

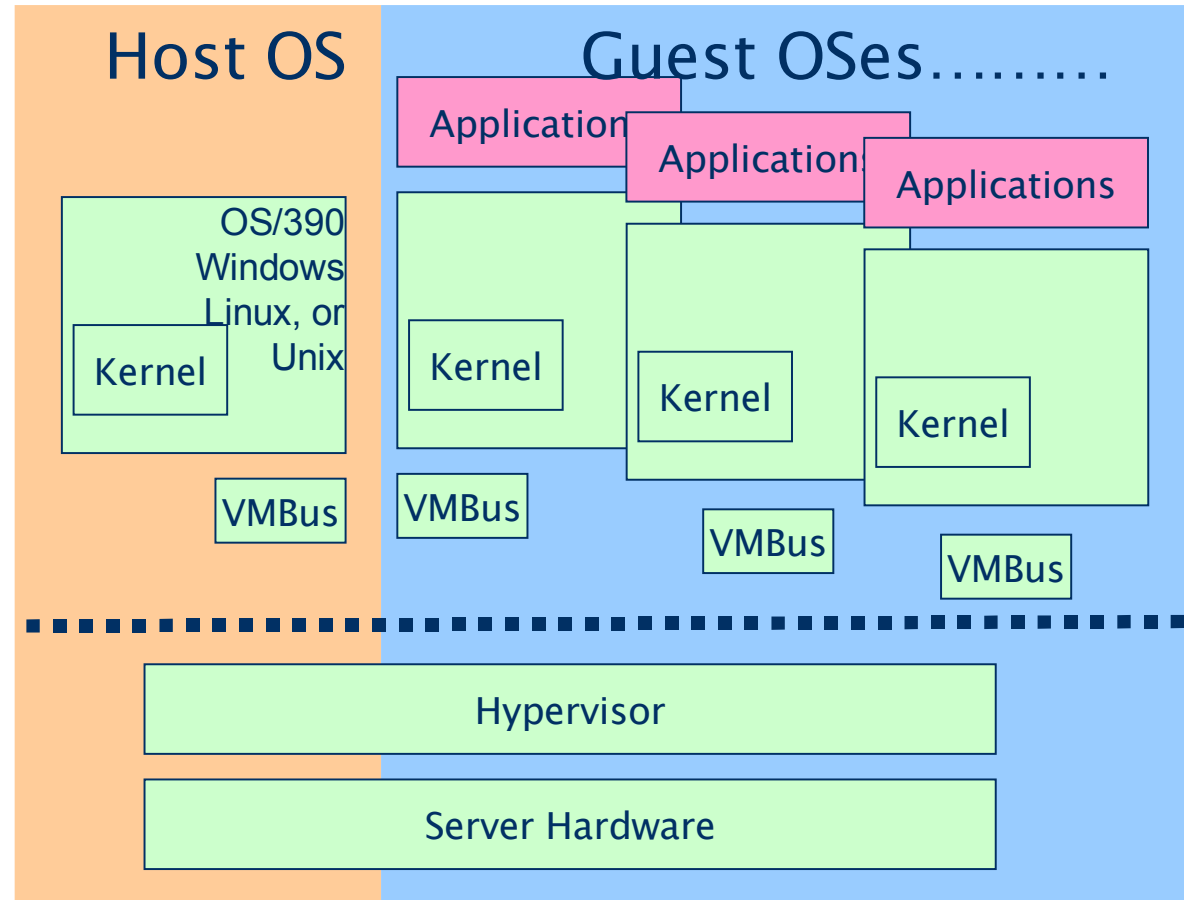
The Business and Technical Drivers of Virtualization

Martin Hingley, Chief Research Officer

- Definitions and History
- Trends in Server Sales
- IT Management Challenges
- The Business Advantages
- Technical Futures

A Definition of Server Virtualization

Where a single, larger server is partitioned into two or more physical or logical servers. The outcome is that a single server appears to be multiple servers, capable of running multiple operating system instances and/or applications in isolation on dedicated hardware resources.



Server Virtualization 3.0 – We've Been Here Before!

