



The Impact of Virtualization on Enterprise Infrastructure

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A background image showing a silver tablet with a black screen, a gold pen, and a spiral-bound calendar with a grid of dates. The calendar shows dates from 14 to 20. The entire scene is set against a blue gradient background.

Agenda

- Driven to Virtualize?
- Flexibility with Server Virtualization
- Managing Simplicity
- Putting it together

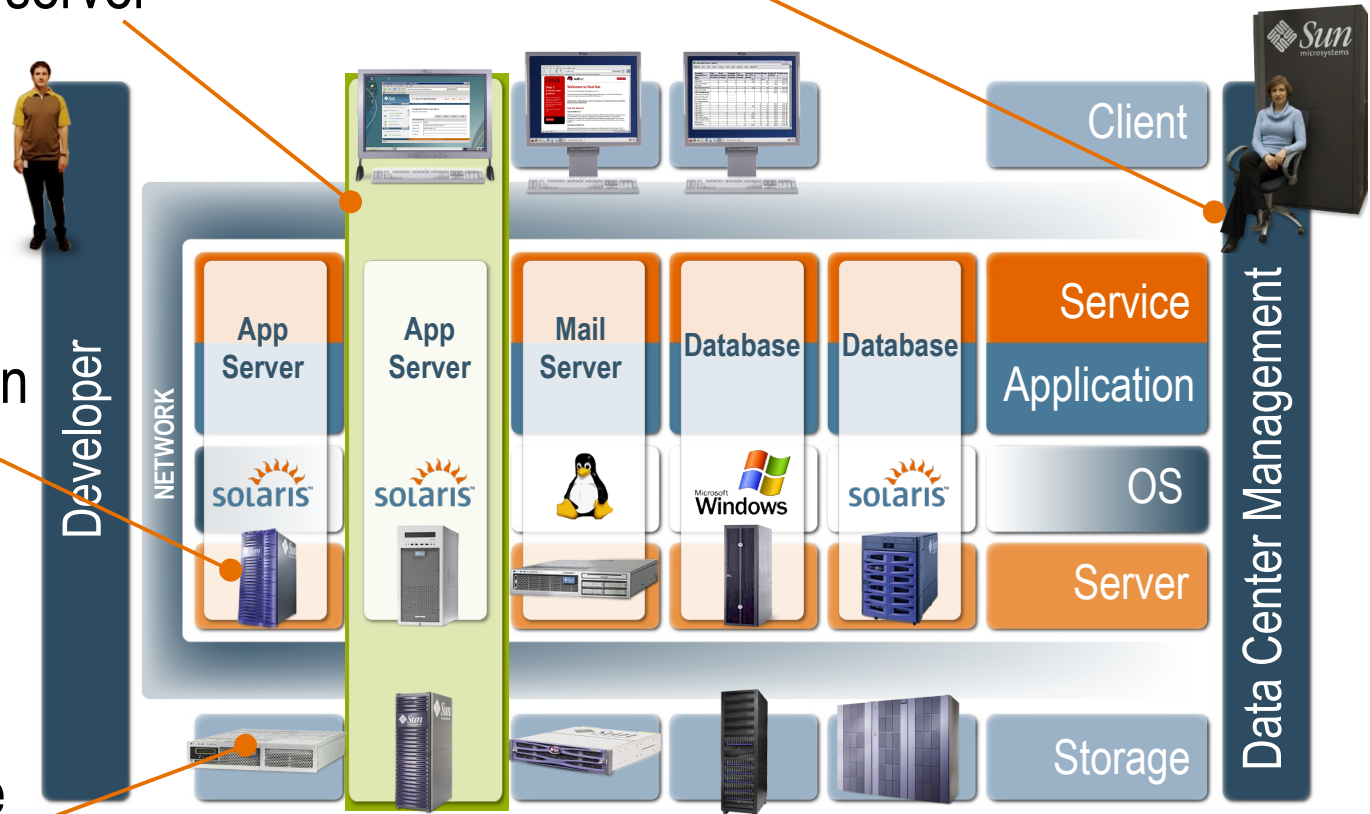
The Data Center Today

Single application per server

Server sprawl is hard to manage

Average server utilization between 5 to 15 %

Multiple storage islands



Client

Developer

Data Center Management

NETWORK

App Server

App Server

Mail Server

Database

Database

Service Application

OS

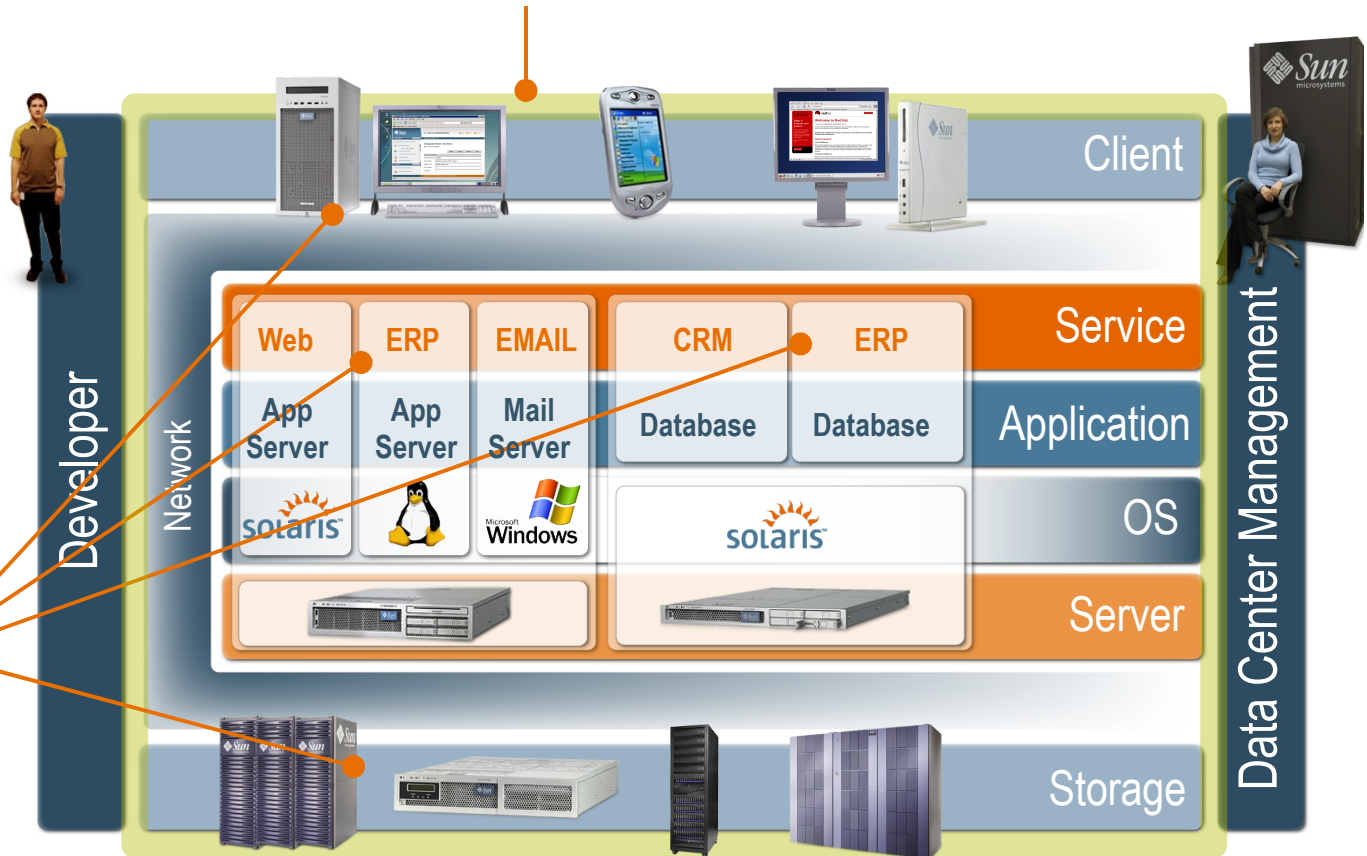
Server

