

# IBM Tivoli Network Management

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# Agenda

- Overview of IBM Tivoli's Network Management Portfolio
- The Problems facing Network Administrators
- IBM Tivoli Netcool OMNIBus
- IBM Tivoli Network Manager
- IBM Tivoli Netcool Configuration Manager
- IBM Tivoli Netcool Performance Manager



# Event and Network Management

## IBM Tivoli's Network Management Portfolio

The goal of Network Resource Management is to improve mean-time-to-recovery and move to incident avoidance by managing

**THE NETWORK STATE, THE NETWORK CONFIGURATION**

and

**THE NETWORK PERFORMANCE.**

### IBM Tivoli/Netcool Network Management

#### OMNIBUS (Network Event Management)

Gather, Consolidate, Correlate, Filter, and Present all Events

#### IBM Tivoli Network Manager (Network State)

(Discovery, Topology Visualization for Root Cause Analysis)

#### IBM Tivoli Netcool Configuration Manager (Network Configuration)

(Change and Configuration, Backup and Restore and Policy Management)

#### IBM Tivoli Netcool Performance Manager (Network Performance)

(Monitor, Alert, Performance (streaming analytics) for Incident Avoidance)

Network Management

Configuration Management

Performance Management



# The Problems facing Network Administrators

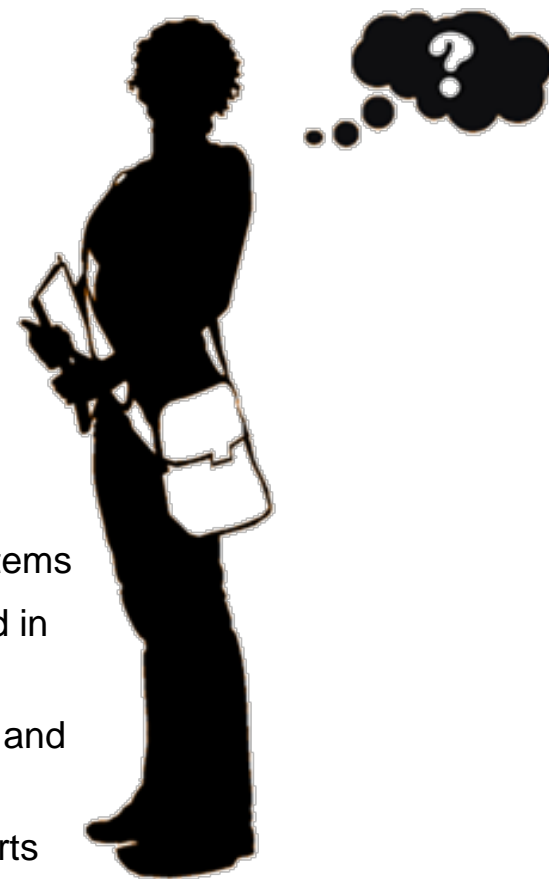
## Network Complexity Raises Operational Costs

### Increasing number of vendors and type of network devices

- Cisco, Juniper, Alcatel, Lucent, Nokia, Ericsson, Huawei, Motorola, NSN, Tellabs, etc.
- Routers, switches, DSLAMs, gateways, softswitches, IMS, LTE, SBCs, access points, fiber terminals, and more

### Increasing network complexity

- 100's to 100,000's of devices deployed
  - Number of devices prevents any effective manual solution from being effective.
- Each network device vendor has multiple network element operating systems
  - There are over +400 network element vendors and divisions deployed in networks today
- Each network element model may have its own unique set of commands and version of OS
  - Command set changes with each OS version and each device supports from 10s to 10,000's of individual commands
  - Customers typically have multiple OS versions deployed



# The Problems facing Network Administrators

## Network Growth Raises Capital and Operational Costs

### Networking is having positive 2010 growth

- “The first quarter was an exceptionally good quarter for the Ethernet switch market.....typically, first calendar quarters tend to be seasonally weak, but 1Q 2010 was quite different.”



Rohit Mehra, IDC analyst

### New Technologies are driving the networking infrastructure

- The Ethernet switch and router markets saw strong growth in the first quarter, driven by demand for such applications as **VOICE AND VIDEO OVER IP, VIRTUALIZATION** and **CLOUD COMPUTING**, according to research firm IDC.
- “The breadth of the network market recovery is very encouraging, with all regions and market segments making a contribution....of all enterprise IT priorities, **NETWORKING CLEARLY REMAINS A KEY BUILDING BLOCK**, playing an important role in the next-generation IT infrastructure.”

