# The Successful Deployment of VoIP

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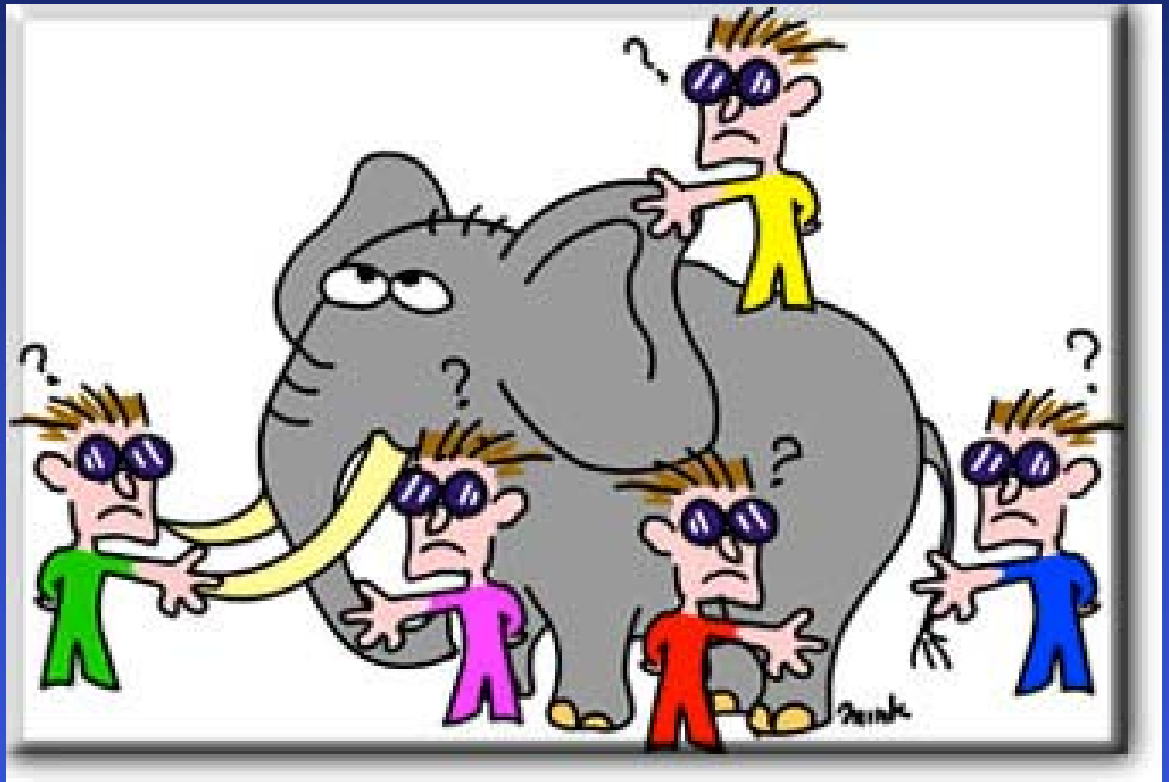
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# Agenda

4 <u>What is VoIP?</u>

4 VoIP: Drivers and Inhibitors

4 What are end users saying about VoIP Deployment?

4 What are Vendors Saying about the VoIP Business Case?

# What is VoIP?

4 Voice that is transmitted over IP and some point in the network…
- ι Very popular
- ι Very broad
- ι Very imprecise

4 Digging deeper…



Graphic source: http://www.pixelmonger.com/art_flavors.html

# Definitions

4 Voice over IP (VoIP) refers to <u>carrying voice</u> over a presumable low cost IP network.  This IP network could be:

- ι The company's private IP network
- ι The Internet
- ι A single service provider's IP network

4 Companies choosing to deploy VoIP are choosing IP over other transmission technologies, such as circuit switching, TDM, Frame Relay, and ATM