1. Mainframe Virtualization (V1)

- IBM CP/CMS in 1972
- Open Source until mid-1980s
- z/VM allows multiple Linux iterations on S/390 hardware
- Mainframes also allow single system image through synchronization

2. Unix Virtualization (V2)

- Unix servers sought to compete with Mainframes
- Continuous development of workload management, static and dynamic partitioning and systems management tools from IBM, HP and Sun
- Recent developments include Logical Domains (LDOMs) for Sun's Niagara processors supported by Solaris 10

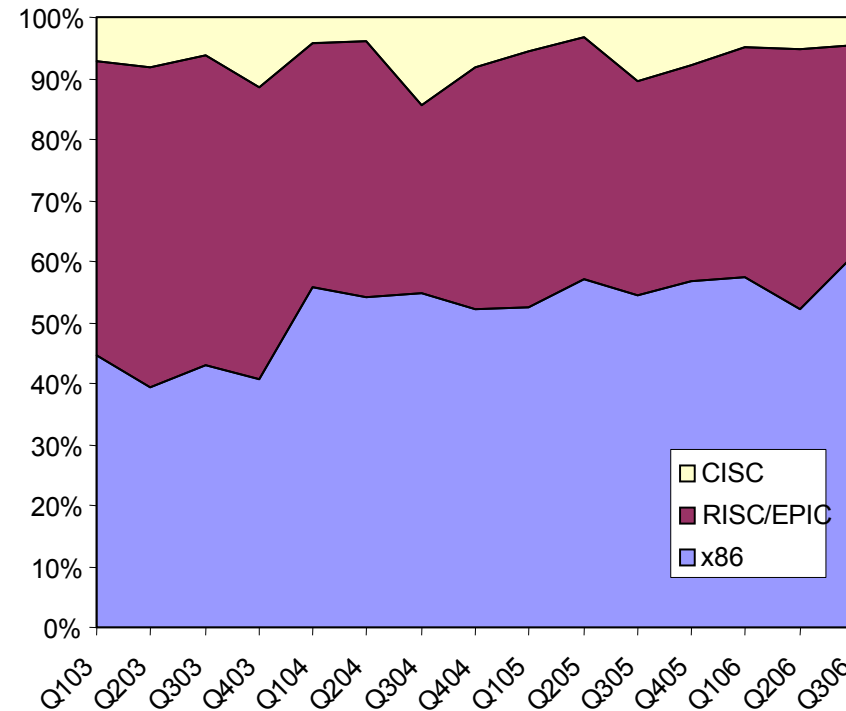
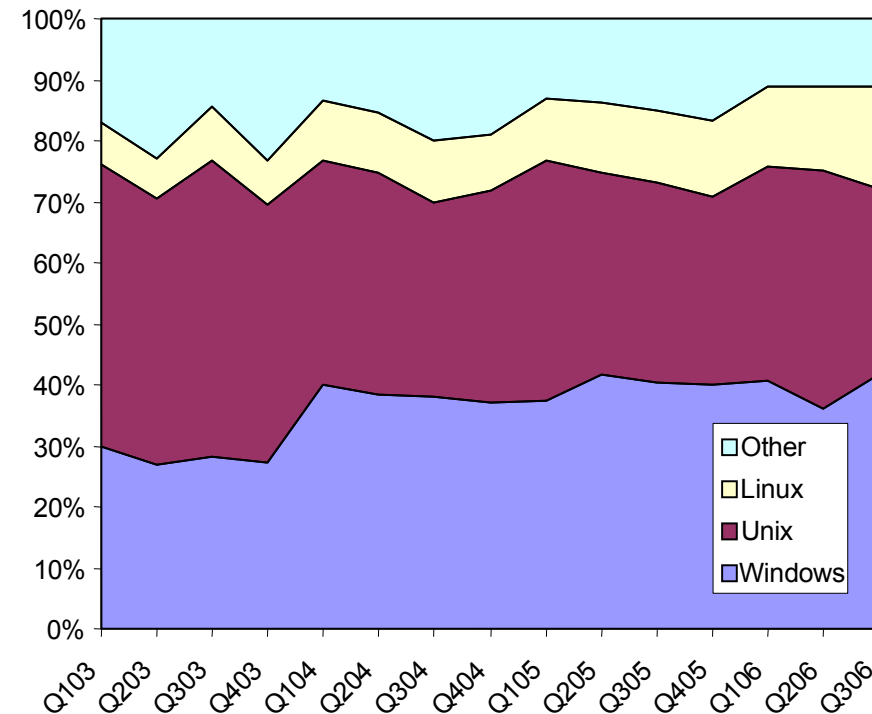
3. x86 Virtualization (V3)

