SSO, DCS and NSD

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IBM

Vladimir Vagner message

- He will sent mail with more informations about ITSM
- Will share link and PDF for every presentation
- Share terms for the excursion in IBM CIC

About lector

- Dr. Ing. Petr Habarta, Ph.D.
- 11 years spent on multiple universities
- Over 9 years in IBM
- Positions - started as 1st level technician, 2nd level production control, incident coordinator, shift leader, senior incident manager, problem manager
- In IBM organization GTS division – service management
- Senior Problem Manager with focus on strategic data centers
- Lector of Service Management University
- Experience in IT and computers 30 years (14 years as professional, before it was only hobby)

Agenda

- SSO – System server operations
- DCS – Desktop Client services
- NSD – Network services delivery
- Organization structure
- 1st level, 2nd level and 3rd level support
- Tickets and ticketing tools
- Monitoring tools
- Tivoli infrastructure
- LAN and WAN management
- Security

SSO – System Server Operation

- Managing IT infrastructure
- Managing and maintenance of customer servers – remotely (server monitoring)
- Coverage of functions and availability of servers
- Backups and data restores
- Applications

DCS – Desktop Client Support

- 2nd level helpdesk
- Image services
- Managing of issues
- Coordination of installations, changes etc. (SCCM services)
- Disaster recovery – backups & restores
- Centralized support of end user stations

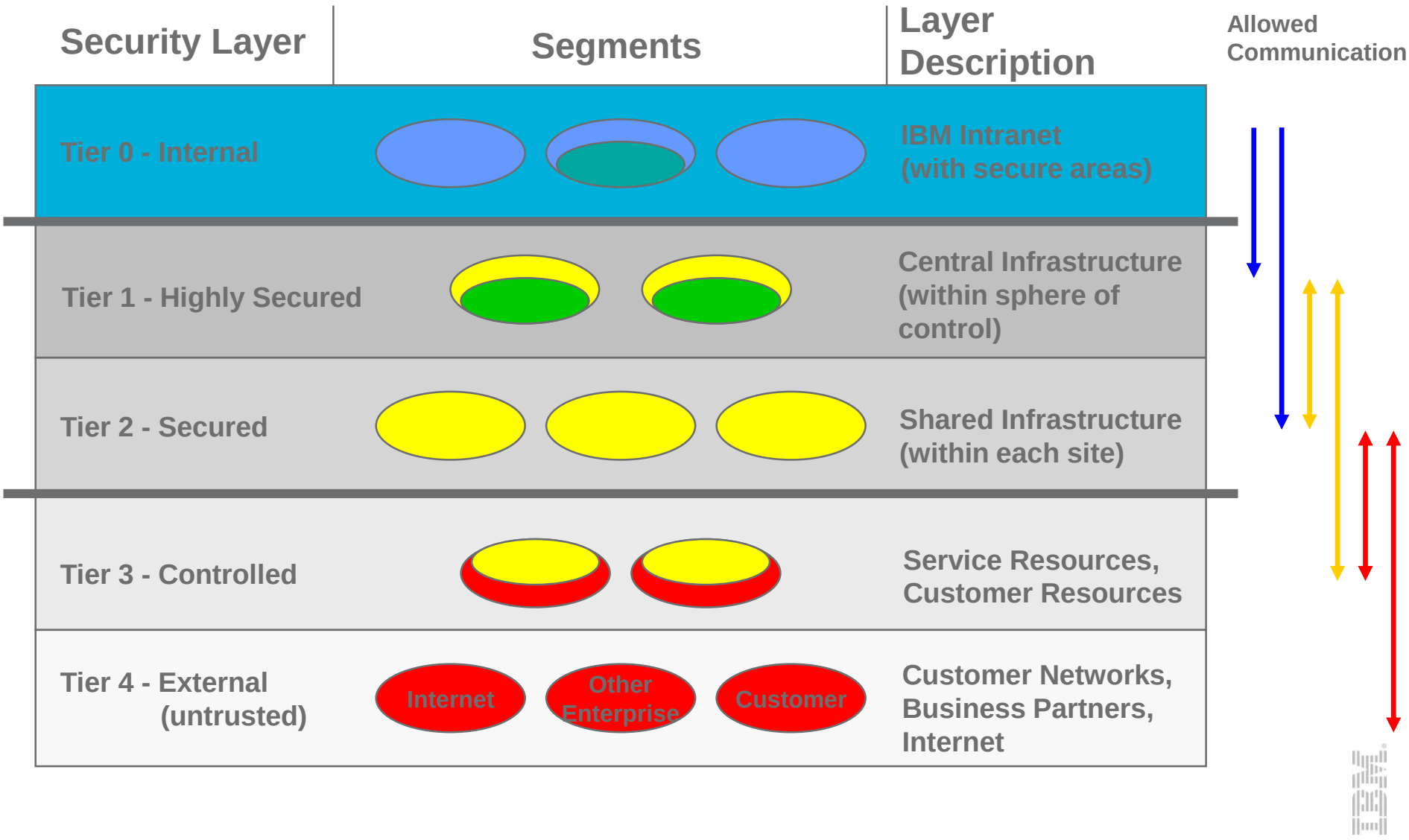
NSD – Network services delivery

- Focus only to network IT infrastructure
- Proactive monitoring of different tools. Coordinates incident resolution and communication.
- Require best knowledge of processes, tools usage and got global overview of systems.
- Necessary 24/7 support
- About 70% of issues are network based

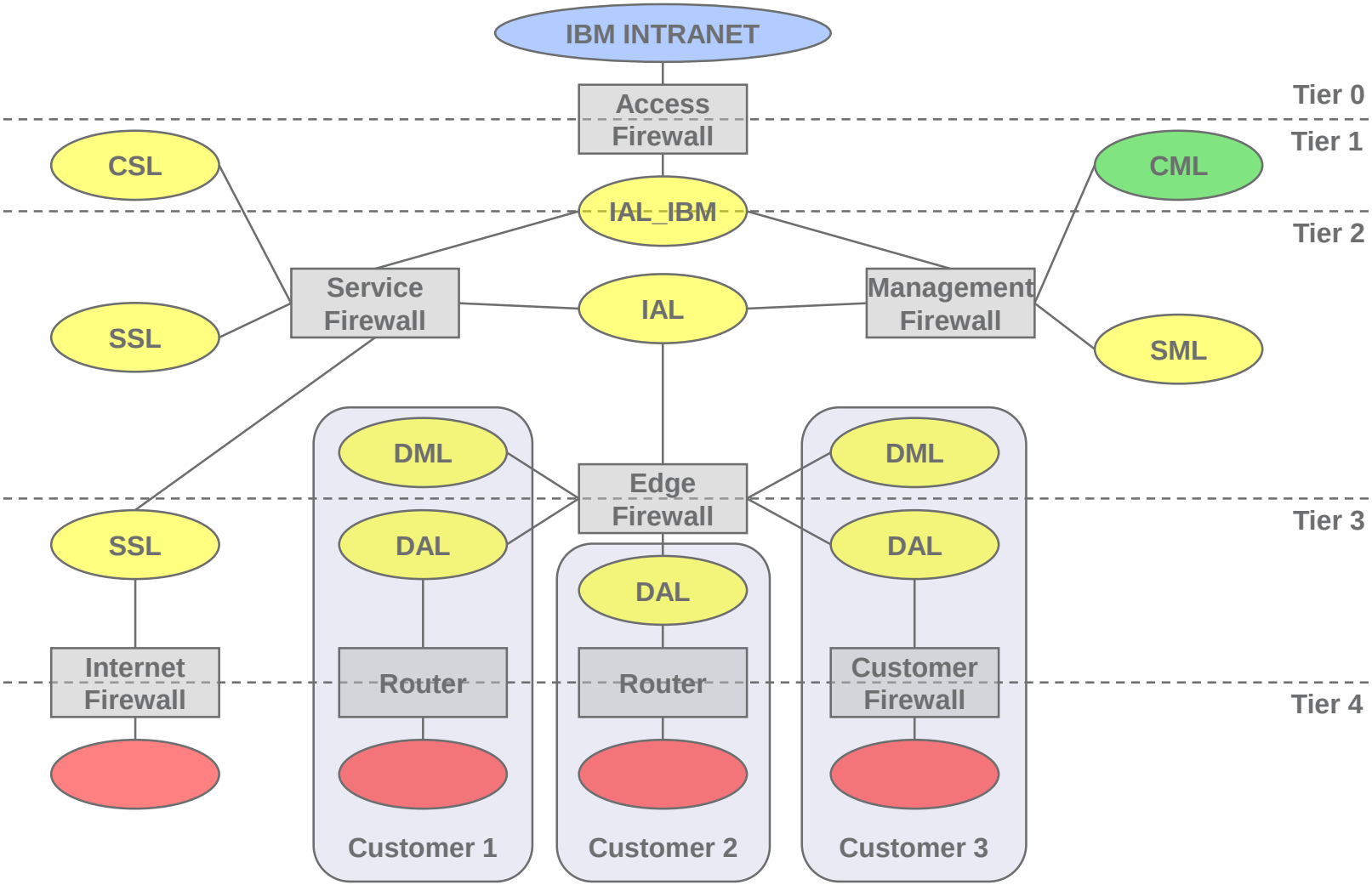
What is Shared Network Infrastructure (SNI)?

- Provides secure way how to connect from IBM internal network to customer network
- SNI is special network architecture inside IBM Global Services Data Center.
- Security requirements are very difficult
- Is based on few network segment with different security access levels

Tier Definitions for SNI (e.g. eSNI “simplified”)



Implementation Example (e.g. eSNI “simplified”)



Abbreviations

- CML – Central Management LAN
- CSL – Central Service LAN
- SML – Shared Management LAN
- SSL – Shared Service LAN
- DML – Dedicated Management LAN
- DAL – Dedicated Access LAN
- IAL – Infrastructure Access LAN
- IAL_IBM – Infrastructure Access LAN IBM

What Advantages/Disadvantages are there for SNI?

Advantages

- Standard solution
- Secure solution
- Reuse of environment
- Cost reduction

Disadvantages

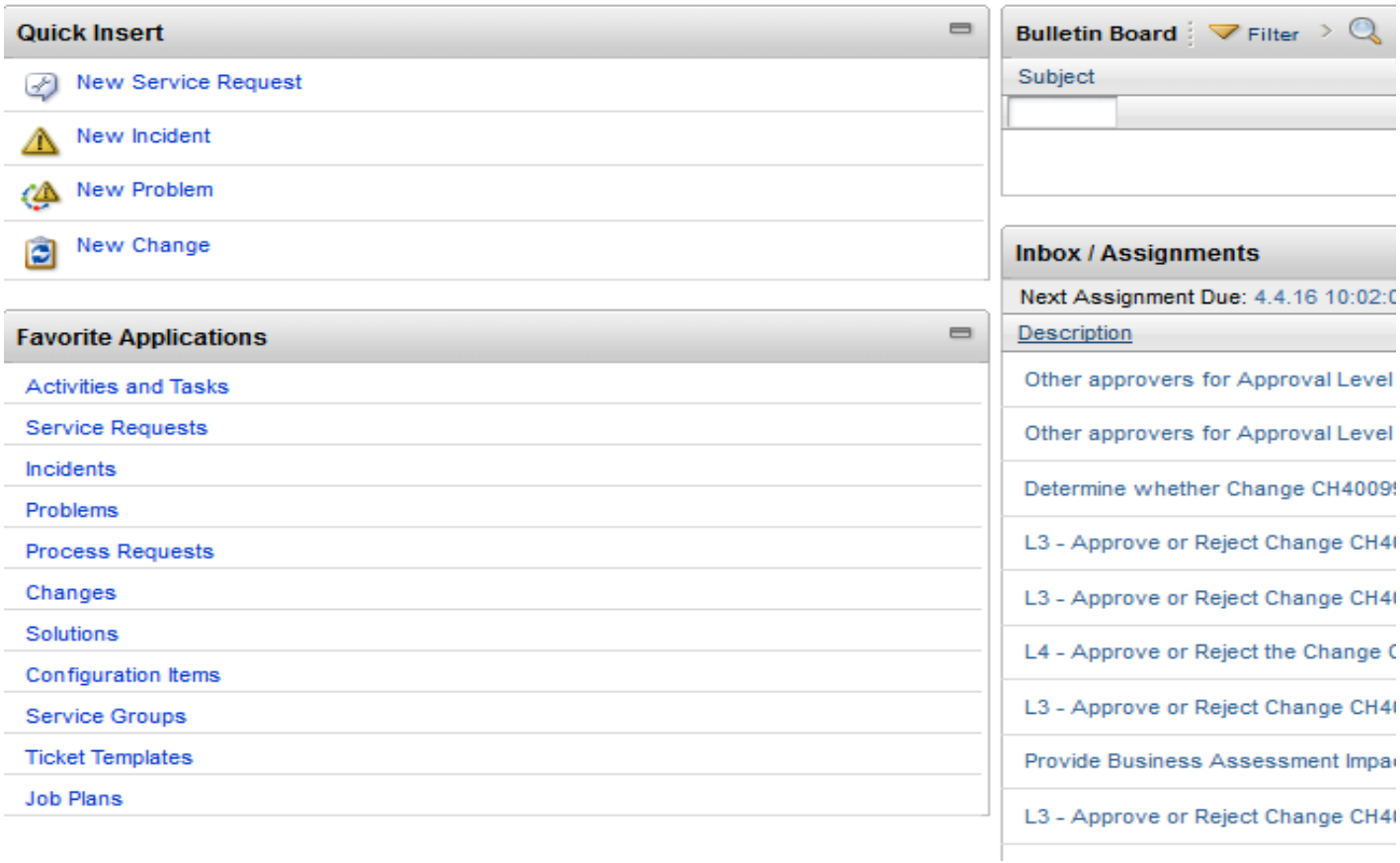
- Sharing of network environment got much higher security and management requirement as single-customer one.
- It’s not always possible standardize all customer specific requests
- Possibility of conflicts in private IP address ranges

