Test Report of Atom CPU with asterisk G729-G711 codec transcoding

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Some people buy the Intel CPU (Atom 230) to build an asterisk server. I did a simple test for codec transcoding. The purpose of test case is only for reference when you build a Atom CPU based asterisk server, maybe the test environment is not really completed due to some limitations such as test tools, bandwidth of LAN, Network card, version of g729 and the duration of timing, but I try to give you a picture for asterisk server with transcoding. In this paper, I will cover installation of G729, testing tools, result of testing and some screens.

1) Installation of Open Source G729

Before installing g729 codec, make sure the asterisk server can run properly, then go to the official website to get the binary files and copy those two files into the default path. The two figure show the modules as below:

app_read.so	cnan_pnone.so	
app_realtime.so	chan_sip.so	
app_record.so	chan_skinny.so	
app_sayunixtime.so	chan_zap.so	under
app_senddtmf.so	codec_adpcm.so	/usr/lib/asterisk
app_sendtext.so	codec_alaw.so	
app_setcallerid.so	- codec_a_mu.so	
app_setcdruserfield.so	codec_g723-ast14-i	.cc-glibc-pentium4-sse3.so
app_settransfercapability.so	codec_g726.so	
app_sms.so	codec_g729-ast14-g	<pre>gcc4-glibc-pentium4-sse3.so</pre>
app softhangup.so	codec gsm.so	

pogon*CLI> show translation															
	Translation times between formats (in milliseconds) for one second of data														
	Source Format (Rows) Destination Format (Columns)														
		g723	gsm	ulaw	alaw	g726aa12	adpcm	slin	lpc10	g729 :	peex	ilbc	g726	g722	
	g723							1		14					
	gsm	19				7			10	15			7		
	ulaw	18	6	—	1	6	2	1	9	14	-				
	alaw	18	6	1		6	2	1	9	14	-				
g72	6aa12	21	9	5	5	_	5	4	12	17	-		1		
	adpcm	18			2			1		14					
	slin	17		1	1		1			13					
	lpc10	21						4		17			9		
	g729	21						4	12	-					
	speex									-					
	ilbc									-					
	g726	21			5	1		4	12	17					
	g722	-	-	-	-	—	-	-	-	<u> </u>] –	-	-	-	



2) Set testing tools

Here, three tools are used: Sipp, tpcdump and wireshark. Please go to those official websites to get those tools. You must use tcpdump or wireshark to get a G729 code pcap file. The easy way to get G729 file is that, using Xlite-Pro version to call other SIP phone and record down the file with G729 codec by this: tcpdump -T rtp -vvv dst 192. 168. 2. 108 -w g729. pcap This should capture the RTP stream from asterisk server and save it as g729.pcap file. You must make sure the Xlite-pro solely use G729 codec. You also can use Wireshark to capture G729 codec and save as G729.pcap. Capturing the G729 RTP stream by Wireshark filter:

(ip.dst == 192.168.2.108) && (rtp.p_type == 18)

this will filter the G729 codec from 192.168.2.108. Once you get the G729 codec file, you put the file under pacp folder under Sipp:



Figure 2

After that, you have to edit the uac_pcap.xml to make sure Sipp will play with RTP stream. You have to edit the uac_pcap.xml like this:



Figure 3

Once the Sipp side is done, you have to add a sip account in asterisk server 1. The sip is named sipp. Please add an account in asterisk sip.conf. the SIP account information should like this:

```
[sipp]
type=friend
context=internal
host=192.168.2.111
port=6000
user=sipp
canreinvite=no
disallow=all
allow=a729
;allow=alaw
;allow=ulaw
```



And you add other sip (for example 1000) account with codec allow=ulaw or alaw only. SIP 1000 will forward the sip call from Spp to asterisk 2, in asterisk 2, some sound files will be played for certain periods. The dialplan in asterisk 1 likes this:

```
[internal]
; dummy extension just forServer Asterisk 2 IP
exten => 2005,1,Answer
exten => 2005,n,DIAL(SIP/10000192.168.2.127,80,r)
exten => 2005,n,Hangup
```

Figure 5

In this scenario, transcoding will be done from G729 to G711. If you do not set it properly, asterisk server will report codec compatibility error. The Sipp test can not be made, please double check that. Until this step, you can execute the Sipp command to test:

sipp -sf uac_pcap.xml -s 2005 192.168.2.108 -r 20 -rp 10000

sipp will call uac_pcap.xml file first, and go to asterisk dialplan, the context "internal" will be called with asterisk server 1. It will generate 20 calls in 10 seconds. You can test it with different time variables. You also can press =-*/ to increase the calls or decrease calls. You can monitor the calls during call connection time by running *sip show channels* under asterisk console, you will see the sipp using g729 and 1000 using ulaw. The figure shows this:

Executing	[2005@inter	nal:11 Answer	("SIP/sipp-b7	dOda18", "") in n	ew stack						
Executing	Executing [2005@internal:2] Dial("SIP/sipp-b7d0da18", "SIP/1000@192.168.2.127 80 r") in ne										
Called 10000192.168.2.127											
STD/102 168 2 127_00410f0 enemared STD/einn_h740de18											
ogon*CLI> sip s	ogon*CLI> sin show channels										
Peer	User/ANR	Call ID	Seq (Tx/Rx)	Format	Hold	Last Message					
92.168.2.127	1000	40251edf272	00102/00000	Dx80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	2-6080192.1	00101/00001	Dx100 (g729)	No	Rx: ACK					
.∋2.168.2.127	1000	398774836a5	00102/00000	Dx80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	1-6080192.1	00101/00001	Dx100 (g729)	No	Rx: ACK					
92.168.2.127	(None)	07c6bb5568e	00101/00102	DxO (nothing)	No	Rx: OPTIONS					
92.168.2.127	1000	39d177673b3	00102/00000	0x80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	453-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK					
92.168.2.127	1000	3b2b9d1a43f	00102/00000	0x80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	452-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK					
.∋2.168.2.127	1000	330091333a1	00102/00000	0x80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	451-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK					
.∋2.168.2.127	1000	08ce67ad11a	00102/00000	0x80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	450-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK					
.∋2.168.2.127	1000	73edbf397a6	00102/00000	0x80004 (ulaw h	No	Tx: ACK					
.∋2.168.2.111	sipp	449-2420019	00101/00001	0x100 (g729)	No	Rx: ACK					
1 <mark>5 active SIP ch</mark>	annels										
Executing	[2005@inter	nal:1] Answer	("SIP/sipp-b7	d25538", "") in n	ew stack						
Evecuting	[2005@inter	nal 21 Dial ("	STP/sinn-h7d2	5538" "STP/10000	192 168 2	127[80[r"] in ne					

Figure 6

3) Result of Testing

The results are summarized to give users some statistical data. The scenarios are:

The scenario one:

Sipp(g711)->asterisk-1 with Atom CPU (g711)->asterisk-2(g711)

The scenario two:

Sipp(g729)->asterisk-1	with	Atom	CPU

(g729->g711)->asterisk-2(g711)

After testing, the results are show as below:

	Usage of CPU	Current calls	Mem	CPS
10c-10s	40%	18	3.5	2
20c-10s	53%	24	3.5	2
25c-10s	70%	30	3.5	3
30c-10s	93%	36	3.5	3
	Ulav	v->ulaw		
	Usage of CPU	Current calls	Mem	CPS
10c-10s	9%	12	3.5	1
20c-10s	10%	24	3.5	1
25c-10s	17%	30	3.5	2
30c-10s	17%	37	3.5	3

G729->ulaw

Table 1

Measurement: calls in 10 seconds, for example: 10c-10s means sipp will generate 10 calls in 10 second.



Figure	7

In conclusion, codec contanscoding will consume much CPU resource. During the test, some factors must be considered. They are duration of each events, codecs, length of RTP streams, condition of Lan transmission, Network cards of asterisk servers. For Intel Atom CPU, the current calls should be limited less 30 calls. When the peak time reaches, the SIP calls will generate some warning. For further test improvement, it is very necessary to make a further investigation with g729 codec under Sipp RTP test for more accurate result.

Some screens captured for reference:

The scenario one:

Sipp(ulaw)=>Asterisk1(ulaw)=>asterisk2(ulaw)

