The Impact of Virtualization on Enterprise Infrastructure

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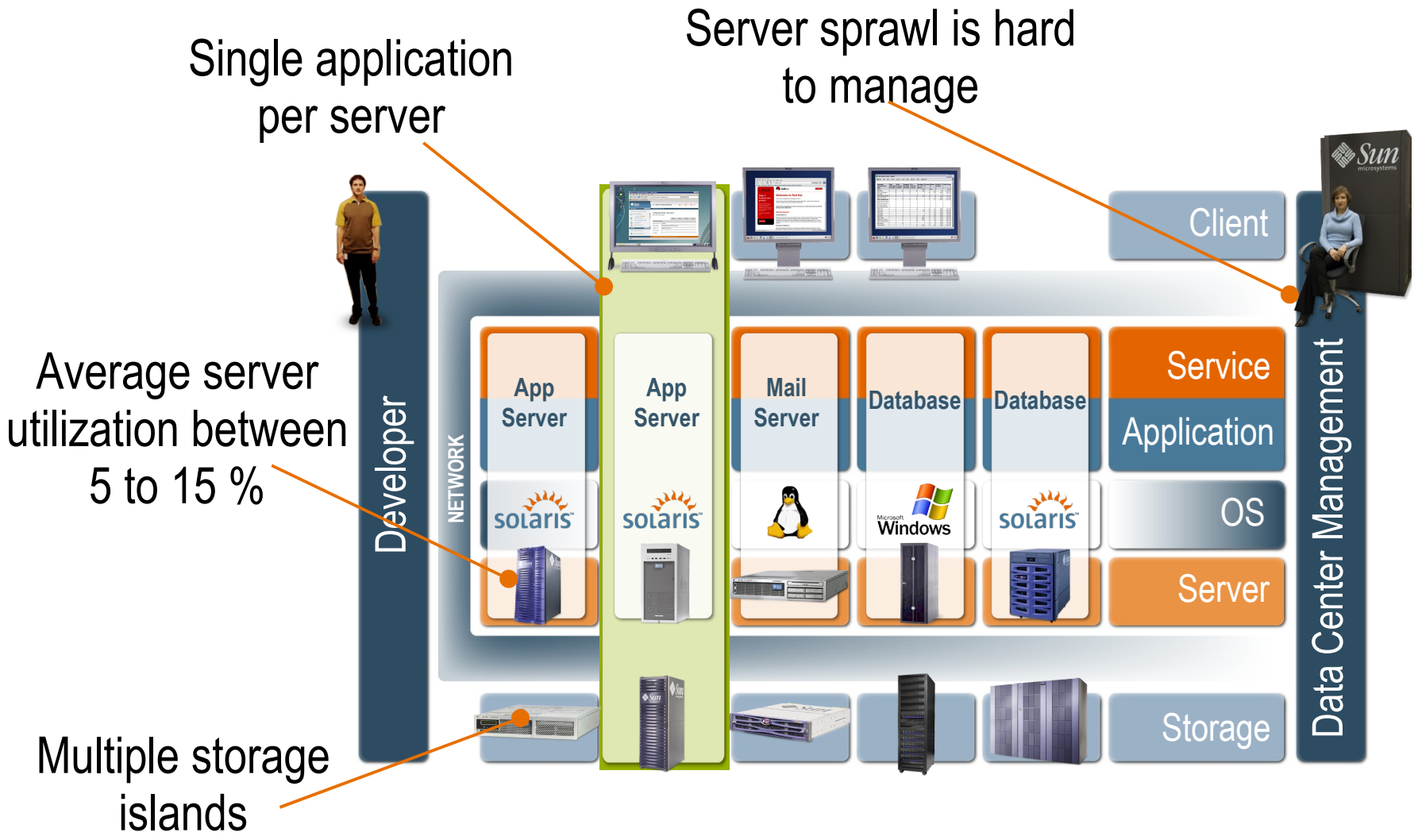
Agenda

