



OWASP  
Open Web Application  
Security Project





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\kpff4ss.exe  
C:\Program Files\Norton AntiVirus\navapsvc.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFMntor.exe  
C:\Program Files\Norton AntiVirus\AdvTools\NPPD-LC\NPPD-LC.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpff4gui.exe  
C:\Program Files\Fichiers communs\Sync\SyncBCSvcs.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.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\qtask.exe  
C:\Program Files\Logitech\Video\LogiTray.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 800-840\dsimon.exe  
C:\Program Files\WinZip\WZQKPICK.EXE  
C:\Program Files\Kerio\Personal Firewall 4\kpff4gui.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\msimian.exe

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

White Hat Help

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



winlogon.exe  
services.exe  
crash.exe  
C:\WINDOWS\system32\ati2evxx.exe  
C:\WINDOWS\system32\svchost.exe  
C:\WINDOWS\System32\svchost.exe

## 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.

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Running processes:  
C:\WINDOWS\System32  
C:\WINDOWS\system32  
C:\WINDOWS\system32  
C:\WINDOWS\system32  
C:\WINDOWS\system32  
C:\WINDOWS\system32  
C:\WINDOWS\System32  
C:\Program Files\Sp  
C:\WINDOWS\system32  
C:\Program Files\Re  
C:\Program Files\K  
C:\Program Files\N  
C:\Program Files\N  
C:\Program Files\N  
C:\Program Files\K  
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe  
C:\Program Files\Fichiers communs\Symantec Shared\SPBEC\SPBECsv



# 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 ▾



## Emails blamed for Bundestag cyberattack

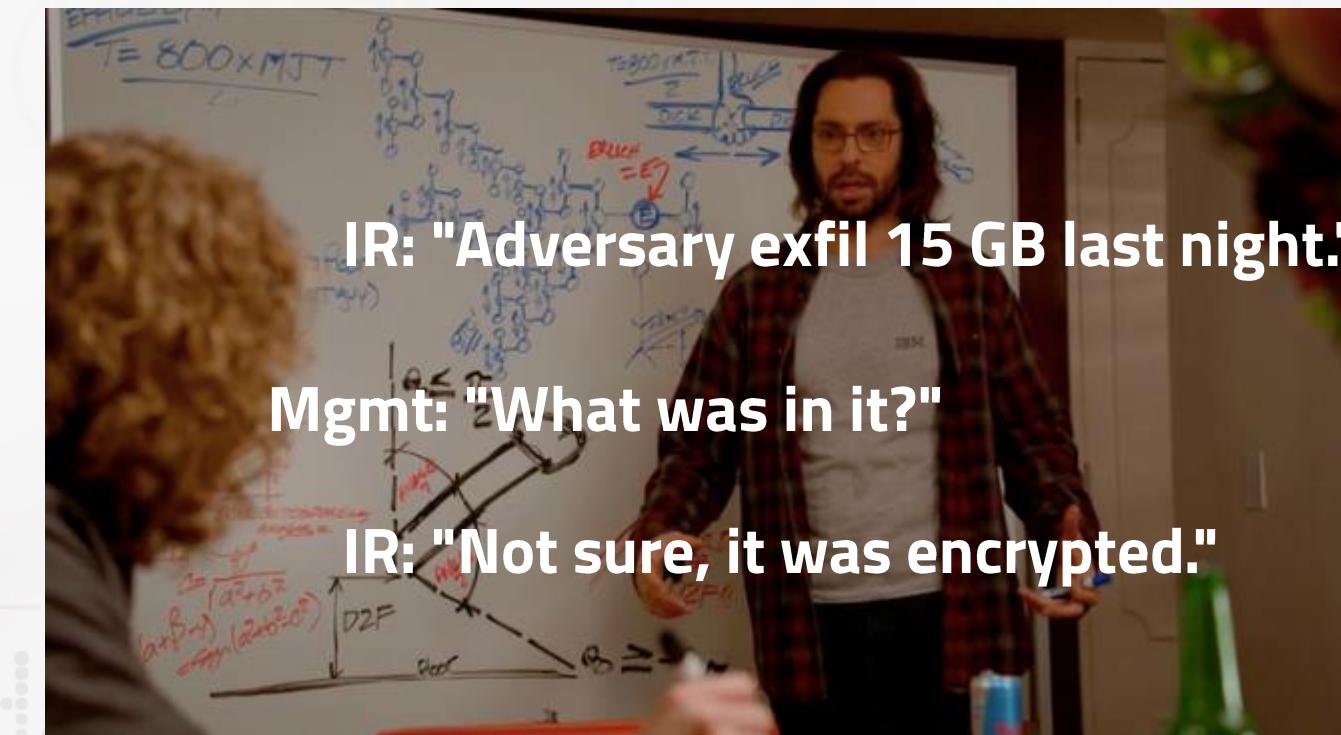
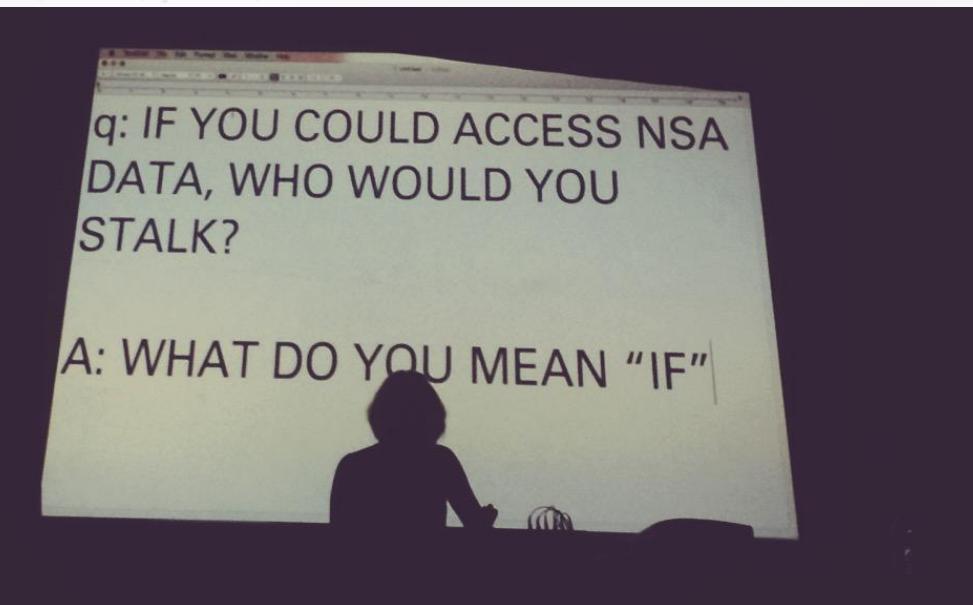
The cyberattack on Germany's parliament has been traced to a link contained in at least two emails, according to a newspaper report. Parliamentarians left unaware of the breach for three weeks have slammed the delay.



LogFile of HijackThis v1.99.1  
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Platform: Windows XP SP2 - CPU: Pentium 4 3.01 GHz  
MSI: 100% / 100% / 100%

# Security Mindset Have Changed But rarely implemented

- Zero-Trust
- Assume breached





# YAHOO!

## AppSec is Eating Security

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

### Alex Stamos - Yahoo's CISO and VP of InfoSEC

```
C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFIIntor.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\Fichiers communs\Symantec Shared\SPBBC\SPBBCSvc.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.exe
```

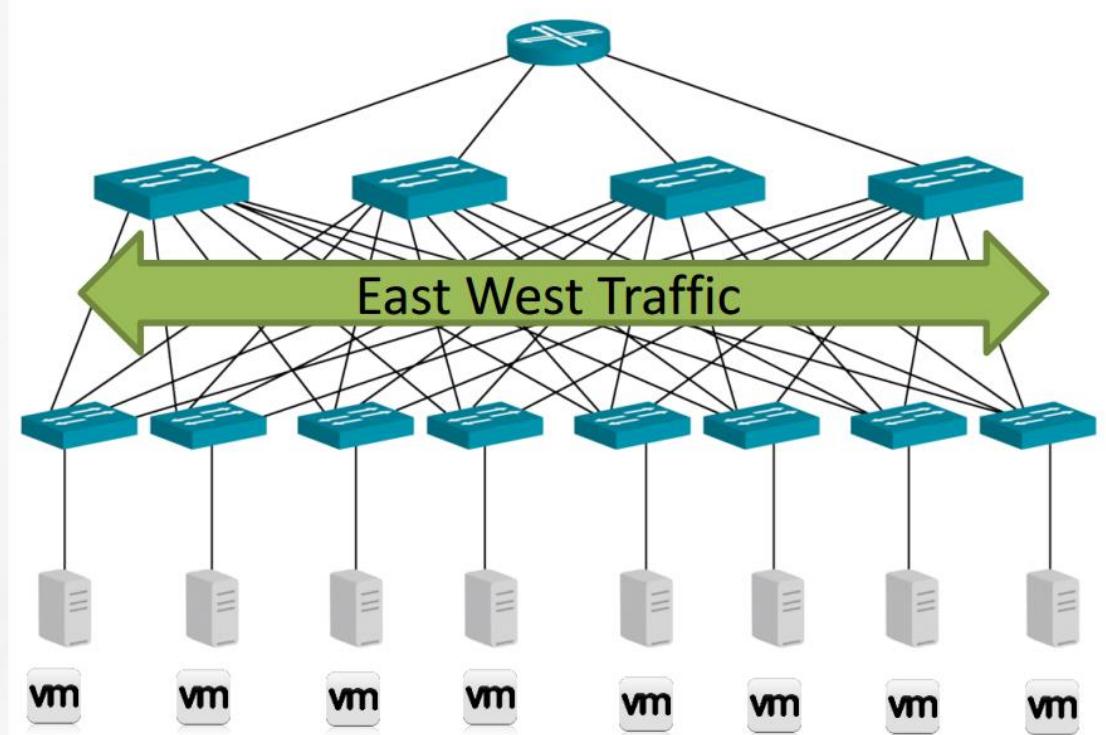
### Security hardware is becoming un-buyable



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



Palo Alto 7050  
120Gbps throughput  
2.4kW



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Running processes:

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

C:\...