top	- 1	19:45:07	up	5:55	, 2 u	sers,	108	ad ave	rage	: 0.00	, 0.03	, 0.00	
Task	ເສ:	76 tota	al,	1 r	unning	, 75	slee	eping,	0	stopp	ed, () zombie	
Cpu	(ສ):	: 0.3%us	з, О	.7%s	у, О.	O%ni,	97.2	2%id,	0.0	l∻wa,	1.7%hi	, O.2%si,	0.0%st
Mem:		505656}	t tot	al,	2874	56k us	sed,	218	200k	: free,	403	284k buffers	3
Swap):	1015800}	t tot	al,		Ok us	sed,	1015	800k	: free,	165	764k cached	
PI	ID U	JSER	PR	NI	VIRT	RES	SHR	S %CP	U %M	EM	ΓIME+	COMMAND	
240	04 r	root	15	0	75764	30m !	5548	s	26	.3 15	:44.55	asterisk	_
	1 r	coot	15	0	2040	632	544	S	0 0	.1 0	:00.64	init	
	2 r	root	RT	0	0	0	0	S	0 0		:00.00	migration/0)
	3 r	root	34	19	0	0	0	S	0 0	0	:00.00	ksoftirqd/0)
	4 r	coot	RT	0	0	0	0	S	0 0		:00.00	watchdog/0	
			5 m			-				E 100		100 - 10	
	ax s	tart sip	op – :	sibb	-si u	ac_pca	ap. xi	11 -s	200	o 192.	100.2.1	108 -r 10	-r - L
	Ca	ll-rate(lengt	th)	Port	Tot	al-t	ime	Tota	l-calls	Remo	te-host	
	10.	0(0 ms)/	20.00	00s	5060		21.0	10 s		16	192.	168.2.108:5	060(UDP)
												_	
											1	1 4	
	Ø	new call	.s dui	ring	1.000	s per	·iod		l ms	schedi	Ler re	solution	
	Ø 5	new call calls (1	s du: .imit	ring 13)	1.000	s per	·iod		1 ms Peak	schedu was 5	calls,	after 10 s	
	9 5 9	new call calls (1 Running,	s du: imit 10]	ring 13) Pause	1.000 ed, 1 4	s per Woken	•iod up		ı ms Peak	schedi was 5	calls,	after 10 s	
	0 5 0 0	new call calls (1 Running, dead cal	.s du: .imit 10] .1 msg	ring 13) Pause g (d:	1.000 ed, 1 iscardo	s per Woken ed)	·iod up		1 ms Peak 0 ou ⁻	schedu was 5 t-of-ca	ller re calls, ll msg	after 10 s (discarded	>
	9 5 9 9 3	new call calls (1 Running, dead cal open soc	s du imit 10 l 1 ms kets	ring 13) Pause g (d:	1.000 ed, 1 4 iscardo	s per Woken ed)	•iod up		ı ms Peak Øou	schedu was 5 t-of-ca	calls,	after 10 s (discarded	>
	0 5 0 3 20	new call calls (] Running, dead cal open soc 12 Total	s dui imit 10 l 1 msg kets RTP	ring 13) Pause g (d: pckt	1.000 ed, 1 iscard ts sent	s per Woken ed) t	·iod up		1 ms Peak Ø ou [.] 33.6'	schedu was 5 t-of-ca 76 last	calls, call msg cll msg	solution after 10 s (discarded d RTP rate) (kB/s)
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total	s dur imit 10 l 1 msg kets RTP	ring 13) Pause g (d: pckt	1.000 ed, 1 iscardo ts sent	s per Woken ed) t	·iod up Mes	sages	1 ms Peak 0 ou 33.6' Re	schedu was 5 t-of-ca 76 last trans	calls, calls msg <u>perio</u> Timeo	solution after 10 s (discarded od RTP rate out Unexpe) (kB/s) cted-Msg
	0 5 0 3 20	new call calls <1 Running, dead cal open soc 12 Total INVITE	s dur imit 10 1 1 msg kets RTP	ring 13) Pause g (d: pckt	1.000 ed, 1 iscardo ts sent	s per Woken ed) t	·iod up Mes 10	sages	1 ms Peak 0 ou 33.6 Re 0	schedu was 5 t-of-ca 76 last trans	calls, calls , call msg <u>perio</u> Timeo Ø	after 10 s (discarded d RTP rate out Unexpe) (kB/s) cted-Msg
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100	s du: imit 10] l msg kets RTP	ring 13> Pause y (d: pckt	1.000 ed, 1 iscardo ts sent	s per Woken ed) t	viod up Mes 10 10	sages	1 ms Peak 0 ou 33.6 8e 0 0	schedu was 5 t-of-ca 76 last trans	calls, calls, cll msg perio Timeo 0 0	after 10 s (discarded d RTP rate out Unexpe) (kB/s) cted-Msg
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180	s du: imit 10 1 l msg kets RTP	ring 13) Pause g (d: pckt	1.000 ed, 1 iscardo ts sent	s per Woken ed) t	viod up Mes 10 10 0	sages	1 ms Peak 0 ou 33.6 33.6 0 0 0	schedu was 5 t-of-ca 76 last trans	calls, calls, cll msg perio D 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0) (kB/s) cted-Msg
