Hype Cycle for Networking and Communications, 2006


Future networks will be intelligent, secure and highly automated, supporting many forms of media and collaboration capabilities in wired and wireless environments. Understanding the maturity of networking technologies will help you make more informed investment decisions.
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STRATEGIC PLANNING ASSUMPTION

Through 2010, 80 percent of businesses that have deployed communications-enabled business processes will have acquired significant competitive and revenue differentiation because of them (0.9 probability).

ANALYSIS

1.0 What You Need to Know

Many demands are placed on enterprise networks, and investing properly in network and communications technologies requires an understanding of their maturity. Responsible network managers know when to adopt a technology and where it is best used. Investing too early in immature technology can lead to costly project failures and rework; investing too late means missed opportunity.

Companies should accelerate their investment in technologies that are within two years of the Plateau of Productivity. Enterprises should be cautious about making large investments in technologies that will take longer than two years to mature.

2.0 The Hype Cycle

The Hype Cycle for Networking and Communications is made up of technologies that span many technical domains, which is indicative of network managers’ broad responsibilities. Network managers are concerned with both wired and wireless technologies, and are responsible for data and voice, and often video as well. They are adding more intelligence in the network to improve application performance, efficiency and security. They are also increasingly using third-party managed services. The entries in this Hype Cycle describe the most general set typically considered. For more detail on, for example, wireless networking or network service provider infrastructure, please consult the specific Hype Cycle (see Recommended Reading section).

Many communications network technologies matured in a short period. Foundational technologies such as Internet Protocol (IP), Ethernet, routing and switching moved quickly from early deployments through to massive acceptance in less than a decade. IP-based virtual private networks are now broadly embraced, and companies that do not migrate will find themselves unable to meet the demands of the business. Other technologies are now evolving at the same rapid pace: wireless, broadband and application-aware networking are becoming mainstream in short order.

Managed network services have also matured, and companies are asking their service providers to take on more responsibilities for equipment management and monitoring, among other tasks.

Despite the range of technologies here, there are some common themes: convergence (IP telephony, fixed-mobile convergence, unified communications, video and broadband IP telephony); intelligence (wide-area network optimization controllers, network admission control and XML appliances); use of services (hosted and utility networks, hosted voice over IP [VoIP] and telecom expense management); and wireless (VoWLAN, 802.16-2004 WiMAX, point-to-point wireless bridges and Air PBX).
Figure 1. Hype Cycle for Networking and Communications, 2006

![Diagram of Hype Cycle for Networking and Communications, 2006](image)

**Technology**

- Video Telephony — Enterprise
- Network Device
- Configuration Management
- Communications as a Service
- Fixed-Mobile Converged Voice Service
- IPv6
- Network Access Control
- Open-Source Software: IP Telephony
- Unified Communications
- WAN Optimization Services
- Broadband IP Telephony Services
- XML Appliances
- SSL Remote-Access VPNs
- 802.3af — Power Over Ethernet
- MPLS Services
- IP Telephony
- Enterprise WDM Wavelength Services
- Application Delivery Controller
- Network Performance Reporting
- Streaming Video
- WAN Optimization Controllers
- Videoconferencing
- Session Initiation Protocol
- VoIP WLAN
- Telecom Expense Management
- Next-Generation Satellite Network Outsourcing
- 802.16-2004 WiMAX
- Broadband IP Telephony Services
- IP Telephony
- Enterprise WDM Wavelength Services
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- Streaming Video
- WAN Optimization Controllers
- Videoconferencing
- Session Initiation Protocol
- VoIP WLAN
- Telecom Expense Management
- Next-Generation Satellite Network Outsourcing
- 802.16-2004 WiMAX

**Peak of Inflated Expectations**

- Enterprise Peer-to-Peer VoIP
- Hosted IP Telephony
- 802.16-2004 WiMAX
- Point-to-Point Wireless Bridges
- Point-to-Point Wireless Bridges
- Point-to-Point Wireless Bridges

**Trough of Disillusionment**

- Air PBX
- SSL Peer-to-Peer, Site-to-Site Virtual Private Networks

**Slope of Enlightenment**

- Network Device
- Configuration Management
- Communications as a Service
- Fixed-Mobile Converged Voice Service
- IPv6
- Network Access Control
- Open-Source Software: IP Telephony
- Unified Communications
- WAN Optimization Services
- Broadband IP Telephony Services
- XML Appliances
- SSL Remote-Access VPNs
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- Telecom Expense Management
- Next-Generation Satellite Network Outsourcing
- 802.16-2004 WiMAX

**Plateau of Productivity**

- VoIP

**Years to mainstream adoption:**

- ○ less than 2 years
- ● 2 to 5 years
- ● 5 to 10 years
- △ more than 10 years
- ❌ before plateau

Source: Gartner (July 2006)
3.0 The Priority Matrix

Within two years, VoIP in its many forms will impact businesses through more efficiency, better productivity, more openness and better integration with applications. Application delivery controllers will play an essential role in improving the performance of a wide variety of applications (and the underlying infrastructure) in the data center.

On a two- to five-year horizon, several technologies will actually transform business, especially via enhanced employee productivity, better access to information, more standardization and more control over communications systems.

IP telephony provides a new level of flexibility that will be transformative to those who adopt it correctly (that is, those who do not simply duplicate their existing phone system using IP, but rather adopt a communications-enabled business process approach to it). Systems using unified communications are a key productivity enhancer, removing latency from key business processes. Session Initiation Protocol will provide additional control to developers, better integration to various collaborative applications and more openness.
## Figure 2. Priority Matrix for Networking and Communications, 2006

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Years to Mainstream Adoption</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Less than 2 Years</td>
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<tr>
<td>Transformational</td>
<td>IP Telephony</td>
</tr>
<tr>
<td></td>
<td>Unified Communications</td>
</tr>
<tr>
<td>High</td>
<td>Application Delivery Controller</td>
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<td>VoIP</td>
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<tr>
<td>Moderate</td>
<td>802.3af — Power Over Ethernet</td>
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<td></td>
<td>Wavelength Services</td>
</tr>
<tr>
<td>Low</td>
<td>Network Monitoring Tools</td>
</tr>
</tbody>
</table>

*As of July 2006*

*Source: Gartner (July 2006)*
4.0 On the Rise

4.1 SSL Peer-to-Peer, Site-to-Site Virtual Private Networks

**Definition:** Secure Sockets Layer (SSL) is used between individual workstations to create meshed connections that can enable peer-to-peer (P2P) communications and emulate a corporate network without the use of boundary routers and distributed remote LANs.

**Position and Adoption Speed Justification:** Inquiries are starting, but the capability to create distributed SSL associations is primitive.

**User Advice:** Network planners might consider individual tunnels both for flexibility (meshing of user connections) and also to separate traffic for quality of service (QOS) management (each tunnel gets a different QOS treatment).

**Business Impact:** SSL can help fill the need for secure communications over the Internet.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Embryonic

**Sample Vendors:** Array Networks

**Appears In Hype Cycle:**
- "Hype Cycle for Information Security, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** John Girard

4.2 Air PBX

**Definition:** An "air PBX" is an IP-PBX system in which traditional PBX desk phones are replaced by cell phones. The implementation can be via wireless LAN (WLAN) or cellular. Devices using software telephone ("softphone") technology can use all functions provided by the call manager. Implementation can be behind the firewall or on a carrier network.

**Position and Adoption Speed Justification:** Few vendors have this technology, but major PBX vendors are discussing the idea. Most people use cell phones far more than any wired devices, so it's logical to assume that the desk phone and cell phone will eventually converge into a single device: the wireless phone. First, however, WLAN capability in the handset, more standards and interoperability, and roaming among networks must be developed. The concept could follow the emergence of unified communications.

**User Advice:** Users should question the practice of purchasing desk phones for all users, and question vendors on all implementations using cell phones. When the replacement finally occurs, companies could save $350 to $1,000 per desk phone.