# SDN



What's Happening?

# Compare

Search terms ▾

**Software-defined networking**

Topic

**docker**

Search term

+ Add term

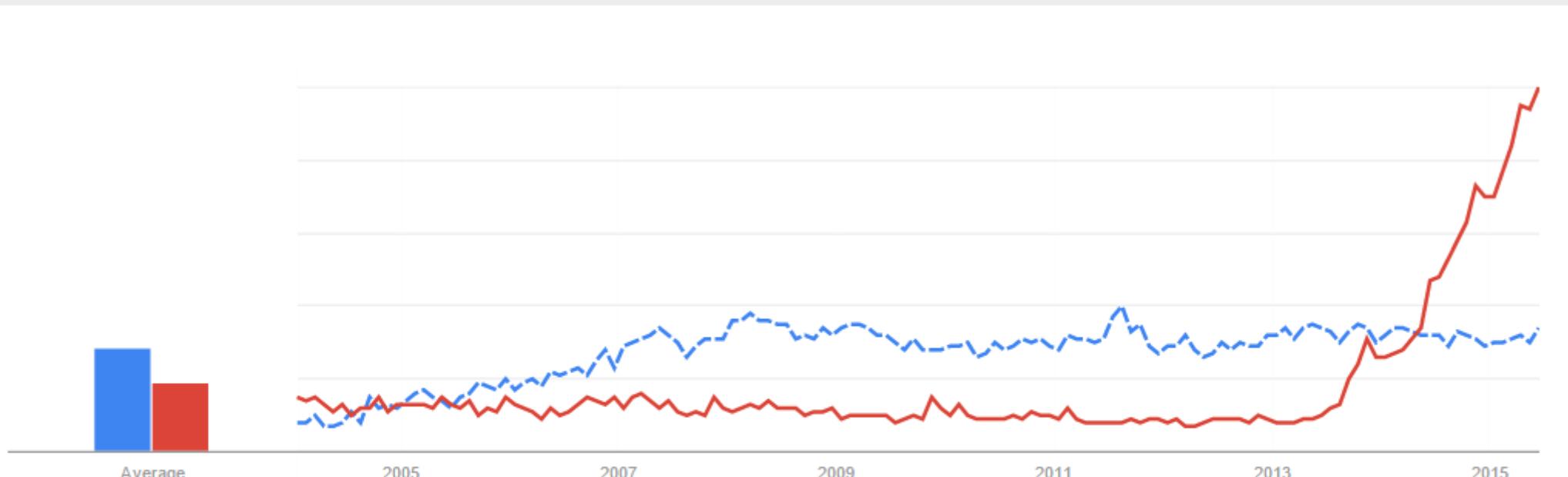
Beta: Measuring search interest in *topics* is a beta feature which quickly provides accurate measurements of overall search interest. To measure search interest for a specific *query*, select the "search term" option. [?](#)

## Interest over time



News headlines

Forecast



Average

</>

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

# Misconceptions

**OpenFlow Management**  
**Automation Buzzword NFV**  
**Protocol Controller API**



What's Happening?



C:\Program Files\Fichiers communs\Symantec Shared\ccSetMgr.exe  
C:\Program Files\Kerio\Personal Firewall 4\bmf4ee.exe

C:\Program Files\Norton AntiVirus\navapsvc.  
C:\Program Files\Norton AntiVirus\IWP\NPFWr  
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\poi  
C:\Program Files\Lavasoft\Ad-Aware SE Prof  
C:\Program Files\Fichiers communs\Symantec  
C:\Program Files\QuickTime\qtask.exe  
C:\Program Files\Logitech\Video\LogiTray.e  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 800-840\c  
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\msimam.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**