Structure of teams

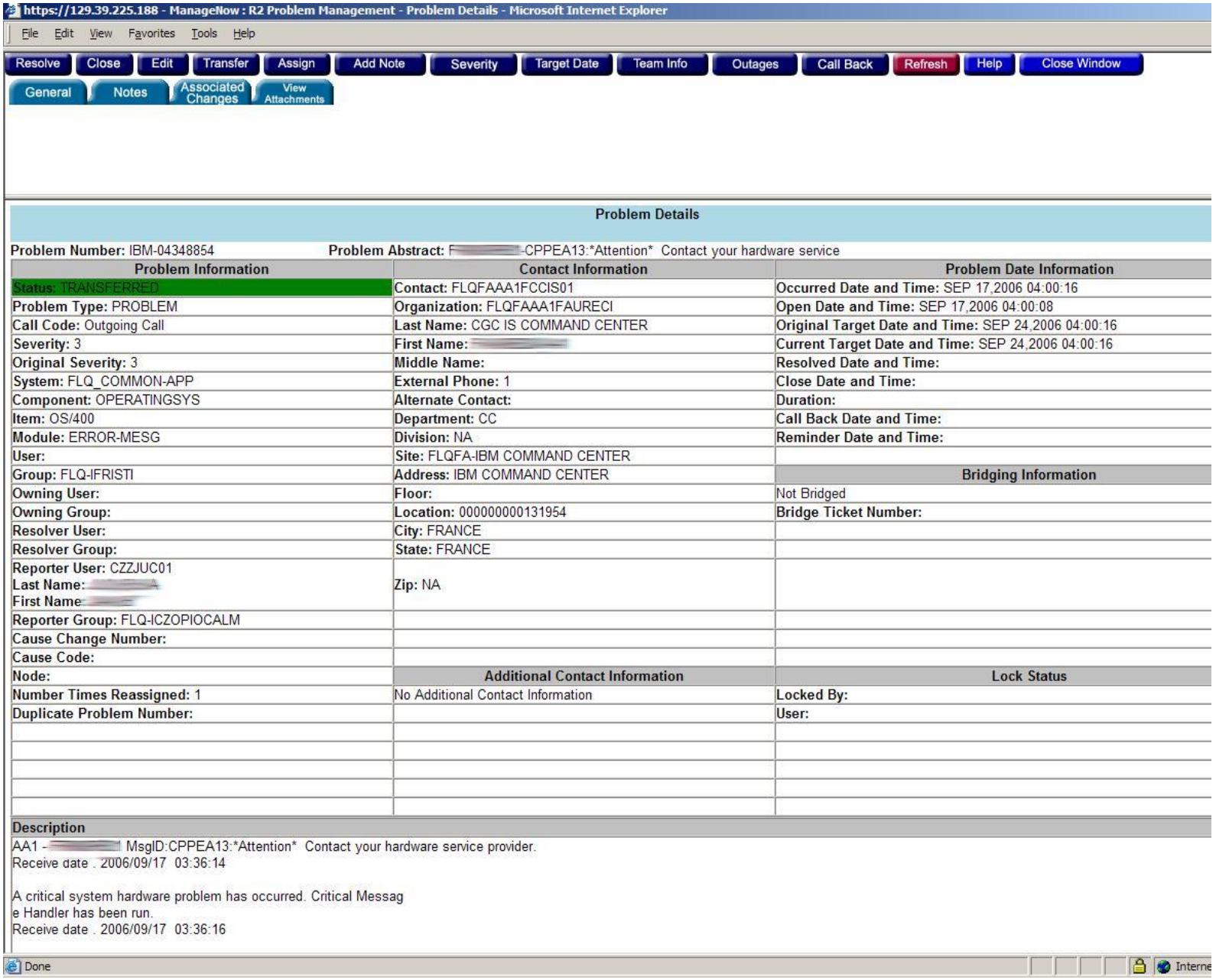
- 1st level support
  - Monitoring team
  - Basic and simple tasks
- 2nd level support
  - Managing more complex issues (installation, patching, changes etc.)
  - Application management
  - Divided based on theirs specialization – Windows, Unix, DB, Storage, DNS/DHCP, Firewalls etc.
- 3rd level support
  - Masters of their specialization
  - “Top guns” used for most critical and complex issues

Ticketing tools

- Ticket is record (evidence & protocol) in ticketing tool – Basic communication tool
- Different names – Maximo, Remedy, Manage now, AOTS, HPSM, SNOW etc.
- 1 record = 1 ticket
- Advantages – every record is unique, simple escalation, recorded all activities and steps done



Ticket tools



https://129.39.225.188 - ManageNow : R2 Problem Management - Problem Details - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Resolve | Close | Edit | Transfer | Assign | Add Note | Severity | Target Date | Team Info | Outages | Call Back | Refresh | Help | Close Window

General | Notes | Associated Changes | View Attachments

Problem Details

Problem Number: IBM-04348854 **Problem Abstract:** [redacted]-CPPEA13:*Attention* Contact your hardware service

Problem Information	Contact Information	Problem Date Information
Status: TRANSFERRED	**Contact:** FLQFAAA1FCCIS01	**Occurred Date and Time:** SEP 17,2006 04:00:16
Problem Type: PROBLEM	**Organization:** FLQFAAA1FAURECI	**Open Date and Time:** SEP 17,2006 04:00:08
Call Code: Outgoing Call	**Last Name:** CGC IS COMMAND CENTER	**Original Target Date and Time:** SEP 24,2006 04:00:16
Severity: 3	**First Name:** [redacted]	**Current Target Date and Time:** SEP 24,2006 04:00:16
Original Severity: 3	**Middle Name:**	**Resolved Date and Time:**
System: FLQ_COMMON-APP	**External Phone:** 1	**Close Date and Time:**
Component: OPERATINGSYS	**Alternate Contact:**	**Duration:**
Item: OS/400	**Department:** CC	**Call Back Date and Time:**
Module: ERROR-MESG	**Division:** NA	**Reminder Date and Time:**
User:	**Site:** FLQFA-IBM COMMAND CENTER	
Group: FLQ-IFRISTI	**Address:** IBM COMMAND CENTER	**Bridging Information**
Owning User:	**Floor:**	Not Bridged
Owning Group:	**Location:** 000000000131954	**Bridge Ticket Number:**
Resolver User:	**City:** FRANCE	
Resolver Group:	**State:** FRANCE	
Reporter User: CZZJUC01 **Last Name:** [redacted] **First Name:** [redacted]	**Zip:** NA	
Reporter Group: FLQ-ICZOPIOCALM		
Cause Change Number:		
Cause Code:		
Node:	**Additional Contact Information**	**Lock Status**
Number Times Reassigned: 1	No Additional Contact Information	**Locked By:**
Duplicate Problem Number:		**User:**

Description

AA1 -[redacted] MsgID:CPPEA13:*Attention* Contact your hardware service provider.
Receive date . 2006/09/17 03:36:14

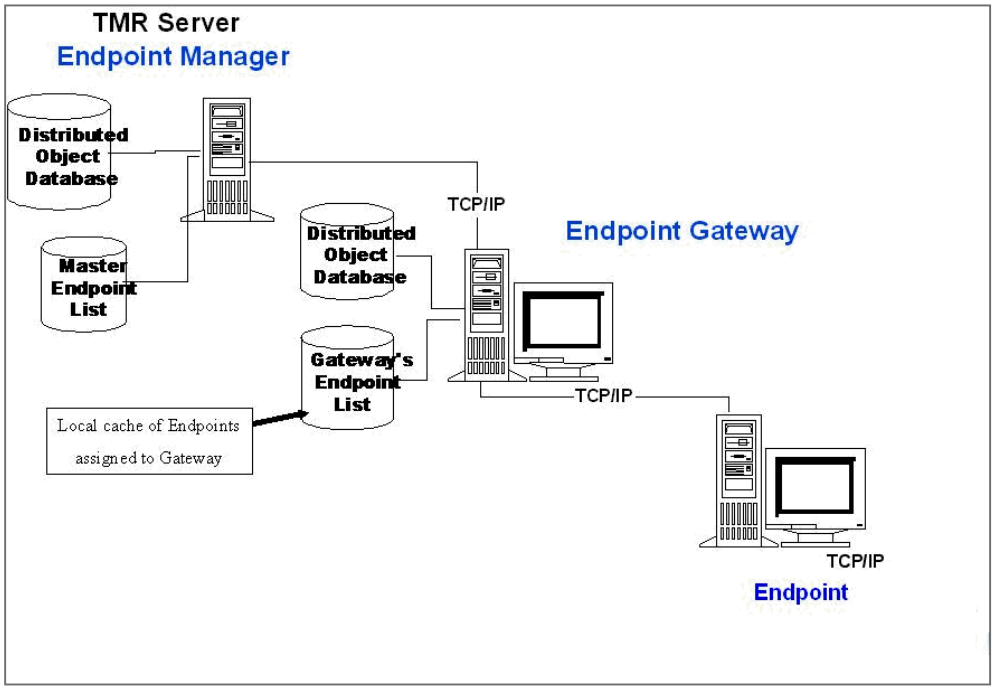
A critical system hardware problem has occurred. Critical Messag
e Handler has been run.
Receive date . 2006/09/17 03:36:16

Done

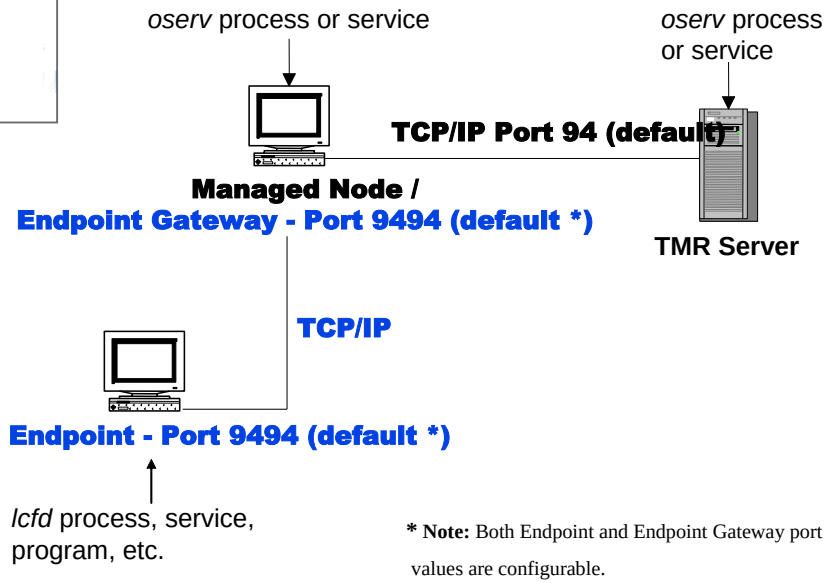
Monitoring - Tivoli

- Tivoli is IBM product
- Set of tools with many features
- One of them is monitoring of OS, SW, HW, NSD etc.

Tivoli monitoring infrastructure

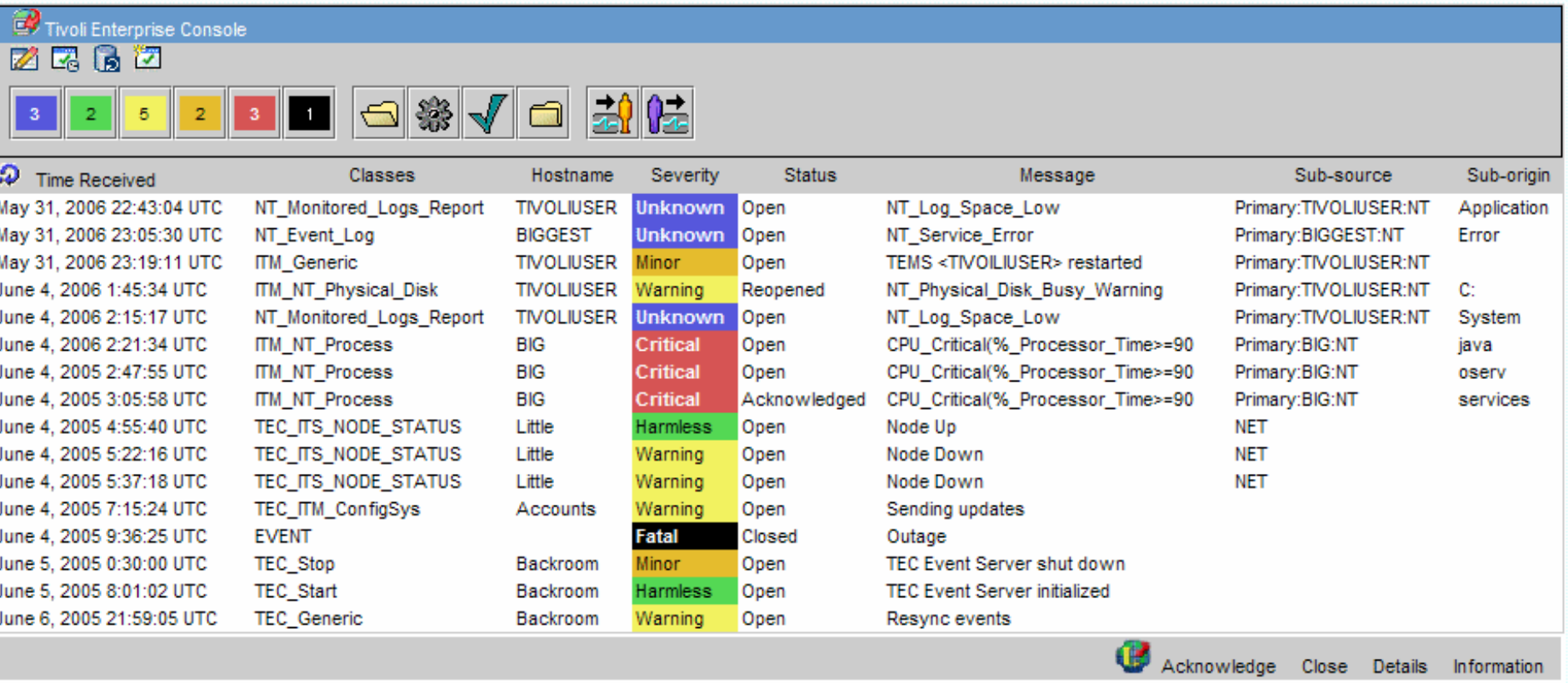


Endpoint Process



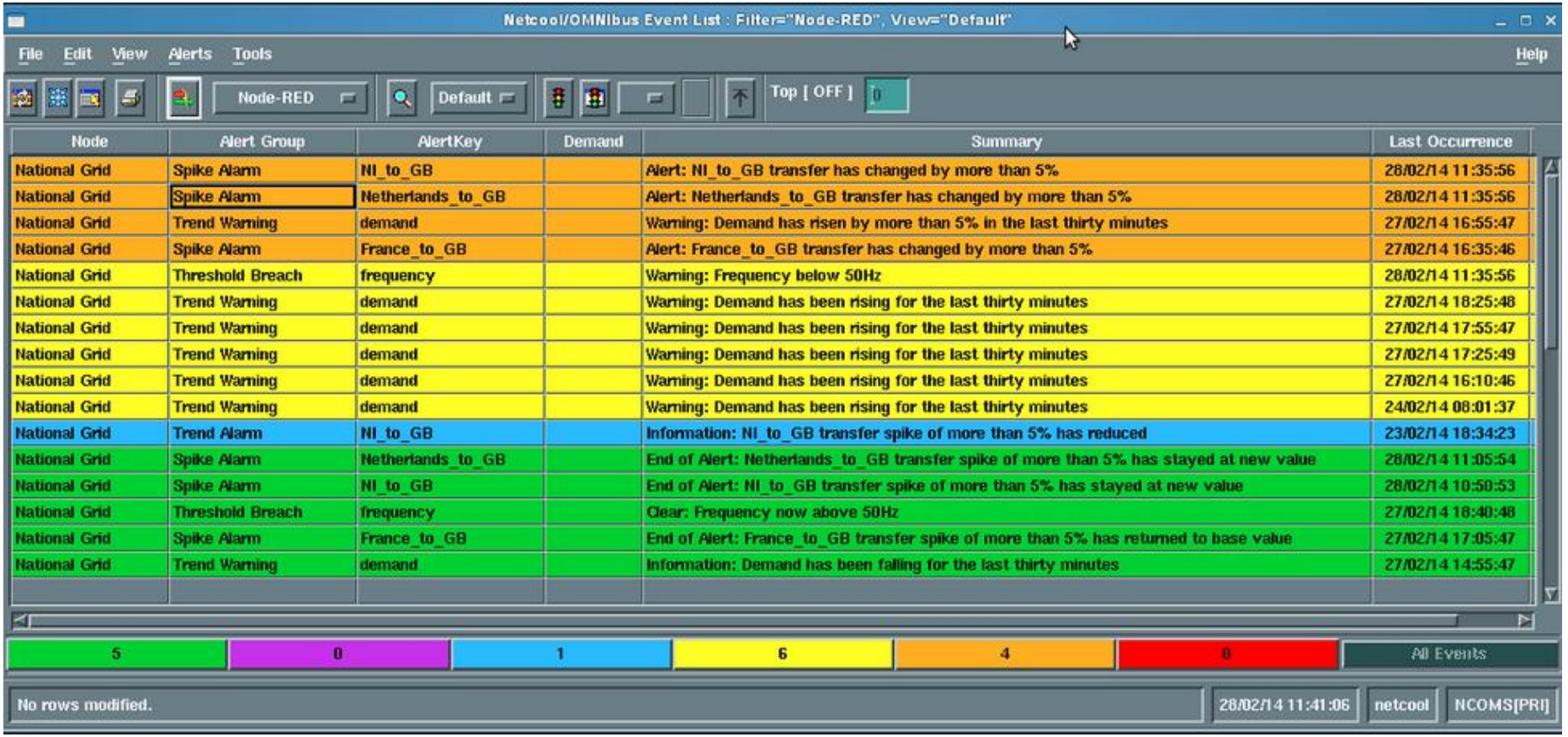
* **Note:** Both Endpoint and Endpoint Gateway port values are configurable.