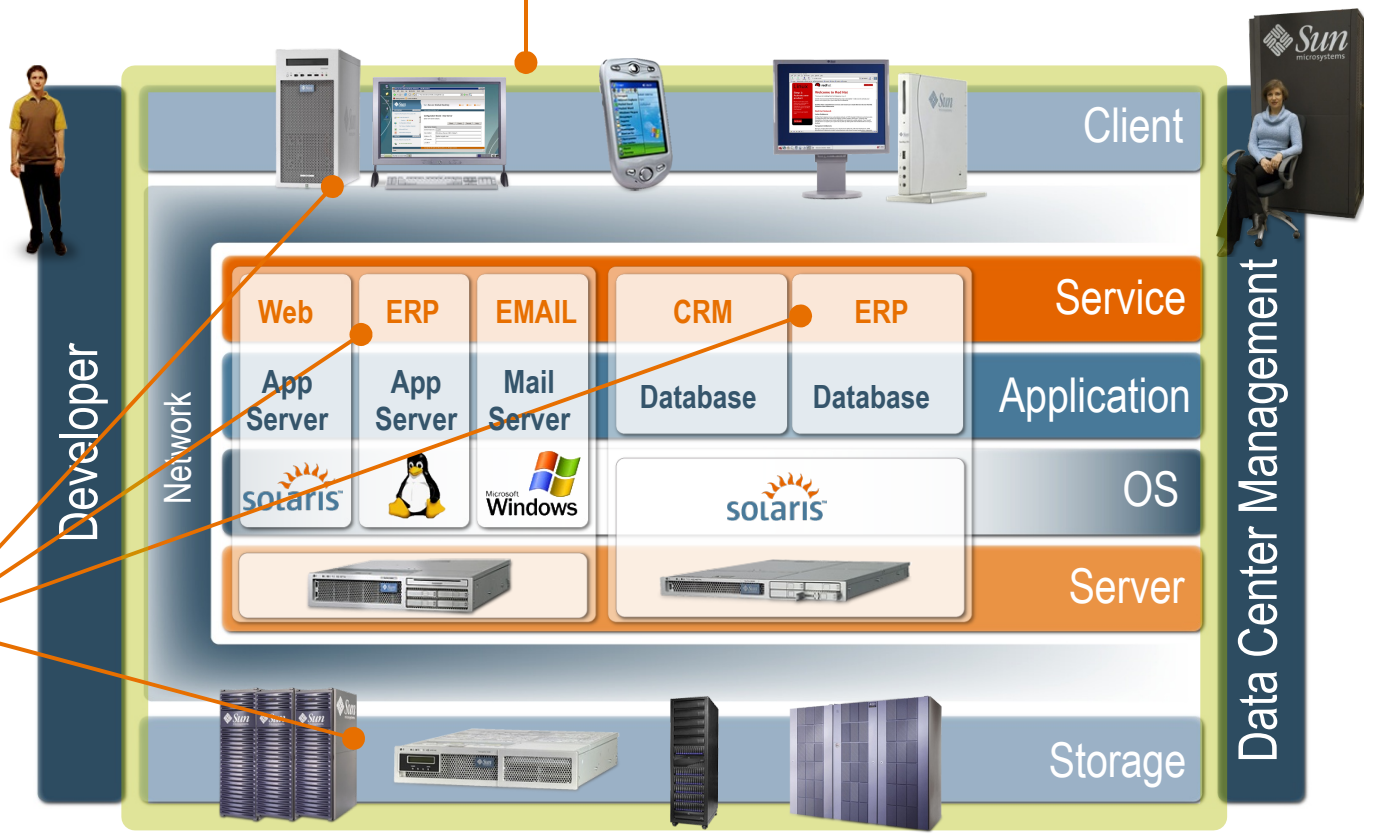
- Driven to Virtualize?
- Flexibility with Server Virtualization
- Managing Simplicity
- Putting it together

The Data Center Today



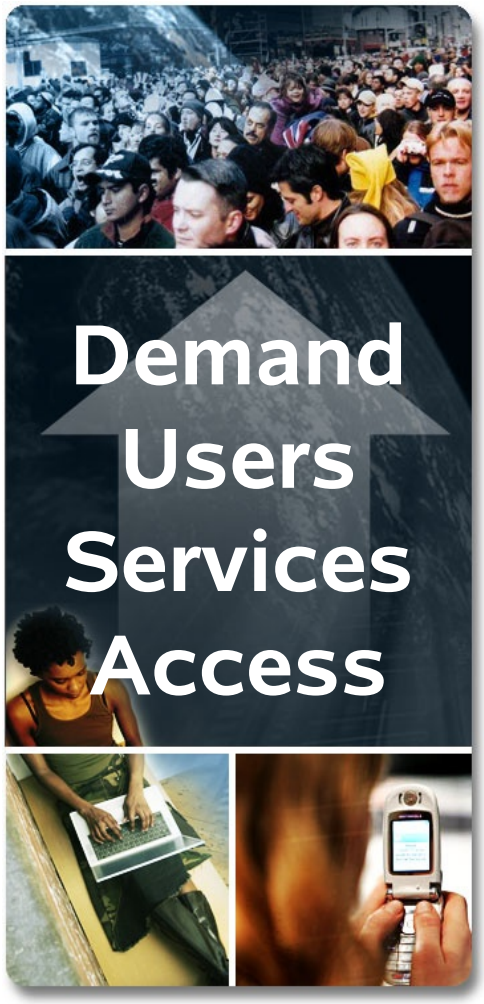
Virtualize Everywhere!

