

SILICON VALLEY



OWASP

Open Web Application
Security Project

oad.exe

```
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Kerio\Personal Firewall 4\kpfw.exe
C:\Program Files\Norton AntiVirus\navapvc.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHnt.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPFHnt.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Kerio\Personal Firewall 4\kpfw.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\ad-aware.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
```



SDN



\$ whoami

Almog Ohayon

Co-founder and Chief Product @ Javelin-Networks

Lots of Certifications

Lots of Hands-on

Lots of Customers

Lots of Lectures

Lots of Hacking

<https://twitter.com/md5session>
almog@javelin-networks.com



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe
C:\Program Files\Norton AntiVirus\navapsvc.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPRO...
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LE\symalcsvc.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsg.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asimn.exe

Is it really that **bad** out there ???

White Hat Hacking

In **2014** we saw the highest number of reported vulnerabilities (CVEs) ever, reaching **7945**. Over 2000 vulnerabilities have been reported in 2015.

CERT-UK

2014 Top 10 Web Hacks

1. **Heartbleed**
2. ShellShock
3. POODLE
4. Rosetta Flash
5. Misfortune Cookie
6. Hacking PayPal Accounts with 1 Click
7. Google Two-Factor Authentication Bypass
8. Apache Struts ClassLoader Manipulation Remote Code Execution
9. Facebook Hosted DDoS with Notes App.
10. Covert Timing Channels based on HTTP Cache Headers



Tens of Alexa Top 1,000 Websites Vulnerable to Heartbleed Attacks

Yahoo, Flickr, Imgur and KAT are still vulnerable, experts found



#!/bin/bash

```
~root: env X="()" { ;; } ; echo shellshock" /bin/sh -c "echo completed"
```



POODLE Attack and SSLv3 Deployment

Good News! Your browser does not support SSLv3.

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 29/04/2009
Platform: Windows
MSIE: Internet Exp

Running processes:

C:\WINDOWS\System32
C:\WINDOWS\system32
C:\WINDOWS\system32
C:\WINDOWS\system32
C:\WINDOWS\system32
C:\WINDOWS\System32
C:\Program Files\S
C:\WINDOWS\system32
C:\Program Files\F
C:\Program Files\K
C:\Program Files\N
C:\Program Files\N
C:\Program Files\N
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBBC\SPBBCSvc.exe



Emails blamed for Bundestag cyberattack

The cyberattack on Germany's parliament has been traced to a link contained in at least two emails, according to a newspaper report. Parliamentarians left unaware of the breach for three weeks have slammed the delay.



AA FONT SIZE + PRINT AP

OPM Breach Just Put America's Spies 'At High Risk'

JUNE 12, 2015 BY PATRICK TUCKER

Hackers may now have detailed biographical information and a virtual phonebook of virtually every United States intelligence asset. [Intelligence](#)

THE DUQU 2.0

KASPERSKY Lab

APT28:

A WINDOW INTO RUSSIA'S CYBER ESPIONAGE OPERATIONS?

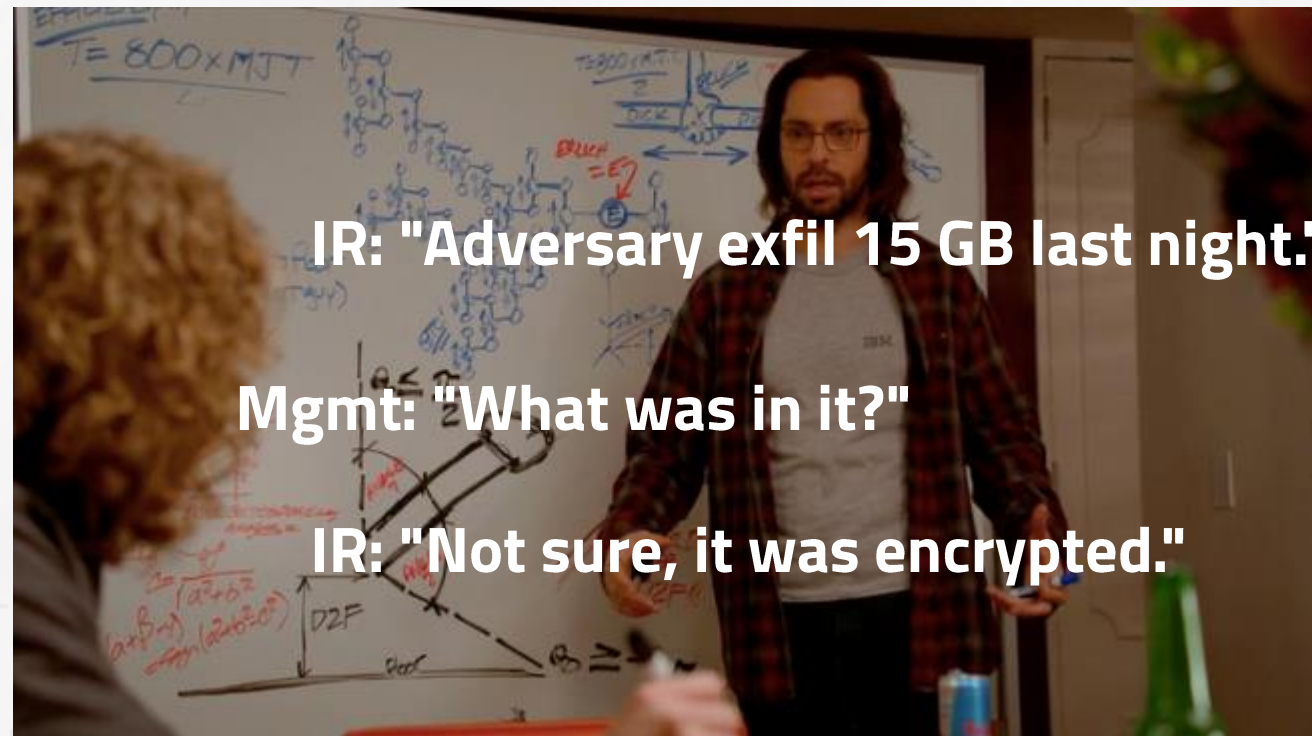
Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2
Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Fichiers communs\Symantec Shared\firewall 4\kpf4ss.exe
C:\Program Files\Norton AntiVirus\navapsvc.exe
C:\Program Files\Norton AntiVirus\NRE\NPFM.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBSC\SPBSCSvc.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe
C:\WINDOWS\system32\ati2evxx.exe

- Zero-Trust
- Assume breached

q: IF YOU COULD ACCESS NSA
DATA, WHO WOULD YOU
STALK?

A: WHAT DO YOU MEAN "IF"





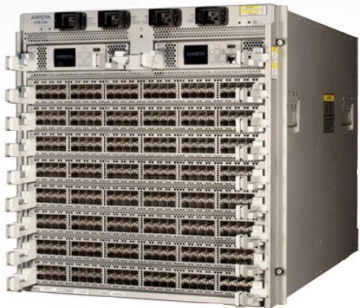
YAHOO!

AppSec is Eating Security

PRESENTED BY Alex Stamos | AppSec Cali | January 27, 2015

Alex Stamos - Yahoo's CISO and VP of InfoSEC

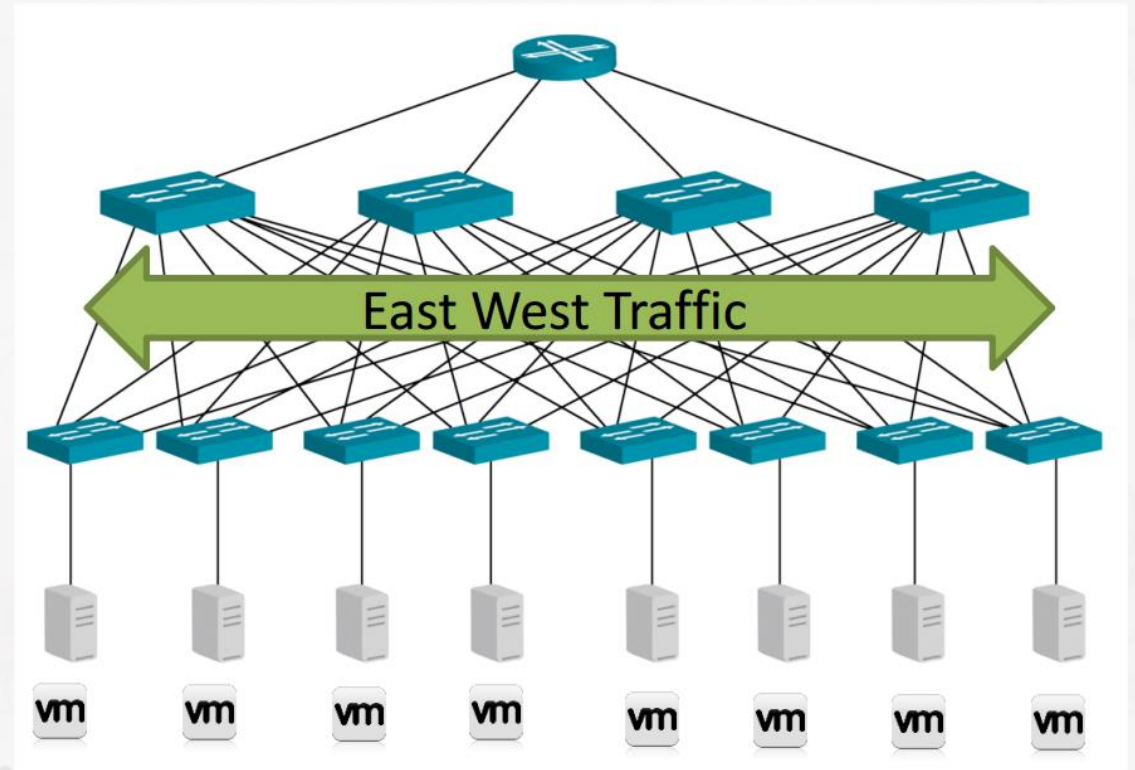
Security hardware is becoming un-buyable



