Key Trends in Enterprise Networks

Lee Doyle

Group Vice President

Network Infrastructure
IDC

Agenda

- **Networking on demand**
- **Data center networking requirements**
- **LAN switching: speed, intelligence and power**
- **Wi-Fi in the enterprise**
- **Adoption of VoIP**
- **Essential guidance**

Networking on Demand

Network must be transparently accessed by all applications.

- **Anytime, anywhere access**
- **Advent of grid and cluster computing**
- **Improved network reliability**
- **Support for a wide range on non-PC devices (e.g., RFID)**
- **Simplified provisioning and lower management (e.g., labor) costs**

"This is a process, not an end state"

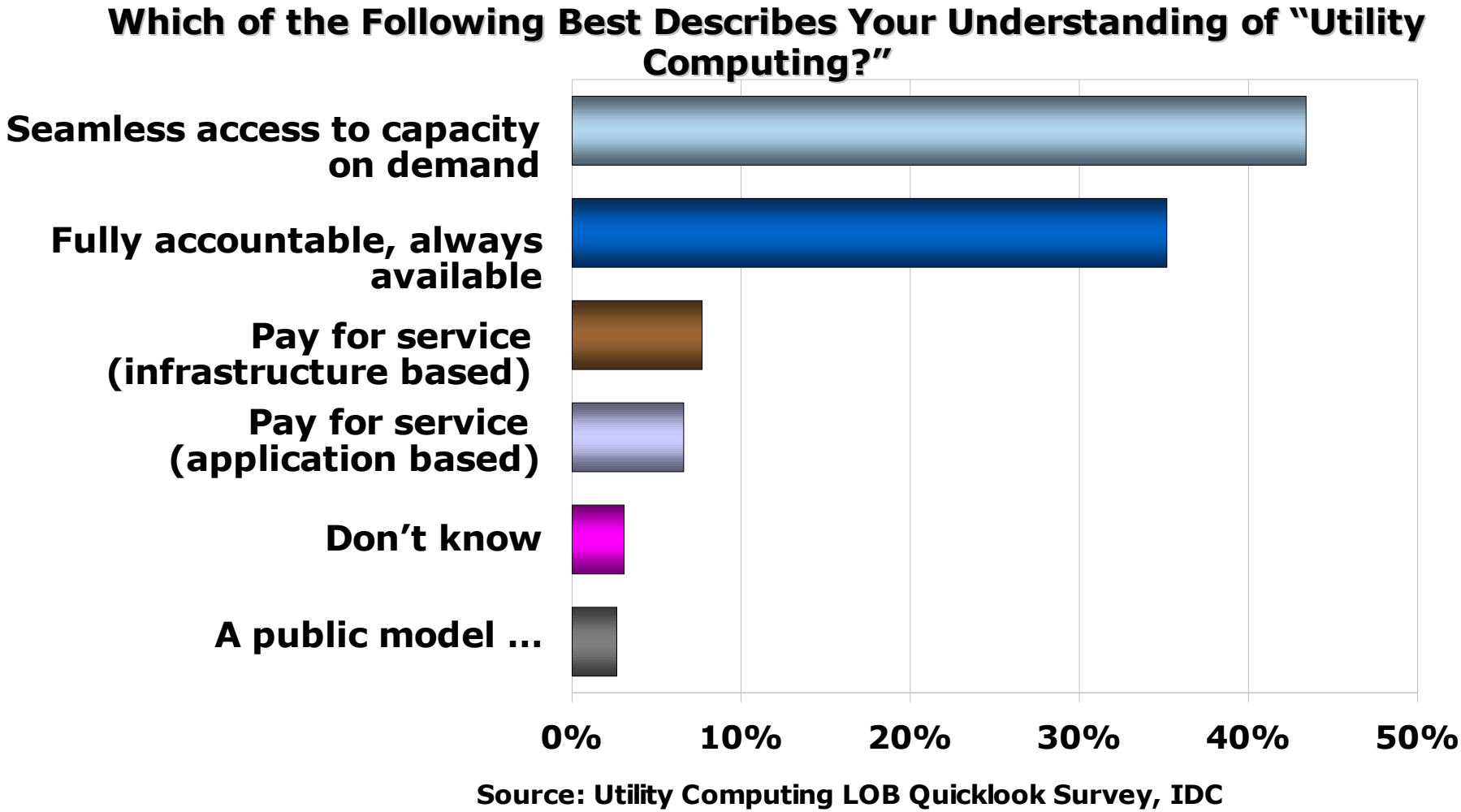
Data Center on Demand
What is Utility Computing?

