



# White Paper Application Performance Management (APM).

Accelerating business processes  
with efficient ICT infrastructures.

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# 1. Introduction.

The process of globalization continues apace. Today, virtually no major enterprise restricts business activities to its local market. The desire to grow and the need for geographical proximity to customers, even in the international marketplace, drives companies to take an increasingly global approach to business. Furthermore, to keep costs in check, routine tasks are being offshored to lower-wage countries. Today's enterprises often have production facilities, subsidiaries and offices on several continents. Wide area networks (WANs) provide remote sites with access to the company's ICT applications. In recent years, rising cost pressures have prompted widespread consolidation and centralization of ICT infrastructure. However, that increases the physical distance between data centers and users. And within the scope of centralization, applications designed for, and formerly deployed in, LANs (local area networks), are being moved to WANs.



**There are new challenges ahead for WANs. APM can help master them.**

The migration of telephony from hardwired equipment to IP platforms, in conjunction with the spread of multimedia applications (e.g. telepresence and increasingly high-quality video transmissions) increase the data traffic carried by WANs. Moreover, new ways of communicating, such as video conferencing and other unified communications and collaboration (UCC) software, create demand for better transmission quality. Time-critical applications like these become unusable if not enough bandwidth is available.

As more and more applications are shifted to WANs, their importance increases. However, WANs have far less bandwidth than LANs, and are more expensive. So there is a pressing need to optimize data streams and eliminate unnecessary transfers. Companies must prioritize mission-critical applications and provide them with sufficient capacity.

Recent surveys have shown that more than 50 percent of employees already access applications remotely, i.e. via WANs. Their productivity depends heavily on the performance of software accessed via WAN. Even small delays can add up to considerable amounts of wasted time, leading to user dissatisfaction. Because they have a direct impact on business-process efficiency, WANs are mission-critical. The challenge is to get networks in shape for significantly increased demands.

Application Performance Management (APM) is a method for enhancing performance within a WAN and maintaining transmission quality at an acceptable level. But APM is not simply about monitoring network quality. It can also be used to optimize application response times, for example by eliminating redundant data transfer.

The Application Performance Management service comprises three modules:

**ICT Analyze** is a consulting service offered as a preparatory step to implementing an APM solution. It comprises a comprehensive analysis of performance with respect to applications, network infrastructure, and business processes. The findings are used to develop a tailored ICT strategy and to define an optimization and monitoring process driven by actual needs.

**ICT Monitor** consists of the ongoing analysis of a company's ICT infrastructure, and quality control. Applications and ICT components are continuously monitored. Performance metrics are captured both in real time and over defined periods. IT managers can immediately see who is experiencing performance problems when, and with what applications, and can pinpoint the causes. Bottlenecks and errors are detected in good time, and IT decision-makers alerted before performance starts to degrade. Proactive, end-to-end application monitoring by the managed service, ICT Monitor, is an effective way of minimizing risks and protecting ICT infrastructure from failure.

**ICT Optimize**, the third module, focuses on data streams. It eliminates redundant data transfer, compresses data packets and optimizes the TCP protocol. It also leverages dedicated acceleration tools for improving application performance.

In combination, these modules can boost the speed of data traffic by a factor of 20 to 50. This increases business-process efficiency, and users notice significantly improved performance in their day-to-day work.

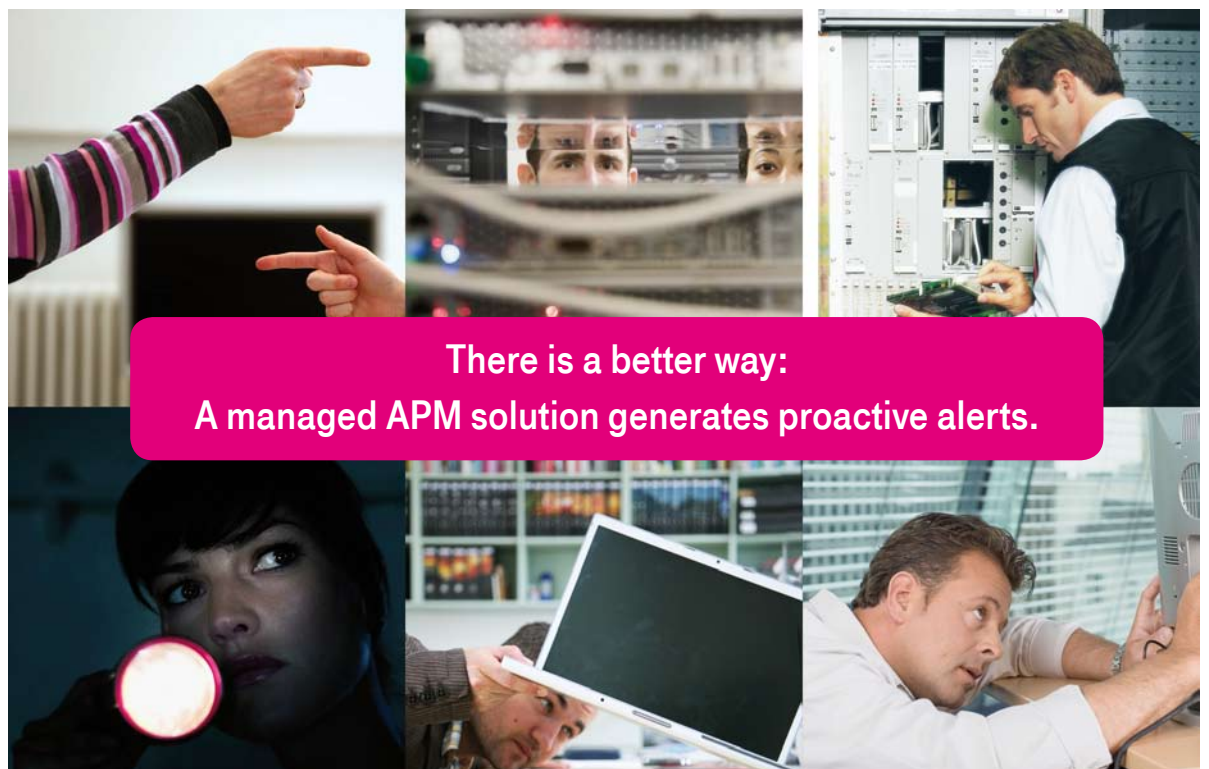


Figure 1: A managed APM solution generates proactive alerts.