Arista 7508E
1152 x 10GbE
30Tbps backplane
5kW



Palo Alto 7050
120Gbps throughput
2.4kW



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe

SDN



C:\WINDOWS\system32\LVCom3.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.exe
C:\Program Files\Outlook Express\msimn.exe

White Hat Haxxor

Compare Search terms ▾

Software-defined networking

Topic

docker

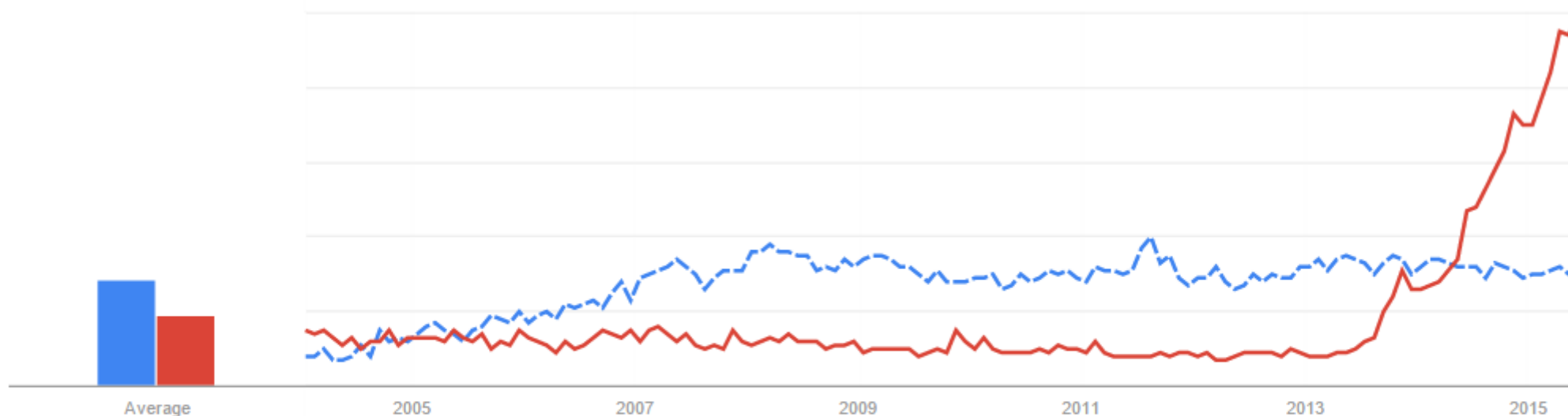
Search term

+ Add term

Beta: Measuring search interest in *topics* is a beta feature which quickly provides accurate measurements of overall search interest. To measure search interest for a specific *query*, select the "search term" option. ?

Interest over time ?

☐ News headlines ☐ Forecast ?



</>

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:
C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe

Misconceptions

OpenFlow Management
Automation Buzzword NFV
Protocol Controller API



C:\WINDOWS\system32\LVCom3.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.exe
C:\Program Files\Outlook Express\msimn.exe

White Hat Haxxor



```
Logfile of HijackThis v1.99.1
...
C:\Program Files\Fichiers communs\Symantec Shared\ccSetNgr.exe
C:\Program Files\Kerio\Personal Firewall 4\bnf4cc.exe
C:\Program Files\Norton AntiVirus\navapvc.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHx.exe
C:\Program Files\Norton AntiVirus\AdvTools\
C:\Program Files\Fichiers communs\Symantec
C:\Program Files\Kerio\Personal Firewall 4\
C:\Program Files\Fichiers communs\Symantec
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec
C:\WINDOWS\system32\Ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\po
C:\Program Files\Lavasoft\Ad-Aware SE Profe
C:\Program Files\Fichiers communs\Symantec
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsg.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.e
C:\Program Files\Internet Explorer\IEXPLORE
C:\Program Files\Outlook Express\asian.exe
```

1996

```
Router> enable
Router# configure terminal
Router(config)# enable secret cisco
Router(config)# ip route 0.0.0.0 0.0.0.0 20.2.2.3
Router(config)# interface ethernet0
Router(config-if)# ip address 10.1.1.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface serial0
Router(config-if)# ip address 20.2.2.2 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# router rip
Router(config-router)# network 10.0.0.0
Router(config-router)# network 20.0.0.0
Router(config-router)# exit
Router(config)# exit
Router# copy running-config startup-config
Router# disable
Router>
```

Terminal Protocol: **Telnet**

2013

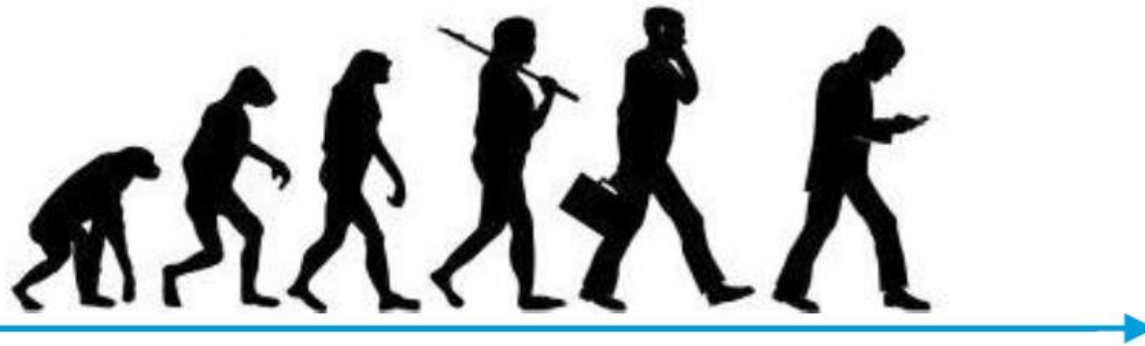
```
Router> enable
Router# configure terminal
Router(config)# enable secret cisco
Router(config)# ip route 0.0.0.0 0.0.0.0 20.2.2.3
Router(config)# interface ethernet0
Router(config-if)# ip address 10.1.1.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface serial0
Router(config-if)# ip address 20.2.2.2 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# router rip
Router(config-router)# network 10.0.0.0
Router(config-router)# network 20.0.0.0
Router(config-router)# exit
Router(config)# exit
Router# copy running-config startup-config
Router# disable
Router>
```

Terminal Protocol: **SSH**

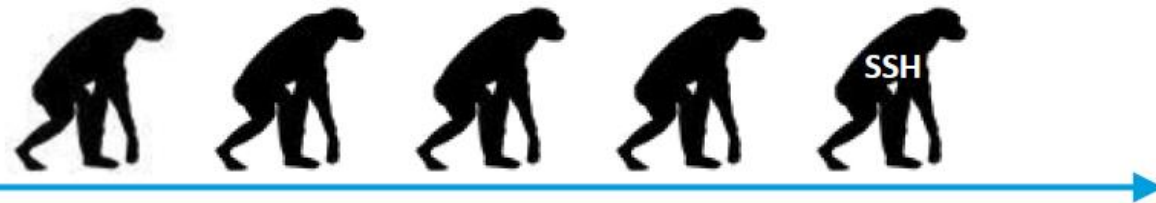
Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 09/09/2009
Platform: Windows XP SP2
MSIE: Internet Explorer v6.0.5959.62

Running processes:
C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Stardock.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe
C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft Office\Office\OUTLOOK.EXE
C:\Program Files\Lavasoft\Ad-Aware\Ad-Aware.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\Program Files\QuickTime\QuickTime.exe
C:\Program Files\Logitech\Logitech.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM.saf.exe
C:\Program Files\WinZip\WinZip.exe
C:\Program Files\Kerio\PeaSoft\Kerio.exe
C:\WINDOWS\system32\LVComd.exe
C:\Program Files\Logitech\Logitech.exe
C:\Program Files\Internet Explorer\Internet Explorer.exe
C:\Program Files\Outlook\Outlook.exe

COMPUTE EVOLUTION



NETWORKING EVOLUTION



Compute



Storage



Network



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSI Internet Explorer v6.00 SP2 (6.00.2900.1800)

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\smss.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetNgr.exe
C:\Program Files\Symantec Shared\ccpf4ss.exe
C:\Program Files\Symantec Shared\ccpf4ss.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrvc.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Symantec Shared\SPBSC\SPBSCSvc.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symlcsvc.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtNgr.exe
C:\WINDOWS\SoundMAN\EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\System32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asian.exe

In terms of Deployment SDN is Slightly different for:

- Service Provider
- Data Center
- Enterprise
- Campus networks
- Cloud
- WAN and Metro Links

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSI...

Ok, please tell me what is SDN, Please...

Run...
C:\WINDOWS\system32\cmd.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\...
C:\WINDOWS\system32\...
C:\WINDOWS\system32\...
C:\Program Files\Sta...
C:\WINDOWS\system32\...
C:\Program Files\Fie...
C:\Program Files\Ke...
C:\Program Files\No...
C:\Program Files\No...
C:\Program Files\Fie...
C:\Program Files\Ke...
C:\Program Files\Fie...
C:\WINDOWS\System32\...
C:\Program Files\Fie...
C:\WINDOWS\system32\...
C:\Program Files\Fie...
C:\WINDOWS\Explorer...
C:\WINDOWS\SOUNDMAN...
C:\Program Files\Hic...
C:\Program Files\Lav...
C:\Program Files\Fie...
C:\Program Files\Qu...
C:\Program Files\Lo...
C:\Program Files\MS...
C:\Program Files\S...
C:\Program Files\Win...
C:\Program Files\Ke...
C:\WINDOWS\system32\...
C:\Program Files\Lo...
C:\Program Files\Int...
C:\Program Files\Out...



