



# Converged Communications: Delivering Business Value Through IP Telephony

White Paper

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## 1 Executive Summary

Successful Information Technology (IT) professionals must meet two seemingly conflicting objectives. They not only must run their IT infrastructure as a utility—providing low cost, high reliability performance based on best-in-class benchmarks—but also must provide the functionality their company needs to achieve a competitive advantage and generate revenue.

This paper addresses ways that IT professionals can reconcile these conflicting requirements and add true value to their enterprise. It outlines an architecture that gives IT organizations an easy way to reduce costs and to implement new high-value functionality over time. It details how converged networks in general, and IP Telephony in particular, can offer immediate business value without compromising functionality or reliability. Finally, it describes how a company can transition its network to support IP Telephony, one of the cornerstones of converged networks.

Related Avaya white papers, including many of those mentioned in this document, can be found at [http://www1.avaya.com/enterprise/news/docs/thought\\_leadership/powering.html](http://www1.avaya.com/enterprise/news/docs/thought_leadership/powering.html)

## 2 Introduction: The Requirement to Show Incremental Value

*Information Week* reports that the average company spends around four percent of its total revenues on IT (a much higher percentage in information-intensive organizations)—making it often one of the largest cost items in an annual budget. As a result, IT and networking resources have typically been regarded as costs that need to be minimized. Today, though, that perception is beginning to change as companies develop a more balanced view of the value IT can bring.

There are two fundamentally different approaches an IT organization can take to providing business value. The first is the Utility Model. To be successful with the **Utility Model**, an IT organization must:

1. Satisfy the requirements of the majority of the company's business and functional managers
2. Have performance levels that are appropriate for the business requirements
3. Have a cost structure that is low compared to companies providing similar services at analogous performance levels.

The second approach is the **Value-Added Model**. To be successful with the Value-Added Model, an IT organization must continually deploy new functionality to help managers achieve their goals. Avaya market research<sup>1</sup> shows that the primary ways an IT organization can help a company achieve its goals are to:

<sup>1</sup>The research involved interviewing 30 IT organizations and surveying approximately 300 others. The goal of the research was to better understand how IT added distinct and measurable business value.



1. Increase the company's speed and flexibility in the marketplace
2. Provide for better collaboration with customers, suppliers, and distributors
3. Assist in acquiring and retaining skilled employees
4. Help respond to shifts in the marketplace
5. Increase customer loyalty
6. Increase worker efficiency

A successful example of the Value-Added Model is found in the experiences of an Avaya customer in the insurance industry that chose to begin providing broad financial planning services. In the company's new business model, financial planners met with potential clients to understand their financial situation and then developed appropriate investment strategies. Initially, it took the firm 30 to 45 days to deliver a completed financial plan, and this lengthy delay resulted in lost sales. To make significant reductions this interval, the company's IT organization worked closely with business managers to improve processes and to implement new IT solutions to support them. Now financial plans are delivered to clients in just three days, giving the company more speed and flexibility in the marketplace.

It is important to note that adding business value is not a one-time event. Instead it is a continual process for companies and their senior IT professionals, who must deploy an architecture that will allow them to implement high-value functionality both immediately and over time

### **3 The New IT Architecture: Integrating the Utility Model and the Value-Add Model**

To help IT managers implement new high-value functionality, Avaya has created a flexible model called the Avaya Communication Architecture (Figure 1).

Traditionally, networking organizations have been relegated to providing functionality such as switched Ethernet LANs or wide area network connectivity using technologies such as Frame Relay. Based on this limited role, the best these organizations can aspire to is success with The Utility Model, delivering low cost and high performance. The Avaya Communication Architecture positions networking professionals to do more, enabling new communications applications and services—such as interaction management and presence—that provide high value to the enterprise (see below).