Industry Definition

IDC Definition

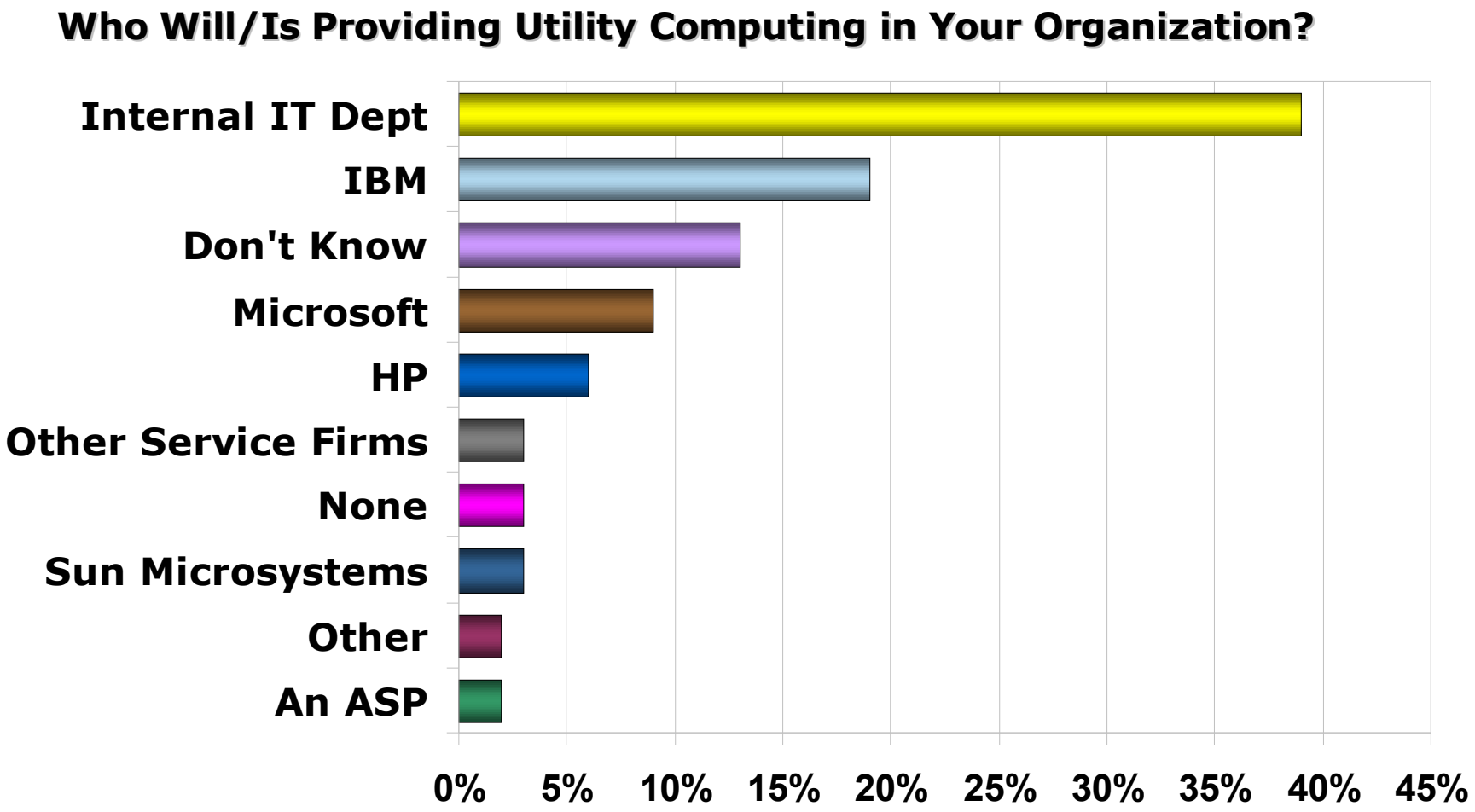
- **Utility Computing Infrastructure.**
- **UCI provides instant IT service or capability on demand to meet pre-established service levels for multiple applications, workloads or business units.**
- **It provides on/off pay-per-use metering and billing capability.**
- **The UCI consists of server, storage and networking elements that are part of a virtual pool of resources that can scale and partition automatically to meet the demands of the service levels of the applications and workloads serviced by the UCI.**

Data Center on Demand



Source: Utility Computing LOB Quicklook Survey, IDC

Data Center on Demand



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Data Center on Demand

IT requirements are transforming the data center

- **Commodity servers and blades**
- **Integration of high-speed storage networks**
- **Support for multiple OSes**
- **Advent of grid and cluster computing**
- **Web applications more critical to business success**
- **Improved network reliability and high availability**
- **Improved security for all applications and services**
- **Simplified provisioning and lower management (e.g., labor) costs**

Data Center Networking Challenges

Challenges

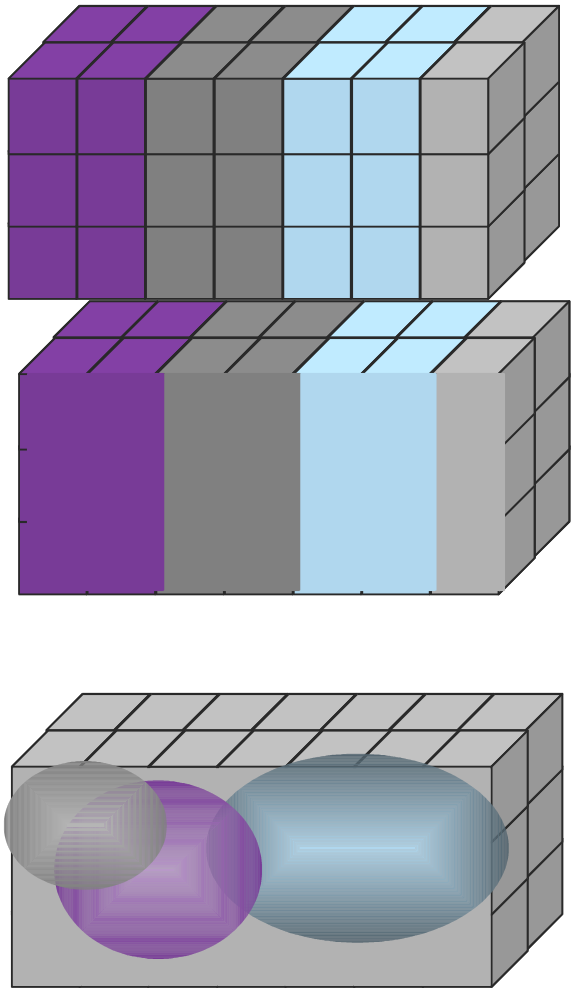
- Limited performance for new applications
- Network is not application aware
- Web applications critical to business success
- DOS attacks degrade performance
- Management is OPEX-intensive

