IBM® Systems Director Overview

Systems Software leadership for innovation

Management
Energy
Security
Availability
Operating Systems
Virtualization

IBM® Systems Software
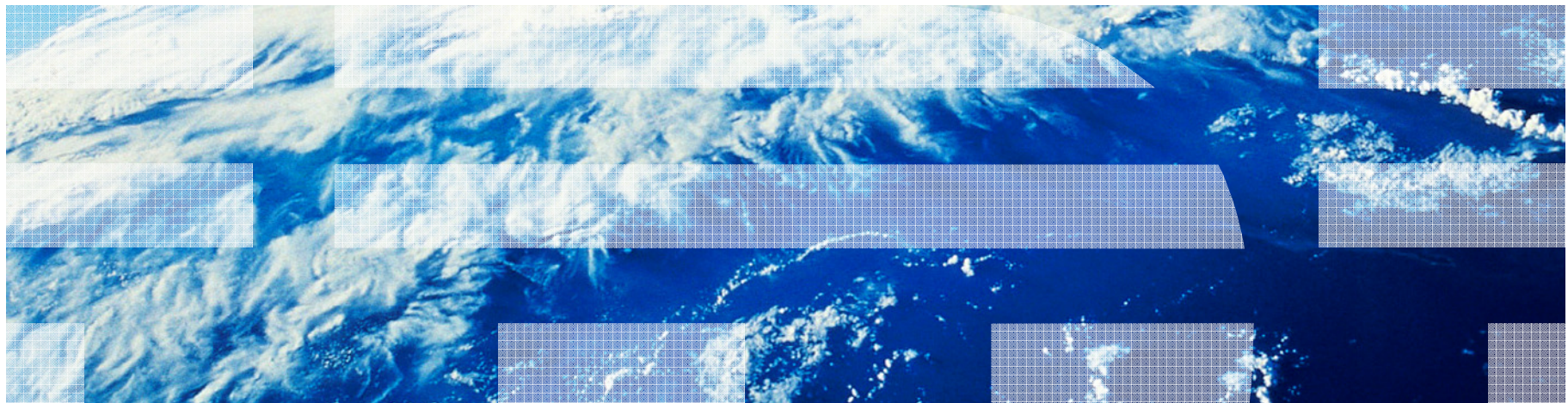
Phillip Ambartzakis

philla@za.ibm.com

IT administrators must prepare for changing business needs

Challenge:

- How can you effectively plan to address today's challenges and prepare for tomorrow's opportunities?

    – Maintenance costs: R8 for every rand spent on infrastructure.*
    – Energy costs: R1 for every R2 spent on hardware.*

"… **the days of focusing on physical system management are now gone**. Upper-level management wants greater IT operational efficiencies. CIOs require resources to be virtualized to ***increase resource utilization and simplify management, and that data center energy consumption be reduced***."

- Clabby Analytics, March 2009

* Source: IDC 2007

Integrated management enables greater operational efficiency

TODAY'S INFRASTRUCTURE…	INTEGRATED SERVICE MANAGEMENT…
Silos lead to a disconnected business and IT infrastructure.	▪ Integrates visibility, control, and automation across all business and IT assets.
Islands of computing create inefficiencies & underutilized assets.	▪ Is highly optimized to do more with less.
Struggle with regulatory compliance, information integrity and security.	▪ Addresses the information challenge. ▪ Manages and mitigates risks.
Resource constraints, difficulties managing complexity and change.	▪ Facilitates flexible delivery choices like clouds.

IBM Systems Director - End-to-End Management –

Tivoli software / **Other Systems Management Software**	Enterprise Service Management
IBM® Systems Director Editions	Integrated Service Management

IBM® Systems Director

VMControl	Active Energy Manager	Network Control	Transition Mgr for HP SIM	BOFM	Service & Support Manager	VMControl Image Manager	WPAR Manager	Additional Plug-Ins	Storage Control

