

Analyze Assure Accelerate™

Application Note

Abacus Events AutoTrack

June 2004



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Contents

Overview	2
Introduction	2
Abacus Events	;
AutoTrack	;
Configuration Steps	ś
Reviewing Attachments	ś
Summary	;





Abacus Events AutoTrack

This application note provides guidelines for analyzing reported errors.

In this document...

This application note contains the following topics:

- **Overview** 2
- Introduction 2
- Abacus Events 3
- AutoTrack 5
- Summary 8

Overview

Test Engineers all over the world are working with more and more complicated test scenarios for VoIP equipment and network testing. The collection of results, pass/not pass conditions, test configurations, and lists of errors to analyze are growing exponentially with the constant addition of new technologies, interfaces, policies, and protocols. The ever-increasing capacity of equipment requires test engineers to analyze errors occurring on a large number of channels over a long period of time. The existing analyzing tools usually do not have the ability to store this huge volume of history records in memory.

Not so with Abacus. The new AutoTrack feature automatically analyzes all channels and records a history of calls. AutoTrack makes the analysis of tests, if not enjoyable, less time consuming, more productive, and more efficient.

This application note will assist you in making full use of AutoTrack. You will learn how to configure the tracking and how to view and analyze the data triggered by an event.

Introduction

Abacus provides test and development engineers with a fully integrated IP and PSTN Telephony test system in a single platform. Abacus test methodology allows users to objectively measure Voice Quality (MOS, PSQM, PSQM+, PESQ) under real-world voice and signaling traffic load generation. Abacus provides functional testing, decodes, testing of performance, and interoperability. Abacus 5000 Media Payload formats include tones, WAV, Video (H.261 and H.263 encoding), and encoding and decoding of CODEC variants G.711, G.726, G.723.1, G.729A/B. Supported protocols include:

- PSTN protocols: SS7, CAS, MFR1/R1.5/R2, ISDN PRI, GR-303, V5.1/V5.2.
- Fax and Data Modems: T.30, T.38, V.90, V.92
- VoIP protocols: RTP/RTCP, MGCP, MEGACO, SIGTRAN, H.323 and SIP.

Multiple physical interfaces are provided to connect to the DUT/SUT:

- 10/100/1000Base-T Ethernet for IP traffic
- T1/E1/J1, G.747, and T3/E3 for digital PSTN traffic
- FXO and FXS (ground start/loop start) for analog PSTN traffic

To view and analyze the results of tests configured with all supported means, Abacus provides monitoring tools such as the **Audio Monitor**, **Data Link Monitors**, and various **Signaling Monitors**. In conjunction with these tools, **AutoTrack** delivers powerful and efficient test analysis.

To help you make full use of AutoTrack, the sections below will show you how to specify call generation errors, how to configure AutoTrack, and how to review and analyze the history provided.

Abacus Events

Abacus provides real-time responses to the thresholds and errors specified for carried-out tests. For all errors, you should determine how Abacus should react when an error occurs. Abacus can respond by stopping the script, by stopping the test, or by freezing the errored channel.

Threshold and erroneous states you determine for your tests should be configured in the **Timeouts and Errors** GUI window. Each occurrence of a timeout or error is defined as an *Event*. Events are grouped into occurrences related to system, call generation, and switching timeouts and errors.

The error conditions are processed while the test is running for all active channels on Abacus, and errors are generated in cases of failure. You can display the errors totaled for all of the active channels or for any individual channel.

Examples of errors for call generation are shown in *Figure 1*. The example on the left shows *regular* errors, and the example on the right shows *digit* errors.