- VMWare leads in offering server virtualization
- Microsoft and Linux (Xen) plan big
- Intel and AMD add virtualization instructions to latest 64-bit Multi-Core processors

All Server Purchases in Holland by Operating System and CPU Type 2003-2006 – User Spending

Server Sales by Operating System

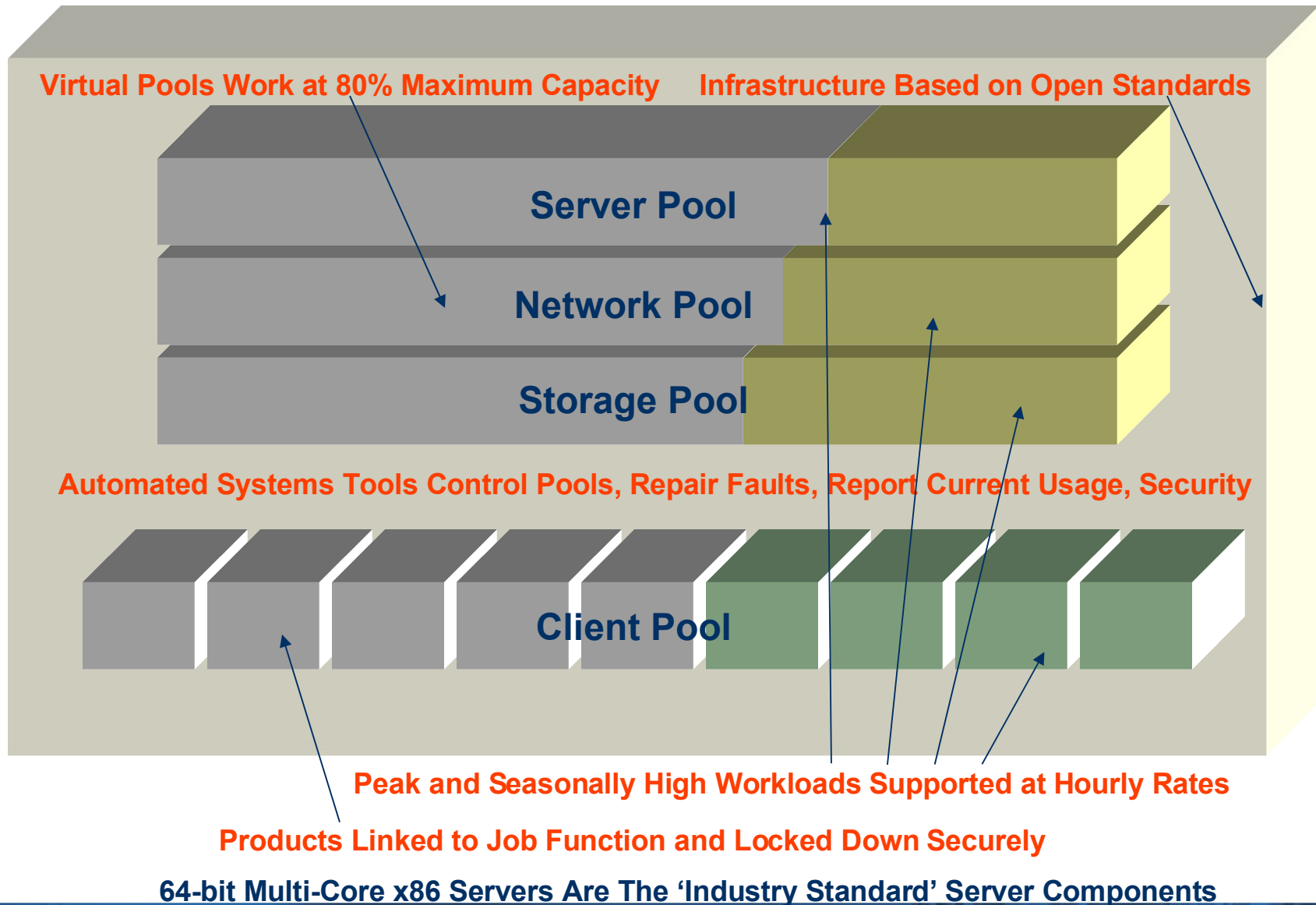
- X86 Grows
- CISC Declines
- RISC/EPIC Holds Steady