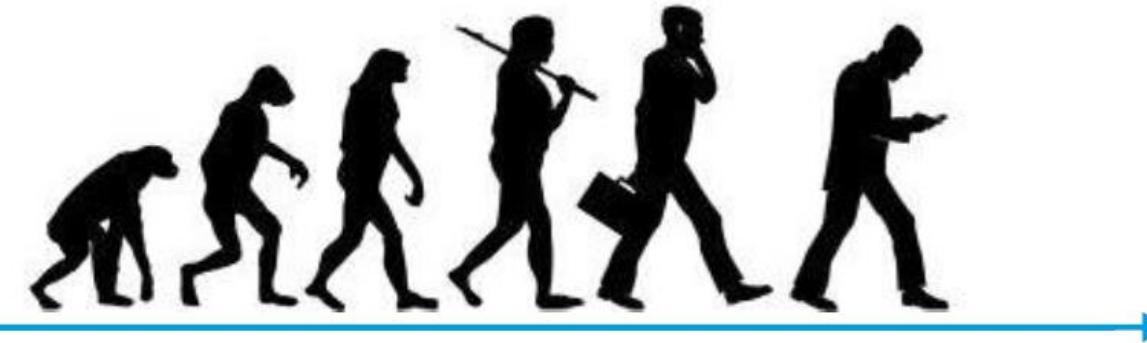
## 2013

```
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 v1.7.0  
Scan saved at 09:36:29, on  
Platform: Windows XP SP2  
MSIE: Internet Explorer v6.0

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\Ati2evn.dll  
C:\WINDOWS\system32\svchost.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Stardock\SDTaskbar.exe  
C:\WINDOWS\system32\spooler.exe  
C:\Program Files\Fichiers\Kerio\Perso\\*.exe  
C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe  
C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe  
C:\Program Files\Norton AntiVirus\Norton AntiVirus.exe  
C:\Program Files\Fichiers\Kerio\Perso\\*.exe  
C:\Program Files\Fichiers\Kerio\Perso\\*.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers\Kerio\Perso\\*.exe  
C:\WINDOWS\system32\Ati2evn.dll  
C:\Program Files\Fichiers\communs\Symantec Shared\ccEvtMgr.exe  
C:\WINDOWS\Explorer.EXE  
C:\WINDOWS\SOUNDMAN.EXE  
C:\Program Files\Microsoft\Windows\Help和支持中心\\*.exe  
C:\Program Files\Lavasoft\\*.exe  
C:\Program Files\Fichiers\Kerio\Perso\\*.exe  
C:\Program Files\QuickTime\\*.exe  
C:\Program Files\Logitech\\*.exe  
C:\Program Files\MSN Messenger\\*.exe  
C:\Program Files\SAGEM\SAgent\\*.exe  
C:\Program Files\WinZip\\*.exe  
C:\Program Files\Kerio\\*.exe  
C:\WINDOWS\system32\LVCom2.dll  
C:\Program Files\Logitech\\*.exe  
C:\Program Files\Internet Explorer\\*.exe  
C:\Program Files\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)  
Run Task Manager  
C:\WINDOWS\System32\smss.exe  
C:\WINDOWS\system32\winlogon.exe  
C:\WINDOWS\System32\services.exe  
C:\WINDOWS\System32\spoolsv.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\Kaspersky\Kav\kpf4ss.exe  
C:\Program Files\Kaspersky\Kav\kpf4ss.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFIHntor.exe  
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE  
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrvc.exe  
C:\Program Files\Kaspersky\Kav\Personal Firewall 4\kpf4gui.exe  
C:\Program Files\Kaspersky\Kav\SPBBC\SPBBCSvc.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.exe  
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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\Logitech\Video\logigrm.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 800-840\dsimon.exe  
C:\Program Files\WinZip\WZQKPICK.EXE  
C:\Program Files\Kaspersky\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\msimian.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  