**Beware of PBX vendors that want to charge license fees equivalent to the cost of a desk phone for softphone technology.**

**Business Impact:** Potentially huge savings by consolidating two devices into one on each user's desk. Possible full-cost avoidance if the end user subsidizes or purchases the cell phone.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Embryonic
4.3 Fixed-Mobile Converged Voice Service

**Definition:** Service convergence is when an operator offers services that are integrated across stand-alone services, such as voice mail or a directory system that embraces voice over Internet Protocol (VoIP) and cellular subscripts. A fixed-mobile converged voice offering is a similarly integrated voice offering using one handset.

**Position and Adoption Speed Justification:** There are still very few commercial fixed-mobile converged voice services, but several more are in trial, and further service launches are expected in the second half of 2006 and beyond. Current services have used Bluetooth to connect to the fixed network, and the range of handsets have been very limited. Next-generation services to be launched in 2006 will instead use Wi-Fi, and the range of available handsets will be larger.

**User Advice:** Users should carefully assess the potential return on using these services, including the cost of swapping out the established handsets. It is also likely that the established wireless LAN will need to be upgraded. Mobile operators may well provide location-based tariffs in response or larger buckets of minutes to counter a potential threat.

**Business Impact:** This impacts the voice services and enterprise uses and provides an opportunity to eliminate duplication of voice services within one organization. Duplication can be costly as illustrated by duplicate handsets, duplicate subscriptions, duplicable numbers and management of multiple providers, including provisioning and billing. Fixed-mobile converged voice services are aimed at meeting the requirements for mobility and convenience in the form of one handset, one voice mail and one number, but they do so at a lower cost than relying on a pure cellular solution. The impact can therefore be high from a cost perspective and from a convenience perspective.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** BT Group; TeliaSonera

4.4 Communications as a Service

**Definition:** The utilization of enterprise-class communications applications and technology (such as IP telephony, contact center services and unified communications) is offered as a service. Included within this market offering would be the extension of communications application in a software-as-a-service (SaaS) or utility model. End users would not be required to make capital investments in communications applications, nor would they be responsible for the maintenance and management of the communications infrastructure.
Position and Adoption Speed Justification: The growing acceptance of off-premise business communication solutions will also fuel the growth of solutions based on the “valued-added” communications-as-a-service (CaaS) model. Startups, network service providers, equipment vendors and large systems integrators (SIs) are all looking at this market.

User Advice: Users are cautioned to scrutinize feature refreshment and change control service levels in standard statements of work (SoW). Most offerings are structured as monthly recurring charges on a per-active port, or per-seat, basis.

Business Impact: The service reduces the risks associated with managing internal communications infrastructure. The service may also reduce some level of capital and operating expenses related to business communication infrastructure. These services provide companies with a way to procure advanced communications capabilities (for example, contact center and IP telephony features) without capital investments. These services also provide companies their first approach to being able to allocate communications charges within their organizations based on standard monthly recurring charges (MRC).

Market Penetration: Less than 1 percent of target audience

Maturity: Emerging

Sample Vendors: Avaya; Contactual; Electronic Data Systems (EDS); IBM; M5 Networks; Siemens

Recommended Reading:
- "Hosted Contact Center Services Offer Opportunities for Providers"
- "Managed, IP Centrex Services Will Be IP Voice Winners"
- "IP Centrex and IP Telephony Offer Different Capabilities"

Appears In Hype Cycle:
- "Hype Cycle for Software as a Service, 2006"
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Eric Goodness

4.5 Network Device Configuration Management

Definition: Network device configuration management tools focus on documenting configuration files, auditing changes and deploying updates to multivendor network devices. Network configuration management tends to be a discipline unto itself, but in the future it increasingly must be considered as part of the configuration process for an end-to-end service.

Position and Adoption Speed Justification: Network device configuration management has primarily been a manual process involving typing commands into vendor-specific command line interfaces or creating homegrown scripts to ease retyping requirements. Little consideration is given to rigorous change management or disaster recovery rollback processes. A new generation of network configuration management vendors is creating tools that operate in multivendor environments and bring a more rigorous change management process and audit capability.

User Advice: Replace manual processes with network device configuration management tools to monitor and control the change process, reducing risk and allowing compliance policies to be
enforced. Prior to investing in tools, establish standard network device configuration policies to reduce complexity and enable more effective, automated change.

**Business Impact:** These tools provide an automated way of maintaining network configuration, offering an opportunity to lower cost and head count.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Alterpoint; Intelliden; Opsware (Rendition); Voyence

**Appears In Hype Cycle:**
- "Hype Cycle for IT Operations Management, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Debra Curtis; Will Cappelli

### 5.0 At the Peak

#### 5.1 Video Telephony — Enterprise

**Definition:** Video telephony is the ability to make video calls to individuals as easily as making voice calls using the enterprise IP telephony systems. This is one-to-one video calling and not videoconferencing of three or more people or locations.

**Position and Adoption Speed Justification:** The applications are beginning to arrive; however, the deployment of video cameras as an integral part of a workstation has not started. A critical base is required to justify the value.

**User Advice:** In many cases, this is a capability of IP telephony systems; however, actual use of the capability will be limited to specific vertical applications such as engineering or manufacturing. In many cases, the visual component adds little value after the first or second call with the same individual. Companies should look at specific opportunities for the technology — the cost and value from the application does not suggest that this will be an immediate horizontal application in most companies. Applications that have a visual component, such as showing someone how a part is built or connected, could act as driver in some verticals. Cameras, both in terms of supply and sufficient bandwidth, remain factors that will limit usage in many companies. Over time, PCs will come standard with a camera, and enterprise video telephony will then begin to grow rapidly.

**Business Impact:** Video telephony will provide improved communications by adding the visual component.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Alcatel; Cisco Systems; Mitel Networks; Nortel

**Recommended Reading:**
- "Positions 2005: Voice and Data Will Converge Onto a Single Network via IP Telephony and Voice Over IP"

**Appears In Hype Cycle:**
5.2 IPv6

**Definition:** IPv6 is the next version of the Internet Protocol (IP). The main benefits of IPv6 are vastly increased address space, integrated security and quality-of-service mechanisms, as well as support for autoconfiguration and mobility. In addition, large network operators may see better routing stability.

**Position and Adoption Speed Justification:** Commercial enterprises have little reason to adopt IPv6. Migration costs are very high for established IP networks, and attempts to transition even moderate-sized networks have revealed many unexpected problems and hidden costs. Most of the benefits of IPv6 can be delivered with current IP (IPv4) workarounds such as network address translation and IPsec security. On a worldwide basis, most of the interest in IPv6 comes from government and research entities, with some interest from mobile operators. In the U.S., the military has been an aggressive driver of IPv6 adoption.

**User Advice:** Enterprises should not invest in an IPv6 transition at this time. There are many other important investments to make that will deliver a faster return, and may indeed be inhibited by migrating to IPv6 too early. Over the next five years, enterprise networks may connect to external IPv6 service networks, but this will not require a large investment. Enterprises should merely be prepared to support remote IPv6 clients and provide gateway services to the enterprise’s IPv4 applications for these users.

In the U.S., the defense establishment has been an aggressive driver of IPv6 adoption and the Office of Management and Budget has set June 2008 as the date by which all federal government agencies’ network backbones must be transitioned to IPv6. We anticipate, however, that many agencies will not make the target dates and that the timeline will be adjusted.

**Business Impact:** Little or no impact to business. Very little benefit to enterprise organizations, and potentially disruptive to operations. Government organizations may be forced to adopt IPv6 as a result of internal mandates.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** BT Group; Cisco Systems; Juniper Networks; Nortel; NTT Communications

**Recommended Reading:**
- "There's Still No Reason for Enterprises to Move to IPv6"
- "U.S. Government's Move to IPv6 Will Require Disciplined Implementation"

**Appears In Hype Cycle:**
- "Hype Cycle for Emerging Technologies, 2006"
- "Hype Cycle for Government, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** David Willis
5.3 Network Access Control

**Definition:** A network access control (NAC) process evaluates the security state of a system or user as it connects to the network; monitors the security state of systems that are already connected; and implements network access and system remediation policies based on the state of the system, the threat environment and user identity.