Phase 1: Maximize system resources across entire Data Center



Phase 2: Agility through encapsulation

Growing Demand, Shrinking Resources



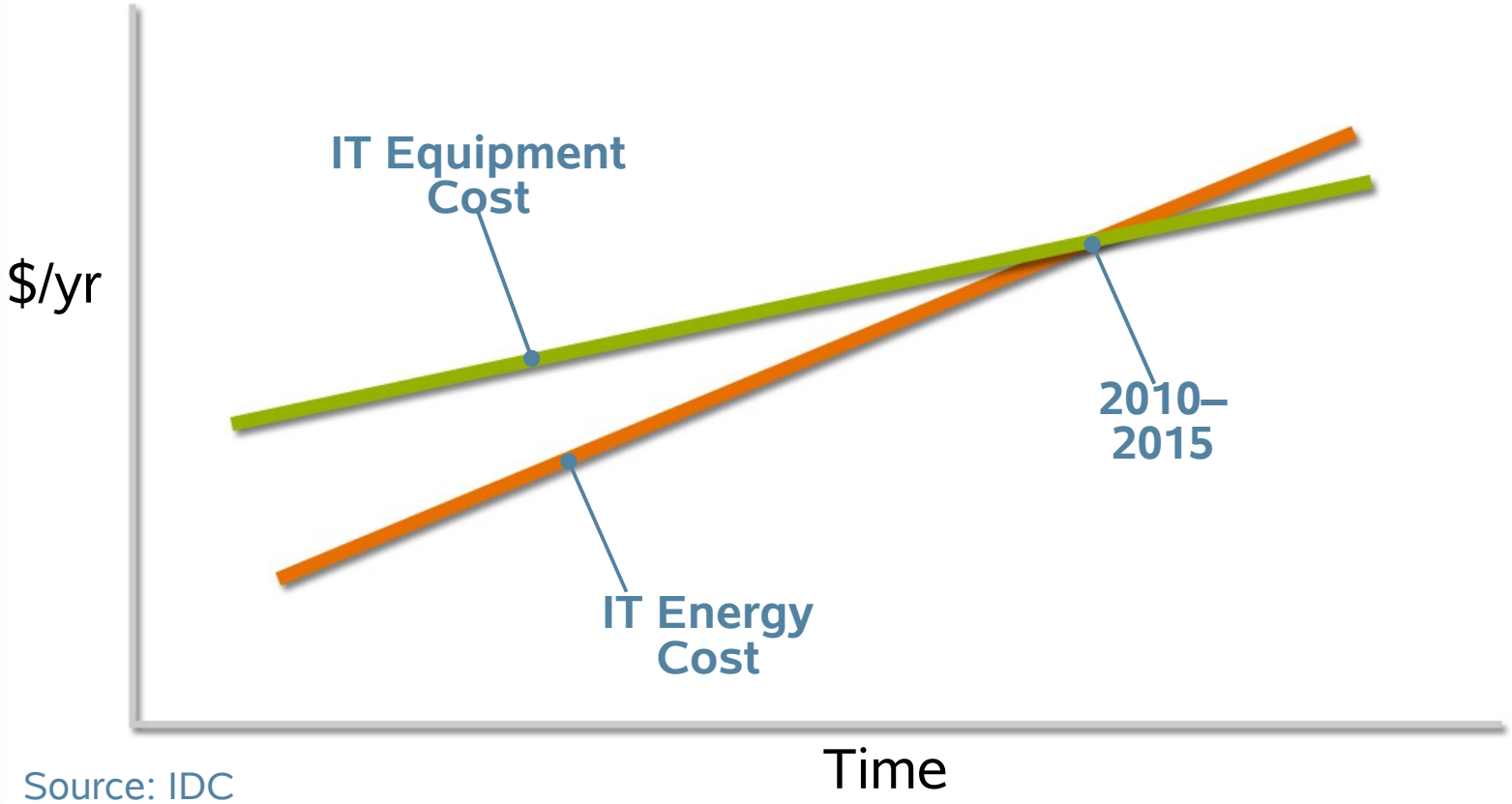
"By 2008, 50 percent of current data centers will have insufficient power and cooling capacity to meet the demands of high-density equipment"* **--Gartner**

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

*Source:
http://www.gartner.com/it/page.jsp?id=499090

Economic Impact

Increasing Power Density is Shifting the Balance of Cost



Source: IDC

Increasing Difficulty Keeping Greenhouse Gas Emission Commitments

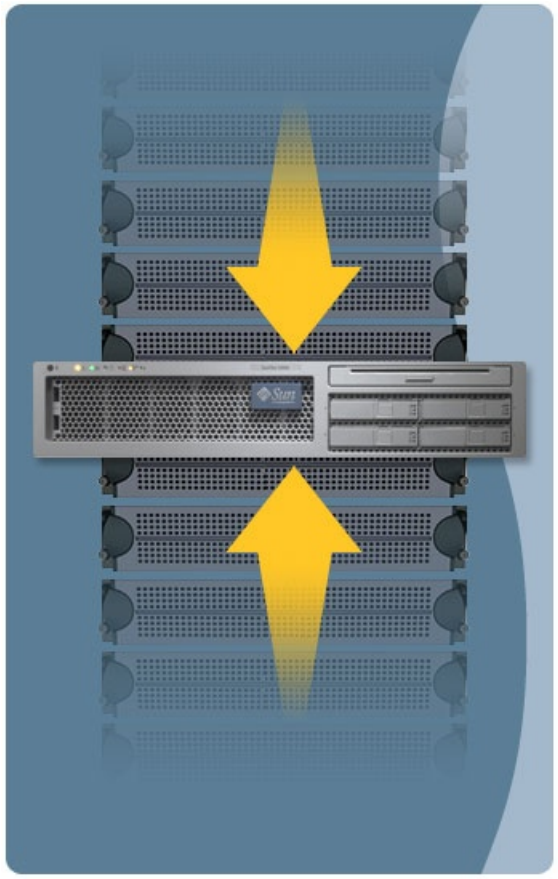
- GHG Emissions Increased 70% from 1970 to 2004
- Energy Supply Sector Rose the Sharpest (145%)