Tivoli Enterprise Console - TEC



Time Received	Classes	Hostname	Severity	Status	Message	Sub-source	Sub-origin
May 31, 2006 22:43:04 UTC	NT_Monitored_Logs_Report	TIVOLIUSER	Unknown	Open	NT_Log_Space_Low	Primary:TIVOLIUSER:NT	Application
May 31, 2006 23:05:30 UTC	NT_Event_Log	BIGGEST	Unknown	Open	NT_Service_Error	Primary:BIGGEST:NT	Error
May 31, 2006 23:19:11 UTC	ITM_Generic	TIVOLIUSER	Minor	Open	TEMS <TIVOILIUSER> restarted	Primary:TIVOLIUSER:NT	
June 4, 2006 1:45:34 UTC	ITM_NT_Physical_Disk	TIVOLIUSER	Warning	Reopened	NT_Physical_Disk_Busy_Warning	Primary:TIVOLIUSER:NT	C:
June 4, 2006 2:15:17 UTC	NT_Monitored_Logs_Report	TIVOLIUSER	Unknown	Open	NT_Log_Space_Low	Primary:TIVOLIUSER:NT	System
June 4, 2006 2:21:34 UTC	ITM_NT_Process	BIG	Critical	Open	CPU_Critical(%_Processor_Time>=90	Primary:BIG:NT	java
June 4, 2005 2:47:55 UTC	ITM_NT_Process	BIG	Critical	Open	CPU_Critical(%_Processor_Time>=90	Primary:BIG:NT	oserv
June 4, 2005 3:05:58 UTC	ITM_NT_Process	BIG	Critical	Acknowledged	CPU_Critical(%_Processor_Time>=90	Primary:BIG:NT	services
June 4, 2005 4:55:40 UTC	TEC_ITS_NODE_STATUS	Little	Harmless	Open	Node Up	NET	
June 4, 2005 5:22:16 UTC	TEC_ITS_NODE_STATUS	Little	Warning	Open	Node Down	NET	
June 4, 2005 5:37:18 UTC	TEC_ITS_NODE_STATUS	Little	Warning	Open	Node Down	NET	
June 4, 2005 7:15:24 UTC	TEC_ITM_ConfigSys	Accounts	Warning	Open	Sending updates		
June 4, 2005 9:36:25 UTC	EVENT		Fatal	Closed	Outage		
June 5, 2005 0:30:00 UTC	TEC_Stop	Backroom	Minor	Open	TEC Event Server shut down		
June 5, 2005 8:01:02 UTC	TEC_Start	Backroom	Harmless	Open	TEC Event Server initialized		
June 6, 2005 21:59:05 UTC	TEC_Generic	Backroom	Warning	Open	Resync events		

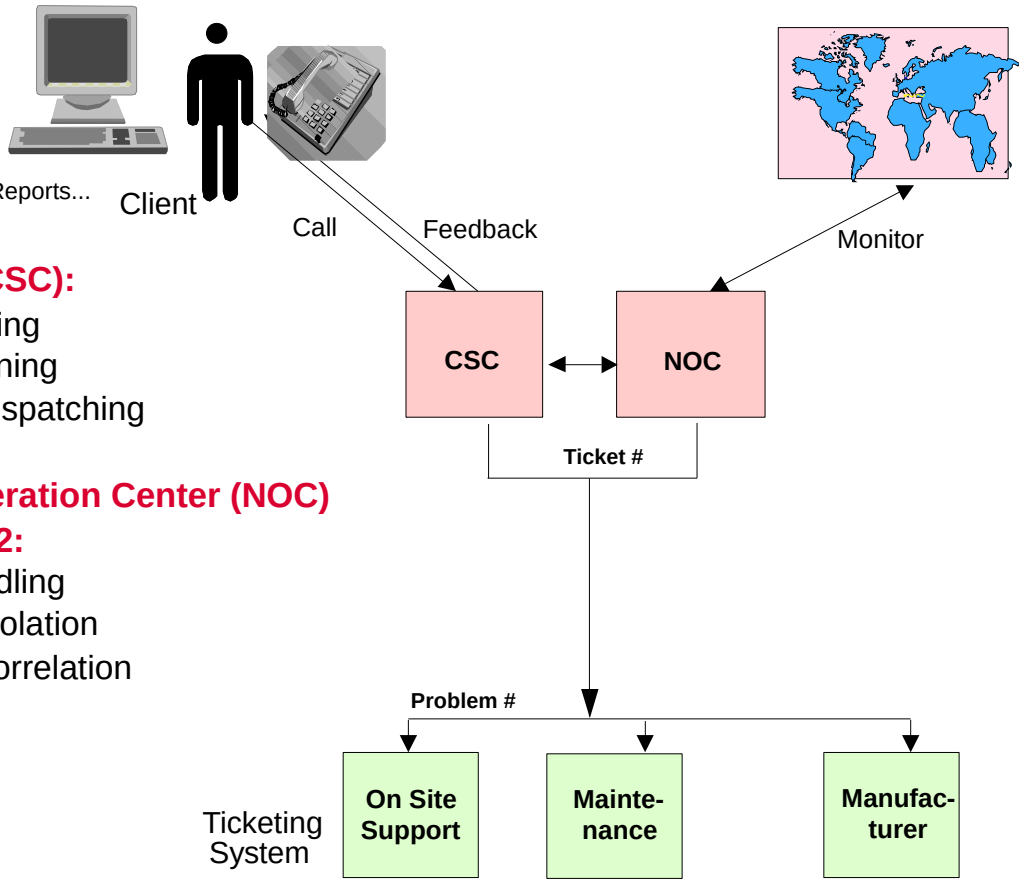
Netcool monitoring tool



Tivoli features

- TEC – Tivoli Enterprise Console
- TSM – Tivoli Storage Manager
- TWS – Tivoli Workload Scheduler
- Tivoli Configuration Manager
- Tivoli License Manager
- Tivoli Acces Manager

Organization Structure – Network management GNMC model



Help Desk (CSC):

- Call Handling
- Ticket opening
- Problem dispatching

Network Operation Center (NOC)
Level 1/level2:

- Ticket handling
- Problem isolation
- Problem correlation

Why we need proper NSD tools set?

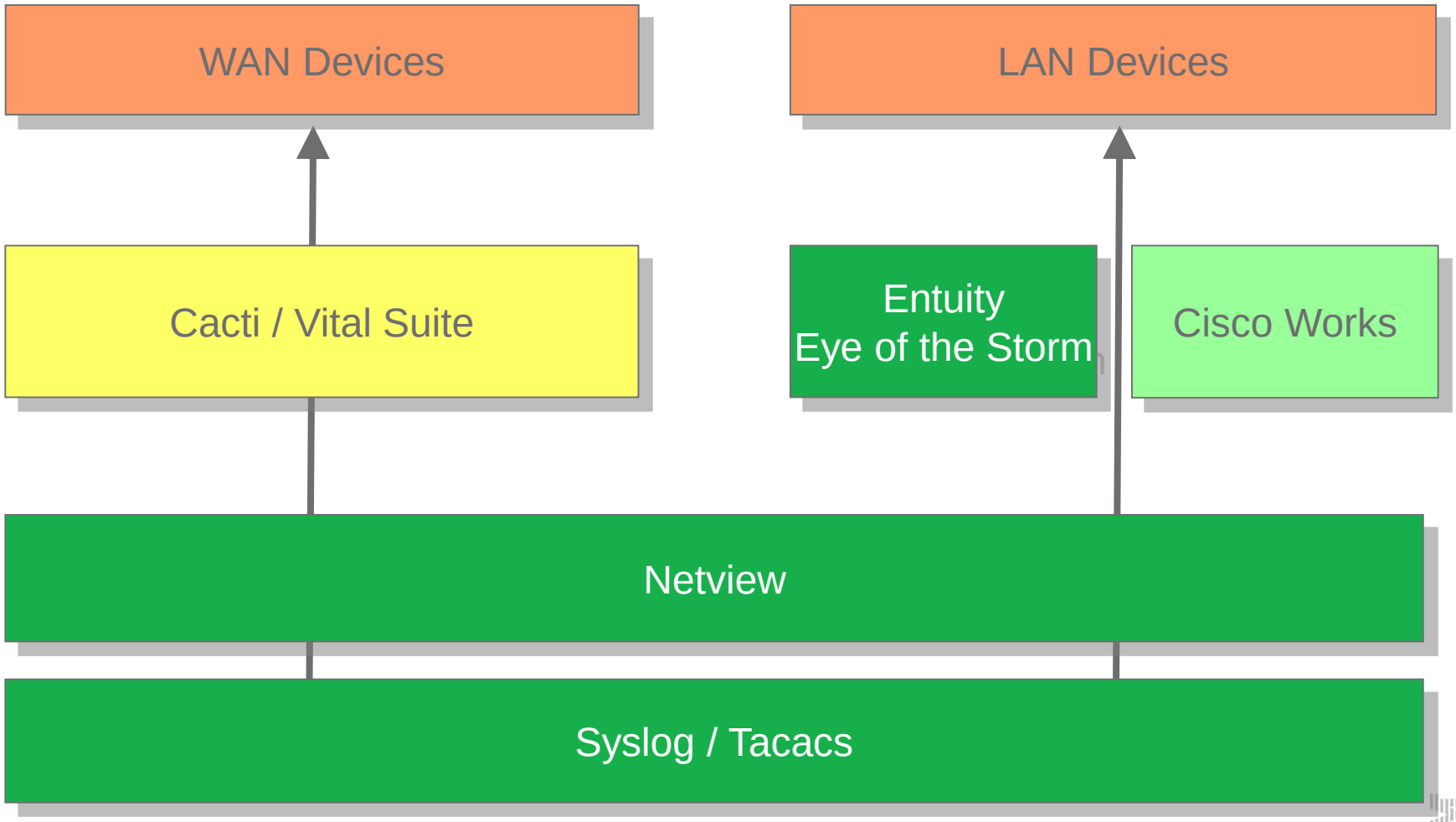
More than 80 percent of application performance and availability failures will be blamed on network problems, but the network will represent less than 20 percent of the root cause

- **With proper tools set you can**
  - With monitoring tool react before customer will recognize problem.
  - Locate problem much faster then by manual tracking
  - Update many devices by one click
  - By performance tools see the trend and recognize problem before it will occurred
  - Based on historical data prevent blaming application problems

Network Management Toolset

- Tivoli Netview
  - Detection of problems with implementation of L3 map
- Entuity Eye of the Storm
  - Performance and advanced monitoring / analysis
  - Monitor device with SNMP - can detect more than 70 type of errors.
- Cisco Works (CW)
  - Provides advanced configuration / problem detection for Cisco Platform
- CACTI / Vital suite Statistics
  - SNMP orientated performance management tool
- Other tools
  - TACACS/RADIUS/LDAP – Authentication services
  - Evidence databases – CEP+ / MAD / eAMT
  - Ticket tracking tools