Storage



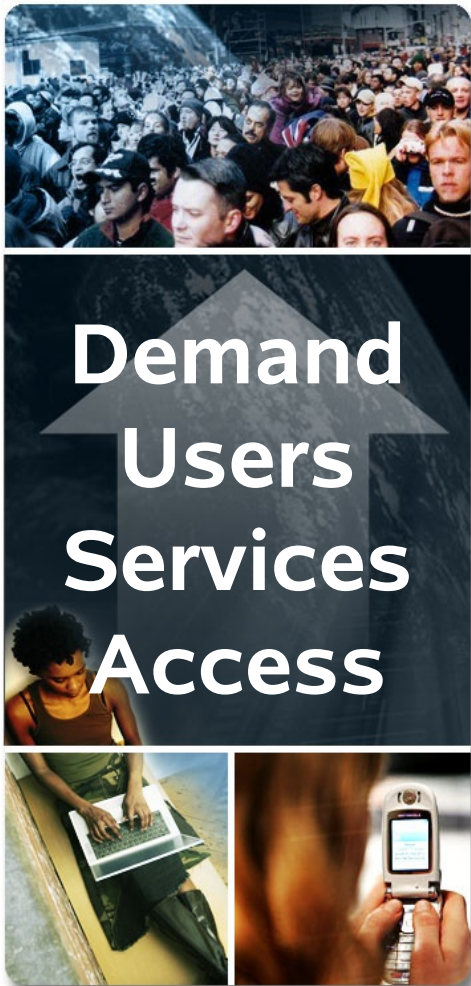
Virtualize Everywhere!

Phase 1: Maximize system resources across entire Data Center



Phase 2: Agility through encapsulation

Growing Demand, Shrinking Resources



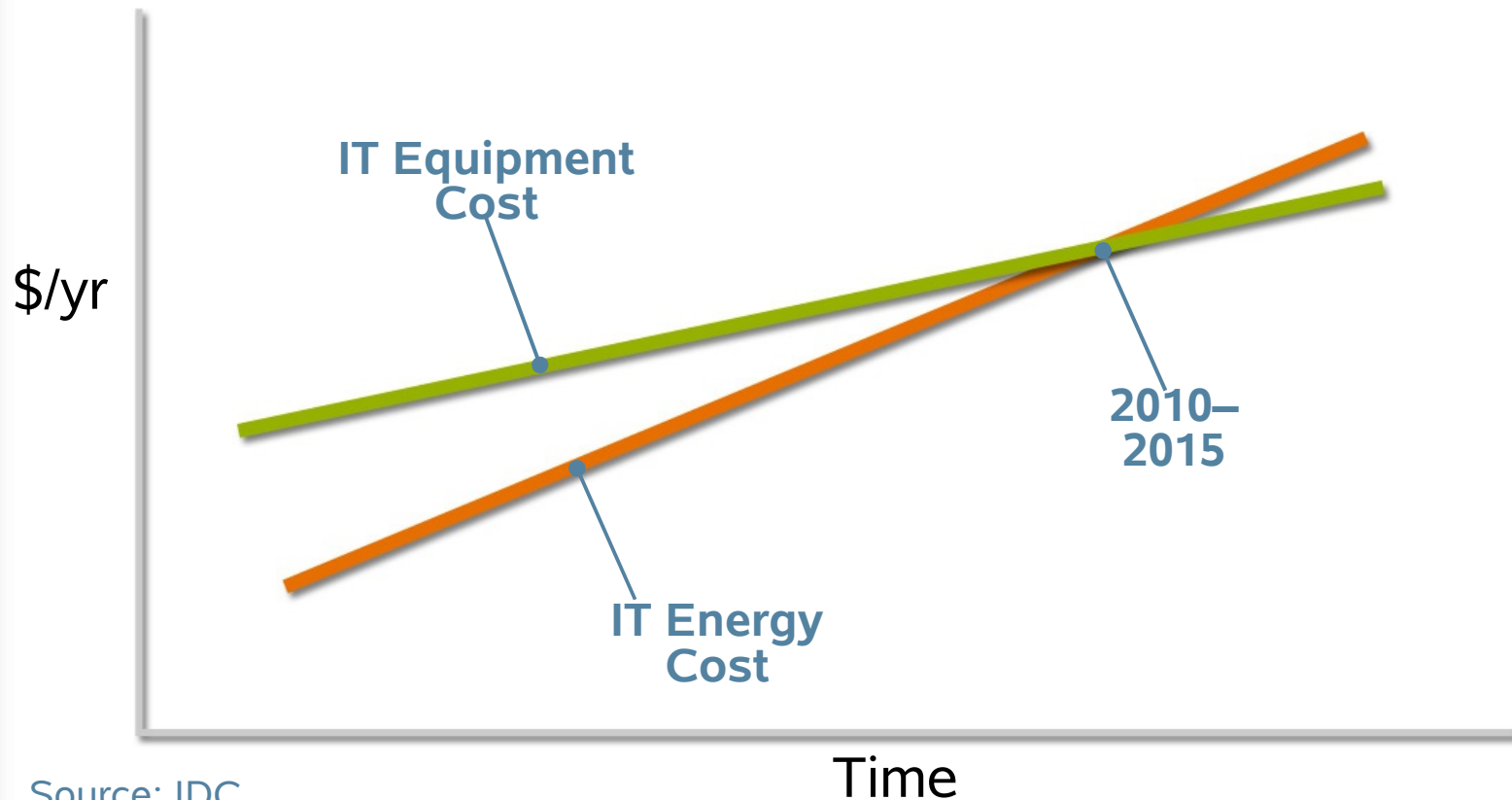
“By 2008, 50 percent of current data centers will have insufficient power and cooling capacity to meet the demands of high-density equipment”* --Gartner

“Energy bills traditionally have accounted for less than 10% of an overall IT budget but soon could account for more than half” --Gartner



Economic Impact

Increasing Power Density is Shifting the Balance of Cost



Source: IDC

Increasing Difficulty Keeping Greenhouse Gas Emission Commitments

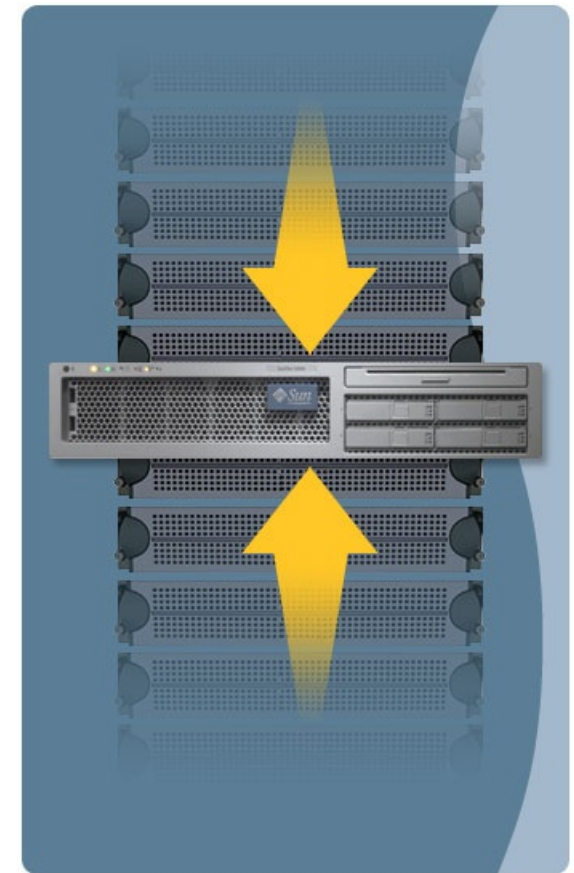


- GHG Emissions Increased 70% from 1970 to 2004
- Energy Supply Sector Rose the Sharpest (145%)