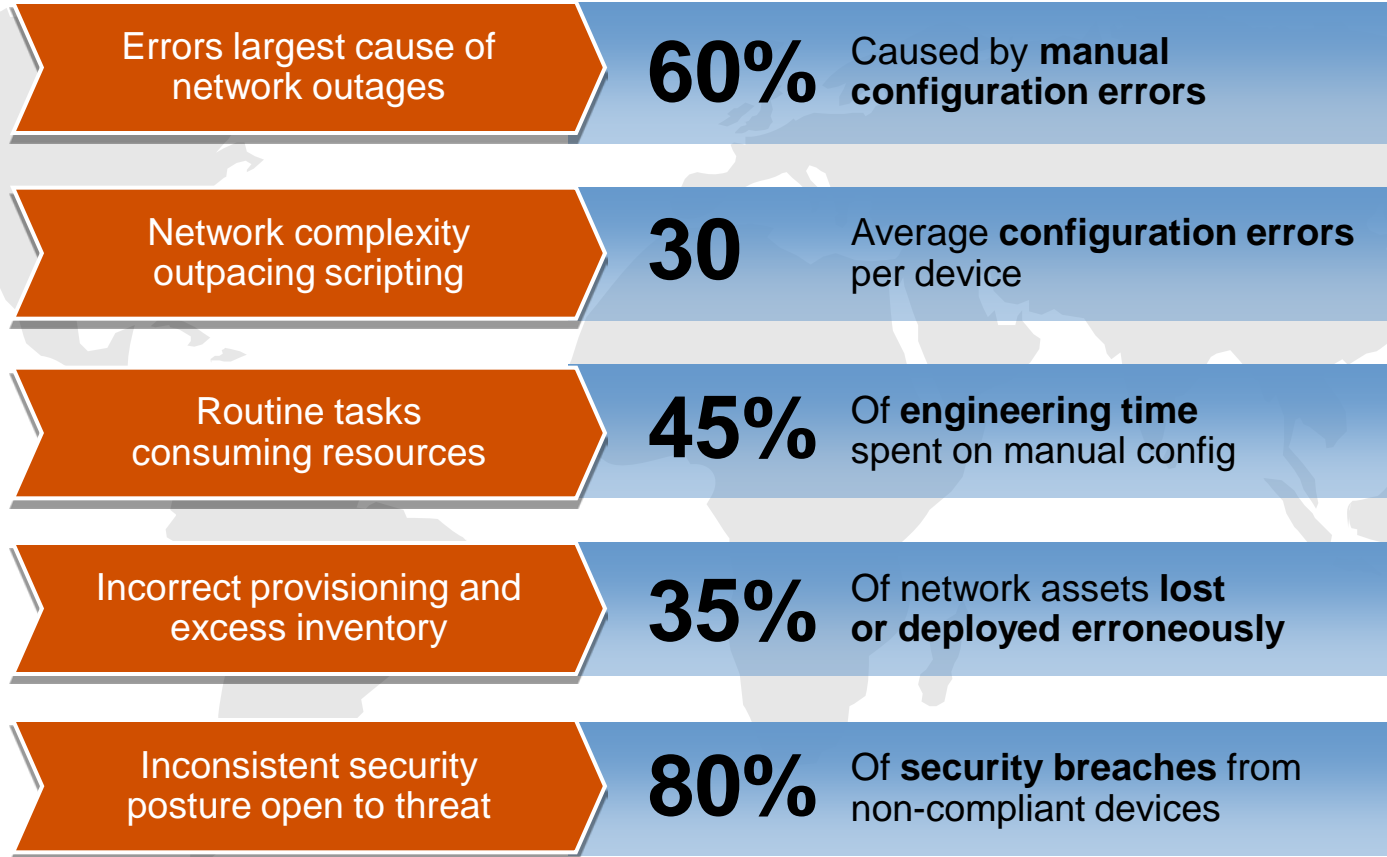
Cindy Borovick, IDC Analyst

“Virtualization, Cloud Fuel Rebound in Ethernet Switch, Router Markets”, eWeek IDC Share, May 26, 2010



# The Problems facing Network Administrators

## Network Configuration Complexity impacts Availability



Sources: Dataquest, EMA, Yankee, Infonetics Research



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# Prioritizing a Mission-Critical Network Events

## Enterprise Event Management

Determines that the “Mission-Critical Application” has failed!

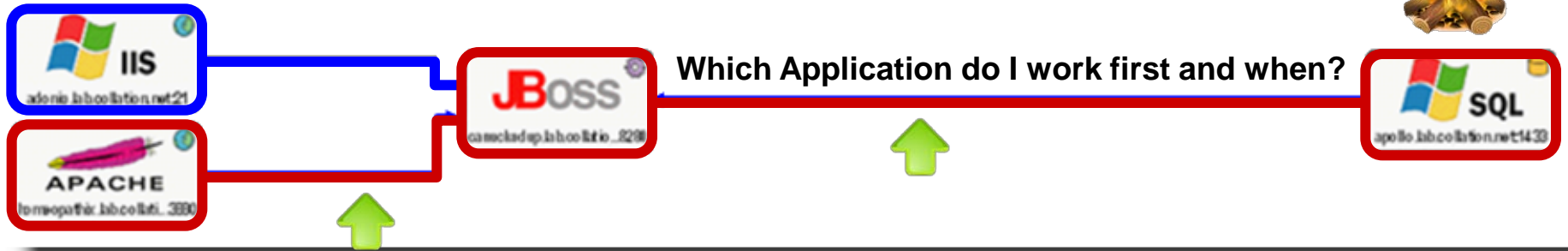
OK, to wait until 8 to 5

Wake Someone Up!