New!
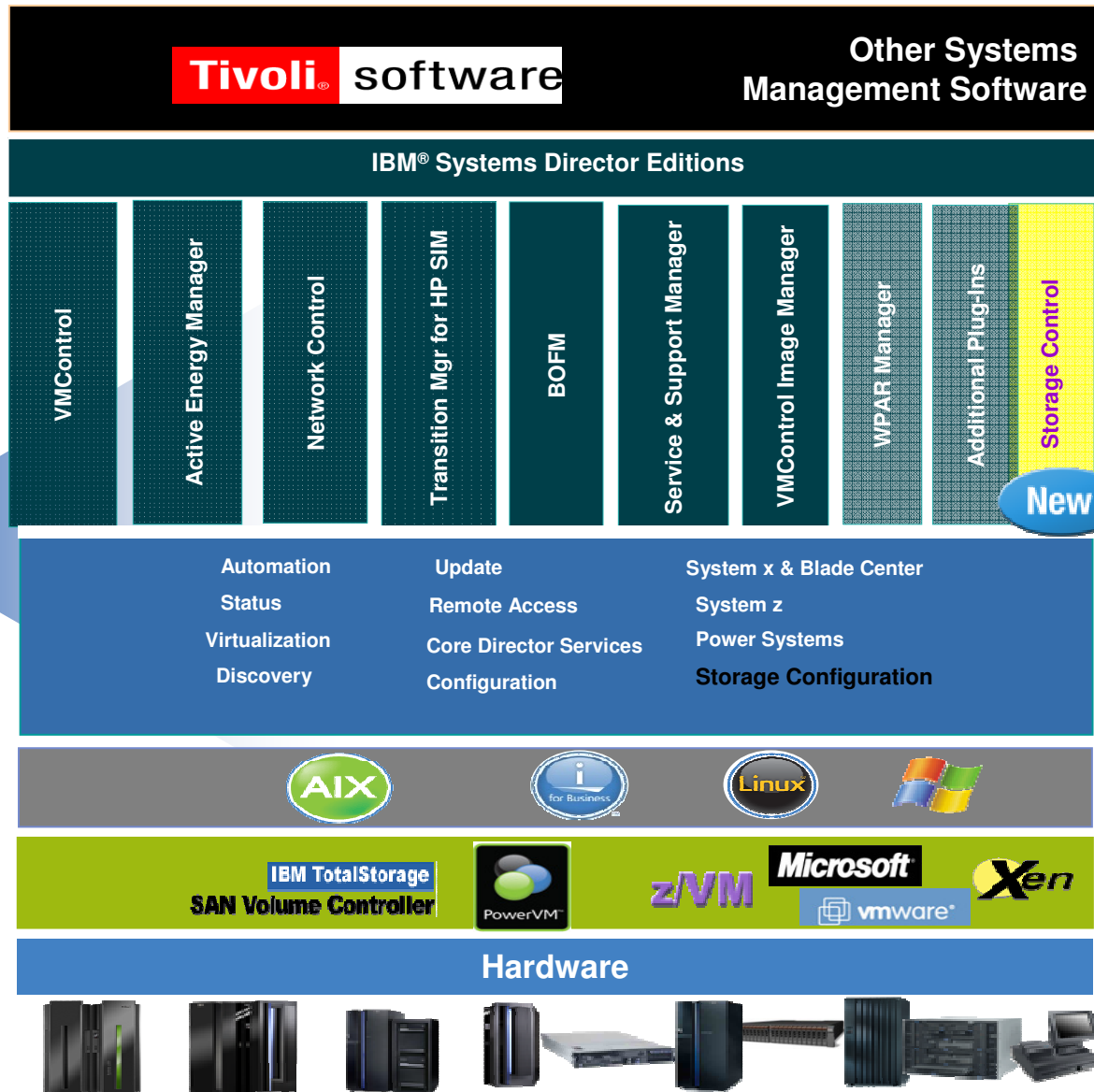
Advanced Managers & Priced Plug-Ins

Automation	Update	System x & Blade Center
Status	Remote Access	System z
Virtualization	Core Director Services	Power Systems
Discovery	Configuration	Storage Configuration

Base Systems Director Managers & Hardware Platform Managers

AIX · **i for Business** · **Linux** · Microsoft Windows

Resource Management

IBM TotalStorage SAN Volume Controller · **PowerVM** · **z/VM** · **Microsoft** · **vmware** · **Xen**

Managed virtual and physical environments

Hardware

IBM and non-IBM hardware

4   4

Systems Director Standard delivers value & quantifiable results

IBM Systems Director value proposition

1. **Dramatically reduce IT costs**
   - Save 34-42% in IT systems management admin costs
   - Save on infrastructure costs thru optimization of server, storage and network utilization
   - Reduce data center energy costs by 15-50%

2. **Improve service level agreements and responsiveness to business needs**
   - Enable faster and more flexible IT service delivery and deployment of new applications and workloads
   - Increase efficiency thru better utilization and management of IT resources (includes: servers, storage, network devices and staff)
   - Provide integrated tools that enable better decisions to increase reliability, availability, serviceability and security

3. **Reduce complexity and risk of managing IT operations**
   - Provide a single, unified and simple point of control, i.e., "a single pane of glass" from x86 to mainframe, including storage and networking devices
   - Simplify management of physical & virtual resources across heterogeneous environments
   - Eliminate layers of management platforms and tools across the broadest portfolio of hypervisors

Sample proof points

Lower Costs, TCO; Faster ROI
- energy savings of 66%
- lower power & cooling cost
- 100K/KWh/year savings
- 80% reduction in management costs
- lower TCO
- TCO reduced 40%; ROI <12 mo.

Improve service
- improved productivity in IT operations went up by 30% easy to use tools improved IT staff productivity
- requires less time to manage
- reduced time-to-market for new services

Reduce complexity and risk of managing IT operations
- improved availability & disaster recovery

IBM® Systems Director Standard
Simplifying the management of multi-system environments

- *Common toolset for managing physical and virtual resources – servers, storage and networking*

- *Automates data center operations to proactively avoid problems*

- *Reduces burden of time consuming administrative tasks*

- *Simplified deployment, installation and update process*

- *Remote control to manage, monitor, and troubleshoot from any corner of the world*

Simplified management of physical and virtual infrastructure

Rapid deployment and optimization of IT resources

Reduction in time-consuming management tasks

Systems Director Standard helps to . . .

- **Find and identify systems on the network**

- **Determine if systems are working properly**

- **Configure and deploy new systems**

- **Optimize systems for peak performance**

- **Monitor network devices**

- **Deploy physical and virtual machines**

- **Reduce time to execute systems administrative tasks**

- **Keep system firmware and drivers up to date**

- **Manage Energy**

- **Improve System Availability**

- **Automated discovery and topology views to simplify Troubleshooting**

- **Reduce virtualization complexity**

- **Lightpath Diagnostics**

IBM® Systems Director Standard
provides platform lifecycle management

- **Consolidation of Platform Management Tools**
  - Single consistent cross-platform management tool
  - Simplified tasks via Web based interface
  - Manage many systems from one console

- **Integrated Physical and Virtual Management**
  - Discovery and Inventory of physical and virtual resources
  - Configuration and provisioning of platform resources
  - Status, Health, and Monitoring of platform resources
  - Visualization of server resource topologies
  - Move virtual servers between systems without disruption to running workloads