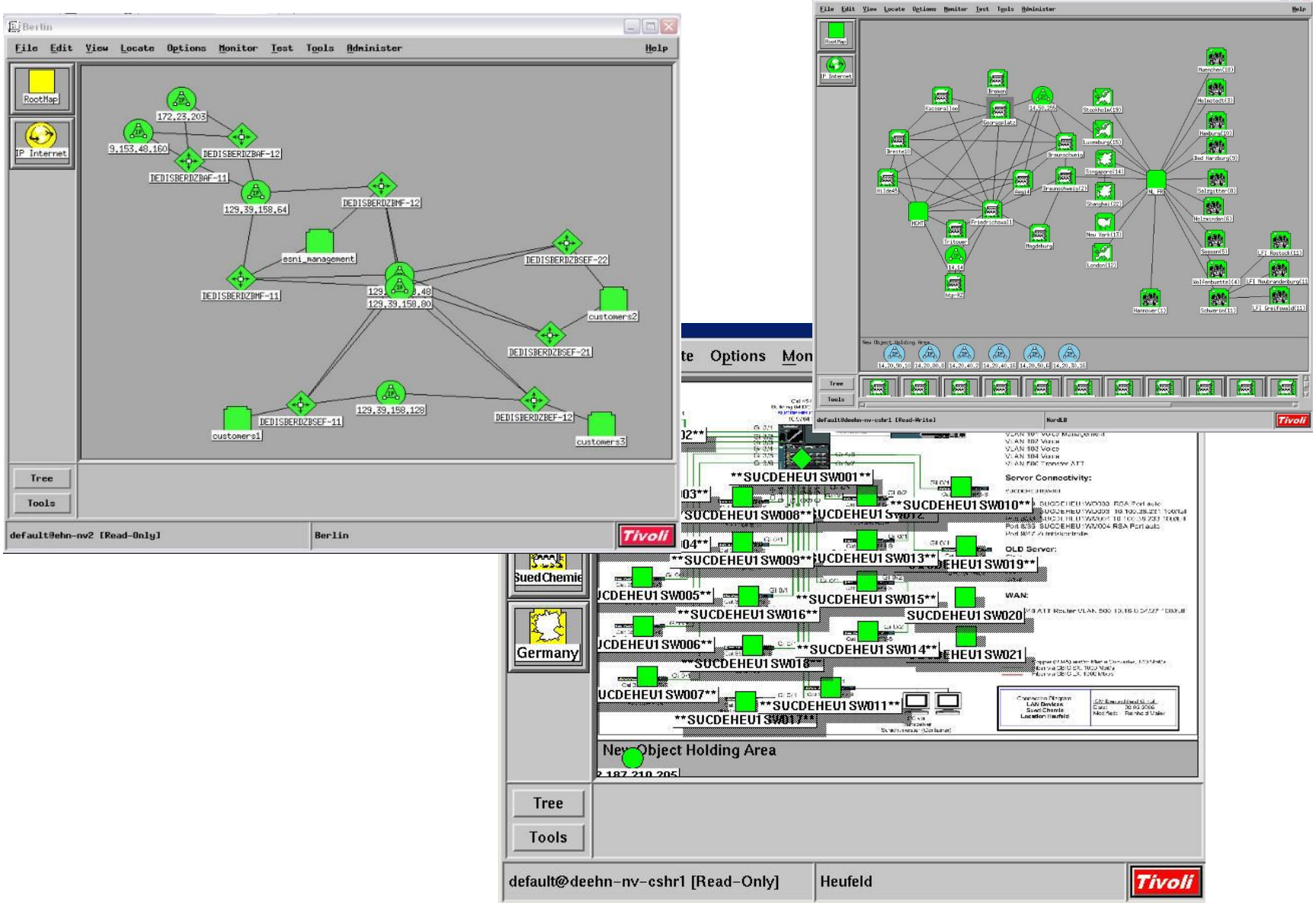
Network Management Toolset



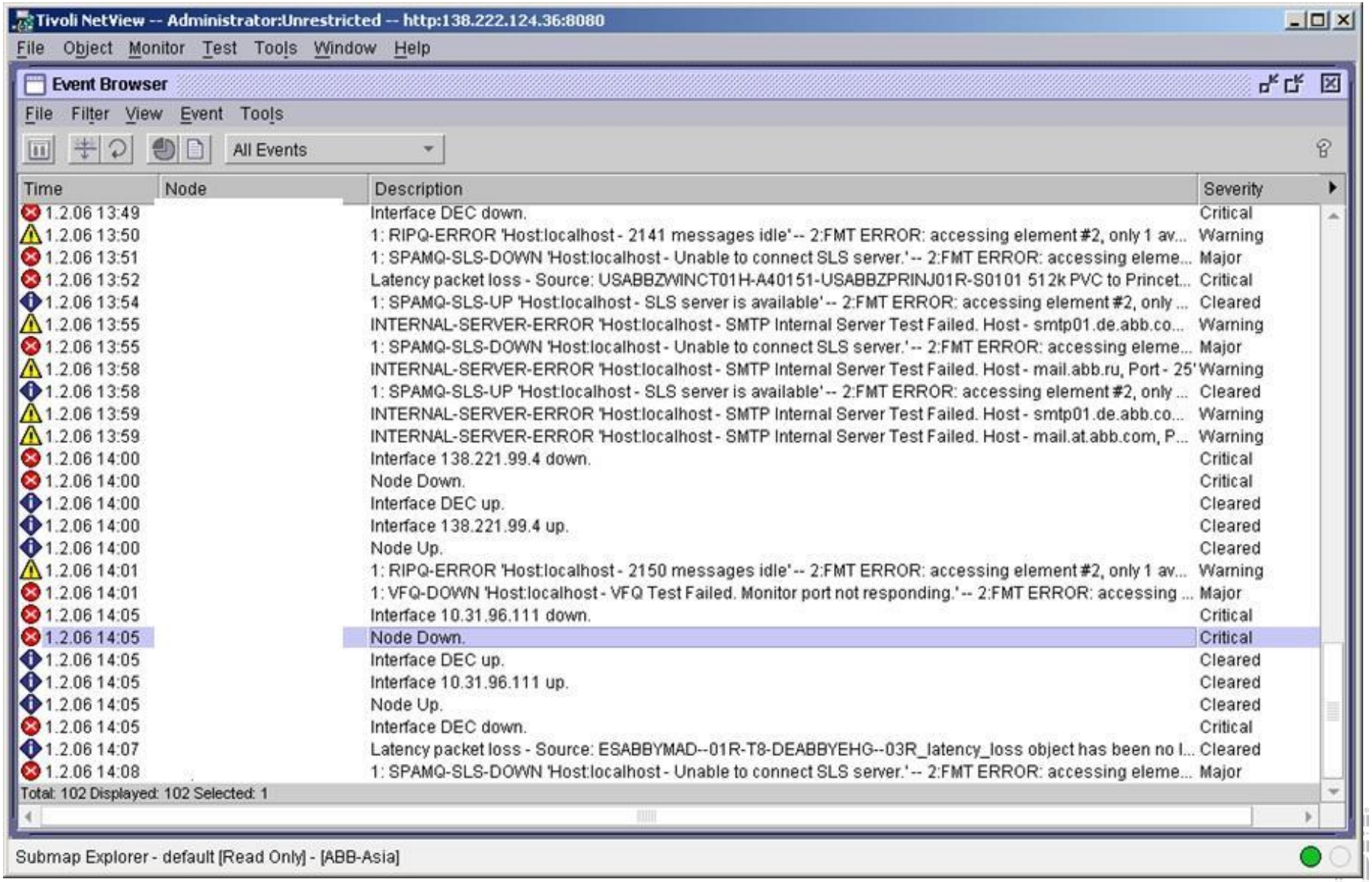
Fault detection with Netview

- Netview is standard tool used by IBM all over the world for most customers.
- Monitoring of device status
- Clear picture of network infrastructure
- Netview support easy implementation of various scripts which can automation work.
- With SNMP support of all devices provides advanced monitoring (not based only on UP/DOWN functionality with ICMP)
- Can receive/forward SNMP traps from/to other tools (EotS/Cacti…)

Fault detection - Netview



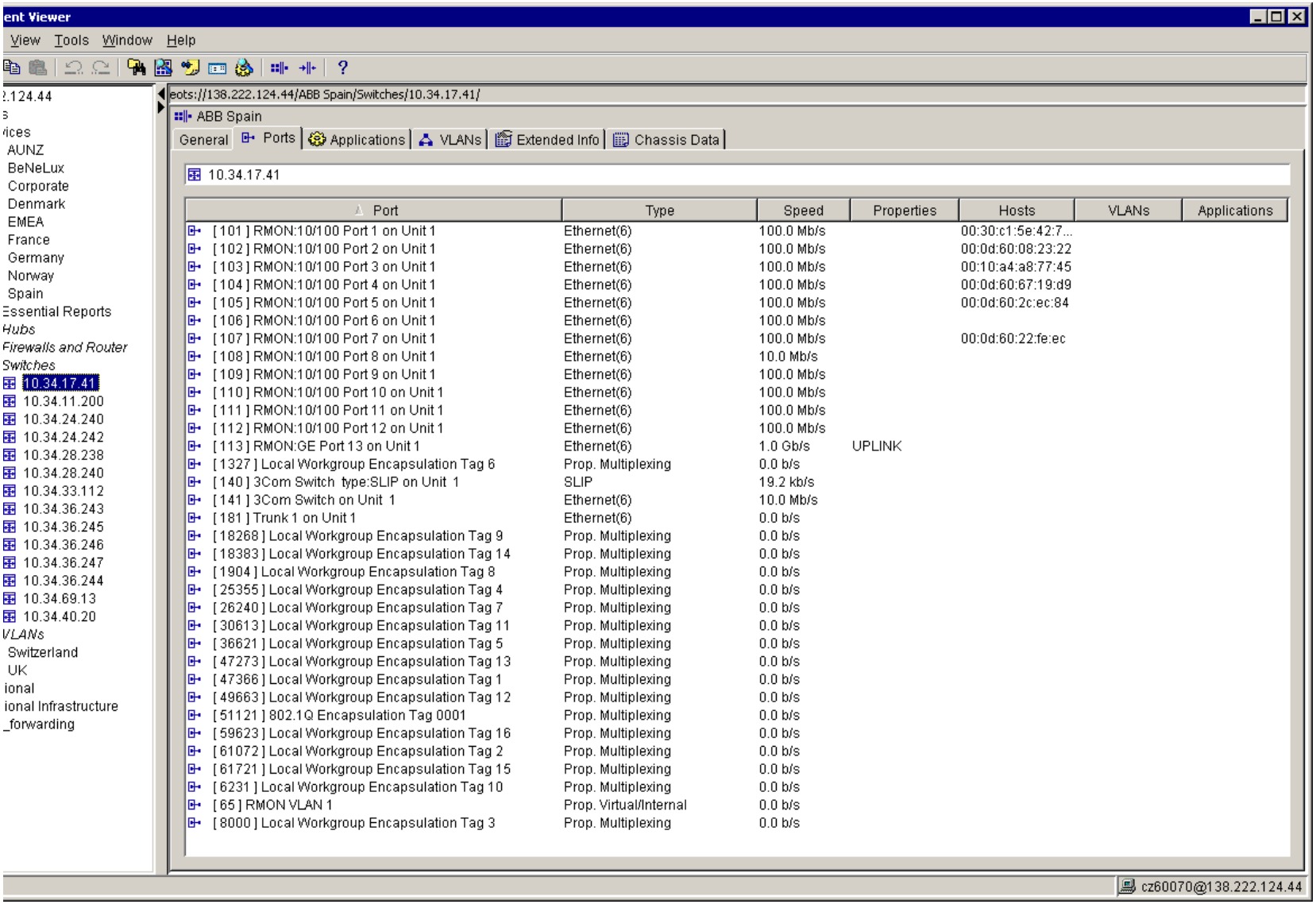
Tivoli Netview – Event Browser



Entuity Eye of the Storm

- Advanced monitoring of devices (LAN, WAN and firewalls) with SNMP
- Forward major issues to netview
- Provides advanced troubles finding
- Feature performance monitoring gives us possibility for prevention in outages based on wrong implementation
- Provides statistic for core lines (Trunks, Etherchannels)
- Availability management
- Keeps historical data

Entuity Eye of the Storm – port listing



Port	Type	Speed	Properties	Hosts	VLANs	Applications
[101] RMON:10/100 Port 1 on Unit 1	Ethernet(6)	100.0 Mb/s		00:30:c1:5e:42:7...		
[102] RMON:10/100 Port 2 on Unit 1	Ethernet(6)	100.0 Mb/s		00:0d:60:08:23:22		
[103] RMON:10/100 Port 3 on Unit 1	Ethernet(6)	100.0 Mb/s		00:10:a4:a8:77:45		
[104] RMON:10/100 Port 4 on Unit 1	Ethernet(6)	100.0 Mb/s		00:0d:60:67:19:d9		
[105] RMON:10/100 Port 5 on Unit 1	Ethernet(6)	100.0 Mb/s		00:0d:60:2c:ec:84		
[106] RMON:10/100 Port 6 on Unit 1	Ethernet(6)	100.0 Mb/s				
[107] RMON:10/100 Port 7 on Unit 1	Ethernet(6)	100.0 Mb/s		00:0d:60:22:fe:ec		
[108] RMON:10/100 Port 8 on Unit 1	Ethernet(6)	10.0 Mb/s				
[109] RMON:10/100 Port 9 on Unit 1	Ethernet(6)	100.0 Mb/s				
[110] RMON:10/100 Port 10 on Unit 1	Ethernet(6)	100.0 Mb/s				
[111] RMON:10/100 Port 11 on Unit 1	Ethernet(6)	100.0 Mb/s				
[112] RMON:10/100 Port 12 on Unit 1	Ethernet(6)	100.0 Mb/s				
[113] RMON:GE Port 13 on Unit 1	Ethernet(6)	1.0 Gb/s	UPLINK			
[1327] Local Workgroup Encapsulation Tag 6	Prop. Multiplexing	0.0 b/s				
[140] 3Com Switch type:SLIP on Unit 1	SLIP	19.2 kb/s				
[141] 3Com Switch on Unit 1	Ethernet(6)	10.0 Mb/s				
[181] Trunk 1 on Unit 1	Ethernet(6)	0.0 b/s				
[18268] Local Workgroup Encapsulation Tag 9	Prop. Multiplexing	0.0 b/s				
[18383] Local Workgroup Encapsulation Tag 14	Prop. Multiplexing	0.0 b/s				
[1904] Local Workgroup Encapsulation Tag 8	Prop. Multiplexing	0.0 b/s				
[25355] Local Workgroup Encapsulation Tag 4	Prop. Multiplexing	0.0 b/s				
[26240] Local Workgroup Encapsulation Tag 7	Prop. Multiplexing	0.0 b/s				
[30613] Local Workgroup Encapsulation Tag 11	Prop. Multiplexing	0.0 b/s				
[36621] Local Workgroup Encapsulation Tag 5	Prop. Multiplexing	0.0 b/s				
[47273] Local Workgroup Encapsulation Tag 13	Prop. Multiplexing	0.0 b/s				
[47366] Local Workgroup Encapsulation Tag 1	Prop. Multiplexing	0.0 b/s				
[49663] Local Workgroup Encapsulation Tag 12	Prop. Multiplexing	0.0 b/s				
[51121] 802.1Q Encapsulation Tag 0001	Prop. Multiplexing	0.0 b/s				
[59623] Local Workgroup Encapsulation Tag 16	Prop. Multiplexing	0.0 b/s				
[61072] Local Workgroup Encapsulation Tag 2	Prop. Multiplexing	0.0 b/s				
[61721] Local Workgroup Encapsulation Tag 15	Prop. Multiplexing	0.0 b/s				
[6231] Local Workgroup Encapsulation Tag 10	Prop. Multiplexing	0.0 b/s				
[65] RMON VLAN 1	Prop. Virtual/Internal	0.0 b/s				
[8000] Local Workgroup Encapsulation Tag 3	Prop. Multiplexing	0.0 b/s				

Entuity Eye of the Storm – device report

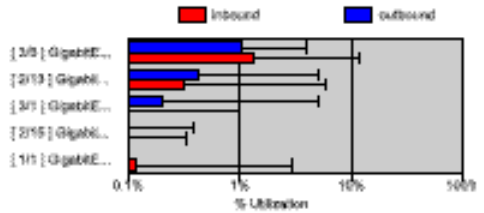
10.49.29.130

Cisco Internetwork Operating System Software IOS (tm) c6sup1_rp Software (c6sup1_rp-DSV-M), Version 12.1(23)E2, RELEASE SOFTW

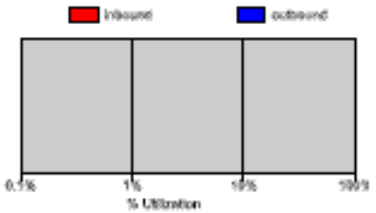
Speed	Total	Spare
10/100Mb	48	43 (90%)
1Gb	66	18 (27%)