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Platform: Windows XP SP2 (WinNT 5.01.2600)  
MSI: net Explorer 6.00 SP2 (6.00.2900.2130)

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



I Internet Explorer v6.00 SP2 (6.00.2900.2180)  
Long story short, SDN is mainly about

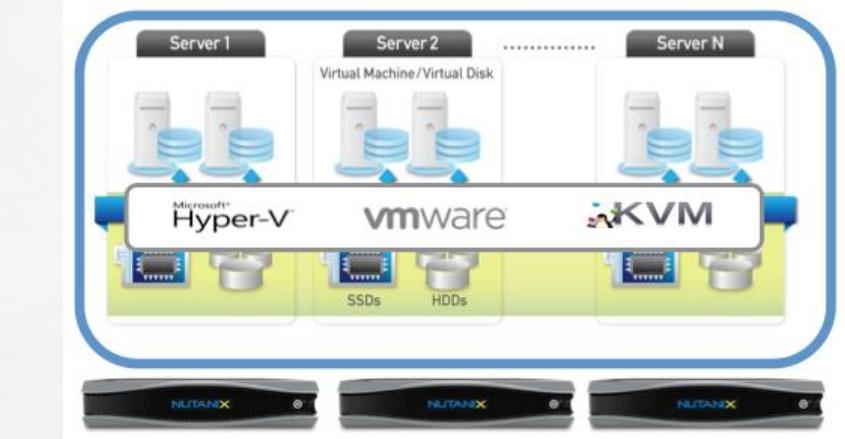
The image features a black silhouette of a conductor in a top hat and tailcoat, standing on a rectangular podium. The conductor is facing right, holding a baton in their right hand and a small book or scorebook in their left. Above the conductor's head is a large, dark, cloud-like thought bubble. Inside the bubble, there are five white server rack icons arranged in two rows: three in the top row and two in the bottom row.

A black silhouette of a conductor in a tuxedo, holding a baton in one hand and a glass in the other. To the right is a thought bubble containing five server rack icons.

# Programmabilit



# Hypervisors



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# How did Amazon AWS build its cloud?

AWS API (EC2, S3, ...)

**Programmability**

Amazon Orchestration Software

**Orchestration**

Open Source Xen Hypervisor

**Hypervisors**

Networking

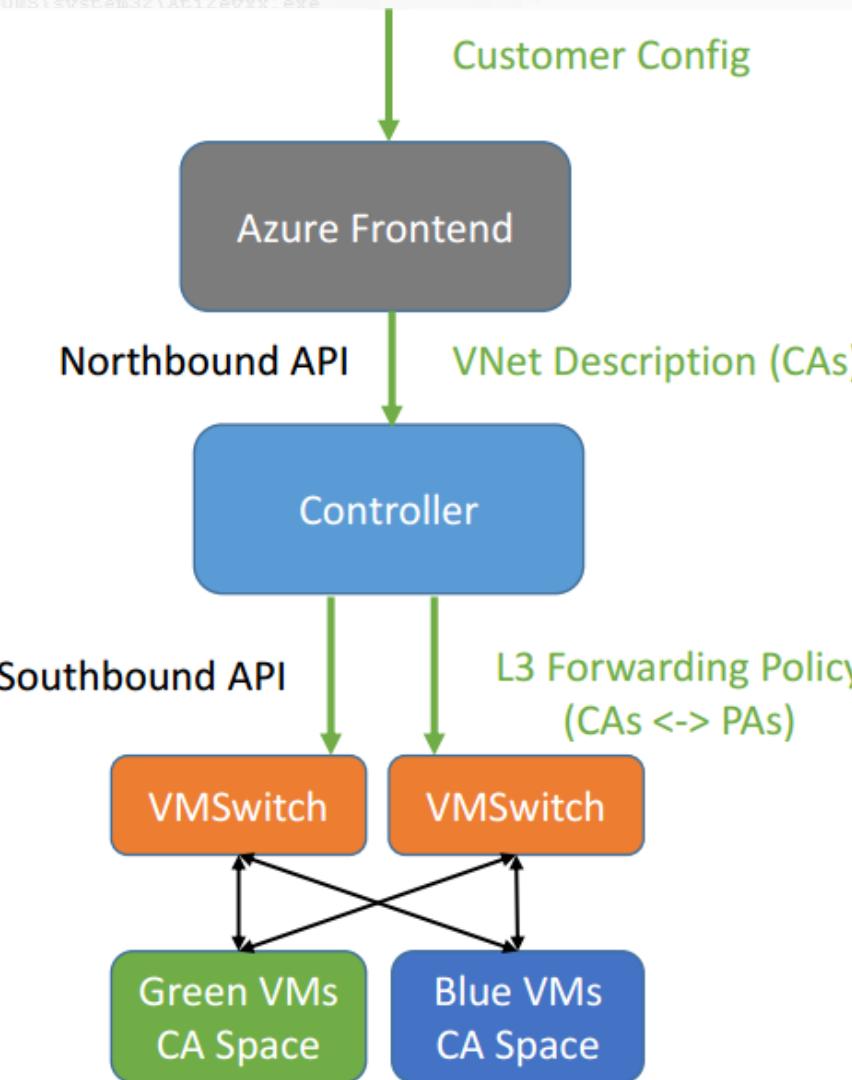
Commodity Servers

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)

# How Microsoft build its cloud?



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# How companies can build their SDN network?

- **Vmware NSX**

- **Openstack**

- **Cisco ACI**

- **CloudStack**

- **Juniper Contrail**

- **Microsoft azure pack**

- There are some more...



LogFile of HijackThis v1.99.1  
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Platform: Windows XP SP2 (WinNT 5.01.2600)  
MSIE: Internet Explorer 6.00 SP1 / 6.00.2900.2180)

# Now let's see the magic

Run  
C:\WINDOWS\system32\smss.exe  
C:\WINDOWS\system32\winlogon.exe  
C:\WINDOWS\system32\services.exe  
C:\WINDOWS\system32\lsass.exe  
C:\WINDOWS\system32\AtiZevxx.exe  
C:\WINDOWS\system32\svchost.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\St  
C:\WINDOWS\system3  
C:\Program Files\K  
C:\Program Files\N  
C:\Program Files\N  
C:\Program Files\N  
C:\Program Files\T  
C:\Program Files\K  
C:\Program Files\T  
C:\Program Files\N  
C:\WINDOWS\System3  
C:\Program Files\T  
C:\WINDOWS\system3  
C:\Program Files\T  
C:\WINDOWS\Explor  
C:\WINDOWS\SOUNDMA  
C:\Program Files\W  
C:\Program Files\L  
C:\Program Files\F  
C:\Program Files\Q  
C:\Program Files\L  
C:\Program Files\H  
C:\Program Files\S  
C:\Program Files\U  
C:\Program Files\K  
