Whitepaper

exinda networks

Resolving Wide Area Network & Applications Performance Problems With Unified Performance Management

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Executive Summary

"IP was not designed to be fast, efficient or dynamic as a priority; it was designed to be resilient, reliable and universal. The time has come though for IP to be all of the above. The demands of industry usage growth and global adoption have created this imperative. The resolution lies in the manner of IP implementations and standards."

Corporate networks are increasingly unable to keep pace with the business demands placed on them, leading to significant and adverse effects on staff productivity. The difference between the demands of the business and the network's ability to deliver performance has thus been defined as the Productivity Gap. To solve the Productivity Gap, functionality as defined in Unified Performance Management (UPM) is required. UPM is currently defined as the full integration of wide area network (WAN) optimization, application acceleration, application visibility and application response time measurements, with access to a synonymous management graphical user interface (GUI) across all platforms and/or a ubiquitous, global management system. It is the benchmark defining the minimum functionality required to accelerate IP traffic and IP-supported applications across the exponentially growing WANs and Internet based business communications infrastructure, and has the capacity to close the Productivity Gap now and into the future.

With an expectation that within three years, the vast majority of WAN and Internet based communications will be automatically and transparently accelerated and optimized, irrespective of the vendors platforms involved. In recognizing that currently offered vendors platforms could not deliver this capacity, the requirements were analyzed and UPM was defined.

High Demands on the Corporate Network

Today, more than ever before, businesses rely upon their corporate networks to conduct business. Given today's dynamic business environment, it is an immense challenge for the corporate network to keep pace with these rapidly increasing business demands. Common changes in the business environment include:

- Exponential growth in new applications, services & general usage of the Internet & corporate WANs
- Significant shift in staff productivity dependency to the performance of WAN and Internet based communications
- High rate of business being completed via transactions between remote offices and the headquarters data center
- Increase in business services, communications and products delivery via IP infrastructures such as the Internet and myriad forms of mobile computing, wireless broadband, GSM, etc., with significant related back end corporate WAN traffic growth
- Widespread server centralization and consolidation initiatives (centralized file access via the WAN)
- Over-contention rates and extreme congestion on limited bandwidth mediums such as satellites

The Growth and The Dynamics

An almost universal broadband availability combined with sinking relative access capacity costs has fueled an explosive expansion in WAN based communications via both leased line and the openly accessible Internet infrastructures.

The number of new applications and types of information traversing the network has grown exponentially in recent years. On average, companies deploy 84 new Web-enabled applications each year (Source: Juniper Networks industry survey). This trend will continue for years to come. As the number of applications on the corporate network increases, there is a continual need to extract higher performance, often facilitated by adding bandwidth from the provider infrastructure, or alternatively to improve the overall infrastructure efficiencies. Critical applications such as Voice over IP, Web services, Web enabled applications and Citrix demand both quality network performance and reliability.

We observe today that adding bandwidth is not fulfilling the performance requirements to the degree needed, and that many of the performance issues are not dependent on available bandwidth but on the effects of latencies, repetitive data transfers, the lack of alignment of network resources allocation to prevailing corporate policies, protocol inefficiencies and resource wastage due to unregulated applications usage of available network resources.

Corporate networks have become more distributed, with organizations being more geographically dispersed and today locating over 60 percent of a typical enterprises staff outside of headquarters. (Source: Juniper Networks, The Need for Speed). Offices and staff are being connected not only to headquarters resources but also increasingly to third party networks, partners and the Internet. Employee numbers working from home offices have increased exponentially, with more than 11 percent of enterprise staff being totally mobile today (Source: Gartner), in line with the advent of massive mobile computing growth driven by wireless networks, IP services via mobile phones and now wireless broadband. This translates into a massive increase in corporate network traffic between remote locations and the corporate data center, where server centralization is being driven in parallel.

The data, which traverses the WAN and/or the Internet, is subject to higher latency than if the data traveled over the corporate local area network (LAN). Higher WAN latency translates into end user frustration and unproductive time as employees in remote sites wait for the network to respond. The Time Waiting at Screen (TWAS) factor drives productivity losses.