Source: http://www.ipcc.ch/SPM040507.pdf

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

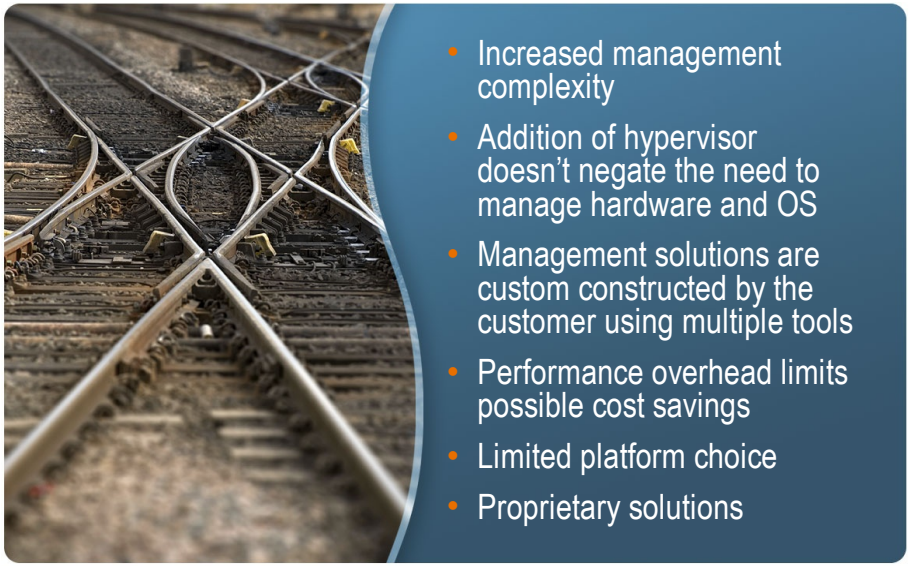
DigiTar™



Virtualization: Opportunities & Risks

The Power of Virtualization

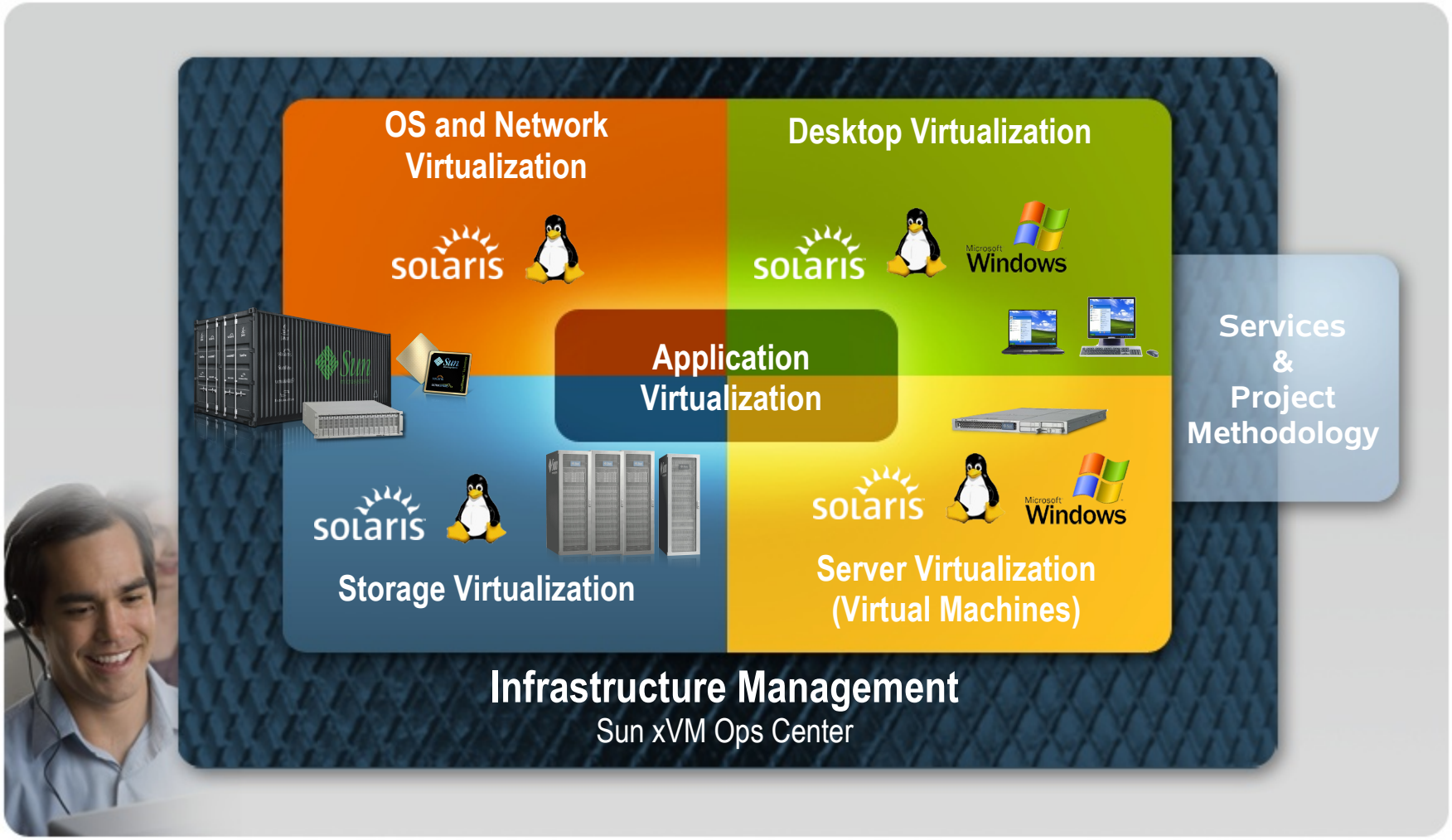
Virtualization Pitfalls



- Increased management complexity
- Addition of hypervisor doesn't negate the need to manage hardware and OS
- Management solutions are custom constructed by the customer using multiple tools
- Performance overhead limits possible cost savings
- Limited platform choice
- Proprietary solutions

Defining Infrastructure

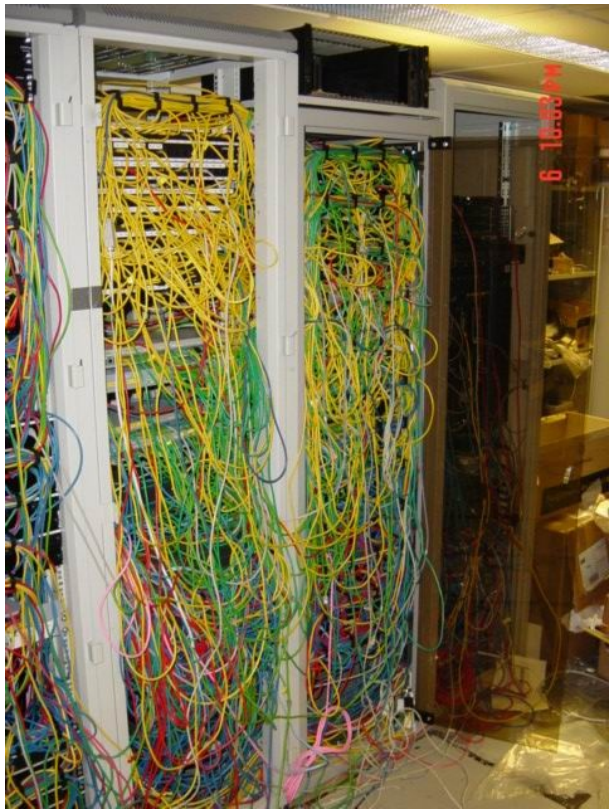
Innovations and features across the stack