C:\WINDOWS\system3  
C:\Program Files\L  
C:\Program Files\I  
C:\Program Files\O



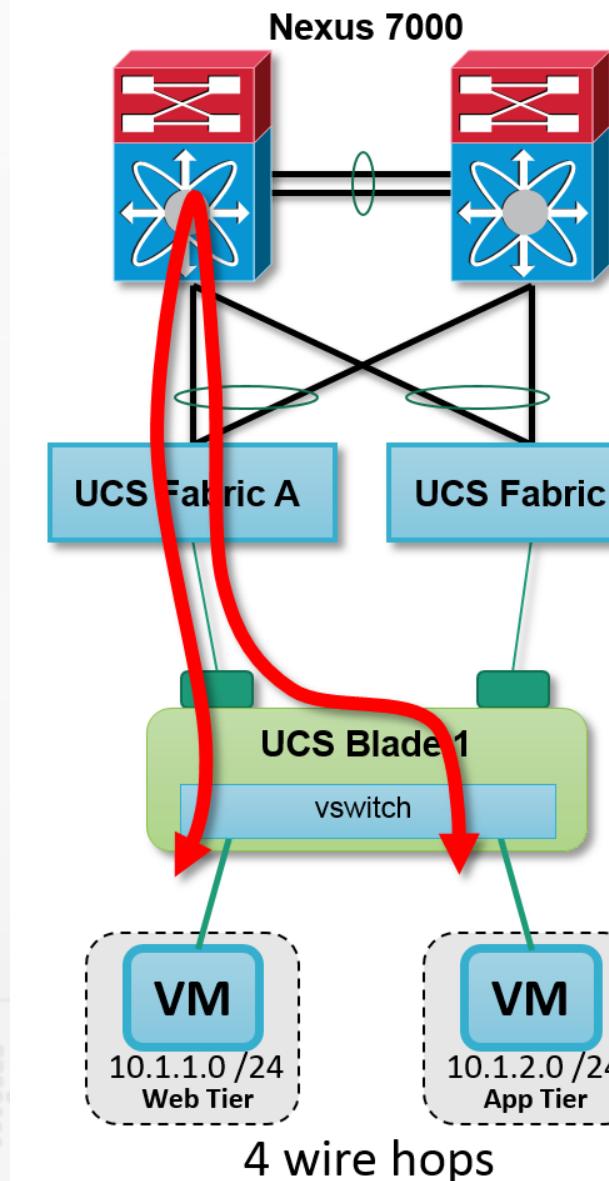
Logfile of HijackThis v1.99.1  
Scan saved at 09:36:29, on 28/04/2009  
Platform: Windows XP SP2 (WinNT 5.01.2600)  
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

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\Symantec Shared\ccSetMgr.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFLmtr.exe  
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C:\Program Files\Fichiers communs\Symantec Shared\SPBBC\SPBBCSVC.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.exe  
C:\WINDOWS\system32\ccEvtMngr.exe  
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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 F@st 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\msimian.exe

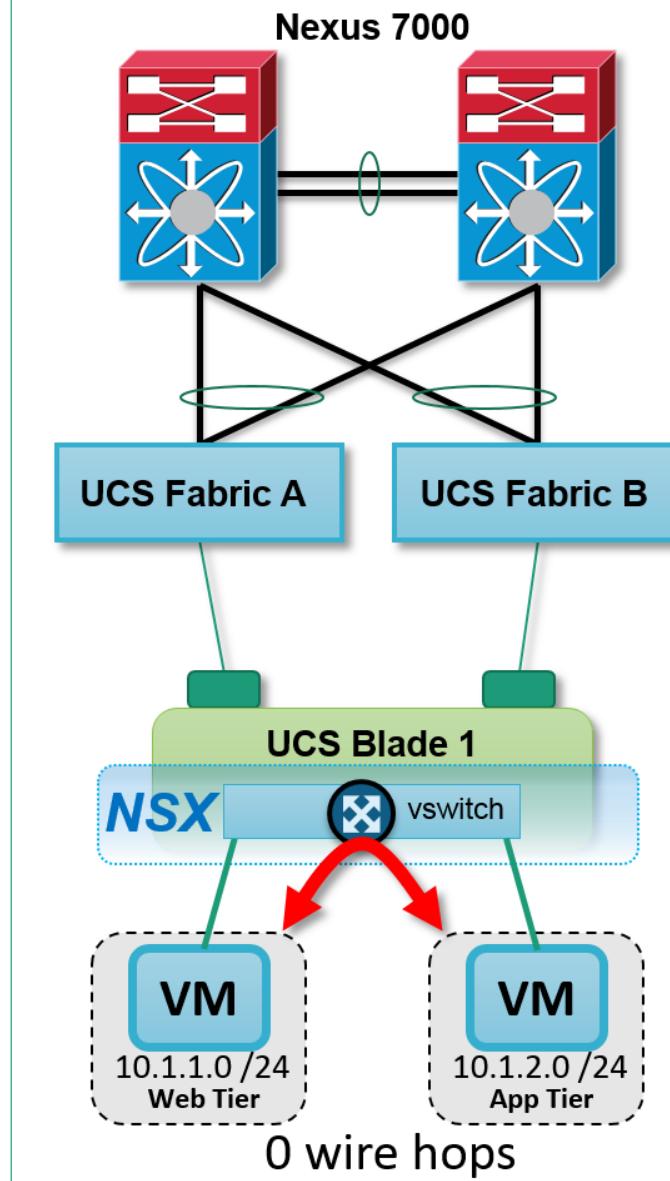
# Before/After SDN

## East-West Layer 3 / Same host

### Before NSX



### With NSX Distributed Logical Routing



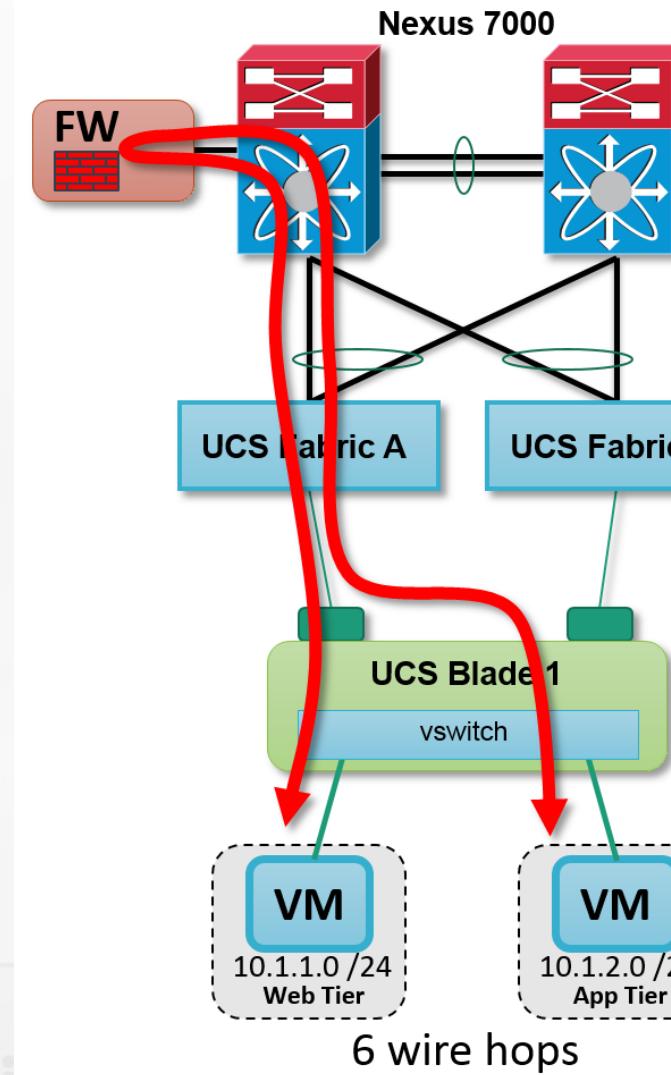
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Running processes:  
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C:\Program Files\Fichiers communs\Symantec Shared\SPBBCSVC.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.exe  
C:\WINDOWS\system32\ccEvtMgr.exe  
C:\WINDOWS\Explorateur.exe  
C:\WINDOWS\SOUNDMAN.EXE  
C:\Program Files\Microsoft IntelliPoint\point32.exe  
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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 F@st 800-840\dsimon.exe  
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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\msimian.exe

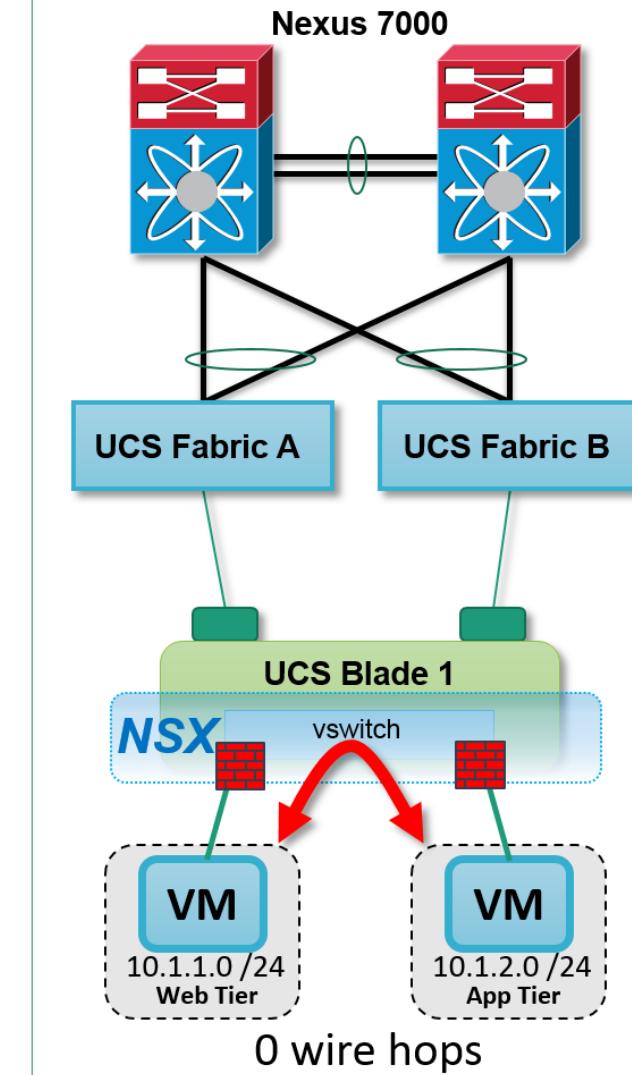
# Before/After SDN

## East-West Firewalling / Same host

Before NSX



With NSX  
Distributed Virtual Firewall

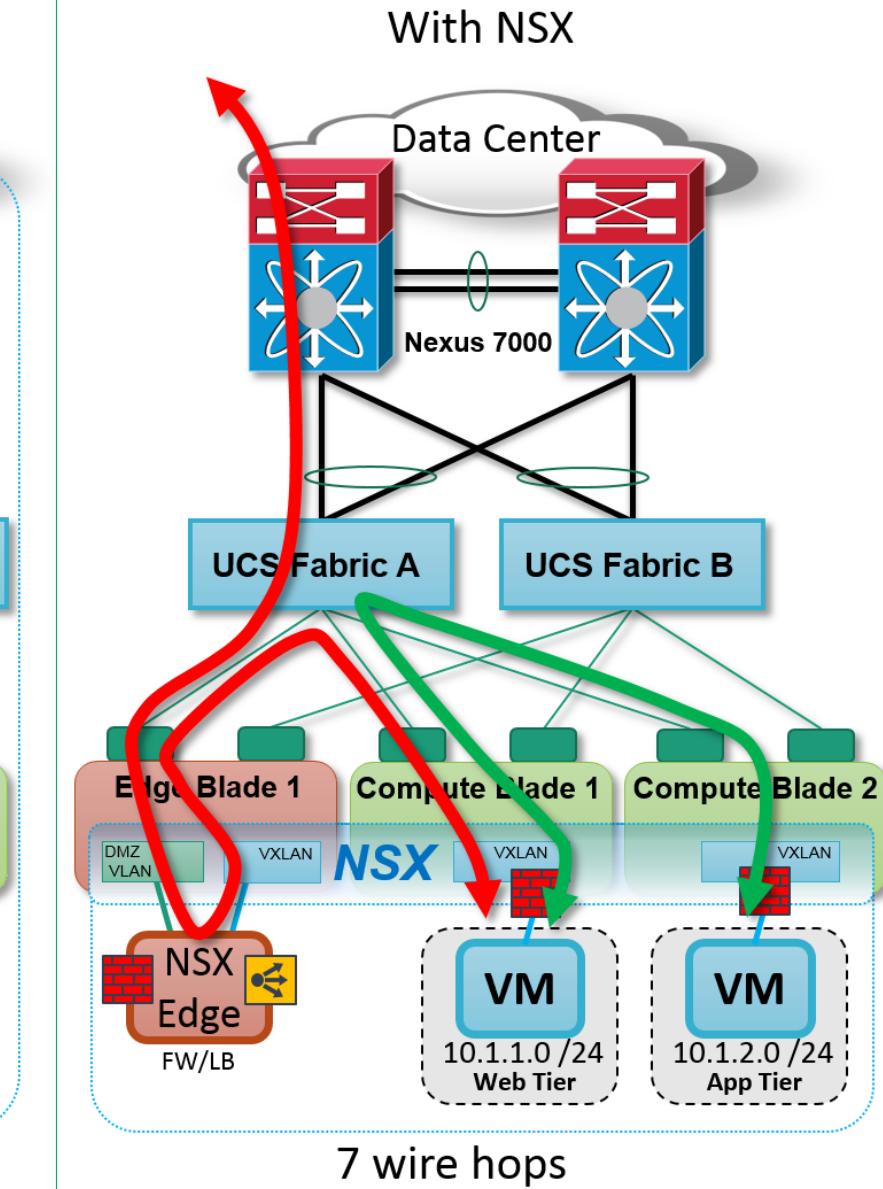
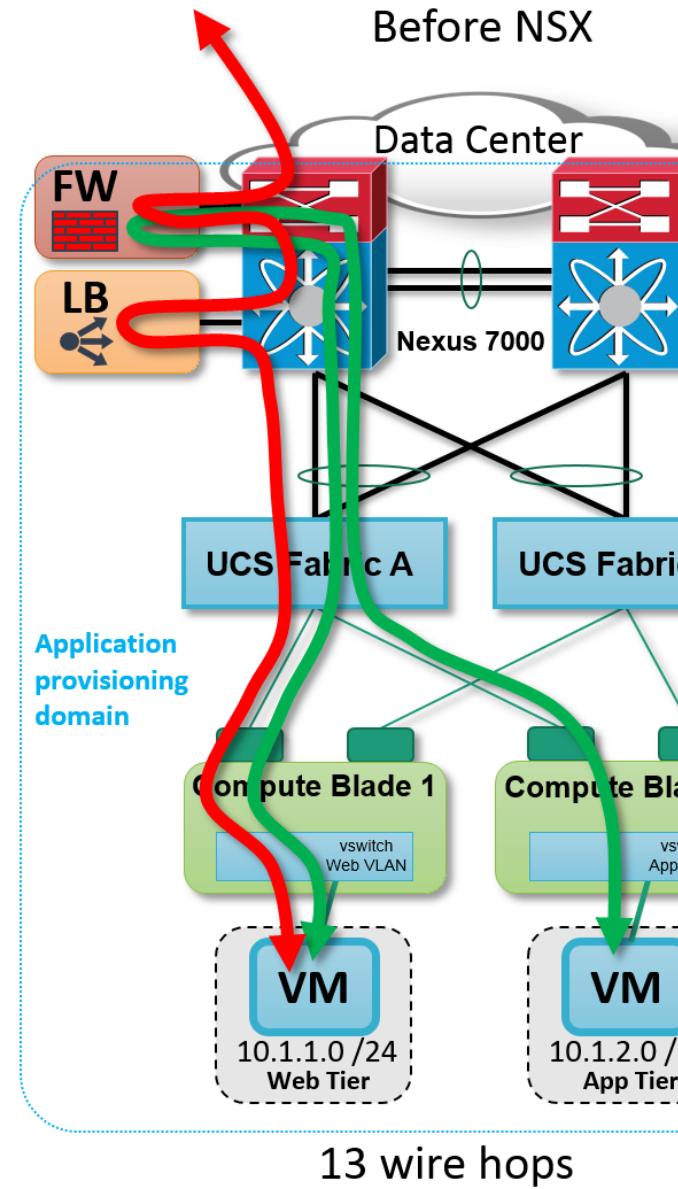


Logfile of HijackThis v1.99.1  
Scan saved at 09:36:29, on 28/04/2009  
Platform: Windows XP SP2 (WinNT 5.01.2600)  
MSIE: Internet Explorer v6.00 SP2 (6.00.2900.2180)

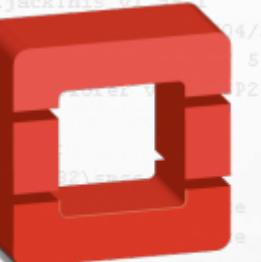
# Before/After SDN

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\AtiEvxx.exe  
C:\WINDOWS\system32\svchost.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Stardock\Object Desktop\WindowBlinds\wbload.  
C:\WINDOWS\system32\spoolsv.exe  
C:\Program Files\Atheros\comm\Shared\ccSetMgr.exe  