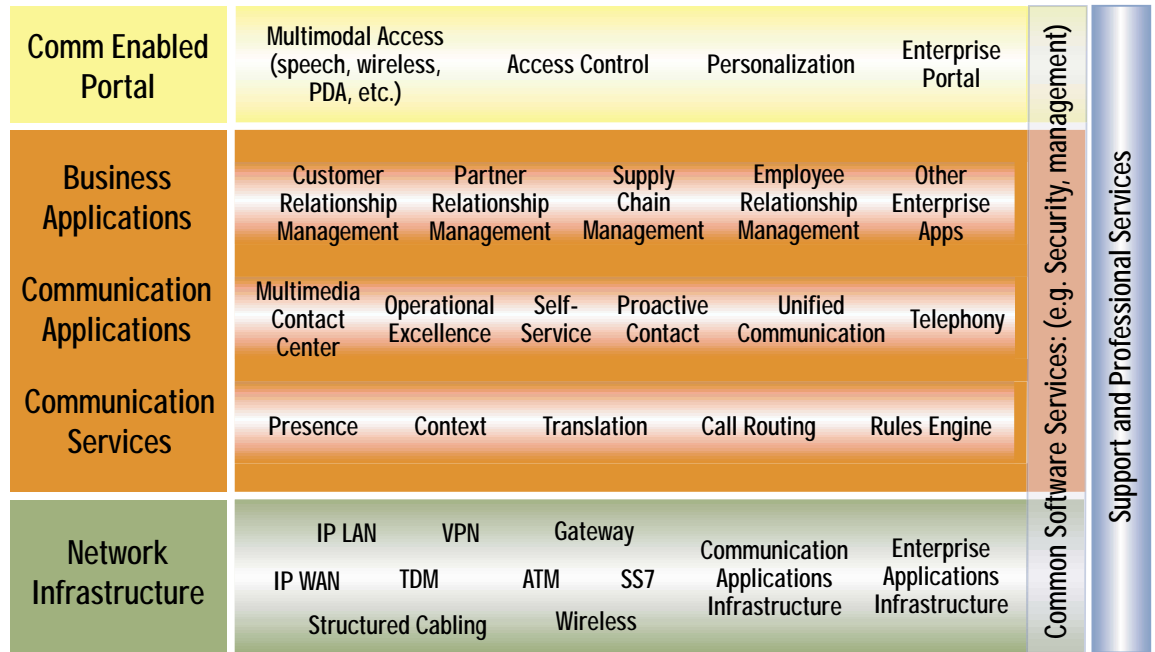


Figure 1—The Avaya Communication Architecture

In addition to providing opportunities to realize the Value-Added Model, Avaya’s architecture facilitates an IT organization’s ability to deploy new high-value functionality continually, ensuring that IT investments provide competitive advantage over the long haul.

**1. Creating Value Add Business Applications**

To help an IT organization add value, Avaya’s architecture:

- a.) Positions enterprise business processes at its apex
- b.) Facilitates the integration of IT in general, and communications in particular, with these business processes

Note that the business applications shown in Figure 1 (i.e., Customer Relationship Management, Partner Relationship Management, Supply Chain Management, and Employee Relationship Management) are intended to be representative applications. There is nothing in the architecture that limits the network to these particular business applications.

**2. Providing Universal Access to Value-Added Applications Via a Portal**

Avaya’s architecture uses a portal as an electronic gateway to a company’s IT resources. The key characteristics of the portal are:



- **Multimodal Access**—This feature allows access to communications-enabled business applications using any device (e.g., PDA, phone, PC) over any wired or wireless transmission infrastructure.
- **Security**—The portal supports a variety of security mechanisms, including authorization via access control, a single sign-on (authentication) process and integration with enterprise directories via the LDAP standard.
- **Personalization**—The personalization component provides the capability to dynamically specify what will be presented to the user based on the access mechanism, access device, the specific application and the user profile.
- **Extensibility**—The portal provides the ability to link communication capabilities seamlessly into new and existing enterprise portals.

