed 8 bytes)								08
6	NN upper byte								00
7	NN lower byte								19
8	SS upper byte								00
9	SS lower byte								10
10	Timestamp highest byte								38
11	Timestamp								F7
12	Timestamp								25
13	Timestamp lowest byte Timestamp = 955721139								B3
14	ASAI App ID								C8
15	Length of ASAI user info data								06
16	IA5 coded 1st digit – 5								35
17	2nd digit – 2								32
18	3rd digit – 8								38
19	4th digit – 9								39
20	5th digit – 3								33
21	6th digit – 2								32
22	In-VDN Time App ID								F7
23	Length of In VDN Time data (fixed 2 bytes)								02
24	Time (secs) high byte								00
25	Time (secs) low byte – 65 seconds								41
26	Collected Digits App ID								F8
27	Length of Collected Digits data								04
28	Number of digits = 5 for this example								05
29	packed BCD for 2nd and 1st digits – 5 and 1								51
30	packed BCD for 4th and 3rd digits – 4 and 0								4A
31	packed BCD for 5th digit – 9								09
32	VDN Name App ID								F5
33	Length of VDN Name data – 15 bytes								0F
34	1st character – B								42
35	2nd char – S								53
36	3rd char – R								52
37	4th char – space								20
38	5th char – P								50
39	6th char – R								52
40	7th char – I								49
41	8th char – M								4D
42	9th char – A								41
43	10th char – R								52
44	11th char – Y								59

Byte / Octet	7	6	5	4	3	2	1	0	Hex Value
45	12th char – space								20
46	13th char – C								43
47	14th char – O								4F
48	15th char – N								4E
49	Other LAI Info App ID								F4
50	Length of Other LAI Info (fixed 4 bytes)								04
51	1	Priority Level = low (1)				Type Interflow = 2			8A
52	1	0	0	Time stamp – hours = 11 (01011)					8B
53	1	0	Time stamp – minutes = 15 (001111)						8F
54	1	0	Time stamp – seconds = 20 (010100)						94

UUI in SIP Messages (INVITE, REFER, etc.)

Only bytes 3 through 54 will be included (the UUI IE Codepoint and the Length of the IE will be excluded). The actual IP addresses have been replaced with an ip_address text string in the examples. Also note that the User-to-User lines do not have a line break in the actual messages.

UUI in the SIP INVITE message (for Information Forwarding):

Here is an example of the above UUI data included in a SIP INVITE message:

INVITE sip:30111@ip_address SIP/2.0
Via: SIP/2.0/TCP ip_address:6003;branch=z9hG4bK80a9f337cf6db145046377e3100
Via: SIP/2.0/TCP ip_address:6003;branch=z9hG4bK80a9f337cf6db141046377e3100
From: "dcp 1" <sip:anonymous.invalid:6003>;tag=80a9f337cf6db143046377e3100
To: "30111" <sip:30111@ ip_address >
Call-ID: 80a9f337cf6db144046377e3100
CSeq: 1 INVITE
Max-Forwards: 67
Route: <sip: ip_address:6004;lr;phase=terminating;transport=tcp>
Record-Route: <sip: ip_address:6003;lr;transport=tcp>
User-to-User:
00FA080019001038F725B3C806353238393332F7020041F80405514A09F50F4253522050524
94D41525920434F4EF4048A8B8F94;encoding=hex
User-Agent: Avaya CM/R014x.01.0.811.0
Supported: 100rel,timer,replaces,join,histinfo
Allow:
INVITE,CANCEL,BYE,ACK,PRACK,SUBSCRIBE,NOTIFY,REFER,OPTIONS,INFO,PUBLISH
Contact: "dcp 1" <sip:*04@ ip_address:6003;transport=tcp>
Session-Expires: 1200;refresher=uac
Min-SE: 1200
Content-Type: application/sdp
History-Info: <sip:30130@ ip_address >;index=1
History-Info: "30130" <sip:30130@ ip_address >;index=1.1
Content-Length: 161

v=0
o=- 1 1 IN IP4 ip_address
s=-
c=IN IP4 ip_address
b=AS:64
t=0 0
m=audio 2116 RTP/AVP 0 127
a=rtpmap:0 PCMU/8000
a=rtpmap:127 telephone-event/8000

UUI in the SIP 302 Moved Temporarily message (for an NCR redirect request before answer):

SIP/2.0 302 Moved Temporarily
From: "Digital 2" <sip:30011@avaya.com:5061>;tag=062d68e916edc14ea474d25300
To: "30130" <sip:30130@avaya.com>;tag=062d68e916edc1b67476aa2d00
Call-ID: 062d68e916edc14fa474d25300
CSeq: 1 INVITE

Via: SIP/2.0/TLS ip_address;branch=z9hG4bK062d68e916edc150a474d25300
Server: Avaya CM/R015x.00.0.822.0
Contact: <sip:74430012@avaya.com?User-to-User=**00FA080019001038F725B3C806353238393332F7020041F80405514A09F50F425352205052494D41525920434F4EF4048A8B8F94**%3Bencoding%3Dhex>
Content-Length: 0

UUI in the SIP REFER message (for an NCR transfer request after answer):