- Windows and Linux Grow
- Unix and Other OS Decline

Server Sales by CPU Type

Pooled Resources Within Dynamic IT



Virtualization is Not Just Servers

•Storage Pool

- Networked Storage (SAN and NAS) is Virtual Storage
- Separating Physical and Virtual Can Help Overcome Asset Value and Information Retention Challenges

•Network Pool

- Virtual Networking is Least Advanced Hardware Area

•Client Pool

- PCs Have Very Low Utilization Rates (Often Less Than 5%)
- Thin Clients Offer Superior Security (Physical and Anti-Intrusion)
- PC Blade Developments Sometimes Hidden by Volume Desktop PC Suppliers
- Dynamic Image Provisioning Relatively New

•Systems Management

- Autonomic Tools Required to Help Manage Virtual (as Well as Physical) Resources

•Applications

- Full Virtualization Will Allow Service Oriented Architecture, Software as a Services and Tighter SLAs

Typical On-Going IT Management Challenges

- Departments Have Handed Over Multiple 'One Application Per System' Machines
- Utilization in x86 Servers is Only Around 15%
- Infrastructure Management is Manual and Expensive – 70% of Resources Spent on Keeping Things from Falling Over
- Systems Management Software Has Usually Been Proprietary and not Inclusive of all Devices (and Typically not Multi-Vendor)
- Servers, PCs, Storage, Networking, Comms, Software, Services Are All Managed Differently and Independently
- IT Skills Shortages Grow in Many Disciplines
- Business (CFO, LOB, CEO) Increasingly Demand Service Level Agreements and Flexible IT Costs

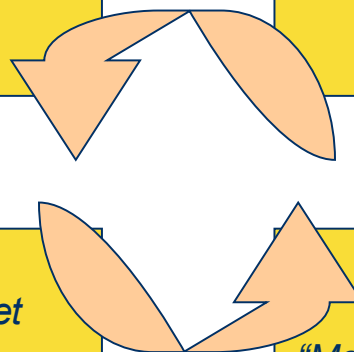
Customers Have Trouble Handling the Proliferation of Servers and Applications

*"We are trying to stem the tide of growth... but it's not happening. It's the old rule of thumb here -one application, one server."
-(Insurance)*

"Every time we get a new application it seems like we have a new server. It's just got to stop." (Manufacturing)

"Yes, consolidation absolutely met our financial objectives. The thing now is to maintain that. It's very difficult. Once you consolidate it becomes difficult to stay lean..." (Telco)

"Most suppliers have proprietary products and their products don't integrate as well as we would like them to integrate with other technologies. That would be my number one thing." (IT Services)



The Potential Business Advantages of Virtualization

- **Reduce Costs** - Reduce On-Going Server Costs, Reduce Upfront Server Costs, Reduce Power Consumption and Heat, Reduce (or Redeploy) IT Staff
- **Add Business Continuity** - Improve Software Life Cycle Management and Back-Up/Disaster Recovery Processes
- **Better Software Support** - Reduce Software Licensing costs, Improve Legacy applications support
- **Become More Responsive to Business** - Improve Server Utilization, Provide More Proactive Support, Adapt to Workload Change, Improve Availability
- **IT Consolidation** - Reduce the Number of Servers, Reduce Server Sprawl, Simplify IT Management, Consolidate Applications