Availability: 100%
Outages: 0
Monitored Servers: 0
Monitored Applications: 0

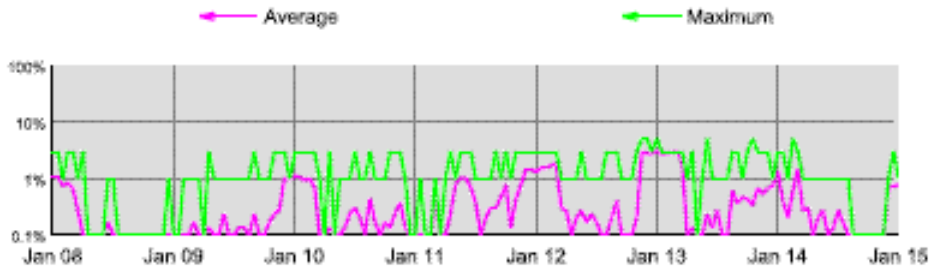
Top trunk ports



Top server ports



Bus Utilization



Entuity Eye of the Storm

Availability Summary

Over the 4 week period Wed Feb 01 2006 - Wed Mar 01 2006

Generated at 00:42 on Wed Mar 01 2006 for the Germany view

Based on data from **28 availability samples** each covering **1 day**

OVERALL AVAILABILITY SUMMARY
Application: -- (Application: --, Server: --, Network: --)
Server: -- (Server: --, Network: --)
WAN link: 94.17%

NETWORK AVAILABILITY SUMMARY		
IP Address Outages: 320 on 186 elements (585 being monitored)	MTBF: 458.9hours	MTTR: 9,949.3minutes
Router Outages: 25 on 8 devices (23 being monitored)	MTBF: 321.6hours	MTTR: 45minutes
Switch Outages: 6 on 6 devices (82 being monitored)	MTBF: 655.7hours	MTTR: 26,505minutes

APPLICATION AVAILABILITY SUMMARY		
Application Outages: none (0 being monitored)	MTBF: --	MTTR: --

SERVER AVAILABILITY SUMMARY		
Server Outages: none (0 being monitored)	MTBF: --	MTTR: --

WAN LINK AVAILABILITY SUMMARY		
Wan Link Outages: 108 on 38 links (106 being monitored)	MTBF: 333.2hours	MTTR: 6,995.4minutes

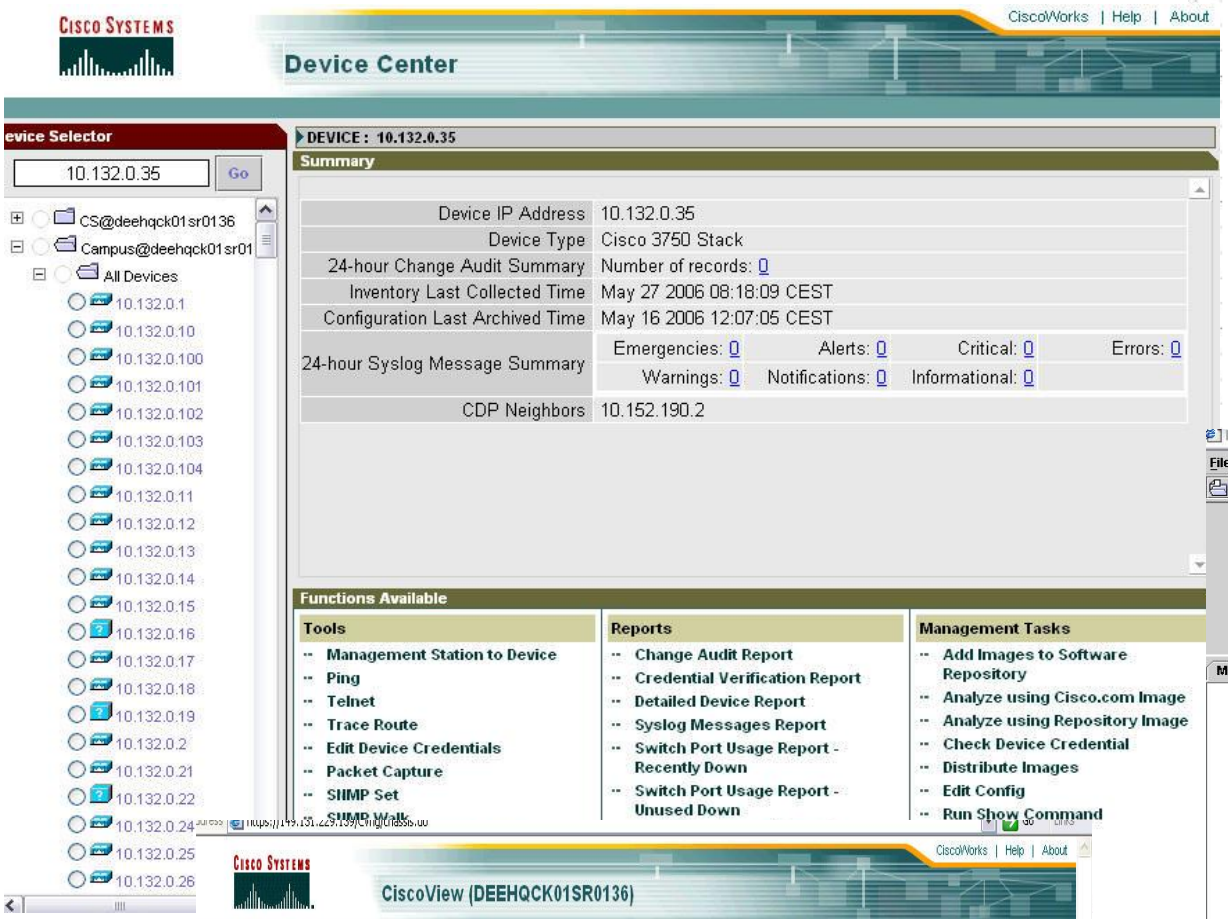
Top problem WAN links (sorted by number of outages)	Outage count	Downtime (minutes)
138.228.192.222 : [22] DEABBYEHG--03R-T65002-SGABBYSI[illegible]	15	155.7minutes
138.228.192.222 : [17] att-unman DEABBYEHG-03R-T9-ZAABBYJNB--01	13	1,717.6minutes
138.228.192.222 : [12] DEABBYEHG-03R-T4-CZABBYBRQ--01	10	340.6minutes
138.228.192.222 : [19] DEABBYEHG-03R-T11-CHABBYBAD--01	8	21.8minutes
138.228.192.222 : [15] DEABBYEHG-03R-T7-PTABBYPCS--01	7	26minutes

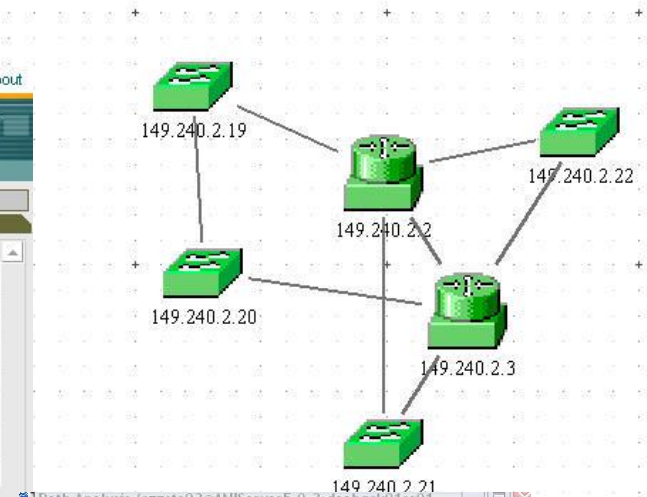
Top problem WAN links (sorted by downtime)	Outage count	Downtime (minutes)
10.49.127.199 : [124] Vlan120	1	39,600minutes
10.49.240.3 : [206] Vlan51	1	39,600minutes
10.49.240.2 : [107] Vlan1	1	39,600minutes
10.49.127.75 : [135] Vlan101	1	39,600minutes
10.49.240.3 : [203] Vlan1	1	39,600minutes

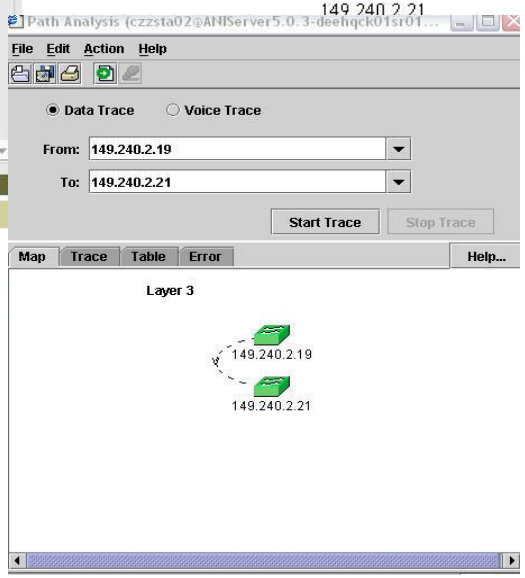
Configuration with Cisco Works

- CW support mapping devices in network made by Cisco devices.
- CW is able to download configs but it also allow to upload them to device, modify directly on CW which allow to made small common changes by “one click” on many devices
- CW give you chance to work with device like with real (show physical surface)
- Data colleting from devices / mass changes / security activities
- Can create reports for Cisco platform