Sun Virtualization Doubles Datacenter Capacity, Reduces Costs

- Reduced operational costs and doubled data center capacity
 - > 13.5x higher MySQL performance
 - > 50–75% operational savings
 - > 3.6x lower acquisition cost
- Reduced datacenter power and heat
 - > 13x power saving
 - > Simplified HA environment
- Better space efficiency
 - > 7x reduction in footprint

DigiTar™



Virtualization: Opportunities & Risks



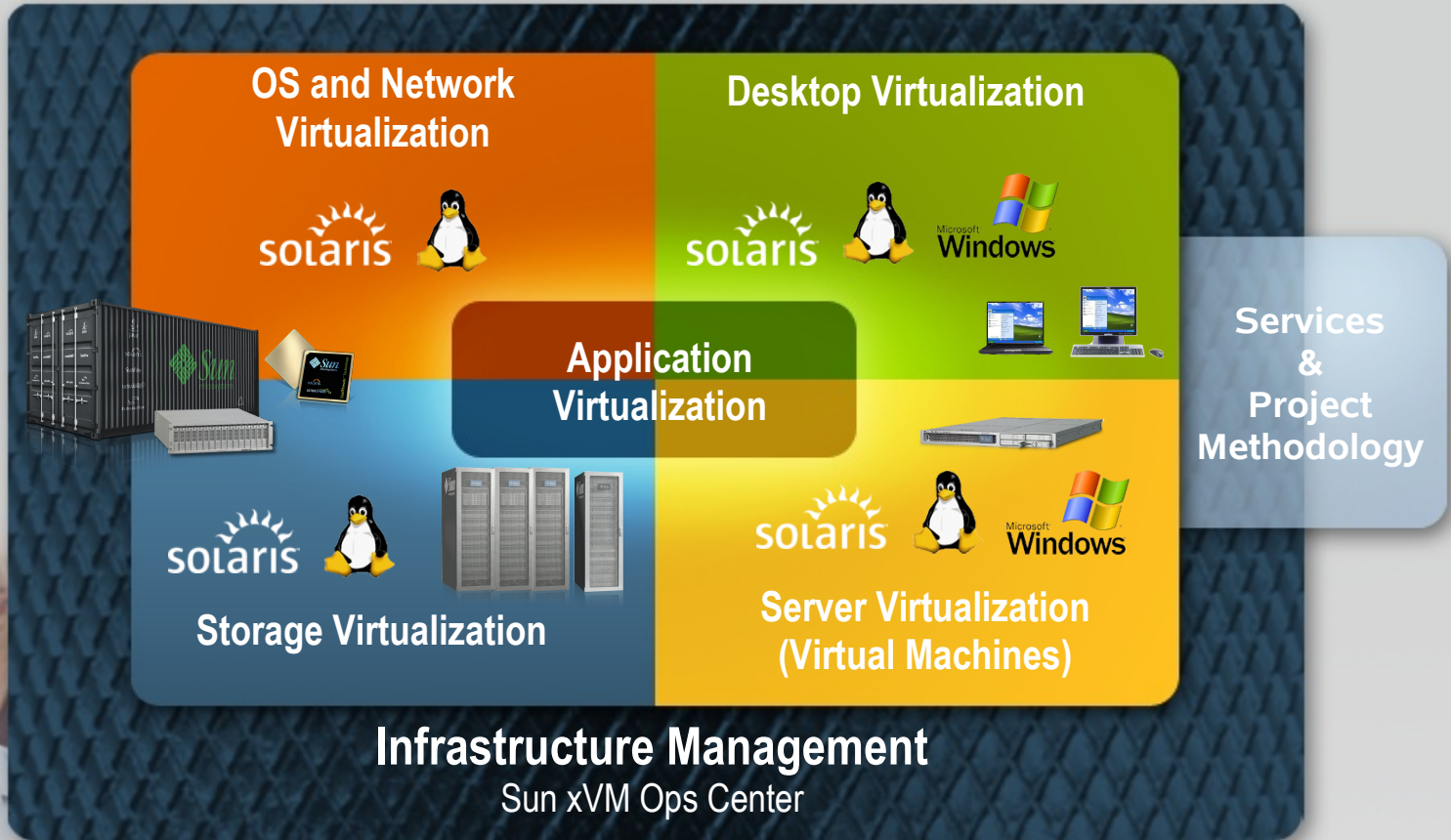
The Power of Virtualization

Virtualization Pitfalls



Defining Infrastructure

Innovations and features across the stack

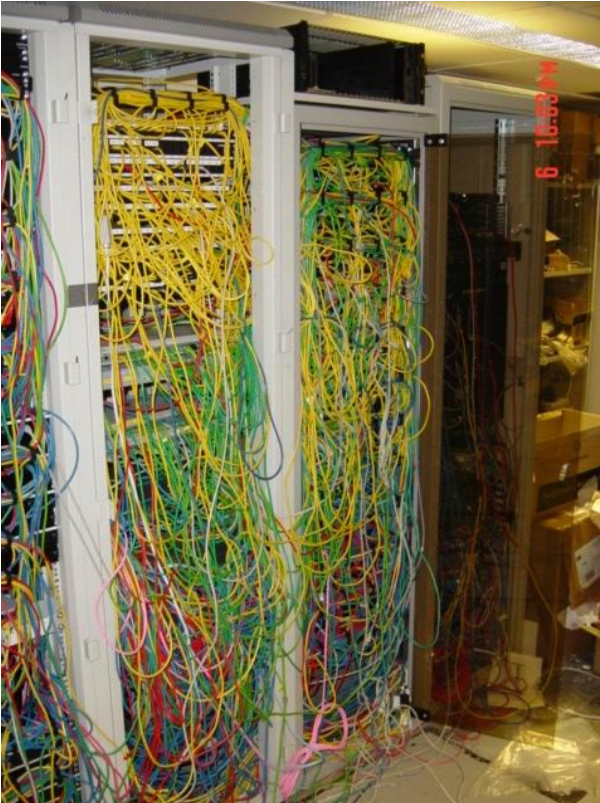


Storage Virtualization

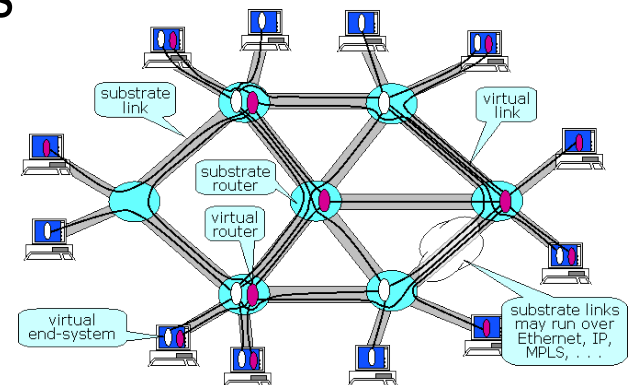
- Combine multiple physical storage devices into logical storage devices (pools)
- Benefits:
 - > Less resources = reduced complexity
 - > Automates many time-consuming tasks
 - > Disguises physical complexity -> easier backup/recovery/archiving