Server Consolidation & Centralization

More critically though, corporations are driven to undertake server centralization and consolidation initiatives to reduce network operating costs and achieve better control, administration, backup, recovery and security of data. With these initiatives, transactions and data requests previously handled over the branch LAN are now being processed over the WAN and the Internet. Unfortunately, these transactions are subject to high WAN latency and network congestion with the WAN being typically up to 100 times slower than the LAN, which slows application response times. Again, these poor application response times ultimately affect the employee productivity and create end user frustration while spiraling costs.

In summary, the corporate network is struggling to keep pace with the changing business environment. The difference between the demands being placed on the corporate network and the network's ability to delivery is called the "Productivity Gap." The Productivity Gap creates a monumental challenge for the IT staff. However, the impact of the Productivity Gap reaches far beyond the IT staff. It negatively impacts a business' profitability as poor network performance will result in lower employee productivity, inferior customer service, increased staffing costs, higher network infrastructure costs, network bandwidth upgrade pressures and lost revenues.

The Productivity Gap

Using Exinda's application response measurement tools, we can measure the unproductive TWAS time for employees. It is estimated that each employee can reduce TWAS by approximately 10 minutes per day by improving application response and data transfer times.

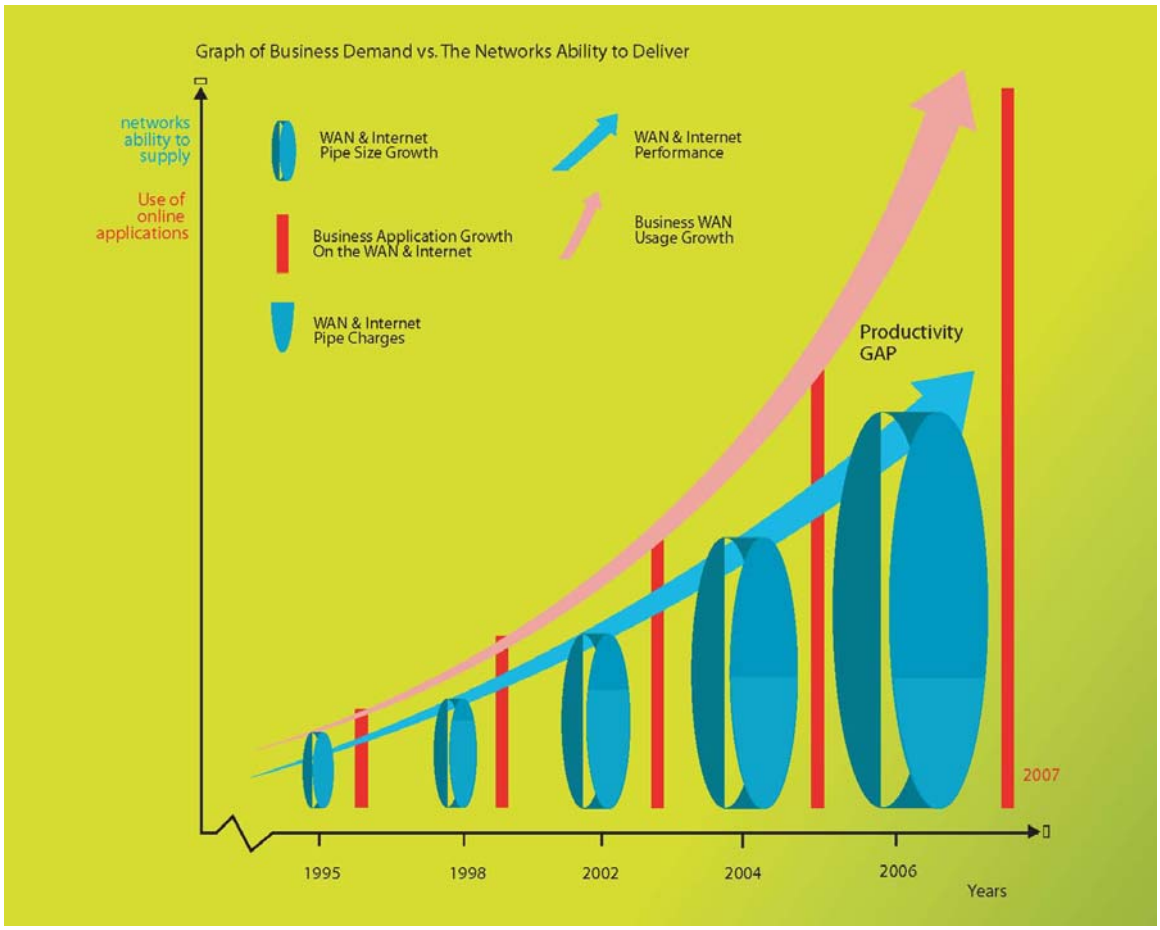
For a 500 workstation organization, a 10 minute per day variation (reduction or increase) in the TWAS factor, would represent a gain or loss in excess of $750,000 per year.