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200	s dur imit 10] 1 msg. kets RTP	ring 13> Pause y (d: pckt	1.000 ed, 1 ! iscardd ts sent > 	s per Woken ed> t	•iod up Mes 10 10 0 . 10	sages	1 ms Peak 0 ou 33.6 33.6 Re 0 0 0 0	schedu was 5 t-of-ca 76 last trans	calls, all msg perio D 0 0 0	after 10 s discarded d RTP rate out Unexpe 0 0) (kB/s) cted-Msg
	0 5 0 3 2 0	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200	s dur imit 10] 1 msg. kets RTP	ring 13) Pause y (d: pckt	1.000 ed, 1 iscardo ts sen > 	s per Woken ed> t	•iod up Mes 10 10 0 . 10	sages	1 ms Peak 0 ou 33.6 8 Re 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, .ll msg : peric 0 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0) (kB/s) cted-Msg
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACK	s dur imit 10 1 1 msg kets RTP	ring 13) Pause g (d: pckt	1.000 ed, 1 iscardo ts sent > 	s per Woken ed> t E-RTD1	•iod up Mes 10 10 . 10 . 10	sages	1 ms Peak 0 ou 33.6 3 Re 0 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, ll msg peric 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0) (kB/s) cted-Msg
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACM	s dur imit 10 l l msg kets RTP	ring 13> Pause g (d: pckt	1.000 ed, 1 iscardo ts sent > >]	s per Woken ed> t E-RTD1	•iod up Mes 10 10 . 10 . 10	sages	1 ms Peak 0 ou 33.6 0 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, ll msg peric 0 0 0 0	discarded d RTP rate out Unexpend 0 0 0 20s 1) (kB/s) cted-Msg 0 Calls
	0 5 0 3 20	new call calls (1 Running, dead cal open soc 12 Total 12 Total 180 200 ACM Pause	s dur imit 10 1 1 msg. kets RTP 0 < 0 < 0 < 1 < 1 < 1 < 1 < 1 <	<pre>*ing 13> Pause g <d: 8000<="" nop="" pckt="" pre=""></d:></pre>	1.000 iscardo ts sent > >] J Jms]	s per Woken ed> t	•iod up Mes 10 10 10 10	sages	1 ms Peak 0 ou 33.6 8 8 0 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, ll msg peric 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0 20s 1) (kB/s) cted-Msg 0 Calls
	0 5 0 3 20 3	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACM Pause	s dur imit 10 1 1 msg kets RTP < < < < < < <	<pre>*ing 13> Pause pause pockt pockt NOP 8000</pre>	1.000 iscardo ts sent > >] 0ms]]	s per Woken ed> t	•iod up Mes 10 10 10 10	sages	1 ms Peak 33.6 33.6 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, ill msg peric 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0 20s 1) (kB/s) cted-Msg 0 Calls
	0 5 0 3 20 3	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACM Pause Pause	s dur imit 10] 1 msg kets RTP (<pre>sing 13> Pause y <d: 1000<="" nop="" pck1="" pre="" selected=""></d:></pre>	1.000 iscardd ts sent > >] J J J J J J J J J J J J J	s per Woken ed> t	•iod up Mes 10 10 10 10	sages	1 ms Peak 0 ou 33.6 7 8 0 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, .ll msg : peric 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0 20s 1) (kB/s) cted-Msg 0 Calls
	0 5 0 3 20 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACM Pause BYE	s dur imit 10] 1 msg kets RTP (ring 13) Pause g (d g (d g (d g g (d g (d	1.000 ed, 1 iscardo ts sent > >] 0ms]] 0ms]] 0ms]	s per Woken ed> t	-iod up Mes 10 10 10 10 10 5_	sages	1 ms Peak 33.6 Re: 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, .ll msg : peric 0 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 0 20s 1) (kB/s) cted-Msg 0 Calls
	0 5 0 3 20 3 20	new call calls (1 Running, dead cal open soc 12 Total INVITE 100 180 200 ACM Pause BYE 200	s dur imit 10] 1 msg kets RTP (ring 13> Pause g (d: pckt NOP 8000 NOP	1.000 ed, 1 iscardd ts sent > >] >] 0ms]] 0ms] >	s per Woken ed> t	-iod up 10 10 10 10 10 10 5 5 5	sages	1 ms Peak 33.6 Re 0 0 0 0 0 0 0	schedu was 5 t-of-ca 76 last trans	ller re calls, .ll msg : peric 0 0 0 0 0 0	after 10 s (discarded d RTP rate out Unexpe 0 0 20s 1 0 0) (kB/s) cted-Msg 0 Calls

