

# *Application Traffic Management Over the WAN*

*Linking Network Application Performance,  
Information Security, and Business Continuity*

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## ***CRA Reports***

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## *Introduction: Market Overview*

*This White Paper explores the market trends that are creating requirements for Application Traffic Management strategies. It demonstrates how a multi-disciplinary approach to Application Traffic Management can be most effectively integrated into the operations of companies. It describes the technological requirements for implementing an Application Traffic Management strategy, and explains the technology requirements needed to protect critical applications from bandwidth events that lead to degraded enterprise performance. Finally it provides a cost-benefit context against which Application Traffic Management investments can be understood.*

It would not be out of line to describe the strategic management initiatives implemented by corporations over the past decade as being about bridging operational boundaries that have interrupted — or at least caused friction to — business processes as companies strive to deliver value to the marketplace. For instance, sanding down the friction with those who buy products drives Customer Relationship Management (CRM) strategies, while streamlining the distribution channel drives Supply Chain Management (SCM) activities, and enhancing internal collaboration drives Enterprise Resource Planning (ERP).

At the root of all this activity lies the imperative to closely align all of the major investments in an enterprise's operations, by:

- Deploying mission-oriented business processes.
- Harnessing the creativity and productivity of the knowledge workforce.
- Implementing enterprise technologies that support effective business processes and efficient knowledge workers.

All of this has significantly raised the stakes for enterprise network application performance during the normal course of doing business. This is certainly the case during stress, such as when:

- Unexpected spikes in demand for enterprise application resources create network congestion; or
- Concerted virus/cyber attacks disrupt and interrupt continuity of operations.

Optimizing network application performance on one hand - and responding to information security threats on the other — have traditionally been seen by many players in corporate America as two distinctly separate categories of risk for which companies have dedicated separate resources. Outside of the fact that both of these categories involve the enterprise network, there has been little strategic coordination or collaboration to address these issues in unison.

But as the concept of "layered information security" blends with efforts to remove unnecessary barriers to cooperation within and between organizations, there is growing support for integrating network application performance initiatives into information security and business continuity strategies.

Today, companies are blurring the lines between security, availability and performance to gain major improvements in their ability to protect and enhance the enterprise resources for employees, supply chain partners and customers.

### *Application Traffic Management Defined*

One of the key management principles enabling this integration is Application Traffic Management, a systematic enterprise-wide approach to gaining visibility and control of network and application performance.

Application Traffic Management is an emerging corporate discipline that has been recognized by major market analyst and management consulting firms (including Gartner and Meta).

- It defines and describes a process by which companies can gain insight into how specific applications use WAN resources.
- It provides tools for dynamically managing the impact of specific applications on the network and each other.

The objective of Application Traffic Management is to ensure that mission-critical applications (such as CRM, SCM, and ERP) receive adequate bandwidth resources at all times. This is accomplished by preventing non-mission-critical network activities (Web surfing, transfers of large email attachments, or virus attacks) from overwhelming the enterprise network and choke access to high-priority applications.

Application Traffic Management strategies start with the proposition that applications running on enterprise networks must be identified, categorized/prioritized, and then managed accordingly.

It builds on the concepts introduced at the network level with Quality of Service (QoS) techniques that have been developed for communications systems to distinguish, prioritize and provision bandwidth for voice communication sessions that cannot tolerate latency. It de-prioritizes messages or transmissions that can operate on a "best-effort basis," like e-mail.

Application Traffic Management adds a level of granularity to QoS, allowing IT managers to segment and manage the performance of individual applications. It enables organizations to reserve network resources for high-priority applications so that the network allocates bandwidth to critical operations automatically, regardless of spikes in demand from non-prioritized or unauthorized network activities.

### *Evolution of Application Traffic Management Imperatives*

Application Traffic Management makes a major contribution to the so-called "enterprise dashboard" that executives use to run their operations. IT organizations have had little insight into how specific applications utilize enterprise network resources. A survey of 189 IT professionals and executives recently conducted by **NetworkWorld** magazine and **Packeteer** revealed that:

- Only 25 percent of respondents indicated that they knew precisely what applications are running on their networks and how much bandwidth is used by each.
- A full 56 percent acknowledged that they know about some of the traffic on their networks.
- Nearly 19 percent admitted that they would have to make an educated guess — or simply do not know — what application traffic is currently running on their networks.