## 2. The current situation.

In light of growing cost pressures, ICT centralization and consolidation are attractive options for many companies. Globalization, home offices, and ever more mobile workforces have led to a steep rise in intra-enterprise data transfer. The mission-critical role of WANs has long been recognized. More than 55 percent of employees already access their applications remotely. And large quantities of data are maintained exclusively at company headquarters. As a result, poor transmission quality or WAN failure can cause serious disruptions and bring entire business processes to a standstill.



**The demands on IT infrastructure are rising sharply. Meeting them is easier with APM.**

Growing demands and the need to prepare for a wide range of future IP-based applications present considerable challenges in terms of infrastructure. In most companies, IT and telecommunications are generally still seen as being quite separate technologies. However, customer-driven, service-centric IT service management (ITSM), and related concepts such as service-oriented architecture (SOA), call for a holistic approach to ICT infrastructures. Business processes, workflows and services are not confined to single departments, but need to be seen in an enterprise-wide context. APM lays the foundations for documenting, monitoring and optimizing processes and services in a truly comprehensive way – enabling both the identification and resolution of bottlenecks. Only an end-to-end approach to process efficiency makes it possible to accelerate a company's processes and workflows across the board, and as a result, improve customer satisfaction.

From a service perspective, ICT infrastructure is viewed as an integrated whole, rather than as a series of networks, data centers and desktop systems that are all managed individually, by staff responsible for a particular location or for certain sections or parts of the hardware environment. Cloud computing and software as a service (SaaS) have already introduced total abstraction, i.e. concealing the complexities of the underlying hardware from the end user. With these models, the “product” offered is a process or a software solution. From the customer perspective, the hardware is virtually invisible.

ICT can only be centralized and consolidated by means of SOA. With SOA, the service offered – i.e. the software or more generally, improved processes – is decoupled from the hardware. The hardware is consolidated in a small number of large-scale data centers and does not have to be operated at the customer site. The customer's sites are linked to the data center via a WAN, which therefore takes on a much more critical role within an SOA environment.

Although hardware virtualization helps cut costs, it also brings new challenges. If applications originally developed for use in a LAN are to be accessed via a WAN, they generally require considerable bandwidth. Furthermore, their performance via a WAN is often inferior, hampering productivity.

The growing popularity of time-critical, bandwidth-hungry IP-based applications such as Voice over IP (VoIP), telepresence and UCC, presents WANs with additional challenges. Simply expanding networks and adding bandwidth is very expensive but not very effective. A more promising approach is to conduct detailed analysis and implement continuous monitoring of data traffic. This enables bottlenecks and the sources of errors to be detected before performance starts to degrade. Ideally, these tasks are performed by the company operating the WAN within the scope of a managed service, enabling the source of problems to be proactively identified and resolved.

Analyzing the customer's actual needs and developing a corresponding ICT strategy helps businesses to invest in network expansion in a much more appropriate, systematic way. This reduces operating costs and avoids wasted investments. In addition, ongoing monitoring allows the effectiveness of past investments to be assessed.

But it takes more than appropriate expansion of the network to master the challenges described earlier and maintain the necessary quality of service. The volume of data traffic is simply too vast, and load fluctuates too much. Two additional factors need to be considered: both the applications and data traffic via the WAN need to be optimized. These tasks, too, require in-depth analysis and continuous monitoring. If both are performed consistently and effectively, applications can be accelerated by a factor between 20 and 50. This perceptibly speeds up business processes, reduces the cost of operating ICT infrastructure, and enables greater efficiency.

# 3. Application Performance Management.

Application Performance Management is a package of services for monitoring and optimizing ICT infrastructures. The package consists of three modules:

- ICT Analyze: a consulting service that lays the foundations for later activities.
- ICT Monitor: statistical, real-time, end-to-end measurement of application performance.
- ICT Optimize: data-traffic optimization.

Each module can be implemented separately. However, the best results are achieved if all three are chosen. Analysis, monitoring and optimization complement and reinforce each other. For example, the ICT Optimize solution is particularly effective if it is based on an ICT strategy that reflects the company's specific needs and ICT landscape. Developing this strategy is the purpose of the ICT Analyze module. Implementing the APM solution in its entirety can help ensure that ICT is fully aligned with business processes.

If all three modules are deployed, the first step comprises an examination of the ICT infrastructure by means of ICT Analyze. The goal is to identify weaknesses and potential improvements and to develop a tailored ICT strategy. The ICT Monitor and ICT Optimize modules are then installed.

ICT Monitor captures data from all business-critical applications across the entire WAN and for each individual part of the ICT infrastructure. As a managed service, APM provides accurate and proactive identification of problems. This ensures the right investments are made to eradicate faults and bottlenecks. Investment is precisely targeted at maintaining optimum performance – avoiding unnecessary capital expenditure.

Once the potential for improvement has been determined, the ICT Optimize module is deployed. It eliminates redundant data transfer, compresses data, and optimizes applications, enabling the proposed performance improvements to be realized.

## 3.1 ICT Analyze.

ICT Analyze is a consulting service that precedes the implementation of the APM solution. It offers an exhaustive analysis of performance, encompassing the applications, network infrastructure and business processes. For a limited period, ICT monitoring is performed to analyze the network during ongoing operations, and identify potential performance improvements. In collaboration with an experienced service provider, the customer uses the findings to develop a comprehensive ICT strategy that is fully aligned with its business processes and combines the goals of outstanding performance with maximum efficiency.

Generally, ICT Analyze begins with a kick-off meeting where the customer and the service provider agree how to proceed. A preliminary analysis of the network is conducted to determine the best monitoring points.

The service provider's staff then installs the ICT Monitor temporarily and use it to conduct a comprehensive analysis of the infrastructure, lasting four weeks. Subsequently, the consultants present the customer with an overview of current performance, achievable improvements, and the overall potential within ICT. The findings deliver detailed visibility into all aspects of the performance of key applications. This information comprises metrics such as total transaction delay, network round-trip time and service response time, and an analysis of how concrete optimization measures would affect these parameters.

The concluding workshop focuses on the bottlenecks that lead to unsatisfactory performance from the user's perspective. The consultants offer the customer recommendations on issues such as bandwidth, network quality of service, and optimizing applications. These are used to develop a tailored ICT strategy as the basis for subsequent activities. This includes a precise timeline for implementing APM.

By providing comprehensive, detailed insight into existing infrastructure, ICT Analyze lays the foundation for the effective, customer-specific execution of ICT Monitor und ICT Optimize.