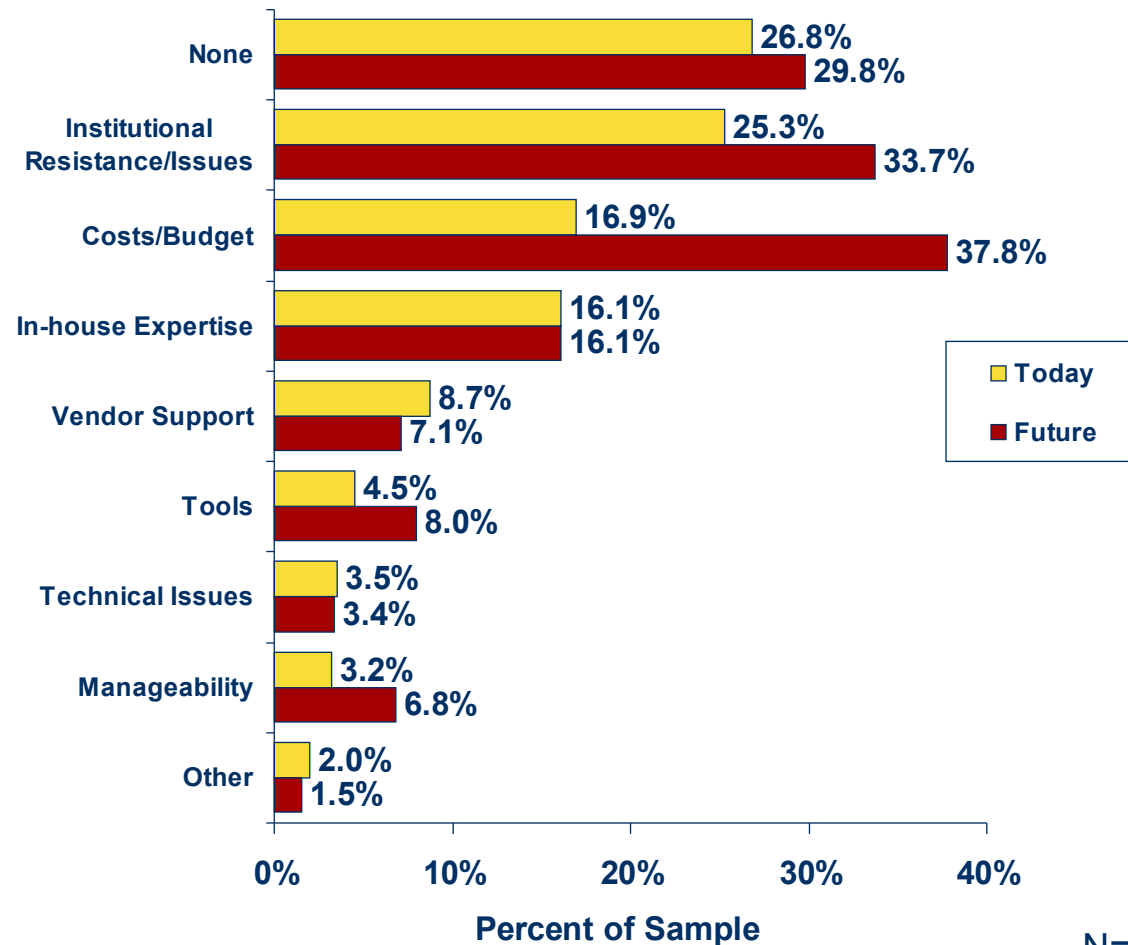
Cost and Institutional Issues Are Set to Become Main Hurdles to Virtual Server Implementation

More than one-quarter of the sample believe there were no major hurdles in implementing server virtualization

Among those that did list hurdles, institutional resistance (25%), costs (17%), and lack of technical expertise (16%) are the top of mind hurdles

Users Expect Cost and Institutional Issues to Become Bigger Hurdles to Adopting Virtual Servers in the Future