### 3. Layering the Functionality to Enable Best of Breed Practices

When the IT industry develops an approach to solving complex problems, it typically avoids a monolithic solution in favor of a layered solution. With monolithic solutions, major changes must be made to accommodate any evolution of the supporting technologies. In contrast, a layered architecture—such as the ISO-standard Open System Interconnection model or the Avaya Communication Architecture—allows a given technology to be changed with little if any impact on the rest of the solution. As a result, IT organizations can introduce new and improved technologies without negatively impacting the rest of the solution.

### 4. Including a Vertical Layer for Common Services

The vertical common software services layer of Avaya's architecture supports accessibility by enabling a common policy and framework—from access to application to infrastructure. Two representative areas included in this layer are security and management.

More detailed information on the Avaya Communication Architecture can be found in the Avaya white paper entitled "*Avaya Communication Architecture*."

## 4 Converged Networks

Today there are many evolutionary technologies for increased business productivity and improved customer interaction. Among these are convergence technologies that merge voice and data networks into a single contact solution. With converged networks, users are able to communicate using new, flexible options that make them more productive. Additionally, data networks are now empowered to support telephony service and provide more detailed, contact-aware information. More information from Avaya on converged networks can be found in "*Converged Networks: A White Paper*."

In contrast to converged networks, traditional technologies offer a single "stovepipe" approach to business communications. While very effective at addressing the specific issues they were designed for, they are not very efficient with respect to costs and operational overhead. Converged networks provide a migration path that advances a traditional infrastructure from stand-alone applications into a distributed, shared information environment.



To achieve this integration, converged infrastructures rely on Internet Protocol (IP) for universal transport, which in turn enables technologies such as unified messaging, network-based call control and end-to-end quality of service. These technologies then form the foundation of more application-oriented services, such as contact centers that now can communicate with customers by web, fax, telephone or even video.

By enabling real-time communications, converged networks position businesses to take advantage of the next phase of convergence—converged communications. Converged communications involves the seamless integration of a full range of communication capabilities and business processes to increase both the efficiency and effectiveness of enterprise operations. In such an environment, communication is no longer a stand-alone application, but is driven by the same set of business rules that drive all other transactions that are part of the business process. The challenge for IT managers—and one that Avaya’s Communication Architecture supports—is the graceful evolution of enterprise infrastructures from traditional technologies to converged networks to converged communications.

More information on Avaya’s vision for migrating beyond converged networks to converged communications is available in the white paper, “*The Evolution to Converged Communications.*”

## 5 IP Telephony

One of the cornerstones of converged networks is often referred to as Voice over IP (VoIP) or IP Telephony. Though once used interchangeably, the marketplace is beginning to distinguish between these two terms.

VoIP supports both the Utility Model and the Value-Add Model by allowing enterprise IT organizations not only to lower the cost of networking, but also to offer functionality that previously was not economically feasible.

This chapter will discuss:

- The distinction between VoIP and IP Telephony
- The acceptance of VoIP in the marketplace
- Drivers for VoIP
- Essential voice functionality missing from some IP Telephony implementations
- Key voice design principles
- Architectural implications of implementing IP Telephony

### 5.1 VoIP and IP Telephony

The traditional approach to transporting voice traffic uses dedicated bandwidth from either a circuit-switched or Time Division Multiplexing (TDM) network. Initially, IT managers were motivated to replace these traditional networks with IP in order to reduce or eliminate PSTN costs. It made sense to call these initial deployments “Voice over IP,” emphasizing the key role of the IP network in transporting traditional voice traffic.



Reducing PSTN costs is still a powerful motivator and facilitates the Utility Model. However, the initial adopters of VoIP have experienced additional benefits and new factors are becoming significant drivers of non-traditional voice networking. As depicted in Table 2, these include:

- The ease of deploying new integrated applications
- The enhanced ability to deploy more business-oriented voice functionality, such as three-way calling and call forwarding

These new factors leverage IP and related technologies to provide telephony functionality that would be very difficult technically or economically to provide in a traditional voice network. As such, VoIP deployment also facilitates the Value-Added Model.