- **Platform Update Management**
  - Simplified consistent cross-platform tools to acquire, distribute and install firmware and OS updates
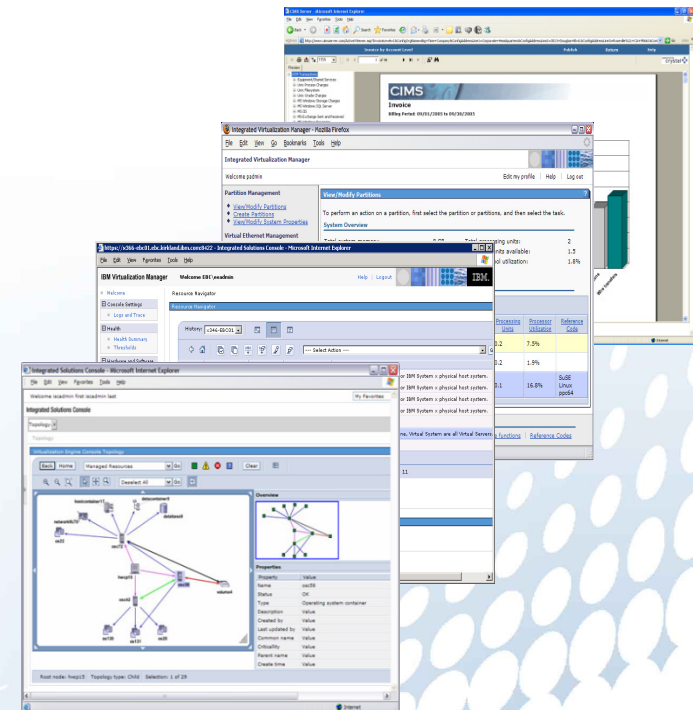
IBM® Systems Director topology

IBM System Director Server
Application Logic
Database

Management Console(s)
Web Interface

IBM® Systems Director

IBM Systems Director Agent
Managed Systems
(Servers, Desktops, Laptops, SNMP devices, CIM devices)

- **Three-tiered architecture**
- **Thousands of managed nodes**
- **Upward Integration modules supporting**
  - Tivoli, Computer Associates, Hewlett Packard, Microsoft

IBM® Systems Director provides server monitoring and control

- **IBM Systems Director simplifies the management of servers and storage**
  - Discovery and asset inventory
  - Monitoring and event alerting
  - Resource optimization
  - Simplified deployment, installation and update process
  - Upward integration to enterprise service management

- **Monitor and alert on defined thresholds for CPU and memory utilization and for network and file system metrics**

- **Ensure Hardware Management Console and Virtual I/O Server are operational**

- **Automate actions based on defined events and monitoring thresholds to reduce administrative workload**

Access all tasks on a single console and user interface to simplify and automate IT administration

At-a-glance status helps reduce administration and troubleshooting time

- **Customizable health summary**
  - Favorite systems
  - Critical monitors
  - Group thumbnails
- **Monitoring**
  - Monitor critical resources (e.g. CPU, memory, disk, VMs)
  - Thresholds
  - Events
- **Automation Plans**
  - Notify
  - Run commands
  - Trigger tasks
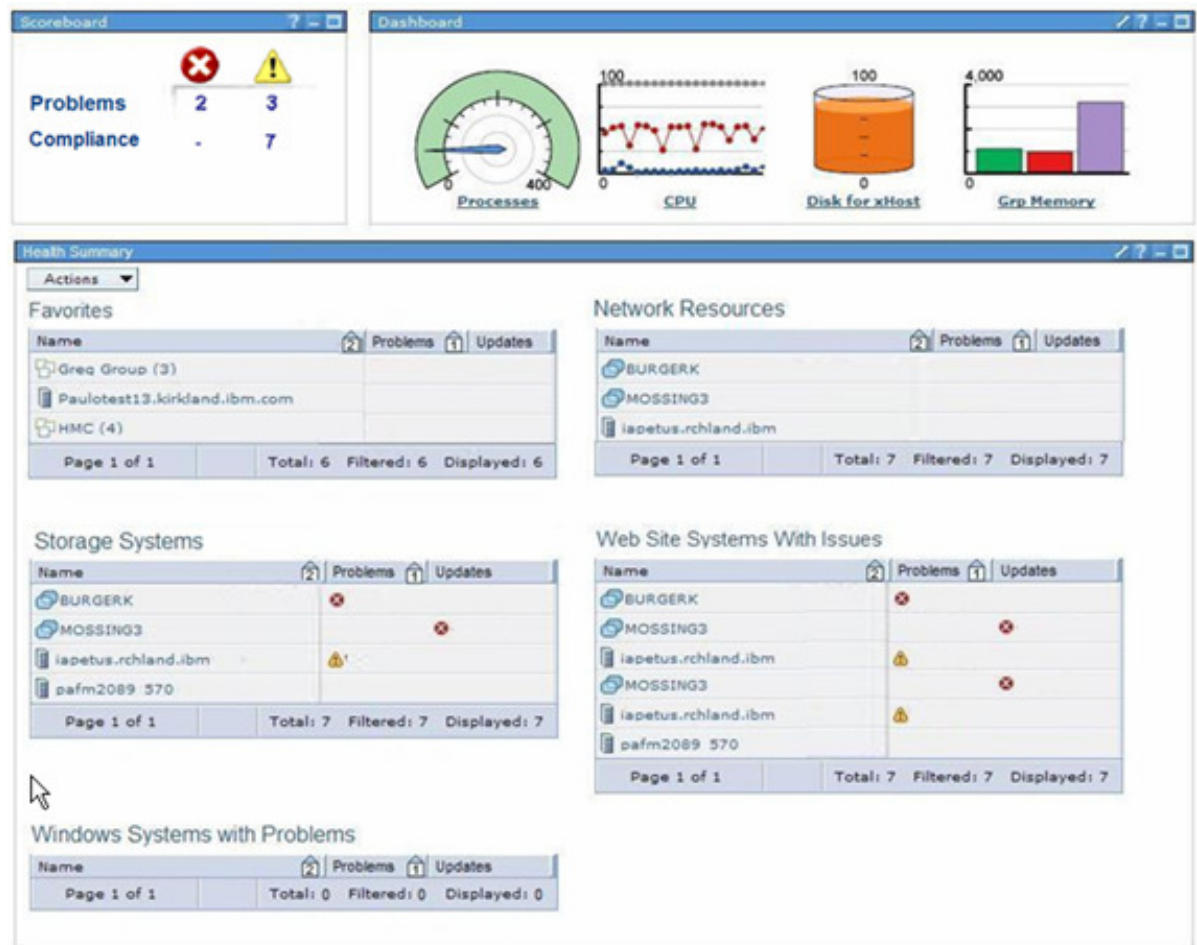
Communicate directly with IBM for the latest OS and firmware updates