### 3.2 ICT Monitor.

ICT Monitor delivers continuous monitoring of and reporting for the entire ICT infrastructure. It continuously scans the network and enables ongoing quality control. To maintain quality of service, it issues alerts when predefined thresholds are reached. If a component, such as storage, is close to maximum load, the tool detects this early, enabling capacity to be scaled up in good time. ICT Monitor takes the provision of applications to a new level. For example, it enables companies to create a virtually fail-safe infrastructure. Moreover, no additional effort is required to monitor and document the fulfillment of service-level agreements.

ICT Monitor comprises four service components, each deploying different technologies. They combine to provide end-to-end monitoring of the ICT infrastructure:

**ICT Monitor ApplicationHealth** keeps track of the quality of TCP/IP-based data exchange at the level of individual applications. The module measures application transaction time (comprising network and server response time) between the user and the server, defines effective procedures for addressing performance problems at application level, and determines the application performance that individual users actually experience.

**ICT Monitor TrafficHealth** delivers visibility into the number and variety of applications deployed, their interactions and data flows between them: i.e. the communications matrix within the ICT infrastructure. The tool efficiently detects unusual loads and infected systems.

**ICT Monitor NetHealth** monitors the utilization of LAN and WAN bandwidths and of device capacity. It reports SLA violations relating to availability and performance, and compiles device-specific, availability, and IP SLA reports.

The fourth component, **ICT Monitor VoiceHealth**, analyzes the quality of VoIP transmissions – both call setup quality and call quality. Passive measurements across the entire ICT infrastructure are made from a single, central point: the data center. No additional hardware or software is required on the end-user side. This keeps down costs, requires little installation effort, and ensures ease of maintenance.

Deployed in concert, ICT Monitor's components can resolve a wide variety of problems. For example, a sudden loss of performance in an Oracle database can be traced to an ill-timed backup, or a decline in network performance to a wrongly prioritized multimedia application. Without deep insight into the ICT infrastructure, these kinds of faults are generally very difficult to detect. ICT Monitor not only issues warnings proactively when these types of problems arise, but offers a solution at the same time. The following example of ICT Monitor ApplicationHealth in practice illustrates how this is done.

In this scenario, an overload of the Oracle back-end server causes the performance of multiple applications to degrade. At first sight, the applications appear to be unrelated, but as they all access the database, they all experience a slow-down. Because so many remote offices are affected, the problem seriously hampers practically all of the company's work. However, finding the problem is not easy. This is where ICT Monitor comes into its own: a loss of performance affecting many parts of the infrastructure is often attributed to insufficient bandwidth. However, increasing capacity would have no effect. Only a comprehensive investigation would uncover the database server as the cause. And until capacity is added, inferior server performance would lead to staff working inefficiently for several days. Moreover, a preventive increase in bandwidth would have led to unnecessarily high operating costs.



### **APM ICT Monitor automatically issues alerts when predefined thresholds are reached.**

In a similar situation, a company with APM would have fewer problems. The monitoring software employed by the user help desk reports that the Oracle database is approaching maximum load – before performance begins to deteriorate. ICT Monitor immediately pinpoints the cause of the impending loss of performance, so there is no need to spend time and money finding the problem. It is immediately apparent that the server needs more RAM, which can be provided quickly. By resolving potential issues of this type in good time, the technology helps to maintain performance at the required levels.

As APM is a managed service, it delivers proactive problem identification and resolution. When the user help desk staff informs the customer about upcoming performance issues and their causes, they offer a solution at the same time – before users experience any performance problems. This ensures that service level agreements are fulfilled, quality of service is maintained, and users can continue to work without disruption.