**Position and Adoption Speed Justification:** Appliances are available for providing point solutions for all connection scenarios. Cisco Systems released Phase 2 of its solution in late 2005, and Microsoft plans to release NAC functions with its Vista client and its Longhorn server. The Trusted Computing Group's Trusted Network Connect initiative is driving multivendor interoperability via a set of application programming interfaces (APIs) — the most recent of which were released in May 2006.

**User Advice:** Initial deployments of NAC technology should be narrow in focus, to minimize support issues, technology integration requirements and overall project risk. An example of a good initial deployment scenario: application of the process to guest worker network segments.

**Business Impact:** NAC enables enterprises to establish policies for controlling network access. Typical policies include checking for up-to-date antivirus signatures, up-to-date operating system patches and the existence of a personal firewall. Endpoints that don’t meet these policies get quarantined.

**Market Penetration:** Five percent to 20 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Check Point Software Technologies; Cisco Systems; Juniper Networks; McAfee; Microsoft; Symantec

**Recommended Reading:**
- "Benefits of Cisco's Network Admission Control Come at a Price"
- "Implement a Network Access Control Architecture"
- "Network Access Control Market Overview"
- "Pitfalls Lurk Where IP Telephony Meets Network Access Control"
- "Protect Your Resources With a Network Access Control Process"

**Appears In Hype Cycle:**
- "Hype Cycle for Information Security, 2006"
- "Hype Cycle for Infrastructure Protection, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Mark Nicolett; Lawrence Orans

5.4 Open-Source Software: IP Telephony

**Definition:** Open-source software consists of versions of Internet Protocol (IP) telephony applications.
**Position and Adoption Speed Justification:** Early versions of the software are now available. Enterprise experience is still limited. However, one large vendor, Aspect, now supports open-source software. Aspect is now offering support for the Asterisk open-source IP telephony platform. Although Aspect had previously focused on the contact center, this offering allows it to provide the mainstream voice capabilities to its contact center clients.

**User Advice:** Open-source IP telephony systems still have limited functionality and require a somewhat technically sophisticated company to run them. Ongoing support can also be challenging. Users should approach this alternative cautiously and conduct thorough trials before using it as a replacement for established telephony solutions.

**Business Impact:** Open-source IP telephony could reduce costs for communications applications.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Embryonic

**Sample Vendors:** Digium Asterisk; Pingtel SIPxchange; SIPFoundry

**Recommended Reading:**
- "Open-Source Telephony Is Cheap to Buy but Costly to Manage"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for Open-Source Software, 2006"

**Analysis By:** Bob Hafner

### 5.5 Unified Communications

**Definition:** Unified communications (UC) is the direct result of convergence in communication networks and applications. Differing forms of communication have historically been developed, marketed and sold as individual applications. The convergence of all communications on IP networks and on open software platforms is allowing a new paradigm for UC and its impact on how individuals, groups and organizations communicate.

Gartner defines UC products (equipment, software and services) as those that enhance individual, workgroup, and organizational productivity by enabling and facilitating the control, management, integration, and use of multiple enterprise communication methods. UC products achieve this through convergence and integration of the communication channels (that is, media), networks, systems and business applications, as well as through consolidation of controls over them. UC products may be made up of a stand-alone product suite or from a portfolio of integrated applications and platforms.

UC products are used by employees for their own communications as well by enterprises to support workgroup and collaborative communications. These products also extend UC outside of the boundaries of a company to enhance communications between organizations and to support interactions among both very large public audiences and specific individuals.

**Position and Adoption Speed Justification:** UC solutions are now emerging onto the market. They represent a consolidation and convergence of capabilities that previously were available only separately. Key functional areas that are being combined include PBX, IP-PBX, softphones,
voice mail, unified messaging, e-mail, desktop calendaring, audioconferencing, Web collaboration, videoconferencing, presence and instant messaging.

**User Advice:** Users should review the existing communication servers to see how they could offer more value by being integrated. They should also review business processes to see how these could benefit by being communication-enabled. Pilots can be undertaken to evaluate the solutions. A migration path should be developed so that as communications equipment is updated or acquired, it has a better chance of fitting into a broader portfolio.

**Business Impact:** UC improves the communications ability of individuals, groups and enterprises. This is typically reflected in speedier response to events and increased availability of accurate information.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Embryonic

**Sample Vendors:** Alcatel; Cisco; IBM; Microsoft; Nortel; Siemens

**Recommended Reading:**
- "Achieving Agility Through Communication-Enabled Business Processes"
- "Magic Quadrant for Unified Communications, 2006"

**Appears In Hype Cycle:**
- "Hype Cycle for Collaboration and Communication, 2006"
- "Hype Cycle for Contact Center Infrastructure, 2006"
- "Hype Cycle for Enterprise Communications Applications, 2006"
- "Hype Cycle for High-Performance Workplace, 2006"
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for the Telecommunications Industry, 2006"
- "Hype Cycle for Wireless Hardware, Software and Services, 2006"

**Analysis By:** Bernard Elliot

### 5.6 WAN Optimization Services

**Definition:** WAN optimization controllers (WOCs) are provisioned, managed and potentially hosted to offer services that make more efficient use of the bandwidth. In time, we will see more WOC functions built into carrier-class services.

**Position and Adoption Speed Justification:** As WOCs mature and gain deeper penetration in the business market, service providers will respond with services to retain and gain customers.

**User Advice:** Organizations that have customer-facing Internet applications or want to purchase WAN optimization as a service can go to specialist service providers or global carriers for various types of service offerings.

**Business Impact:** Can reduce the cost of WAN bandwidth, while delivering significant gains in application performance.
Market Penetration: Less than 1 percent of target audience

Maturity: Emerging

Sample Vendors: Akamai Technologies; BT Group; Netli; Orange Business Services

Appears In Hype Cycle:
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Mark Fabbi

6.0 Sliding Into the Trough

6.1 Broadband IP Telephony Services

Definition: Broadband IP telephony services provide a full complement of voice services for one to three lines, including local and long-distance voice services, voice mail and caller ID over a public broadband service such as digital subscriber line (DSL) or cable broadband. It may be purchased independently of the actual broadband service, or bundled with the access. Broadband IP telephony is occasionally called "voice over broadband," but we use the term broadband IP telephony to distinguish it as a specific type of IP-based voice service (voice over broadband may be delivered without IP).

Position and Adoption Speed Justification: Consumer voice-over-IP services are gradually maturing but have significant challenges, including inconsistent service reliability for customers. Providing the service profitably is also difficult for service providers. Companies such as Vonage have pioneered the use of voice services overlaid on top of the user's own broadband. User experience has been lackluster, with substantial complaints about the service itself and the limitations of support by the service providers. Technical issues remain: for example, with call quality, emergency services (that is, 911 in the U.S.) and customer diagnostic capabilities. The pricing advantage for these services has also deteriorated, as competitive offerings from the telcos and cable companies have emerged — and traditional voice rates continue to drop. It is likely to deteriorate further as regulators move to impose taxes, interconnection, universal service and other fees to these services.

User Advice: Use broadband IP telephony services for tactical purposes, where low cost is more important than reliability. It should not be used to support customer-facing activities. Consider vendor financial viability when signing contracts. Over time, the ability to save money with this approach will diminish, but clients should use the threat of broadband IP telephony migration when negotiating with traditional carriers. Enterprises with a large remote worker population that needs high reliability should consider more stable providers and/or the self-provisioning of IP telephony and/or softphones. If using the service, insure users have other communications options available in the event of an outage, and that emergency service (such as 911) is available and properly configured — or available on a separate, standard phone line.