Discovery has Defined the Relationships

Monitoring Raises a Resource Alert

### This is my Mission-Critical Application!



# Gartner Report for Event Management

Publication Date: 29 July 2009 ID Number: G00169260

Magic Quadrant for IT Event Correlation and Analysis

David Williams, Debra Curtis

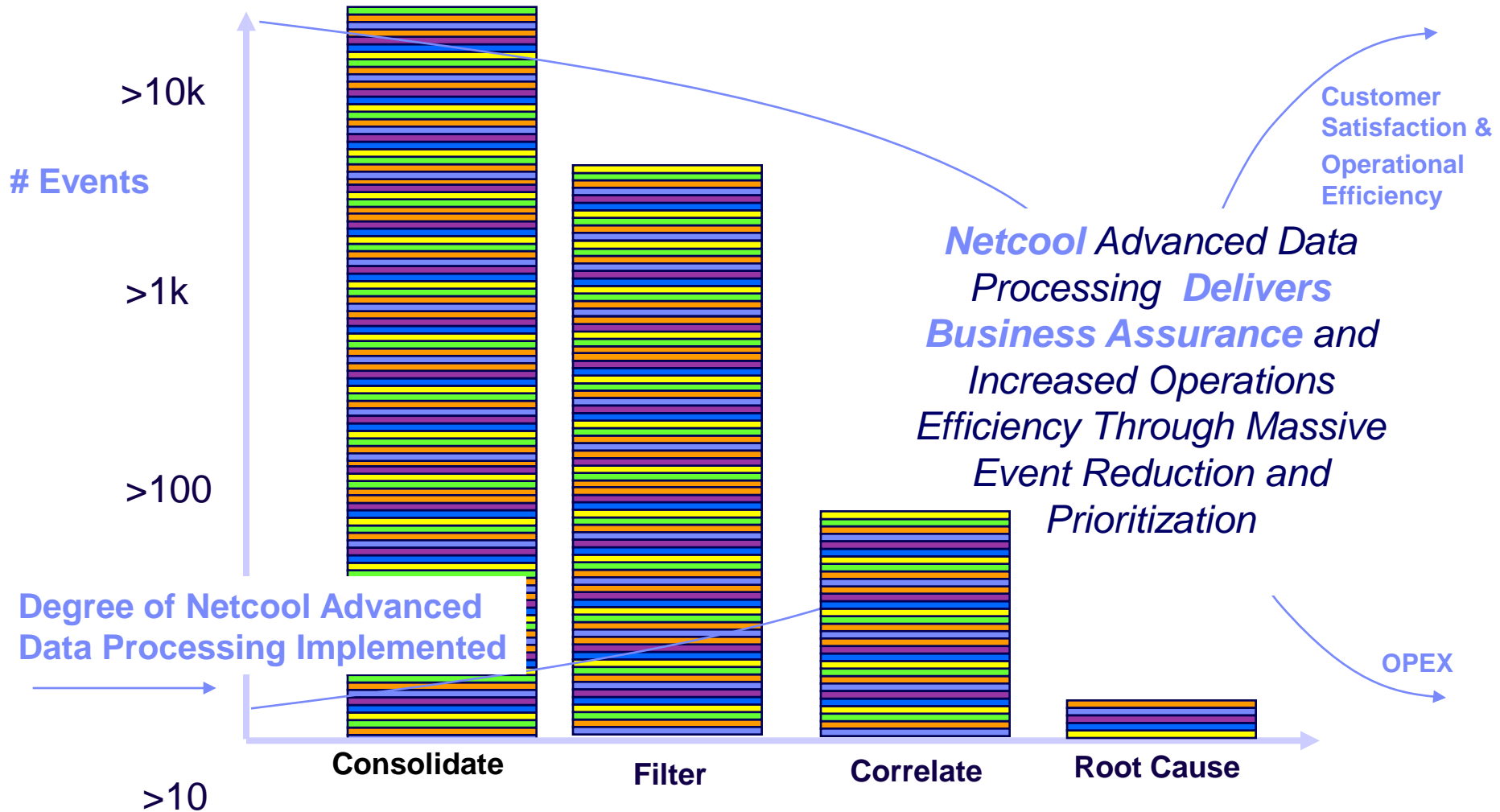
## IBM Commentary

### Strengths:

- Has the **most comprehensive breadth of coverage** in the Magic Quadrant.
- IBM gets **high marks for BSM capabilities** that map events to business impact,
- In addition to the out-of-the-box correlation capabilities provided with IBM Tivoli Netcool/OMNIbus, **the Netcool Knowledge Library provides event correlation rules for specific configurations or unique environments that customers can download.**



# OMNIBUS Event Management



# Broadest Integration Library

## Probes (~ 200):

Mttrapd SNMP	Ericsson MD110
Syslog / Syslogd	Nortel Meridian
Ping	HP OpenView NNM
Tivoli EIF	Oracle Probe
Cisco ACS	Freshwater Sitescope
Cisco PIX	SUN SunNet Manager
Cisco SDEE	Castlerock SNMPC
Checkpoint Firewall-1	Multi-headed socket
ISS SiteProtector	CA Spectrum
TL1 TSM	Sun ManagementCenter
RADIUS	HP Vantage Point Operations
Siemens DCO Probe	Microsoft SCOM 2007
Ericsson AXE 10	Microsoft Operations Manager
Nortel DMS 10	Email Probe
Marconi System X	Exec Probe
Avaya Definity G3	FDf Server
Alcatel-Lucent ECP	FIFO Probe
Alcatel-Lucent 5ESS	Generic Logfile Probe
Ericsson ACP 1000	OpenService NerveCenter
Nortel DMS 10	Standard Input /Stdin Probe
ODBC	Cisco WAN Manager

Ericsson Xmate  
 Huawei T2000 MML  
 Huawei M2000 MML  
 Nortel EV-DO  
 NORTEL IEMS  
 Motorola OMC-R (Iden)  
 Nortel EIF  
 Alcatel-Lucent ITM-NM/OMS  
 Alcatel-Lucent NFM  
 Tekelec LSMS  
 Tellabs Metrowatch DCS  
 Samsung BSM  
 Ericsson BNSI  
 Siemens TNMS (CORBA)  
 Motorola OMC-R (3GPP)  
 Kodiak EMS  
 Huawei T2000 CORBA  
 Huawei N2000 CORBA  
 Huawei M2000 CORBA  
 Cisco CTM (CORBA)  
 ECI Lightsoft CORBA  
 Ericsson/Marconi  
 Lucent OMC (CORBA)  
 Ciena On Center  
 Alcatel-Lucent OS-OS/IOO

Nokia Netact/NMS2000  
 Nokia NetAct for Broadband  
 Nortel EA1  
 Nortel Magellan NMS  
 Alcatel 5620 SAM  
 Ericsson/Marconi MV36/PFM  
 Nortel MDM  
 IBM CEI  
 Alcatel-Lucent 5529 OAD  
 Nortel Preside Wireless Ericsson  
 3GPP -OSSRC  
 Lucent Naviscore  
 Nortel OAM5 CORBA  
 Nokia NetAct (3GPP)  
 Alcatel OMC-R (3GPP)  
 ALU 5620 NM CORBA  
 ALU 9753 WIMAX  
 Alcatel OMC-R (Q3)  
 Nortel CNM  
 Nortel CEMS  
 ZTE M31 NetNumen  
 Message Bus (JMS/XML)-  
 Websphere ESB

## Vendor Alliances (>30):

**Alcatel-Lucent**  
**Nortel Networks**  
**Motorola**  
**Nokia-Siemens Networks**  
**Ericsson-Marconi**  
**Tellabs**  
**Huawei Technologies**  
**Fujitsu**  
**Ciena**  
**Cisco Systems**  
**Juniper Networks**  
**Checkpoint**  
**Cramer**  
**ZTE Corp**  
**ACME Packet**  
**Foundry Networks**  
**AMDOCS**  
**NEC**  
**Voyence**  
**Infinera**  
**Anritsu**  
**NERA Networks**  
**KEYMILE**

## Netcool Knowledge Library SNMP support (>175 MIBs), including:

Bridge MIB RFC 1493	ATM Forum MIB RFC 1695 for ATM switches	31 different Cisco MIBs (including MPLS VPNs)
MIB-II RFC 1213/2096	ATM Forum PNNI (Single Pier) MIB	21 Nortel MIBs
RMON MIBs	ATM Forum ILMI MIB	6 different Extreme Networks MIBs (inc VLANs)
OSPF MIB	ATM Forum LANE Client MIB	Juniper MPLS VPN support
BGP MIB	Frame Relay MIB RFC 1315	Tivoli Storage Manager
ifStack MIB	FDDI MIB RFC 1512	Tivoli TotalStorage Productivity Center
VRRP MIB		

