LAMPIRAN

Lampiran 1

Instalasi softphone 3CXPhone pada handphone Samsung Galaxy Y i509.

1. Aplikasi dapat diunduh dari Android Market atau Google Play.



2. Setelah proses instalasi selesai buka aplikasi *3CXPhone* kemudian buat profil dengan sentuh tombol *Menu* \rightarrow *Profiles* \rightarrow *Create Profile*.



3. Pada tampilan Account isikan nama yang diinginkan. Pada Textbox User, ID dan Password isikan nomor extension dan password sesuai dengan yang telah diregister pada server 3CX Phone System. Pada Local PBX IP diisi dengan IP dari PC dimana server 3CX Phone System terinstal kemudian sentuh tombol Save untuk menyimpan.

67 🔀	🛜 🗓 🔲 🛑 😭 10:46
Account	
ID	
103	
Password	

Server settings	
I am Out of Off	ice 💌
Local PBX IP	
10.1.16.5	
External PBX IP	
Delete	Save

4. Setelah muncul tampilan *3CXPhone* dengan status *On Hook* maka status *softphone* telah *registered* dan siap digunakan.



Lampiran 2

Analisa *bandwidth, delay, jitter* dan *packet loss* hasil *capture* trafik data VoIP menggunakan aplikasi *wireshark*.

1. Pada aplikasi *wireshark* pilih tab *Telephony* \rightarrow *RTP* \rightarrow *Show All Streams*.



2. Akan muncul tampilan *RTP Streams* yang berisi data *record* dari sesi komunikasi VoIP. Pilih salah satu data sesi komunikasi yang akan dianalisa lalu klik *Analyze*.

Wireshark:	RTP Streams						
	Detect	od E6 DTD stroom	- Chaosa ana far	Forward and roug	ved divertion for an	alucia	
	Detett	eu 50 KTP Stream:	s. Choose one for	Turwaru anu reve	rse urection for an	aiysis	
Src IP addr	 Src port 	 Dst IP addr 	 Dst port 	 SSRC 	 Payload 	 Packets 	💶 Lost 🔄 🔼
10.1.16.5	7042	10.1.16.254	40048	0x4DB7	g711A	1495	0 (0,0%
10.1.16.5	7046	10.1.16.254	40010	0x39B3	g711A	2065	0 (0,0%
10.1.16.5	7038	10.1.16.254	40046	0×440D	g711A	987	0 (0,0%
10.1.16.5	7022	10.1.16.254	40022	0x26E9	g711A	3044	0 (0,0%
10.1.16.5	7034	10.1.16.254	40040	0×99	g711A	554	0 (0,0%
10.1.16.5	7058	10.1.16.254	40028	0×5D03	g711A	7924	182 (2,2
10.1.16.5	7050	10.1.16.254	40016	0x4DC8	g711A	2564	0 (0,0%
10.1.16.5	7062	10.1.16.254	40034	0×4509	g711A	1444	1 (0,1%
10.1.16.5	7054	10.1.16.254	40022	0×428B	g711A	3338	0 (0,0%
10.1.16.5	7018	10.1.16.254	40016	0×6DF1	g711A	3126	0 (0,0%
10.1.16.5	7002	10.1.16.254	40006	0×18BE	g711A	3130	0 (0,0%
10.1.16.254	40028	10.1.16.5	7058	0x4DC8	g711A	6589	1520 (18
10.1.16.254	40034	10.1.16.5	7062	0×428B	g711A	1437	15 (1,0% 🔽
<							>
		Forward: 10.3 Reverse: 10.1.	1.16.254:40048 - 16.5:7042 -> 10.	> 10.1.16.5:7042 1.16.254:40048,	, SSRC=0x99 SSRC=0x4DB7		
Unselect	Find Reverse	Save <u>A</u> s	Mark Packets	Prepare Filter	⊆opy	Analyze	⊆lose