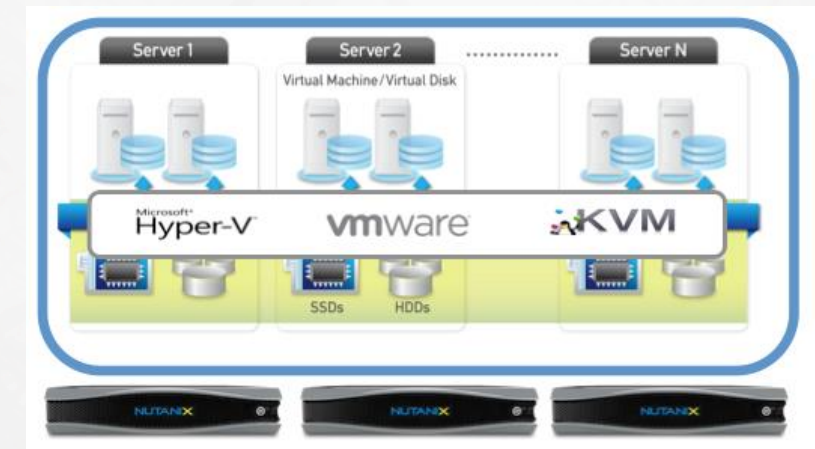
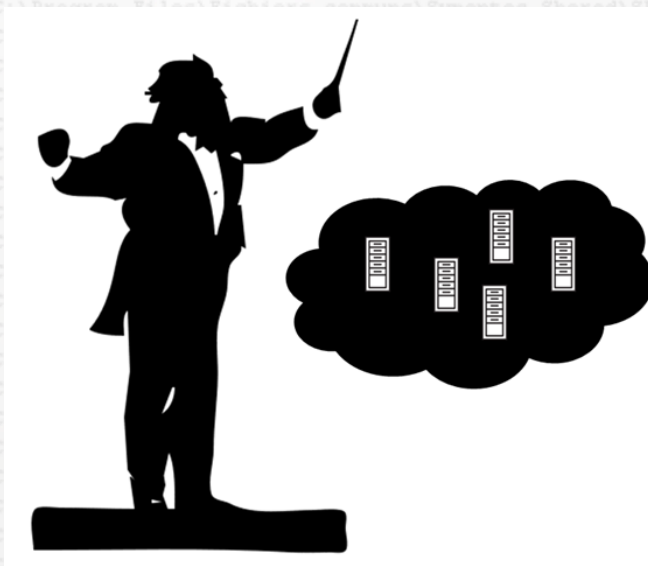
Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSI Internet Explorer v6.00 SP2 (6.00.2900.2180)

Long story short, SDN is mainly about

Orchestration

Programmability

Hypervisors



White Hat Hacking

How did Amazon

Running pro
C:\WINDOWS\st
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Pr
C:\Pr
C:\Pr
C:\Pr
C:\Pr
C:\Program Files\Internet Explorer\iexplore.exe
C:\Pr
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C:\Program Files\Internet Explorer\iexplore.exe
C:\Pr
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C:\WI
C:\Pr
C:\Program Files\Internet Explorer\iexplore.exe
C:\Program Files\Outlook Express\outexp.exe

AWS API (EC2, S3, ...)

Amazon Orchestration Software

Open Source Xen Hypervisor

Networking

Commodity Servers

Commodity Storage

AWS API (EC2, S3, ...)

Amazon Orchestration Software

Orchestration

Hypervisors

Networking

Commodity Servers

Commodity Storage

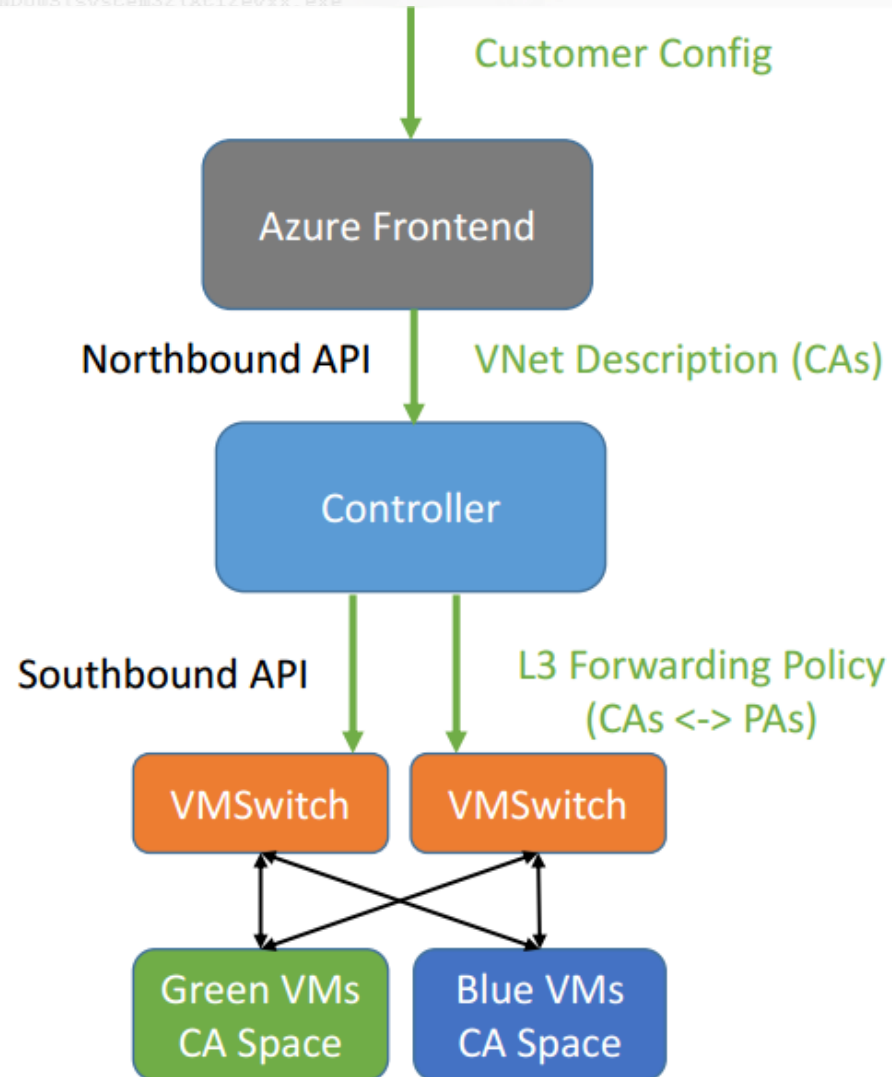


Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\lsass.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\Ati2evxx.exe

How Microsoft build its cloud?



Microsoft

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

How companies can build their SDN network?

- **VMware NSX**
- **Openstack**
- **Cisco ACI**
- **CloudStack**
- **Juniper Contrail**
- **Microsoft azure pack**
- **There are some more...**



Microsoft

cloudstack



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSI Internet Explorer 8.00.5002.0000.2900.2180

Now let's see the magic

Running Process
C:\WINDOWS\system32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\S...
C:\WINDOWS\system3...
C:\Program Files\F...
C:\Program Files\K...
C:\Program Files\N...
C:\Program Files\N...
C:\Program Files\N...
C:\Program Files\F...
C:\Program Files\K...
C:\Program Files\F...
C:\WINDOWS\System3...
C:\Program Files\F...
C:\WINDOWS\system3...
C:\Program Files\F...
C:\WINDOWS\Explore...
C:\WINDOWS\SOUNDMA...
C:\Program Files\H...
C:\Program Files\L...
C:\Program Files\F...
C:\Program Files\O...
C:\Program Files\L...
C:\Program Files\H...
C:\Program Files\S...
C:\Program Files\W...
C:\Program Files\K...
C:\WINDOWS\system3...
C:\Program Files\L...
C:\Program Files\I...
C:\Program Files\O...



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

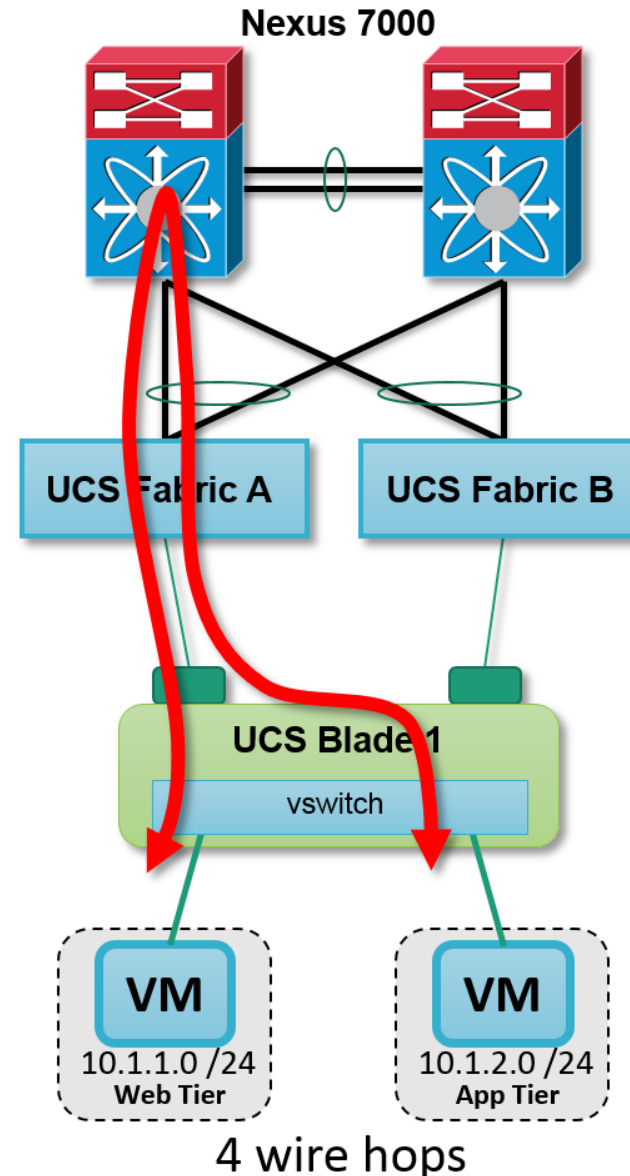
C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Shared\ccSetNgr.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrv.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBSC\SPBSCSvc.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe
C:\WINDOWS\system32\cmd.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtNgr.exe
C:\WINDOWS\Explorer.exe
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asian.exe

