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Putting Reliability into VoIP Networks

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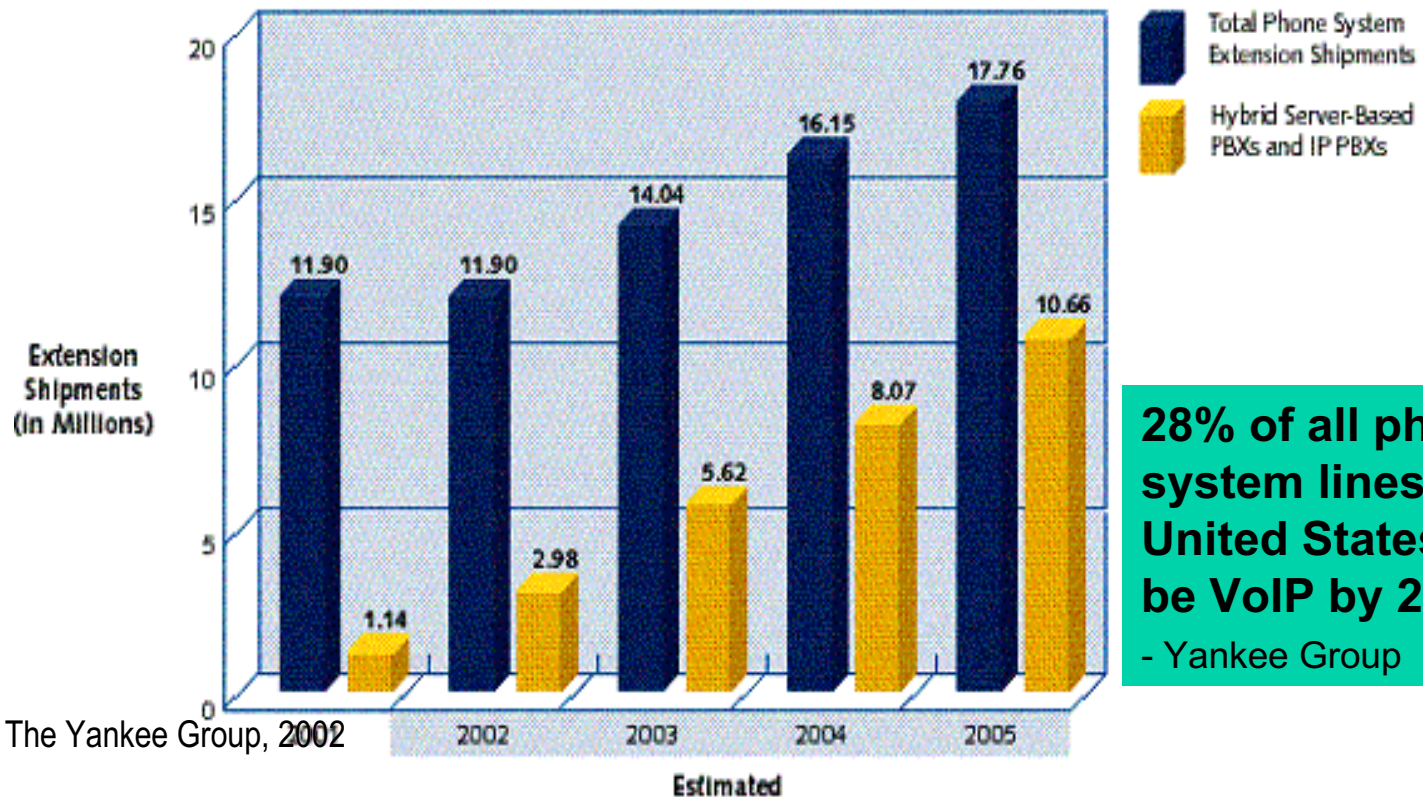*thomas.g.dalrymple.jr@Verizon.com*

Agenda

- The bright future of Voice over IP
- Cost savings enabled by VoIP
- A closer look at true costs
- Managing the risk with end to end management
- Managed IP Telephony – what to look for

Shipment forecast for IP PBX's

2001: VoIP Drivers – cost reduction and rapid deployment of new applications

Total Phone System Extension Shipments

Hybrid Server-Based PBXs and IP PBXs

Extension Shipments (in Millions)