## Gateways (~ 30):

Oracle	IBM DB2	Socket	Clarify/Amdocs CRM
SNMP Forwarder	IBM Informix	HP ServiceDesk	HP ServiceCenter
Socket	MS SQL	IBM Tivoli EIF	BMC Remedy ARS
Flat File	Siebel	Siebel eCommunications	Tivoli Service Request Manager
MessageBus (JMS/XML)	SNMP		Tivoli Data Warehouse



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# IBM Tivoli Network Manager

## Discovery and Visualization for Root Cause Analysis



### Scalable Flexible Network Discovery

- Provides end to end visibility of heterogeneous networks
- Optimize network asset utilization and extract the maximum return from existing investments
- Reconcile the 'as-built' view of the network vs 'as-planned' views stored in off-line network design, inventory and provisioning systems

### Real time web-based Network Visualization

- Centralizes the management of complex networks into one user interface
- Task-oriented UI helps operations staff locate, troubleshoot and resolve network problems
- Integrated fault, topology and performance views

### Accurate Monitoring and Root Cause Analysis (RCA)

- Automatically determines root cause (actionable) events and their symptom events
- Reduces the mean time to resolution of network faults and increase reliability
- Ensures staff have meaningful, contextual information at their fingertips



# IBM Tivoli Network Manager

## Addresses Today's Problems



### The Network is constantly changing

- The network environment is dynamic
- Impossible to visualize on a single screen all the heterogeneous vendor's networking environments
- Difficult to visualize the "logical" with the "physical" network structure
- Increased management complexity with new technologies such as VoIP, MPLS and VPN

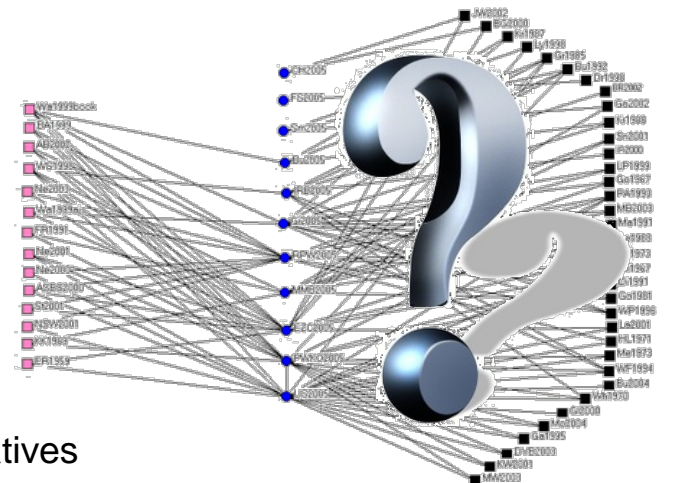


### Sense and Isolating that the network is the problem

- Many times users know before us that the network has failed
- How do we quickly sense and isolate the network problem
- Working root cause analysis in an event storm is not easy

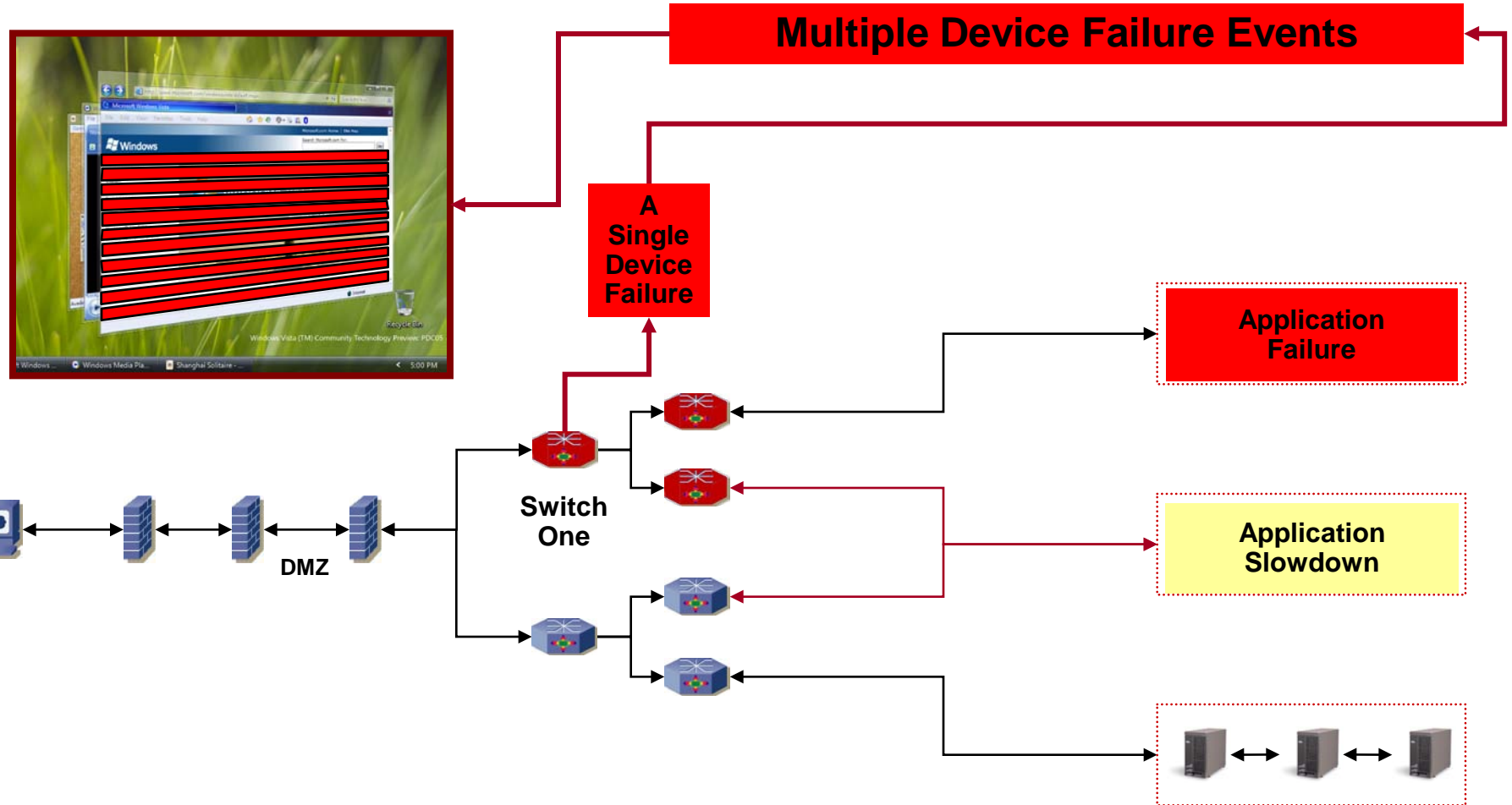
### Things are getting worse...