The following graphical representation demonstrates the relationships and developments between:

- The growth of business demand on WANs, including the Internet
- The reductions in "price per Megabyte" of data or "price per Megabit" of access speeds
- The rapid growth in the size and utilization of "bandwidth pipes"
- Business application growth on the WAN and the Internet
- The ability of the business network to keep pace with demand

Clearly, driven by application and business usage, which in turn is driven by costs and resources savings pressures, demand on the efficiencies, dynamics and performance of IP networking infrastructures has far outstripped their current ability to deliver.

Development Factors of the Productivity Gap:



Partial Solutions for the Productivity Gap

What can be done to bridge the Productivity Gap? What is required to overcome the slow network and application response times that are causing significant financial losses for corporations?

Some corporations will pursue adding bandwidth. According to Gartner analyst Mark Fabbi, enterprises in the United States will overspend $100 billion in the next five years to purchase more bandwidth. Adding expensive bandwidth provides only temporary relief for network performance problems. Unfortunately, for most corporations, the IT budget could not purchase enough bandwidth to solve the Productivity Gap.

Other corporations will pursue using individual technologies to close the Productivity Gap. These technologies including application acceleration, protocol optimization, wide area file services (WAFS), data compression and caching. Each of these solutions provides some relief to the Productivity Gap. But, they fail to resolve the entire problem.

The table below summarizes the merits and shortcomings of using these different technologies to solve the Productivity Gap:

APPROACH	MERITS	SHORTCOMINGS
Application Acceleration (AA) & Reduction Only	●Solves latency issues associated with distance of branch office from data center ●Reduces amount of repetitive data on the WAN ●Works well when native file transfers occur across the WAN	●Often does not improve application response times for interactive applications. ●Works with a limited number of network applications ●Does not provide any application level visibility ●Does not address corporate Internet strategy ●Inability to classify & monitor Layer 7 traffic ●Incapable of optimizing UDP-based traffic (voice, video)
Quality of Service (QoS) Only	●Improves application response times by prioritizing applications to resolve congestion issues ●Ensures predictable performance by guaranteeing important applications are not bandwidth starved during peak network periods ●Works well when differentiation of traffic is required such as VoIP traffic on a shared data network	●Limited traffic monitoring & measurement capability required to adapt QoS policies ●Requires a high level of expertise to set QoS policies ●Limited Layer 7 inspection capabilities ●Does not provide application response monitoring to understand delays associated with applications ●QoS does not address WAN latency
Combining AA and QoS	●Provides some network performance improvements	● QoS in routers cannot be used in conjunction with some AA solutions because routers encapsulate key header information that QoS requires ● QoS must be applied after traffic is accelerated in order to improve network performance ● Some AA devices have limited QoS and are not Layer 7 application aware ●Lacks monitoring and reporting required for network performance improvement ●Lacks application response time measurements

In the chart above, it is clear that the listed approaches are helpful in many situations. However, individually they are not comprehensive enough to solve the Productivity Gap.

Unified Performance Management (UPM)
Exinda Networks is proposing a new industry benchmark for the components required to deliver ubiquitous IP acceleration and thus successfully resolve the Productivity Gap. This benchmark effectively manages the network performance for a wide breadth of applications and resources that organizations use to do their business across a WAN and/or the Internet. Exinda calls this new benchmark Unified Performance Management (UPM). UPM fully integrates:

- WAN Optimization
- Application Acceleration
- Application Visibility
- Application Response Measurement
- Ubiquitous Global Management
- Transparent Mode, Auto Discovery and Auto Accelerate

WAN Optimization: For the UPM benchmark, WAN optimization includes Layer 2 through Layer 7 monitoring, policy-based traffic shaping, quality of service (QoS), compression, adaptive response, Application Specific Analysis Modules such as VoIP reporting and policy enforcement.