C:\Program Files\Atheros\comm\Shared\ccEvtMgr.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFI Monitor.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\Fichiers communs\Symantec Shared\SPBBC\SPBBC  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\syn  
C:\WINDOWS\system32\l2l2d.exe  
C:\Program Files\Fichiers communs\Symantec Shared\ccEvtMgr.exe  
C:\WINDOWS\Explorati...  
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 F@st 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\msimian.exe

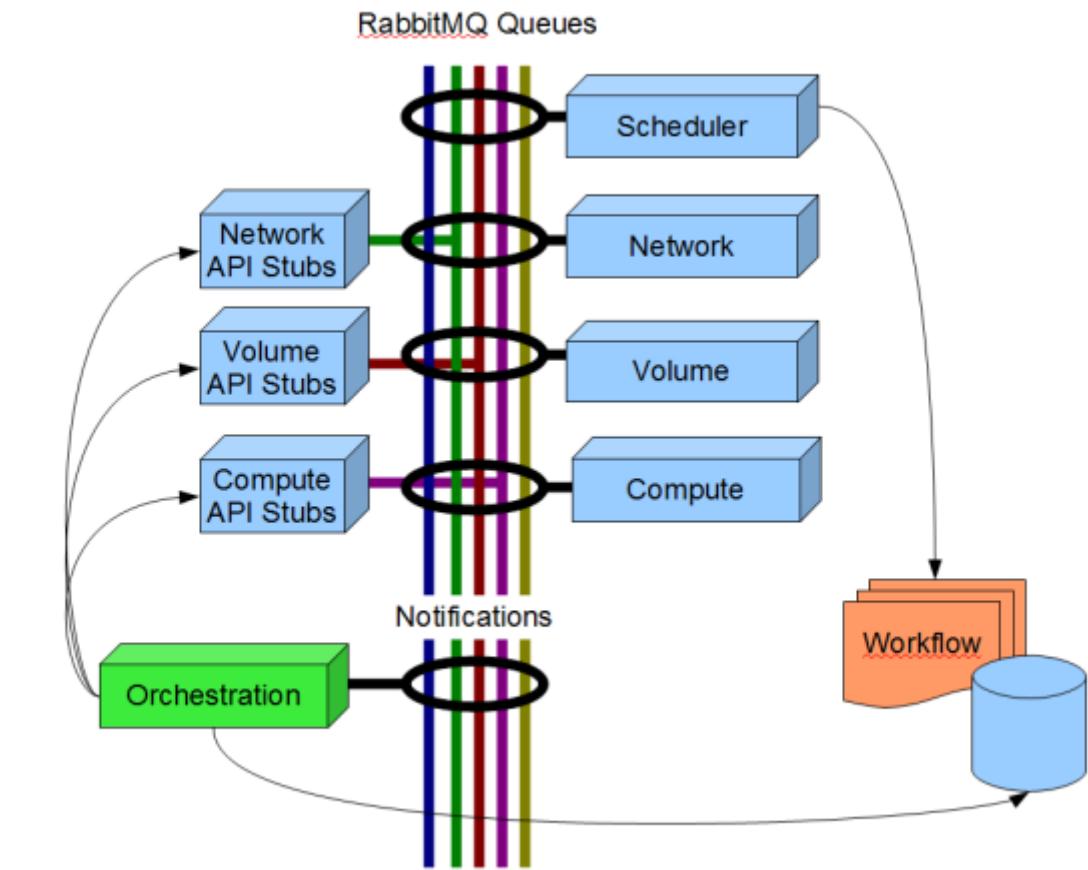
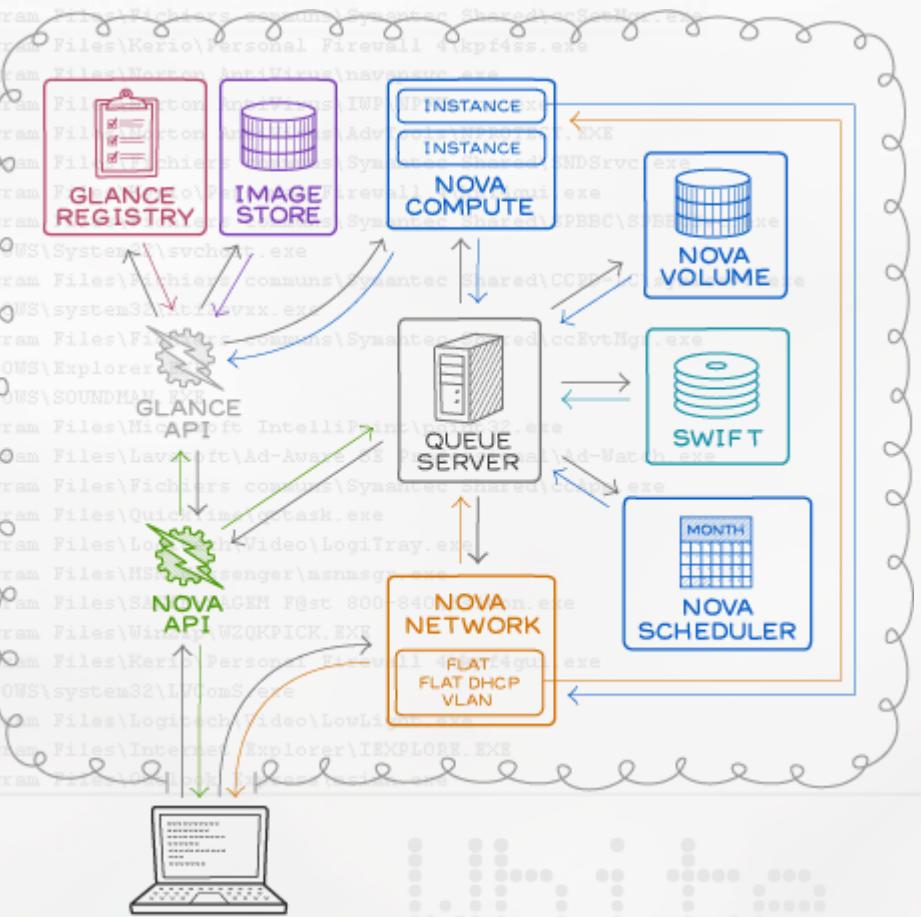
## North-South & East-West Traffic Flow



LogFile of HijackThis v1.0.1  
Scan saved: 2009-04-09 10:04:09  
Platform: Win7 Pro SP1 (5.01.2600)  
MSIE: Internet Explorer 8.0.6001.18702 (6.00.2900.2180)



# openstack™



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\NPFMntor.exe  
C:\Program Files\Norton AntiVirus\AdvTools\ACT.EXE  
C:\Program Files\Symantec Shared\CCPD-LC\synalcsvc.exe  
C:\Program Files\Symantec Shared\ccEvtMgr.exe  
C:\Program Files\Symantec Shared\ccEvtMgr.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.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 F@st 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\msimian.exe

# Micro-Segmentation using SDN

White Hat Help

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

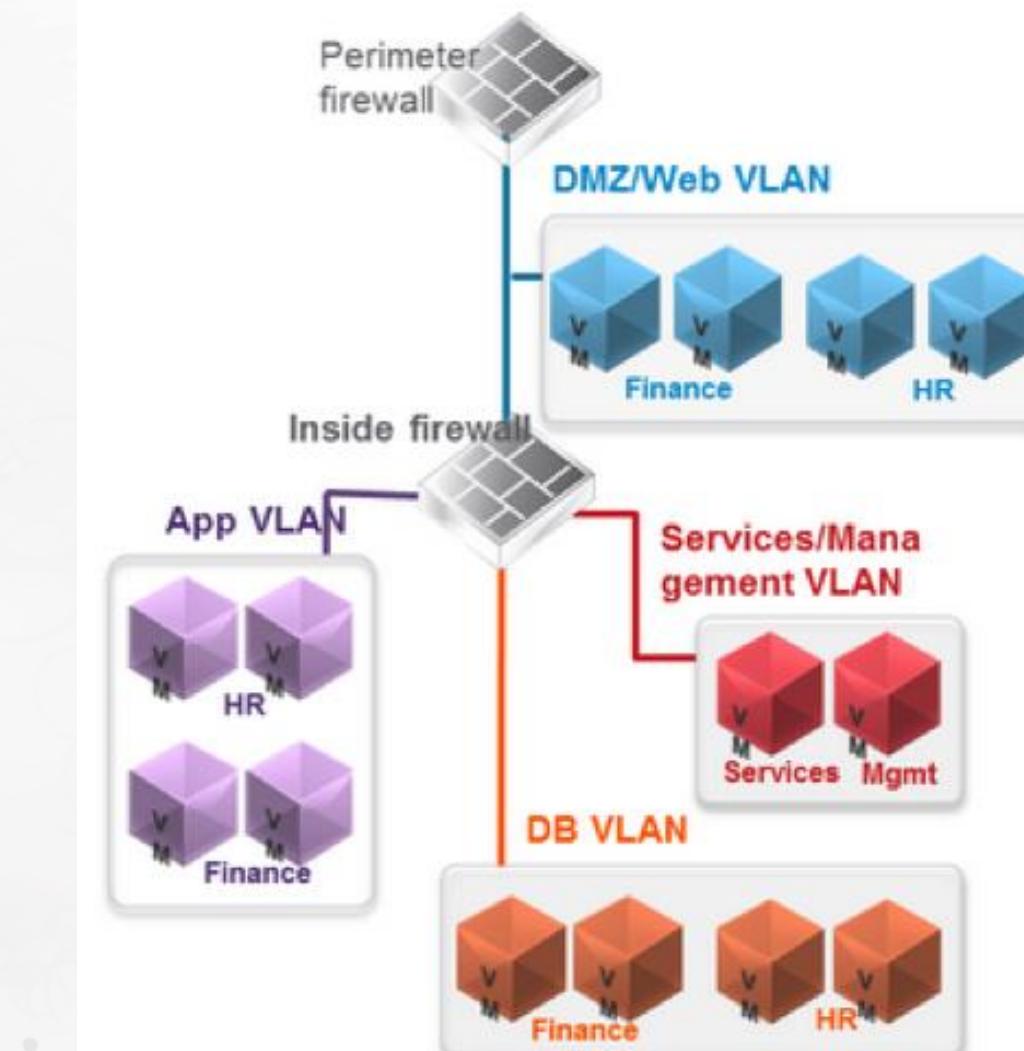
- Vlan oriented

C:\WINDOWS\System32\shssvc.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:\Program Files\Kerio\Personal Firewall 4\ccSetMgr.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpff4ss.exe  
C:\Program Files\Norton AntiVirus\navapsvc.exe  
C:\Program Files\Norton AntiVirus\IWP\NPFIHntor.exe  
C:\Program Files\Norton AntiVirus\AdvTools\NPROTECT.EXE  
C:\Program Files\Norton AntiVirus\Shared\SNDSrvc.exe  
C:\Program Files\Norton AntiVirus\Shared\kpff4gui.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\synalcsvc.exe  
C:\WINDOWS\System32\Ati2evxx.exe  
C:\Program Files\Kerio\Personal Firewall 4\ccEvtMgr.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\Microsoft IntelliPoint\point32.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 800-840\dsimon.exe  
C:\Program Files\WinZip\WZQKPICK.EXE  
C:\Program Files\Kerio\Personal Firewall 4\kpff4gui.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\msimian.exe

- Unmanageable

- Big attack surface

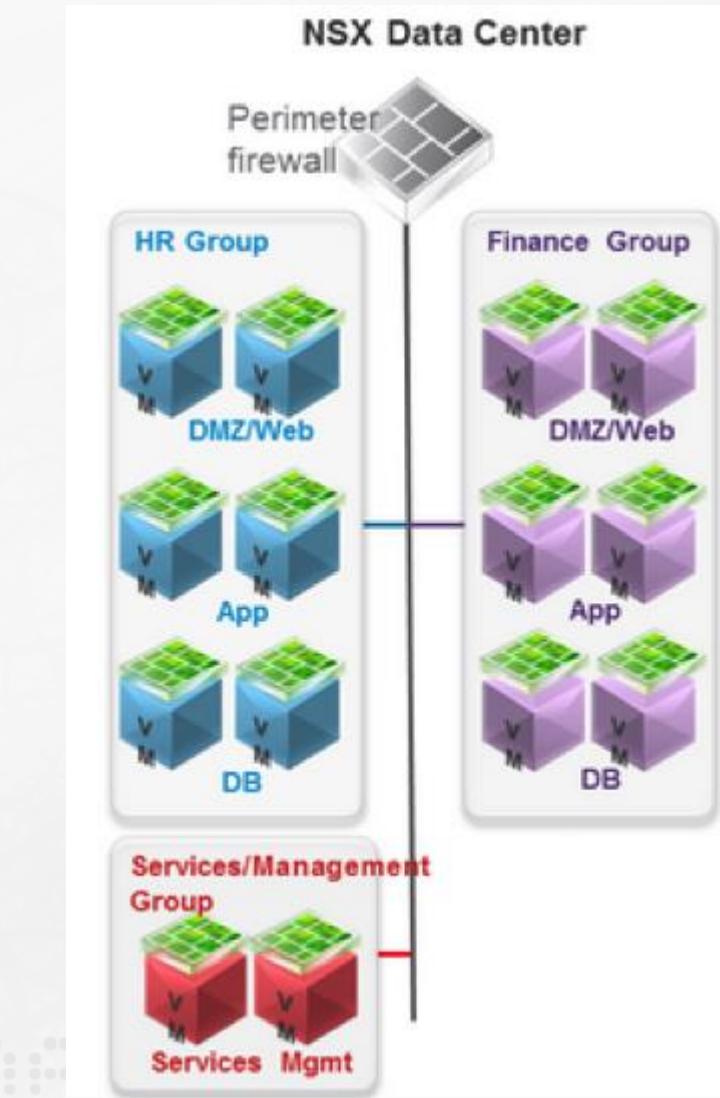
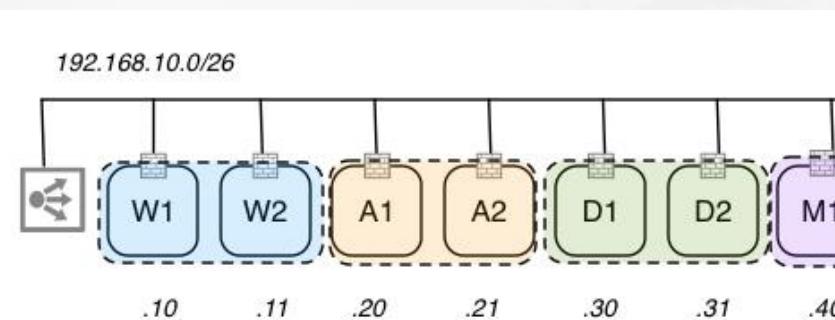
## Traditional Data Center



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: Microsoft Internet Explorer v6.0.2900.2180