This state of understanding — or misunderstanding — is a direct consequence of the rapid evolution that most enterprise IT shops have experienced in recent years. The migration from legacy mainframes, to client-server, to today's N-tier, Web-services-based architecture has combined with new extended-enterprise business strategies to complicate the application performance picture. extended-enterprise business strategies to complicate the application performance picture.

Era	Computing	Communication	Application Traffic Management Imperative
1960s-1980s	Siloed Mainframe Systems	Dedicated Circuits for Corporate Networks	Low
1990s	Integrated Corporate Systems based on Client-Server Architectures	Local/Campus Networks Separate Voice and Data Networks	Medium
Today	Extended Enterprise Computing Mission-Critical Web Services to: * Employees* Customers* Suppliers	Shared/Converged Networks that Support: * Multimedia * Internet Access	High

When enterprises operated private leased-line networks with little requirement for communicating with users that were not indirectly connected to a mainframe — it was easy to keep track of application traffic. But it was an irrelevant point of analysis, because there was no competition for network resources. Each major silo of automation had dedicated network resources. The performance of both networks and applications were highly predictable. That is no longer the case.

*Unintended & Unknown Application Traffic*

Beyond the dynamics of today's architectures, the Internet has become the transport platform of choice for business WANs across many industry sectors. While this universally shared network has contributed significantly to reducing connectivity costs, it has also allowed unintended traffic to flow into enterprise systems.

The same network resources that support ERP, SCM, and CRM operations are also used by employees to access Web sites and peer-to-peer networks to download music, games, and other non-business traffic. The move to the Internet has opened enterprise networks up to misuse by spammers and attack by viruses and hackers. So there is a range of unplanned traffic that is not well understood by enterprise systems managers. All of these elements have a dramatic effect on network application performance.

*"The value of application traffic management systems should be measured in terms of overall application response times. Companies should be able to look across the users, the servers, et cetera, and be able to understand if any given application is performing at levels necessary to support optimum business performance."*

Dave Côté | CEO, Packeteer

*"The applications and the networks are architected differently today than they were 3 or 4 years ago. All the major applications -- like Siebel, Oracle, and SAP -- have all gone to this multi-tiered architecture. And we have moved this multi-tiered architecture back into the data center. These browser-based applications and network resources are creating a lot more traffic that has to flow back and forth over a shared wide-area network (WAN). And when it gets bogged down, performance slows down."*

--- Lawrence Orans  
Analyst, Gartner

## *Operational Impact Analysis*

From an operational standpoint, it would be a mistake to view Application Traffic Management initiatives strictly as technology projects. While it is true that technology decisions must be made to gain visibility and establish control of how applications use network resources, by far the most important decisions affecting the success of an Application Traffic Management strategy revolve around how to prioritize applications in business terms.

### *Line-of-Business Buy-In*

In fact, one of the biggest operational consequences of Application Traffic Management is that it forces a new level of interaction to take place among line-of-business executives and IT managers. In the final analysis, investments in Application Traffic Management must provide returns that take the form of application performance guarantees. The technology team will be in a position to assure business managers that they can assume levels of uptime for mission-critical applications and make business decisions accordingly. This can affect how supply-chain agreements are formulated, how CRM call centers are staffed or managed, and how production resources are allocated.

The laws of economic scarcity, however, still apply — which means that not every application can be guaranteed at the highest levels. That is why a thorough discussion to determine priority applications must take place in the context of business processes and objectives. This critical step must be business-driven, not technology-driven; which means that there must be senior C-level executive support for the initiative.

And more than lip service must be paid to executive involvement, because in the internal debates to prioritize application performance, there are likely to be differences of opinion among business managers and IT staffs about organizational priorities. Someone — or some process — must be in place to arbitrate these conflicts — what might be called "the politics of policy."