🖎 start sipp - sipp -sf	uac_pcap.xml	-s 2005 192.168	3.2.108 -r 1 -rp 🗆 🗙
Start Time	2008-10-27	20:17:46:882	1225109866.882182
Last Reset Time	2008-10-27	20:18:24:927	1225109904.927182
Current Time	¦ 2008-10-27	20:18:25:923	1225109905.923182
	+	+	
Counter Name	Periodic val	ue l	Cumulative value
Elapsed Time	00:00:00:996	·	00:00:39:041
Call Rate	4.016 cps	1	1.665 cps
Incoming call created	 1 Ø	 	0
OutGoing call created	l 4	:	65
Total Call created	1	:	65
Current Call	29	:	
Successful call	- 1 2		35
Failed call	l Ø		1
Response Time 1	00:00:00:001	••	00:00:00:024
Call Length	1 00:00:09:005	:	00:00:08:841
[+ - * /]: Adjust :	rate [g]:	Soft exit	[p]: Pause traffic

40s, Cpu 30%, increased by 5 calls in 5 s

The scenario two:

Sipp(g729)=>Asterisk-1(g729->ulaw)=>asterisk-2(ulaw)

Case 1

Cpu 15% asterisk, 20s, 10 calls

hew-host*(CL1>													
ew-host*CLI> show translation														
Translation times between formats (in milliseconds) for one second of data														
	Source Format (Rows) Destination Format (Columns)													
	g723	gsm	ulaw	alaw g	726aa12	adpcm	slin	lpc10	g729	speex	ilbc	g726	g722	
g723				2		2	1		14	_				
gsm	27			3	7			10	15			7		
<u>ulam</u>	2.6	8	_	1	6	2	1	9	14					
alaw	26		1				1		14					
g726aa12	29	11		5		5	4	12	17			1		
adpcm	26		2				1		14					
slin	25	- 7	1	1		1			13					
lpc10	29	11					4		17					
g729	29	11					4	12						
speex														
ilbc														
g72.6	29	11			1		4	12	17					
g722	-	-	-	—	-	-	-	-	_	-	_	—		

10.0(0 ms)/20.000s 5060	21.01 s	10	192.168.2	2.108:5060(UDP)			
0 new calls during 1.001 s per	iod 1	1 ms scheduler resolution					
4 calls (limit 13)	F	eak was 5 d	calls, afte	er 10 s			
0 Running, 10 Paused, 1 Woken	սք						
0 dead call msg (discarded)	Ø	l out-of-ca	ll msg (di:	scarded)			
3 open sockets							
5036 Total RTP pckts sent	1	4.658 last	period RT	P rate (kB/s)			
	Messages	Retrans	Timeout	Unexpected-Msg			
INVITE>	10	0	0				
100 <	10	Ø	Ø	Ø			
180 <	Ø	0	0	Ø			
200 < E-RTD1	10	0	0	Ø			
ACK>	10	Ø					
[NOP]							
Pause [8000ms]	10			0			
[NOP]							
Pause [1000ms]	6			0			
BYE>	6	Ø	Ø				
200 <	6	Ø	Ø	0			

CPU over 80%, increased by 5 calls in 5s

🛤 start sipp - sipp -sf	uac_pcap.xml -s 2005 192.16	8.2.108 -r 1 -rp 🗆 🗙
Start Time	2008-10-27 20:37:42:054	1225111062.054057
Last Reset Time	¦ 2008-10-27 20:39:07:191	1225111147.191057
Current Time	l 2008-10-27 20:39:08:179	1225111148.179057
	+	·
Counter Name	l Periodic value	Cumulative value
Elapsed Time		00:01:26:125
Call Rate	8.097 cps	3.994 cps
Incoming call created	I Ø	
OutGoing call created	8	344
Current Call	70	344
Successful call	+ 8	274
Failed call	. 0	0
Response Time 1	+ 00:00:00:007	 . 00:00:00:006
Call Length		00:00:09:012
L+i-i*i/J: Hajust 1	rate [q]: Soft exit	- Lpl: Pause traffic
谷歌拼音 半:		

top -	20:23	9:32 up	6:3	9, 2 u	sers,	. lo:	ad	avera	ge: (6.60, 1.86	, 0.69
Tasks	: 76	total,	3 :	running	r, 73) slee	≥pi	ing,	0 st	topped, () zombie
Cpu(s)	1: 79	.4%us,	9.5%;	sy, O.	O%ni,	2.0	D%j	id, O	.0៖ឃ៖	a, 3.6%hi	, 5.5%si, 0.0%st
Mem:	50-	5656k to	otal,	3016	36k i	used,		20402	Ok fi	ree, 442	272k buffers
Swap:	101	5800k to	otal,		Okι	used,	1	101580	Ok fı	ree, 167:	132k cached
PID	USER	Pl	R NI	VIRT	RES	SHR	ສ	%CPU	% ME M	TIME+	COMMAND
2404	root	13	5 O	85712	38m	5556	s	196	7.8	24:32.29	asterisk
1	root	13	5 0	2040	632	544	s	0	0.1	0:00.64	init
2	root	R	г о	0	0	0	s	0	0.0	0:00.00	migration/O
3	root	34	4 19	0	0	0	s	0	0.0	0:00.00	ksoftirqd/0
4	root	R	г о	0	0	0	s	0	0.0	0:00.00	watchdog/0
5	root	R	г о	0	0	0	s	0	0.0	0:00.00	migration/1
6	root	34	4 19	0	0	0	s	0	0.0	0:00.00	ksoftirqd/1
7	root	R	г о	0	0	0	s	0	0.0	0:00.00	watchdog/1
8	root	10) -5	0	0	0	s	0	0.0	0:00.00	events/0
9	root	10) -5	0	0	0	s	0	0.0	0:00.00	events/1
10	root	10) -5	0	0	0	s	0	0.0	0:00.01	khelper
11	root	10) -5	0	0	0	s	0	0.0	0:00.00	kthread
15	root	10) -5	0	0	0	s	0	0.0	0:00.00	kblockd/0
16	root	10) -5	0	0	0	s	0	0.0	0:00.00	kblockd/1
17	root	10	6 -5	0	0	0	s	0	0.0	0:00.00	kacpid
109	root	10	6 -5	0	0	0	s	0	0.0	0:00.00	cqueue/0
110	root	10	6 -5	0	0	0	s	0	0.0	0:00.00	cqueue/1
113	root	10) -5	0	0	0	s	0	0.0	0:00.00	khubd
115	root	10) -5	0	0	0	s	0	0.0	0:00.00	kseriod
182	root	2:	1 0	0	0	0	s	0	0.0	0:00.00	pdflush
183	root	13	5 0	0	0	0	s	0	0.0	0:00.02	pdflush
184	root	1'	7 -5	0	0	0	s	0	0.0	0:00.00	kswapd0
185	root	1'	7 -5	0	0	0	s	0	0.0	0:00.00	aio/O
186	root	1'	7 -5	0	0	0	s	0	0.0	0:00.00	aio/1
352	root	1.	1 -5	0	0	0	S	0	0.0	0:00.00	knsmoused