Identify updates which are tested and should be deployed

Summary page for single view

Integrated actions for download, distribute, install and uninstall

Automate notification alerts and fixes based on warning thresholds

Monitoring

Event thresholds

Automation

IBM Systems Director functions:

1. Monitor disk capacity.
2. If the disk is ≥ 90%:

    a. Execute command to back-up and delete non-critical files

    b. Log the back-up

    c. Send an e-mail to the administrator

VM   VM
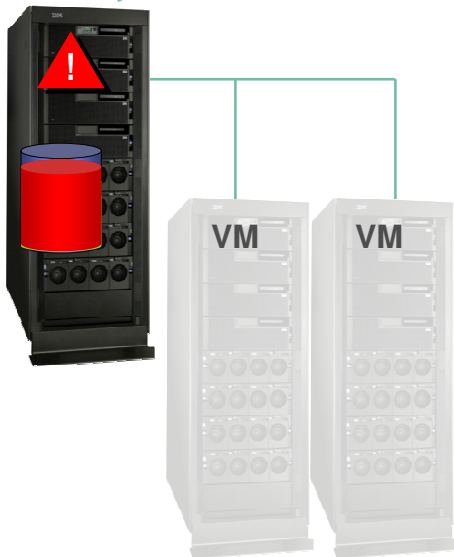
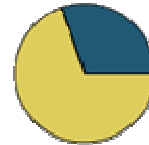# IBM® Systems Director Standard
VMControl™

Discovers relationships of virtual machines to server hardware and Hardware Management Consoles (HMCs)

Discovers hardware and virtual resources via the Hardware Management Console

Automated discovery

Getting Started

Discovery completed

33 Operating systems:
- 10 systems with no agent
- 0 systems with Platform Agent
- 23 systems with Common Agent

xt Steps

Windows Server 2008
Hyper-V™

AIX

i for Business

VM

PowerVM™

Linux
VMware ESX™
VM

Linux
VM
z/VM

AIX

Linux

VM **VM**

PowerVM™
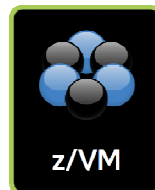
VIO **VIO**

Discovers physical and shared I/O

IBM Systems Director VMControl
Delivers leadership multi-platform ***virtualization management***

Microsoft Windows™

VMware® ESX and ESXi

Microsoft® Hyper-V™

PowerVM™

z/VM

IBM System x

Power Systems

IBM System z

IBM BladeCenter

- Simplifies virtual machine management and relocation on all IBM platforms

- Supports faster time to market for new services by reducing time and complexity of application installation and configuration

- Reduces disruption to IT operations associated with provisioning resources

- Reduces deployment errors and time to troubleshoot and fix them

- Provides automation necessary for cloud computing environments

VMControl™ Express Edition

## See and act on all of the virtualized resources

A plug-in option for IBM Systems Director (available for no additional charge) to **enhance virtualization management** and **simplify** virtual appliance **deployment** across heterogeneous platforms

Features:

- Multi-platform management
  - View virtual and physical assets
  - Virtualized life-cycle management
  - Topology maps

- Edit virtual resources
  - Edit physical hosts
  - Edit virtual machines
  - Use GUI or command line