Network Virtualization

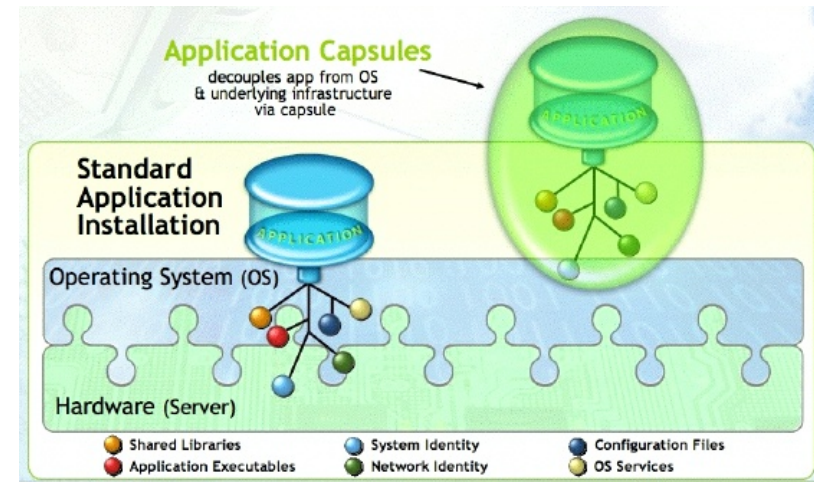


- Defining 'paths' in your network
- Benefits
 - > Less physical complexity
 - > More flexible
- Management effort same or more
- Examples:
 - > CISCO VLANs
 - > Our VPN



Application Virtualization

- De-couple (abstract) applications from the underlying OS
- Only take the pieces of the OS that you need
- Provide functionality, not stacks



Making features available

- Traditional high-end features are now available for the Mid-range, Low-range
 - > Resource Management
 - > Isolation
 - > High Availability
 - > Backup
 - > Mobility
- But there could be an impact on the infrastructure underneath (network, storage, systems)
- Tools are required to address this



Server V12N

A quick look at the options

Customers benefit from innovation

Less Space, Greater Performance and Efficiency

“We at Bank of America are doing our part by selecting environmentally friendly products such as the Sun Fire T2000. These servers **utilize less space and consume much less energy while delivering significantly improved performance.**

Numbers don't lie — we experienced a **300% performance increase** after we started using the T1000s. In a **third of the space at a third of the power consumption...**”

Bank of America.

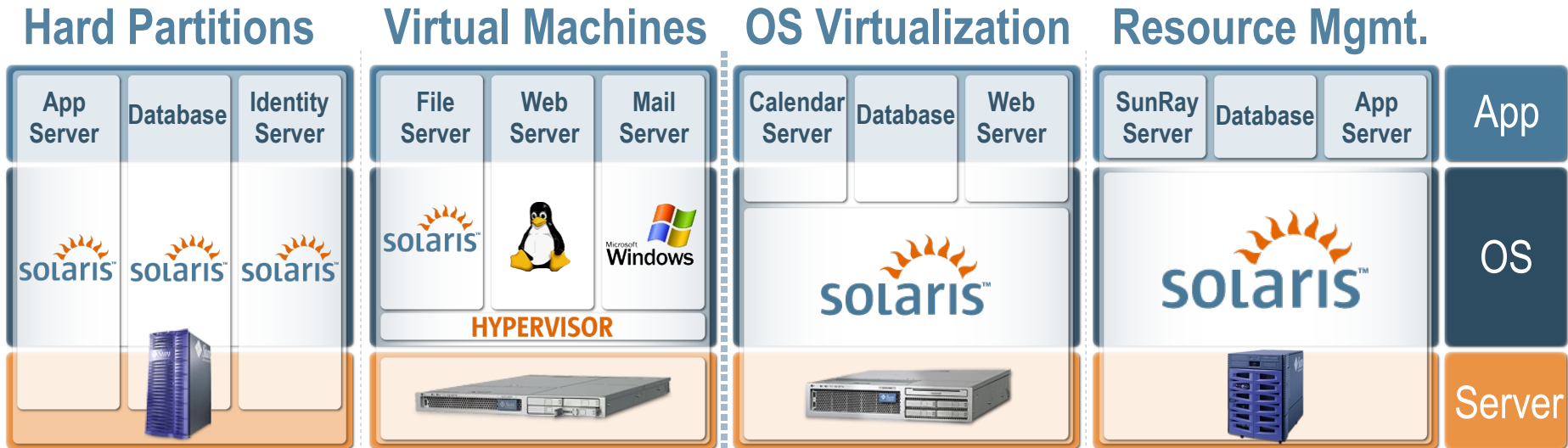
Don Obert, CTO



 **FOTOLOG™**

Warren Habib, CTO

Selecting Solutions (Server V12N)



Multiple OSes | Single OS

Trend to flexibility

Trend to isolation

Dynamic System Domains

Logical Domains

Solaris Containers (Zones + SRM)

Solaris Resource Manager (SRM)

xVM

Solaris Trusted Extensions

VMware

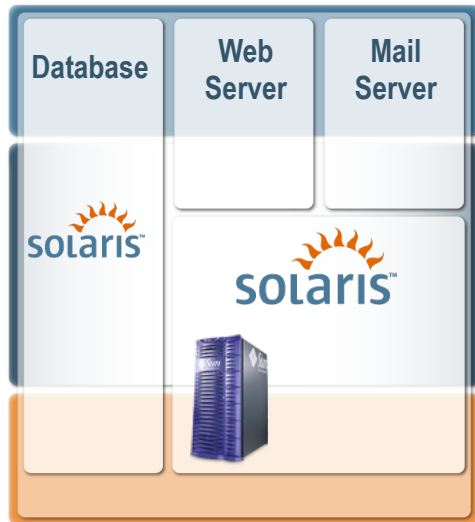
Solaris Containers for Linux Applications

Microsoft HyperV

Solaris 8 Migration Assistant

Hybrid Solutions

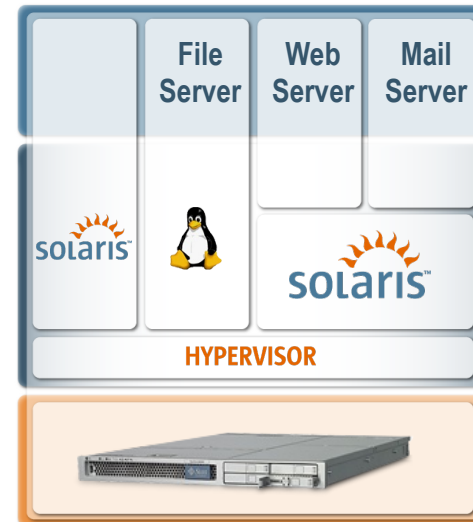
Hard Partitions & OS Virtualization



Dynamic System Domains with Solaris Containers

- > Combine high RAS and proven robustness with flexible application environments
- > Both can scale all the way up to 144 way systems
- > Incur no extra overhead for Virtualization