Case 2:

1 call in 5s, after 40 m, the sip calls failed.

on - 1411/109 00 3115	/ Users Load average, V /4	11 79 11 57		
Tasks: 77 total. 1 runn:	ing. 75 sleening. 1 stonm	, 0.12, 0.32 ed. – O zombie		
Cnu(s): 30.7%us. 4.1%sv.	0.0%ni. 58.9%id. 0.0%wa. 3	2.2%hi. 4.1%si. 0.0%st		
Mem: 505656k total. 2)	68956k used. 236700k free.	30792k buffers		
Swap: 1015800k total.	Ok used, 1015800k free.	164544k cached		
7				
PID USER PR NI VI	RT RES SHR S %CPU %MEM '	TIME+ COMMAND		
2402 root 15 0 5853	20 23m 5548 S <u>76 4.7 21</u>	:16.11 asterisk		
2579 root 15 0 914	48 2732 2200 S 1 0.5 0	:09.27 sshd		
2614 root 15 0 91	52 2732 2200 S 0 0.5 0	:02.73 sshd		
1562 moot 15 0 21	<u>, , , , , , , , , , , , , , , , , , , </u>	14 07 ton		
🚥 start sipp - sipp -sf	uac_pcap.xml -s 2005 192.168	.2.108 -r 1 -rp 15 🗗 🗙		
Start Time	2008-10-28 13:37:31:390	1225172251.390625		
Last Reset Time	¦ 2008-10-28 14:22:51:686	1225174971.686625		
Current Time	2008-10-28 14:22:52:681	1225174972.681625		
Counter Name	+ Periodic value	+ ! Cumulative value		
Flansed Time	! 00:00:00:995	00:45:21:291		
Call Rate	4.020 cps	1.834 cps		
	+	+		
Incoming call created	l 0	: Ø		
OutGoing call created	l 4	1 4990		
Total Call created	:	4990		
Current Call	l <u>33</u>			
	+	t		
Successful call	i 4	i 4935		
Falleu Call	e 	·		
Response Time 1 Call Length duration 45				
the range of the r				

Case 3:

5 calls in 10s

op - 20:49:03 up 6:59, 4 users, load average: 0.11, 0.82, 2.64 asks: 82 total, 1 running, 81 sleeping, 0 stopped, 0 zombie pu(s): 8.5%us, 1.0%sy, 0.0%ni, 87.9%id, 0.0%wa, 2.2%hi, 0.5%si, 0.0%st em: 505656k total, 307092k used, 198564k free, 46040k buffers wap: 1015800k total, 0k used, 1015800k free, 167304k cached					
PID USER PR NI VIR	T RES SHR S %CPU %MEM T	IME+ COMMAND			
2404 1000 15 0 8695 5779 root 15 0 217	2 40m 5556 5 19 6.2 55: 2 1008 804 R 1 0.2 0:1	11.12 ton			
1 root 15 0 204	0 632 544 \$ 0 0.1 0:0	DO.64 init			
🛤 start sipp - sipp -sf	uac_pcap.xml -s 2005 192.168	8.2.108 -r 5 -rp 🗆 🗙			
Start Time	2008-10-27 20:57:47:429	1225112267.429000			
Last Reset Time	l 2008-10-27 20:59:48:559	1225112388.559000			
Current Time	2008–10–27 20:5 <u>9:49:554</u>	1225112389.554000			
Counter Name	Periodic value	Cumulative value			
Elapsed Time Call Rate	00:00:00:995 1.005 cps	0 <u>0:02:02:125</u> 0.499 cps			
Incoming call created	 И О	 ผ			
OutGoing call created	l 1	61			
Total Call created	:	61			
Current Call	5				
Successful call	 I Ø	56			
Failed call	. 0	Ø			
Response Time 1 Call Length [+¦-¦*¦/]: Adjust p	+ 00:00:00:001 00:00:00:000 *ate [q]: Soft exit	00:00:00:016 00:00:09:021 - [p]: Pause traffic			