*"If you don't have business buy-in, it's never going to work. Executive level support must be active if application traffic management initiatives are to be strategically effective."*

**Jerry Murphy** | Analyst, Meta

### *Ongoing Operational Insight*

Few organizations that implement an Application Traffic Management strategy fail to be surprised by the actual behavior of enterprise applications on the network.

A thorough inventory of what applications are currently running on the network along with an analysis of how much bandwidth each is using at different times of day and at different points in

***"The effectiveness of these strategies really depends on what relationship the business heads have with IT and what the business units' roles are in the governing process. If you're not doing Application Traffic Management, the IT operations folks can be less specific in how they are meeting the business units' requirements for managing infrastructure and the applications. Without Application Traffic Management, IT departments can't give the business application performance guarantees."***

--- **Jerry Murphy**  
Analyst, Meta

the business cycle are among the early steps that must be taken prior to establishing application performance priorities. And after the initial inventory is taken, plans should be put in place to periodically audit application performance and compare the results to the business mission.

*"Application Traffic Management is an ongoing iterative process — not a single event. The network changes all of the time. The applications that are running on your network change all the time. This isn't a deploy it and forget it type of system — application traffic management is an ongoing operational exercise."*

**Mark Urban** | Senior Product Marketing Manager, Packeteer

### *Integrating Security and Business Continuity Considerations*

Security and business continuity imperatives should also be included in the development and implementation of an enterprise-wide Application Traffic Management strategy.

- The process of prioritizing applications carries significant implications for how the security team decides to allocate its perimeter, remediation, and recovery measures. The bandwidth guarantees can buy the security team precious time as they respond to threats that target the enterprise.
- The process of dynamically managing bandwidth allocation at the application layer provides capabilities that can significantly enhance the redundant, backup systems standing by in emergency reserve. In fact, during a crisis, backup systems operating at full capacity during a disaster recovery situation can offer line-of-business managers and senior executives performance guarantees for mission-critical applications kept in reserve.

***"What Application Traffic Management contributes most to both security and business continuity operations is the idea that organizations can in effect insulate the applications that are most important to the business from bandwidth-robbing events that can adversely affect mission-critical operations."***

--- Dave Côté

## *Technical Impact Analysis*

### ***"Adding bandwidth is not a silver bullet to resolving application performance issues."***

Jeff Barker | Director of Product Marketing, Packeteer

That statement may well surprise many in the IT community, because the traditional approach to addressing this issue has been somewhat one-dimensional. Most enterprises simply throw bandwidth at the problem.

- Approximately 60 percent of respondents in the Packeteer/NetworkWorld survey of IT professionals reported that their solution of choice for ensuring that critical business applications receive adequate bandwidth is to add bandwidth.

Many in the survey pointed out that other measures are in place to secure enterprise resources — such as firewalls, employee traffic monitoring, content filtering, etc. — but the allocation of more bandwidth was the only measure mentioned in large numbers that directly addressed the issue of application performance.

While the "bandwidth solution" carried some currency during the peak of the telecommunications era when it seemed that broadband resources were abundant, and thus inexpensive, that consensus has since reversed. Moreover, allocating more bandwidth is a strategy that delivers diminishing margins of return.

Just as nature abhors a vacuum, user communities — in both the consumer and corporate space — have demonstrated repeatedly that fallow capacity does not last for long. Reserve bandwidth is almost an oxymoron in today's enterprise networks — especially in the context of the Web-based extended enterprise applications that are being deployed at a rapid-fire rate.

The absence of a single technology to address application performance is why the problem must be "managed." And in fact, Application Traffic Management as a discipline identifies a basket of technical requirements that can be managed to deliver the performance guarantees needed to deliver the organization's business objectives.

### *Visibility and Application Profiling*

The first objective of the technical deployment is to take inventory of the applications that run on the enterprise network and capture a profile of its key behavioral characteristics. This requires companies to deploy an application-intelligent traffic monitoring appliance that provides visibility into network utilization and application performance. This appliance should identify how WAN and Internet resources are consumed, what causes performance problems, and provide the analytical context against which a solution can be developed. Specifically, it should:

- Discover traffic automatically by leveraging Layer 7 classifications to identify the nature of network traffic.
- Analyze traffic performance issues using statistics to generate peak utilization and efficiency measurements that are key indicators of performance issues.
- Benchmark and track application performance with Response Time Management (RTM) and TCP Health statistics.