Virtual Machines & OS Virtualization

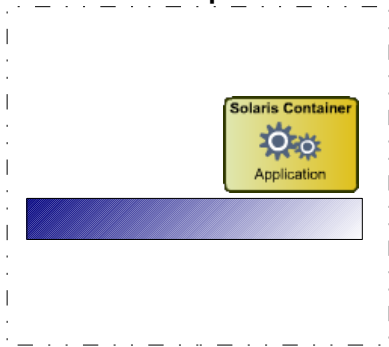


LDoms/xVM/VMware/MSVS with Solaris Containers

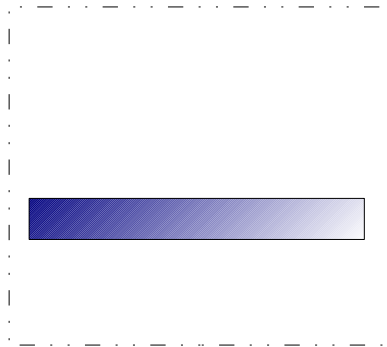
- > Combine flexibility of OS version and type with secure application environments
- > Live migration allows for off-loading a system in production for repair or DR

Business Impact: Rapid deployment Using Solaris Containers

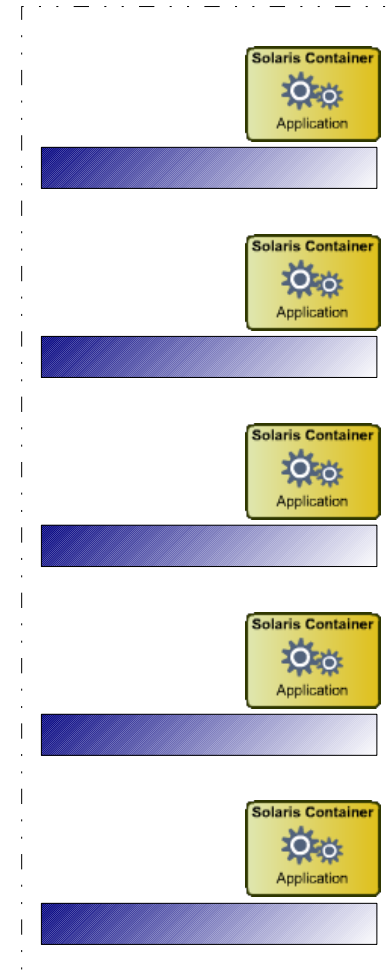
Development



Test



Production



Development

- | |
|---------------------------|
| 1. Create and develop app |
| 2. Shutdown |
| 3. Move to Test |

Test

- | |
|------------------------|
| 4. Boot in test |
| 5. Test |
| 6. Shutdown |
| 7. Move into pre-stage |

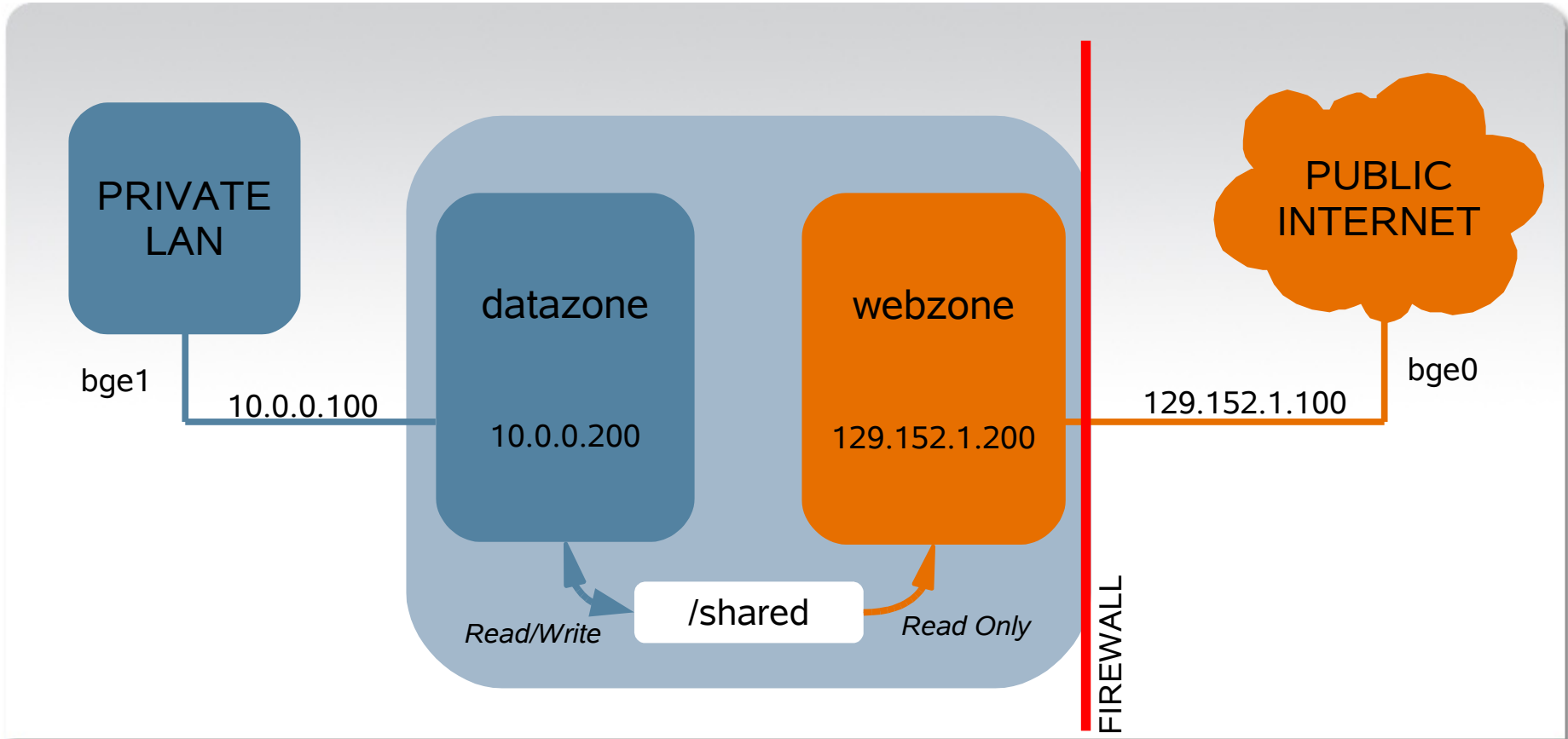
Production

- | |
|------------------------|
| 8. Clone |
| 9. Configure (offline) |
| 10. Shutdown old app |
| 11. Start new app |
| 12. Roll out |

Regression?