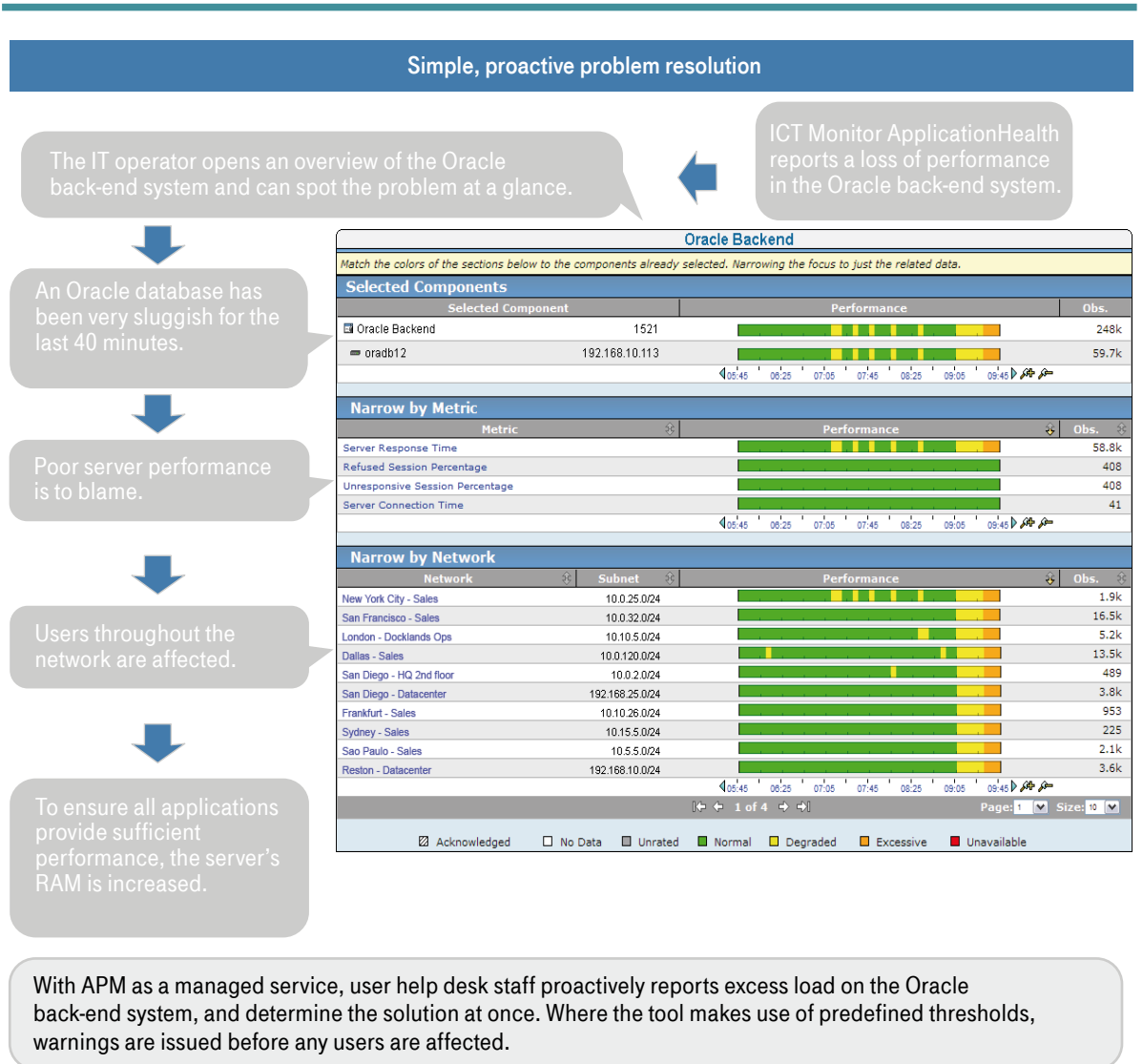


Figure 2: Screenshot of the problem resolution process with an example APM application.

### 3.3 ICT Optimize.

The third module, ICT Optimize, optimizes both the data streams transferred via the WAN and the applications. Through a combination of WAN optimization and application acceleration technologies, data traffic can be accelerated by a factor of 20 to 50. As a result, all business processes become noticeably faster. With this technology, the company makes best possible use of existing network resources.

Like ICT Monitor, ICT Optimize requires no modifications to desktop systems. The necessary hardware is integrated into the existing infrastructure at the LAN/WAN interface.

At this point in the network, the optimization engine is able to optimize all TCP/IP-based data streams coming from the LAN. All data streams are optimized before reaching the WAN. At the receiver end, the router at the data center or at the remote office receives the data and recreates the original data stream from the optimized stream. Then the data is passed on to the ultimate recipient via the LAN.

Both client and server receive the original data stream. As a result, there is no need for modifications to software or hardware. This optimization technique is used solely for reducing the load on the network section with the lowest capacity, i.e. the WAN.

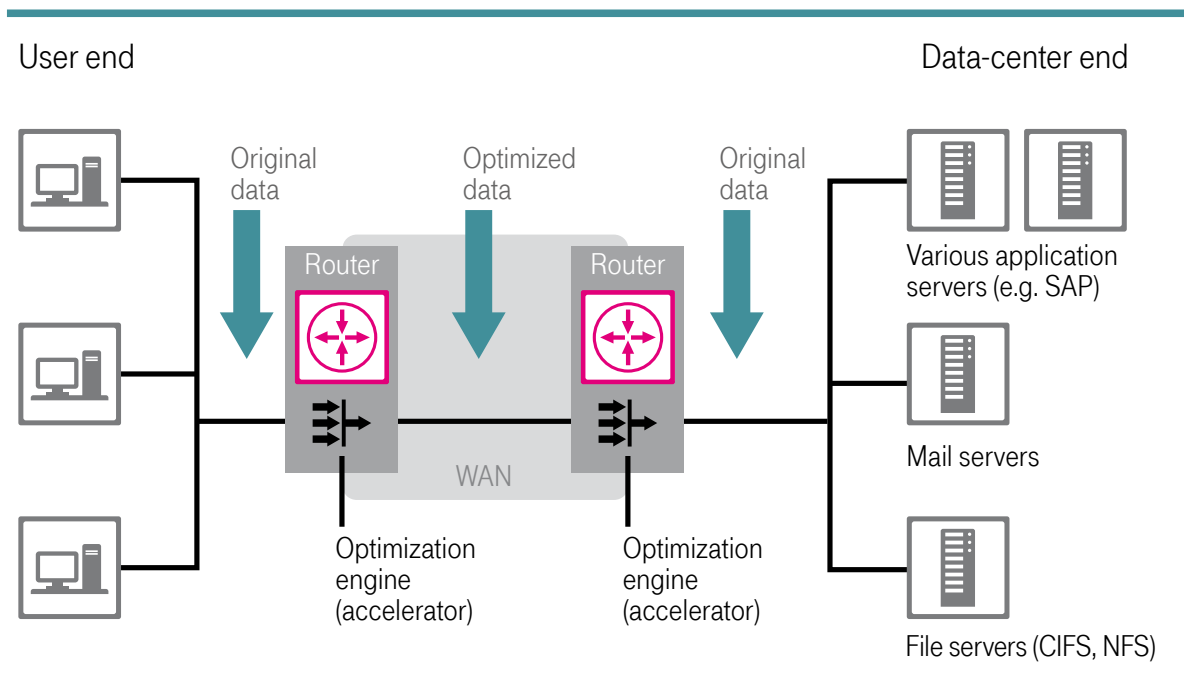


Figure 3: Schematic of a network.

As part of the ICT Optimize module, **WAN Optimization** focuses on optimizing all data streams. It comprises three separate services:

WAN optimization is primarily achieved by avoiding **duplication of data transfer**. It takes advantage of the fact that TCP/IP divides all data into packets and transfers it in small chunks. The optimization engines at the sender and receiver ends record which packets have already been sent. If the same unit of data is required multiple times, rather than re-sending the packet (256 to 1600 kilobytes), the engines send a much smaller reference (5 bytes) to the data unit already transferred.

With this technique, duplicate requests for the same data cause little additional load on the WAN. This leads to substantial bandwidth savings, considering how many employees in a remote office will typically access the same intranet page or the CEO's latest video statement. Data is only transmitted from the central data center on first request. All other users receive data from the router's buffer. Where it is known in advance that a remote office will need a particular file (such as a Webcast), system administrators can even place the file in the buffer beforehand. The acceleration is then apparent from the first time the file is accessed.

Other, less obvious, bandwidth savings are achievable, too. They stem from that fact that identical packets are found not only in identical files, but also, to some extent, across different files. For example, every file contains a format definition (e.g. PowerPoint). Since this definition is identical in all files of the same format, it only has to be transmitted once. Similarly, frequently used elements, such as images or fonts, are only sent once and then simply referenced. Avoiding redundant transfers can reduce total data volumes by 60 to 95 percent.

WAN Optimization encompasses two further services.

The first is data-stream **compression**. Data is coded in a format that requires less storage space. This method is very similar to the widely used data-compression format, zip.