Business Impact: Use tactically for small office/home office environments where low cost is more important than service reliability.

Market Penetration: Less than 1 percent of target audience

Maturity: Adolescent

Sample Vendors: AT&T; Verizon; Vonage

Recommended Reading:
6.2 XML Appliances

**Definition:** Extensible Markup Language (XML) appliances (increasingly called integration appliances) are software-configurable devices that perform processing (for example, validation, routing, security checking, transformation, logging, tracking and compression) of XML data. Some vendors have appliances that apply these functions to non-XML data as well, which essentially are application integration functions.

**Position and Adoption Speed Justification:** The primary advantages of XML appliances are to offload processes from general-purpose CPUs and provide enhanced security, message quality, throughput and business process tracking in a scalable, centrally configured and managed topology. Accelerated implementation times are also claimed due to the reduced complexity of creating data descriptions using XML (in those cases where they are used). The interest in and need for XML processing capabilities continues to grow in government, financial (investment, banking, insurance), telecommunications and retail organizations. The need for high-speed XML-based processing will grow with activities in the commercial sector and the rapid adoption of XML standards by, among others, the U.S. military, the Internal Revenue Service, the Securities and Exchange Commission and the Federal Deposit Insurance Corp.

**User Advice:** Appliances are useful for high-speed processing of large data volumes. These are targeted at functions that may be specific to XML-defined data, or more generally applicable to predictable message streams. Be sure your integration appliance provider can process XML-defined messages.

**Business Impact:** High-speed, secure processing of discrete XML messages and large XML data sets.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Adolescent

**Sample Vendors:** Cast Iron Systems; Cisco Systems; Forum Systems; IBM (DataPower); Infotone Communications; Intel (Sarvega; Conformative Systems); Layer 7 Technologies; Reactivity; Solace Systems; Tarari; Vordel; Xlipstream

**Recommended Reading:**
- "Who's Who in Integration Appliances, 4Q05"
- "XML Appliance Use in SOAs Benefits Organizations"

**Appears In Hype Cycle:**
- "Hype Cycle for Application Integration and Platform Middleware, 2006"
6.3 Enterprise Peer-to-Peer VoIP

**Definition:** Business applications that enable peer-to-peer (P2P) voice connections using voice over Internet Protocol (VoIP) technology. In P2P communications, each end point is independent until a direct connection is made.

The relative simplicity of these applications means they can be sold through channels other than those used for traditional telephony products.

**Position and Adoption Speed Justification:** Vendors are developing proprietary applications. But security concerns have yet to be addressed.

**User Advice:** Businesses should assess the risks of using P2P VoIP applications. They should recognize that the main disadvantages are limited scalability and a lack of support for third-party controls and services (to create consolidated reports, for instance). In addition, they must consider the implications for bandwidth consumption.

On the other hand, these applications can reduce call costs — especially mobile roaming charges — significantly, and they allow for great independence of individual users and devices. What's more, administration overheads are very low or even nonexistent.

Organizations that decide to use such an application should strictly control the version deployed and its distribution to authorized users by means of configuration management tools.

**Business Impact:** Collaborative and multimedia applications. Low-cost communications.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Avaya; Microsoft; Popular Telephony; Skype

**Recommended Reading:**
- "Skype Makes Significant Contributions to the Changing Voice Market"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Katja Ruud

6.4 Ethernet MAN/WAN Services

**Definition:** Ethernet MAN/WAN services use optical Ethernet service for the delivery of Ethernet services over the metropolitan-area and wide-area networks.

**Position and Adoption Speed Justification:** Further investment in network service provider (NSP) metropolitan networks is needed before services are widespread. The current product set is limited in geographic reach, and most providers do not support virtual private LAN service (VPLS) or Multiprotocol Layer Switching (MPLS).
User Advice: Consider Ethernet MAN/WAN services for use with high-bandwidth intensive applications, such as computer-aided design/computer-aided manufacturing (CAD/CAM) and records retention; also consider this service when access to Ethernet is installed in your location. Users must understand that Ethernet services can be delivered on dedicated Synchronous Optical Network (SONET) infrastructure (point to point) or shared and best efforts infrastructure (point to multipoint).

Business Impact: Ethernet MAN/WAN services offer lower-cost, high-bandwidth and Layer 2 management.

Market Penetration: Five percent to 20 percent of target audience

Maturity: Adolescent

Sample Vendors: AT&T; Qwest; Time Warner Telecom; Verizon Business; Yipes Enterprise Services

Appears In Hype Cycle:
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Ted Chamberlin

6.5 Hosted IP Telephony

Definition: Hosted IP telephony solutions encompass two primary services: externally hosted IP-PBX and IP Centrex. IP trunking, a service in which internal IP voice traffic is converted to time division multiplexing (TDM) traffic to traverse the public switched telephone network (PSTN), has reached full maturity and been removed from the Hype Cycle.

Position and Adoption Speed Justification: The market opportunity for converting legacy switched voice to packetized voice is growing, but few service providers have standardized offerings or installed clients. Many end users will be unable to make an effective business case for hosted voice over IP (VoIP), due to the continued erosion of voice pricing and the incremental investments necessary to convert customer premise equipment to IP-enabled. Hosted IP-PBX, in which a service provider hosts and manages a client-provided IP-PBX off-site at an Internet data center, enables enterprises to continue developing and managing their PBX environments without the initial capital investment, or the ongoing operational maintenance of the server. IP Centrex enables enterprises, educational institutions, and state and local governments to purchase IP-based voice functionality on a shared platform without committing to a particular PBX platform, maintenance and support.

User Advice: Consider which component of hosted IP telephony will provide your enterprise with a positive return on investment and minimal risk; then plan a strategy to convert switched voice to that platform. Most users implementing IP telephony build it directly on the enterprise network with on-premise solutions. Managed solutions for on-site IP telephony are also an option, and IP trunking is the least-intrusive option. IP Centrex will meet the needs of legacy Centrex users as well as organizations that don't want to make the capital investment in a PBX. Hosted IP-PBX will enable enterprises to offload the day-to-day maintenance of the IP-PBX; simplify moves, adds and changes; and still retain a level of control over dial plan management.

Enterprises should consolidate their telephony into a common strategic supplier that's consistent with programs for e-mail, ERP, CRM and other business application software. Businesses should focus on telephony suppliers that can support all their geographic locations directly or through a network of systems integrators and value-added resellers.
Proceed with caution when engaging a service provider for hosted IP telephony services, because most product offerings don’t have consistent pricing, customer support or service-level agreements.

**Business Impact:** Cost savings will be the initial driver, but not the compelling reason to consider hosted VoIP. However, the capability to enable new applications, capabilities and business processes will eventually drive migration to hosted VoIP.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** AT&T; Avaya; Covad; Qwest; Sprint Nextel; Verizon Business

**Recommended Reading:**
- "Ask Five Critical Questions Before Moving to a Hosted IP PBX Contract"
- "Large and Small Customers Can Benefit From IP Centrex"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Ted Chamberlin

### 6.6 802.16-2004 WiMAX

**Definition:** Originally known as 802.16d, this approved wireless broadband standard uses 2GHz-to-11GHz frequencies, which can penetrate walls and other dense objects. 802.16-2004 provides transmission to stationary devices and replaces the 802.16 and 802.16a specifications.

**Position and Adoption Speed Justification:** Some pre-standard equipment is already in commercial use and certified products just entered the market in the first half of 2006.

**User Advice:** The mobile standard was ratified in 2005, with products to come by 2007 — so unless there is an urgent and immediate need, wait for certified mobile products.