Many now use IP Telephony to describe this burgeoning, value-added approach to implementing non-traditional voice networks. The phrase is appropriate because it not only maintains the focus on IP, but also highlights the increasing emphasis on providing additional telephony functionality. Note that many companies are deploying both VoIP and IP Telephony solutions.

#### 5.2 Marketplace Acceptance of VoIP

VoIP has become a common way for companies of all sizes to provide voice services. An article entitled “*Survey: VOIP Moves Beyond Cost-Cutting*” (hereinafter referred to as the **BCR** article) in the July 2002 edition of **Business Communications Review**<sup>2</sup>(**BCR**) presents the results of a survey that was given to over 600 network professionals. The survey questions that were asked for the BCR article did not explicitly distinguish VoIP from IP Telephony. As such, the responses represent a mixture of both VoIP and IP Telephony.

However, the research that was done for the article asked the survey respondents to indicate which components of a VoIP solution they had already deployed. Their responses are depicted in Table 1<sup>3</sup>.

Solution Component	Percentage of Respondents who had Already Deployed
IP Phones	67%
VoIP Gateways	58%
Voice Enabled Routers	44%
IP PBXs	37%
IP Enabled PBXs	34%

Table 1—Currently Deployed Components of a VoIP/IP Telephony Solution

<sup>2</sup> Survey: VOIP Moves Beyond Cost Cutting, BCR, July 2002, Jim Metzler

<sup>3</sup> Table 1 provided by Jim Metzler, author of “Survey: VOIP Moves Beyond Cost Cutting”, id.



Typically, IP phones and IP PBXs are part of an IP Telephony solution. VoIP gateways, voice enabled routers, and IP-enabled PBXs are part of a VoIP solution. Table 1 indicates that both VoIP and IP Telephony are being widely deployed.

The article in BCR stated that 28 percent of companies had already deployed VoIP, and an additional 51 percent were either planning to evaluate or to deploy VoIP by mid-2003 (Figure 2).

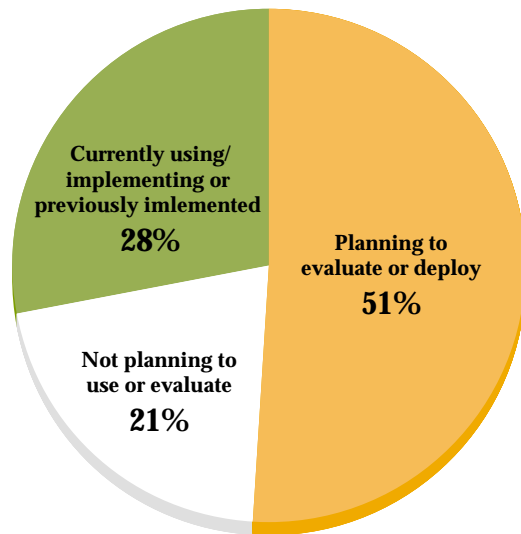


Figure 2—Current Deployment of VoIP

The BCR article stated that 28 percent of the companies surveyed had already deployed VoIP, and an additional 51 percent were planning either to evaluate or to deploy VoIP by mid-2003 (Figure 2). Further, those already using VoIP predicted they would use the technology more extensively in the future. According to BCR, roughly one of every five companies who have deployed VoIP is using it to carry 20 percent or more of their voice traffic. However, within a year 41 percent of these current implementers expect to utilize VoIP to carry 20 percent or more of their voice traffic.

**5.3 Benefits and Concerns Relative to Deploying VoIP**  
The survey summarized by BCR asked companies currently utilizing VoIP to indicate the top benefit they enjoyed as a result. Their responses are summarized in Table 2.