The second is **TCP Optimization** – optimizing the Transmission Control Protocol (TCP) itself. For example, the maximum window size is scaled up as far as possible, and the local optimization engine intervenes to respond to network control signals, so the signals do not need to be sent over the WAN.

**Application Acceleration**, the second optimization technique deployed by ICT Optimize, does not focus on TCP data traffic but on individual applications, such as Microsoft Windows File Sharing. Application-specific adaptors have been developed to compensate for weaknesses in the respective software. They can accelerate these software products by a factor of up to 50.

# 4. Practical benefits.

Surveys show that many ICT themes remain critical success factors. Many of these issues can be addressed by Application Performance Management. For example, the need to increase efficiency is clearly the top priority. This in turn is closely related to the desire to improve the measurement of ICT's contribution to business performance. Application Performance Management is a valuable tool for achieving both of these goals.

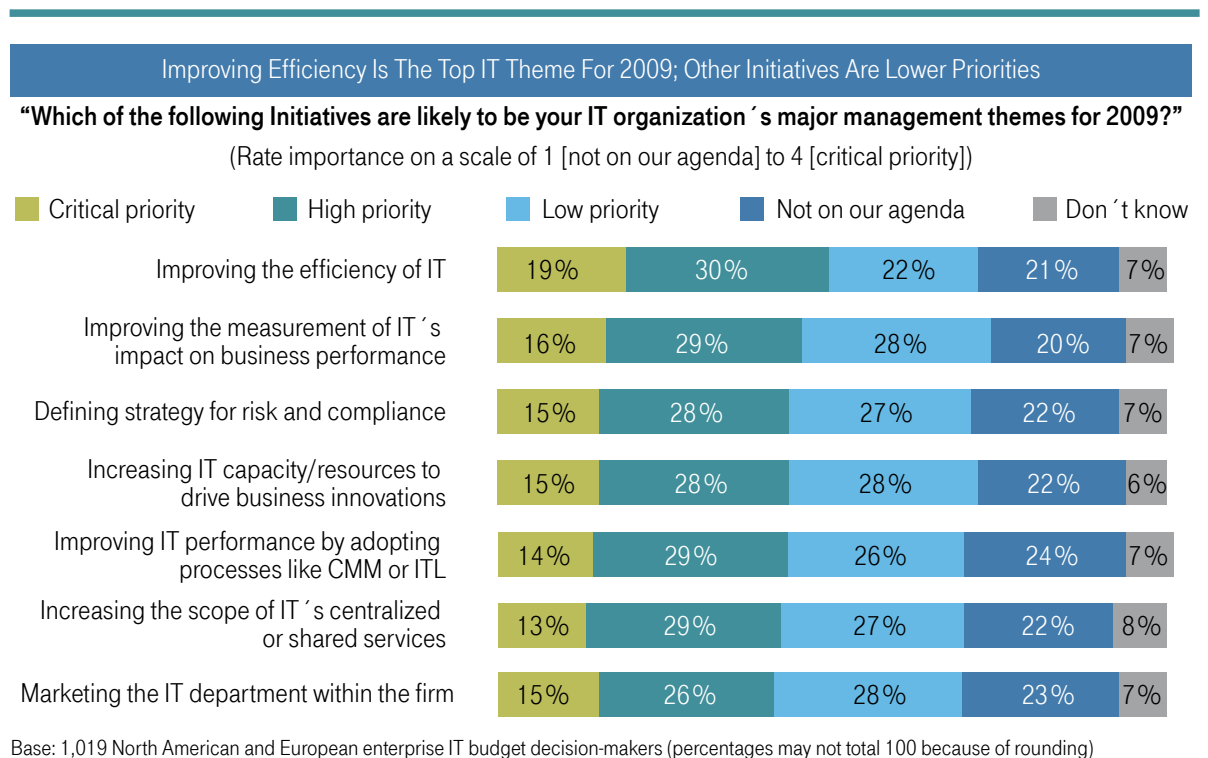


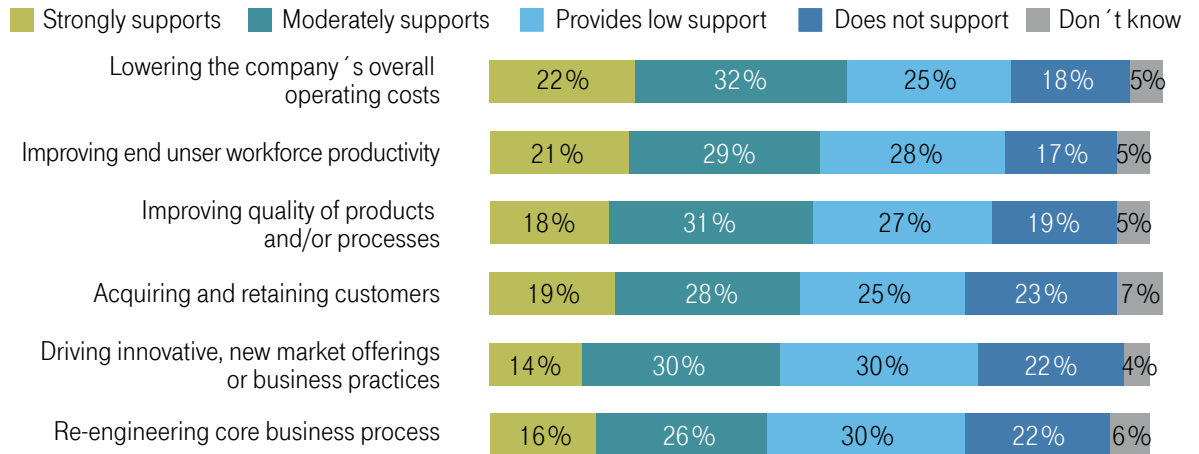
Figure 4: The most important IT-related issues in 2009.  
(Source: Forrester, The State Of Enterprise IT Budgets: 2009; Übersetzung ins Deutsche: T-Systems Enterprise Services GmbH).

ICT resources are not only essential for day-to-day business activities. They are also a key driver of innovation. Application Performance Management is an enabler in this context, supporting seamless integration of new technologies. Telepresence, unified communications and collaboration (UCC), cloud computing and software as a service all require, in comparison to traditional applications, a more powerful network infrastructure, with significantly greater bandwidth. APM makes it possible to implement these new technologies at an acceptable cost.