Application Acceleration: The UPM benchmark requires TCP acceleration, WAFS through CIFS acceleration, WAN memory, protocol optimization as well as data compression.

Application Visibility: The UPM benchmark encompasses application visibility, the ability to monitor at Layer 7 and see how applications are performing on the WAN. This information is critical to locating, understanding and resolving network problems. Unfortunately, most WAN optimization solutions provide minimal monitoring and reporting capabilities. Without thorough monitoring, there is no means to measure the effectiveness of a WAN acceleration solution.

Effective monitoring should provide both real-time and historical data, to deliver complete network and application operations visibility and help troubleshoot problems. Real-time data gives you a snapshot of what is happening on the network at a given moment in time. Historical monitoring with drill down capability provides a look at the trends over an extended period of time. This information is essential to the UPM benchmark and to any comprehensive management and acceleration of networks and applications.

Application Response Measurement (ARM): ARM quantifies application performance from the end-user perspective. This important tool detects how long end users are waiting for their applications to respond. It helps to pinpoint if a problem is network or server related. It also helps to fine-tune QoS policies to control response times. These measurements are an integral part of UPM and deliver the data analysis component of TWAS. Without monitoring, there is no clear measurement to know if application response times are improving.

Ubiquitous Global Management: UPM incorporates a ubiquitous global management system called Service Delivery Point (SDP). This hosted service allows a community of Exinda appliances, of any scale, number, model or geographical location, to be centrally managed, without the requirement for the addition of centralized management equipment at the customers premises, save a screen, keyboard and browser.

Transparent Mode, **Auto Discovery Mode and Auto Accelerate Mode:** These features are key UPM components, in addition to a fundamental end-user level optimization and acceleration capability.

Summaries and Conclusion:

The Future of UPM
The UPM benchmark will evolve based on market and technology demands. Imminent future versions of the UPM benchmark will include an end user acceleration client.

The First UPM Platforms
Exinda is the first vendor to meet the UPM benchmark that solves all facets of the Productivity Gap. Exinda's solutions not only fulfill the technical requirements for UPM but also the commercial requirements for a broad and scalable market adoption of the benchmark.

The requirement for a sub (US Dollars) $1,000 small to medium enterprise (SME)/branch office system has proven to be a critical broad market adoption driver in recent generations of technology product life cycles, such as for security gateway appliances and wireless gateway appliances.

In aligning the Exinda product family to the UPM benchmark, a sub-$1,000 WAN optimization appliance is available to the market, with the required minimum DSL 2 megabits per second optimization capability.

Exinda Networks is the first manufacturer to deliver UPM compliant solutions to the marketplace.

UPM Delivers Significant and Ongoing Benefits
Using the same example of a 500 workstation corporation to demonstrate the financial costs of the Productivity Gap, Exinda estimates a return on investment of between 5 to 8 days. This calculation involves a minimum achievable 10 minute productivity gain for employees through reduced file and data transfer times, increased VoIP penetration, quality and reliability, as well as the gains in general operational process efficiencies.

This represents an approximate 5,000 minute or more than an 80 man-hour productivity gain per day. The numbers can vary according to the current operational environment. However, on average an extra 10 employees are being carried by a corporation of this size to overcome the current lack of WAN optimization.

The UPM productivity savings to a corporation dwarf the cost of investment. UPM solutions improve network efficiencies by up to a factor of 100 and defer bandwidth access upgrades for significant periods. Deferring bandwidth upgrades in this manner can deliver many organizations with an instant ROI as well as superior and more resilient information technology architecture.

Future Industry and Market Developments
UPM will remain an open benchmark, with other vendors becoming UPM compliant in the future. A fully standardized and industry wide acceleration and optimization compliance model would advance the business and network performance of all sectors of our economies, irrespective of the vendors involved, as the improvement of underlying technology infrastructures has always delivered enhanced industry performance, competitive advantage and economic benefits.

In order to achieve this goal, UPM will not be a proprietary benchmark. Rather, it will be an open benchmark, with the potential to develop into an industry standard and foreseen to deliver benefits to all parties involved.

For more information on UPM and Exinda's UPM platforms, visit www.exinda.com/upm.html