Benefit	Percentage of Times it was the Primary Benefit
Cheaper Domestic Calls Between Company Sites	17%
Reduce the cost of Systems Administration	17%
Increase the ease of deploying new Integrated Applications	13%
Economic ability to deploy voice functionality such as three-way calling and call forwarding	12%
Cheaper International Calls	10%

Table 2—Primary Benefits of VoIP Utilization As seen by Current VoIP users



Table 2 shows that while tariff arbitrage is still an important benefit of VoIP, other benefits are becoming almost as important. In particular, the ability to extend voice functionality to offices where it was not previously economically feasible is ranked as a major benefit to a large numbers of users. So is the ease of deploying new integrated applications—a clear indication that enterprises are steadfastly on the move to realize the vision of the Avaya Communication Architecture and IP Telephony with applications that integrate communications and business services.

The BCR article stated that though the vast majority of companies deploying VoIP were satisfied, there were two primary concerns:

- Implementation of VoIP was more difficult than they expected
- Users complained about poor voice quality

A subsequent section of this paper entitled “Preparing for the Transition” discusses how Avaya works with its customers to eliminate these concerns.

#### 5.4 Essential Voice Functionality

Most traditional PBXs offer hundreds of features. This is in sharp contrast to many IP Telephony solutions that offer relatively few features. This gap in functionality is the subject of a Gartner Research Note entitled “*IP Telephony is Missing Frequently Used Voice Features*,”<sup>4</sup> published in June 2002.

Below are ten of the voice features Gartner described as missing or available only in limited fashion in many current IP Telephony solutions. Avaya not only supports these features, but does so in a way that allows customers to deploy them as part of a graceful evolution to IP Telephony from whatever their current IT environment happens to be.

In the following list, an “\*” indicates a feature that is most closely associated with the Utility Model and a “\*\*” indicates a feature that is most closely associated with the Value-Added Model.

**1. Account and Forced Account Code Entry \*\***

The lack of this feature means that enterprises will not be able to bill back for items such as the cost of phone calls or the time spent with a client.

**2. Malicious Call Trace \***

The lack of this feature makes it difficult or even impossible to identify the source of a malicious call, provide appropriate information to the authorities, or record these calls.

**3. Basic or Network Automatic Route Selection or Least-Cost Routing \***

The lack of this feature means that calls will not automatically be routed over the most economical facility. This will likely lead to higher transmission costs.

**4. Class of Service (COS) and Network Class of Service (NCOS) \*\***

The lack of this feature means that users cannot be given different levels of access to system resources, thereby limiting end-user flexibility and system control.

**5. Analog Ports and Devices, Paging Interface \***

The lack of this functionality means that there is no direct support for modems, fax machines, or music-on-hold sources. Group and loudspeaker paging are also not supported.

<sup>4</sup> IP Telephony is Missing Frequently Used Voice Features, Gartner, June 3, 2002



6. **Blind Transfer \***  
The lack of this feature means that the transferring party must stay on the line until the transferred call is answered.
7. **Speed Dial—User and System \*\***  
The lack of this feature means that users can only access frequently dialed numbers by pressing a preprogrammed button on their telephones.
8. **Call Forwarding \*\***  
The lack of the full functionality of this feature means that there is no ability to forward calls to off-premise locations, or to differentiate between ring no-answer and busy no-answer calls.
9. **Hunting \***  
The lack of the full functionality of this feature may limit a company's ability to effectively support call coverage applications.
10. **Conferencing \***  
The lack of this feature would require that an adjunct conference bridge be added.

#### 5.5 Design Principals

In order to be truly impactful, IP Telephony solutions must be highly extensible. Some of the key design principles that ensure this extensibility include:

- **Multi-Modal Support**  
This enables transmission of a variety of media types (i.e., voice, text, image) over both wireline and wireless networks, between devices that range from PDAs to mainframe computers.
- **Multi-Vendor Support**  
Whether within an enterprise or across the PSTN, IP Telephony solutions must run over an infrastructure that includes equipment from multiple vendors.
- **Strict Adherence to Standards and Interoperability**  
Standards are key to achieving interoperability, which is an absolute requirement for true multivendor support. Note that “interoperability” refers to communications at both a basic and advanced level between:
  - o Equipment from different vendors that supports a given standard, e.g., H.323
  - o Equipment from the same or different vendors that supports multiple related standards, e.g., H.323 and SIP.
- **Software Features and Capabilities**  
Telephony is far more complex than merely setting up a call between two end points. There is a richness of voice functionality that must be supported in any effective IP Telephony deployment.
- **Robustness**  
One highly desirable feature of the traditional PBX is that it is extremely reliable. In order for IP Telephony to be successful, media servers and media gateways must be as reliable as these PBXs. This robustness can be provided by increasing the reliability of individual devices, or by deploying these servers and gateways in clusters such that the failure of any given device does not disable the network.



- **Scalability**  
IP Telephony solutions need to scale from support for a small office to support for a global enterprise with a virtually unlimited number of employees.
- **Centralized and Integrated Management**  
As pointed out by BCR, the two primary concerns expressed by companies deploying VoIP are the difficulty of implementation and poor voice quality. This feedback underscores the need for effective management of VoIP deployments.  
  
Effective management is integrated, with a single tool set and a common user interface for functions such as configuration management, fault management and monitoring of the entire VoIP environment. It is also centralized. These characteristics will improve the quality of the management provided, while simultaneously reducing the learning curve and staff requirements.
- **Security**  
In many cases, the deployment of IP Telephony will require additional security functionality, such as end-to-end encryption. Additional security functionality is discussed in other white papers found on Avaya.com.
- **End-to-End QoS**  
As a minimum, converged networks must support the IEEE 802.1p and the IEEE 802.1Q standards. These standards will enable packet classification and queuing, traffic prioritization, as well as the ability to eliminate unnecessary multi-cast traffic. Several options in effectively implementing end-to-end QoS are discussed in application notes and white papers found at [avaya.com/eclips](http://avaya.com/eclips).

The preceding set of design guidelines apply to the technological underpinnings of an IP Telephony solution. The next section describes some of the issues related to IP Telephony deployment that impact the IT staff.

#### 5.6 Implementation Considerations

According to industry technical analyst, Phil Hippensteel, the evolution of IP Telephony will bring several significant architectural changes to the IT staff. Some of these seem rather obvious while others require some deeper thought. In most cases the changes result from the differences in the way voice professionals and data professionals go about their daily work responsibilities. On the other hand, some changes are based on new ways of using technology. Some of the more significant changes that Phil Hippensteel commented on are:

1. IP Telephony vendors will use a mix of both proprietary protocols as well as traditional voice standards from organizations such as the ITU-T and from the Internet Engineering Task Force (IETF).  
  
Avaya has embraced standards such as H.323 and Power Over Ethernet from the inception of its product line. Other vendors, such as Cisco, have consistently used proprietary protocols to control primary voice endpoints. Cisco's Skinny Client Control Protocol, inherited through an acquisition, uses H.323 to pass calls out of the Skinny environment into the PSTN. As a general rule, the use of proprietary protocols reduces interoperability.
2. Both IP Telephony and traditional data switching devices, such as Ethernet switches and routers from all manufacturers, use TDM. What is new with IP Telephony is where the TDM is implemented.



For example, Avaya uses TDM in its Avaya™ S8700 Media Server and in its Avaya™ G700 Media Gateway. Cisco uses TDM in its Catalyst switch fabric to produce similar functions. Codec transposing and music on hold are examples of functions that were supplied from the PBX bus, but are now done in the Catalyst switch TDM fabric.

While distribution of the TDM-based functions to the switch fabric may seem to be a good thing, it adds a requirement that uninterrupted power be behind each switch. This requirement can be circumvented in a pure data world by using multiple switches and re-routing traffic automatically with the spanning tree algorithm.

3. Avaya and several other vendors differ in their approach to the integration of legacy voice equipment such as PBXs and voice mail servers.