# 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\cmd.exe  
C:\WINDOWS\system32\cmdcon.dll  
C:\WINDOWS\system32\cmdcon.sv.dll  
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\Ficher...  
C:\Program Files\Keric...  
C:\Program Files\Norto...  
C:\Program Files\Norto...  
C:\Program Files\Norto...  
C:\Program Files\Norto...  
C:\Program Files\Keric...  
C:\Program Files\Keric...  
C:\WINDOWS\System32\sv...  
C:\Program Files\Ficher...  
C:\WINDOWS\system32\At...  
C:\Program Files\Ficher...  
C:\WINDOWS\Explorer.E...  
C:\WINDOWS\SOUNDMAN.E...  
C:\Program Files\Micro...  
C:\Program Files\Lava...  
C:\Program Files\Ficher...  
C:\Program Files\Quick...  
C:\Program Files\Logit...  
C:\Program Files\MSN...  
C:\Program Files\SAGEN...  
C:\Program Files\WinZ...  
C:\Program Files\Keric...  
C:\WINDOWS\system32\LV...  
C:\Program Files\Logit...  
C:\Program Files\Inter...  
C:\Program Files\Outlo...



SILICON VALLEY | HBO

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\kpf4.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpf4gui.exe  
C:\Program Files\Kerio\Antivirus\SPBBC\SPBBCSvc.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\synalcsvc.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\qtask.exe  
C:\Program Files\Logitech\Video\LogiTray.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 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\msimian.exe

# If we have some more time

White Hat Help

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

Running pro...

C:\WINDOWS\System32\smss.exe

C:\WINDOWS\system32\winlogon.exe

C:\WINDOWS\system32\services.exe

C:\WINDOWS\system32\lsass.exe

C:\WINDOWS\system32\RPC.dll

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\Symant

C:\Program Files\Kerio\Personal Firewall

C:\Program Files\Norton AntiVirus\navapsu

C:\Program Files\Norton AntiVirus\IWP\NPP

C:\Program Files\Norton AntiVirus\AdvTool

C:\Program Files\Fichiers communs\Symant

C:\Program Files\Kerio\Personal Firewall

C:\Program Files\Fichiers communs\Symant

C:\WINDOWS\System32\svchost.exe

C:\Program Files\Fichiers communs\Symant

C:\WINDOWS\system32\Ati2evxx.exe

C:\Program Files\Fichiers communs\Symant

C:\WINDOWS\Explorer.EXE

C:\WINDOWS\SOUNDMAN.EXE

C:\Program Files\Microsoft IntelliPoint

C:\Program Files\Lavasoft\Ad-Aware SE Pro

C:\Program Files\Fichiers communs\Symant

C:\Program Files\QuickTime\qttask.exe

C:\Program Files\Logitech\Video\LogiTray

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

C:\Program Files\SAGEM\SAGEM F@st 800-840

C:\Program Files\WinZip\WZQKPICK.EXE