Case 4:

🖪 Realtek RTL8169	/8110 Family Gigal	oit Ethernet NIC				(Licros	soft's H	Packet Scl	neduler)	: Capturing
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>G</u> o	<u>Capture</u> <u>A</u> nalyze <u>S</u> tat	istics <u>H</u> elp								
	🕷 🖻 🖾 ×	°) 🖪 🖣 🗢	🔿 🕺 🛉	7 L [୍୍୍୍ର୍	Q. [M 👪	* 0
Eilter: rtp.p_type==18		•	<u>E</u> xpression	<u>C</u> lear <u>A</u> pp	dy					
No. ↓ Time 4)1894 / 59, 533/26 451895 759, 6337/26 451895 759, 642421 451902 759, 643401 451901 759, 644502 451912 759, 644574 451915 759, 645542 451917 759, 645533 451936 759, 648282 451937 759, 648282 451937 759, 648282 451941 759, 649374 451941 759, 649374 451942 759, 649374	Source 192.108.2.111 192.168.2	Destination 192.168.2.108 192.168.	Protocol RTP RTP RTP RTP RTP RTP RTP RTP	Info Payload T) Payload T)	ype=11U-1 (ype=11U-T (ype=11	5.729, 5,	SSRC=27 SSRC=27 SSRC=27 SSRC=27 SSRC=27 SSRC=27 SSRC=30 SSRC=30 SSRC=30 SSRC=30 SSRC=30 SSRC=30 SSRC=30	18015020, 18015020, 57777981, 18015020, 18015020, 18015020, 18015020, 18015020, 18015020, 18015020, 18015020, 18015020, 57777981, 38015020, 57777981,	Seq=2483 Seq=2483 Seq=1360 Seq=1370 Seq=1377 Seq=1387 Seq=1883 Seq=1883 Seq=1883 Seq=1060 Seq=1060 Seq=1060 Seq=777, Seq=778,	, 11me=223 , Time=1340 , Time=1940 , Time=1341 , Time=1343 , Time=1343 3, Time=1910 , Time=1911 , Time=1911 , Time=10208 Time=10216
Payload type: Sequence numb Timestamp: 17	ITU-T G.729 (18) er: 1634 0640]								
0000 00 1c c0 6f 0010 00 32 47 e7 0020 02 6c 6b d0 0030 02 00 b6 41	5d 5d 00 13 8f f 00 00 80 11 6c a 50 38 00 1e 9e c fd 3d 04 14 4d c	d 9c 26 08 00 45 00 8 c0 a8 02 6f c0 a8 a 80 12 06 62 00 02 7 51 e0 4e 6c 58 04)o]]. 3 .2G .1k.P8.	&E. . 1o. b M o NIX						

top –	- 13:18:12 up 4:05, 2 v	users, load av	erage: 0.09, 0	.14, 0.09		
Tasks	asks: 76 total, 1 running, 75 sleeping, 0 stopped, 0 zombie					
Cpu(s	3): 4.3%us, 0. <u>5%sy, 0</u>	.0%ni, 92.0%id,	0.0%wa, 2.0	%hi, 1.2%si, 0.0%st	5	
Mem:	505656k total, 2740)48k used, 23	1608k free,	38328k buffers		
Swap:	1015800k total,	Ok used, 101	5800k free,	167260k cached		
PII	USER PR NI VIRT	RES SHR S %C	PU %MEM TIM	E+ COMMAND		
2413) root 16 0 25696	10m 5548 S	11 2.1 2:55	.29 asterisk		
2701	l root 15 0 8996	2736 2212 S	0 0.5 0:01	.34 sshd		
3484	łroot 15 0 2168	988 792 R	0 0.2 0:17	.26 top		
1	l root 15 0 2040	636 544 S	0 0.1 0:00	.64 init		
2	root RT O O	0 0 5	0 0.0 0:00	.00 migration/0		
		<u> </u>	<u> </u>			
-	🕶 start sipp - sipp -sf	uac_pcap.xml -	s 2005 192.168	.2.108 -r 10 -rp 2	- 8 ×	
	Start Time	2008-11-04	13:13:36:671	1225775616.671875		
	Last Reset Time	2008-11-04	13:28:35:758	1225776515.758875		
	Current Time	2008-11-04	13:28:36:754	1225776516.754875		
		-+		+		
	Counter Name	Periodic value		¦ Cumulative value		
		+		+		
	Elapsed Time	1 00:00:00:996		00:15:00:083		
1	Call Rate	1.004 cps		1 0.500 cps		
1		+		+		
1	Incoming call created	: Ø		: 0		
1	OutGoing call created	1 1		l 450		
1	Total Call created	:		l 450		
1	Current Call	1 5		:		
1		+		+		
1	Successful call	l 1		l 445		
1	Failed call	: 0		I 0		
3		+		*		
3	Response Time 1	: 00:00:00:002				
3	Call Length	00:00:10:005				
3	[+ - * /]: Adjust	rate [q]:	s 10 call	s in 20 s _{affic}		
3						