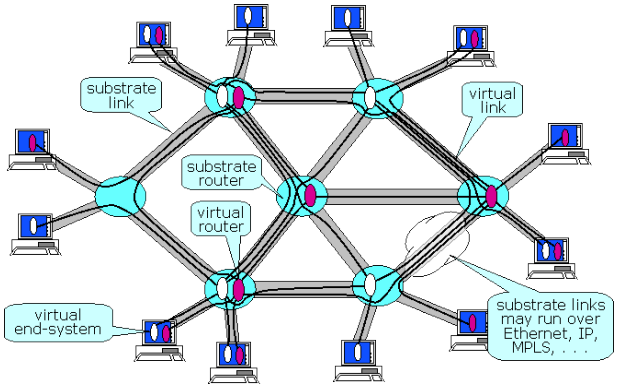
Storage Virtualization

- 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

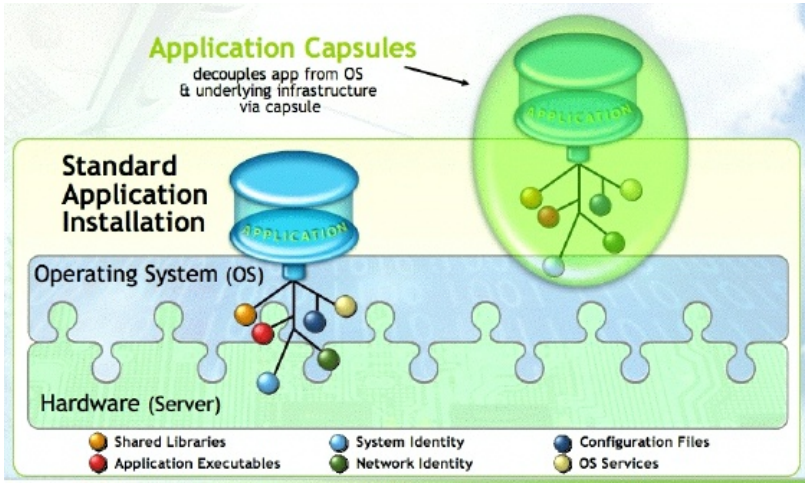


- Defining 'paths' in your network
- Benefits
  - > Less physical complexity
  - > More flexible
- Management efford same or more
- Examples:
  - > CISCO VLANs
  - > Our VPN



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..."

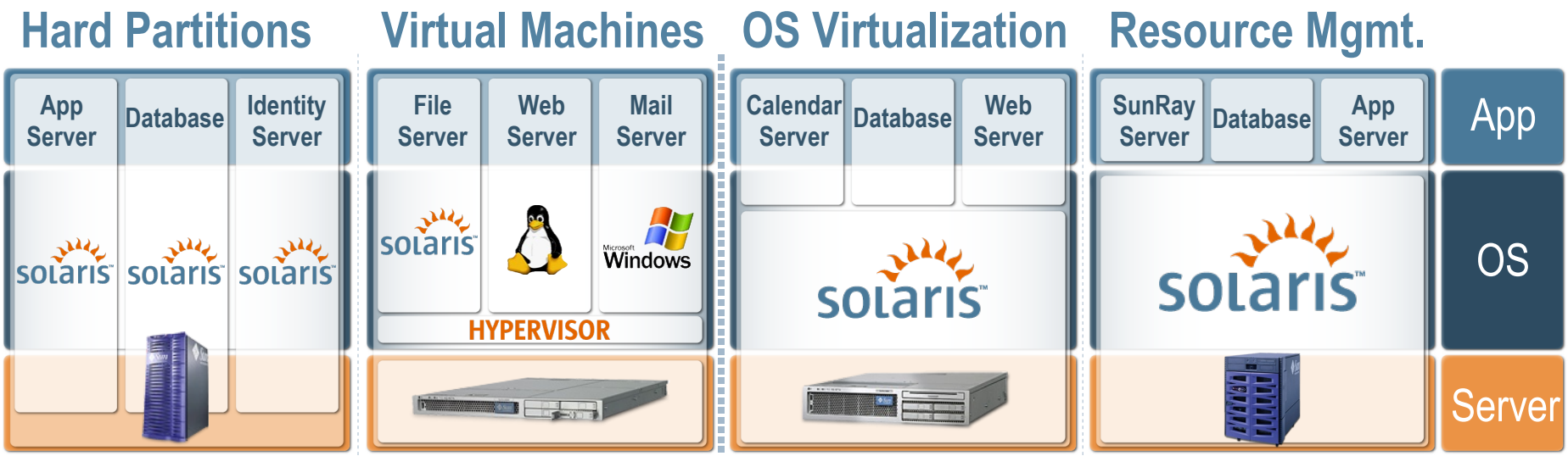
Bank of America

Don Obert, CTO

FOTOLOG™

Warren Habib, CTO

Selecting Solutions (Server V12N)