20
15
10
5
0

11.90   11.90   14.04   16.15   17.76
1.14   2.98   5.62   8.07   10.66

2002   2003   2004   2005

Estimated

28% of all phone system lines in the United States will be VoIP by 2005

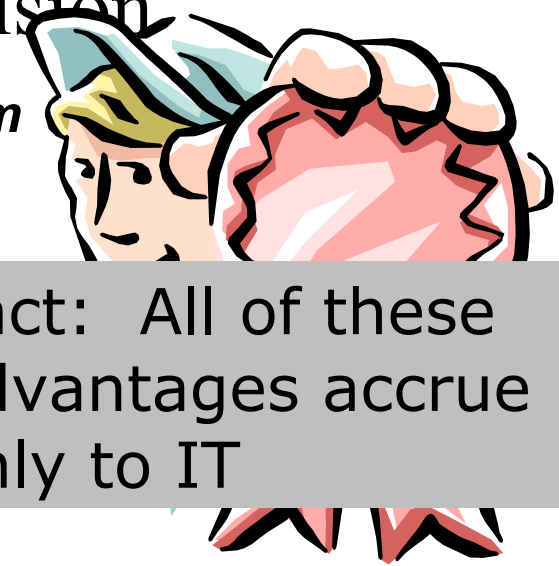- Yankee Group

Source: The Yankee Group, 2002

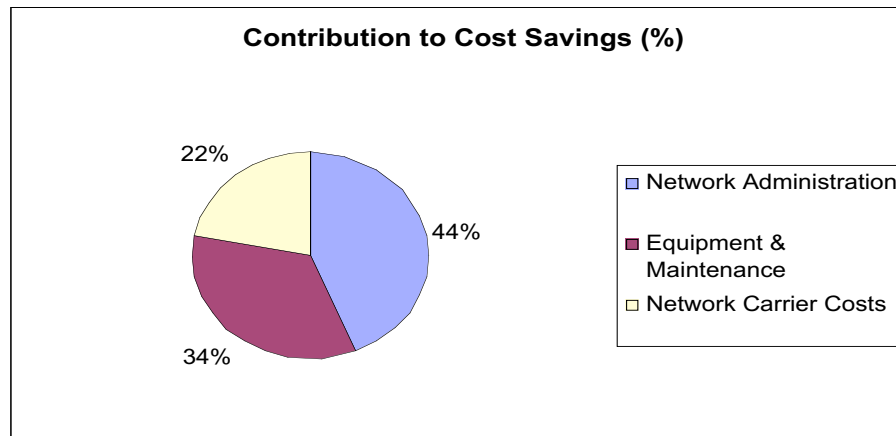# 2002 – 2003: Cost reduction is key

2 Sample Business Cases

- Retail product manufacturing company
  - Expects to save $2M over 5 years
  - 3000 IP Phones deployed
  - $60K/year network admin/training
  - $52K reduction in wiring and PBX upgrades
  - $37K/year reduction in moves/adds/changes
- High tech manufacturing company
  - 650 IP Phones deployed
  - 7 month payback + 33% productivity increase
  - $30K 1st year savings in moves/adds/changes
  - $25K/year interoffice cost savings

The Cost Reduction Vision

VP of IT: Visions of Heroism

Contribution to Cost Savings (%)