Concentration on core competencies, high cost pressure, changes in the industry-specific and market environment will continue to drive enterprises towards centralization and consolidation. APM solutions can deliver a lasting reduction in operating costs, and increase productivity and flexibility.

IT's Impact On Business Is Greatest In Supporting Cost-Cutting, Improving Productivity

“How well does your IT organization currently support each of the following goals?”



Base: 1,019 North American and European enterprise IT budget decision-makers (percentages may not total 100 because of rounding)

Figure 5: IT's impact on business goals.

(Source: Forrester, The State Of Enterprise IT Budgets: 2009; Übersetzung ins Deutsche: T-Systems Enterprise Services GmbH).

#### 4.1 Centralization of IT.

There are many reasons for centralization but in most cases, cost-cutting is the main aim. IT-related goals include eliminating duplication of effort, and lowering costs associated with operating and maintaining multiple data centers due to internationalization. For international organizations, managing ICT across multiple sites is difficult and resource-intensive. Centralization can make maintenance and problem-resolution more efficient, and lower infrastructure costs.



### APM helps businesses overcome barriers to centralization.

A further argument in favor of centralization is security. Storing data locally can create security problems. In China, for example, the government has the right to access servers and data. Even some politically stable countries such as the USA have legislation (such as the USA PATRIOT Act) that permit governmental agencies to view confidential company data. These risks can be lowered by consolidating sensitive and strategically important data in a data center in a country with favorable legislation, such as Germany.

The third argument for centralization is compliance with legislation and regulations on data integrity and archiving (such as Basel II, EURO-SOX and, in Germany, GDPdU).

Centralizing ICT offers many benefits. However, it also has a downside: the huge rise in WAN traffic means that bandwidth must be increased – which, in turn, means higher costs. At the same time, the performance of applications accessed via the WAN is affected. APM addresses both issues.

#### **4.2 Cost savings.**

Application Performance Management can result in significant savings, particularly for multinational companies. Because applications are centrally managed, APM lowers IT costs. Moreover, processes are more efficient, as applications can be accessed quicker. It enables more rapid identification of weaknesses and problems, and helps avoid unnecessary or poor ICT investment. Experience with APM-like solutions has demonstrated a potential return on investment of over 250%, with break-even after around three months.



**Deployment of APM can yield a return on investment of over 250%.**

Application Performance Management is in many ways a prerequisite for ICT centralization, as it makes the large number of applications to be operated via the WAN manageable.

**ICT Analyze**, the optional consulting module within APM, identifies inefficient ICT processes and pinpoints the sources of any problems. This facilitates decisions on targeted ICT infrastructure investments, avoiding unnecessary expenditure.

**ICT Monitor** which provides comprehensive, around-the-clock monitoring of the ICT infrastructure's performance. It creates transparency and verifies compliance with service level agreements. Problems are identified sooner, making operation and management of ICT much more efficient. This is a key advantage, since identifying problems within today's complex infrastructures consumes significant time and money.

**ICT Optimize** is the module that has the most direct impact on ICT infrastructure efficiency. It reduces WAN traffic and accelerates applications by compressing data packets, improving the TCP protocol, eliminating redundant data transfer, and optimizing all TCP-based applications. The resulting boost in performance allows servers and data centers to be consolidated. This improves security, and makes data management easier. All in all, ICT Optimize creates a highly-efficient ICT infrastructure that makes best use of existing resources, and provides effective support for business processes, while keeping costs low.

#### **4.3 Improved performance.**

In addition to cost savings, APM ensures efficient data transfer and improves the performance of all applications.

In addition to high-quality products and services, staff productivity is a key business success factor. This depends on the performance and availability of ICT. Application Performance Management boosts the performance of applications, accelerating business processes across the enterprise. The consolidation strategies (data centers and servers) described above can be implemented as soon as performance of remote applications is improved.

Faster response times mean that staff at remote sites can work more productively. This, together with unified communications and collaboration, is set to become an important issue in the future. Making collaboration easier and faster, such as between employees in the field and their offices, makes all staff members more productive.



## According to Ovum, accelerating the WAN is a “focus investment”.

Application performance can be improved by deploying WAN optimization technologies. By optimizing the TCP protocol, they enable available bandwidth to be used more efficiently, ensuring that data is transferred at the highest possible rate from the moment a connection is established. APM almost completely eliminates redundant data transfer. Session-based compression further reduces the volume of data sent via the WAN.

Whereas WAN-optimization software improves the performance of all applications, application-acceleration tools increase the efficiency of individual applications. These tools improve application protocols, and compensate for their weaknesses. When deployed together, WAN-optimization and application-acceleration technologies can improve the performance of applications by up to fifty times.

Consultants at Ovum consider WAN acceleration to be a “focus investment”, especially in today’s economic climate. WAN performance can be a key differentiator, especially for businesses that provide services.

### **4.4 Preparation for and evaluation of infrastructure modifications.**

Whenever application-performance problems arise, expanding the ICT infrastructure can seem unavoidable. Businesses attempt to resolve these issues by upping bandwidth, purchasing new servers or replacing software. But quite often, these investments fail to bring about an improvement.

Therefore, it is important to carefully analyze the network and the ICT environment before making investment decisions. The existing infrastructure’s potential should be analyzed, and possible causes of faults and ways of achieving improvement assessed. ICT Monitor can help IT professionals make informed decisions on whether and where investment is required.

For example, it may be necessary to modify classes of service or to deploy optimization mechanisms that accelerate business-critical applications. Or a recommendation may be made to expand the server landscape.

The goal is to achieve optimum performance while minimizing costs. All investments need to be critically assessed in terms of necessity. ICT Monitor provides a comprehensive means of evaluating the effectiveness of any expenditure. The module documents system processes and presents a clear picture of the impact of changes.

The following illustrations provide an example of the effects of an infrastructure modification.

In the first example, the service class is changed, which has a positive impact on the network round-trip time. In the second example, memory is expanded, improving response time. The magenta-colored bar indicates when the change was implemented, making it easy to see the improvement. This provides visibility into ICT performance.