- Relocate virtual machines
  - Execute live relocation
  - Plan for relocation

© 2010 IBM Corporation
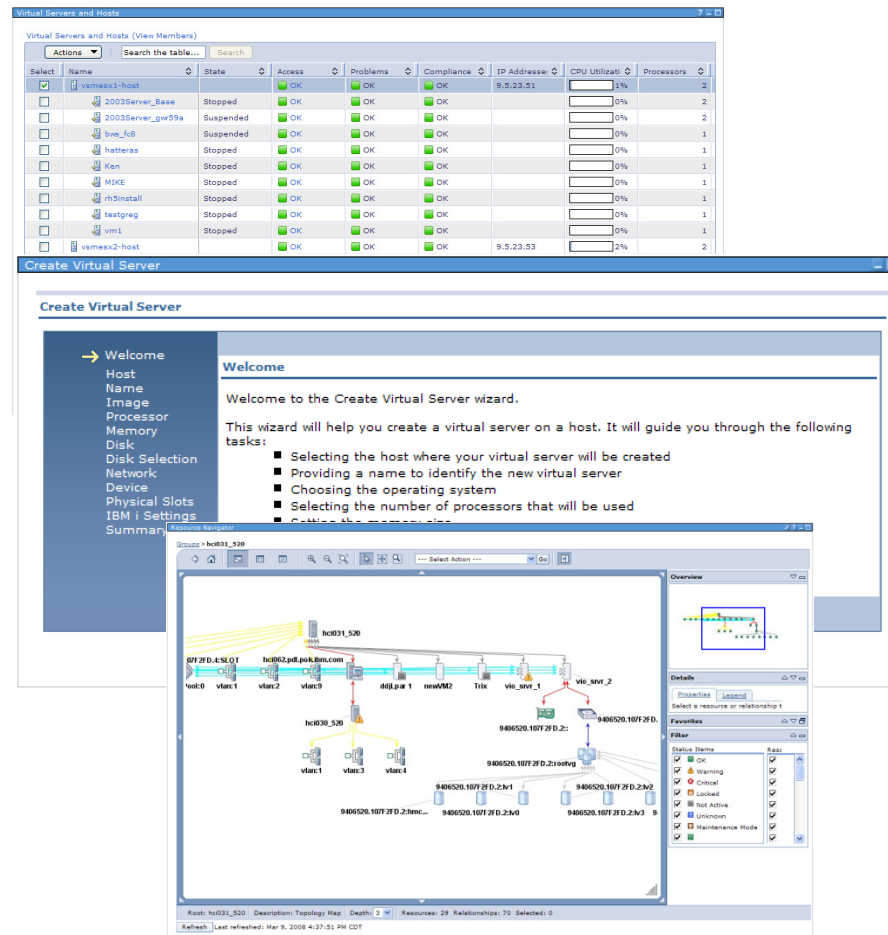
VMControl™ Express Edition

Benefits:

- Simplify management of virtual environments
  - Fewer tools and common interfaces across multiple platforms
  - Reduce troubleshooting time with topology views of physical and virtual resource relationships

- Reduce IT training costs
  - Access using Systems Director interface
  - Provides core virtualization management of all IBM server platforms

- Reduce or Eliminate unplanned downtime
  - Health monitoring
  - Threshold alerts
  - Move active virtual resources

IBM® Systems Director
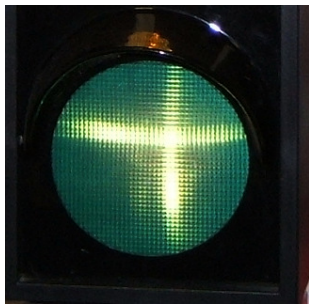## *Active Energy Manager™*

Common goals for energy management

Cost Reduction and Avoidance

- Identify opportunities for energy cost reduction *(Operating Expenses)*
- Delay facility expansion due to energy or cooling constraints *(Capital Expenses)*

Remove Operational Barriers

- Manage power and cooling capacity to enable growth and flexibility
- Avoid service disruptions caused by energy related outages

IBM® Systems Director Active Energy Manager™
Improved energy efficiency to help reduce data center costs/upgrades

Monitoring/control of server energy use

– 3rd-party facilities equipment support
  (sensors and meters supported)
– Alerts surfaced for servers affected by
  a power or cooling failure
– Control and set energy caps for both AC and DC power
– Support for Power Distribution Units (PDUs)

Balance workloads across servers to fit electrical power and thermal profiles

– Create and display relationships between all servers,
  and the power and cooling equipment supporting them
– Collect data to plan what servers to power off and when

Active Energy Manager™ monitors electrical energy and thermal profiles

Trend electrical power use over time

Trend temperature over time
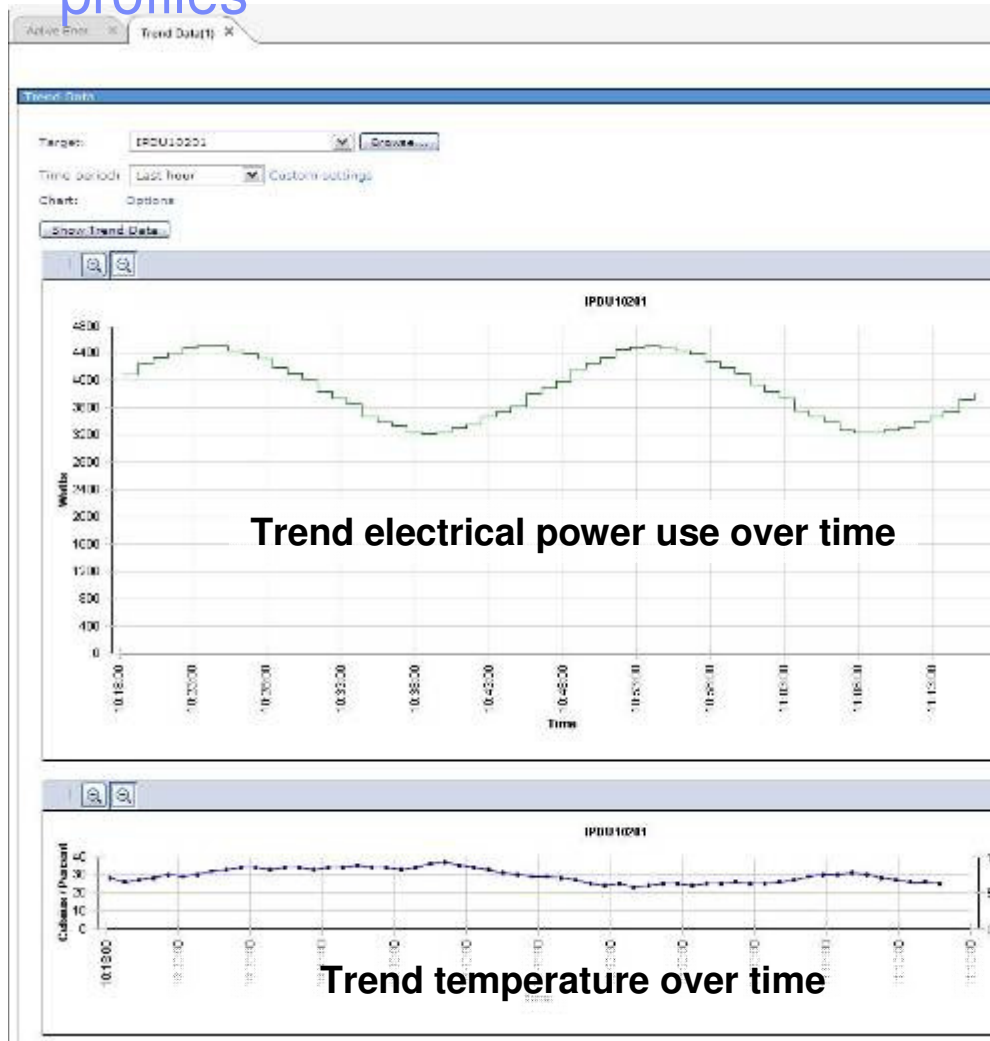
- Manage electrical power at the rack and server level