22%

44%

34%

- Network Administration
- Equipment & Maintenance
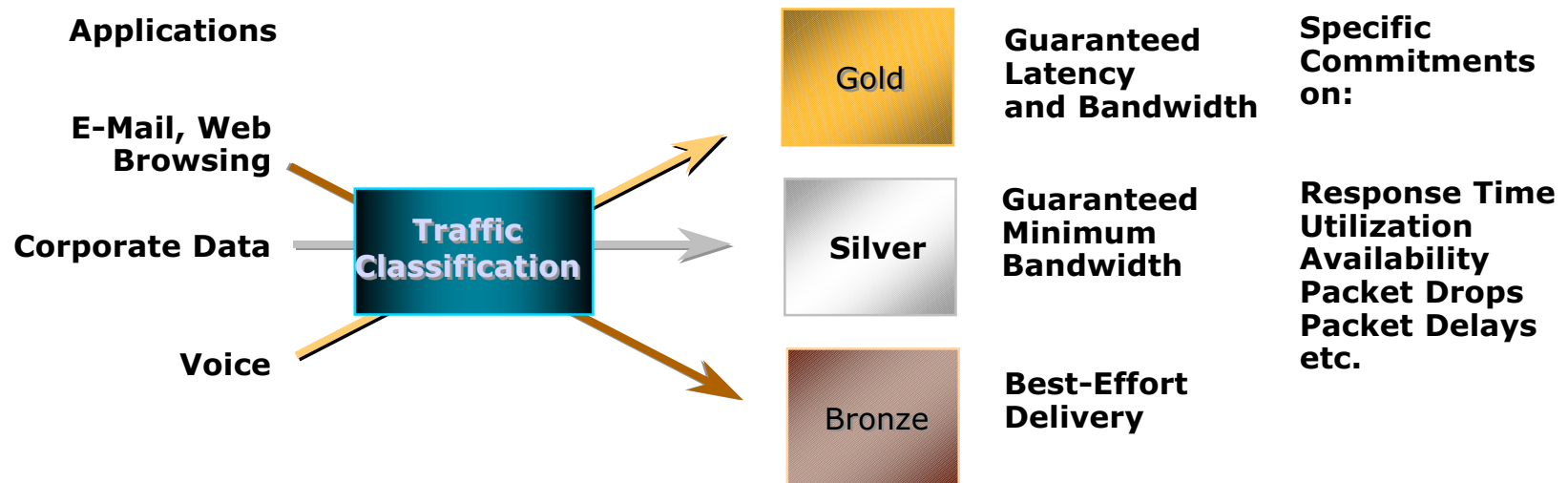- Network Carrier Costs

Fact: All of these advantages accrue only to IT

- Lower equipment costs
  - Converged voice and data – eliminate need for PBXs
  - Centralize call processing – reduced equipment needs for branch offices
  - Fewer wiring drops – PC and IP phone on 1 ethernet port
  - Less hardware connection cost – ethernet is faster & cheaper than channelized T1
- Lower Network Admin costs
  - Better productivity => better efficiency, larger user population supported
  - Cheaper moves, adds, and changes
- Lower network carrier costs
  - Fewer voice circuits required

Source: "The Strategic and Financial Justification for IP Communications," Cisco

Clouding the Vision –
Assuring IP Quality of Service is complex

- Guarantee that critical applications (provided over an IP network) get the resources they need, despite varying network traffic load

  – Get the most out of network resources

  – Ensure the network supports business goals

Applications

E-Mail, Web Browsing

Corporate Data

Voice

Traffic Classification

Gold — **Guaranteed Latency and Bandwidth**

Silver — **Guaranteed Minimum Bandwidth**

Bronze — **Best-Effort Delivery**

Specific Commitments on:

Response Time Utilization Availability Packet Drops Packet Delays etc.

Clouding the Vision – Management complexities add to IT cost

VP of IT: Business case foundation isn't so strong

- How will you do Traffic Management?
    - Enough bandwidth for current classes of service
        - Are pipes big enough for high priority traffic?
        - Is too much lower priority traffic being discarded?
    - Capacity planning must account for class of service
    - Track application usage

- How will you do Service Assurance?
    - Effect of service degradations on classes of service
        - How to protect higher classes first?
        - How to fix problems fast?

Clouding the Vision –
Service Assurance gets harder
VP of IT: Need some shielding from the heat

- Call quality – Today's situation (without VoIP)
  - How often do you have issues of poor call quality?
  - How do you resolve these?
  - How much staff time does this take?
  - Who is usually to blame? Is your job at risk today?
  - What is your discomfort level in responding to the CEO's questions