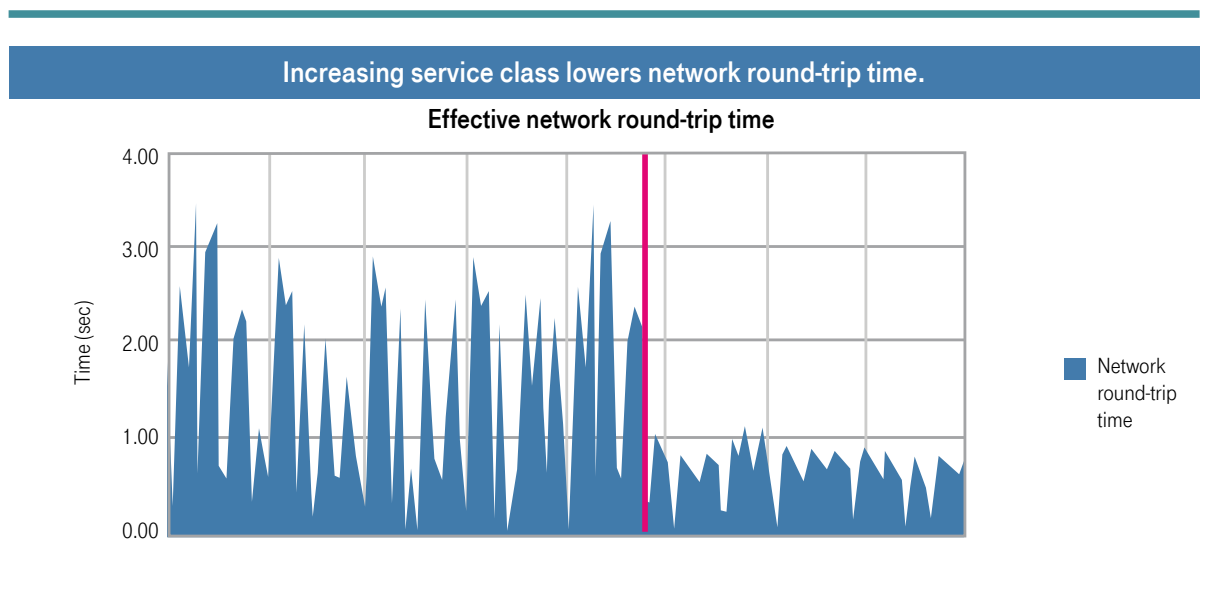


Figure 6: ICT Monitor screenshot illustrating change in network round-trip time.

ICT Monitor also plays an important role in terms of preparing a company's ICT resources to meet future demand. Because it collects and evaluates statistics on load, ICT Monitor can alert companies to potential problems and bottlenecks. As soon as it predicts that the bandwidth will soon be exhausted, or that an application is about to overload, it automatically informs the user help desk so that it can take action. This allows many problems to be resolved without involving the customer. In fact, the customer only needs to be involved when internal adjustments need to be made, or when significant changes to the ICT are necessary. In these cases, the user help desk notifies the customer, and they work together on developing a solution.

ICT Monitor screenshot illustrating a change in response time.

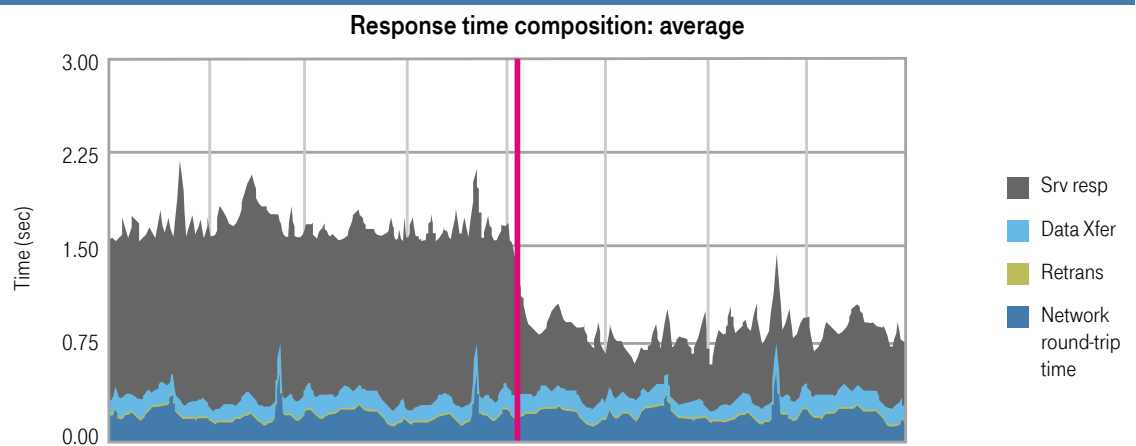


Figure 7: ICT Monitor screenshot illustrating a change in response time.

## 5. Case studies.

The following case studies illustrate the benefits of Application Performance Management in practice.

### **Case study 1: A company expands its presence in the USA.**

#### **The situation:**

An international player was enjoying great success on the US market. With profitability high and sales rising, the company decided to expand its presence in the US, and increase the number of local offices from three to nine. These had remote access to applications such as file servers, mail exchange servers, Citrix products and Data Link Switching (a real-time application). The enterprise also wished to make greater use of UCC systems to cut travel costs and improve intra-enterprise communications. For reasons of security and centralization, the data center was located near to corporate headquarters in Europe. To meet increased demands, the company invested in WAN bandwidth. However, there were still performance problems at application level.

#### **The company's approach:**

The organization tried to resolve the problem itself, and considered two alternatives.

First, they considered a massive increase in bandwidth. However, that would lead to high operating costs. Moreover, previous bandwidth increments had very little effect. This plan was therefore rejected.

Second, they played around with the idea of establishing an additional data center near New York to reduce the load on the intercontinental network. This solution would drive up costs, too, as it would mean maintaining a second data center synchronized with the one in Europe. But it was rejected for a different reason: a data center in the USA does not offer sufficient security, since current legislation grants the US government direct access to all data, however confidential.

#### **Application Performance Management:**

ICT Analyze was deployed to conduct a thorough analysis of the network, down to application level, and the service provider highlighted how and where bandwidth savings could be made.

Implementing ICT Monitor and ICT Optimize led to a significant reduction in network load. As a result, there was no need to increase bandwidth nor to build a second data center to safeguard performance. All key data remained at the secure, Europe-based data center.

Opting for APM as a managed service means the company will now receive advance warning of excess load on the network due to additional demand (e.g. as a result of continued expansion on the US market). At the same time, the service provider will explain exactly how the infrastructure should be expanded to achieve optimum performance and avoid unnecessary costs.

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Other APM success stories.

A leading sports-car manufacturer reduced the time taken to make backups from several hours to just 12 minutes.

An application installed at a local-government data center failed to deliver the expected performance. Replacing the servers did not solve the problem. After four weeks of analysis, a programming error was revealed as the root cause, which led directly to the solution.