- Manage thermal energy at the rack and server level

- Analyze trends in energy use

- Server power down

- Performance per watt display

Note: Active Energy Manager monitoring and control capabilities vary by system.

Control energy use on servers

- Set fixed energy usage caps that the servers will not exceed when fully configured,   **OR**

- Set a lower "soft cap" for even more energy savings

- Optimize to maximize performance or power savings

- Set a fixed processor energy reduction, or dynamically adjust energy based on utilization

- Input altitude for more efficient fan operation

- Active Energy Manager™ data and energy controls are available on the console and via Command Line Interface

US Energy consumption by servers and data centers is expected to almost double in the next 5 years.

- US Environmental Protection Agency (EPA), August 2007

Note: Active Energy Manager monitoring and control capabilities vary by system.

IBM Systems Director
Systems Network Control

Simplifying network management tasks

IBM Systems Director Network Control integrates end-to-end platform management for the data center

Provides:

- Simplification of network management tasks, providing a unified view of the total IT environment, servers, storage and network.

- Device based launch in context point for IBM Data Center Fabric Manager.

- Integration of Tivoli based technology for advanced discovery and topology.

- Graphical view of L2 network connectivity using Director's topology perspective.

- Logical views of network systems arranged by the subnetworks to which they belong.

Enables:

- End-to-end user tasks to be done with a single tool

- Network monitoring at a glance via network topology perspectives with ability to see the components affected by network outages.

- Support for latest converged Fabric Ethernet technology (FCoCEE).

26

IBM

IBM Systems Director Network Control
Physical Connectivity Features

View Network Topology

System-level is high-level, showing relationships between servers and switches, user can:

- Determine to what switch a specific server is connected

- Determine what other devices are using the same switch

- Determine scope and impact of network outages

User can follow a diagnostic path by traversing the view, selecting a new root node, and displaying additional resources or topology perspectives.

Name	┅ᵇnetvf15.vrow.netfinity.com
Access	OK
Status	OK
Type	Switch
Description	Cisco Internetwork Operating System Softw
Slots Occupied	1
IP Hosts	
Agent Time Zone Off	
Manufacturer	CSCO
Model	32R1894
Serial Number	K12VH71C08T
UUID	65cfb258-6d7b-11db-b222-001b2afc5380
Asset Tag	
Changed Date	Mar 28, 2007 9:31:33 AM
Communication State	Communication OK
Detailed State	Unknown
Last Boot Up Time	Mar 17, 2007 5:28:15 AM
Primary Owner Conta	
Query Vital Properties	Every 24 hours
State	Unknown
Switch Type	Ethernet
Total Ports	22
Verify Connection Int	Default

IBM Systems Director Network Control
Physical Connectivity Features

Additional Subnet views

Systems by Subnet

User can:

- Determine what systems are in each subnet
- Determine what IP addresses are still in use for a particular subnet
- Determine the MAC address of each system, along with the Interface (LAN Connection) that is connected to the subnet

Subnet group

User can:

- Determine what subnets are defined
- Determine how many IP addresses are still available for a particular subnet

Systems by Subnet

Systems by Subnet (View Members)

Select	Name	Type	Access	Problems	Complia	IP Addresses	MAC Address	LAN Connecti	Contact
☐	Subnet 128.0.0.0/2								
☐	elm8a48	Switch	Partial access	OK	OK	128.0.0.32, 128.0.0.	00:19:e2:54:76:		
☐	Subnet 9.42.212.96/27								
☐	SIT	Switch	Partial access	OK	OK	9.42.212.111, 9.42.	00:05:ad:00:3f:	0005AD003F74	
☐	Subnet 9.42.236.0/23								
☐	QLogicFCoE	Pass-Thru Modu	Partial access	OK	OK	9.42.236.82	00:c0:dd:13:9b:	00C0DD139B44	
☐	SIT	Switch	Partial access	OK	OK	9.42.212.111, 9.42.	00:05:ad:00:3f:	0005AD003F74	
☐	Subnet 9.47.80.0/24								
☐	Cisco	Switch	Partial access	OK	OK	9.47.80.154	00:0d:ec:a3:e5:	000DECA3E5C0	
☐	elm8a105	Switch	OK	Information	OK	9.47.80.105	00:05:1e:76:90:	00051E769080	
☐	elm8a107.beaverton.ib	Operating System	OK	OK	OK	9.47.80.107	00-14-5e-f5-60-	001A64035FB2	
☐	elm8a167.beaverton.ib	Operating System	OK	OK	OK	9.47.80.167	00-14-5e-7a-5a-	00145E7A5A6D	
☐	elm8a48	Switch	Partial access	OK	OK	128.0.0.32, 128.0.0.	00:19:e2:54:76:		
☐	elm8a50.beaverton.ibr	Operating System	OK	Information	OK	9.47.80.50	00-1a-64-8f-02-	001A648F02AA	
☐	elm8a77.beaverton.ibr	Switch	Partial access	OK	OK	9.47.80.77	00:18:b1:66:f4:	0018B166F400	