- Capacity management – Today's situation (without VoIP)
  - How do you determine how much capacity you need?
  - How often do you assess capacity requirements?
  - How much staff time does this take?
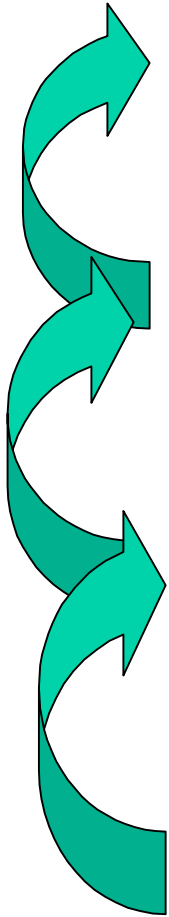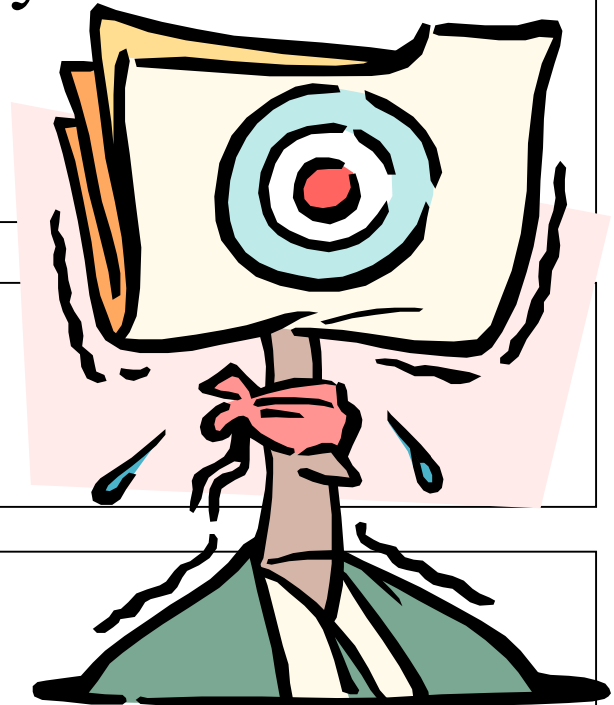 - How bad is it if you are wrong? Job risk?

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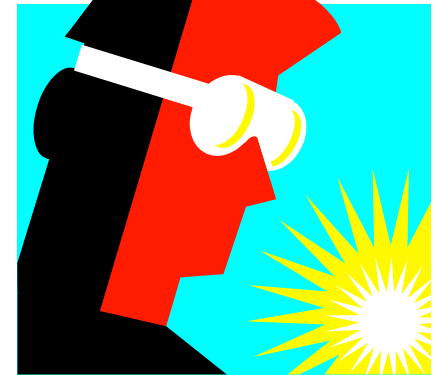
Clouding the Vision– Risk is shared across the company

Title:	CEO
Pain:	Share price dropping
Reason 1:	Eroding profit

Title:	CFO
Pain:	Eroding profits
Reason 1:	Missing sales targets

Title:	VP Sales
Pain:	Missing sales targets
Reason 1:	Poor VoIP performance causes business to slow

Title:	VP IT
Pain:	High cost, high risk of assuring VoIP reliability
Reason 1:	Traffic management requires expensive labor
Reason 2:	Poor VoIP performance causes business to slow

Managing the risk requires End to End Management

Active tests from edge
Jitter, response,
SIP, Q.931, RTP

VoIP Gateway

IP Phone

PBX

DSO
T1/E1

AAA
(Radius)