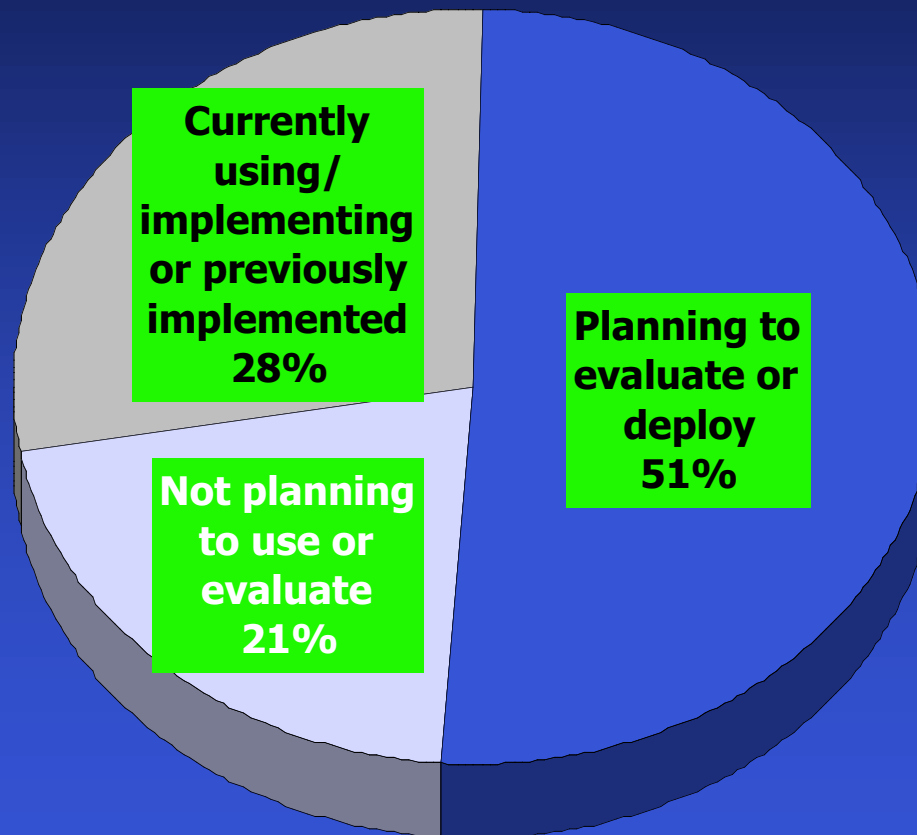4 The key design issues here are high availability and low predictable delay

# Definitions

4 IP Telephony refers to the provisioning of voice functionality using primarily IP based technologies

4 The phrase "voice functionality" refers to functions such as:

  ι Call set up across potentially disparate networks; i.e., the internet and the PSTN

  ι Support for traditional voice features, such as three way calling and call forwarding

  ι The support for a growing array of applications, such as unified messaging

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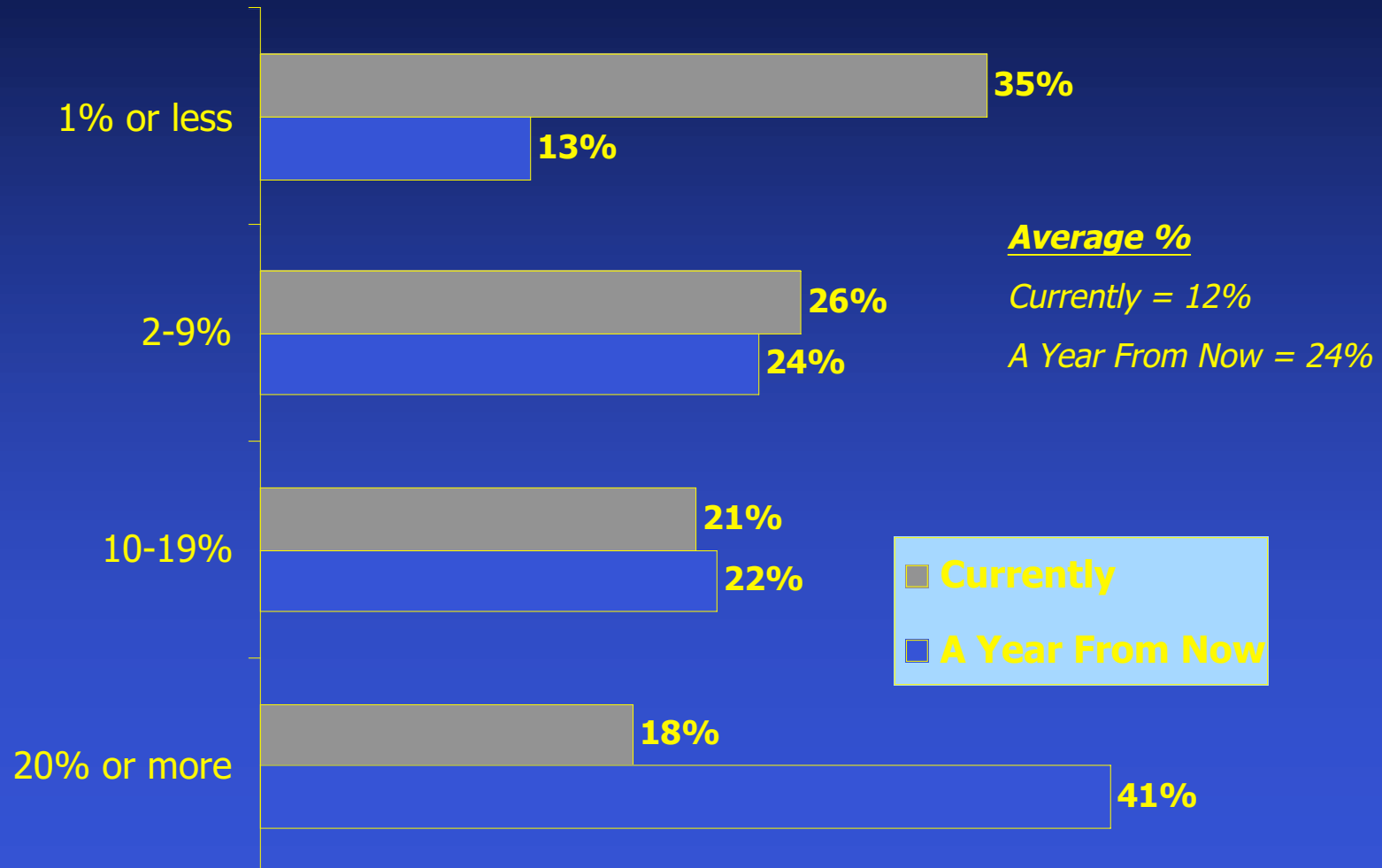
# Use of VoIP