Before/After

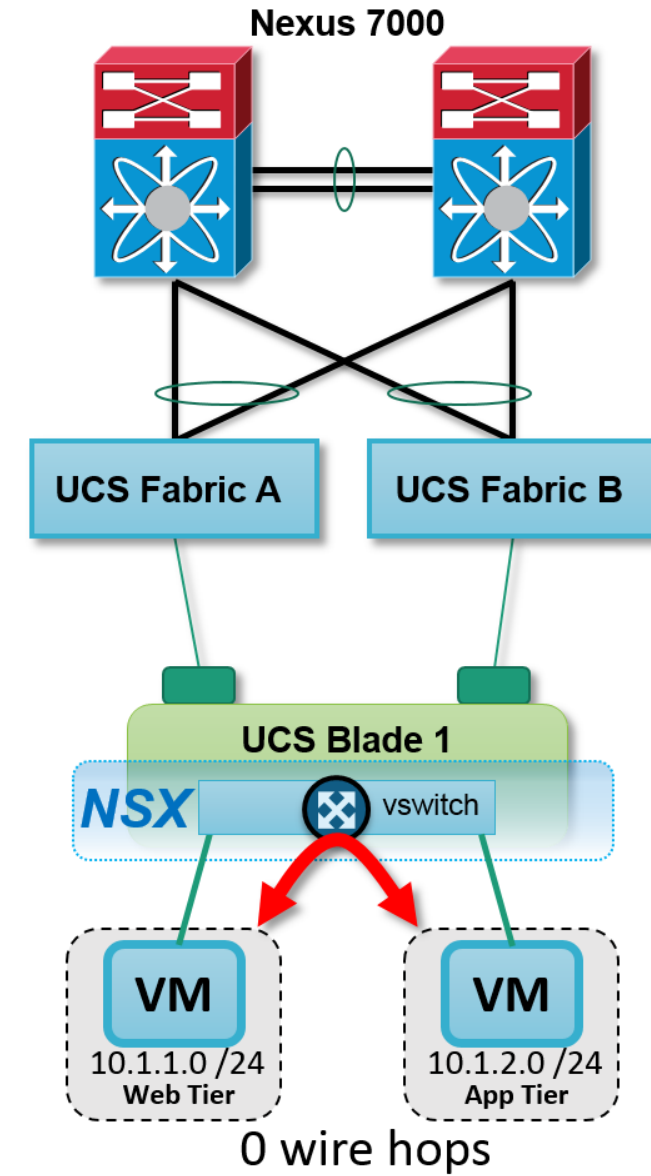
SDN

East-West Layer 3 / Same host

Before NSX



With NSX
Distributed Logical Routing



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

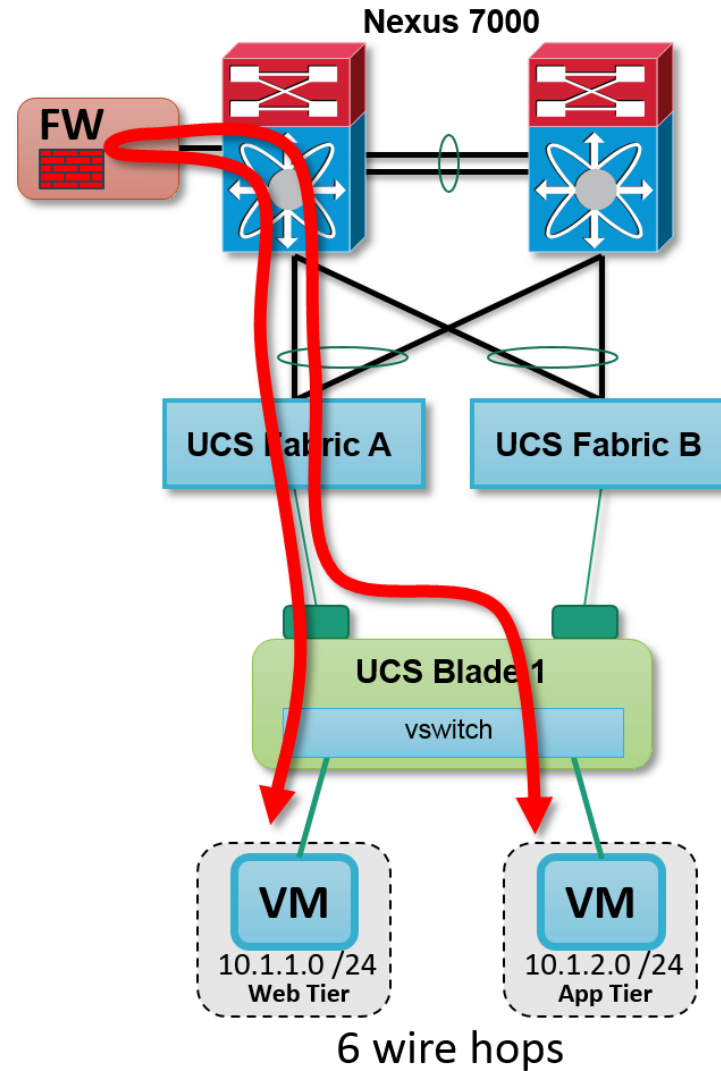
C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Shared\ccSetNgr.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrv.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBSC\SPBSCSvc.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe
C:\WINDOWS\system32\cmd.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtNgr.exe
C:\WINDOWS\Explorer.exe
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN\Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\msimn.exe