IP Call Manager

Gatekeeper

Router

IP Backbone

Layer 2 Network

VoIP Gateway

PTSN

Phone

- ■ IP/FR/ATM Network Management
- ■ Extension to VoIP Gateways
- ■ Server based content management
- ■ Extension to the Enterprise
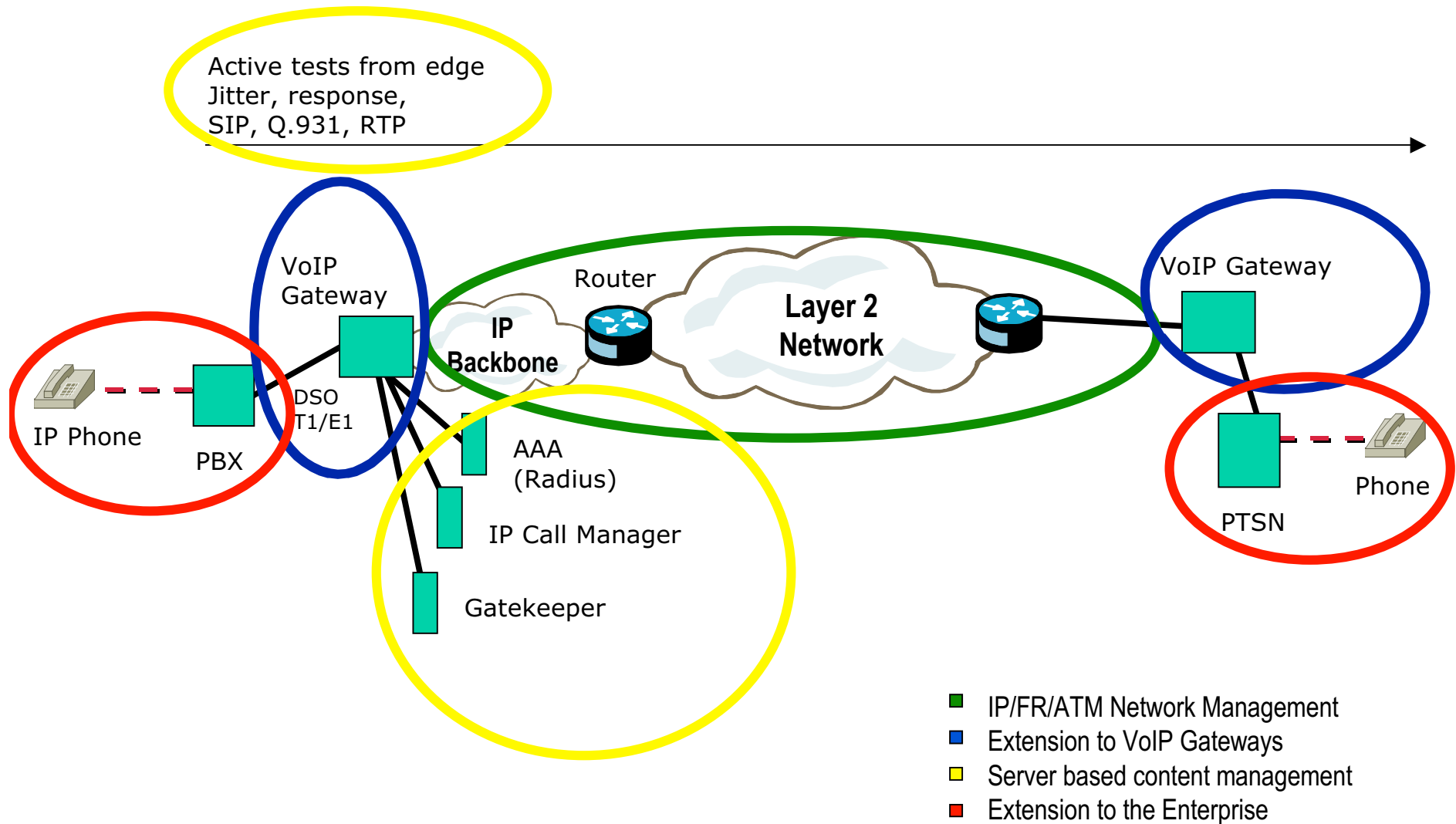
End to end management – consider it up front

Address your ability to provide end to end management <u>before</u> you count your savings

It will help you save more than a fistful of dollars

IP Telephony- *Required Implementation Steps*

- Network Assessment
- Site Assessment
- Dial Plan, Station Reviews, Addressing Scheme
- Engineering Design
- Network Upgrades
- Project Management
- Implementation
- Maintenance
- Managed Network Solutions
- Managed IP Telephony-- IPT Watch

> **IPT Products- with Installation, Integration, Project Management, and ongoing Maintenance**
>
> **Remember, It's Voice….**