REFER sip:30341@ ip_address;transport=tcp SIP/2.0
From: "3322" <sip:3322@avaya.com>;tag=0e0782f7aacdb1ad045bb4a1400
To: "ISDN 2" <sip:30341@avaya.com>;tag=0e0782f7aacdb145e45bb1f4100
Call-ID: 0e0782f7aacdb146e45bb1f4100
CSeq: 1 REFER
Max-Forwards: 70
Route: <sip: ip_address;lr;transport=tcp>
Via: SIP/2.0/TCP ip_address:5062;branch=z9hG4bK80943d347aacdb1ae045bb4a1400
User-Agent: Avaya CM/R014x.01.0.805.0
Contact: "test vdn" <sip:3322@ ip_address:5062;transport=tcp>
Refer-To: <sip:825030340@avaya.com?User-to-User=**00FA080019001038F725B3C806353238393332F7020041F80405514A09F50F425352205052494D41525920434F4EF4048A8B8F94**%3Bencoding%3Dhex>
Content-Length: 0

Reply Best BSR Data in Shared UUI IE Provided in ISDN DISCONNECT/RELEASE Message

Byte / Octet	Data Item	# Bytes	Data Value
1	UUI IE Codepoint	1	01111110 or Hex(7E)
2	Length of IE (total – 2)	1	00001101 or Hex(0D)
3	Shared UUI protocol discriminator	1	Hex(00)
4	Shared UUI ID for BSR status poll reply	1	Hex(F6) [dec 246]
5	Size of UUI IE data items for BSR status poll reply	1	Hex(0a) [dec 10 bytes]
6 & 7	EWT for "best" BSR choice with no available agent (call will queue)	2	Value from 0 to 32767 secs in Hex (7FFF), FFFE is infinite EWT; set to Hex 00 with an available agent
8 & 9	WAT (Weighted Advance Time – also stated as AAT) for the best EWT	2	Value from 0 to 32767 secs in Hex
10 & 11	Idle time of most-idle available agent (AIT)	2	Value from 0 to 32767 secs in Hex
12	Consider step "adjust-by" value for "best" BSR choice (for queuing or for the available agent selection)	1	Value from 0 to 100 in Hex
13	Skill level of the "best" BSR available agent choice (SL)	1	Value from 1 to 16 in Hex (x00 when EWT >0)
14	Occupancy (LOA) of the available agent (AOC)	1	Value from 0 to 100 % in Hex
15	(Unused data item)	1	Hex(00)

Example ISDN PRI/H.323 IP Formatted Message:

(available agent example: EWT = 0, WAT = 0, AIT = 2196 secs, adj_by = 30, skill_lv = 2, AOC = 70%)

Byte / Octet	7	6	5	4	3	2	1	0	Hex Value
1	UUI IE Codepoint								7E
2	Length of IE (13 bytes)								0D
3	Protocol discriminator								00
4	BSR reply-best App ID								F6
5	Reply-best data length in bytes (10)								0A
6	EWT high byte								00
7	EWT low byte = 0								00
8	WAT high byte								00
9	WAT low byte = 0								00
10	AIT high byte								08
11	AIT low byte = 2196 - AIT = 2196 secs or 36 mins 36 secs								94
12	Adjust_by = 30								1E
13	Skill level = 2								02
14	AOC = 70								46
15	Spare byte = 0 – Always included by CM								00

Reply Best BSR Data UUI in a SIP 183 Progress message (followed by a 487 to terminate the poll request):

SIP/2.0 183 Session Progress
From: "x3100" <sip:11112343100@avaya.com:5062>;tag=80348f4b263ddc15a046ae42c00
To: "30345" <sip:30345@avaya.com>;tag=80348f4b263ddc12a046aeefa00
Call-ID: 80348f4b263ddc15b046ae42c00
CSeq: 2 INVITE
Via: SIP/2.0/TCP ip_address:5062;branch=z9hG4bK80348f4b263ddc15d046ae42c00
Record-Route: <sip: ip_address;lr;transport=tcp>
Record-Route: <sip: ip_address:5062;lr;transport=tcp>
Contact: <sip:30345@ ip_address;transport=tcp>
Supported: 100rel,timer,replaces,join,histinfo
Allow:
INVITE,CANCEL,BYE,ACK,PRACK,SUBSCRIBE,NOTIFY,REFER,OPTIONS,INFO,PUBLISH
Server: Avaya CM/R015x.00.0.818.0
RSeq: 1
Require: 100rel
History-Info: <sip:30345@avaya.com>;index=1
History-Info: "30345" <sip:30345@avaya.com>;index=1.1
User-to-User: **00F60A0000000008941E024600**;encoding=hex
Content-Type: application/sdp
Content-Length: 161

v=0
o=- 1 2 IN IP4 ip_address
s=-
c=IN IP4 ip_address
b=AS:64
t=0 0
m=audio 2084 RTP/AVP 0 127
a=rtpmap:0 PCMU/8000
a=rtpmap:127 telephone-event/8000

SIP/2.0 487 Request Terminated
From: "x3100" <sip:11112343100@avaya.com:5062>;tag=80348f4b263ddc15a046ae42c00
To: "30345" <sip:30345@avaya.com>;tag=80348f4b263ddc12a046aeefa00
Call-ID: 80348f4b263ddc15b046ae42c00
CSeq: 2 INVITE
Via: SIP/2.0/TCP ip_address:5062;branch=z9hG4bK80348f4b263ddc15d046ae42c00
Server: Avaya CM/R015x.00.0.818.0
Content-Length: 0