Before/After

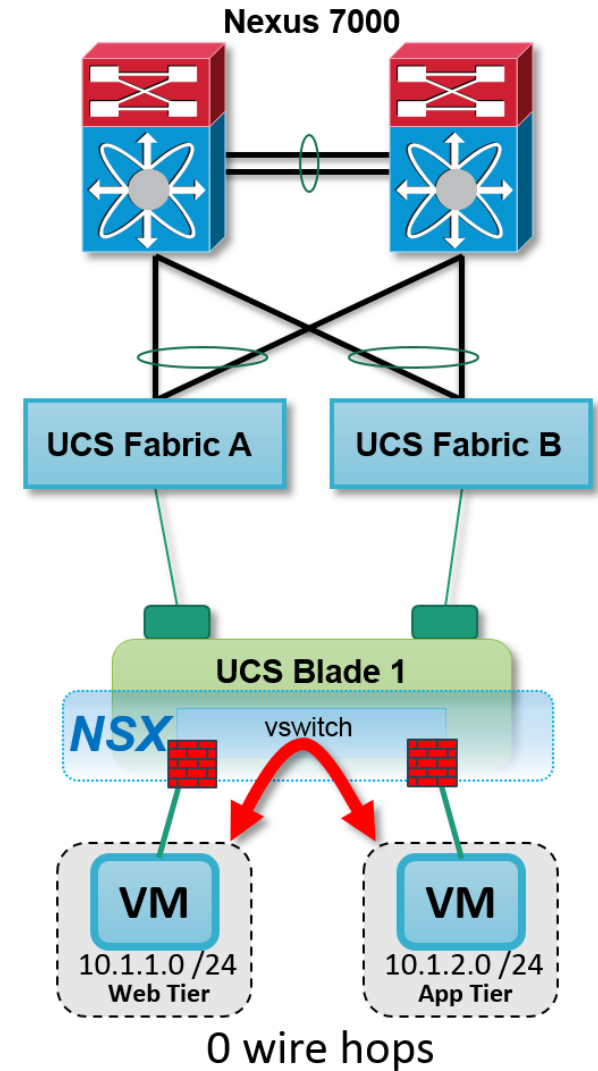
SDN

East-West Firewalling / Same host

Before NSX



With NSX Distributed Virtual Firewall



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

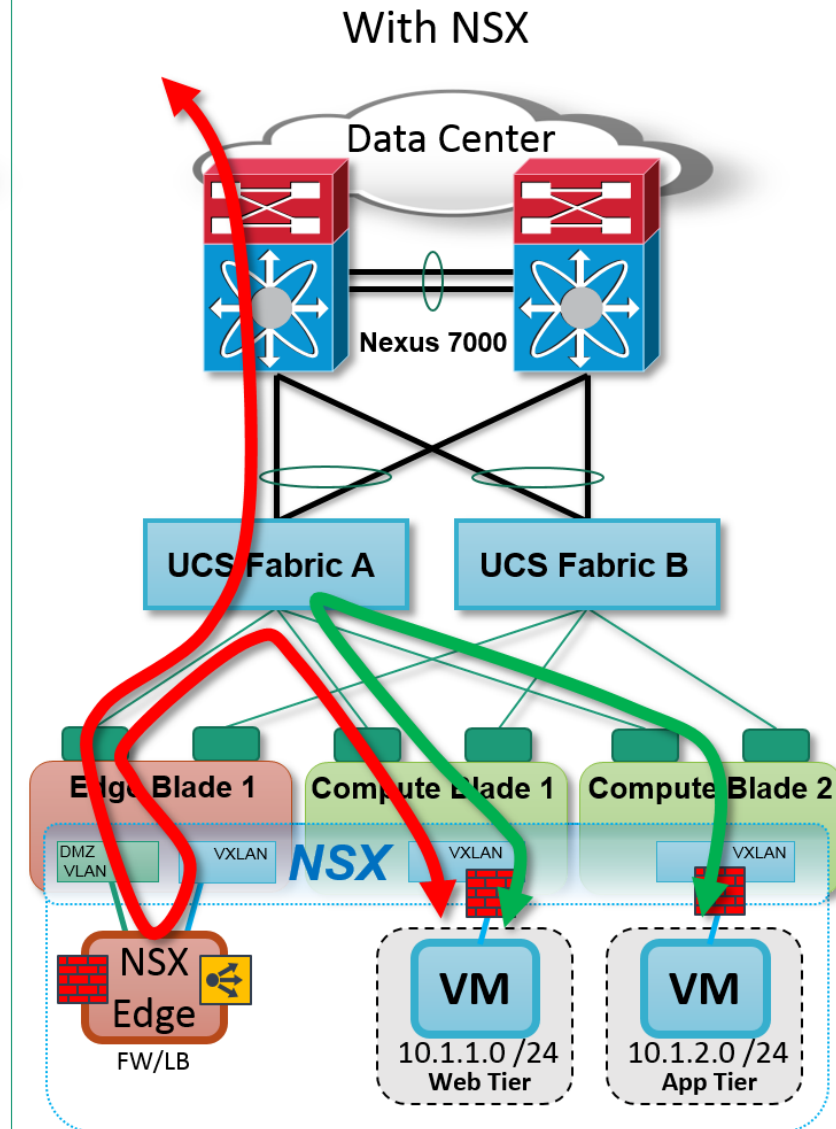
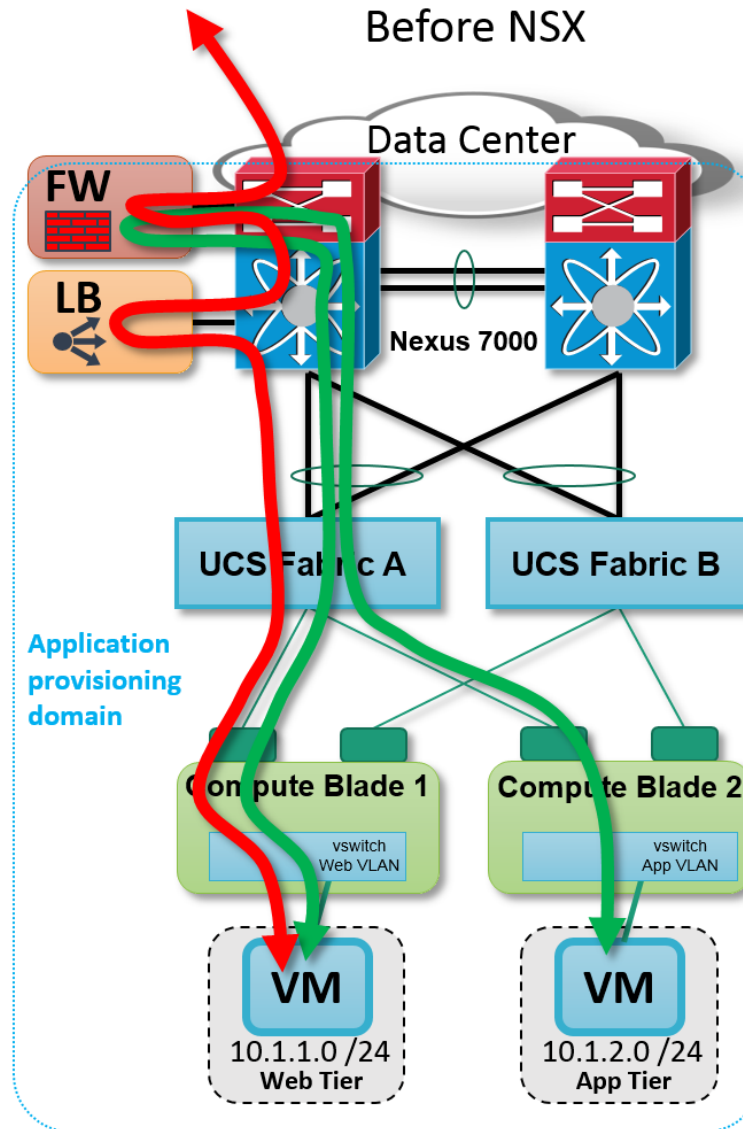
Running processes:

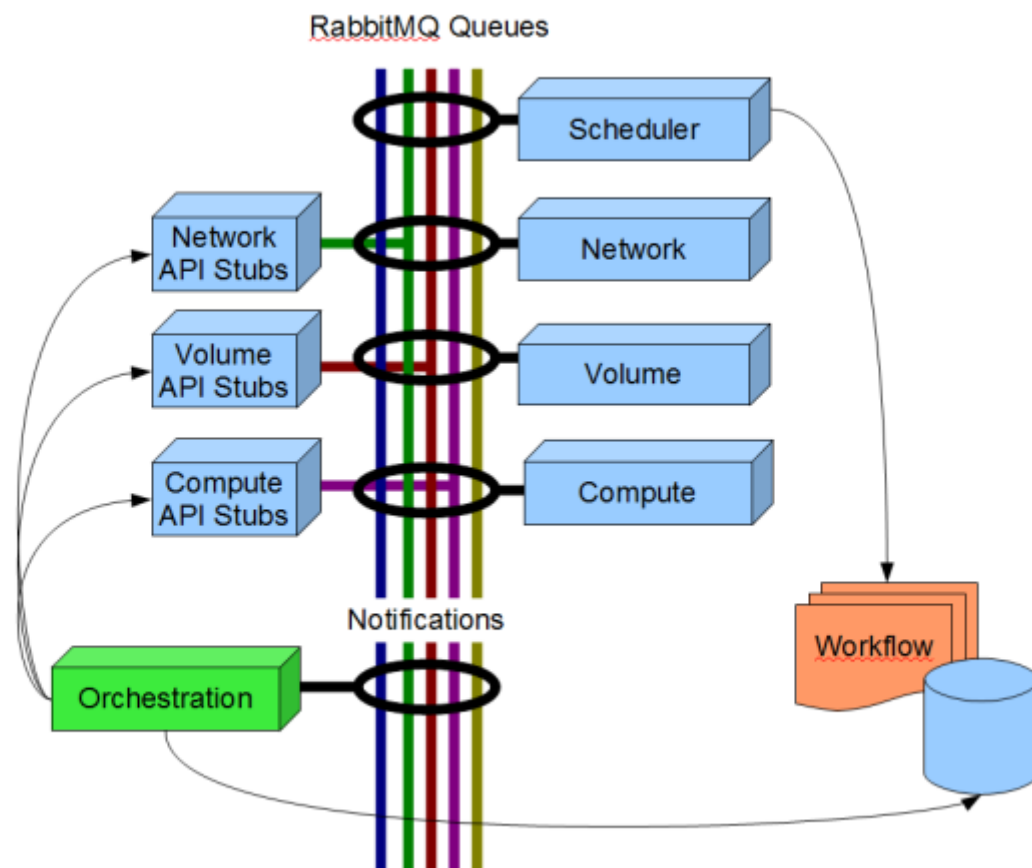
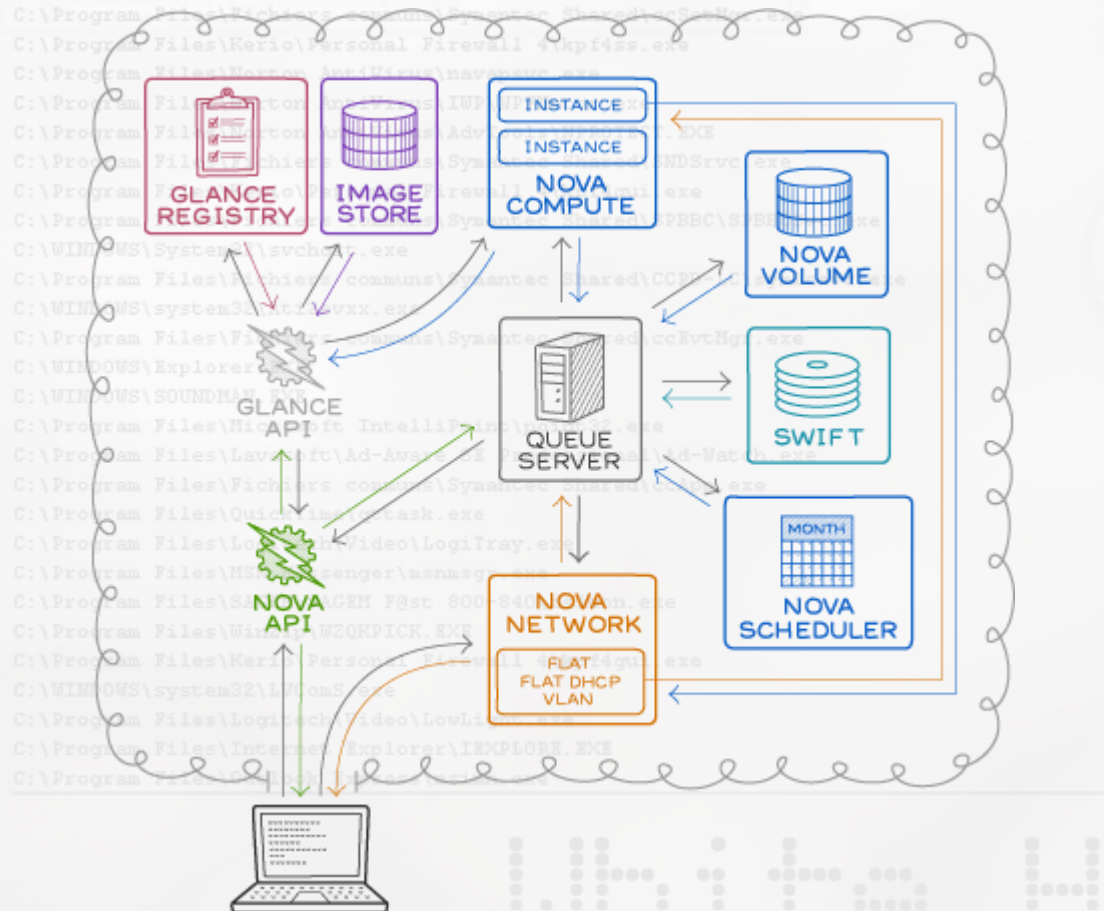
C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\Ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.
C:\WINDOWS\system32\poolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetNgr.ex
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrv.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBBC\SPBBC
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\sym
C:\WINDOWS\system32\cmd.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtNgr.ex
C:\WINDOWS\Explorer.exe
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.e
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\msimn.exe