**Business Impact:** It provides high-speed wireless backhaul and last-mile access.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Alvarion; Iospan Wireless; Navini Networks; Redline Communications

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for Wireless Networking, 2006"

**Analysis By:** Phillip Redman

### 6.7 Point-to-Point Wireless Bridges

**Definition:** Wireless bridges used in outdoor applications for WAN/MAN network access and short-span connectivity (typically 0.5 to two miles and up to 10 miles using directional antennas) using Wi-Fi or other wireless technologies in either licensed or unlicensed spectrum.
Position and Adoption Speed Justification: A cost-effective alternative to carrier leased-line services, free space optics, microwave or enterprise WiMAX.

User Advice: Good alternative to microwave in rugged terrain or urban areas because it does not require line of sight. Do not overlook the costs of spectrum licensing and management and the need to assess solutions based on unlicensed spectrum.

Business Impact: Lower-cost services and more network capacity.

Market Penetration: One percent to 5 percent of target audience

Maturity: Adolescent

Sample Vendors: 3Com; Cisco Systems; Proxim

Appears In Hype Cycle:
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for Wireless Networking, 2006"

Analysis By: William Clark

6.8 Network Outsourcing

Definition: Network outsourcing is a multiyear, or annuity, contract or relationship with a service provider to build, manage and operate a company's public and private networks. Historically, companies have kept network management in-house, even while outsourcing data center and desktop functions. Increasingly, companies are looking for a single source to own the ongoing management and operation of their business networks and network personnel. The network environments addressed in this market are the local-area network (LAN), wide-area network (WAN) and premises-based voice (CPE).

Position and Adoption Speed Justification: Companies are looking to outsource their networks to external providers (for example, carriers, systems integrators, and IT and business process outsourcers); however, the deals are complex because of the size of the networks, long-term carrier contracts and personnel. It should be noted that managed router services, a key point service in network outsourcing, have become more mainstream as companies migrate to IP services (for example, Multiprotocol Label Switching [MPLS]). Managed network services have also matured, and companies are asking their service providers — whether they be network service providers or IT outsourcers — to take on more responsibilities for equipment management and monitoring.

User Advice: Users are urged to identify primary drivers for specific network platforms and to tailor their bid documents, and service-level agreements, accordingly. Examples of approaches to developing outsourcing goals for discrete network platforms are: LAN represents the offload of tedious, and often understaffed, operations responsibilities, while the WAN may represent cost-reduction possibilities and performance improvements. Outsourcing the premises voice infrastructure may reduce operating costs and/or enable beneficial business capabilities previously unrealized with in-house managers (for example, IP telephony and contact centers).

Business Impact: Network outsourcing enables the company to focus on its core business, and optimize current infrastructures for cost reduction and IP migration.

Market Penetration: Five percent to 20 percent of target audience

Maturity: Adolescent
**Sample Vendors:** AT&T; Avaya; BT; CSC; EDS; Equant; IBM Global Services; Northrop Grumman; SAIC; Verizon Business

**Recommended Reading:**
- "Network Outsourcing: Lessons from State Government"
- "Network Outsourcing Popularity Grows in Western Europe"
- "Users Reveal Requirements for Network Outsourcing (Executive Summary)"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Eric Goodness

### 6.9 Next-Generation Satellite

**Definition:** Megabit and multimegabit next-generation Ka-band satellite services, which incorporates multiple spot beams and frequency reuse technologies, targeted to residential and small and midsize business markets underserved by wired infrastructure or alternative wireless broadband access modalities. Many new satellite services now support IP-based transmissions and applications.

**Position and Adoption Speed Justification:** Ka-band satellite services were more widely available in North America and Asia/Pacific with the launch of WildBlue in the United States, Telesat in Canada, and IPStar by Shin Satellite in many countries in Asia/Pacific. Satellite-based connectivity is still a niche player in the total access market. However, the ability to support IP-based services, virtual private networks, higher speeds and more competitive pricing, and service provider alliances and reseller agreements with carriers such as AT&T all contribute to the improved future prospects for next-generation satellite network services. Many companies are also increasing use of satellite technologies for path diversity in support of business continuity planning in case of disasters. Next-generation satellite will start to compete against growing WiMAX deployments in regions lacking terrestrial networks. But it could also be used to backhaul WiMAX traffic.

**User Advice:** For users in areas that still lack robust cable, DSL or fiber-based access, this new generation of satellite services now offers more capabilities at prices that are nearly competitive with terrestrial alternatives. The exception is the equipment costs. Enterprises may want to look again at this option for workers that are truly remote, as well as for branch offices for insurance, healthcare, financial, manufacturing or other industries.

**Business Impact:** Lower cost, higher bandwidth and wider applications support. Next-generation satellite service providers will be increasingly allied with larger carriers such as AT&T and Verizon in wholesale agreements to offer solutions as part of total service options for business continuity, or as fill-in access modality offerings.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Adolescent

**Sample Vendors:** AT&T; IPStar; Telesat Canada; WildBlue

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"
6.10 Telecom Expense Management

**Definition:** This is a subcategory of business process outsourcing that manages the consolidation of wireline and mobile invoices, manages and automates bill processing and disputes (accounts payable), and reduces stranded network and telecommunication capital through improved asset management.

**Position and Adoption Speed Justification:** This market remains immature because the primary vendors in it are small and immature. The market has suffered from poor delivery for two reasons. First, many of the largest players have suffered "indigestion" resulting from acquisitions. Second, because there are over 100 vendors competing in the U.S. market alone, many providers have underbid on opportunities only to reduce customer service to ensure margins for the company. The market does offer stunning return on investment (ROI) in terms of telecom cost reduction. But customer satisfaction has suffered. The catalyst to better market offerings is for network service providers (NSPs) and systems integrators (SIs) to invest more resources to provide services. The past year has seen CSC and Verizon Business make significant announcements to provide multi-carrier expense management solutions. Gartner is encouraged by these announcements.

Telecom expense management is primarily a North American market; however, Gartner is seeing strong growth in Europe from Europe-based companies. Similarly, there is modest growth in Asia/Pacific being initiated by U.S.-based multinational corporations. Business intelligence relative to telecom expenditure and improved telecom asset management are the main drivers outside the U.S.

**User Advice:** Users are urged to request between five and 10 customer references from similar size companies and vertical markets when considering vendor proposals. Guarantees for ROI should be discussed with vendors if their marketing claims offer large cost reductions. Gartner sees contingency fees as a standard of business for one-time audits. However, Gartner strongly urges companies to avoid contingency fees for managed or outsourcing services structured as annual subscriptions.

**Business Impact:** Reduces costs for telecom services spending and the resources to manage telecom services spending.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Asentinel; Invoice Insight; ProfitLine; Rivermine; Tangoe

**Recommended Reading:**
- "MarketScope: Telecom Expense Management, 2005"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Eric Goodness
6.11 VoIP WLAN

**Definition:** Voice over wireless LAN is standards and technology to deliver voice calls and other audio over a wireless IP framework over a wireless LAN.

**Position and Adoption Speed Justification:** Voice over wireless LAN is receiving increased support from wireless LAN and cellular handset vendors, standards have been ratified, and the technology is being integrated into a growing number of IP PBX implementations.

**User Advice:** Voice over wireless LAN addresses the need for local mobility and voice communications. There are additional operating and capital costs for supporting voice, so idea of “free” service is not valid.

**Business Impact:** Voice over wireless LAN would be used by those companies with a local, mobile voice need. It works well as a replacement for expensive private mobile radio systems and is being adopted primarily in the healthcare, retail, education and manufacturing industries.

**Market Penetration:** Less than 1 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** Most Wi-Fi vendors

**Appears In Hype Cycle:**

- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for Wireless Networking, 2006"

**Analysis By:** Phillip Redman

6.12 Session Initiation Protocol

**Definition:** Session Initiation Protocol (SIP) is an Internet Engineering Task Force-specified communications protocol. It’s the first to enable multiuser sessions, regardless of media content. SIP will enable a new generation of communications services across the Internet, as well as fixed and mobile IP networks. SIP allows communications of various types to be initiated and managed. Key communication channels include voice, video and instant messaging.