Executing	[2005@inter	nal:1] Answer	("SIP/sipp-b70	dOda18", "") in n	ew stack	
Executing	[2005@inter	nal:2] Dial("	SIP/sipp-b7d0	da18", "SIP/10000	192.168.2	.127 80 r") in ne
Called 10	000192.168.2	.127				
SIP/192.1	.68.2.127-09d	110f0 answere	d SIP/sipp-b70	d0da18		
ogon*CLI> sip s	how channels					
Peer	User/ANR	Call ID	Seq (Tx/Rx)	Format	Hold	Last Message
₽2.168.2.127	1000	40251edf272	00102/00000	Dx80004 (ulaw h	No	Tx: ACK
.∋2.168.2.111	sipp	2-6080192.1	00101/00001	Dx100 (g729)	No	Rx: ACK
.∋2.168.2.127	1000	398774836a5	00102/00000	Dx80004 (ulaw h	No	Tx: ACK
₽2.168.2.111	sipp	1-6080192.1	00101/00001	Dx100 (g729)	No	Rx: ACK
. <mark>9</mark> 2.168.2.127	(None)	07c6bb5568e	00101/00102	DxO (nothing)	No	Rx: OPTIONS
. <mark>92.168.2.127</mark>	1000	39d177673b3	00102/00000	0x80004 (ulaw h	No	Tx: ACK
. <mark>92.168.2.111</mark>	sipp	453-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK
. <mark>92.168.2.127</mark>	1000	3b2b9d1a43f	00102/00000	0x80004 (ulaw h	No	Tx: ACK
. <mark>92.168.2.111</mark>	sipp	452-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK
₽2.168.2.127	1000	330091333a1	00102/00000	Dx80004 (ulaw h	No	Tx: ACK
₽2.168.2.111	sipp	451-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK
₽2.168.2.127	1000	08ce67ad11a	00102/00000	Dx80004 (ulaw h	No	Tx: ACK
₽2.168.2.111	sipp	450-2420019	00101/00001	Dx100 (g729)	No	Rx: ACK
. <mark>92.168.2.127</mark>	1000	73edbf397a6	00102/00000	0x80004 (ulaw h	No	Tx: ACK
. <mark>92.168.2.111</mark>	sipp	449-2420019	00101/00001	0x100 (g729)	No	Rx: ACK
5 active SIP ch	annels					
Executing	[2005@inter	nal:1] Answer	("SIP/sipp-b70	d25538", "") in n	ew stack.	
	500050 · ·				100 100 0	1001001

CPU information:

[root@new-host	~];	# cat /proc/cpuinto
processor	-	0
vendor_id	=	GenuineIntel
≥pu family	-	6
model	=	28
model name	=	Intel(R) Atom(TM) CPU 230 R 1.60GHz
stepping	=	2
⊃pu MHz	-	1596.208
cache size	=	512 KB
physical id	-	0
siblings	=	2
core id	-	0
cpu cores	=	1
fdiv_bug	-	no
hlt_bug	=	no
f00f_bug	=	no
coma_bug	=	no
fpu	=	yes
fpu_exception	=	yes
spuid level	=	10
wp	=	yes
flags	=	fpu vme de pse tsc msr pae mce cx8 apic mtrr
t_tsc pni monit	or	ds_cpl tm2 cx16 xtpr lahf_lm
oogomips	=	3257.81
processor		1
vendor id	-	GenuineIntel
≥pu family		6
model	-	28
model name		Intel(R) Atom(TM) CPU 230 @ 1.60GHz
stepping	-	2
pu MHz		1596.208
cache size	-	512 KB
physical id		0
siblings	-	2
core id		0
cpu cores	=	1
fdiv bug		no
hlt bug	=	no
f00f bug		no
coma bug	-	no
fpu		ves
fpu exception	-	ves
cpuid level	:	10
աթ	:	yes
flags	:	fpu vme de pse tsc msr pae mce cx8 apic mtrr
t tsc pni monit	or	ds cpl tm2 cx16 xtpr lahf lm
pogomips	=	3191.77
[root@new-host	~]#	¥ 📕

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Test environments:

Cnetos-5.0

Intel Atom 230 CPU

Tools: Sipp-3.1, tcpdump and Wireshark

Asterisk-1.4.21