Before/After

SDN

North-South & East-West Traffic Flow





Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe
C:\Program Files\Norton AntiVirus\navapsvc.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\CT.EXE
C:\Program Files\Fichiers communs\Symantec Shared\ccSvcHst.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symcsvc.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsg.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asimn.exe

Micro-Segmentation using SDN

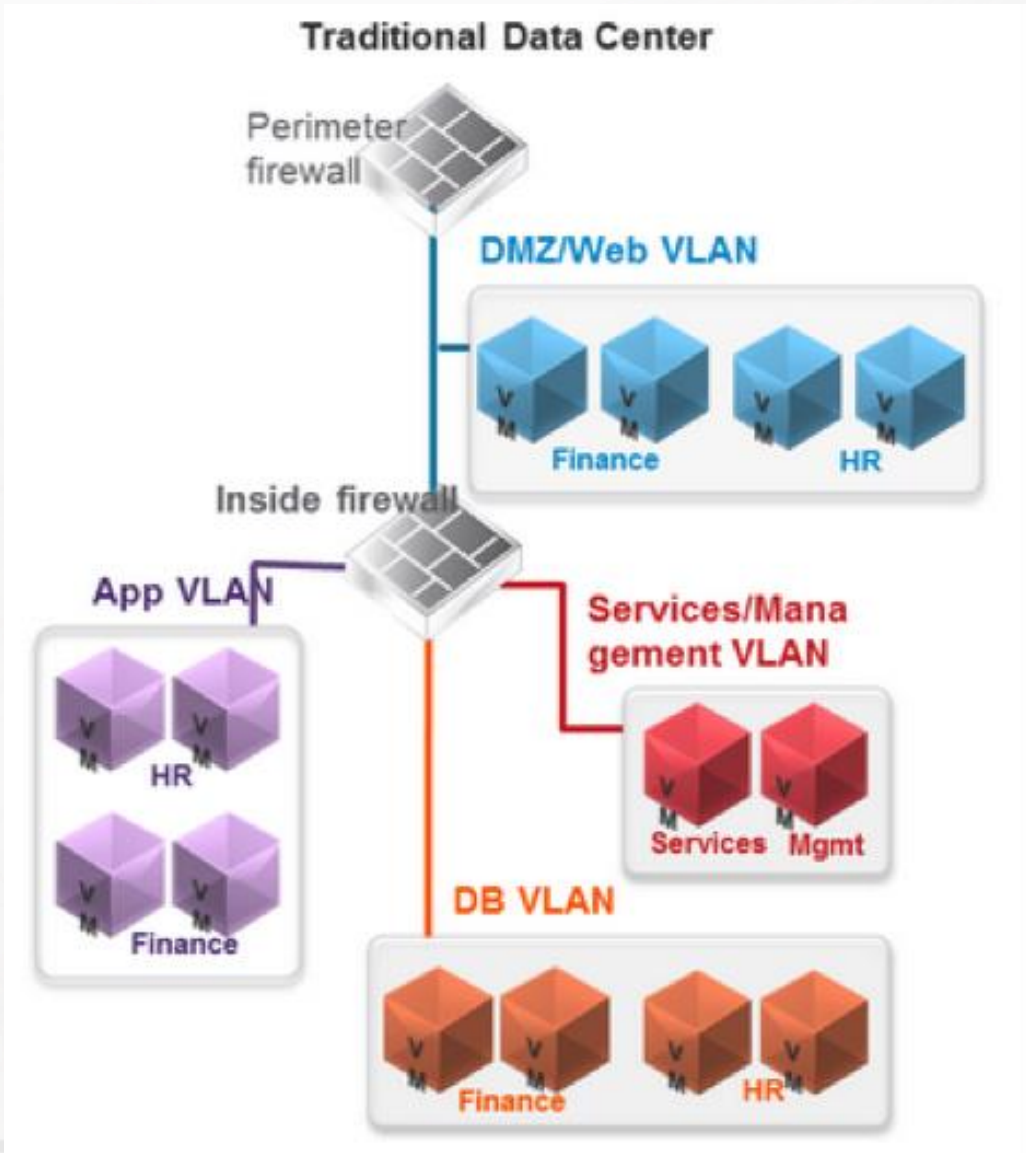
White Hat Hacking

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (WinNT 5.01.2600)

Before SDN

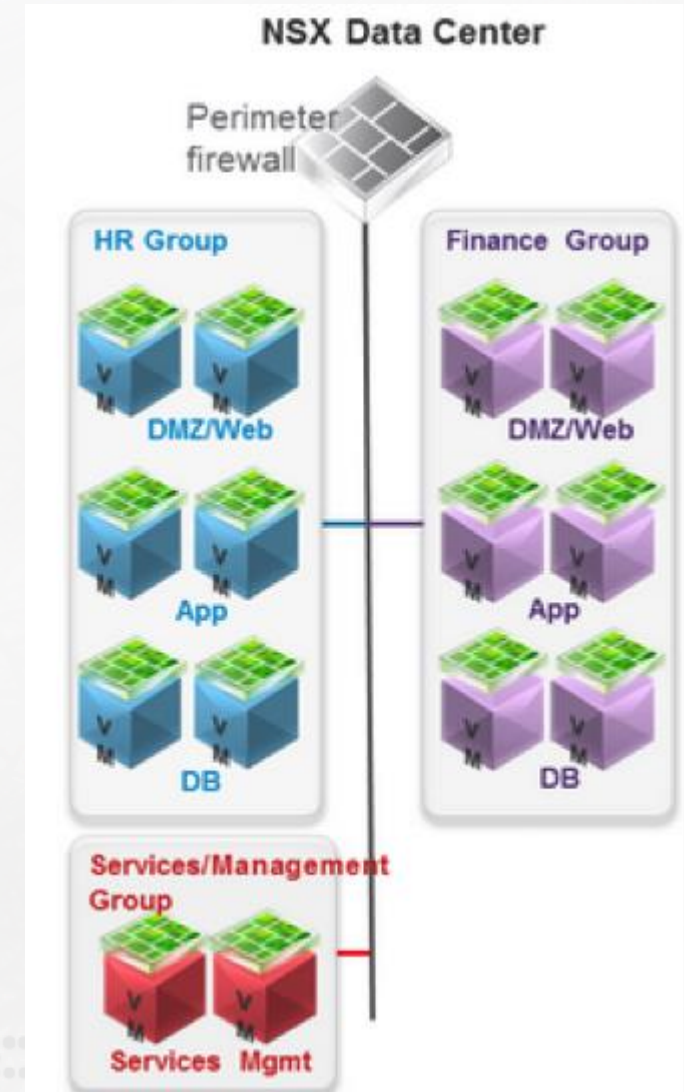
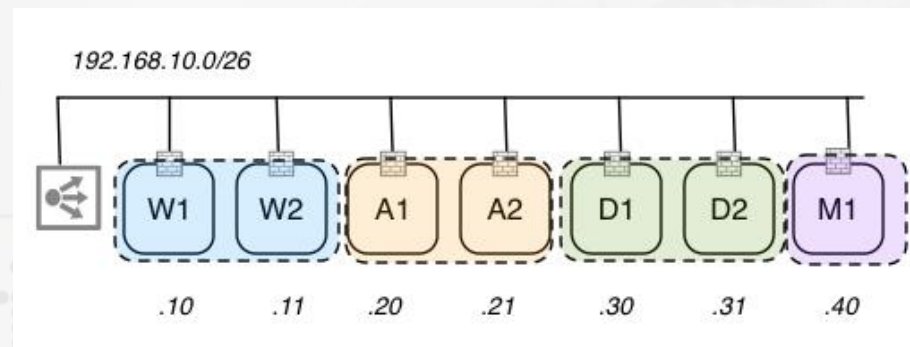
Running:
C:\WINDOWS\system32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\ntlogon.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Norton AntiVirus\navapssvc.exe
C:\Program Files\Norton AntiVirus\IWP\NPFHntor.exe
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE
C:\Program Files\Norton AntiVirus\Shared\SNDSrv.exe
C:\Program Files\Norton AntiVirus\Shared\CCPD-LC\symlcsvc.exe
C:\WINDOWS\system32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symlcsvc.exe
C:\WINDOWS\system32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symlcsvc.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\SoundMan.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symlcsvc.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symlcsvc.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dsimon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asian.exe

- Vlan oriented
- Choke points
- Unmanageable
- Big attack surface



After SDN

- Smaller attack surface, small domains
- Distributed Firewall
- Hypervisor's in-kernel L2/L3/FW
- Simplified deployment