Solutions

- 10-GB interconnections for data center
- Adoption of layers 3–7
- Layer 4-7 switches bring mission-critical reliability to applications
- Layer 4-7 switches secure network without performance penalty
- Move beyond equipment-specific management systems

On Demand Computing Evolution

- **Database**
- **Trans. proc.**
- **Web host.**
- **File/print**

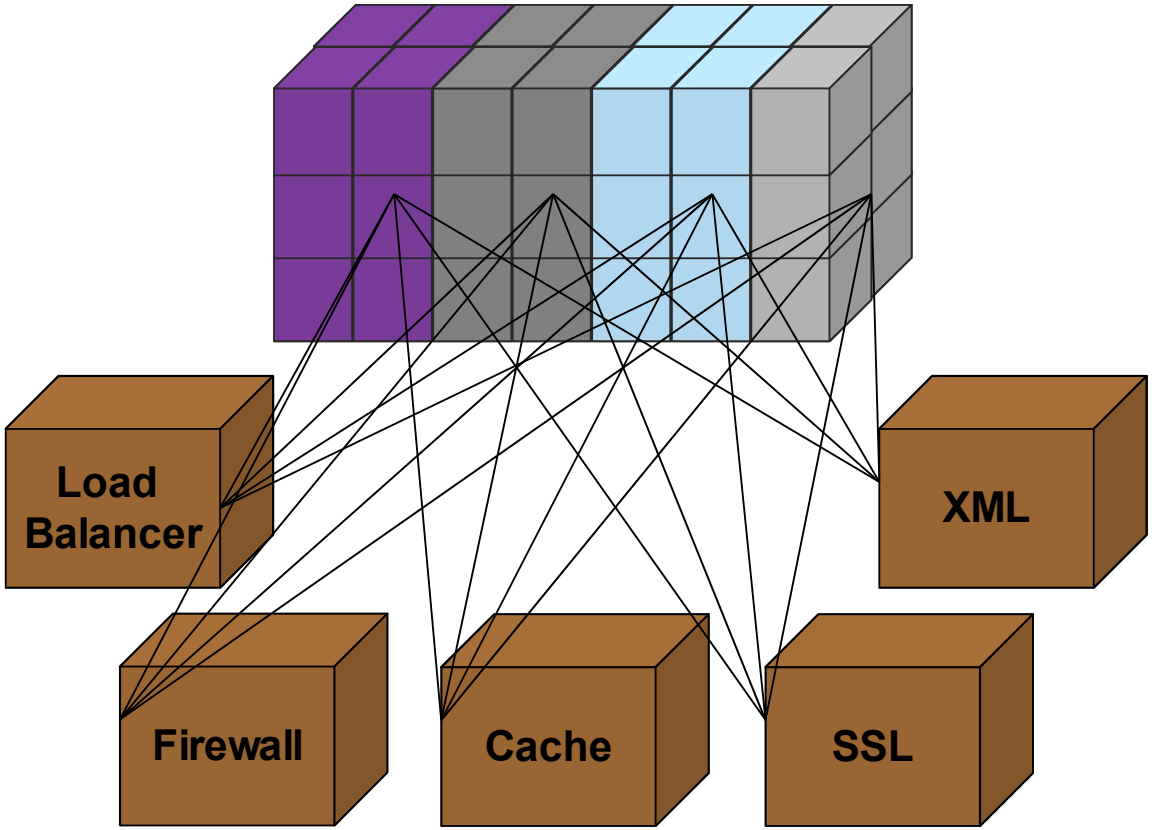


Phase 1
Consolidation

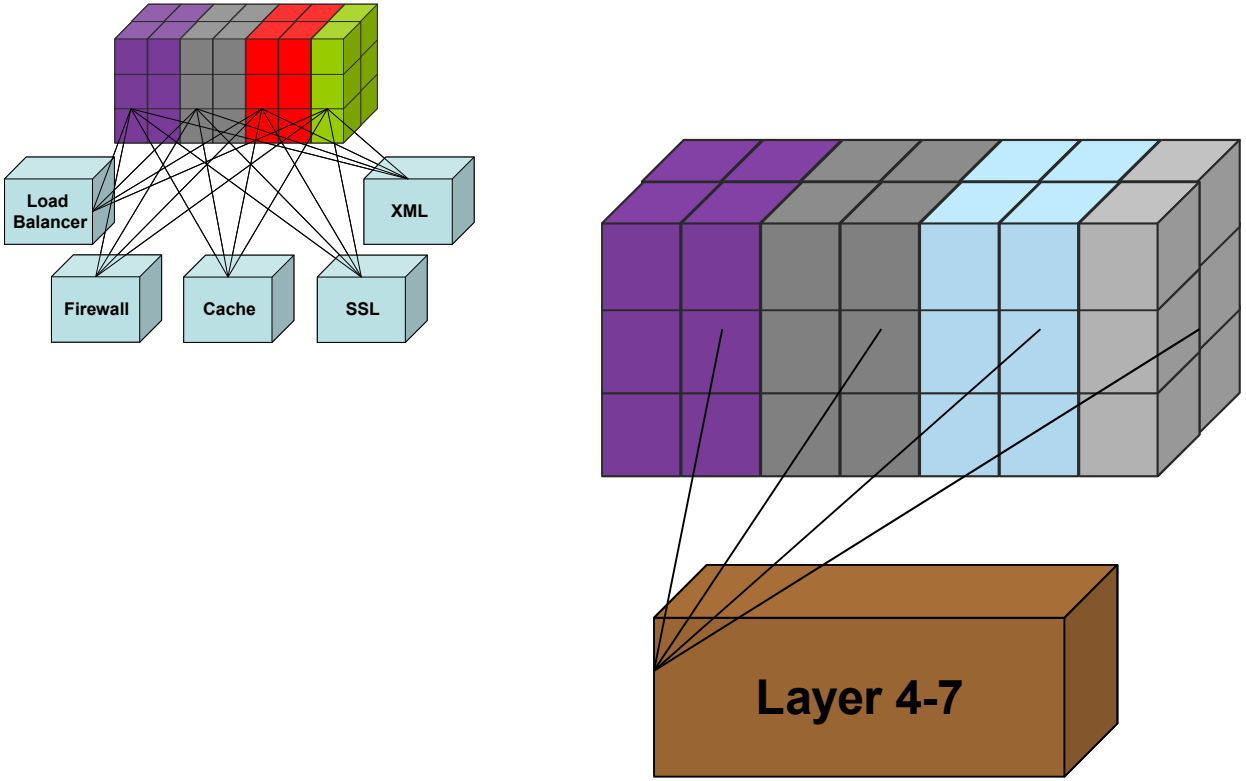
Phase 2
Sharing compatible resources, automation, virtualization

Phase 3
Sharing all resources

Network Complexity



Network Consolidation



Layer 4-7 Switch Simplifies the Network

On Demand Computing Evolution

- **Database**
- **Trans. proc.**
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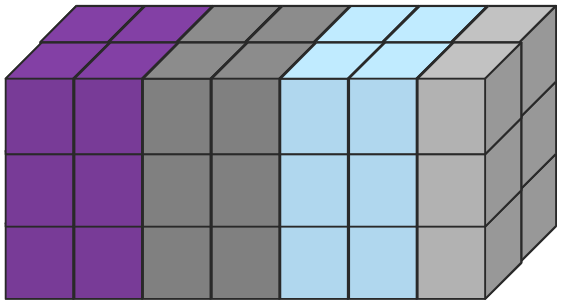