While Avaya provides a migration path that allows the reuse of nearly all of this equipment, other vendors require an almost complete replacement of voice switching equipment. Otherwise, they treat the legacy equipment as “foreign” equipment and connect to it using traditional telecom circuits such as T-1s or analog circuits. In such cases, much of the functionality of the voice endpoints is lost.

4. IP Telephony will require a merging of attitudes between voice and data professionals about initial and ongoing support and maintenance.

Voice professionals have expected strong vendor support during the design phase and direct presence during cutover to a new system. Data professionals have an expectation for some support during the design phase, but little more than remote support as the system is placed in production.

5. There will be one physical infrastructure (wiring plant).

Data wiring specifications provide for a single head-end for all systems. This means cabling will emanate close to the PSTN demarcation point, the video production source, and probably the server room. A critical part of planning for a converged environment is deciding how these three sources can be collocated.

### 5.7 Other Considerations

In addition to the technical considerations described above, IP Telephony deployments must follow legal and regulatory requirements and must address physical requirements, including power.

#### Regulatory Requirements

The FCC requires telecommunications vendors to make their products and services accessible to people with disabilities, if readily achievable, per Section 255 of the Communications Act. While these rules focus on telephony equipment, they require network architecture to be designed in a way that does not hinder access by people with disabilities. Telephony managers need to take these rules into consideration when designing their communication systems.

As a global leader in voice and data systems, Avaya recognizes the need for complete accessibility in a wide range of product categories, from telecommunications and software applications to operating systems and Web-based applications. Though understanding the complex array of accessibility laws is a daunting task, Avaya is strongly focused on multiple initiatives to make disability access a reality:



- Pursuing the vital steps to identify compliant products—using the Section 508 matrix developed by the Information Technology Industry Council (ITI) and the government
- Creating a series of comprehensive compliance verification processes to perform more detailed assessments of conforming products
- Actively participating in standards organizations, helping to ensure the interoperability of assertive technologies and products from different manufacturers.
- Using human factors expertise to develop products with enhanced usability and access capabilities
- Initiating patents (pending) for some fresh new approaches, devices, and technologies that specifically address the needs of anyone with disabilities.

Avaya is committed to bringing equal access technology to today's marketplace. It is actively working to provide innovative solutions and comprehensive services that meet the stringent standards established by Section 508 of the Rehabilitation Act.

#### Power over Ethernet

IP connectivity is not limited to PCs, workstations, servers, switches, or routers. Simple network appliances, such as IP telephones, are proliferating. Many of these appliances require a small amount of power. In the legacy telephony world, power is carried through the same wires that carry voice signals. However, in the new world of IP telephony, IP telephones are cabled to the Ethernet LAN switch, not the PBX cabinet. The IP telephone needs to get power either through the Ethernet or from another source.

There are three approaches for providing power to IP devices: local power, Midspan units, and LAN switches. In the local power approach, the phone uses a power connector on the phone to connect to a local power unit that is plugged into a regular power outlet. In the Midspan approach, a Midspan power unit is inserted in the cabling between the IP phone and the Ethernet switch to provide power to the phone. This approach provides power for IP phones over the existing copper cable, and it allows centralized power management. In the LAN switch approach, the switch provides power directly to the IP phone over the existing cable. The Midspan approach and the LAN approach allow a user to simply plug into an Ethernet jack and start using the device without adding another cord to the power outlet.

Avaya provides a complete range of solutions for Power over Ethernet, including local power solutions, Midspan units and power-supplying LAN switches. Avaya also is committed to meet the specifications of the new IEEE 802.3af standard for Power over Ethernet (currently in development and expected to be ratified in mid-2003). Avaya is very active in the IEEE 802.3af Task Force, with representatives who are prolific contributors and hold the position of Task Force editor.