Due to poor SAP systems performance at two remote sites, a manufacturing company replaced all relevant cables and routers, and doubled the bandwidth. This had no effect. Analysis revealed a migration error: the problem was quickly solved.

By reducing data traffic by 60 percent and increasing transfer speed by a factor of 15, a logistics company eliminated the need for an entire data center.

A temporary employment agency encountered performance problems after installing Citrix. An analysis revealed an error that impacts SAP servers in the new n-tier environment.

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Figure 8: Practical examples of the benefits of implementing APM.

## **Case study 2: a construction company expands its portfolio.**

### **The situation:**

An international construction company was evolving into a global provider of integrated, end-to-end solutions. It expanded its portfolio to include not only the planning, financing and construction of buildings and infrastructure, but also end-to-end facilities management for major properties throughout the world.

Managing a wide variety of commercial and institutional buildings placed increasing demands on ICT resources. Several new applications were required at the company's offices, and performance problems occurred repeatedly during their implementation and operation.

### **The company's solution:**

This organization likewise suspected that server problems were behind the affected applications' poor performance. Replacing the servers did not bring about a noticeable improvement, however, so a decision was taken to replace all relevant cables and routers in several facilities. In addition, available bandwidth was doubled.

None of these measures brought about an improvement.

### **Application Performance Management:**

With the help of Application Performance Management, ICT performance was restored to acceptable levels. The problems were caused by programming and migration errors in the network infrastructure. These were detected and resolved quickly and easily using ICT Monitor.

In the future, high availability of the entire solution will be guaranteed through contractually binding service-level agreements. In addition, essential systems such as SAP will be made fail-safe. The corporate network is now accessible throughout the world.

Thanks to ICT Monitor, decision-makers now enjoy an end-to-end overview of systems quality, and can verify that current demands can be met. This transparency will make it easier to adapt the infrastructure in line with future changes to business processes. The technology also provides optimum support for business growth, since new services and applications can be implemented, and existing ones extended, at any time.

ICT Monitor affords visibility into all processes within the network and in other parts of the ICT infrastructure, and performs proactive systems monitoring. Thanks to its extensive experience, the provider that offers this APM solution is able to quickly identify compatibility problems and other sources of error, and prevent loss of performance when implementing new applications, for example. If the user help desk becomes aware of an imminent performance bottleneck (for example when a predefined threshold is reached), staff immediately informs the customer. This offering provides an effective and timely means to avoid performance problems. And in terms of ICT, the customer is well placed to master future challenges.

## 6. Glossary.

|                           |  |
|---------------------------|--|
| <b>Basel II</b>           | Basel II is an umbrella term for the recommendations on capital reserves issued in recent years by the Basel Committee on Banking Supervision. Financial service providers in EU member states must comply with these regulations from 1 January 2007.                               |
| <b>Cloud computing</b>    | Cloud computing is a term for renting infrastructure, software and bandwidth under set conditions. The services provided are scalable, and are characterized by high availability and security (see Cloud Computing white paper).  |
| <b>EURO-SOX</b>           | EURO-SOX is a directive issued by the European Commission based on the USA's SOX (Sarbanes-Oxley) act. EURO-SOX requires member states to pass national laws regarding investor protection and independent auditing of certain types of businesses (e.g. publicly-traded companies). |
| <b>GDPdU</b>              | GDPdU is German legislation that governs digital records held by businesses; it permits financial authorities to inspect digital records and requires companies to maintain records in an audit-ready state.   |
| <b>ITSM</b>               | IT service management (ITSM) refers to the management of ICT systems in such a way as to support business processes. ITSM is part of the trend towards customer- and service-oriented information technologies.  |
| <b>ICT</b>                | The term ICT (information and communication technology) was first used in the 1980s. It refers to the convergence of information and communications technologies.  |
| <b>ICT infrastructure</b> | ICT infrastructure is an umbrella term for all computer and communications hardware and software that supports general office, administrative and management tasks. It comprises the following components: clients and servers, applications, routers, switches and connections.     |
| <b>LAN</b>                | The local area network (LAN) is a computer network consisting of cabling and access components. Since the early 21st century, Ethernet and the IEEE 802.3 industry standard have served as the basis for LANs.   |
| <b>Quality of service</b> | Quality of service (QoS) is a metric for performance of all components within ICT infrastructures. For example, it is used to define minimum bandwidth and maximum latency, and may be used as the basis for assigning priorities to different types of traffic.                     |

|                        |   |
|------------------------|---|
| <b>SaaS</b>            | Software as a service (SaaS) is a software distribution model. The software is hosted and managed centrally by a provider, and is offered as a service over a WAN or the Internet via IP technology. End users do not require extensive computing resources to access this software.  |
| <b>SLA</b>             | A service level agreement (SLA) is a formal document usually included in contracts for the provision of ICT services. SLAs define quantitative and qualitative benchmarks that must be regularly monitored to evaluate the service provided.  |
| <b>SOA</b>             | Service-oriented architecture is primarily an IT management concept and also a systems architecture concept. An SOA-based infrastructure is engineered to support certain business processes, and can quickly respond to changes in the business environment.   |
| <b>UCC</b>             | Unified communications and collaboration (UCC) makes business processes more efficient by integrating communications channels and process applications. It includes collaborative tools that support teamwork, such as web conferencing (see UCC white paper).  |
| <b>USA PATRIOT Act</b> | An anti-terrorism law that was passed by the US Congress in response to the events of September 11 and the anthrax attacks. The law extends the authority granted to governmental organizations regarding surveillance. For example, it allows eavesdropping of telephone lines and conversations, email, and the Internet, even without a warrant. |
| <b>VoIP</b>            | Voice over Internet Protocol (VoIP) refers to phone calls transported via an IP network. The network that transfers these conversations is also capable of transferring data (see VoIP white paper).  |
| <b>VPN</b>             | A virtual private network (VPN) uses a public network to transport private data. The connection that tunnels data over the public network is usually encrypted. However, the term “private” does not always mean that the connection is encrypted. Today, the term VPN most commonly refers to VPNs that connect users via IP tunnels.              |
| <b>WAN</b>             | A wide area network (WAN) is a network that covers a large area. Due to globalization, many WANs span multiple continents. WANs usually have significantly lower bandwidth than LANs, and have a much higher incidence of latency and packet loss as a result.  |

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## 8. References.

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