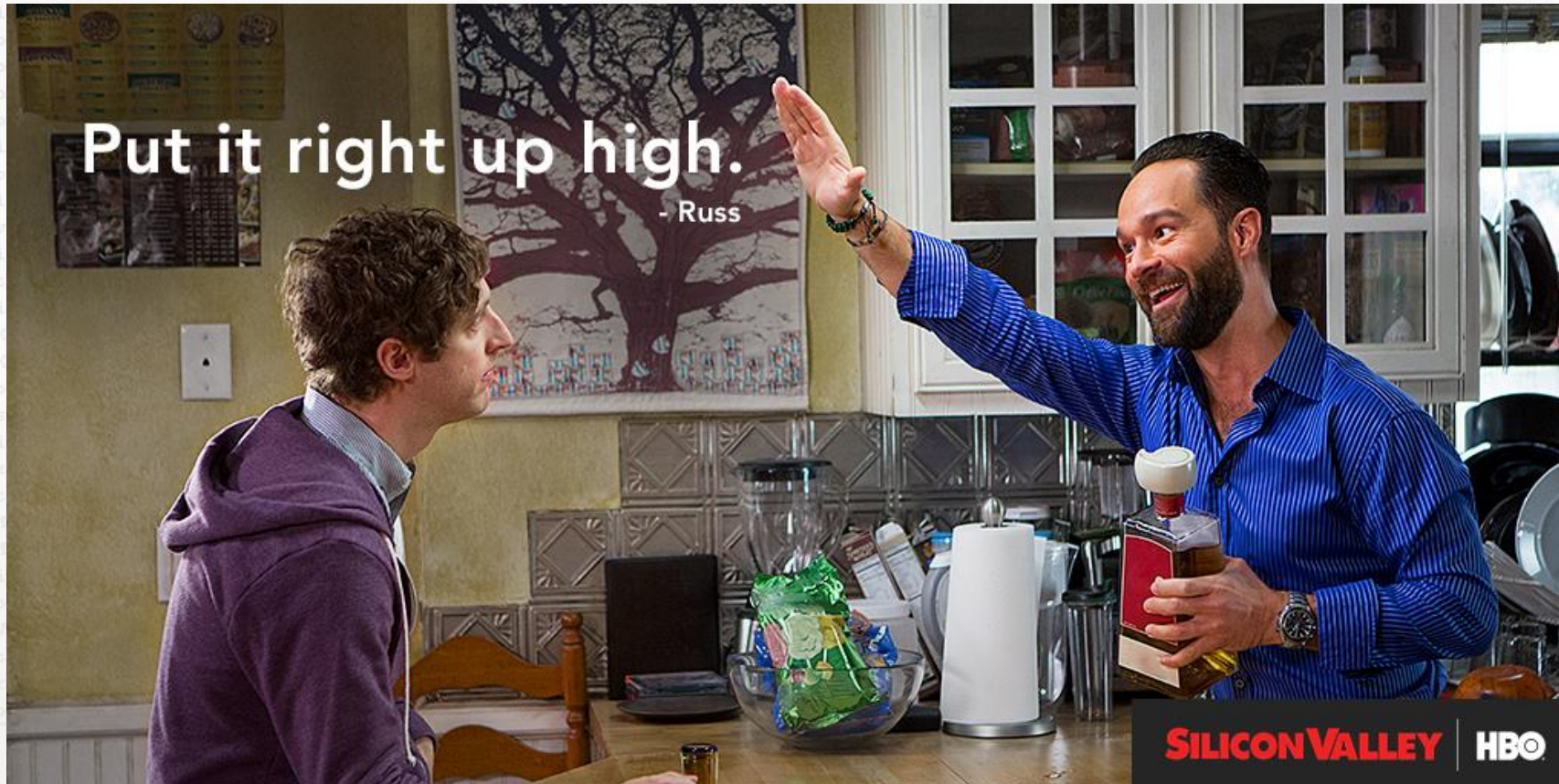


Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\lsass.exe
C:\WINDOWS\system32\smss.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\system32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fich...
C:\Program Files\Kerio...
C:\Program Files\Norto...
C:\Program Files\Norto...
C:\Program Files\Norto...
C:\Program Files\Fichi...
C:\Program Files\Kerio...
C:\Program Files\Fichi...
C:\WINDOWS\System32\sv...
C:\Program Files\Fichi...
C:\WINDOWS\system32\At...
C:\Program Files\Fichi...
C:\WINDOWS\Explorer.EX...
C:\WINDOWS\SOUNDMAN.EX...
C:\Program Files\Micro...
C:\Program Files\Lavas...
C:\Program Files\Fichi...
C:\Program Files\Quick...
C:\Program Files\Logit...
C:\Program Files\MSN H...
C:\Program Files\SAGEN...
C:\Program Files\Win2k...
C:\Program Files\Kerio...
C:\WINDOWS\system32\LV...
C:\Program Files\Logit...
C:\Program Files\Inter...
C:\Program Files\Outlo...

Is it awesome or what ? ;-)



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4.exe
C:\Program Files\Kerio\AntiVirus 4\KAV.exe
C:\Program Files\Kerio\AntiVirus 4\KAVPROCT.exe
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrvc.exe
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\Program Files\Fichiers communs\Symantec Shared\SPBBC\SPBBCSvc.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe
C:\WINDOWS\Explorer.EXE
C:\WINDOWS\SOUNDMAN.EXE
C:\Program Files\Microsoft IntelliPoint\point32.exe
C:\Program Files\Lavasoft\Ad-Aware SE Professional\Ad-Watch.exe
C:\Program Files\Fichiers communs\Symantec Shared\ccApp.exe
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dslmon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\msimn.exe

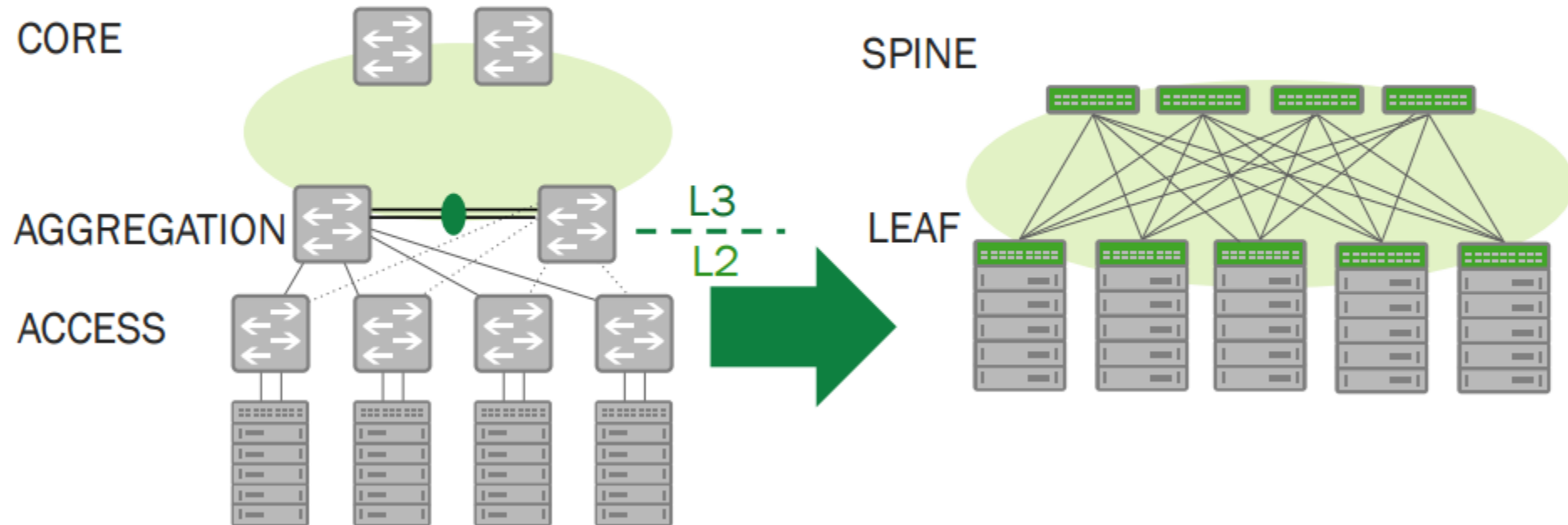
If we have some more time

White Hat Hacking

Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

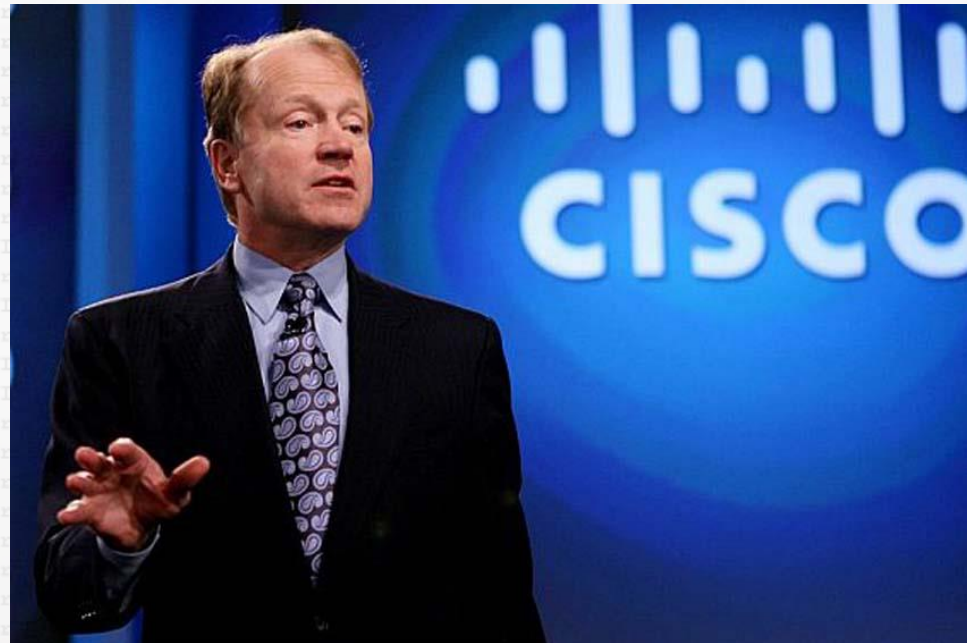
- Nobody care anymore about the underlying networking
- Hypervisor is the new  king!!!