Currently
using/
implementing
or previously
implemented
28%

Planning to
evaluate or
deploy
51%

Not planning
to use or
evaluate
21%

# Amount of Voice Traffic Carried Using VoIP *by Current VoIP Users* – Currently vs. A Year From Now

**1% or less**
- 35%
- 13%

**Average %**
*Currently = 12%*
*A Year From Now = 24%*

**2-9%**
- 26%
- 24%

**10-19%**
- 21%
- 22%

■ **Currently**
■ **A Year From Now**

**20% or more**
- 18%
- 41%

Source:  Key3Media and  Ashton, Metzler & Associates

# Geoffrey Moore's Technology Adoption Life Cycle

C
H
A
S
M

Innovators

Early Adopters

Early Majority

Late Majority

Laggards
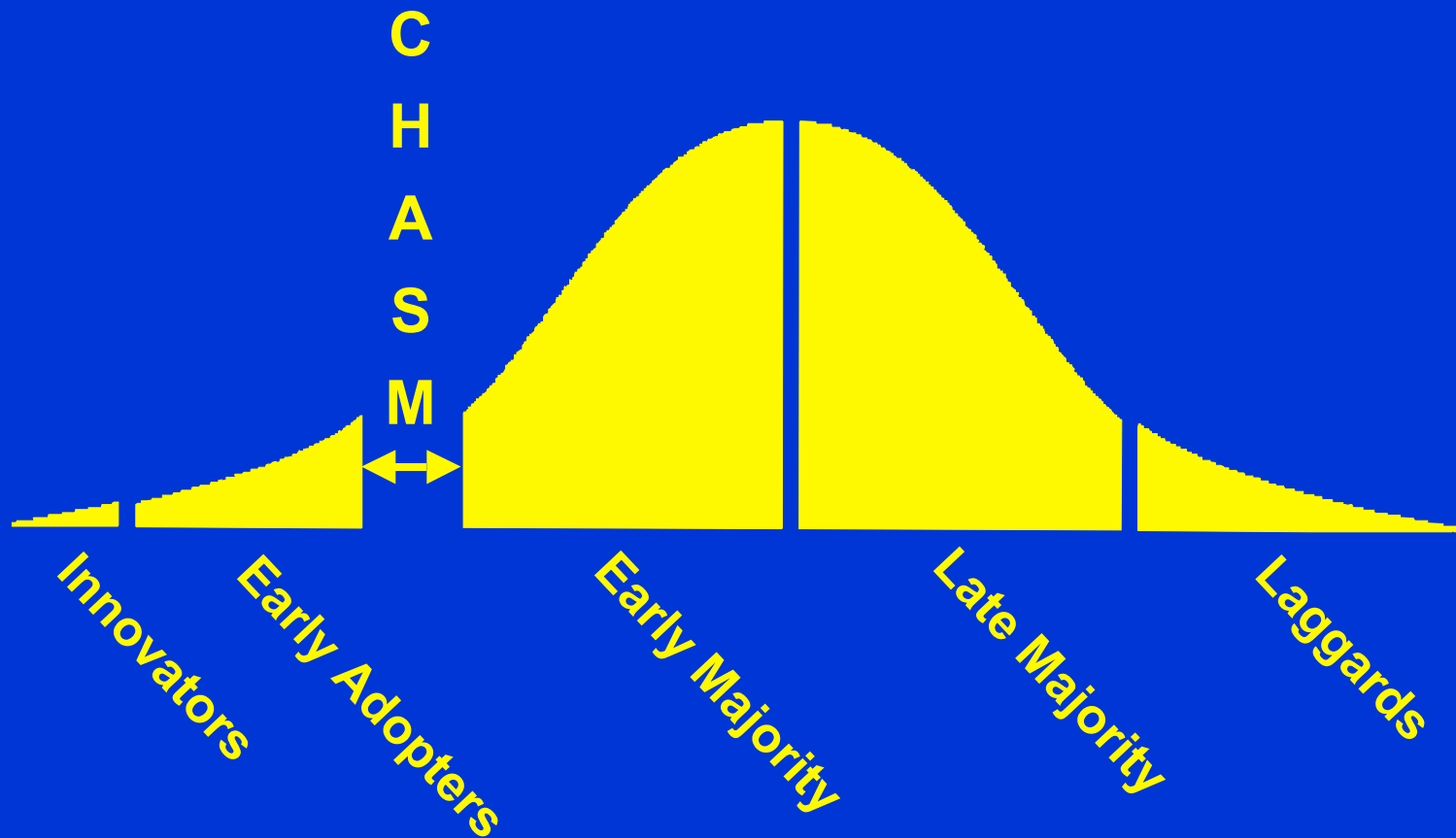
SOURCE: Geoffrey Moore

# Satisfaction With VoIP Deployments Made

**In the survey, of companies that are currently using VoIP, 58% are satisfied with the VoIP deployments made. None were "not at all satisfied".**

| 0% | 10% | 32% | 37% | 21% |
|----|-----|-----|-----|-----|

■ 1 - Not at all satisfied     □ 2    ■ 3    ■ 4    ■ 5 - Very satisfied
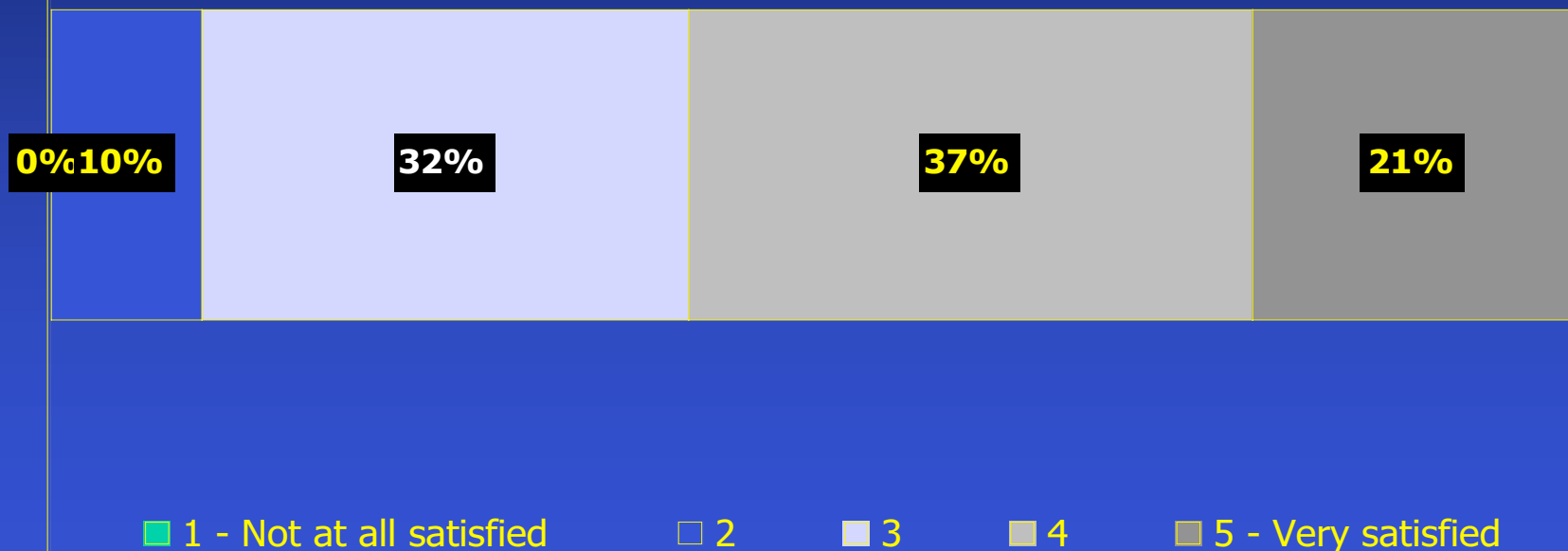
Source: Key3Media and Ashton, Metzler & Associates & Key3Media