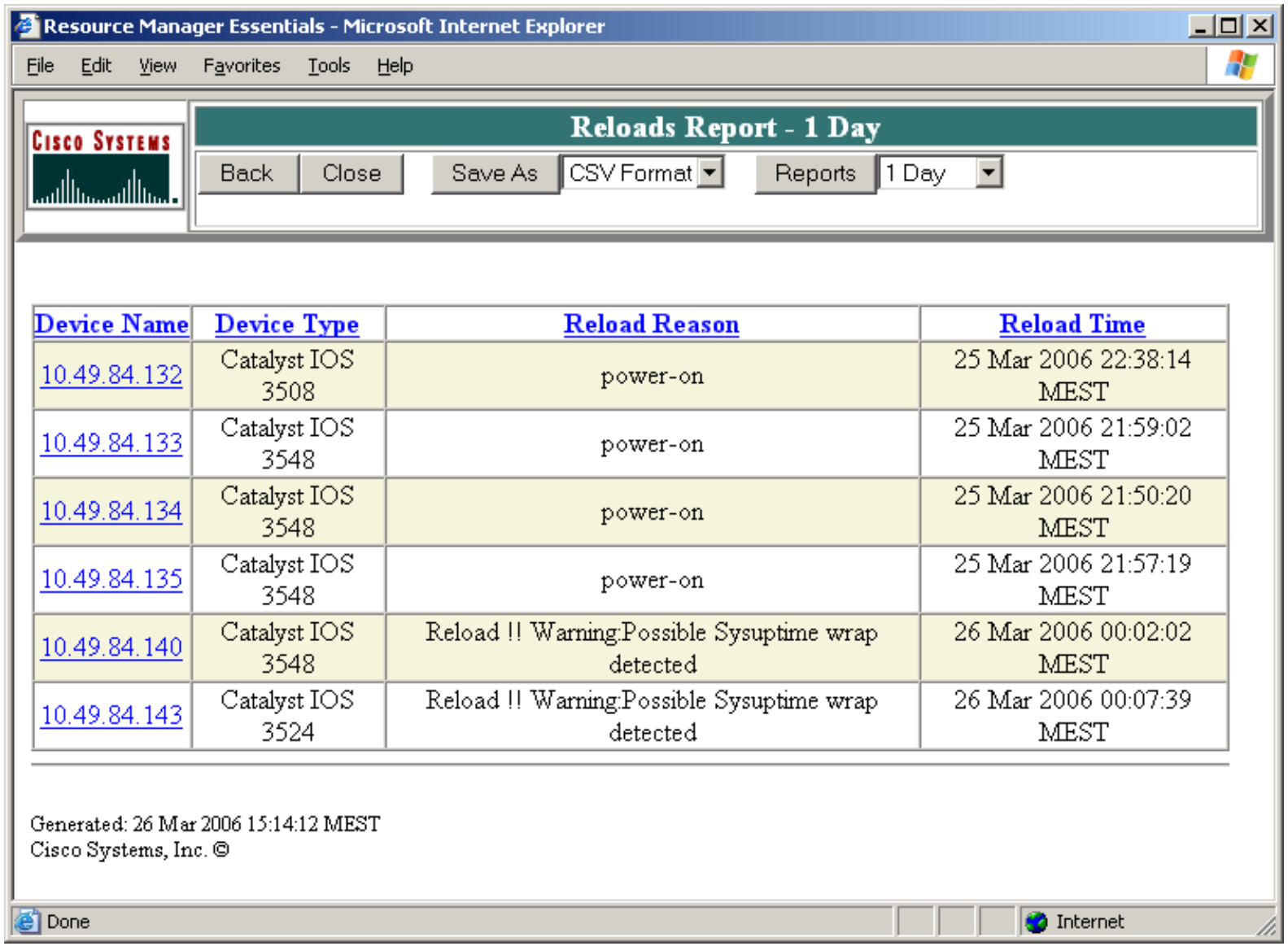
Configuration – Cisco works



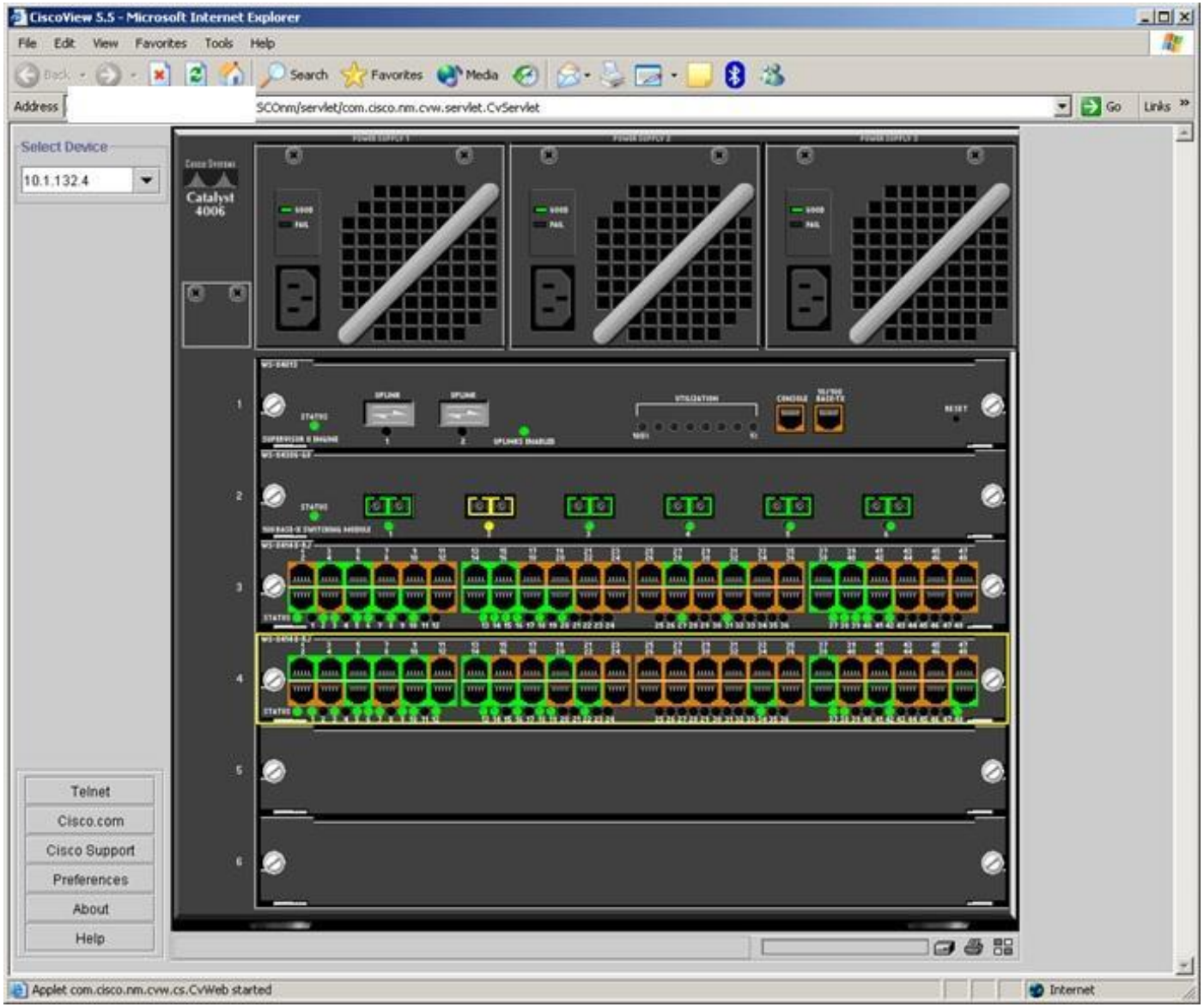




Cisco Works – example of report



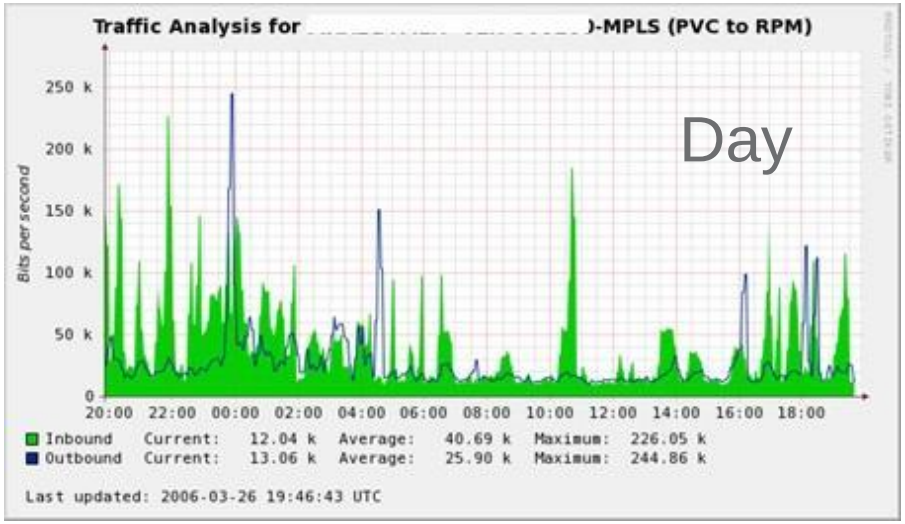
Cisco Works – Cisco View

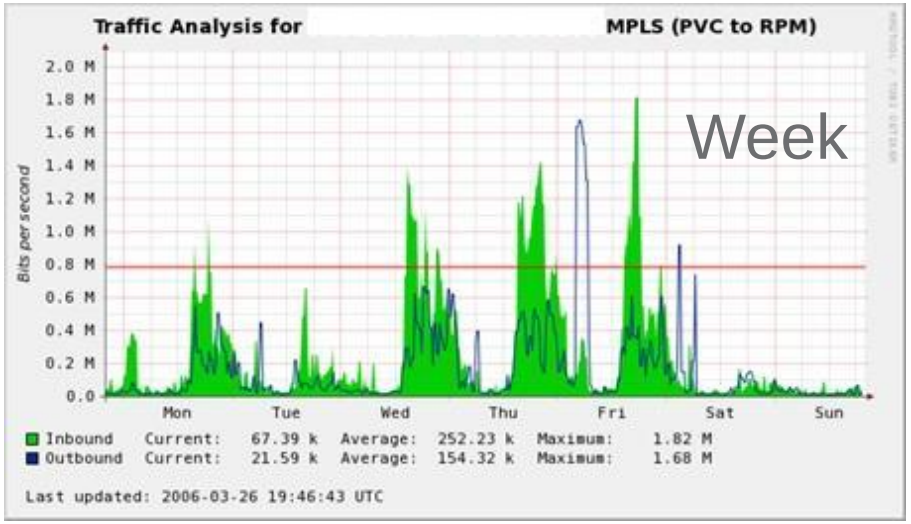


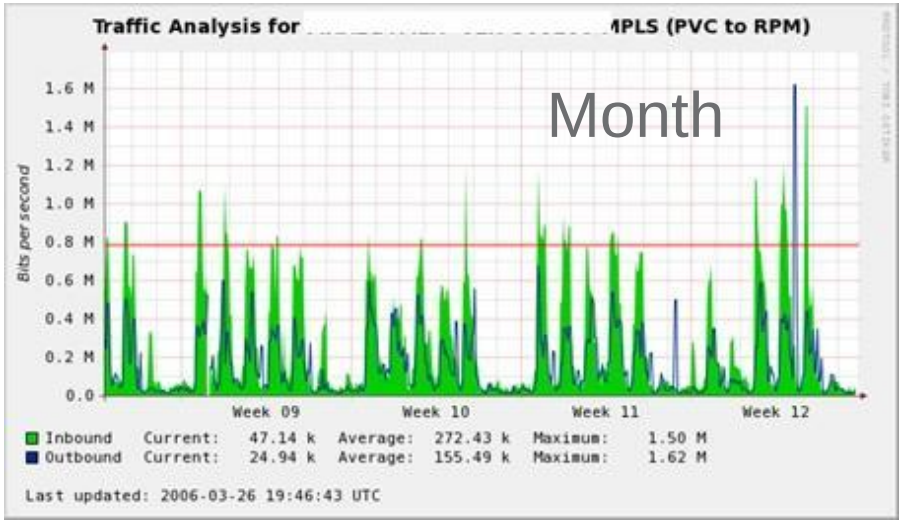
Performance with Lucent Vital suite / CACTI

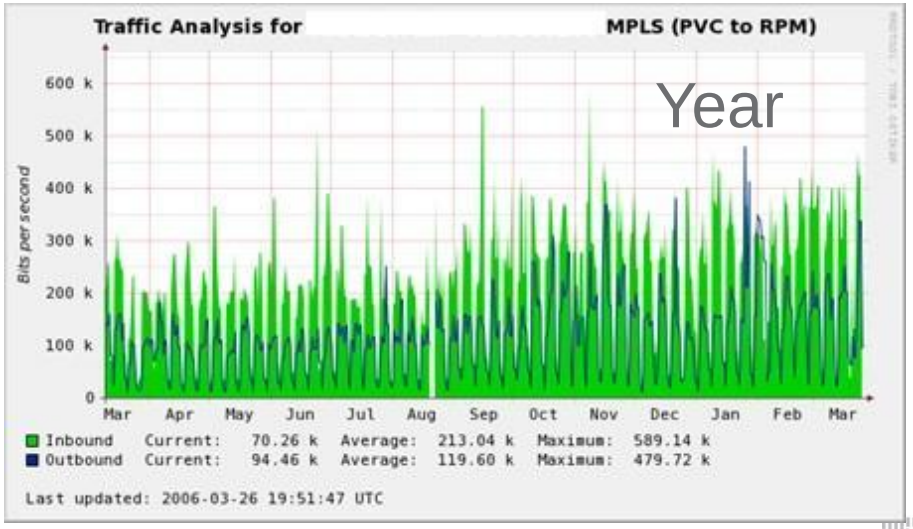
- One of the most important part of our work is troubleshooting are network performance problems.
- Collect variable information from device and store them for analyze (historical data)
- Fast analyze of network performance situations
  - On which point is network overload.
  - And what kind of traffic is overloading it.
- Proactive Information to prevent overload of WAN / LAN networks
- Lucent vital suite are the standard tool for Performance
- Can analyze QoS separately
- List of TOP talkers

Cacti – graphs









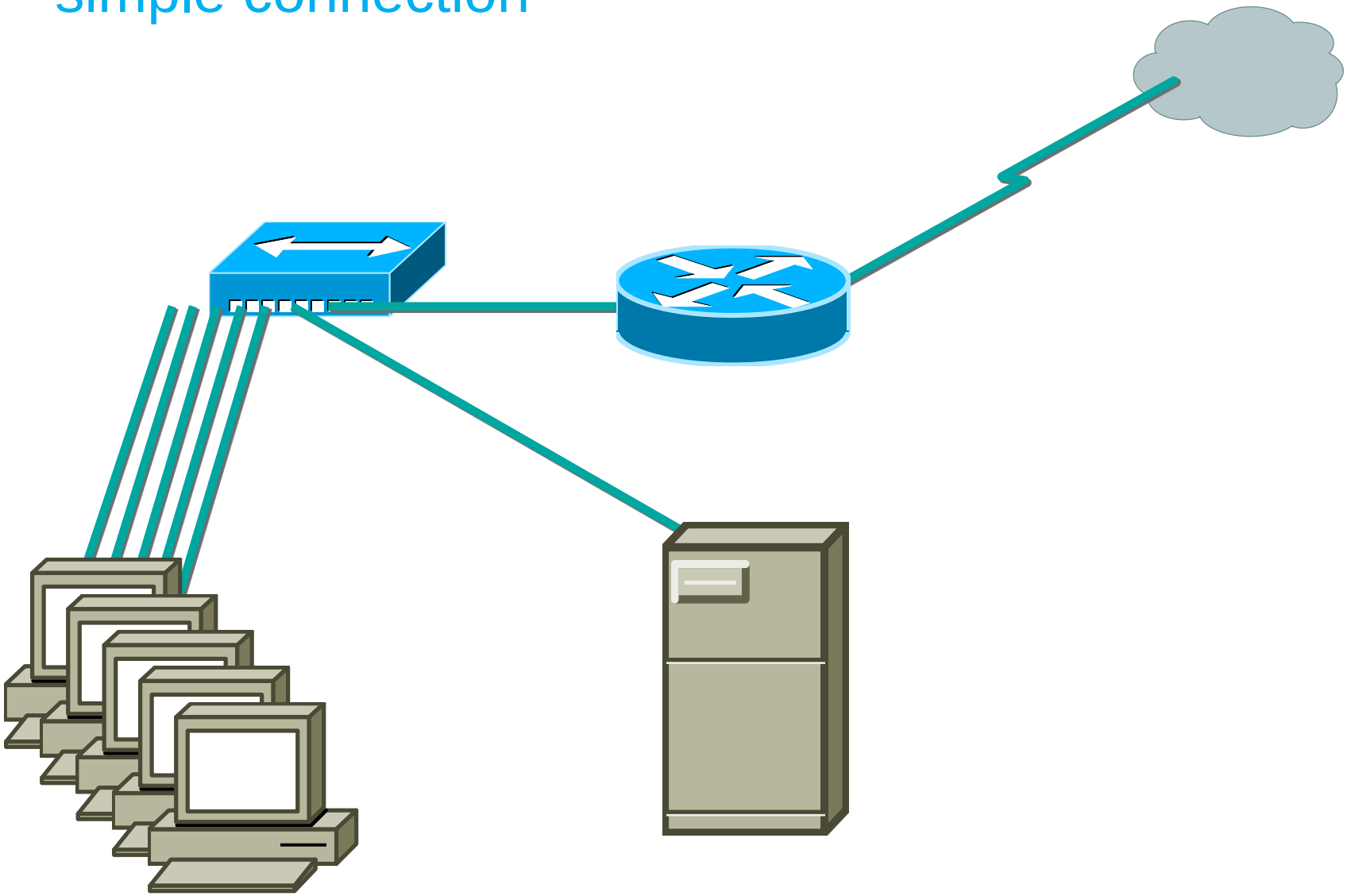
Evidence Databases & Other Databases

- All databases are bind
- Asset Evidence (eAMT)
- Central Evidence of all devices
  - Device type/hardware information
  - Location information
  - IP address, hostname, interfaces
  - Contacts for other support groups / provider / on-site support
  - Security Evidence with historical data
  - Etc.
- Evidence for Security findings
  - Keeps OS bugs
  - With each finding in configuration bug reports to responsible support