SIP has a number of key components. SIP user agents (UAs) are devices (phones, PCs, PDAs) that are used to establish connections. The SIP registrar server is a database that registers the location of all UAs within a domain. It also passes participant IP addresses and other information to the SIP proxy server. The proxy server accepts session requests made by UAs and queries the SIP registrar for the recipient’s address before forwarding the session invitation directly to the recipient. This enables peer-to-peer communication between UAs, where sessions are established or modified using Session Description Protocol (SDP).

SIP is already being used by some mobile applications to add authentication as part of the communication process. This process can replicate with all devices to ensure improved security of communications, especially via the Internet.

**Position and Adoption Speed Justification:** Standards and applications are still evolving, but it is clear that SIP will be the protocol for communications. It is widely adopted by leading vendors. However, there remain some differences between vendors, so portability is not assured and must be validated.
User Advice: Ensure that vendors offer SIP as a contact control option in their platforms, and ask vendors for what interoperability testing they have performed. This will make it more likely that different vendor SIP products will interoperate.

Business Impact: SIP allows communications to be integrated with each other and with business applications more easily. The result is communication-enabled business processes can be developed where the applications themselves initiate and control communication sessions. The result will be more-effective work processes and better usage of collaborative and multimedia applications.

Market Penetration: Less than 1 percent of target audience

Maturity: Adolescent

Sample Vendors: Alcatel; Avaya; Nortel; Siemens

Recommended Reading:
- "Achieving Agility Through Communication-Enabled Business Processes"

Appears In Hype Cycle:
- "Hype Cycle for Contact Center Infrastructure, 2006"
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Bernard Elliot; Bob Hafner

6.13 Videoconferencing

Definition: These are in-house services to support multiparty videoconferencing using room and group systems.

Position and Adoption Speed Justification: Growth in this sector will continue to accelerate with the penetration of IP-based networks and the integration of videoconferencing systems with enterprise IP voice systems. Improvements in videoconferencing technology include lower bandwidth requirements, better overall quality of the video experience and more-intuitive system controls for users. There is also a movement to high-definition quality systems and to higher-end, virtual presence systems (like HP Halo and those from Telesuite, Teliris and LifeSize). Further improvements in compression technology are likely to emerge within the next two to three years as well. Although the traditional videoconferencing room system market is fairly mature, these new technology factors are bringing about some significant changes that need to be watched.

User Advice: Define the proper video bandwidth requirement for the organization by working with the equipment vendor and network service provider(s). Conduct appropriate user training and internal videoconferencing promotion programs, then implement and continue to monitor and adjust the videoconferencing system as required.

Business Impact: Videoconferencing is widely used for enabling better internal corporate communications through the transmission of live/interactive presentations and conferences, especially in sessions where personality is important.

Market Penetration: Five percent to 20 percent of target audience

Maturity: Early mainstream

Sample Vendors: Emblaze-VCON; Polycom; Sony; Tandberg; VTEL
Recommended Reading:
- "Videoconferencing Systems: A Shortlist of Vendors and Products, 2006 Update"

Appears In Hype Cycle:
- "Hype Cycle for Collaboration and Communication, 2006"
- "Hype Cycle for Human-Computer Interaction, 2006"
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Richard Costello; Don Stuart

6.14 WAN Optimization Controllers

Definition: The optimization of WANs through the use of compression, transmission control protocol manipulation, advanced traffic and bandwidth management, quality of service, dynamic caching and other application layer spoofing and manipulation techniques.

Position and Adoption Speed Justification: New algorithms and technologies have significantly improved the performance gains available with these technologies. However, integration into complex networks and the challenges of full network deployment are still not resolved. There will be increasing competition in this market as some of the basic functions become embedded in other WAN equipment and services.

User Advice: The technologies for WAN optimization controllers (WOCs) continue to improve. Organizations wishing to consolidate branch-office servers or dealing with real-time applications should consider WOCs as a short-term fix.

Business Impact: Can reduce the cost of WAN bandwidth, while delivering significant gains in application performance.

Market Penetration: Five percent to 20 percent of target audience

Maturity: Emerging

Sample Vendors: Juniper (Peribit Networks) Expand Networks; Packeteer; Riverbed Technology

Appears In Hype Cycle:
- "Hype Cycle for Networking and Communications, 2006"

Analysis By: Mark Fabbi

7.0 Climbing the Slope

7.1 Streaming Video

Definition: Streamed, live delivery of enterprise information, presentations and training by video to the desktop.

Position and Adoption Speed Justification: Little interest from organizations for live, multipoint streaming, largely because of limitations in access network bandwidth that prevent live streaming media to branch office and small office/home office (SOHO) locations. In most cases, non-real-time streaming of content (training and demonstrations) from local cache/streaming servers is used because it satisfies requirements and is much more cost effective.
**User Advice:** Carefully evaluate the total costs of deploying live streaming video, including WAN bandwidth upgrades, WAN and LAN multicast protocol enablement, quality of service, upgrades, production studio construction and operation. Live, multipoint streaming typically requires a multimillion dollar network upgrade and massive increase in operational expenses.

Often, the driver is a desire from senior management to communicate with staff. In this case, senior management should be presented with a full, evaluation of the total cost of ownership for different options, including differing qualities of live streaming and, for comparison, a costing of stored video playback with audio conferencing for Q&A (which will typically be an order of magnitude less than live video). This will be a major consideration for C-level executives and, therefore, a significant part of the cost/benefit analysis. This lets the budget owner decide what they can afford and what is "good enough" and takes IT out of the difficult position of justifying a significant expense that may provide only marginal IT value.

Look to Microsoft (.wmf) and Apple (QuickTime) for streaming servers and desktop players. Macromedia Flash is popular for creating presentations because it offers a rich set of capabilities and is very bandwidth efficient. Multipoint live and stored streaming scalability can be provided by streaming/caching servers from Bluecoat, NetApp and Cisco. WAN optimization controllers (WOCs) from Riverbed Networks, Juniper Networks, F5 Networks, Expand Networks and others can provide scalability for streaming stored content.

**Business Impact:** E-learning, conferencing and collaboration.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Bluecoat; Cisco Systems; Network Appliance; Stratacache

**Appears In Hype Cycle:**
- "Hype Cycle for Collaboration and Communication, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Joe Skorupa; Lawrence Orans

### 7.2 Network Performance Reporting

**Definition:** Network performance reporting tools provide performance and availability reporting solutions for the data communications network (including network devices and network traffic). They deliver trend analysis, baselining and threshold evaluation with the goal of forewarning network performance and capacity problems.

**Position and Adoption Speed Justification:** These tools are widely deployed and are useful for identifying network usage trends.

**User Advice:** Look for network performance management products that not only track performance over time, but also automatically establish a baseline measurement of "normal" behavior for time of day and day of week, set thresholds, and notify the network manager only when an exception condition occurs.

**Business Impact:** These tools help improve network availability and performance.

**Market Penetration:** More than 50 percent of target audience

**Maturity:** Mature mainstream
7.3 Application Delivery Controllers

**Definition:** Application delivery controllers (ADCs) are deployed within the data center to optimize application performance, security and resource use by offloading servers, providing deep payload inspection and making best use of complex protocols. Originally deployed for externally facing Web applications, they are increasingly used to deliver services for many types of business applications.

**Position and Adoption Speed Justification:** Newer platforms are more robust and extensible, and the move toward more complex application environments is fueling the growth of the market. Organizations are deploying ADCs as a standard part of their data centre architecture, rather than as a response to a specific application performance issue.

**User Advice:** Organizations should think of ADCs as an integral part of the data centre architecture. They should not undertake an application transition without thinking of the ADC as a key element in the deployment of new applications.