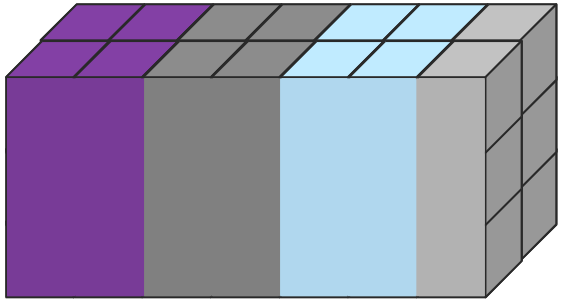
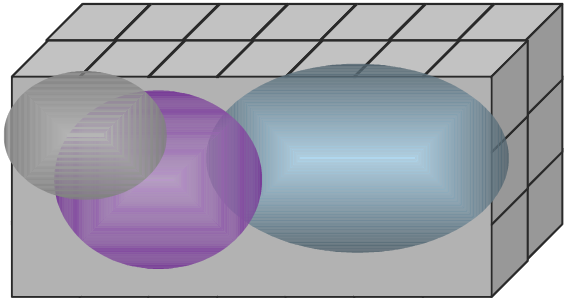


Phase 1
Layer 2 switch
1 Gig, 10 Gig



Phase 2
Layer 4-7 switch
Secure, scale, enable



Phase 3
Next Generation
Layer 4-7 switch

New Life for LAN Switching: Speed, Intelligence and Power

Problems

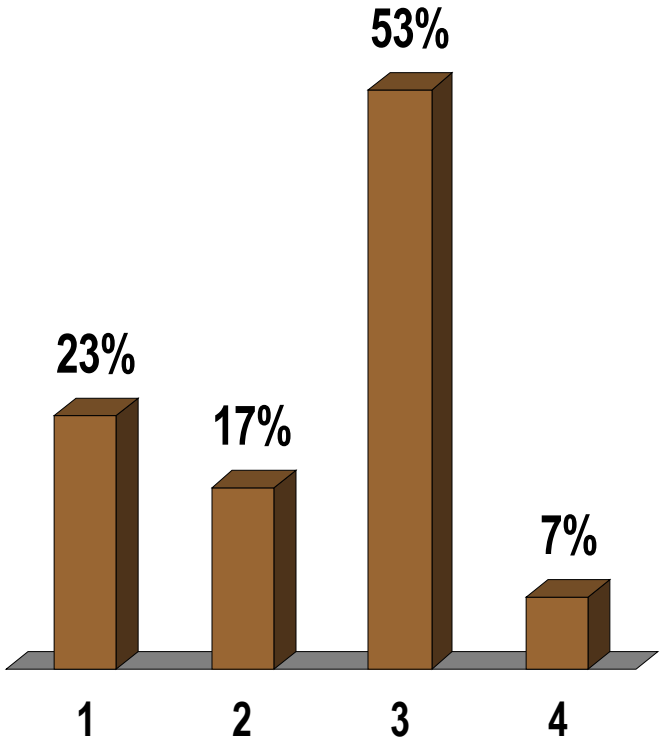
- Limited performance for new applications
- Network is not application aware
- Network not reliable Management capability limited and OPEX intensive

Solutions

- Migration to 1-GB desktop, 10-GB data center
- Adoption of layer 3 and layers 4–7
- High availability network products
- Move beyond equipment specific management systems, need end-to-end views

Have you implemented Layer 4-7 switch?