## **6 Preparing for the Transition**

As noted earlier, the deployment of IP Telephony is complex. To assist IT managers in making the transition, this section of the document will briefly identify some of the key network characteristics and functionality required for success. It will also outline how Avaya can assist enterprises in assessing the readiness of their network to support IP Telephony. More detail on these topics can be found in the following Avaya white papers:



- Avaya IP Voice Quality Network Requirements, Issue 2.0, August 2002
- Avaya Network Assessment for Internet Protocol (IP) Telephony Solutions Primary Network Requirements and Functionality

#### 6.1 Primary Network Requirements and Functionality

Some of the key network requirements and functionality necessary for the successful deployment of IP Telephony are:

- Packet Delay
- Network Jitter
- Packet Loss
- Network Packet Mis-Order
- Codec Selection

More detail on these requirements and functionality can be found in “*Converged Networks: A White Paper.*”

#### 6.2 Avaya’s Network Assessment Capabilities

Avaya offers assessment services to help a company determine if its network can support IP Telephony. These network assessment services consist of two distinct phases: a Customer Infrastructure Readiness Survey and a Network Analysis Network Optimization.

##### 6.2.1 The Customer Infrastructure Readiness Survey

The goal of the readiness survey is to identify potential problems that may affect an enterprise’s ability to deploy IP Telephony. Avaya network consultants use interactive questionnaires and a non-intrusive data collection tool that views the data exchange between a local host and a remote source. Based on these surveys, the Avaya consultants will:

- Identify all of the equipment in the network and collect information on device connections, network topology, and device configurations
- Provide a baseline of the existing application performance
- Ensure that voice traffic will have the proper prioritization.

##### 6.2.2 The Network Analysis Network Optimization

As part of this service, Avaya consultants use a variety of tools, including the Avaya™ ExpertNet VoIP Assessment tool. This tool allows the consultants to gather information on many of the factors described in section 6.1 of this document, e.g., delay, jitter, and packet loss.

The key steps in this service include:

- Determining the end points for installing data collection utilities
- Injecting traffic that represents IP Telephony traffic onto the customer’s network
- Building a model of the customer’s network
- Evaluating various options, such as differing codecs, and quantifying the impact of these options on the customer’s network.



## 7 Summary

In order to be successful, IT professionals must satisfy conflicting goals. They must run their infrastructure as a utility and also continually find new ways to add business value. This paper helps IT professionals achieve both objectives through a new IT architecture and IP Telephony. Specifically:

- We've outlined an Avaya Communication Architecture that gives IT organizations an easy way to implement new high-value functionality over time. The Avaya Communication Architecture achieves this objective by facilitating the integration of IT in general—and communications in particular—with core business processes.
- We've detailed how converged networks and IP Telephony provide the functionality to lower costs while also adding value.
- Through the experiences of those who have deployed IP Telephony and a wealth of third-party market research, we've outlined the complex challenges that must be resolved both to prepare a network for convergence and to ensure a successful IP Telephony deployment.

This paper recommends that companies interested in deploying IP Telephony consider Avaya's network assessment capabilities. Preparation and planning are critical for the success of any network convergence project, and adding value without compromising functionality or reliability involves much more than purchasing excellent products. The added complexity of designing and implementing IP Telephony reinforces the value of a full service vendor like Avaya.

## About Avaya

Avaya enables businesses to achieve superior results by designing, building, and managing their communications networks. More than one million businesses worldwide, including 90 percent of The FORTUNE 500®, rely on Avaya solutions and services to enhance value, improve productivity, and gain competitive advantage.

Focused on enterprises large to small, Avaya is a world leader in secure and reliable IP telephony systems and communications software applications. Driving the convergence of voice and data communications with business applications—and distinguished by comprehensive worldwide services—Avaya helps customers leverage existing and new networks to unlock value and enhance business performance.

For additional information on our Converged Systems, please contact your Avaya Client Executive, Authorized BusinessPartner, or visit us at [avaya.com/leanmore/ip](http://avaya.com/leanmore/ip). For more information about Avaya and our other award-winning solutions, visit [avaya.com](http://avaya.com).

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