**Business Impact:** Better use of IT infrastructure resources.

**Market Penetration:** Twenty percent to 50 percent of target audience

**Maturity:** Early mainstream

**Sample Vendors:** Cisco Systems; Citrix Systems; F5; Radware

**Recommended Reading:**
- "Magic Quadrant for Application Delivery Products, 2005"
- "Hype Cycle for Networking and Communications, 2006"

7.4 Wavelength Services

**Definition:** The ability to deliver single point-to-point wavelengths from a wave division multiplexing (WDM) system for an enterprise to terminate at a speed of the enterprise's choosing (either 2.5 Gbps or 10 Gbps). Useful for latency-sensitive storage area network (SAN) protocols. Generally costs less than dark fiber but includes 24x7 carrier management.

**Position and Adoption Speed Justification:** Further investment in network service provider (NSP) metropolitan networks is needed before services are widespread. For example, in the United States, only 12 percent of enterprises have fiber connectivity to the public network. The next generation of metro WDM equipment (incorporating reconfigurable optical add/drop multiplexers [ROADMs]) will include dynamic wavelength networking for more rapid provisioning.
**User Advice:** Managed wavelength services are important to carrier-class enterprises interested in high-bandwidth SANs and Gigabit Ethernet WANs. (See "Enterprise WDM" for a do-it-yourself alternative.)

**Business Impact:** Lower cost and higher bandwidth.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Early mainstream

**Sample Vendors:** AT&T; BT

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** John Mazur

### 7.5 Enterprise WDM

**Definition:** Wave division multiplexing (WDM) enables multiple wavelengths of light to be placed on a single optical fiber, thereby increasing the capacity of the fiber by the number of wavelengths. This is typically up to 40 wavelengths at 2.5 Gbps each for metro WDM equipment, and up to 160 wavelengths at 10 Gbps each for long-haul WDM. Coarse WDM (CWDM) is a lower-cost option. Enterprises with dark fiber employ metro WDM equipment containing coarse or dense optical components. Carriers employ both metro and long-haul WDM equipment in their networks. Enterprise storage area networks (SANs) have been the primary driver for WDM technology.

**Position and Adoption Speed Justification:** The technology is common with service providers and is making its way into certain enterprises that have very high bandwidth requirements and access to fiber. Latency-sensitive SANs, broadcast video, Gigabit Ethernet WANs and disaster recovery are typical applications supported by metro WDM equipment. Dynamic wavelength networking (supported by reconfigurable optical add/drop multiplexers [ROADMs]) is still immature as enterprise applications are lacking.

**User Advice:** Fiber route protection is supported. Also consider wavelength services from a carrier if available.

**Business Impact:** Lower-cost and higher-capacity bandwidth.

**Market Penetration:** One percent to 5 percent of target audience

**Maturity:** Adolescent

**Sample Vendors:** ADVA; Alcatel; Ciena; Cisco Systems; Nortel

**Recommended Reading:**
- "How to Choose Between WDM Systems for Metro Networks"

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for the Telecommunications Industry, 2006"

**Analysis By:** John Mazur
7.6 IP Telephony

Definition: Internet Protocol (IP) telephony is an application that provides telephony services that were previously delivered via PBX or Centrex to IP telephones or softphones.

Position and Adoption Speed Justification: Products are being shipped to enterprises and beginning to mature. Enterprise implementations have focused on replacement of traditional telephony on a one-for-one basis. Much of the enhanced functionality that will result in transformational changes in the enterprise has been slow to be adopted. This has resulted in enterprises waiting until established telephony systems age before upgrading to IP telephony, which has slowed the expected adoption.

User Advice: Functional and cost benefits can be derived from IP telephony. Enterprises should have already begun to run trials of the technology and build appropriate business cases and deployment plans for the next three to five years.

Business Impact: IP telephony will permit new applications, capabilities and business processes.

Market Penetration: Five percent to 20 percent of target audience

Maturity: Early mainstream

Sample Vendors: Alcatel; Avaya; Cisco Systems; Nortel; Siemens

Recommended Reading:
- "How IT Managers Can Make VoIP Networks More Reliable"
- "Magic Quadrant for North American Corporate Telephony, 2005"
- "Readying Your Network for VoIP"

Appears In Hype Cycle:
- "Hype Cycle for Government, 2006"
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for Transportation, 2006"

Analysis By: Bob Hafner

7.7 MPLS Services

Definition: Multiprotocol Label Switching (MPLS) is a network protocol that uses packet-labeling techniques to deliver efficient network routing as well as traffic prioritization and policy management of network data packets. It also allows multiple protocols such as IP, frame relay and ATM to be delivered through the MPLS network.

Position and Adoption Speed Justification: Network service providers (NSPs) now offer mature MPLS services, but managed services and class-of-service pricing lack standards.

User Advice: Because carrier-based MPLS services will be the predominant WAN service in the future, users are advised to plan migrations to MPLS based on their own business requirements as well as a response to the end of life of carrier legacy networks.
**Business Impact:** The business impacts include lower cost for fully meshed network topologies, and the ability to support differentiated class of service and preparation of client networks for convergence

**Market Penetration:** Five percent to 20 percent of target audience

**Maturity:** Adolescent

**Sample Vendors:** AT&T; BT Group; Deutsche Telecom; Equant; NTT Communications; Qwest; Sprint Nextel; Verizon Business

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for the Telecommunications Industry, 2006"

**Analysis By:** Ted Chamberlin

### 7.8 802.3af — Power Over Ethernet

**Definition:** IEEE 802.3af is a standard method of providing Power Over Ethernet (PoE) to connected devices, such as Internet Protocol phones, wireless access points, cameras and other low-power devices. The feature is being incorporated in most vendors’ LAN switches, though it can also be deployed as an overlay using mid-span power sources.

**Position and Adoption Speed Justification:** Standards are now finalized, but proprietary extensions — especially for power management — remain.

**User Advice:** Network managers upgrading their LAN switches should seriously consider PoE for new purchases. As new LAN equipment should have a life span of five to seven years, network managers need a reason for not including PoE in their purchases.

**Business Impact:** A standard and easy-to-deploy method of powering remote, low-power devices.

**Market Penetration:** Five percent to 20 percent of target audience

**Maturity:** Early mainstream

**Sample Vendors:** 3Com; Cisco Systems; Extreme Networks; Foundry Networks; HP ProCurve; Nortel; Phihong; PowerDSine

**Appears In Hype Cycle:**
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Mark Fabbi

### 7.9 SSL Remote-Access VPNs

**Definition:** Secure Sockets Layer (SSL) remote-access virtual private network (VPN) is a VPN approach based on Web server-side digital certificates used for encrypting traffic in the link.

**Position and Adoption Speed Justification:** Large and midmarket users have installed the technology, gaining experience and coming up against secondary security challenges.

**User Advice:** SSL remote-access VPNs are mature technology suited to broad usage.
**Business Impact:** SSL remote-access VPNs provide a flexible, yet relatively safe, method for intra- and interenterprise communications using a universally available protocol and widely used client (that is, the browser).

**Market Penetration:** Twenty percent to 50 percent of target audience

**Maturity:** Adolescent

**Sample Vendors:** Aventail; Cisco Systems; Juniper Networks; Nortel Networks

**Appears In Hype Cycle:**
- "Hype Cycle for Information Security, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** John Girard

### 8.0 Entering the Plateau

#### 8.1 Network Monitoring Tools

**Definition:** Network monitoring tools are basic tools to indicate the up/down status of data communications network components. They also have capabilities to discover and visualize network topology interconnections.

**Position and Adoption Speed Justification:** These tools have been widely deployed, primarily to address the reactive nature of network monitoring in IT operations.

**User Advice:** Network monitoring tools are frequently used for "blame avoidance" rather than problem resolution by proving to the IT organization and business units that the problem at hand is not the network's fault. Resolving problems, rather than just avoiding blame, requires an increasing alignment of network management tools with business goals.