1. **Yes, comprehensive implementation**
2. **Yes, pilot project**
3. **Plan to implement in 1 year**
4. **No**



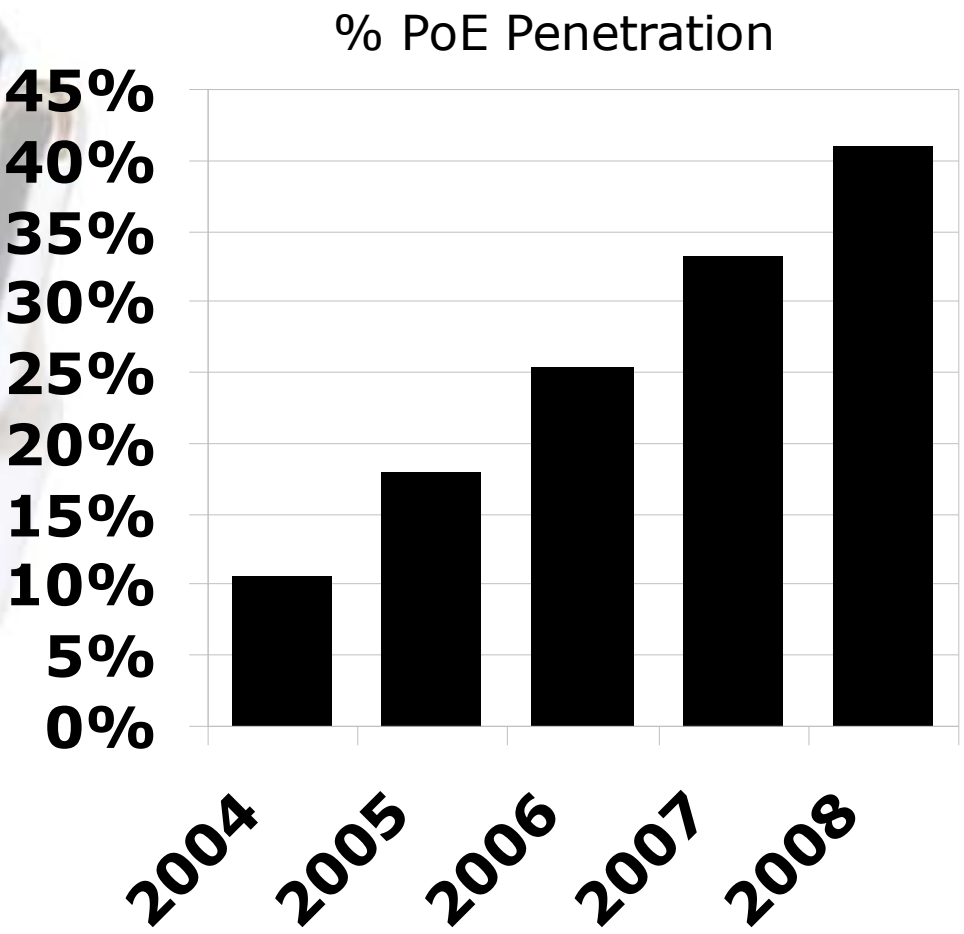
New Solutions/New Devices

Intelligence Example: VoIP

- **Bandwidth needs = low**
- **Intelligence needs = high**
- **Traffic type: high priority**
- **Intelligence needs:**
  - **Layer 3 switching**
    - **Prioritization**
    - **QoS**
  - **Management**
    - **Troubleshoot**
    - **Monitor**
  - **High availability**