Managed IP Telephony: People, Process, Technology

- **People**
  - High-performance teams organized around customers
  - Continuous training to maintain high level, up to date skill set.
  - Certifications
- **Process**
  - ISO 9001 certification
  - Continuous Improvement
  - Documentation
- **Technology**
  - Continuous investments to upgrade NOC systems
  - State-Of-The-Art, Integrated Management Systems
  - WWW-Accessible Information
  - Access to Best-of-Breed Tools

Verizon NOC -
Integrated Management System

- •Problem Management
  - –Filtering/Correlation
    - Veritas Nervecenter
    - MicroMuse NetCool
  - –Ticketing: Remedy
- •Element Managers
  - –CiscoWorks
  - –Net IQ
  - –Concord
  - –Netsys
  - –Optivity
- •Configuration Mgmt
  - –HP OpenView
  - –Visionael (Oracle DB)
- •Reporting - Web Based
  - –Concord Network Health
  - –Visual Uptime
  - –Remedy

Customer Engineer

Remedy Ticketing System

NetIQ ViOP

NetCool

LPA

Concord Network Health

VisionAEL

Nerve Center

Quote System

CiscoWorks 2000

Firewall

Router

Verizon
Network Management Infrastructure

Customer Network

Customer Network

Customer Network

Call Manager

QoS
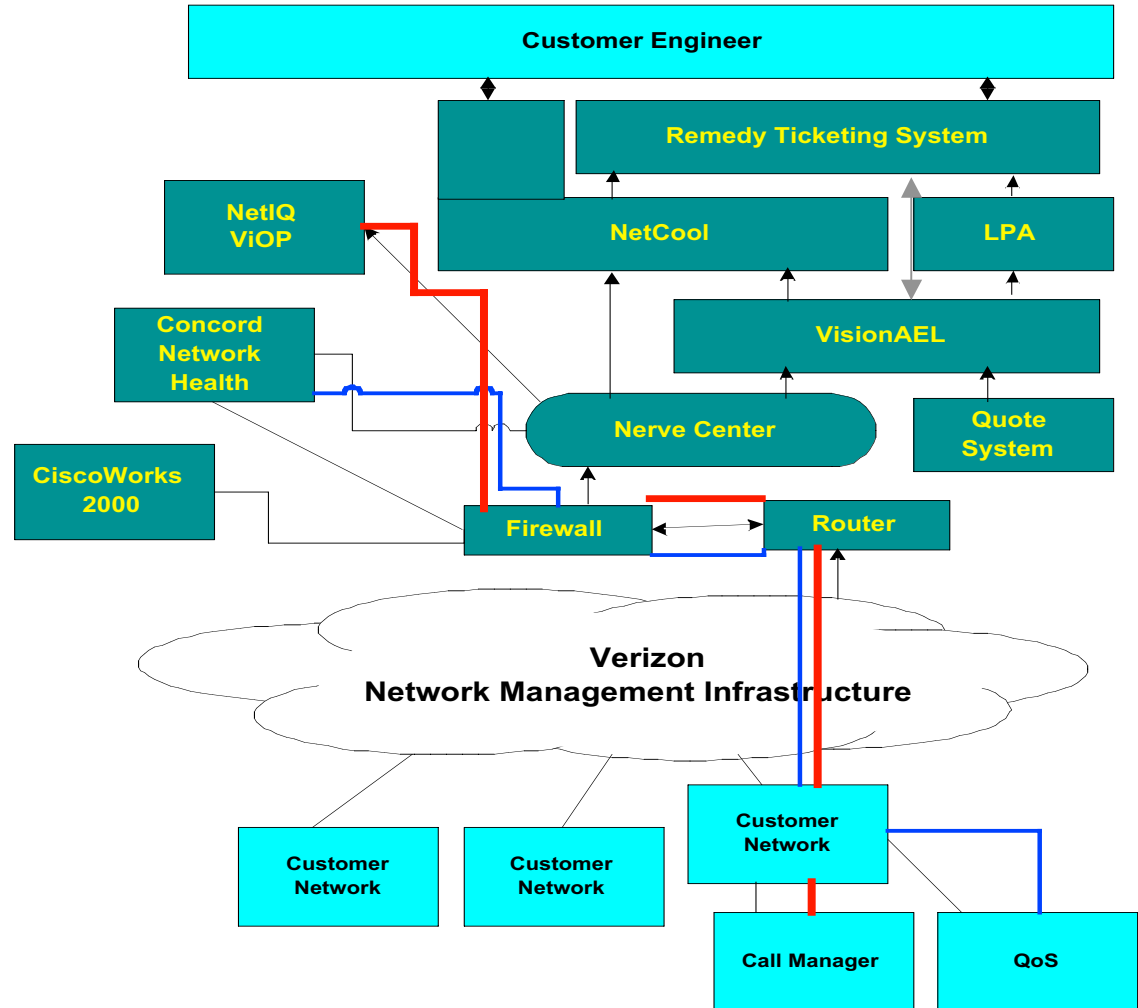
The Managed IP Advantage

Traditional Service	**With Verizon MNS**
Customer suffers disruption	Alarms received, correlated and priority assigned
Customer calls for help	
Customer waits on hold	Notifications sent automatically
Next available engineer receives call	
Customer explains problem	Diagnostics performed automatically
Priority is determined	
Trouble ticket is opened	
Engineer dials into equipment	Trouble ticket populated automatically
Engineer performs preliminary diagnostics	
In-depth troubleshooting begins	In-depth troubleshooting begins
Elapsed Time: 35 minutes	**Elapsed Time: < 5 Minutes**

Verizon Managed Network Solutions
IPT Watch

Provides packaging of tools such as Verizon Data Mntc and SiteWatch for a full network management solution.

Level 4 → **Converged Network Management**

Provides fault monitoring plus performance reports detailing QoS behavior across the network.

Level 3 → **IP QoS Performance Monitoring**

Provides fault monitoring of those elements within the customer network that are crucial to ensuring that established QoS policies are properly tuned and that network performance is within acceptable levels so as not to hinder QoS policy execution.

Level 2 → **IP QoS Fault Monitoring**

Provides management capabilities for the Cisco CallManager & Unity Voice Mail application and for the server on which the applications reside. This service also serves as the foundation on which all other IPT Watch enhanced service modules reside.