- | |
|------------------|
| 13. Shutdown new |
| 14. Start old |

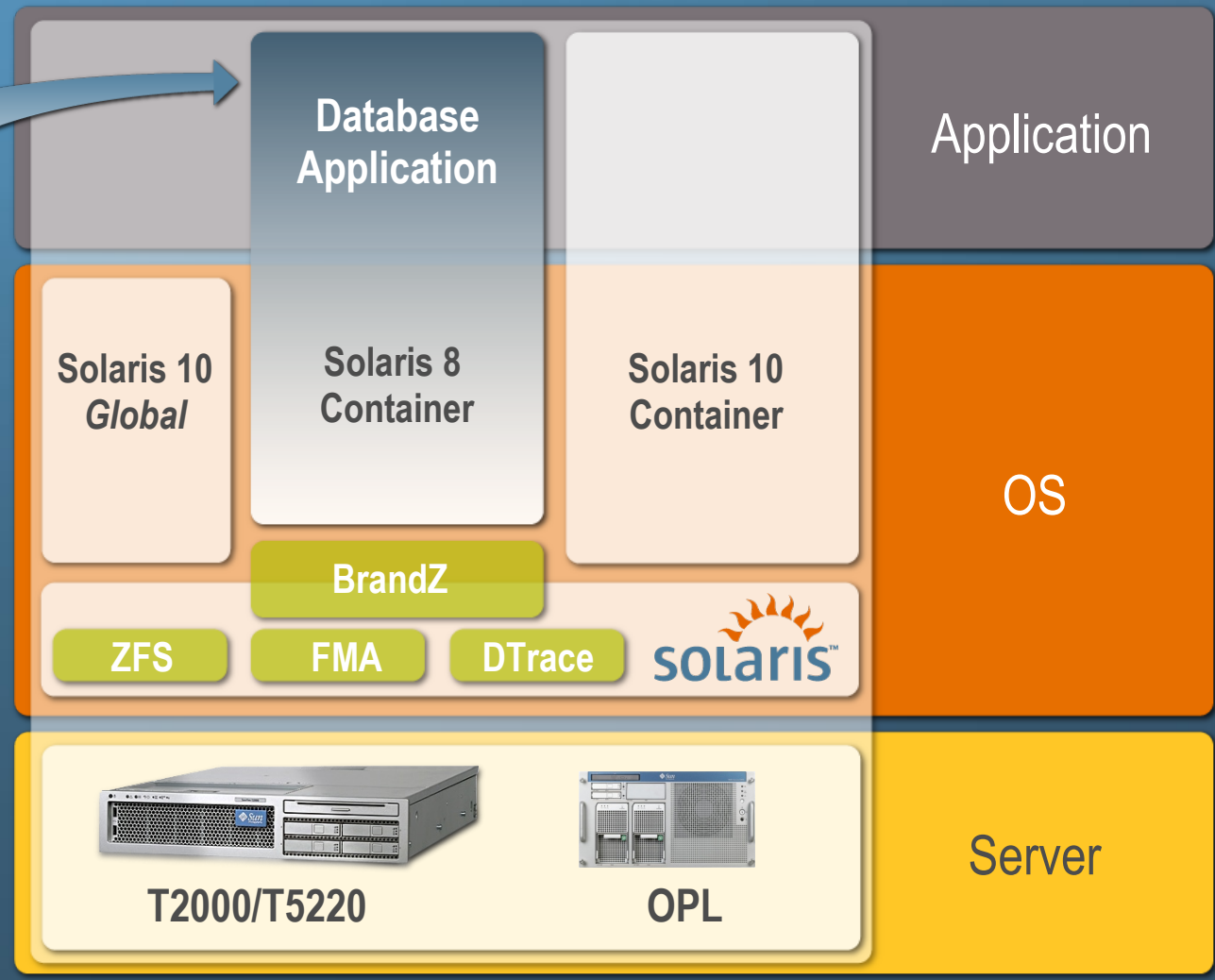
Prevent web page hijacking



Solve without the need for new software or modified applications

Migrate more easily ...

Physical to Virtual
(P2V) tools & services



Using Containers
to help customers
migrate to Solaris 10.

... and feel the benefits



Before: 4 E6500s

- 120 CPUs
- 4 Racks
- 14,000 Watts
- 48,000 BTUs
- OS support cost:
 - \$172,800 for Solaris 8



After: 1 M5000

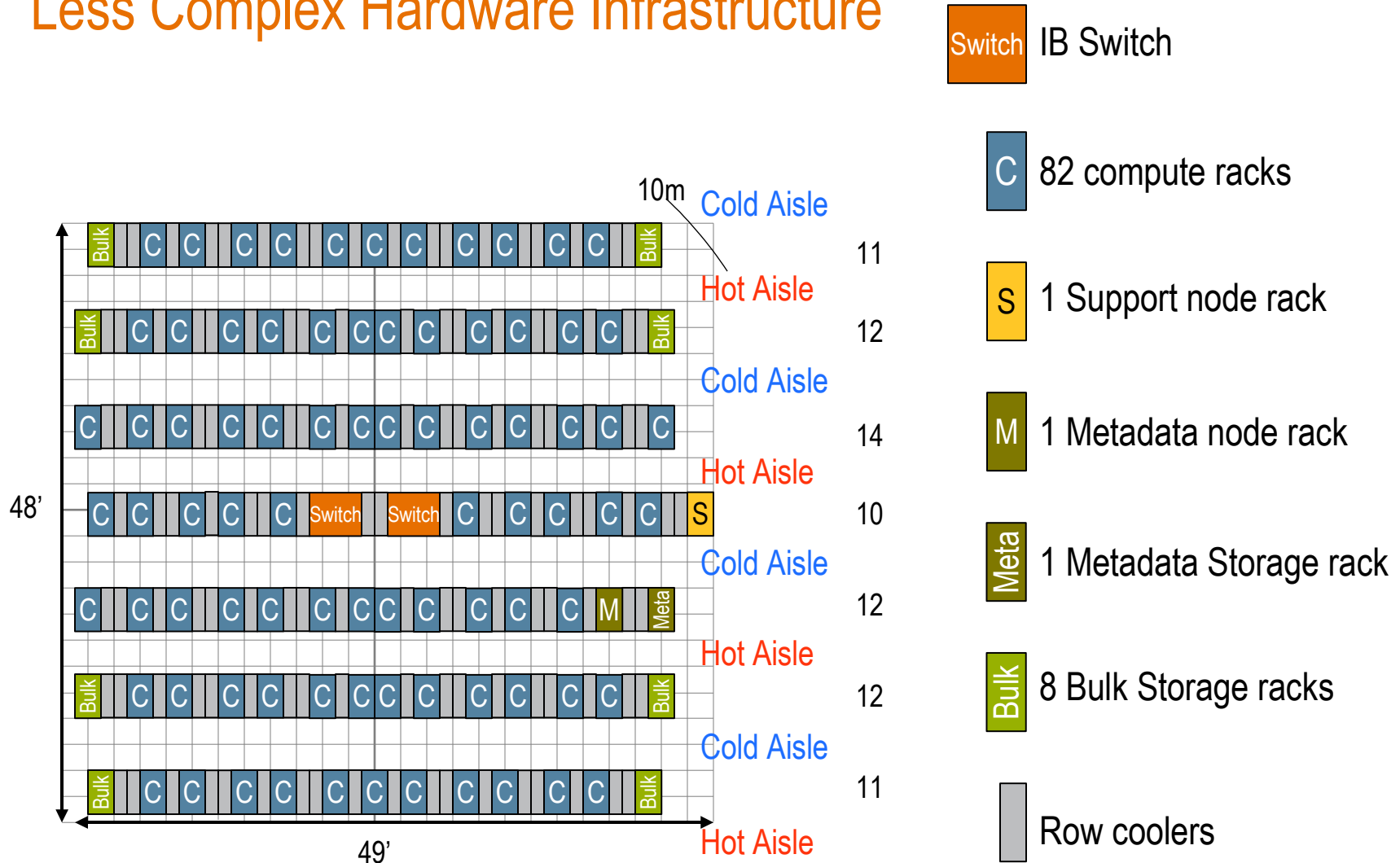
- 8 CPUs
- 10 Rack Units
- 4,590 Watts
- 15,661 BTUs
- OS support cost:
 - \$15,120 for Solaris 10 with S8MA

**Solaris 8 on
4 E6500s**

**4 Solaris 8 Containers on
M5000 with
Solaris 10**

Managing Simplicity

Less Complex Hardware Infrastructure



- Switch IB Switch
- C 82 compute racks
- S 1 Support node rack
- M 1 Metadata node rack
- Meta 1 Metadata Storage rack
- Bulk 8 Bulk Storage racks
- Row coolers