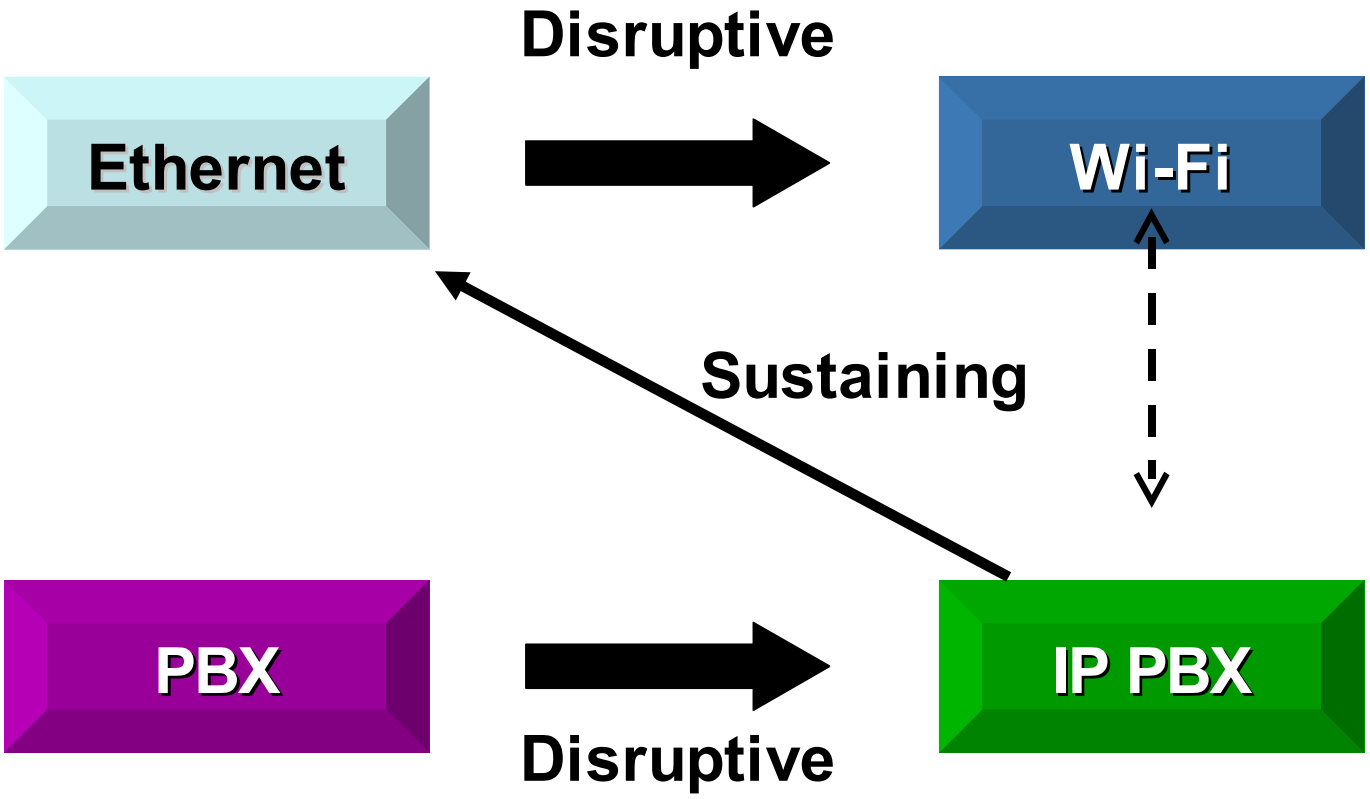
Power Over Ethernet

- **Power over Ethernet**
  - **Applications: IP phones, wireless APs, cameras**
  - **Over 10% penetration of LAN switch shipments**
  - **$30/port premium adds to market value**



Source: IDC

Market Disruptions



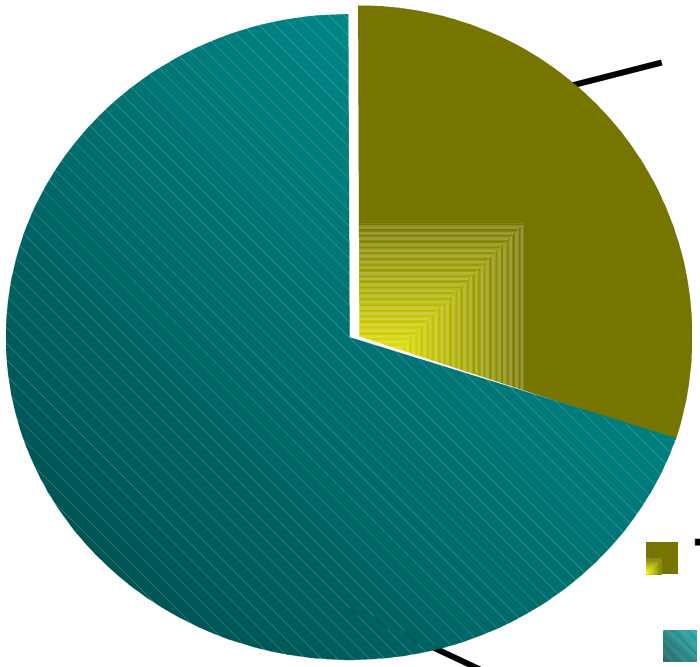
Survey Data: Reasons for Network Upgrades

Higher security	3.34
More access (WAN) bandwidth	2.96
New data applications	2.84
Increased # of users	2.82
More LAN bandwidth	2.80
Greater network robustness	2.72
Voice/streaming media applications	2.08

Scale: 1–5; 5 = High need to upgrade

WLAN Deployment: Tiled vs. Carpeted Environments

- Standards issues continue
- Users demand heterogeneous gear
- Justify ROI for mobile access