Wirest	nark: RTP	Stream Analy	rsis						
Forward [Direction	Reversed Direct	ion						
Analysing stream from 10.1.16.5 port 7042 to 10.1.16.254 port 40048 SSRC = 0x4DB7									
Packet 🗕	Sequence	 Delta(ms) 	• Filtered Jitter(ms	s) 🖣 Skew(ms)	IP BW(kbps) 🖣 Marker 🔳 🤅	Status	• •	
114526	19718	0,00	0,00	0,00	1,60	SET	[Ok]		
114529	19719	14,80	0,33	5,20	3,20		[Ok]		
114550	19720	26,19	0,69	-0,99	4,80		[Ok]		
114552	19721	14,85	0,97	4,16	6,40		[Ok]		
114556	19722	26,17	1,30	-2,01	8,00		[Ok]		
114558	19723	14,73	1,54	3,26	9,60		[Ok]		
114579	19724	17,64	1,59	5,62	11,20		[Ok]		
114582	19725	26,23	1,88	-0,61	12,80		[Ok]		
114601	19726	14,85	2,09	4,54	14,40		[Ok]	-	
114605	10727	26.18	2 34	-1.65	16.00		1011	M	
Max delta = 27,21 ms at packet no. 119537 Max jitter = 5,33 ms. Mean jitter = 5,13 ms. Max skew = -7,13 ms. Total RTP packets = 1495 (expected 1495) Lost RTP packets = 0 (0,00%) Sequence errors = 0 Duration 29,87 s (-19578 ms clock drift, corresponding to 2757 Hz (-65,53%)									
Save pay	vload	Save as CSV	<u>R</u> efresh	Jump to	Graph	Player	Next non-Ok	⊆lose	

3. Setelah itu akan muncul tampilan RTP Streams Analyze.

Dari langkah-langkah di atas, dapat deketahui data hasil analisa sebagai berikut :

Wiresha	ark: RTP Stre	eam Analysis	-		-						
Forward Direction Reversed Direction			ction								
Analysing stream from 10.1.16.254 port 40006 to 10.1.16.5 port 7002 SSRC = 0x18BE											
Packet 4	Sequence	 Delta(ms) 	 Filtered Jit 	ter(ms) 🖣 Skew(ms)	IP BW(kbps	Marker 🖣 Status	A .				
359	18518	18.87	0.59	0.16	81.60	[Ok]					
362	18519	20.02	0.55	0.14	81.60	[Ok]					
366	18520	20.10	0.52	0.04	81.60	[Ok]					
417	18532	18.99	0.54	0.10	81.60	[Ok]					
430	18536	19.93	0.55	0.18	81.60	[Ok]					
432	18537	16.37	0.74	3.81	81.60	[Ok]					
448	18542	19.03	0.93	-0.01	81.60	[Ok]					
480	18552	17.16	1.04	2.86	81.60	[Ok]	+				
Max delta = 26.04 ms at packet no. 8292 Max jitter = 1.30 ms. Mean jitter = 0.56 ms. Max skew = -6.77 ms. Total RTP packets = 3154 (expected 3154) Lost RTP packets = 0 (0.00%) Sequence errors = 0 Duration 63.06 s (-30 ms clock drift, corresponding to 7996 Hz (-0.05%)											
Save pa	Save payload Save as CSV Refresh Jump to Graph Player Next non-Ok Close										

1. Analisa *bandwidth* dengan *codec* G.711.

2. Analisa *bandwidth* dengan *codec* GSM

Į	🚺 Wiresha	rk: RTP Stre	am Analysis		_				
ſ	Forward	Direction	Reversed Direction	ı					
	Analysing stream from 10.1.16.5 port 7194 to 10 <u>.1.16.254</u> port 40042 SSRC = 0x99								
	Packet 4	Sequence	▲ Delta(ms) ▲ F	Itered Jitter(m	s) ◀ Skew(ms)	IP BW(kbps)	Marker 🖣 Status	4	
	474	3953	17.52 4	.83	0.44	29.78	[Ok]		
	501	3961	17.73 4	.76	2.12	29.78	[Ok]		
	529	3970	17.48 4	.97	0.62	29.78	[Ok]		
	546	3975	17.52 4	.96	0.98	29.78	[Ok]		
	562	3980	17.49 4	.96	1.40	29.78	[Ok]		
	569	3982	14.82 5	.04	0.39	29.78	[Ok]		
	585	3987	17.48 5	.01	0.81	29.78	[Ok]		
	594	3990	17.60 4	.93	2.14	29.78	[Ok]	+	
	Max delta = 26.43 ms at packet no. 7430 Max jitter = 5.33 ms. Mean jitter = 5.11 ms. Max skew = -10.78 ms. Total RTP packets = 3117 (expected 3117) Lost RTP packets = 0 (0.00%) Sequence errors = 0 Duration 62.32 s (-82 ms clock drift, corresponding to 7990 Hz (-0.13%)								
	Save pay	/load	Save as CSV	<u>R</u> efresh	<u>J</u> ump to	Graph	Player Next non-Ok	<u>C</u> lose	