- Expected to do "better with less"
- We are fighting fires rather than supporting new business initiatives
- Does our current network state match our inventory systems.



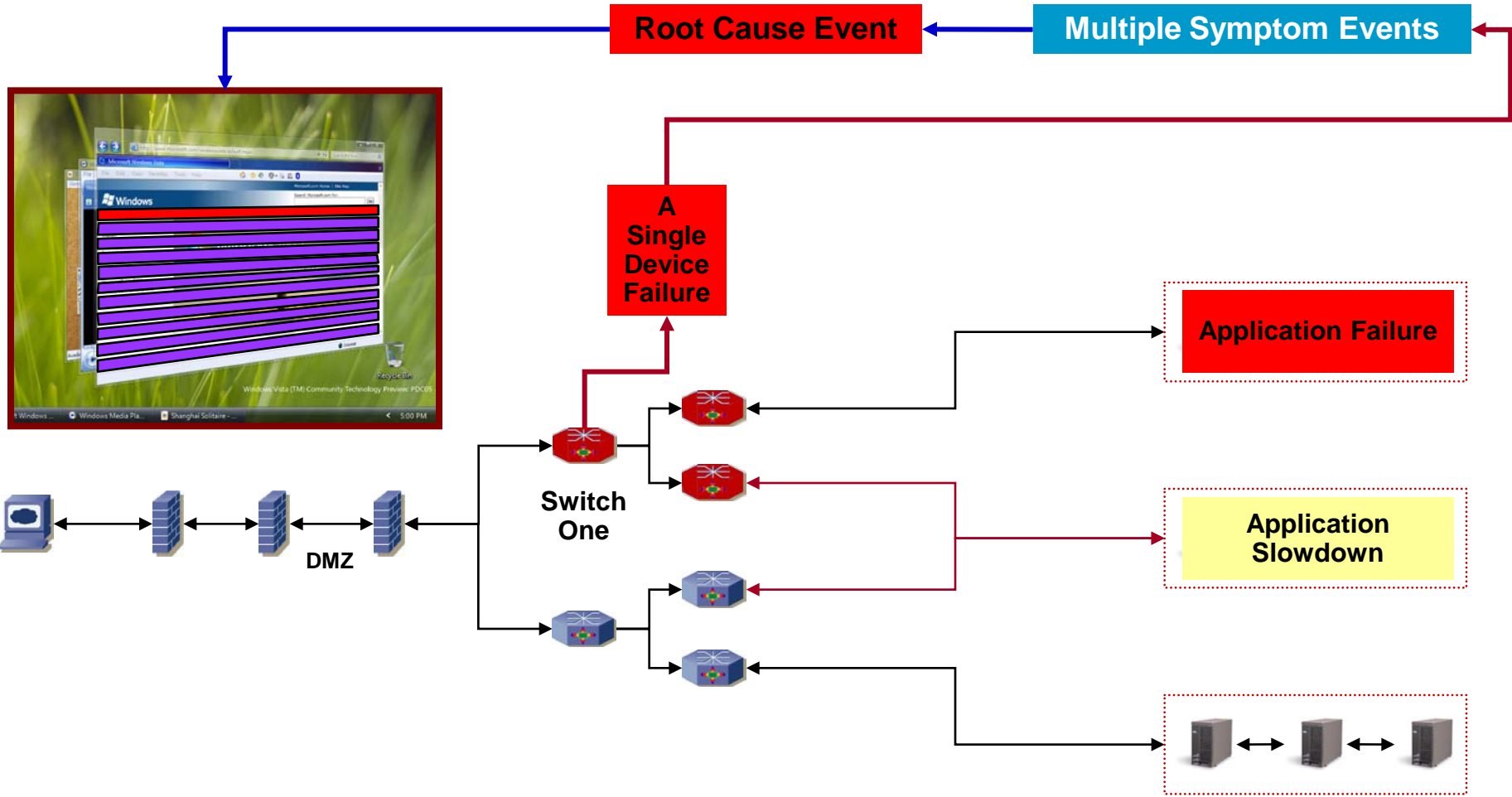
# IBM Tivoli Network Manager

## Network Events without Root Cause Analysis



# IBM Tivoli Network Manager

## Network Events with Root Cause Analysis



# IBM Tivoli Network Manager

## Advantages



### Accuracy

- Every device analyzed individually, regardless of type
- Definitive, “non assumptive” root cause
- End-to-end network connectivity right out to the desktop
- Dynamic root cause analysis (RCA) is based on real network model not static rules

### Breadth of coverage

- Unparalleled device, protocol and vendor support
- Technology support provided with base product
- Rapid new device & version roll out engineering model



### Flexibility

- In discovery: full scheduled; always-on; partial re-discovery triggered by network change
- In customization: support new devices on-the-fly; control what attributes are retrieved; add new event correlations; link to existing tooling
- In data access: discovered network information available for 3rd party integrations

### Out-of-the-box integration with IBM Tivoli Netcool/OMNibus

- Lower cost of ownership: Shared user management, single sign-on
- Increased Operator Efficiency: Launch in-context between network health, configuration and connectivity information; Common reports combining this same data