Timeouts and Errors

Call Generation Switch Graph:	s				
		Erro	or Re	action	n
Error Condition	Time	SS	ST	FZ	All
No dial tone	4.0	\checkmark			
Continuous dial tone	n/a	√			
No ringback	17.0	1			
No answer	19.0	\checkmark			
No path confirm (first)	19.0	\checkmark			
No path confirm (subsq)	1.5	\checkmark			
Unexpected busy	n/a	\checkmark			
Unexpected congestion	n/a	\checkmark			
No expected busy	4.0	\checkmark			
No tone	3.0	\checkmark			
No energy	3.0	\checkmark			
No silence	3.0	\checkmark			
No string (first digit)	6.0	\checkmark			
No string (subsequent)	2.5	\checkmark			
Connect failed	n/a	\checkmark			
Unexpected disconnect	n/a	\checkmark			
Abnormal Disconnect	n/a	\checkmark			
BERT exceeded	n/a	\checkmark			
Script holdoff	10.0	\checkmark			
No incoming call	20.0	\checkmark			
Caller ID Timeout	n/a				
Received Caller ID is wrong	n/a				
Error while recieving Caller ID	n/a				
PSQM value exceeds threshold	n/a				
Too many bad PSQM frames	n/a				
No PSQM data	6.0	\checkmark			
PESQ value less than threshold	n/a				
Not enough PESQ resources	n/a				
No PESQ data	6.0	\checkmark			
No PRBS	6.0				
Negotiation failed	30.0	\checkmark			
Page transfer failed	100.0	\checkmark			
PPP connection failed	10	\checkmark			
SS7 COT failed	n/a				
Regular Digit					

Figure 1. Examples of Errors for Call Generation

Timeouts and Errors

Call Generation Switch Graphs

		Erre	or Re	action	n
Error Condition	Time	SS	ST	FZ	All
Dialed number not found	n/a				
First digit time out	10.0	\checkmark			
Interdigit timeout	3.0	\checkmark			
Insufficient digits dialed	n/a	\checkmark			
No dialed number	n/a	\checkmark			
No MF R2 back digit (first)	5.0	\checkmark			
No MF R2 back digit (subsq)	5.0	\checkmark			
Wrong MF R2 back digit	n/a	\checkmark			
No MF R2 Silence	10.0	\checkmark			
No MF R1.5 back digit	4.0	\checkmark			
No MF R1.5 forward digit	0.4	\checkmark			
Wrong MF R1.5 digit	n/a	\checkmark			
No MF R1.5 silence	0.4	\checkmark			
Regular Digit					

AutoTrack

There can be tens of thousands of channels configured in a test, and the test can run for days. The major task of AutoTrack is to catch for you the signaling history only on the channels where errors occurred and to provide you with information about failures. AutoTrack provides you not only with the record of an event, but also with the history of signaling messages around the time of the event. One message before and three consecutive messages after the event are recorded. This record is called an **Attachment**. The messages in an Attachment are already decoded and put in a timely order to analyze when and why the event happened, and how the device under test (DUT) responded to the event.

To have Abacus generate Attachments, you must configure the test to do it.

Configuration Steps

First you need to identify which set of originate/terminate channels for which you want to have attachments generated. Use the **Partition and Timing** window to select the sets, and the **Events** window to open the attachments.



Enable and view Attachments as follows:

- **1** For all signaling types, enable the **Attachments** checkbox at the bottom of the **Partition and Timing** window.
- 2 On the **Partition and Timing** | **Association** window, click on a box in the **Attach** column for at least one set. A green checkmark appears.
- 3 Start the test. If an error occurs on one or more channels in the selected set(s), an Attachment will accompany it.
- 4 Open the **Events** window. If an error has occurred, an envelope icon is displayed in the **Attach** column.
- 5 Click on the envelope icon to view the Attachment.

Figure 2 shows the Partition and Timing window with Attachments enabled.

Reviewing Attachments

Events Window

A history of all events that happened during the test is displayed in the **Events** window. The **Events** window provides the following information:

- Real time of event occurrence
- Channel type and channel number
- Action number that identifies the position of the action relative to the start of your script.

Partition	and Tim	ning						×
Associatio	on Timir	ng and Si	cripts P	rotocols				
Set	From	To	Total	Configuration	Links	Path Confirmation	Attach	_
1 🔽	1	256	256	OT OT OT	SIP Sub 2	Default	\checkmark	
2 🔽	257	512	256	TO TO TO	SIP Sub 1	Default		
3 🗖								
4 🗖								
5 🗖								
6 🗖								
7 🗖								
8 🗖								
9 🗖								
10 🗖								
11 🗖								
12 🗖								
13 🗖								
14 🗖								
15								
16								
SIP S	ubscrib	er: 512]					
	Г			Channels	Active terminal	tes O Global Phones	Sets	
E <u>n</u>	able	<u></u> M	ар	O Non-contiguous	Attachments	O Phones By Set		Tidy the Insert
	ж Г	🐼 C	ancel	2 Help		🗍 Split 🛛 🔊 Profil	e	Script 🔗 Edit Action 🔄 PathConf
		-					_	

Figure 2. Partition and Timing Window

- A description of the event
- Comments describing functionality of certain actions
- Phone number associated with the channel
- Reasons for the error
- Attachment file with AutoTrack data

The events are shown in chronological order, with the most recent event appearing at the bottom of the list. Newly received events are added to the list as they occur.