 Analisa delay, jitter dan packet loss. Delay diambil dari nilai Max delta, jitter diambil dari nilai Max jitter dan packet loss diambil dari nilai Lost RTP packets.

Forward Direct	ion Reversed Dire	ction								
	Analysing stream from 10.1.16.5 port 7002 to 10.1.16.254 port 40006 SSRC = 0x18BE									
Packet 4 Sequ	ience 🖣 Delta(ms)	Filtered Jitter(ms)	 Skew(ms) 	IP BW(kbps	Marker 4 Status	A 1				
2974 1926	3 14.79	5.85	13.98	84.80	[Ok]					
3723 1948	1 14.70	5.36	14.49	84.80	[Ok]					
2684 1918	14.85	7.49	14.51	83.20	[Ok]					
2705 1918	5 26.23	6.92	9.77	83.20	[Ok]					
2763 1920	3 14.85	6.13	15.04	83.20	[Ok]					
2766 1920	4 26.10	6.13	8.94	83.20	[Ok]					
2964 1926	0 26.29	5.92	9.78	83.20	[Ok]					
2970 1926	26.25	5.90	8.77	83.20	[Ok]	+				
2970 19202 20.23 3.50 6.77 83.20 [0K] Max delta = 61.81 ms at picket no. 3561 Max jitter = 11.71 ms. Mcan jitter = 5.36 ms. Max Skew = -31.73 ms. Total RTP packets = 3130 (expected 3130) Lost RTP packets = 0 (0.00%) Sequence errors = 0 Duration 62.57 s (-29 ms clock drift, corresponding to 7996 Hz (-0.05%) Save payload Save as CSV Refresh Jump to Graph Player Next non-Ok Close										

4. Analisa pada jaringan wireless.

Z	U Wiresha	ark: RTP Stre	am Analysis							x	
ſ	Forward	Direction	Reversed Dire	ection							
	Analysing stream from 10.1.16.37 port 40030 to 10.1.16.18 port 40040 SSRC = 0x3D6C										
	Packet 🔺	Sequence	 Delta(ms) 	 Filtered Jitt 	ter(ms) 4 Skew(ms)	 IP BW(kbp 	s • Marker	 Status 	4	*	
	61	19169	0.00	0.00	0.00	1.60	SET	[Ok]			
	63	19170	19.68	0.02	0.32	3.20		[Ok]			
	67	19171	19.86	0.03	0.46	4.80		[Ok]			
	71	19172	19.59	0.05	0.88	6.40		[Ok]			
	75	19173	19.90	0.06	0.98	8.00		[Ok]			
	79	19174	18.55	0.14	2.43	9.60		[Ok]			
	81	19175	21.45	0.22	0.99	11.20		[Ok]			
	85	19176	20.14	0.22	0.85	12.80		[Ok]		-	
	Max delta = 89.62 ms at pactet no. 6675 Max jitter = 8.51 ms. Mean itter = 0.58 ms. Max skew = -66.05 ms. Total RTP packets = 3055 (expected 3055) Lost RTP packets = 0 (0.00%) Sequence errors = 0 Duration 61.08 s (-46 ms clock drift, corresponding to 7994 Hz (-0.07%)										
	Save pag	yload	Save as CSV	<u>R</u> efresh	Jump to	Graph	Player	Next non-0	k <u>C</u> lose		