Virtual Machine Hurdles

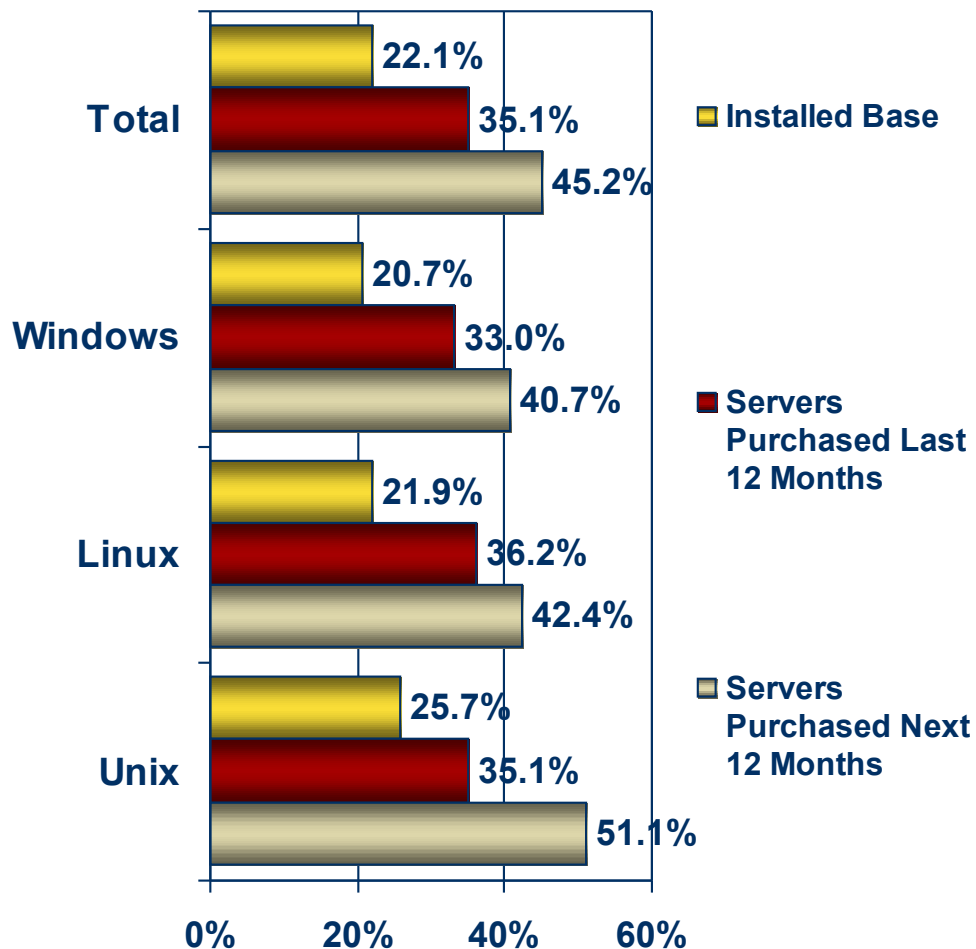


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Users Plan to Increase the Percentage of Virtualized to Non-Virtualized Servers