Tiled environments are deploying WLAN now

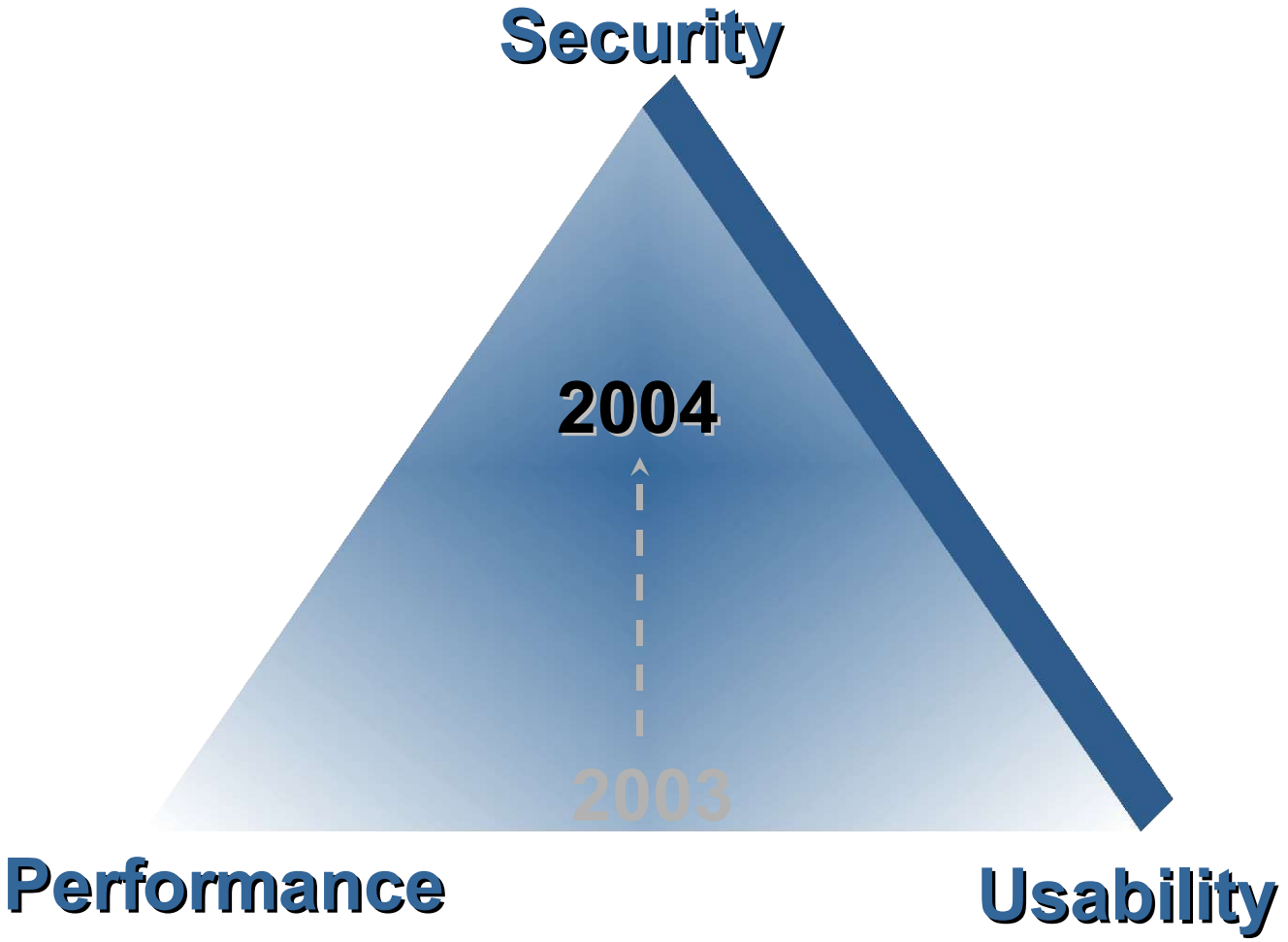
Tiled IT spend

Carpeted IT spend

But, carpeted environments represent a larger market

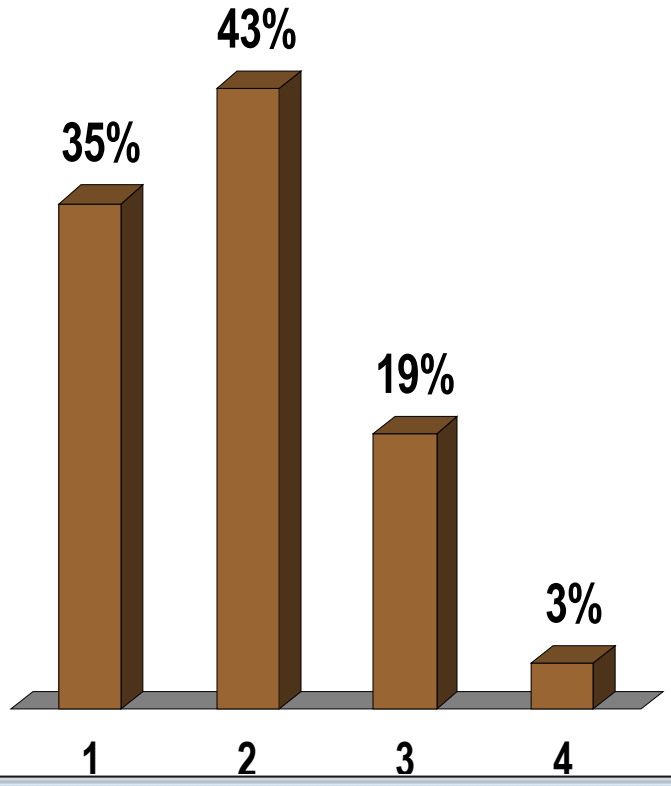
Source: IDC

Wi-Fi Adoption in the Enterprise



Have you implemented WiFi in your organization?