**Business Impact:** These tools help an IT organization to view its network events in a single pane of glass. This helps improve the availability of the network infrastructure.

**Market Penetration:** More than 50 percent of target audience

**Maturity:** Mature mainstream

**Sample Vendors:** CA; HP OpenView; IBM Tivoli; Ipswitch

**Appears In Hype Cycle:**
- "Hype Cycle for IT Operations Management, 2006"
- "Hype Cycle for Networking and Communications, 2006"

**Analysis By:** Debra Curtis; Will Cappelli

#### 8.2 VoIP

**Definition:** Voice over Internet Protocol (VoIP) is the transmission of voice communications over IP data networks, such as IP-based LANs, intranets or the Internet.

**Position and Adoption Speed Justification:** All domestic and global carriers have staked their future service portfolio on VoIP-based technologies and will continue to deliver enhanced products and bundled offerings to lure customers away from their wired voice lines. The adoption
drivers and concerns around VoIP carrier services vary for consumers and enterprises, but most see the technology as proven. Consumer-based offerings from such companies as Vonage and Packet 8 are becoming widely adopted due to the low cost and bundled features. No-fee services from Skype, Google and Yahoo are moving from an underground following toward mainstream adoption, but they have their quality and usability issues. Enterprises have been slow to implement IP voice outside of their corporate walls because the return on their investment continues to be hard to quantify as traditional carrier switched voice prices are at historic lows.

**User Advice:** VoIP will become the predominant wired voice solution, but understand that most carrier VoIP services are immature and can't provide strong service-level agreements. Consider limited rollouts to familiarize your users with packetized voice, such as small offices or remote workers. Any enterprise VoIP implementation must be preceded by extensive network capacity testing. Once rollouts have occurred, enterprise IT must pay close attention to the call quality and work with users to ensure satisfactory voice quality.

**Business Impact:** VoIP can unlock new features and services, including videoconferencing, unified communications and fixed-mobile convergence. Cost savings can be achieved on toll calls, but most enterprises will have to make initial investments to IP-enable their voice premise infrastructure. Enterprises should consider the enhanced features, ease of administration and cost savings as justification to move to VoIP.

**Market Penetration:** Five percent to 20 percent of target audience

**Maturity:** Emerging

**Sample Vendors:** AT&T; Broadwing Communications; BT Group; Cablevision Systems; Covad; Global Crossing; Google; Level 3 Communications; Orange Business Services; Qwest; Singapore Telecom; Sprint; Time Warner Cable; Vonage; Yahoo

**Appears In Hype Cycle:**

- "Hype Cycle for Collaboration and Communication, 2006"
- "Hype Cycle for Emerging Technologies, 2006"
- "Hype Cycle for Networking and Communications, 2006"
- "Hype Cycle for the Telecommunications Industry, 2006"

**Analysis By:** Ted Chamberlin

**9.0 Off the Hype Cycle**

Wireless LAN technologies such as 802.11a/b/g have matured to the point where they are no longer on the Hype Cycle. Managed router services, driven by the increased adoption within the enterprise and the uptake of managed Multiprotocol Label Switching (MPLS) services are also mature.

Enterprise content delivery networks no longer exists as a defined category, as capabilities are now being delivered with a mix of WAN optimization controllers, document management systems and media-specific technologies such as video streaming and caching servers.

Quality-of-service (QOS) traffic shaping has also been dropped, as it is now performed routinely in routers, and more advanced capabilities exist in WAN optimization controllers. However, using QOS capabilities to manage traffic for security purposes such as incident response remains less mature — see "Hype Cycle for Information Security, 2006."
Unified messaging is covered in "Hype Cycle for Collaboration and Communication, 2006."

ADSL and cable modem services are routinely part of the enterprise network, especially for remote workers. Details on specific xDSL and cable technologies can be found in "Hype Cycle for Network Service Provider Infrastructure, 2006."

Voice over IP trunking services have also matured enough to be removed from the Hype Cycle, while the more advanced services described in hosted IP telephony are at an earlier "trough" stage.
10.0 Appendices

10.1 Previous Iteration of the Hype Cycle

Figure 3. For Reference: Hype Cycle for Networking and Communications, 2005
10.2 Hype Cycle Phases, Benefit Ratings and Maturity Levels

Table 1. Hype Cycle Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Trigger</td>
<td>A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.</td>
</tr>
<tr>
<td>Peak of Inflated Expectations</td>
<td>During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The only enterprises making money are conference organizers and magazine publishers.</td>
</tr>
<tr>
<td>Trough of Disillusionment</td>
<td>Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.</td>
</tr>
<tr>
<td>Slope of Enlightenment</td>
<td>Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology's applicability, risks and benefits. Commercial, off-the-shelf methodologies and tools ease the development process.</td>
</tr>
<tr>
<td>Plateau of Productivity</td>
<td>The real-world benefits of the technology are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. The final height of the plateau varies according to whether the technology is broadly applicable or benefits only a niche market. Approximately 20 percent of the technology's target audience has adopted or is adopting the technology as it enters the Plateau.</td>
</tr>
<tr>
<td>Years to Mainstream Adoption</td>
<td>The time required for the technology to reach the Plateau of Productivity.</td>
</tr>
</tbody>
</table>

Source: Gartner (June 2006)

Table 2. Benefit Ratings

<table>
<thead>
<tr>
<th>Benefit Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational</td>
<td>Enables new ways of doing business across industries that will result in major shifts in industry dynamics</td>
</tr>
<tr>
<td>High</td>
<td>Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td>Moderate</td>
<td>Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td>Low</td>
<td>Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings</td>
</tr>
</tbody>
</table>

Source: Gartner (June 2006)

Table 3. Maturity Levels

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Status</th>
<th>Products/Vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embryonic</td>
<td>In labs</td>
<td>None</td>
</tr>
<tr>
<td>Emerging</td>
<td>Commercialization by vendors</td>
<td>First generation</td>
</tr>
<tr>
<td></td>
<td>Pilots and deployments by industry leaders</td>
<td>High price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Much customization</td>
</tr>
<tr>
<td>Maturity Level</td>
<td>Status</td>
<td>Products/Vendors</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>Adolescent</td>
<td>Maturing technology capabilities and process understanding</td>
<td>Second generation</td>
</tr>
<tr>
<td></td>
<td>Uptake beyond early adopters</td>
<td>Less customization</td>
</tr>
<tr>
<td>Early mainstream</td>
<td>Proven technology</td>
<td>Third generation</td>
</tr>
<tr>
<td></td>
<td>Vendors, technology and adoption rapidly evolving</td>
<td>More out of box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methodologies</td>
</tr>
<tr>
<td>Mature mainstream</td>
<td>Robust technology</td>
<td>Several dominant vendors</td>
</tr>
<tr>
<td></td>
<td>Not much evolution in vendors or technology</td>
<td></td>
</tr>
<tr>
<td>Legacy</td>
<td>Not appropriate for new developments</td>
<td>Maintenance revenue focus</td>
</tr>
<tr>
<td></td>
<td>Cost of migration constrains replacement</td>
<td></td>
</tr>
<tr>
<td>Obsolete</td>
<td>Rarely used</td>
<td>Used/resale market only</td>
</tr>
</tbody>
</table>

Source: Gartner (June 2006)

RECOMMENDED READING

"Hype Cycle for Collaboration and Communication, 2006"
"Hype Cycle for Contact Center Infrastructure, 2006"
"Hype Cycle for Information Security, 2006"
"Hype Cycle for IT Operations Management, 2006"
"Hype Cycle for Network Service Provider Infrastructure, 2006"
"Hype Cycle for Wireless Hardware, Software and Services, 2006"
"Hype Cycle for Wireless Networking, 2006"
"Understanding Gartner's Hype Cycles, 2006"

This research is part of a set of related research pieces. See "Gartner's Hype Cycle Special Report for 2006" for an overview.
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