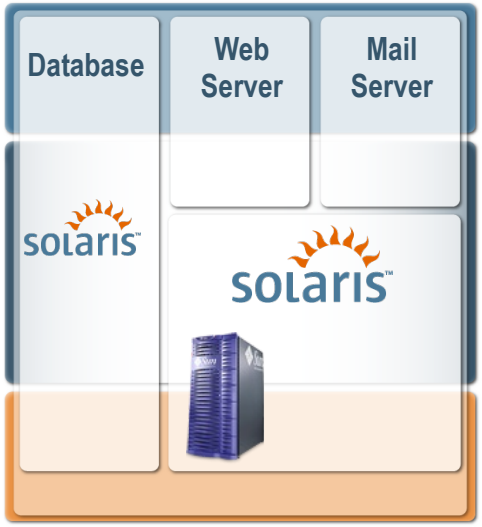
Multiple OSes ← → Single OS

Trend to flexibility ← → Trend to isolation

Dynamic System Domains	Logical Domains xVM VMware Microsoft HyperV	Solaris Containers (Zones + SRM) Solaris Trusted Extensions Solaris Containers for Linux Applications Solaris 8 Migration Assistant	Solaris Resource Manager (SRM)

Hybrid Solutions

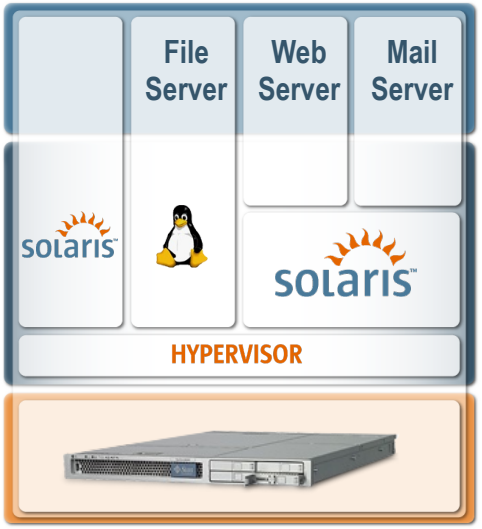
Hard Partitions & OS Virtualization



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

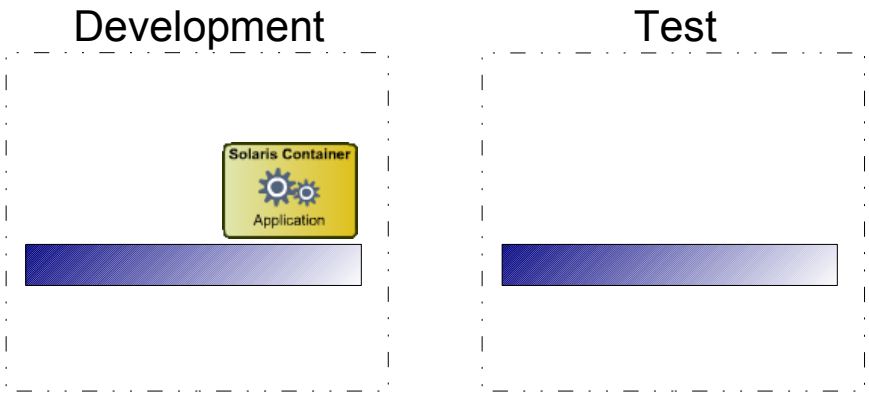


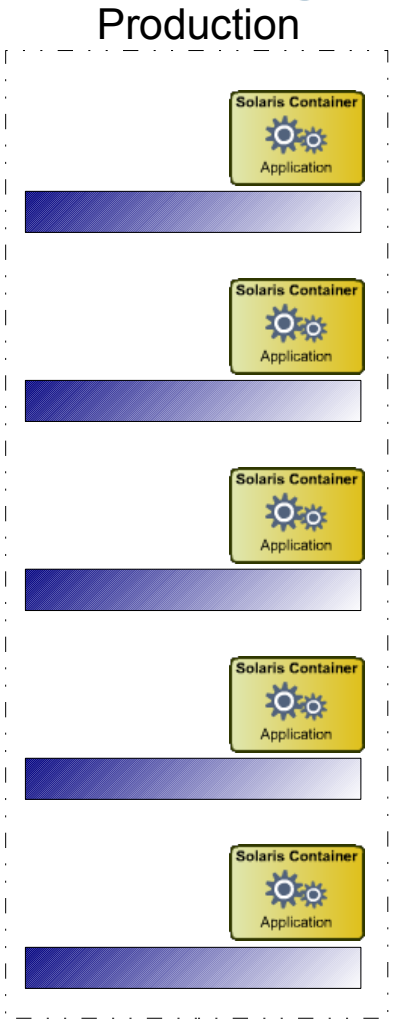
LDoms/xVM/VMware/MSVS with Solaris Containers