Level 1 → **CallManager & Unity Voice Mail / Server Mgmt**

What Does Managed IP Telephony Mean?

CallManager & Unity Voice Mail / Server Management

– System visibility

– Ensure high availability

– Address issues before they become application / server affecting

IP QoS Fault Monitoring

– Network visibility

– Ensure proper tuning of QoS parameters

– Address issues before they become network affecting

 • i.e. voice quality affecting

IP QoS Performance Monitoring

– Enhanced forecasting capabilities

– Accurate and timely information to make critical business decisions

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Better System Reliability, Reduced Ownership Cost, Ability to Focus on Optimizing the Core Business

Higher Education - Customer Problem

- Utilizes an old TDM PBX and a Cisco Data Network.

- Recognizes the benefits of Convergence based on existing and future IP applications.

- Converged network requires costly new tools and expertise to deploy and manage elementary convergence technology with both voice and data traffic.
  - With proper time and financial commitment, customer can retrain voice technicians and administrators to cover some requirements for a converged topology.
  - Customer still requires part time employee support for project implementation and to backfill staff being retrained.
  - Customer still needs to hire full time qualified engineers to support converged network.
  - Customer still needs to invest in converged network management tools.

Higher Education - Customer Solution

- Verizon designs a network and implements a turnkey solution including:

  - Cisco equipment, configuration and installation services

  - Verizon Data Maintenance for Cisco equipment

  - Verizon proactive network management via IPT Watch

  - Verizon High Speed PSTN connections

  - Verizon Dedicated Internet Access

  - Genuity Site Patrol - Managed Firewall Service

Customer Payoffs

- Customer uses existing staff to:
  - Maximize use of system's scalable growth
  - Provide for new applications implementations
- Verizon Provides Single Point of Contact For All Network Issues
- Verizon Provides 24x7x365 Network Management saving the cost of purchasing management tools in hiring new engineers.
- Verizon Provides Improved Network Quality and Availability
- Verizon Provides Accessibility To New Reports and Information For Better Decision Making
- Customer Can Concentrate On Quality Education, Efficient Research & University's Financial Concerns
- Customer Has A Single Consistent Monthly Fee