Page 1 of 2   1   Selected: 0   Total: 23   Filtered: 23

Subnets

Subnets (View Members)

Select	Name	Subnet Number	Subnet Mask	Prefix Lengt	Available IP Add	Discovered IP Ac	Total Usable IP	Description
☐	Subnet 128.0.0.0/2	128.0.0.0	192.0.0.0		1,073,741,819	3	1,073,741,822	IP Subnet
☐	Subnet 9.42.212.96/27	9.42.212.96	255.255.255.224		29	1	30	IP Subnet
☐	Subnet 9.42.236.0/23	9.42.236.0	255.255.254.0		508	2	510	IP Subnet
☐	Subnet 9.47.80.0/24	9.47.80.0	255.255.255.0		244	10	254	IP Subnet

Launch-in-Context and Single Sign-on DCFM Configuration

IBM Systems Director Network Control 1.1

IBM DCFM (Storage product)
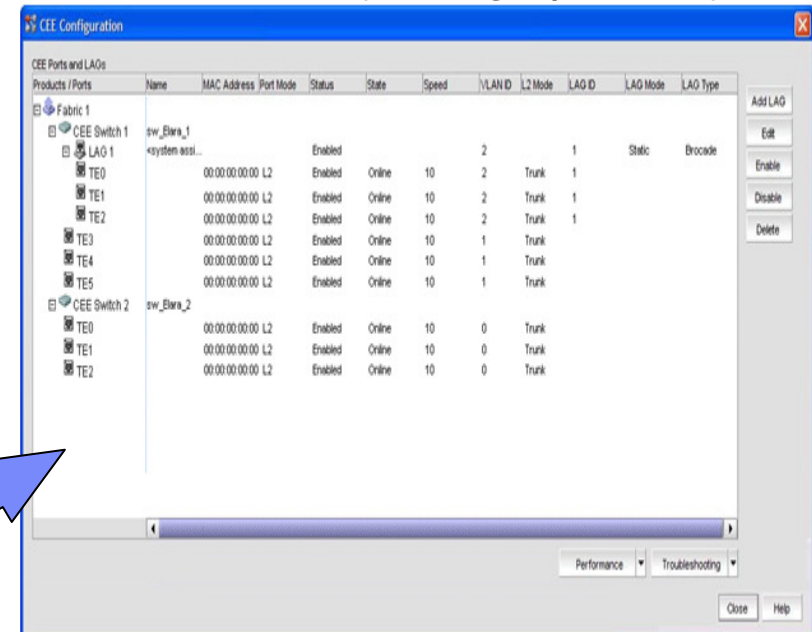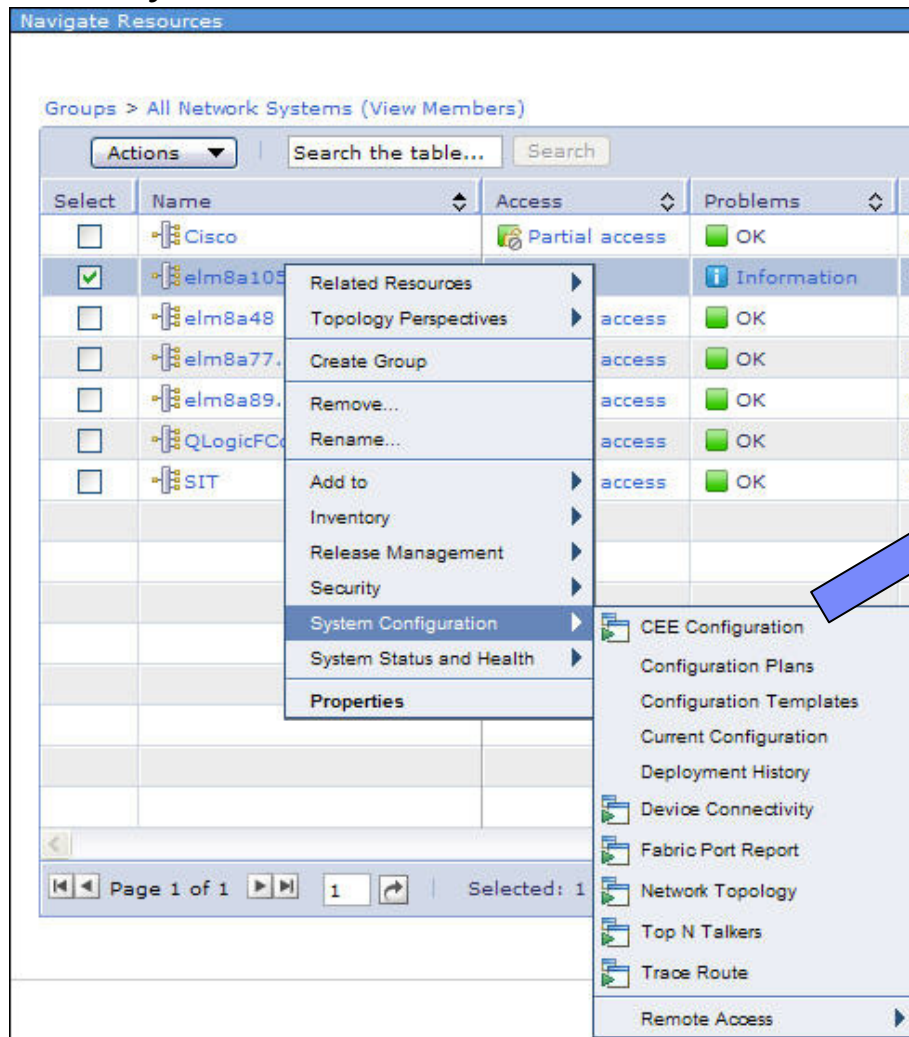
CEE Configuration(Switch / Port / LAG)
- CEE Port Configuration
- Link Aggregation Group Configuration
- QOS Configuration
- LLDP-DCBX
- ACL Configuration and FPMA Configuration
- STP Configuration