# The Primary Benefit to Date of Deploying VoIP

4 Cheaper calls between company sites          16%

4 VoIP systems cheaper to administer          16%

4 Easier to deploy new integrated apps          11%

4 Able to deploy voice functionality
  (i.e., ACD, three way calling) to
  offices that didn't have it          11%

4 Cheaper international calls          10%

4 Significant drop in the cost of M/A/C          8%

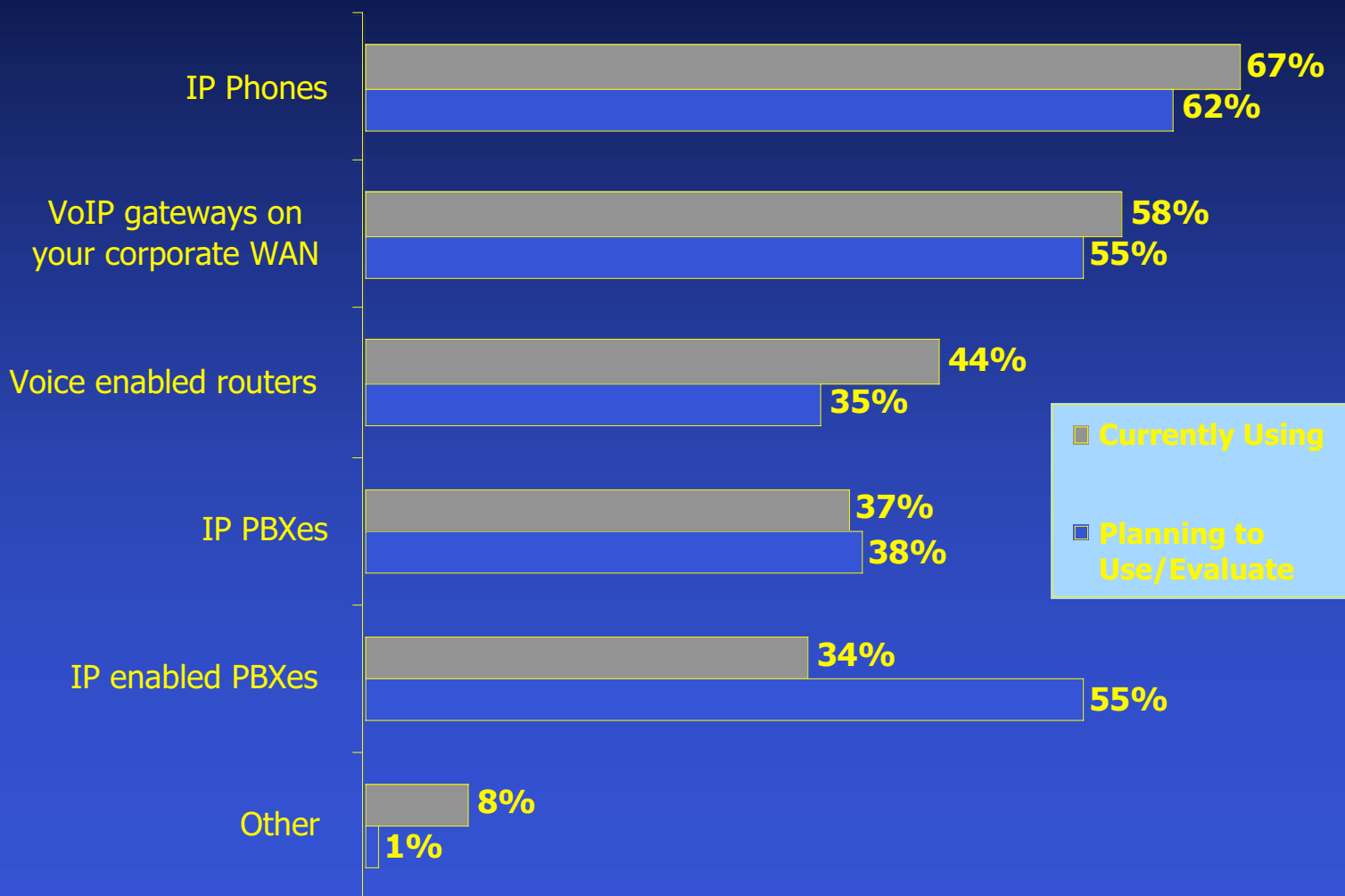*Source:  Ashton, Metzler & Associates and Key3Media*

# The Primary Drawback to Date of Deploying VoIP

4  Deployment was more difficult
   than anticipated                                          37%

4  Users complain about voice quality                        16%

4  The VoIP system is more difficult to manage
   than anticipated                                           8%

4  Our primary vendor made false claims                       6%

4  Have not been able to decrease
   the network staff                                          6%

# VoIP Systems Deployed/Planned

**IP Phones**
- 67% Currently Using
- 62% Planning to Use/Evaluate

**VoIP gateways on your corporate WAN**
- 58% Currently Using
- 55% Planning to Use/Evaluate

**Voice enabled routers**
- 44% Currently Using
- 35% Planning to Use/Evaluate

**IP PBXes**
- 37% Currently Using
- 38% Planning to Use/Evaluate

**IP enabled PBXes**
- 34% Currently Using
- 55% Planning to Use/Evaluate

**Other**
- 8% Currently Using
- 1% Planning to Use/Evaluate

Legend:
- ■ Currently Using
- ■ Planning to Use/Evaluate

Source:  Key3Media and  Ashton, Metzler & Associates

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# What End Users are Saying about VoIP

4 A Tale of Two Companies:

- A company in the Food and Beverage (The Food Company) industry that is architecting their network and their IT organization to be able to support VoIP