# IBM Tivoli OMNibus and Network Manager

## Add Event Management's "Single Pane of Glass" New Bundled Offering

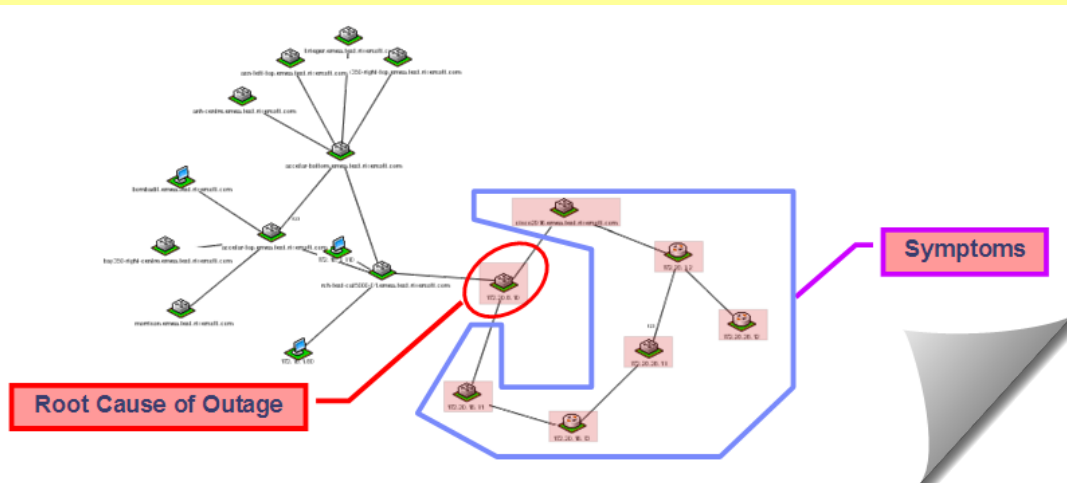


- Network Discovery
- Visualize Network Topology
- Root Cause Analysis



- **Single Pane of Glass**
  - Faster problem resolution
  - Reduced training cost
- **Widest coverage of event sources**
  - Correlate events across silos
  - Collect events from any source
- **Efficient and scalable**
  - Correlation and Automation
  - Out-of-the-box
  - Custom SQL-based automations

Add network, topology-based "root cause" analysis



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# IBM Tivoli Netcool Configuration Manager

## What is Tivoli Netcool Configuration Manager

- Tivoli Netcool Configuration Manager manages network device configurations by storing each devices' specific configuration in an external common data store in near real-time to determine
  - Which device was touched
  - Who touched the device
  - What was changed on the device
  - Why was the change made
  - When was the change made
- Enables reliable errorless changes in the network and rollback when necessary.
- Enables near real-time policy enforcement of access, security and configuration changes.