An option to Managing and Effectively use
an Enterprise Environment

Sun xVM

The Intersection of
Virtualization & Management

Out of the Box Infrastructure

Sun xVM Server

- Hypervisor family
- Consolidates Windows, Linux, and Solaris

Sun xVM Ops Center

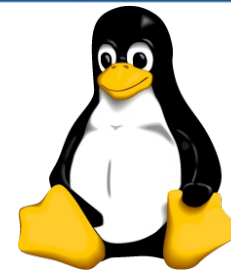
- Physical and virtual resource management
- Manage thousands of hardware and software entities

Complete Virtualization and Management Solution

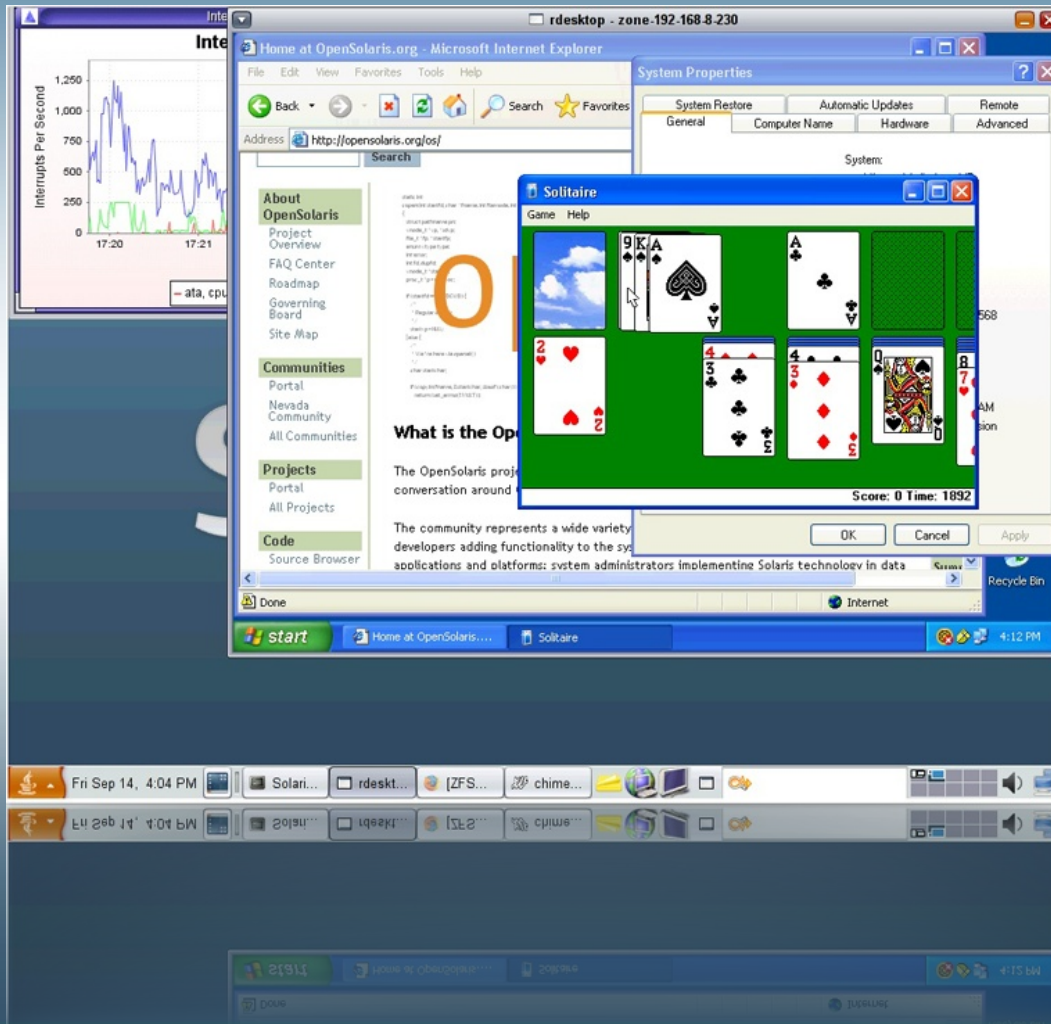
Heterogeneous environments

- Award-winning technology:
 - > ZFS data scale
 - > Self Healing FMA
 - > DTrace observability
 - > Project Crossbow network virtualization
- More than 11 million licensed Solaris downloads
- Xen and OpenSolaris communities

**Foundation for the
Dynamic Datacenter**

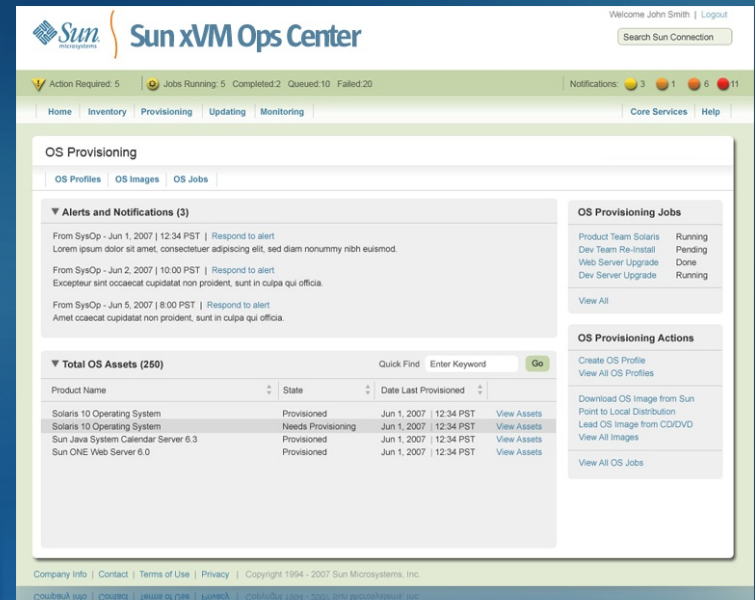


Solaris Hosting a Windows VM



Complete Management Achievable

- Manage physical and virtual datacenter
- Provision from firmware to hypervisor, operating system, and application
- Automatic patching
- Compliance reporting



The screenshot displays the Sun xVM Ops Center web interface. At the top, it shows the Sun Microsystems logo and the title "Sun xVM Ops Center". The user is logged in as "John Smith". A navigation bar includes links for Home, Inventory, Provisioning, Updating, and Monitoring. A status bar indicates "Action Required: 5", "Jobs Running: 5", "Completed: 2", "Queued: 10", and "Failed: 20". There are also notification icons for 3 alerts, 1 warning, 6 errors, and 11 critical issues.

The main content area is titled "OS Provisioning" and has tabs for "OS Profiles", "OS Images", and "OS Jobs". It features several sections:

- Alerts and Notifications (3):** Lists three alerts from SysOp dated June 1, 2007, with details and "Respond to alert" links.
- Total OS Assets (250):** A table with columns for Product Name, State, and Date Last Provisioned.

Product Name	State	Date Last Provisioned	
Solaris 10 Operating System	Provisioned	Jun 1, 2007 12:34 PST	View Assets
Solaris 10 Operating System	Needs Provisioning	Jun 1, 2007 12:34 PST	View Assets
Sun Java System Calendar Server 6.3	Provisioned	Jun 1, 2007 12:34 PST	View Assets
Sun ONE Web Server 6.0	Provisioned	Jun 1, 2007 12:34 PST	View Assets
- OS Provisioning Jobs:** A list of jobs including "Product Team Solaris" (Running), "Dev Team Re-install" (Pending), "Web Server Upgrade" (Done), and "Dev Server Upgrade" (Running).
- OS Provisioning Actions:** A list of actions such as "Create OS Profile", "View All OS Profiles", "Download OS Image from Sun", "Point to Local Distribution", "Lead OS Image from CD/DVD", and "View All Images".