- Pinpoint performance issues by evaluating network, client, and server behavior trends.
- Proactively monitor service levels based on network or application statistics.

### *Monitoring and Control*

Armed with data on what applications are running on the network and how they use bandwidth, a monitoring and control capability must be put in place to observe and manage traffic on the WAN. This is the "steering wheel" of the Application Traffic Management system — it provides the mechanism by which:

- Business-critical applications are dynamically allocated adequate WAN and Internet resources through bandwidth management.
- Performance can be further enhanced by compressing application traffic selectively.
- Traffic in general can be managed to meet benchmarked performance metrics.
- The impact of unsanctioned traffic can be contained.
- "Bursty" applications can be smoothed by assigning bandwidth maximums.

### *Finetuning Performance*

The more organizations learn about application behavior on the network, the more insight and control they can apply to further optimize application performance. Beyond the basic monitoring, management, and control capabilities outlined above, network and application managers can combine compression technologies to better understand and manipulate information delivery. These measures can:

- Create virtual bandwidth out of existing resources.
- Reduce bandwidth utilization and traffic loads.
- Avoid costly bandwidth upgrades.

### *Centralized Enterprise Reporting*

A distinction should be made between managing the tactical day-to-day developments and mining the data generated by Application Traffic Management systems to make strategic decisions. The next step is to centralize and analyze application traffic trends throughout the enterprise (or extended enterprise) to:

- Get system-wide views across the entire WAN and Internet network.
- Track high-level indicators of performance issues with link-load measures, critical and marginal performance thresholds, event tracking and guaranteed rate failures.
- Drill down into detailed statistics or different device groupings to isolate sources of problems quickly.
- Develop reports that are useful to key stakeholders in the Application Traffic Management system, including: network managers, application managers, line-of-business managers, corporate security officers, and business continuity executives.

### *Policy Review and Adjustment*

As the key stakeholders in the Application Traffic Management system respond to the management reports that they receive, adjustments can be made to general performance policies. As a result, companies need an automated way to translate changes and shifts in policy into technical adjustments for all parts of the enterprise network that are affected by those decisions.

## *A Cost/Benefit Analysis*

Like any major enterprise initiative, determining return on investment (ROI) for Application Traffic Management initiatives involves assessing risks and operational inefficiencies that exist prior to the deployment and comparing them to the reduced risk exposures, improved allocation of resources, and enhanced performance that are measured after implementation. Most of those variables are highly specific to industry conventions and the operations of each enterprise. But the categories that can be measured to reach a positive ROI apply to all organizations.

### *Ignorance Is Not Bliss — It's Expensive*

For many organizations that implement Application Traffic Management strategies, financial returns accrue in the immediate wake of the application profiling process. Often, hundreds of thousands — perhaps even millions — of dollars go wasted in the form of underutilized software licenses.

The application profiling process often reveals just how heavy a burden non-critical traffic can place on bandwidth resources. It is not uncommon to discover that large email attachments, peer-to-peer downloading (like KaZaA) and even spam, interfere significantly with the performance of multimillion-dollar investments in enterprise applications.

***“A big benefit for many organizations comes when they realize that they don't even use new applications because their performance is so bad. So a tremendous benefit is yielded from improving the acceptance rates of applications that were performing poorly.”***

--- Lawrence Orans

### *Buying Time for Security and Recovery Teams*

In the event of a bandwidth-damaging incident, Application Traffic Management delivers the ability to manage scarce bandwidth and allocate whatever resources are available to the most critical business application. This is an important consideration given that security breaches are all but inevitable.

- A full 85 percent of companies in the United States experience security breaches that result in more than \$200 billion in losses, according to the annual survey conducted by the Computer Security Institute and the Federal Bureau of Investigation.

Application Traffic Management is integral to a layered security/business continuity/high availability strategy that takes this fact into account.

While it will not stop a worm or a virus from getting into the enterprise network, it can ensure that it does not consume 100 percent of the network's bandwidth. This has the net effect of allowing the security and disaster recovery teams to respond in less of a crisis environment, enhancing their ability to deal with the threats in a comprehensive manner.