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

Business Impact: Rapid deployment

Using Solaris Containers





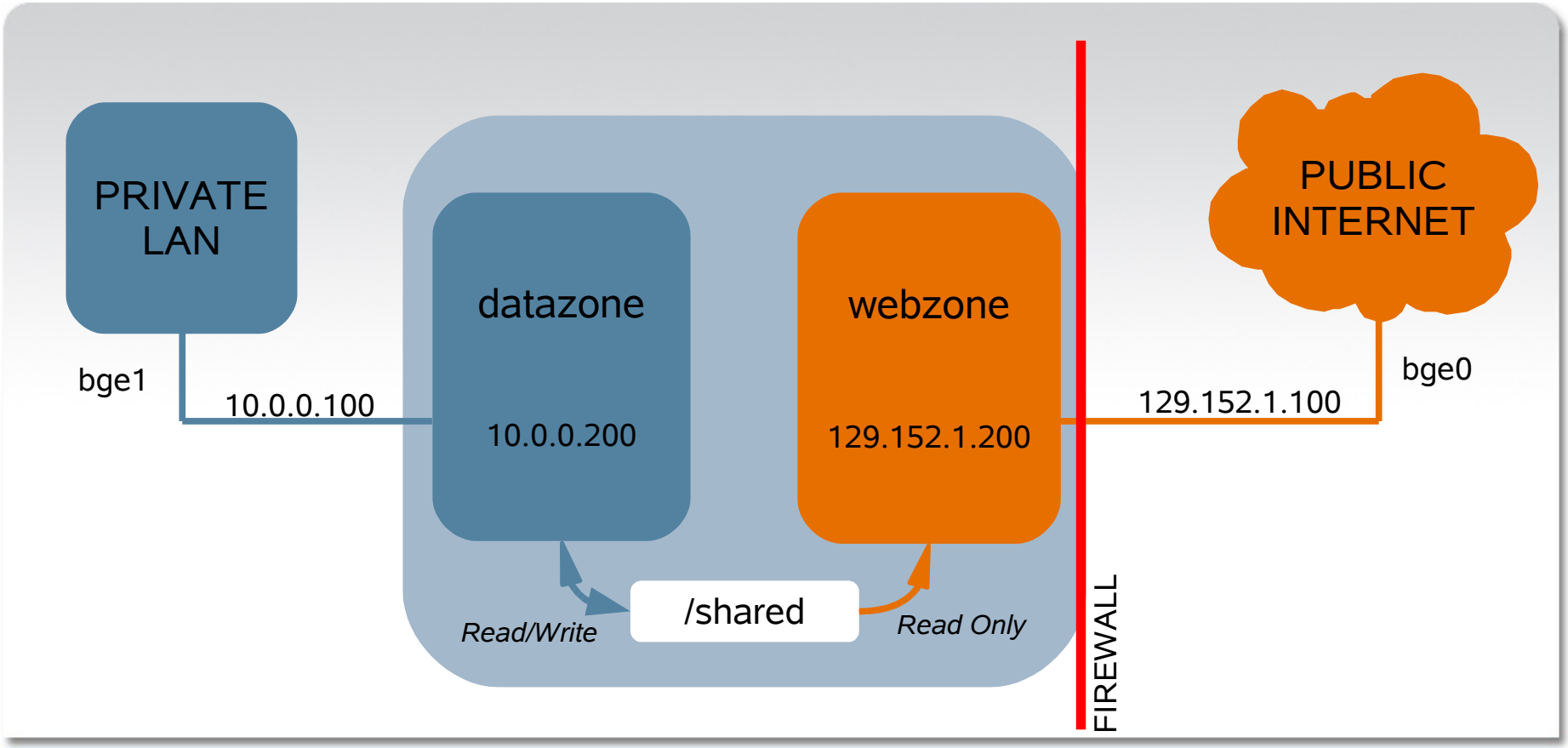
Development
1. Create and develop app
2. Shutdown
3. Move to Test

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

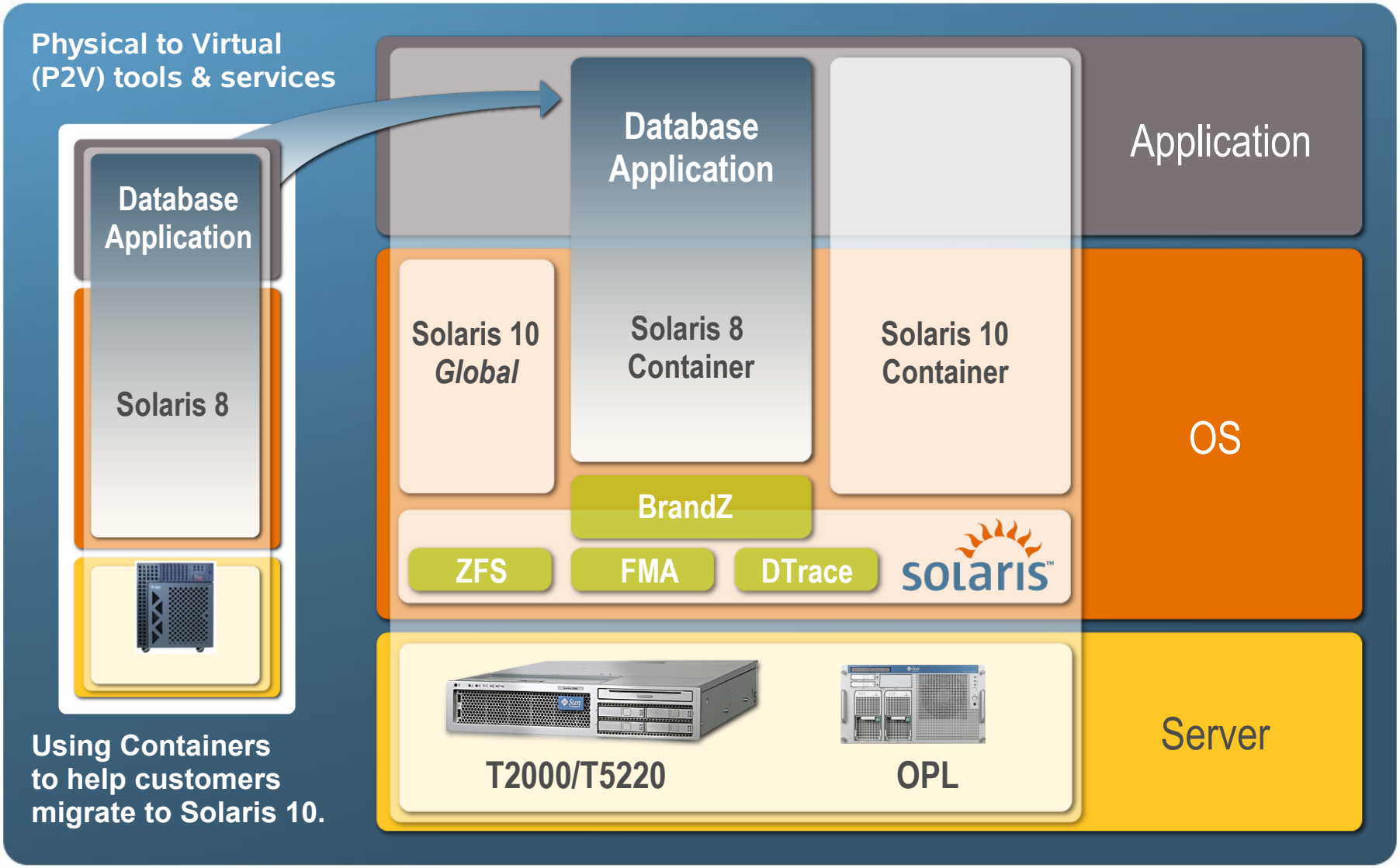
Regression?
13. Shutdown new
14. Start old

Prevent web page hijacking



Solve without the need for new software or modified applications

Migrate more easily ...