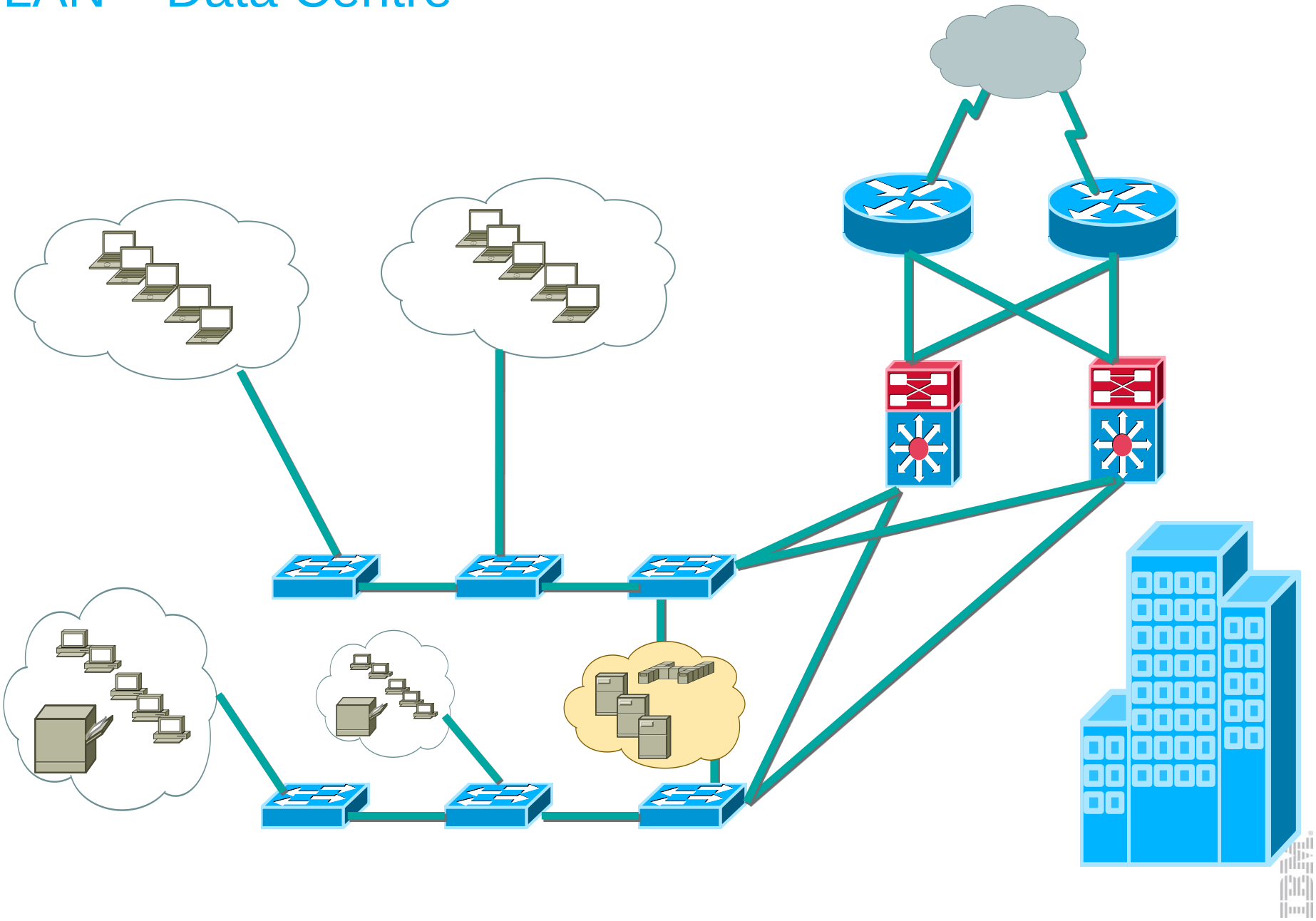
LAN Management

- LAN = Local Area Network
- Device's vendors
  - Cisco, Nortel, 3com, Alel, Allied Telesyn, Blue Coat, Digital, D-link, Edimax, Enterasys, HP, IBM, Intel, Intermac, Kingston, KTI Networks, LANart, LinkSys, Netgear, Nokia, Olicom, Planet, Symbol, Synoptics, Xtreme
  - **Migration of all existing platforms to Cisco for providing best centralized support**
- Device's categories
  - Firewalls
  - Routers
  - Switches

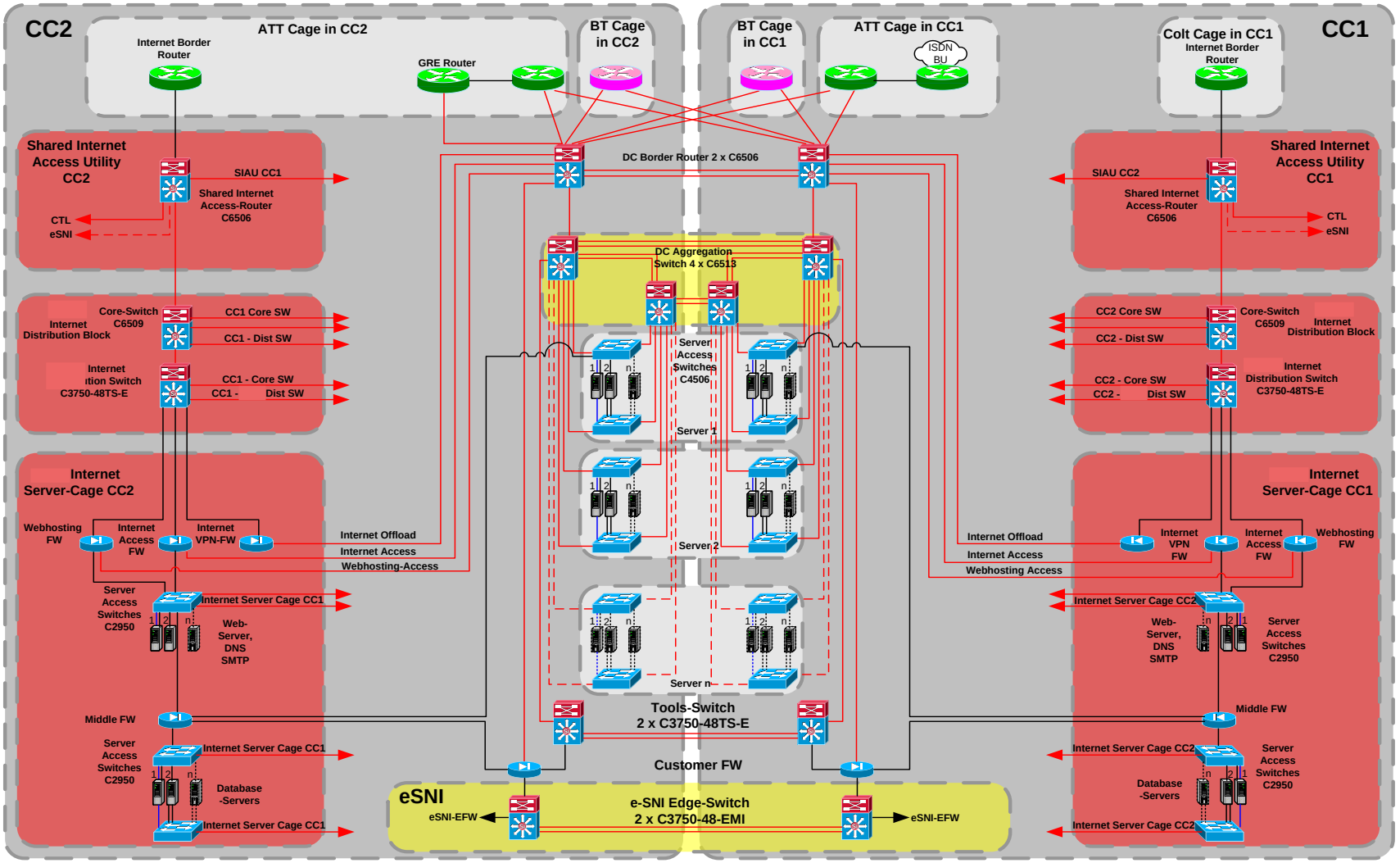
LAN – simple connection



LAN – Data Centre



Datacentre example



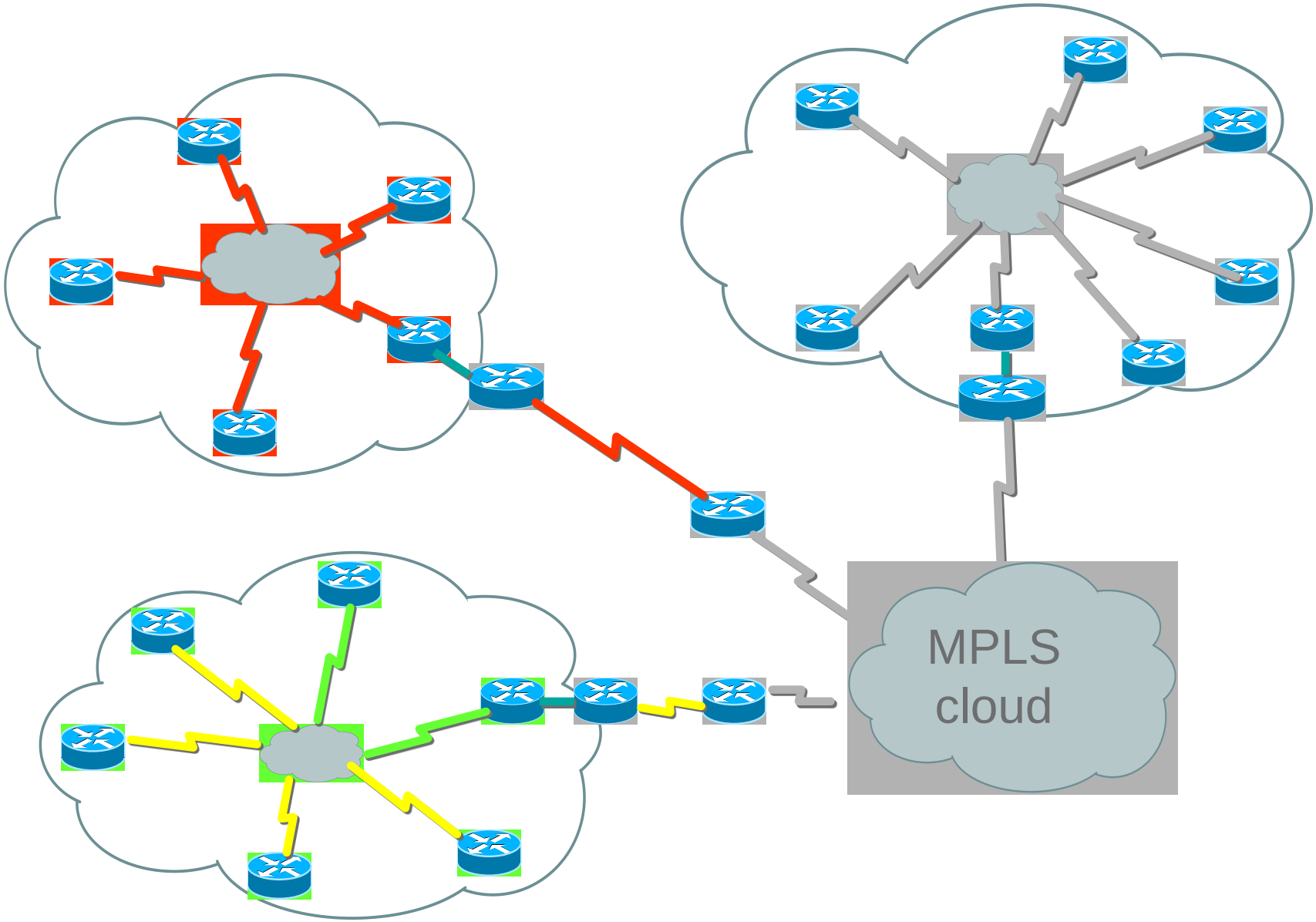
WAN Management

- WAN = Wide Area Network
- Used solutions
  - Leased line
  - ATM/Frame Relay
  - MPLS
  - DSL/ADSL/ISDN
  - Internet tunnel (iVPN)
- WAN lines are usually provided by external companies (BT, AT&T, HP, Colt…)
- NOC (1st level) is contact point between customer and provider

Today's trends for WAN

- MPLS = Multiprotocol Label Switching
- QoS = Quality of Service
- SaS = Solution as Service
- Cloud solutions

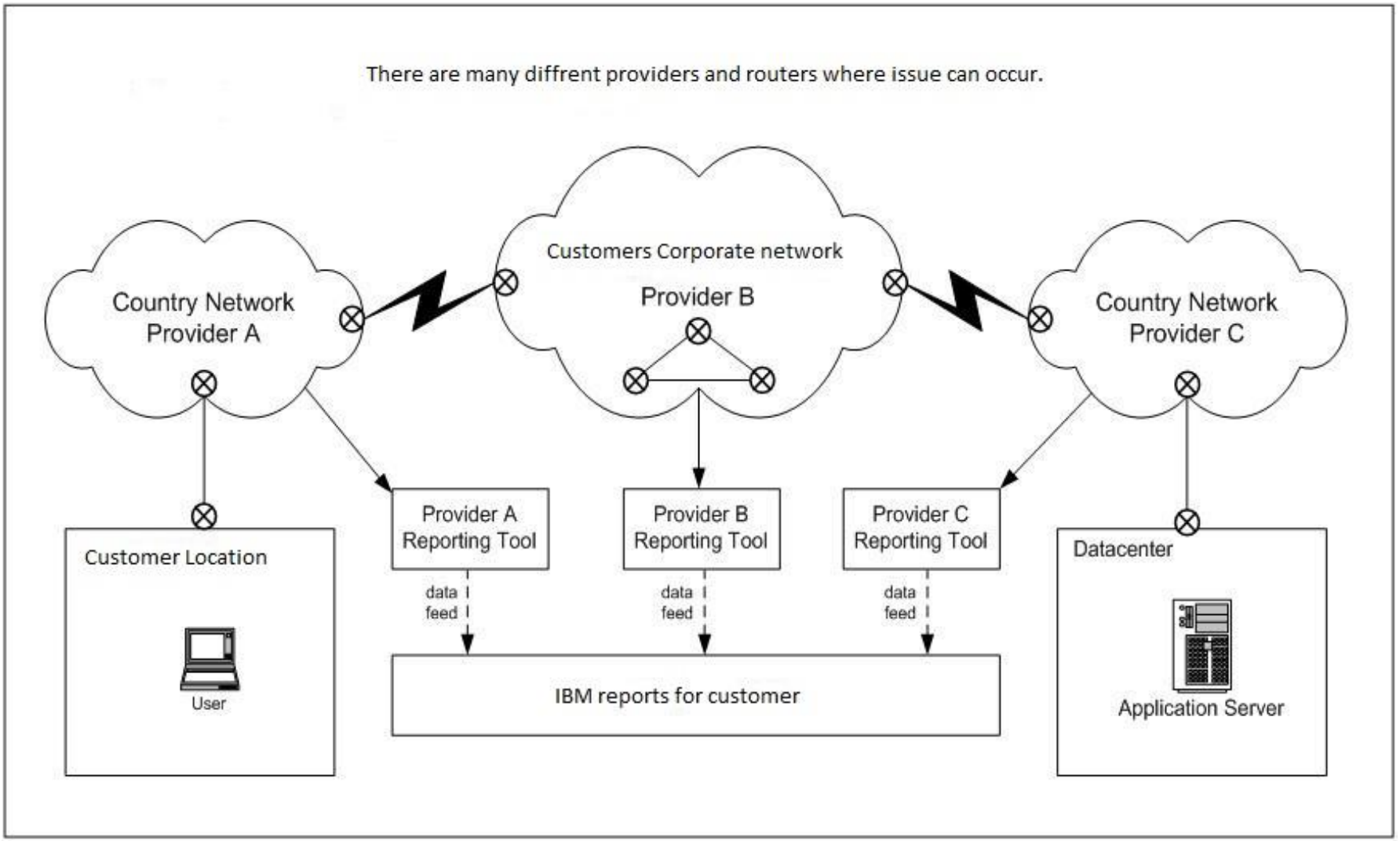
WAN Management – providers



WAN Specifications and requirements

- Setting QoS on WAN lines leads to better performance and usage of line
- 80 – 100 % WAN link utilization (“we pay 100, we use 100”)
- For monitoring of QoS we need good tools

WAN incident determination



IP Services (IPSE)