If the test has generated a large number of events, it can take several minutes before the window is displayed. The events of a test are saved in a log file that can be viewed later.

If **Attachment** is configured, an envelope icon appears in the **Attach** column in the **Events** window when the event occurs.

An example of **Events** window for SIP is shown in *Figure 3*, and an example for T1 is shown in *Figure 4*.

1.7	Even	t <mark>s (</mark> Total:	323)	stored in C:\AB/	ACUS2\A25\Abacus\Aba	cus23\Results\2004052	6_004\Even	<u>- 🗆 ×</u>
Ela	psed	Channel	Act	Event	Comment	Phone	Cause Attach	
s ×00(0:00:00			Test Started				
- 000	0:00:09	SIP Sub 2	Trm	No path confirm (first)		4002:14085411002@10.2.16.11	\sim	
) 000	0:00:10	SIP Sub 4	Trm	No path confirm (first)		4004:14085411004@10.2.16.11	\sim	
000	0:00:11	SIP Sub 6	Trm	No path confirm (first)		4006:14085411006@10.2.16.11	\sim	
000	0:00:12	SIP Sub 258	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4258:14085411258@10.2.16.12		
000	0:00:12	SIP Sub 8	Trm	No path confirm (first)		4008:14085411008@10.2.16.11	2	
000	0:00:13	SIP Sub 260	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4260:14085411260@10.2.16.12		
000	0:00:13	SIP Sub 10	Trm	No path confirm (first)		4010:14085411010@10.2.16.11	\sim	
000	0:00:14	SIP Sub 262	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4262:14085411262@10.2.16.12		
000	0:00:14	SIP Sub 12	Trm	No path confirm (first)		4012:14085411012@10.2.16.11	\sim	
000	0:00:15	SIP Sub 264	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4264:14085411264@10.2.16.12		
000	0:00:15	SIP Sub 14	Trm	No path confirm (first)		4014:14085411014@10.2.16.11	\sim	
000	0:00:16	SIP Sub 266	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4266:14085411266@10.2.16.12		
000	0:00:16	SIP Sub 16	Trm	No path confirm (first)		4016:14085411016@10.2.16.11	\sim	
000	0:00:17	SIP Sub 268	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4268:14085411268@10.2.16.12		
000	0:00:17	SIP Sub 18	Trm	No path confirm (first)		4018:14085411018@10.2.16.11	~	
000	0:00:18	SIP Sub 270	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4270:14085411270@10.2.16.12		
000	0:00:18	SIP Sub 20	Trm	No path confirm (first)		4020:14085411020@10.2.16.11	~	
000	0:00:19	SIP Sub 272	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4272:14085411272@10.2.16.12		
000	0:00:19	SIP Sub 22	Trm	No path confirm (first)		4022:14085411022@10.2.16.11	~	
000	0:00:20	SIP Sub 274	1	Unexpected disconnect	A calls B, VoIP, confirms for Call Length	4274:14085411274@10.2.16.12		
	00.00	CID C L DA	Ŧ.,	1 0 <i>e e</i> o		1001110051100101001001011		
	ouble	click on err	or to	open help.				11.

Figure 3. Events Window for SIP

🗶 Even	ts (Total:	6) st	ored in C:\ABA	CUS2\A25\Aba	cus\A 💶 🗙
Elapsed	Channel	Act	Event	Comment Phone	Cause Attach
*000:00:00			Test Started		
000:00:24	T1 Sub 1	1	No path confirm (first)	A calls B, E7771001	\mathbf{M}
000:00:25	T1 Sub 2	1	No path confirm (first)	A calls B, E7771002	
000:00:26	T1 Sub 3	1	No path confirm (first)	A calls B, E7771003	
000:00:27	T1 Sub 4	1	No path confirm (first)	A calls B, E7771004	
000:00:28	T1 Sub 5	1	No path confirm (first)	A calls B, E7771005	
Duth					
pouble	click on err	or to	open neip.		11.

Figure 4. Events Window for T1

Attachment Review

To view the history of signaling flow around the event, double-click on an envelope icon. The history screen with decoded messages appears.