... 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

Solaris 8 on 4 E6500s

After: 1 M5000

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

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

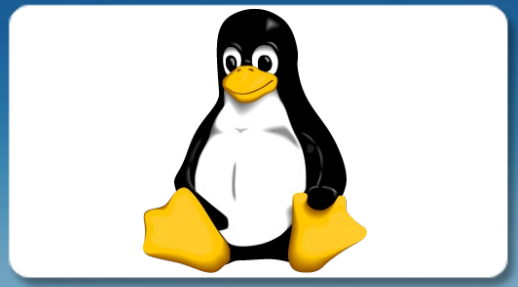
- Physical and virtual resource management
- Manage thousands of hardware and software entities

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

Environments can benefit from tools

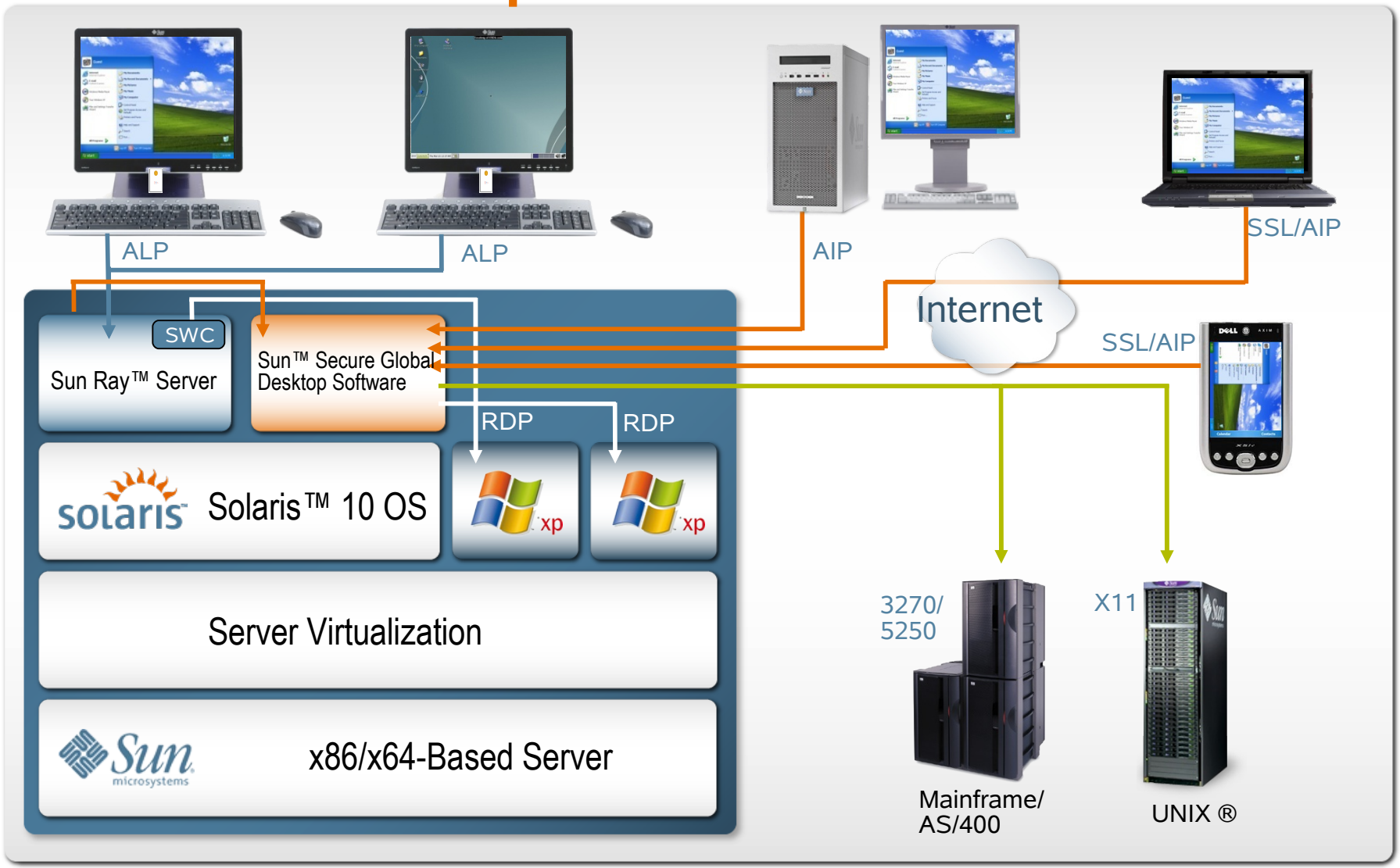
	Activity	Without xVM Ops Center	With xVM Ops Center
Deploy	Convert a server into a Web Server	Hours	15 minutes
Compare	Compare inventory for 100+ systems against baseline	Hours	Minutes
Validate	Obtain software and patches and validate PKG/RPM installation	Days	< 6 hours
Assess	Identify patches required 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

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
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Sun Microsystems, Inc.