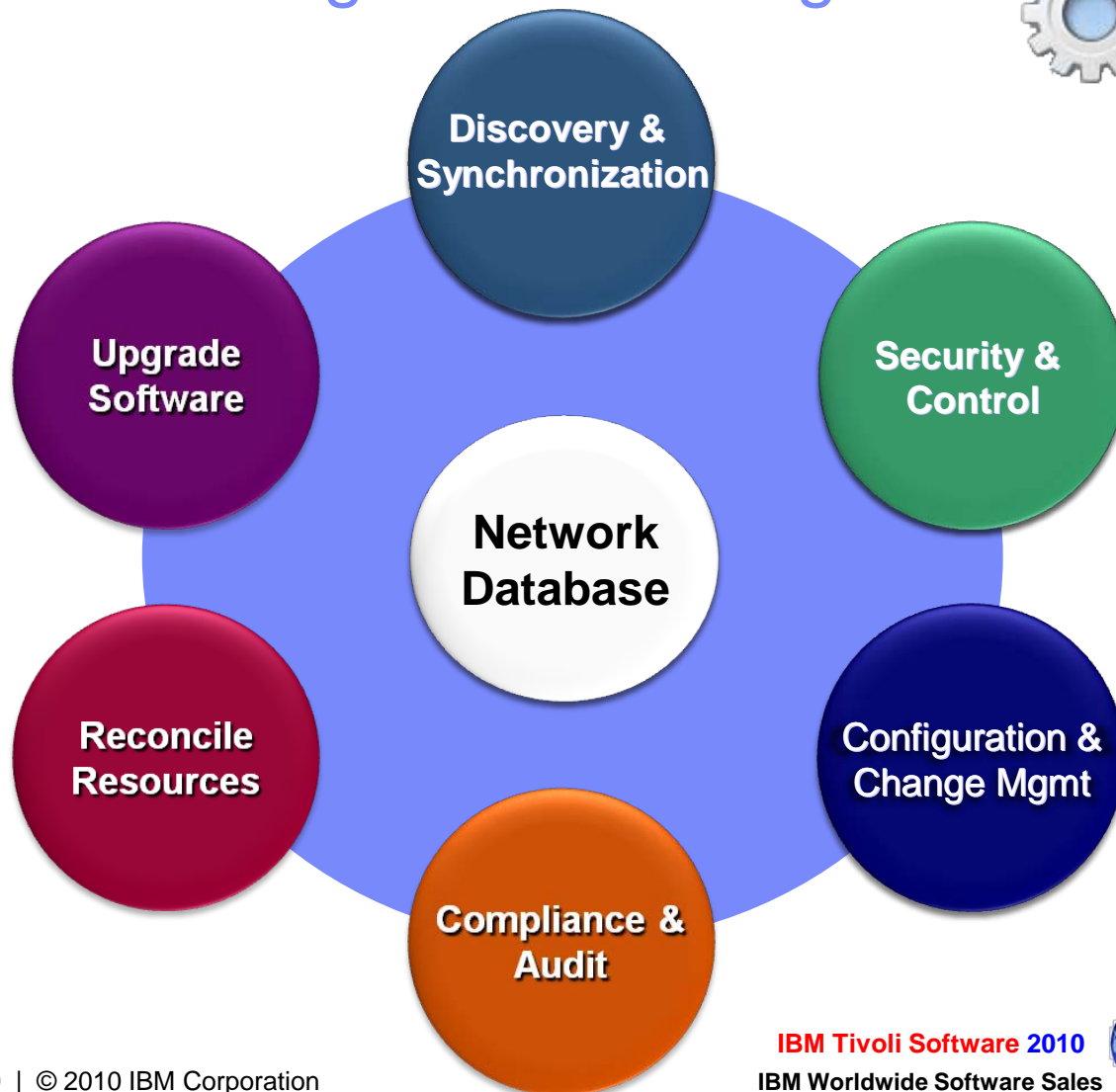


# IBM Tivoli Netcool Configuration Manager

## What is Tivoli Netcool Configuration Manager



**You are  
selling to the  
Networking  
Organization**



# IBM Tivoli Netcool Configuration Manager

## Enforce Network Compliance

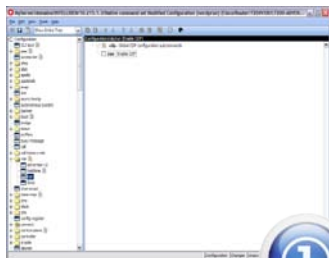


Netcool Configuration Manager



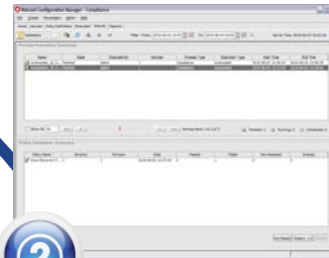
1

Changes made to a device configuration within ITNCM or out of band



2

Configuration changes cause a breach of a defined policy



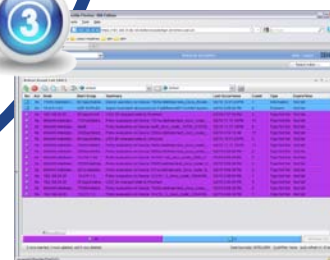
5

Re-evaluation of the policy, clears the policy breach



3

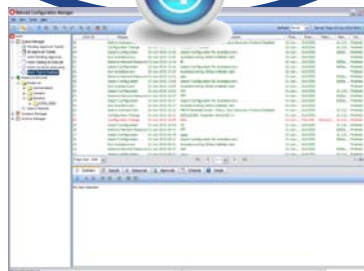
Triggering a trap to fault system for change events and policy breaches



4

Policy breach triggers remedial action – to correct policy breach.

Alternatively ITNCM could put the remedial UOW in a queue waiting for further approvals



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# IBM Tivoli Netcool Performance Manager

## The Importance of Performance Management



- If you can not measure it, you can not improve it.

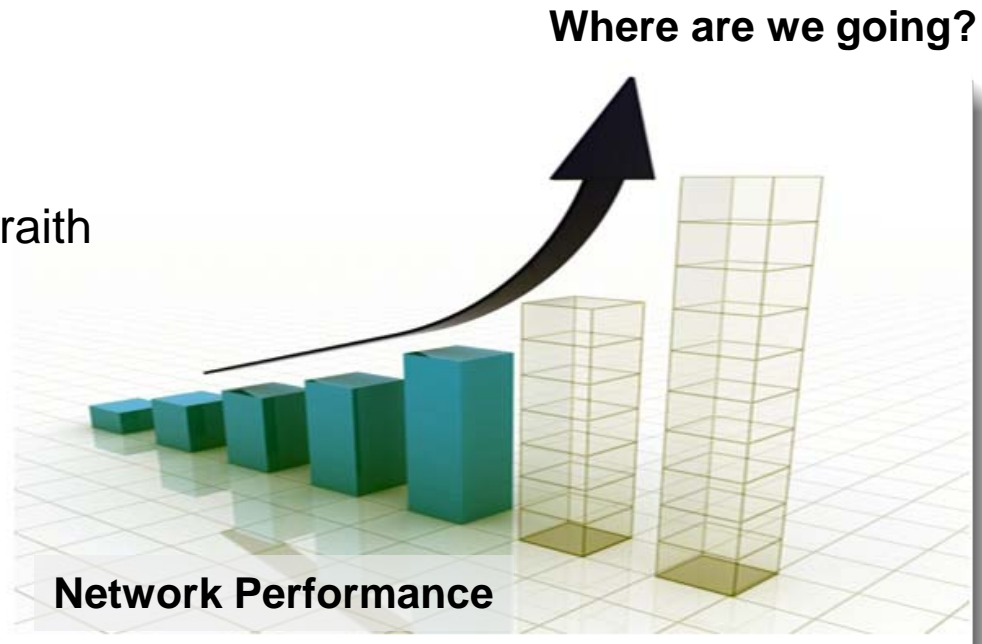
GC Carlton

- Things that are measured tend to improve.

John Kenneth Galbraith

- Every service delivered today is connected to “the network”.

Multiple times.



# IBM Tivoli Netcool Performance Manager

## Moving to Incident Avoidance



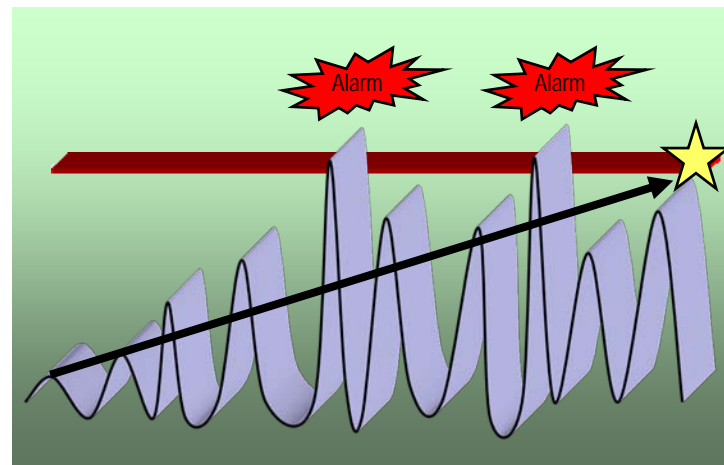
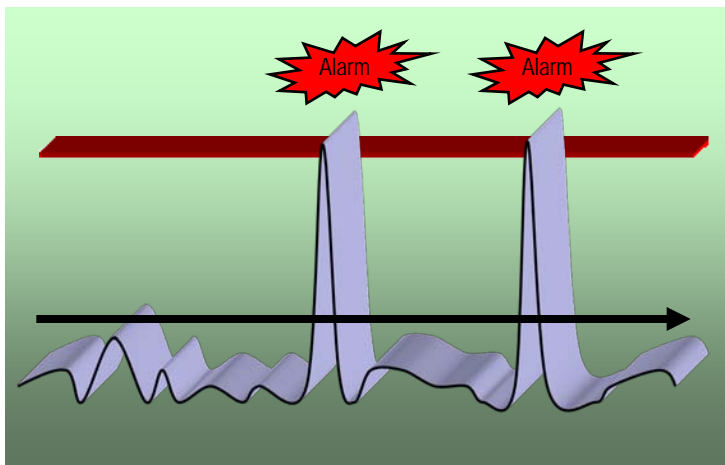
**Ability to monitor, alert, collect, analyse, store and visualize performance data**

- Moves beyond availability to include volume, latency, errors, usage data over time

**Complements Fault/Event Management**

- Two faults/events are received below. By utilizing performance management data the network organization can be proactive and address a “resource constrained” slowdown or outage.