- A Professional Services Firm (The Professional Firm) that is at the testing/piloting stage
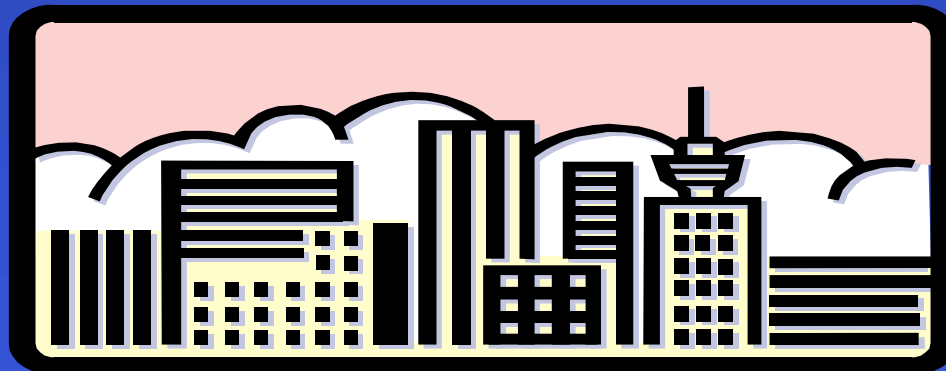
# The Food Company Believes

4 The integration of IP Telephony will be a long journey

4 The issues to be faced are multifaceted

4 In the beginning – technology issues will dominate

4 Later - success will depend on cultural and organizational evolution and adaptation
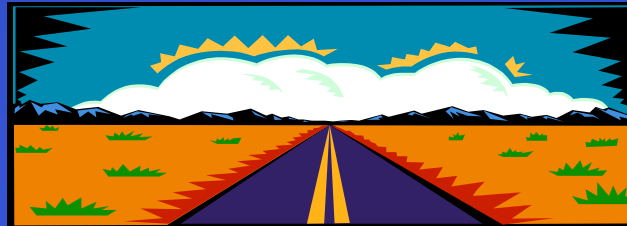
# The Food Company Believes

4   Traditional one server (PBX) per physical location. However, new product directions no longer require one server per location.  Hence, a new equipment deployment strategy should be developed before any additional major purchases.

4   Not all industry standards are fully implemented and available.

4   Successful implementation of strategic products not possible without MPLS and fully mature QOS enabled WAN's and LAN's.

4   Telephony and other application/services integration must be addressed.

# The Food Company Believes

4 SIP (Session Initiation Protocol)

 ι Has powerful momentum in the marketplace.

 ι SIP should result in completely non-proprietary IP telephony devices, which should result in a major cost reduction in phone sets

4 IEEE power delivery over Ethernet/CAT 5

 ι The standards debate is now over

 ι This will solve power delivery issues with new Access Points, IP Telephones, and other IP appliance type devices

 ι Products should appear in market very soon

4 Bottom line: The Food Company will wait for SIP and power over Ethernet before making major purchases.

# The Food Company Believes

4 Latency and Jitter
- ι Only cost effectively controllable in data networks with MPLS and QOS
- ι QOS must be in place on LAN's as well as WAN's

4 Scope of IP Telephony
- ι Is not just about "hello" or voice mail any more
- ι Multi-disciplinary internal resource skill center must be developed
- ι Long term application integration business requirements must be defined and understood before technology/products can be selected

# The Food Company Intends to

4 Continue to avoid new purchases, upgrades, or replacement of telephony devices until:

1. SIP and Power over Ethernet can be deployed
2. Future business requirements are better understood
3. A thoughtful new device deployment paradigm is agreed upon
4. Adequate testing and piloting has been conducted

# What End Users are Saying about VoIP

4 A Tale of Two Companies:

ι A company in the Food and Beverage industry that is architecting their network and their IT organization to be able to support VoIP

ι A Professional Services Firm that is at the testing/piloting stage

# What is Motivating The Professional Firm

4 Lower the cost of making a phone call

   ι Toll Bypass.
- 23 voice calls on a T1 but 60+ voice calls in a VoIP T1 (assuming G.729).

   ι Access Convergence
- Deliver all traffic via IP and carrier provides PSTN gateways and DSP resources.

   ι Replace PBXs and Messaging systems with pure IP Voice Servers.
- PBX/telephone equipment and operating savings.

4 Support New Applications

   ι No longer cost prohibitive to introduce voice based applications.

# Requirements, as Seen by The Professional Firm

4 A data network that meets the key performance metrics for VoIP - Latency, Jitter, Packet Loss and Availability

4 Stable managed network
  - Change management system
  - NOC Monitors network 7 x 24
  - SLAs in place with suppliers

4 Data Infrastructure Audit
  - Routers & Switches that support VoIP
    - Support policing, QoS (prioritization), and queuing.
  - Redundancy & Survivability
    - Dual fiber runs between routers and switches
    - Varying levels of redundancy based on office size
    - UPS's – 30 minutes at full load
    - ISDN Back-Up for majority of sites

# Requirements, as Seen by The Professional Firm

4 Capacity – Bandwidth available per path on the data network
- ι Utilization running at 60 to 65%

4 Voice Infrastructure Audit of Switches
- ι IP enabling the PBX's

4 Detailed understanding of the voice traffic
- ι Identify per site calling patterns and usage
- ι Calculate IP bandwidth requirements

4 Assess the current cost of the data and voice infrastructures

4 Very Extensive Testing

# Requirements, as Seen by The Professional Firm

4 Support

– Data and voice support within IT.