A Key Transformation



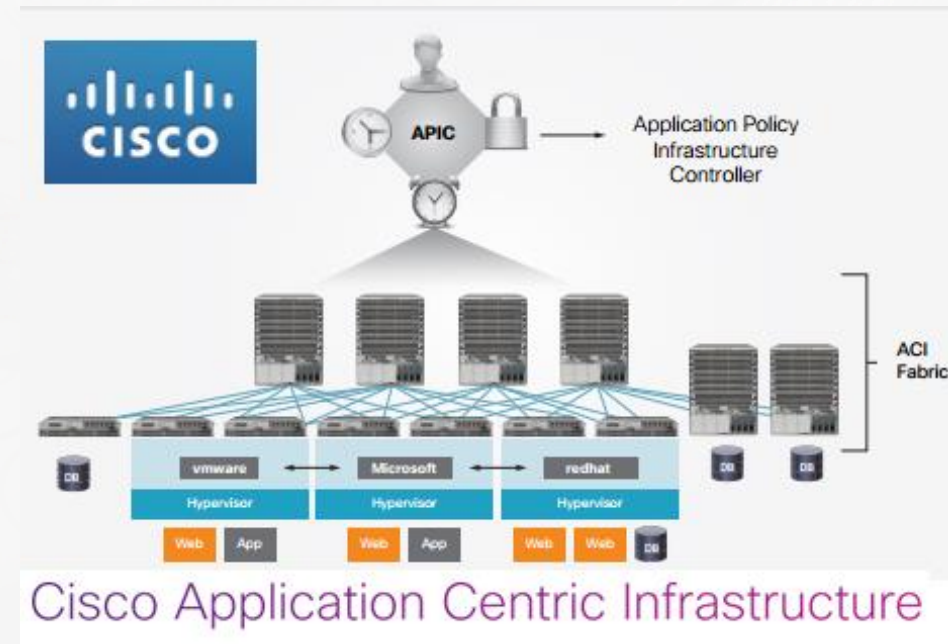
Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (WinNT 5.01.2600)
MSIE: Internet Explorer 8.0.0 SP2 (6.0.2900.2180)

Running processes:
C:\WINDOWS\system32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe
C:\WINDOWS\system32\svchost.exe
C:\WINDOWS\System32\svchost.exe
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.exe
C:\WINDOWS\system32\spoolsv.exe



C:\Program Files\Kerio\Personal Firewall 4\api4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asimn.exe

IMHO, biggest loser would be:



White Hat Hacking

IMHO, biggest winner would be:



- Currently VP, GM & CTO in VMware
- King of the valley
- Nicira was acquired by VMware for \$1.26 billion
- Invented the network virtualization

```
C:\Program Files\QuickTime\qttask.exe
C:\Program Files\Logitech\Video\LogiTray.exe
C:\Program Files\MSN Messenger\msnmsgr.exe
C:\Program Files\SAGEM\SAGEM F8st 800-840\dslmon.exe
C:\Program Files\WinZip\WZQKPICK.EXE
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe
C:\WINDOWS\system32\LVComS.exe
C:\Program Files\Logitech\Video\LowLight.exe
C:\Program Files\Internet Explorer\IEXPLORE.EXE
C:\Program Files\Outlook Express\asian.exe
```

White Hat Hacking

Running processes:

C:\WINDOWS\System32\smss.exe

C:\WINDOWS\system32\winlogon.exe

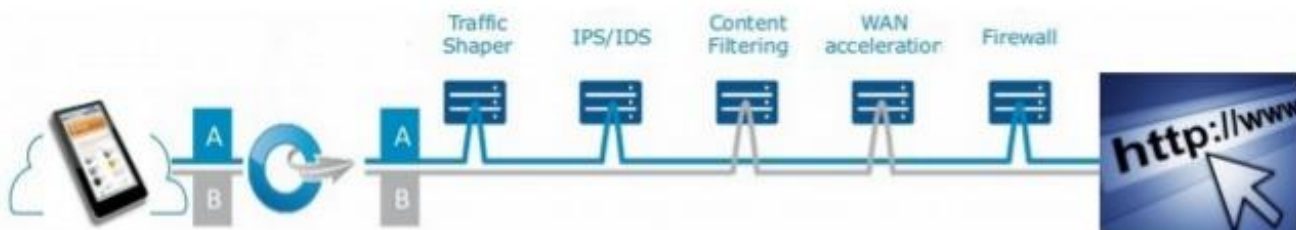
C:\WINDOWS\system32\services.exe

C:\WINDOWS\system32\lsass.exe

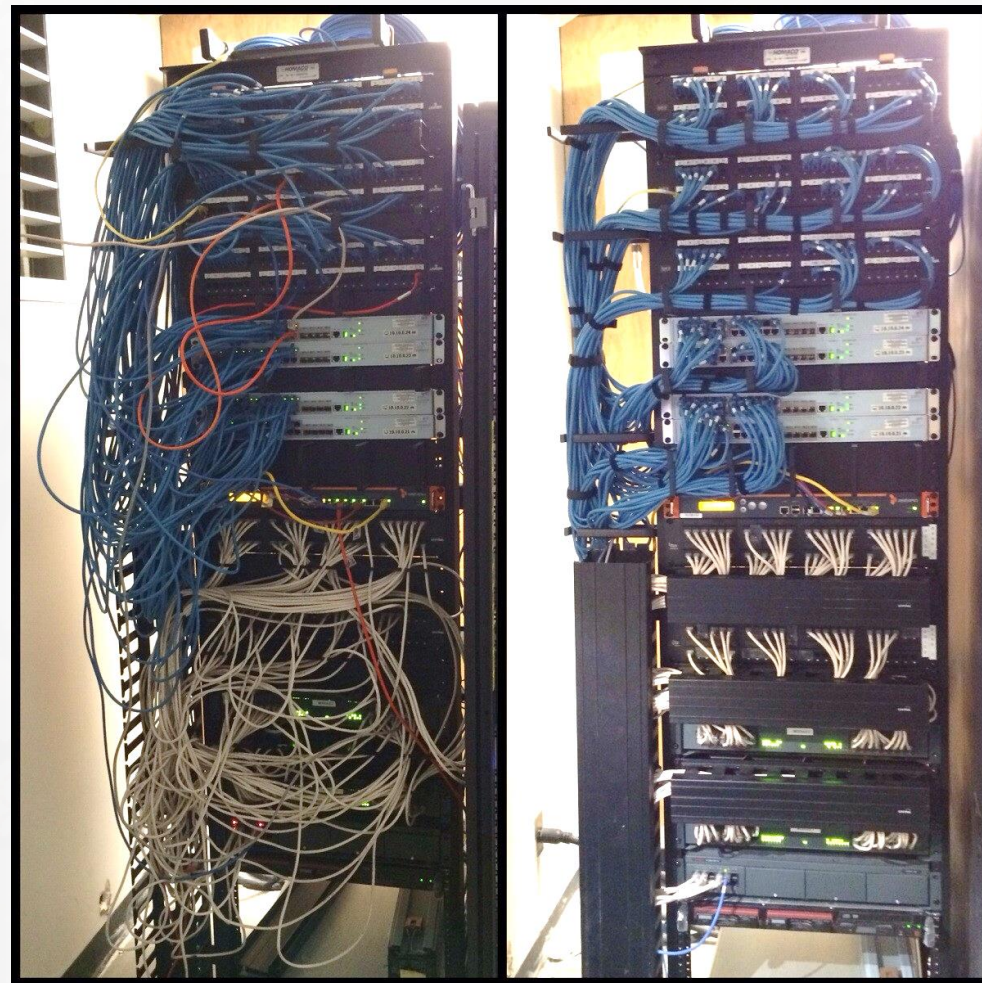
NFV - Network functions virtualization

Service Chaining

Moving network functions into software means that building a service chain no longer requires acquiring hardware.



Source: Dynamic Service Chaining, SDN OpenFlow World Congress, Oct 2013, Jan Lindblad, Tail -f



Logfile of HijackThis v1.99.1
Scan saved at 09:36:29, on 28/04/2009
Platform: Windows XP SP2 (Service Pack 2)
MSIE: Internet Explorer 6.0.6002.18000

Business Impact

Running processes:

C:\WINDOWS\System32\smss.exe
C:\WINDOWS\system32\winlogon.exe
C:\WINDOWS\system32\services.exe
C:\WINDOWS\system32\lsass.exe
C:\WINDOWS\system32\ati2evxx.exe

C:\WINDOWS\system32\svchost.exe

C:\WINDOWS\system32\svchost.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe

C:\WINDOWS\system32\spoolsv.exe

C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe

C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe

C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE

C:\Program Files\Fichiers communs\Symantec Shared\SNDSrvc.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe

C:\WINDOWS\System32\svchost.exe

C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\symalcsvc.exe

C:\WINDOWS\system32\ati2evxx.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe

C:\WINDOWS\Explorer.exe

C:\WINDOWS\SOUNDMAN.EXE

C:\Program Files\Microsoft IntelliPoint\point32.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe

C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe

C:\Program Files\QuickTime\qttask.exe

C:\Program Files\Logitech\Video\LogiTray.exe

C:\Program Files\MSN Messenger\msnmsgr.exe

C:\Program Files\SAGEM\SAGEM F8st 800-840\dslmon.exe

C:\Program Files\WinZip\WZQKPICK.EXE

C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe

C:\WINDOWS\system32\LVComS.exe

C:\Program Files\Logitech\Video\LowLight.exe

C:\Program Files\Internet Explorer\IEXPLORE.EXE

C:\Program Files\Outlook Express\asian.exe

- **Chip hardware - switches, storage, etc..**
- **Smaller physical space, less hardware**
- **Less operational guys**
- **Fast services for end-users**
- **Pay as you grow**



CapEx vs. OpEx

White Hat Hacking

C:\WINDOWS\System32\cmd.exe

C:\WINDOWS\system32\cmd.exe

C:\WINDOWS\system32\sechelp.exe

```
C:\WINDOWS\system32\lsass.exe
```

C:\WINDOWS\System

C:\Windows\System32
C:\Program Files

C:\Program Files

C:\WINDOWS\system32

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\WINDOWS\System

C:\Program Files

C:\WINDOWS\system32

C:\Program Files

C:\PROGRAM FILES
C:\WINDOWS\Fonts

C:\WINDOWS\EXPLORER



C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files

C:\Program Files\

Sub Program Files

C:\Program Files