802.1x Authentication configuration

IBM® Systems Director Standard
TPM for OSD

IBM Tivoli Provisioning Manager for OS Deployment

Simplified Control over Hardware/Software - Manage growth, complexity, cost, risk

Simplified management of physical and virtual infrastructure

Lowers operational costs and improves system availability

Rapid deployment and optimization of IT resources

Provides greater flexibility to respond to a dynamic business environment

Reduction in time-consuming management tasks

Help increases employee productivity

TPM for OSD
Quickly Implement cost-effective OS deployments, migrations and redeployments

- **Automated OS installation (from bare metal)**

  - Easy, quick setup - hierarchical, scalable design, reliable repeatability

  - Cloning installation (take an image, restore/propagate it)

  - Native installation (run the native installation, unattended/zero-touch)

  - Driver injection - install applications as part of the OS install process

    - Applications can be added to an image at run-time
    - Inject hardware/OS specific drivers on the fly

  - Configure OS parameters (e.g. keyboard layout, time zone)

  - Multicast, "join-in" multicast, automated replication

- **Universal process - *Improve Image Administration***

  - Inject drivers automatically to single image for dissimilar hardware targets

  - Separate applications, settings from image for efficient image administration

    - Reduce number of images, storage space, update bandwidth
    - Single instance storage - saves only differential images

  - Same process for different target OS

    - Windows or Linux (Solaris, AIX some limitation)

  - Same process from CD/DVD/USB

  - Only "delta" image changes transferred between boot servers

IBM® Systems Director Standard
Virtual Media Key (Remote Control)

Integrated Management Module – Virtual Media Key
Remote control to manage, monitor, and troubleshoot from any corner of the world.

- **With the Virtual Media Key you can take control of the remote servers keyboard, mouse, and video**

- **You can also attach the remote server to the local disks on your management system**

  – **Provides complete remote management under any OS or pre-OS environment.**

  – **Install software with remote graphical console including KVM**

  – **Boot the remote server from floppy or CD on your laptop!**

  – **Perform firmware updates or operating system installation**

Remote Presence

- **Remote Video**

  - **Resolutions up to 1280 x 1024 @ 75Hz**

  - **Color Depth Selection for Reduced Bandwidth situations**

    - **Color 15 bits -> 7 bits**

    - **Grayscale 128 shades -> 16 shades**

- **Keyboard / Mouse**

  - **Keyboard Macros**

  - **International Keyboard support**

  - **Absolute, Relative - Mouse Modes**

  - **Single Cursor Mode Selection**

- **Server Power Control**

  - **Power On, Power Off, Power Cycle, Reset available via the Remote KVM applet window**

IBM and Microsoft Management Integration
IBM Director Management Pack for Microsoft System Center Operations Manager

Management

Energy

Security

Availability

Operating Systems

Virtualization

IBM® Systems Software

Provides:

- **Discovery**

- **Events**

- **Alerts**

- **State changes**

IBM® Systems Director

IBM® Systems Director provides rich hardware information into Enterprise Service Management software for an end to end integrated management solution

IBM® Systems Director Summary

IBM Systems Director's management increases efficiency to address today's challenges and prepare for tomorrow's opportunities

Physical assets & virtual resources at your fingertips with easy health monitoring & reporting, as well as updates & optimization

Automation of virtualization management to minimize time to provision images and manage system pools

Server and virtualization management integrated with network and storage management for complete resource control

Energy management to control energy use within existing capacity by setting energy usage caps across one or more servers

Integrated platform and service management to reduce time required for troubleshooting

Management
Energy
Security
Availability
Operating Systems
Virtualization

IBM®
Systems Software

IBM® Systems Director

IBM

Get the advantage of IBM® Systems Director cross-platform management solution to reduce the cost of IT service delivery and increase efficiencies

- **Provides a full range of systems management functions for physical and virtual resources**
  - Hardware and software inventory
  - Monitoring with automated responses
  - Software distribution
  - Remote hardware control and task execution

- **Easy-to-use, point-and-click graphical user interface**

- **Manages AIX™, Linux®, IBM i® and Windows®**
  - Linux® and Windows® on compatible non-IBM hardware

- **SNMP Devices**
  - Network devices, Storage subsystems, Power Distribution Units…

- **Systems Director Editions**
  - Packages provide <u>cost effective</u> solutions to support data center transformation.