Figure 5 shows the **Events** window with an Attachment open for SIP, and *Figure 6* shows the **Events** window with an Attachment open for SS7. The failed call is shown in red.

You can see from these examples how the messages flow relates to events. In the SS7 example, you see the message "Release" because of "Unexpected Disconnect" error. This error could happen, for example, if the device under test (DUT) lost connection to Abacus or dropped the call.

In the SIP example, the ACK message got through, but the path for voice was lost at 1min 48sec (elapsed time). An error "No Path Confirmation" was generated. The originate channel disconnects the call and sends a BYE message, and then receives OK from the terminate side. It indicates that the signaling worked correctly, but RTP processing failed on the DUT.

If during the three calls after the reviewed event occurs, new events come to the **Events** window on the same channel, they will appear in the same Attachment. No new Attachments will be generated for such events, to avoid an infinite list of Attachments. After the duration of the three calls after the errored event has expired, AutoTrack will process the next events, and a new Attachment can be opened.

Summary

This application note has shown how you can utilize additional Abacus analyzing capabilities to make your testing or development more productive. You learned how to configure your test to use the most important functions of AutoTrack:

- Help you to concentrate on analyzing only the small number of failed channels, instead of going through thousand and thousands recorded calls.
- Present a history of messages surrounding the event.

🐲 Events	(Total:4)	stored i	in C:\Abacus\Errors_n	o_cct\Results\	20040528_00	3\Event.lo	g 🗕 🗖	×		
Elapsed	Channel	Act	Event	Comment	Phone	Cause	Attach			
*000:00:00			Test Started	17						
000:01:48	SIP Sub 1	1	No path confirm (subsq)	A calls B, VoIP,	confi4001:140854	110				
000:01:49	SIP Sub 2	1	No path confirm (subsq)	A calls B, VoIP,	confi4002:140854	1110				
*000:05:22	1 54.0 - 1 976 A 15		Test Stopped : User Stop			2.21.21.0				
Double click	on error to a	open help.								
😼 Attack	ment: SIF	Sub 1 -	No path confirm (sub	sq)						X
Ti	me	Descripti	on							
000:01:	23.532		a=rtpmap:0 PCMU/	8000						~
000:01:	23.532	C	Dms TX:							
000:01:	23.532		ACK sip:14085411	129010.2.16.1	.2 SIP/2.0					
000:01:	23.532		f: <sip:14085411< td=""><td>001010.2.16.1</td><td>1>;tag=b1002</td><td>20a-13c4-3</td><td>39551824-</td><th>-19c95d-49c1f61f</th><td></td><td></td></sip:14085411<>	001010.2.16.1	1>;tag=b1002	20a-13c4-3	39551824-	-19c95d-49c1f61f		
000:01:	23.532		t: <sip:14085411< td=""><td>129010.2.16.1</td><td>.2>;tag=c1002</td><td>20a-13c4-4</td><td>40Ъ70Ъ99-</td><th>-19c95e-7870ff65</th><td></td><td></td></sip:14085411<>	129010.2.16.1	.2>;tag=c1002	20a-13c4-4	40Ъ70Ъ99-	-19c95e-7870ff65		
000:01:	23.532		Call-ID: 8742300	-b10020a-13c4	-39551824-19	c95d-6ee:	4479010.	.2.16.11		
000:01:	23.532		CSeq: 1 ACK							
000:01:	23.532		Via: SIP/2.0/UDP	10.2.16.11:5	060;branch=:	29hG4bK-39	9551825-1	19cb5a-16af35		
000:01:	23.532		Max-Forwards: 70							
000:01:	23.532		Contact: <sip:14< td=""><td>085411001@10.</td><td>2.16.11></td><td></td><td></td><th></th><td></td><td></td></sip:14<>	085411001@10.	2.16.11>					
000:01:	23.532		Content-Length:	0						
000:01:	23.532									
000:01:	48	No path	n confirm (subsq)							
000:01:	48.877	25,345	āms TX:						1	665
000:01:	48.877		BYE sip:14085411	129010.2.16.1	.2 SIP/2.0					
000:01:	48.877		f: <sip:14085411< td=""><td>001010.2.16.1</td><td>1>;tag=b1002</td><td>20a-13c4-3</td><td>39551824-</td><th>-19c95d-49c1f61f</th><td></td><td></td></sip:14085411<>	001010.2.16.1	1>;tag=b1002	20a-13c4-3	39551824-	-19c95d-49c1f61f		
000:01:	48.877		t: <sip:14085411< td=""><td>129010.2.16.1</td><td>.2>;tag=c1002</td><td>20a-13c4-4</td><td>юъ70ъ99-</td><th>-19c95e-7870ff65</th><td></td><td></td></sip:14085411<>	129010.2.16.1	.2>;tag=c1002	20a-13c4-4	юъ70ъ99-	-19c95e-7870ff65		
000:01:	48.877		Call-ID: 8742300	-b10020a-13c4	-39551824-19	egsd-6ee:	4479@10.	.2.16.11		
000:01:	48.877		CSeq: 2 BYE							
000:01:	48.877		Via: SIP/2.0/UDP	10.2.16.11:5	060;branch=s	9hG4bK-39	955183e-1	la2e5b-2e6a8fed		
000:01:	48.877		Max-Forwards: 70							
000:01:	48.877		Content-Length:	0						
000:01:	48.877									
000:01:	51.200	2,323	Ams RX:							
000:01:	51.200		SIP/2.0 200 OK							
000:01:	51.200		f: ≺sip:14085411	001010.2.16.1	1>;tag=b1002	20a-13c4-3	89551824-	-19c95d-49c1f61f		
000:01:	51.200		t: <sip:14085411< td=""><td>129010.2.16.1</td><td>.2>;tag=c1002</td><td>20a-13c4-4</td><td>10Ъ70Ъ99-</td><th>-19c95e-7870ff65</th><td></td><td></td></sip:14085411<>	129010.2.16.1	.2>;tag=c1002	20a-13c4-4	10Ъ70Ъ99-	-19c95e-7870ff65		
000:01:	51.200		Call-ID: 8742300	-b10020a-13c4	-39551824-19	9c95d-6ee	4479010.	.2.16.11		~
A										