### *Weaning Away From the "Add Bandwidth" Default*

Many companies today rely on application performance techniques that are expensive and ineffective. The most common strategy entails purchasing additional bandwidth in hopes of providing more maneuvering room for critical applications. But even after additional bandwidth is purchased, business application

performance often remains inconsistent and unpredictable. The need to add expensive T1 lines — or even more expensive broadband connections — can often be delayed or postponed by better managing the existing bandwidth resources.

*"The ability of Application Traffic Management to reclaim those bandwidth expenditures from the abusive recreational or non-critical traffic can deliver a high-impact benefit that can be quantified in fairly obvious and accountable hard dollar terms."*

**Mark Urban**

### *About the Sponsor: Packeteer*

Founded in 1996, Cupertino, Calif., Packeteer® provides Application Traffic Management systems that enable enterprises, service providers, and other organizations to align network resources with business priorities. Packeteer systems monitor, control, and accelerate application performance over wide-area networks and the Internet. Their systematic, application-intelligent approach ensures that mission-critical applications perform efficiently and reliably and that existing network resources are extended to support business needs. The company's products are sold through more than 100 resellers, distributors and system integrators in more than 50 countries.

In addition to developing technology and management systems to ensure high levels of application performance, the company works with clients to develop and execute Application Traffic Management strategies that bring together the talents and expertise of:

- Network management professionals
- Application developers
- Line-of-business managers
- Information security experts
- Executives responsible for business continuity operations

### *Managing the Basket of Application Traffic Management Technologies*

The solutions that Packeteer brings to market span the entire technological life-cycle of strategic Application Traffic Management systems. The integrated solution set consists of the following offerings:

- **PacketSeeker™** – an application traffic monitoring appliance that provides visibility into network and application performance. Transparent to network infrastructure, PacketSeeker automatically identifies applications, measures more than 60 performance metrics per application, tracks bandwidth utilization, network efficiency, application health, application response times and service levels, and can be configured to proactively notify you of changes in performance. PacketSeeker measures, aggregates and stores this data on board, providing graphs and analysis via a Web browser. SNMP MIBs and an XML-based API provides data to leading reporting and event management applications.
- **PacketShaper®** – an application traffic management appliance that ensures business applications perform efficiently and reliably over the WAN and Internet. PacketShaper provides Layer 7 visibility and several levels of policy-based control to actively manage network and application performance. Its classification and analysis capabilities identify performance issues and manage service levels by application. PacketShaper leverages this analysis to set policies that allocate bandwidth to each application based on its relative business importance. Minimums and maximums can be established for applications to restore control over network resource allocation. TCP Rate Control, UDP Rate Control, and advanced queuing enforce policies, maximize throughput, and minimize packet loss and latency.
- **PacketShaper's Xpress™** – a set of acceleration technologies designed to extend available network resources with application-intelligent compression and latency management, while simplifying management with ActiveTunnel management. With these technologies, PacketShaper provides Quality of Service and accelerates mission-critical applications. Operating over the WAN and Internet, lowering bandwidth costs and maintaining high levels of availability and performance to important business applications.

- **PolicyCenter™** – a directory-based policy management application that enables Packeteer's enterprise and service provider customers to broadly deploy, scale, and manage application QoS throughout the network and lower total ownership costs. PolicyCenter is an LDAP directory-enabled application that provides central configuration, policy management, administration, and device status for multi-unit PacketShaper deployments.
- **ReportCenter™** – a central analysis and reporting application that aggregates metrics from large deployments of PacketSeeker and PacketShaper appliances. ReportCenter provides system-wide views of network and application performance by centrally collecting, correlating, storing, and analyzing data. Distributing reports via web browser and e-mail, and scaling to manage as many as 500 PacketSeeker or PacketShaper appliances, ReportCenter simplifies network performance reporting and lowers ownership costs for large Packeteer deployments.

For more information on Packeteer's Application Traffic Management offerings and to learn more about implementing effective Application Traffic Management strategies call 800-440-5035 or visit [www.packeteer.com](http://www.packeteer.com).