At the bottom, there is a footer with "Company Info", "Contact", "Terms of Use", "Privacy", and "Copyright 1994 - 2007 Sun Microsystems, Inc." and a search bar.

Environments can benefit from tools

	Activity	Without xVM Ops Center	With xVM Ops Center
Deploy	Convert a server into a Web Server	Hours	15 minutes
Compare	Compare inventory for 100+ systems against baseline	Hours	Minutes
Validate	Obtain software and patches and validate PKG/RPM installation	Days	< 6 hours
Assess	Identify patches required for 100+ servers and impact on system	Hours	15 minutes
Rollback	Rollback security fix across 100+ servers	Hours	15 minutes
Patch	Apply a security fix to 100+ servers	1 day	20 minutes
Recover	Restore server with pre-disaster inventory of components after disaster	2 – 5 hours	15 – 30 minutes

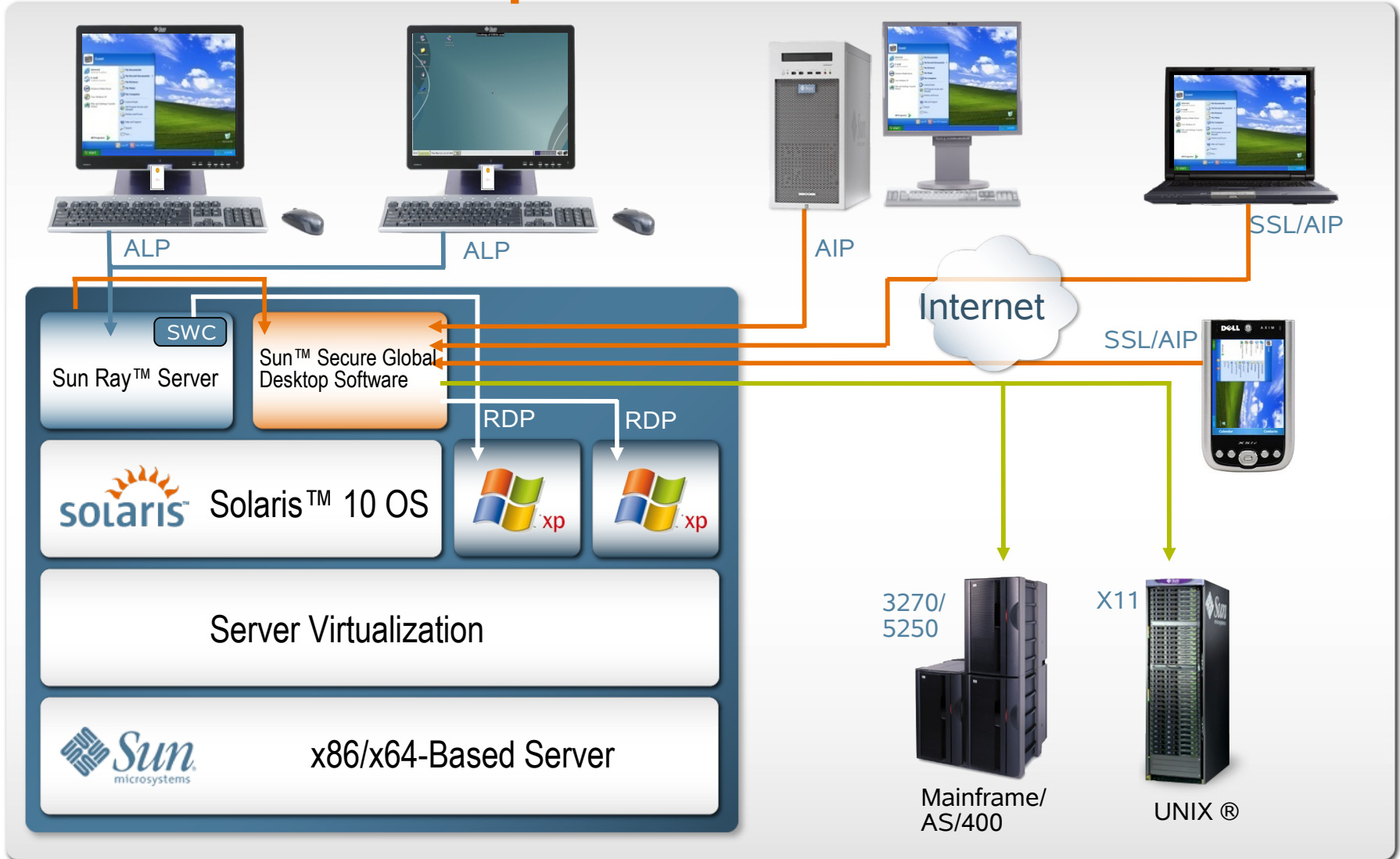
Sharing and interoperability

- Choice **and** flexibility
- No longer locked in to one solution
- Agreements in place to
 - > Ensure that Solaris runs as a guest on Redhat and Microsoft product
 - > Ensure that Redhat Linux and Microsoft Windows runs as guest on Solaris
- Working together

The Solaris logo features a stylized sun with orange rays above the word "solaris" in a blue, lowercase, sans-serif font.The Microsoft Windows logo consists of four colored panes (red, green, blue, yellow) arranged in a square, with the word "Microsoft" in a small font above the word "Windows" in a large, bold, black font.The Redhat logo features a stylized red hat with a white chin strap, set against a black circular background. Below the hat is the word "redhat." in a lowercase, black, sans-serif font.

Putting it Together

Sun Virtual Desktop Solution



Why Virtualize The Desktop?

1

Reduce Desktop Power Consumption

A centralized desktop model allows the use of low power consumption thin clients from Sun and other vendors.

2

Extend Desktop Device Lifecycle

Existing PCs can be used longer, resulting in less waste from discarded PCs. After their useful lives, PCs can easily be replaced with thin clients.

3

Increase Server Utilization

Use the same server hardware to host different shifts of desktop sessions

Virtual Desktop: Sample Use Cases



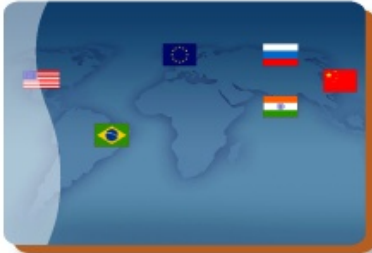
Disaster Recovery

Provide desktop continuity by redirecting user access to alternate desktop infrastructure, while helping to recover desktops and data in the main data center quickly and reliably.



Alternative Workspaces

Ensure alternative, remote access to complete desktop environments and resources.



Outsourcing/Offshoring

Secure corporate assets within your own data centers while providing controlled access to external workers.



Desktop Consolidation

Consolidate, standardize and centrally manage desktops distributed across the enterprise within corporate data centers.

Conclusion

- Virtualization is the enabler – not the goal
- The impact on the IT infrastructure is
 - > Consolidation (savings)
 - > Flexibility (new business models)
- Choices, there are many, make an informed selection
- This is about the whole stack
- Management is key

And remember

- Being a good citizen will save you money!



Thank You.

Duncan Hardie
Product Manager
Sun Microsystems, Inc.