The same two traps are received . . . . but one is a much bigger problem. . . . . ☆



**IP is everywhere now and does not have quality built in – it needs to be monitored**



# IBM Tivoli Netcool Performance Manager

- Network performance solution that addresses both operational and business intelligence requirements:
  - **Operational requirement** - provide real-time operational data and monitoring views using the operations console
  - **Business Intelligence requirement** – provide business intelligence through ad-hoc reporting with TCR/Cognos
- Expansive performance management scope
  - **End-to-end** network performance reporting
  - **Cross domain** performance reporting (network, server and application) with ITM's Tivoli Data Warehouse
  - **Converged** wireless and wireline (fixed/IP) networks
- Streaming analytics for real-time aggregation and threshold monitoring
  - Temporal and Spatial capabilities
- Proven, scalable distributed architecture



# IBM Tivoli Netcool Performance Manager Technology Packs for Rapid Technology Deployment

- **Largest set of out-of-the-box** management capabilities for strategic services, technologies and hardware vendors
- Integrates **Best Practices** for managing a specific technology
- Includes Data Collection, KPI Definitions, Analytics, Threshold Definitions and Reports
- Consolidated Tech Pack process for fixed and wireless
- Enablement for Business Value Report Packs (e.g. across technologies and across vendors)
- Technology Pack Dev Kit (TPDK) for Customers/Partners for rapid deployment of custom wireless Technology Packs

## Over 150 technology packs:

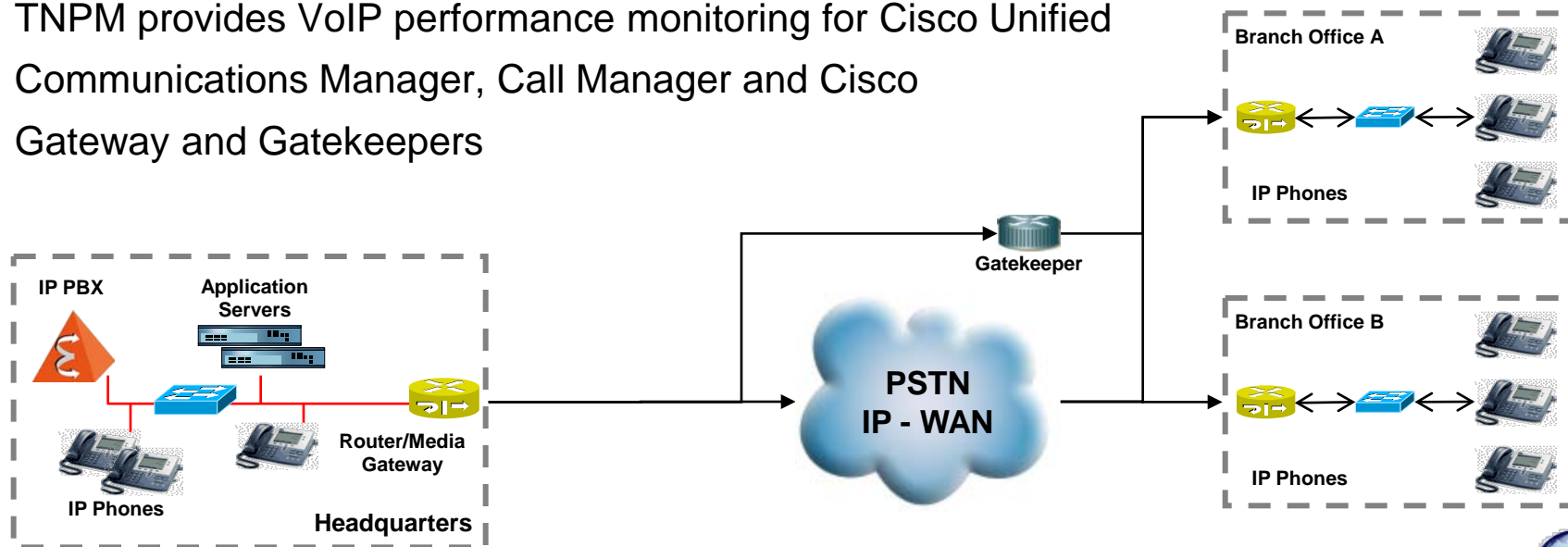
- **QOS Network Traffic Management**
  - Latency / jitter
- **Carrier and Enterprise Unified Communications**
- **IP Telephony (Call managers)**
- **Flow Monitoring**
  - IPFix, Netflow
- **MPLS**
- **Access**
  - WIFI, WIMAX
  - DSL, GPON, CMTS, MSAN
- **Service Aware Probes (VoIP, IPTV)**
- **IPTV (probes, PEVQ, IP Multicast, Video servers)**
- **IMS**
  - CSCF / BGCF, MGW, AS, MGC, MGW



# IBM Tivoli Netcool Performance Manager Technology Pack Example - Cisco IP Telephony



- VoIP is becoming integral to many corporations global voice strategy
- Managing the availability and performance of these VoIP environments is viewed as a mission critical application
- VoIP is becoming an “IT solution” that has to be managed appropriately
- TNPM provides VoIP performance monitoring for Cisco Unified Communications Manager, Call Manager and Cisco Gateway and Gatekeepers



# IBM Tivoli Netcool Performance Manager

## Composite Resources for End-User Experience



A **Composite Resource** models multiple wireline resources as a one entity

- Allows reporting against a “logical” single network entity or end-to-end service path

### Benefits of composite resources

- **Better reflection of the end-user network experience** (e.g. health indices)
- Makes performance indicators more relevant to Service Quality Management (SQM)
- More intuitive way to report on complex configuration metrics
- Generate smarter alarms



# Event and Network Management Summary



**IBM Tivoli/Netcool OMNibus  
(Event/Fault Management Solution)**

Event/Fault Management



**IBM Tivoli Netcool/OMNibus  
and Network Manager**

Event and Network Management



**IBM Tivoli/Netcool Network Management**

<b>IBM Tivoli Network Manager</b> (Network State) (Discovery, Topology Visualization for Root Cause Analysis)	← <b>Network Management</b>
<b>IBM Tivoli Netcool Configuration Manager</b> (Network Configuration) (Change and Configuration, Backup and Restore and Policy Management)	← <b>Configuration Management</b>
<b>IBM Tivoli Netcool Performance Manager</b> (Network Performance) (Monitor, Alert, Performance (streaming analytics) for Incident Avoidance)	← <b>Performance Management</b>



Thank  
YOU