Figure 5. Events Window with Attachment for SIP

lapsed	Channel	Act	Event	Comment	Phone	Cause	Attach	
00:00:30	T1 SS7 Ex 23	1	Unexpected disconnect	A calls B, ISUP,	confii2221023			1
000:00:31	T1 SS7 Ex 24	1	Unexpected disconnect	A calls B, ISUP,	confii2221024			
00:00:32	T1 SS7 Ex 1	1	Unexpected disconnect	A calls B, ISUP,	confii2221001			1
000:00:32	T1 SS7 Ex 2	1	Unexpected disconnect	A calls B, ISUP,	confii2221002			
00:00:32	T1 SS7 Ex 3	1	Unexpected disconnect	A calls B, ISUP,	confii2221003			
100:00:32	T1 SS7 Ex 4	1	Unexpected disconnect	A calls B, ISUP,	confii2221004			
00:00:32	T1 SS7 Ex 5	1	Unexpected disconnect	A calls B, ISUP,	confii2221005			
	T4 007 F 0	9	- 11 - T - 1 - P	1 1 5 1005	// 0004 000			

Time	Description		
000:00:32	L3 ISUP (ANSI)		
000:00:32	12 00001100 Message	12(REL_Release)	
000:00:32	13 00000010 Pointerl	2	
000:00:32	14 00000000 Pointer2	0	
000:00:32	15 00000010 Cause_Indicators_Var_	Length 2	
000:00:32	160000 Location	User	
000:00:32	0 Cause_Indicator_Spare	• '0'B	
000:00:32	.00 Coding_STD	CCITT_Standardized_Coding	
000:00:32	1 Extension	Last_Octet	
000:00:32	17 .0010000 Cause_Value	Normal_Call_Clearing	
000:00:32	1 Extension	Last_Octet	
000:00:32			
000:00:32	Unexpected disconnect		
000:00:32	1. 12:03:08.002 Tx 0.10.2		
000:00:32	Ll Primitive		
000:00:32	1 00000000 Primitive LO_Raw_Mess	sage	
000:00:32	L2 MTP3 (ANSI)		
000:00:32	20101 Service	5(ISDN_User_Part)	
000:00:32	00 Priority	Priority_0	
000:00:32	00 Network_Indicator	International_Network	
000:00:32	3 ******* DPC	'C80000'H	
000:00:32	6 ******** OPC	'640000'H	
000:00:32	9 00000100 SLS	'04'H	
000:00:32	10 ********* CIC	'00000000000000'B	
000:00:32	00 Spare	'00'B	

Figure 6. Events Window with Attachment for SS7