4 Regulatory Environment

– Identification of any legal or regulatory issues; i.e., ADA, E911

4 RoadMap

– Close any metrics gaps, increase capacity, upgrade infrastructure, implement network management

– Approach to prioritizing Voice traffic on the network

– Determine where voice is packetized – router or PBX

# The Professional Firm: Lessons Learned

4 **Know your infrastructure**
- ι Technology, Utilization, Costs, Contracts, etc.
- ι Data network must be ready for VoIP

4 **Don't work in a vacuum**
- ι New applications added to the network may seriously impact VoIP.

4 **TEST, TEST, TEST AND TEST AGAIN**
- ι Do Not Assume; test everything
- ι Involve others in the testing especially users.

4 **Support Model**
- ι Voice operations and design must be part of IT.
- ι If it isn't, do it before implementing VoIP – not during or after.
- ι Start training data and voice staff now.

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# Landscape of Enterprise Communications

4 Business will not buy
- Convergence
- IP
- Broadband

4 Business will buy value:
- to save money
- to be more efficient, change the way they work
- to increase customer loyalty and retention
- to increase revenue

*Source: Mitel*

# Market Realities

- Networking and location transparency are key drivers for change
- Employee productivity and customer satisfaction contribute to the business case for convergence
- Vendors should take an evolutionary rather that revolutionary approach to voice and data convergence
- A converged PBX should offer a full suite of value-added applications, not just voice messaging or unified messaging
- Vendors should put more emphasis on addressing the needs of their customers - not the superiority of the technology

*Source: Mitel*

# Beyond "Voice-over-IP"

4 Benefits now extend beyond the infrastructure level

4 Consider asking, "What's in it for me?"

4 Market Applications

- ι Teleworking and remote access
- ι Branch office integration - consolidated WAN traffic
- ι Plug'n'Play voice - local and hosted applications and access
- ι PDA integration
- ι Video collaboration
- ι Unified communications at the user desktop
- ι Voice Portals
- ι Unified messaging

*Source: Mitel*

# Compelling Reasons for IP

4   Ubiquitous availability and access

4   Increased productivity from staff who benefit from interoperability with PDAs, PCs and wireless devices

4    Intelligent endpoints that evolve the desktop and add "new value" to business

4   Speech-enabled applications that leverage network resources

4   Desktop assistants that redefine personal interaction within the enterprise and enable true "multimedia collaboration"

4   Video communication as simple and robust as a phone call

*Source:  Mitel*

# TCO - "Fact or Fiction"

4 A TCO model is business specific

4 Cost reduction is only a small component of the ROI on an IP-based solution

- Easier movement of people
- Reductions (or greater investments) in required infrastructure
- Reduced toll-charges
- Staff efficiencies
- Administration convergence in skill sets
- Scalability
- Remote and Mobile Workers
- Account for existing legacy environment and transition