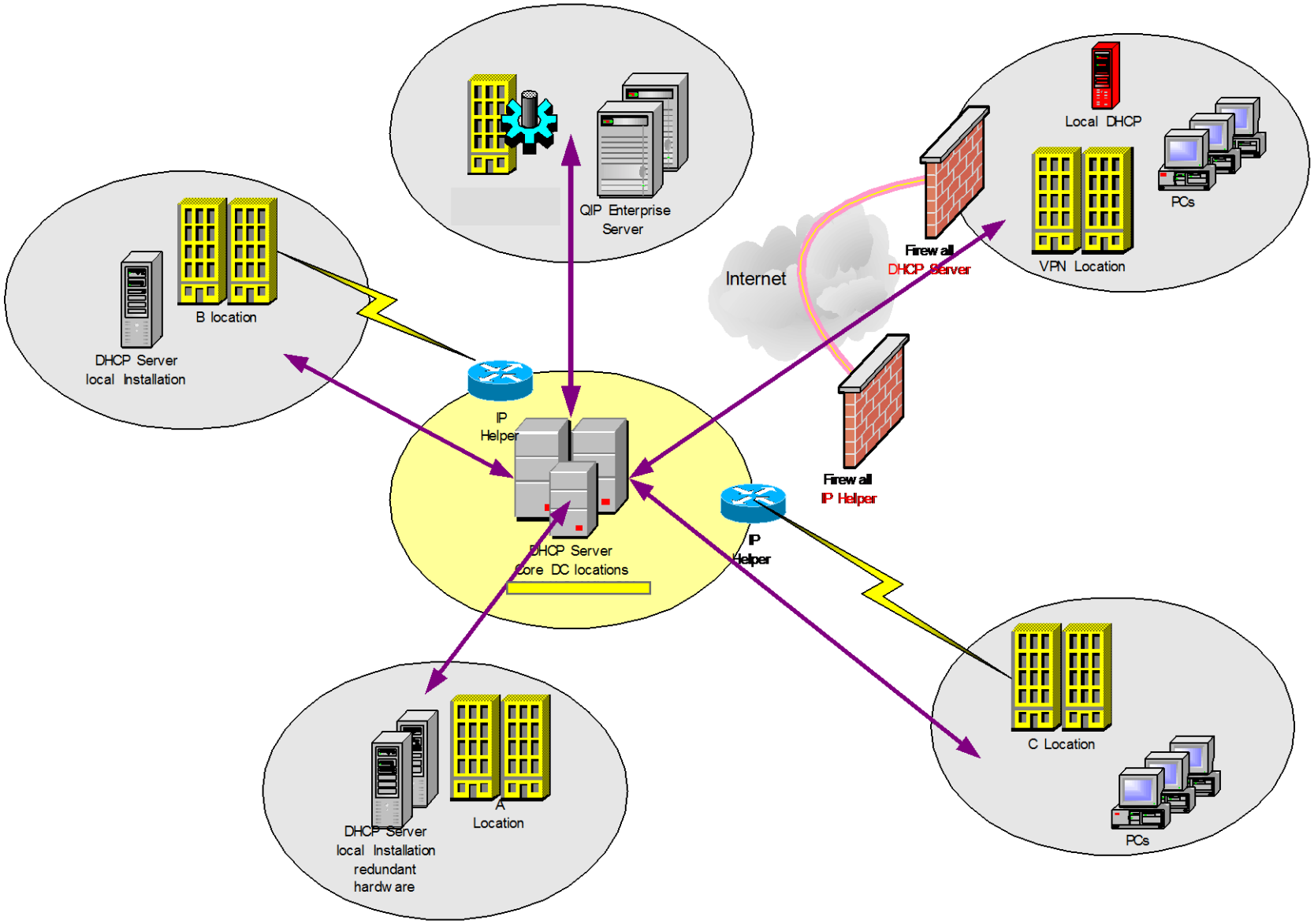
- DNS/DHCP
- NTP
- Proxy

QIP – central management for DNS/DHCP

- One central (with backup feature) QIP management server
- Structure-based implementation of QIP provides opportunity to use other QIP servers which are reporting to QIP management server
- Location types:
  - Less than 250 users DHCP – IP helper
  - Less than 499 users local DHCP server or IP helper
  - More than 500 users (Super location), local DHCP is provided by redundant servers
- Rules
  - Static Addresses for Servers and active network devices
  - Dynamic addresses for PCs and Printers

DNS management

- Central management of all DNS records
  - 2nd level domain (customer.com)
  - Sub-domains (location.customer.com)
- Domain management can be delegated to another server


QIP Enterprise Server
Local DHCP
PCs
VPN Location
Firew all
DHCP Server
Internet
B location
DHCP Server
local Installation
IP
Helper
Firew all
IP Helper
DHCP Server
Core DC locations
IP
Helper
C Location
PCs
A
Location
DHCP Server
local Installation
redundant
hardw are

Proxy Solution

- In past main scope of proxy servers was to provide better usage of WAN lines (http proxy)
- Today’s usage of Proxy servers is to provide secure and balanced connection
- We can recognize two types of proxies
  - Transparent (act as proxy for any traffic – mainly socks proxies)
  - Passive (use proxy feature only if application provide such functionality – http/ftp)

Network Security

- Configuration standards
- Checking or real configuration
- Actualized SW/HW
- User revalidation

Network Security – Standard configuration

- General Rules
- Applicable for different HW/OS
- Pre-defined standards pro Cisco, Nortel, IPSO and other platforms

Network Security – Checking actual configuration

- Correct setup for new device in network
- Revalidation is made at least each half of year
- Documentation of findings
- Corrective actions if applicable

Network security – Actual versions SW/HW

- Monitoring for new information/releases
  - Patches
  - New versions
- Risk management
- Planning upgrade

Firewall

- Firewall types
- Standard used FW
- Checkpoint ProviderOne
- Usage of FW

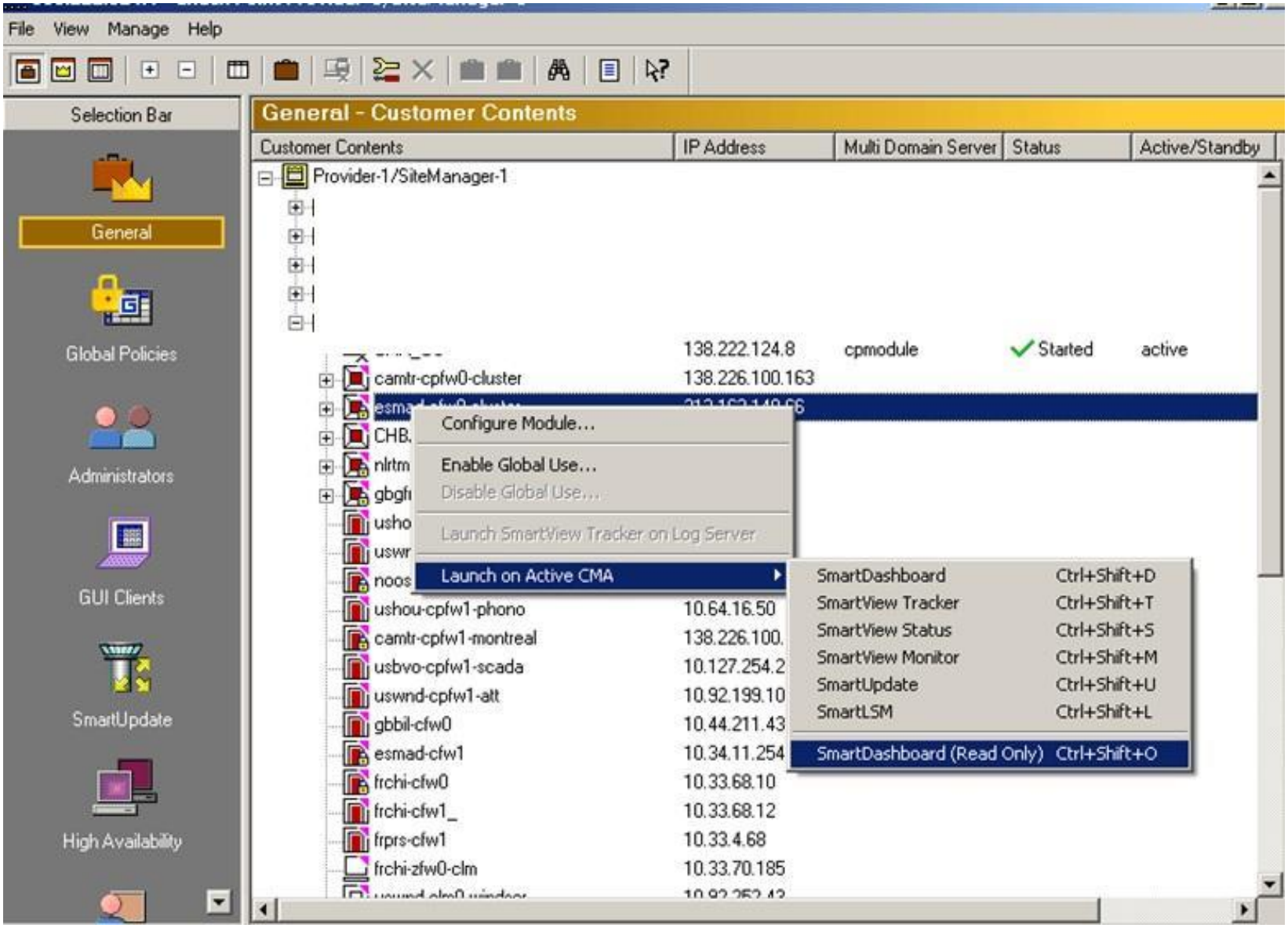
Types of existing Firewalls

- Software
  - Checkpoint Firewall-1 (diverse versions)
  - Cisco PIX
- Operating Systems
  - Checkpoint Secure Platform (SPlat)
  - Sun Solaris
  - Microsoft Windows
  - Linux
  - Nokia IPSO
  - Cisco PIX Firewall OS
- Hardware
  - PC Architecture
  - Sun
  - Nokia
  - Cisco PIX
  - IBM x-Series Servers

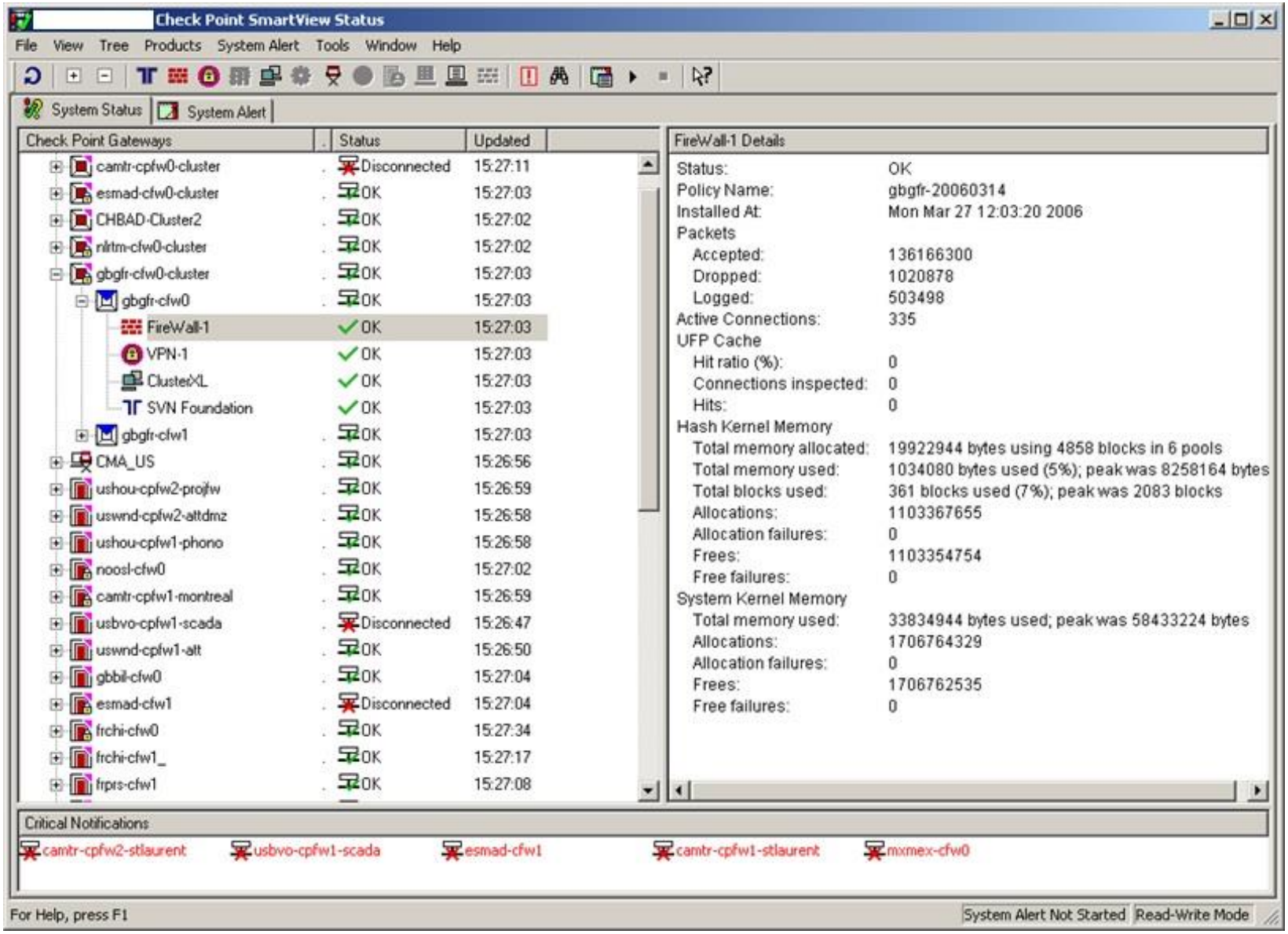
Checkpoint - ProviderOne

- Easy centralized management
- Saved all FW rule sets
- Central Logging
- Multi-platform management (Nokia, Splat)

Checkpoint - ProviderOne



Checkpoint - ProviderOne



Usage of Firewalls

- All network environments (Internet/DMZ/Corporate networks)
- Secure separation of networks
- Advanced security (not only ACLs – access control list)
- Implementation of statefull FW
- VPN implementation – VPN concentrators

Used shortcuts

- IBM = International Business Machines
- CIC = Client Innovation Center
- GSDC = Global Services Delivery Center
- SSO = Server System Operation
- DCS = Desktop Client Support
- HW = Hardware
- SW = Software
- OS = Operating System
- SLA = Service Level Agreement
- IT = Information Technologies
- SNMP = Simple Network Management Protocol
- TCP/IP = Transmission Control Protocol/ Internet Protocol
- OSS = On Site Support
- ERP = Enterprise Resource Planning
- PC = Personal Computer
- CC = Command Center
- HD = HelpDesk
- TEC = Tivoli Enterprise Console
- OSS = On Site Support
- RSA = Remote Supervisor Adapter
- LAN = Local area network
- WAN = Wide area network
- TMR = Tivoli Management Region
- lcfd = Lightweight Client Framework Daemon
- SME = Service Matter Expert

Questions ?