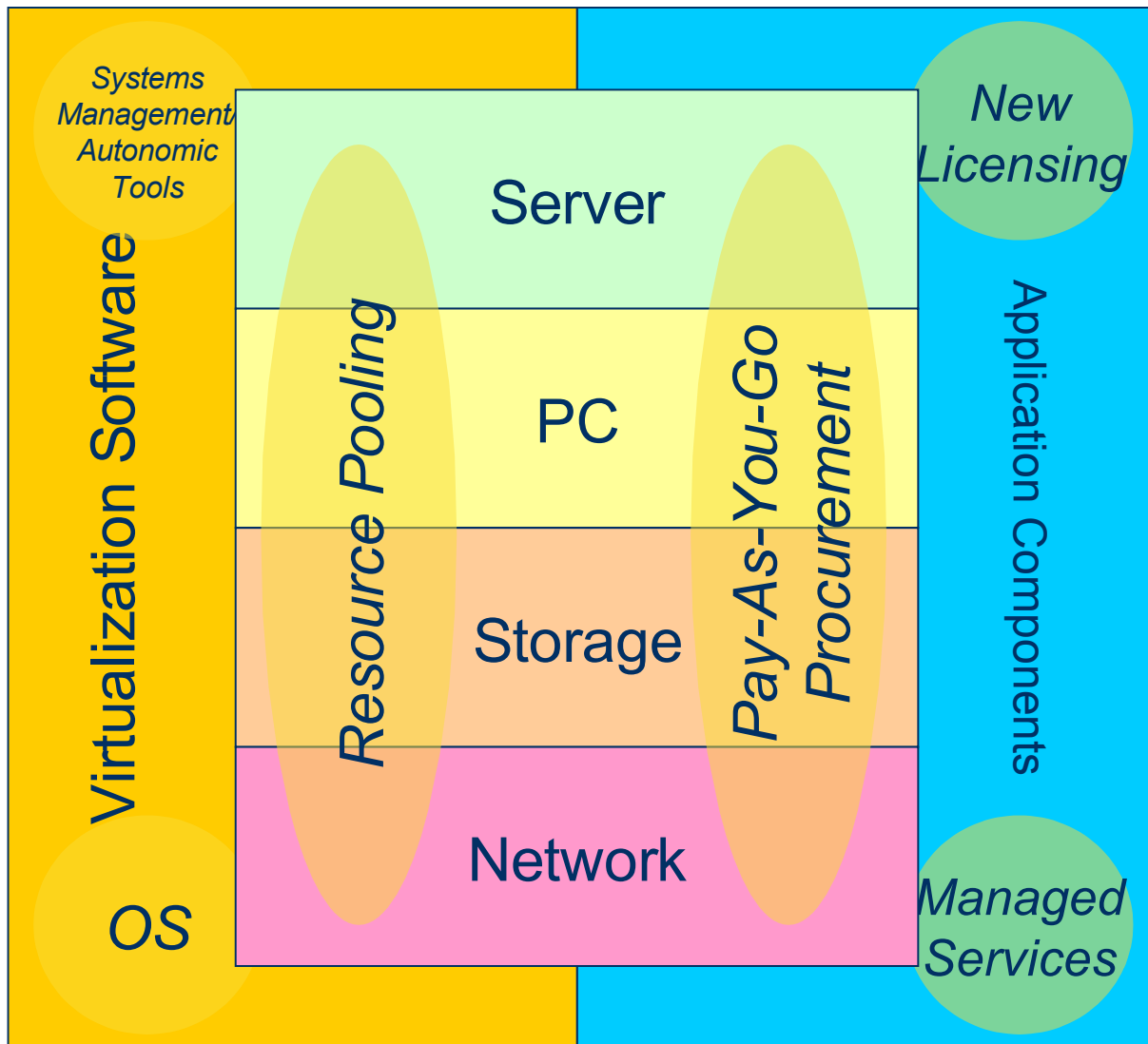
- More than half of all virtualized servers are in 'production' systems
- Business processing, database and decision support are key workloads
- Users Want More 'Ease of Use' and Better Management Tools
- A Lack of ISVs Support is a Major Concern
- Users See the Use of Virtual Machines as a Cost Containment Measure

The Proportion of Servers Virtualized



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A Mapping for Standardized 'Virtual' Infrastructure and Associated Services



Virtual Servers are One Component of a 'Virtual' Infrastructure, Which Will Spread to Storage, PCs and Network I/O

Tied Together with Virtualized Software (OS and Systems Management Tools) this Will be the Platform for SOA and SaaS

The Technical and Organizational Consequences of Virtualization

- Server Virtualization 3.0 is about Industry Standard (x86 Multi-Core) Processors
- Virtualization is also about Storage, Networks, Clients, Applications
- Linux Xen, Microsoft and (Even) VMWare Have Less Experience of Virtualization than Mainframe and Unix Vendors
- IT Managers Have Cut Costs Through Centralization and IT Consolidation – Virtualization is about Increasing Efficiency and Service Levels
- The Adoption of Virtualized Applications (SOA, SaaS) is Dependent on Changes in Major Software Company Pricing and Licensing Models
- IDC Expects Some Organizational Resistance by Departments Deciding to Retain their Own Resources
- IT Managers Who Succeed in Implementing Working Virtualization in Production Systems Will Do Well in their Careers
- However, IDC Expects Eventually the Issues of Virtualization Will be Replaced by those of Systems Management



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