*Source: Mitel*

# Siemens Skyport Facility

- Silicon Valley Headquarters
- 2000 ports
- Production Showcase for Customers
- Full Business Operation – Business over IP
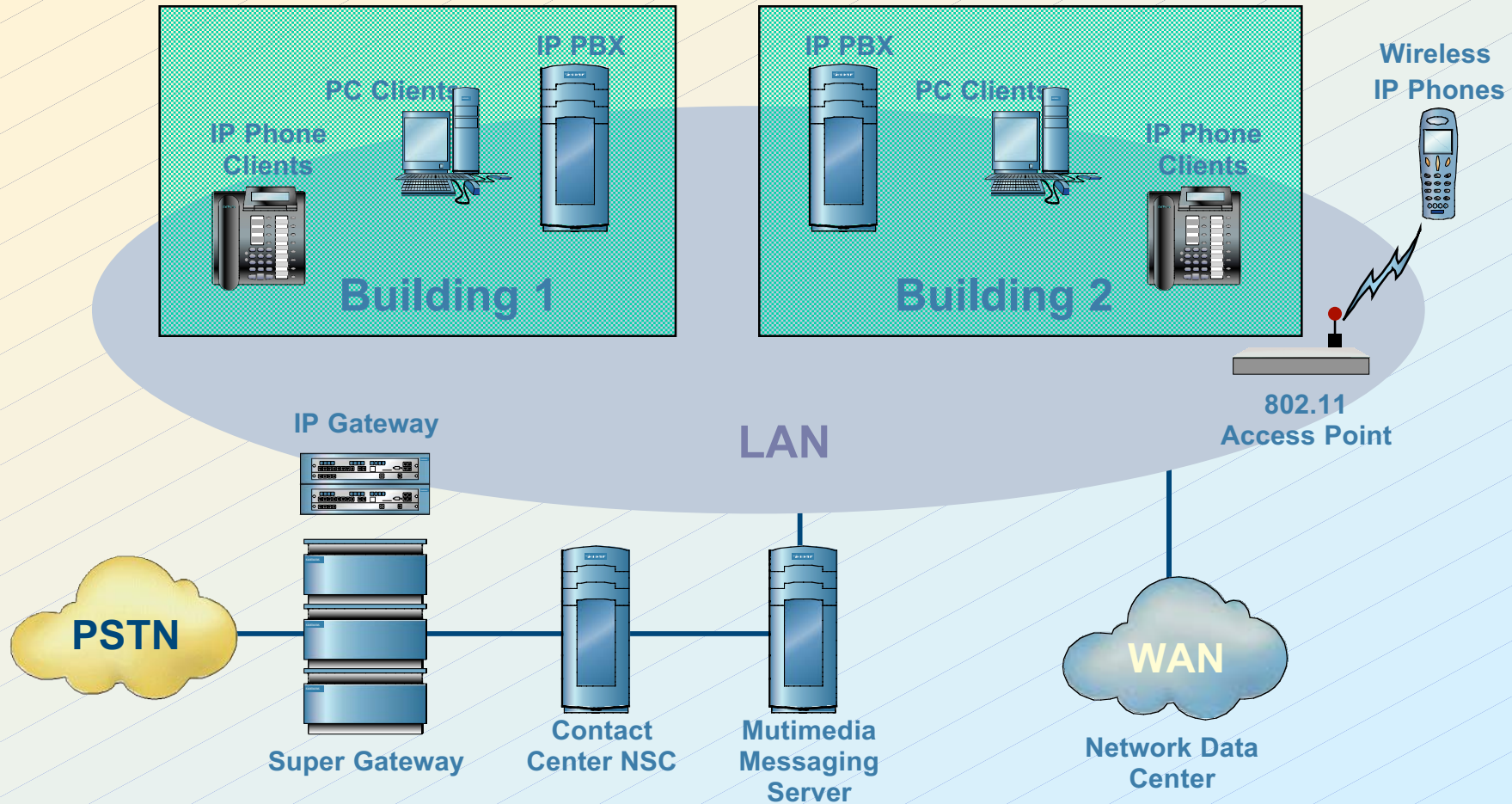
Sales

Marketing

Development

Product Management

100 % IP

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# Building Skyport: Network Infrastructure



Wireless IP Phones

IP PBX

PC Clients

IP Phone Clients

**Building 1**

IP PBX

PC Clients

IP Phone Clients

**Building 2**

802.11 Access Point

IP Gateway

**LAN**

PSTN

WAN

Super Gateway

Contact Center NSC

Mutimedia Messaging Server

Network Data Center

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# Building Skyport: Network Infrastructure

4 Build a "VoIP ready" network

4 Goal was to achieve five 9s reliability

- ι Quality of Service (real-time capable)
- ι Redundancy to the wiring closet
- ι Intelligent diagnostics
- ι Security

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# Lessons Learned

4 Changing the IT Culture

ι Network failures - IT personnel, not used to having real time traffic on the network, made configuration changes during business hours

ι End user support - IT needs to be sensitized to performance requirements of a "real time client"

ι Problem resolution process – Help Desk

ι IT and Telecom organizational partnership

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# Lessons Learned

4 Other Lessons Learned

- Redundancy works – system calls remain when a network component fails

- Complete initial testing of the network is important!

- QOS important during network reconfiguration to maintain voice priority

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# Building Skyport — Capital Costs

◆ **For Siemens Skyport, capital costs were higher**

    ◆ **More backbone**

    ◆ **More network infrastructure to support continuous real-time applications**

    ◆ **Smarter phones**

| | Circuit Switched | VoIP |
|---|---|---|
| Backbone Cable | $644,000 | $610,000 |
| Floor Cable | $248,000 | $124,000 |
| IP Network | $990,000 | $990,000 |
| Redundancy | $438,000 | $438,000 |
| Telecom | $1,380,000 | $1,668,000 |
| Total | $3,700,000 | $3,830,000 |

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# Skyport — Operating Costs

4 Service costs — calculated 20% per user reduction from Santa Clara site in allocated service costs

4 Reduced MAC charges with simplified telephone moves

4 Additional ROI / TCO opportunities targeted

ι Extensive use of PC clients equals fewer desktop devices to support

ι IP trunking to Siemens offices in US and Munich will mean reduced toll charges

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# Future Plans – Building on VoIP

Some of our near term *NEXT STEPS*

4  Wireless LAN – currently 100 users in trial

4  Enabling more IP-based real time applications

    ι  Instant messaging and presence enabling all workpoints (PCs, phones, personal devices) leveraging VoIP CT

    ι  Speech driven personal portal

4  SIP / H.323 interoperability support

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