1. **Yes, comprehensive implementation**
2. **Yes, pilot project**
3. **Plan to implement in 1 year**
4. **No**



Wireless Security Improvements

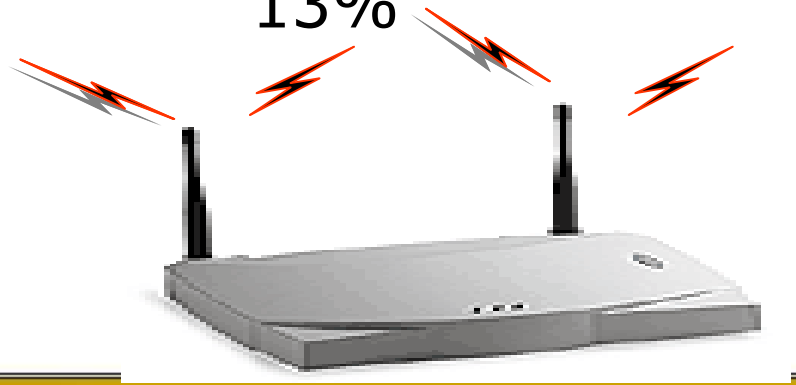
- **Identity management everywhere**
- **Rouge user detection**
- **Authentication and encryption problems fixed by WPA and 802.1X**
- **802.11i further streamlines security processes**
- **Directional antennas prevent signal leakage**
- **Management based on users, not ports**

Primary Uses of Wireless LAN

Conference room access	68%
Data input and retrieval	52%
Create temporary network	36%
Substitute for wired Ethernet	34%
Pilot project	29%
Monitor for rogue users	21%
Wireless phones	13%

Multiple responses allowed

N = 130

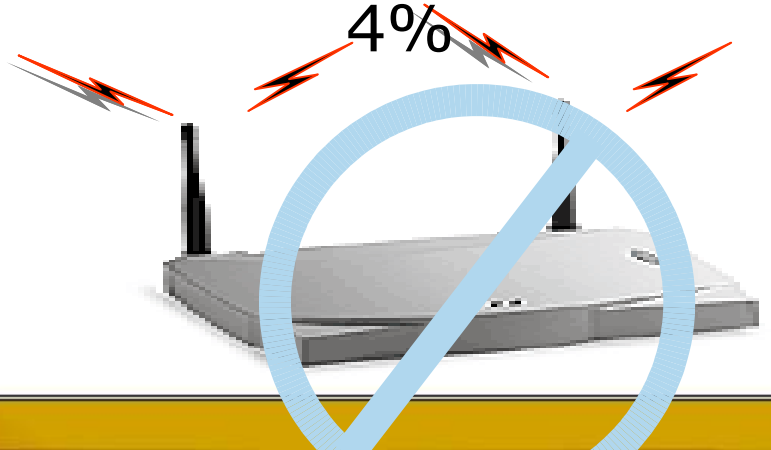


Why Wireless LAN Is NOT Installed

Worried about security	64%
No need/no real reason	22%
No business value	16%
Waiting for better technology	9%
Poor performance	7%
Too expensive	4%

Multiple responses allowed

N = 130



Source: IDC

VoIP (IP PBX) Opportunities

- **Market starting mature in 2004/2005**
- **Revival of hybrid circuit/packet competitors (Nortel, Siemens and Avaya)**
- **Adoption of IP phones**
- **Value-added applications (not just cost savings)**
  - **Voice is data now**

Have you implemented VoIP in your enterprise?

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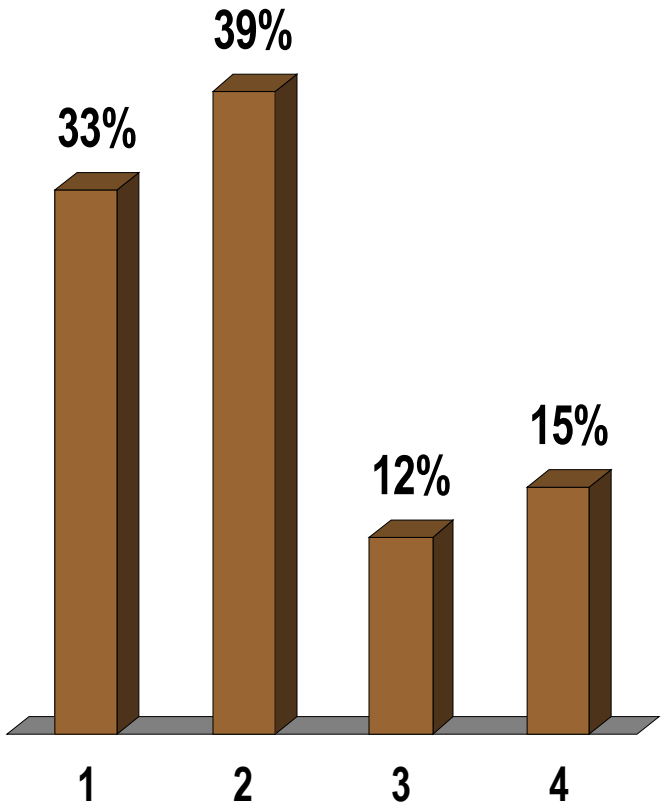
2. **Yes, pilot project**
3. **Plan to implement in 1 year**
4. **No**



Opportunity Matrix: IP PBX vs. PBX

IP PBX

Distributed offices
Message intensive
Contact centers
Green field — no installed PBX
Recently upgraded LAN

PBX

Centralized offices
Not message intensive (separate e-mail and voicemail ok)
Installed PBX (with capacity)
LAN needs upgrade to support VoIP

Essential Guidance

- **Networking on demand requires intelligence, performance and management improvements**
- **Server consolidation trends will drive changes in network**
- **Network intelligence will enable next generation Web services deployments**
- **Network innovations offer users the ability to differentiate network capabilities and drive ROI**
- **Wireless integration continues to be difficult**
- **IP PBX is a platform for value-added applications**
- **Expect continued enhancements in LAN switching technology (e.g., Power over ethernet)**