C:\Program Files\Kerio\Personal Firewall

C:\WINDOWS\system32\LVComS.exe

C:\Program Files\Logitech\Video\LowLight

C:\Program Files\Internet Explorer\IEXPLO

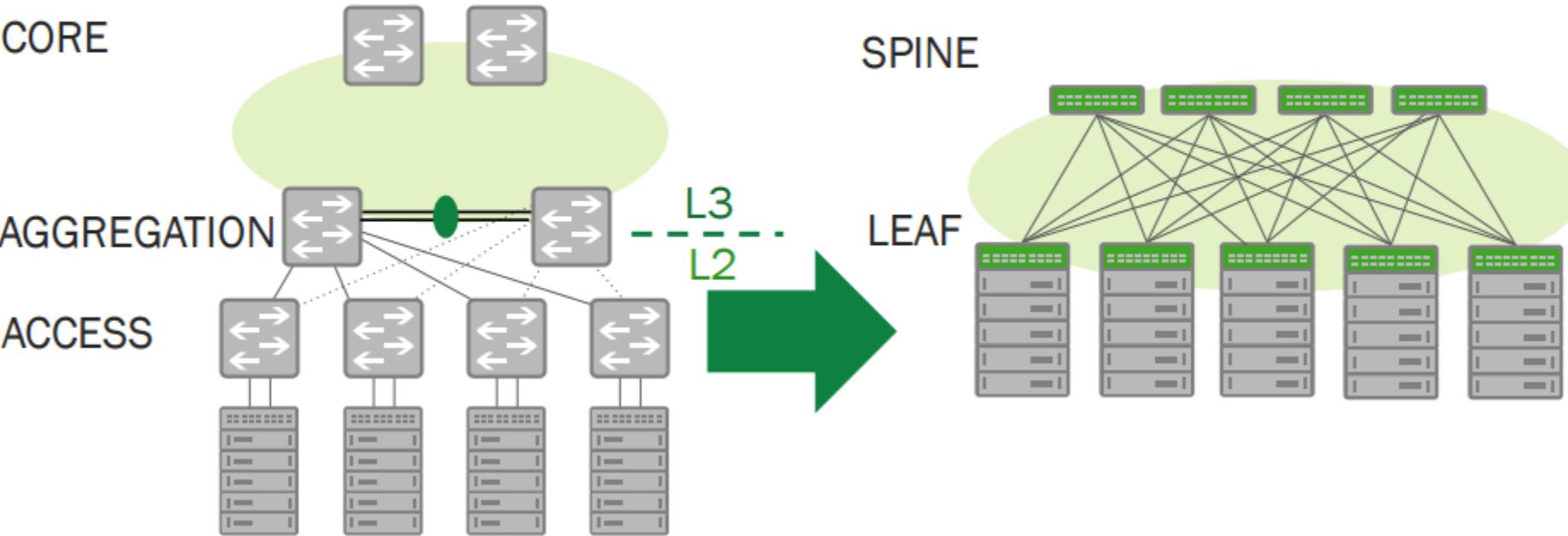
C:\Program Files\Outlook Express\msimam.e

- Hypervisor is the new

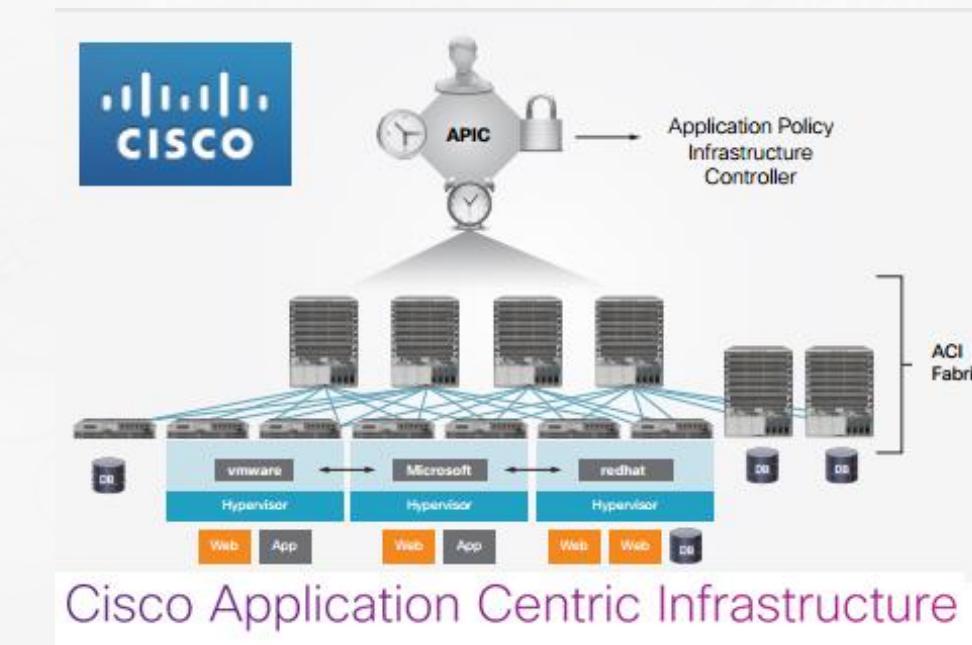
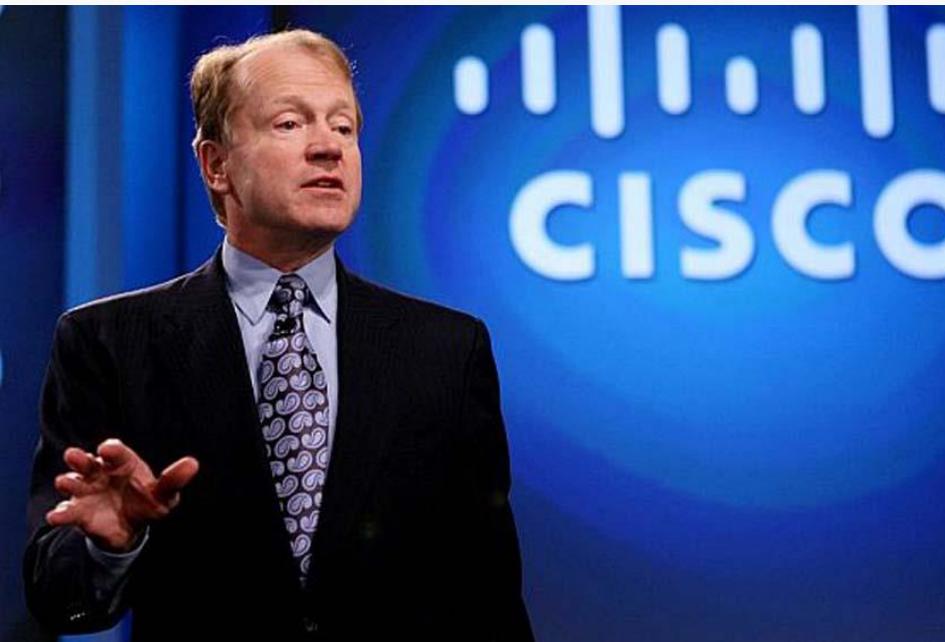


king!!!

## A Key Transformation



**IMHO, biggest loser would be**



Logfile of HijackThis v1.99.1  
Scan saved at 09:36:29, on 28/04/2009  
Platform: Windows XP SP2 (WinNT 5.01.2600)  
HSIE: 0x0000000000000000 SIE (6.1.2900.2180)

# 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\qtask.exe  
C:\Program Files\Logitech\Video\LogiTray.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 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\msimain.exe

Logfile of HijackThis v1.99.1  
Scan saved at 09:36:29, on 28/04/2009  
Platform: Windows Vista (winNT 5.0, SP2)  
MSIE: Internet Explorer 7.00.520

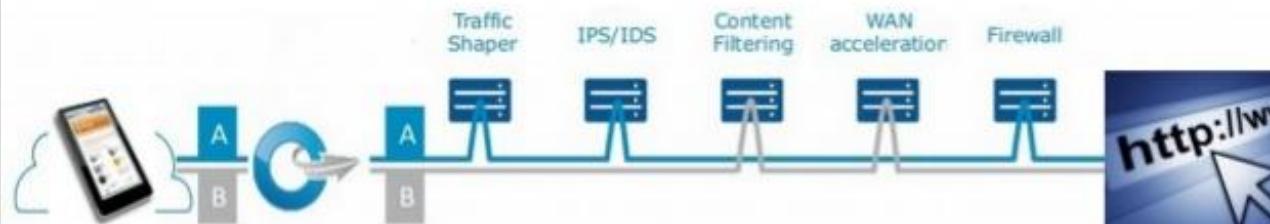
Running processes:

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

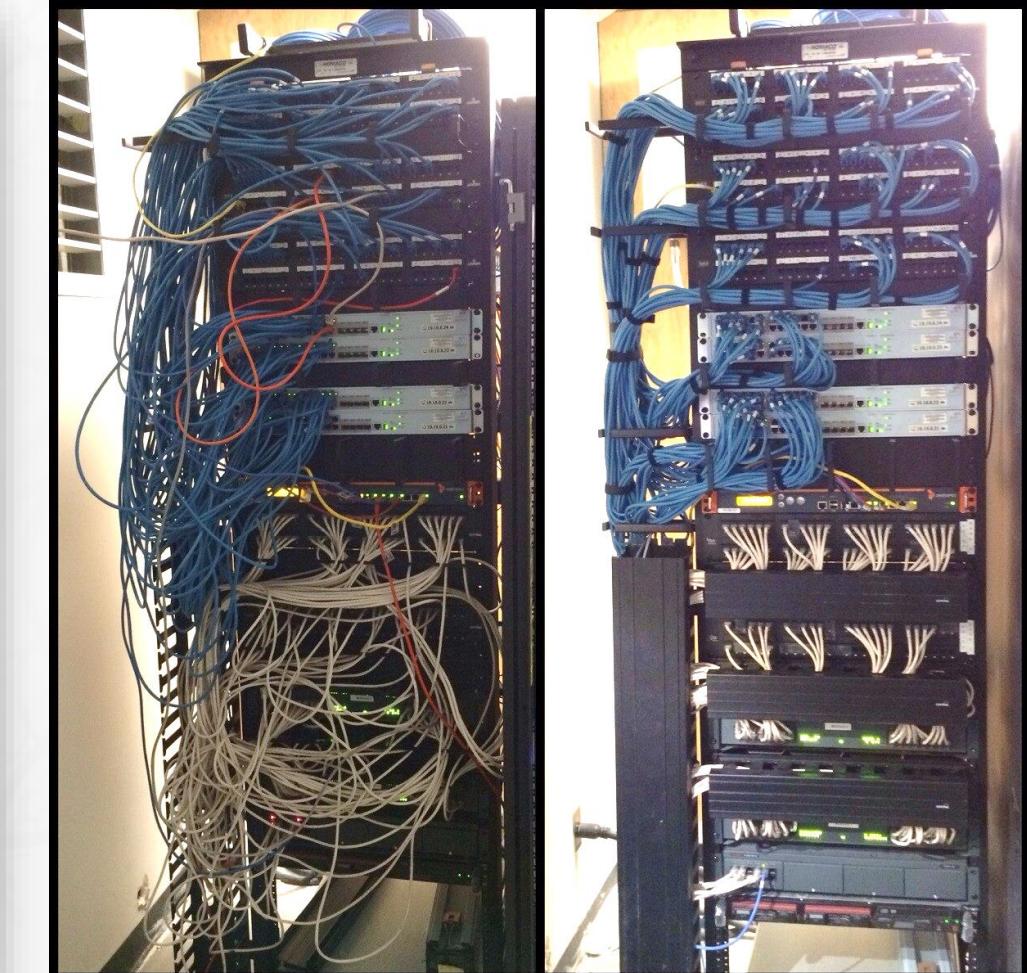
# NFV - Network functions virtualization

## Service Chaining

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



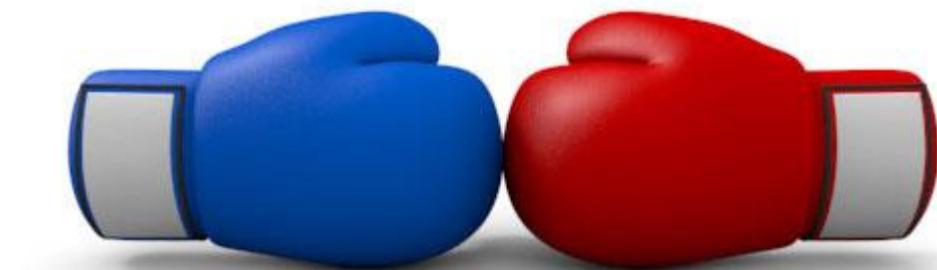
Source: Dynamic Service Chaining, SDN OpenFlow World Congress, Oct 2013, Jan Lindblad, Telia



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 7.0.5723.1180  
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\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\kpf4ui.exe  
C:\Program Files\Norton AntiVirus\AdvTools\NPProtect.EXE  
C:\Program Files\Fichiers communs\Symantec Shared\SNDSrvc.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpf4ui.exe  
C:\Program Files\Kerio\Personal Firewall 4\kpf4ss.exe  
C:\WINDOWS\System32\svchost.exe  
C:\Program Files\Fichiers communs\Symantec Shared\CCPD-LC\synalcsvc.exe  
C:\WINDOWS\system32\Ati2evxx.exe  
C:\Program Files\Microsoft IntelliPoint\point32.exe  
C:\Program Files\JavaSoft\Ad-Aware SE Professional\Ad-Watch.exe  
C:\Program Files\QuickTime\qtcsh.exe  
C:\Program Files\Logitech\Video\LogiTray.exe  
C:\Program Files\MSN Messenger\msnmsgr.exe  
C:\Program Files\SAGEM\SAGEM F@st 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\msimian.exe

# Business Impact

- 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

C:\WINDOWS\System32\Any  
C:\WINDOWS\system32\Any  
C:\WINDOWS\system32\Any  
C:\WINDOWS\system32\lazrxx.exe  
C:\WINDOWS\system32\Ati2evxx.exe

# Any Questions ?

