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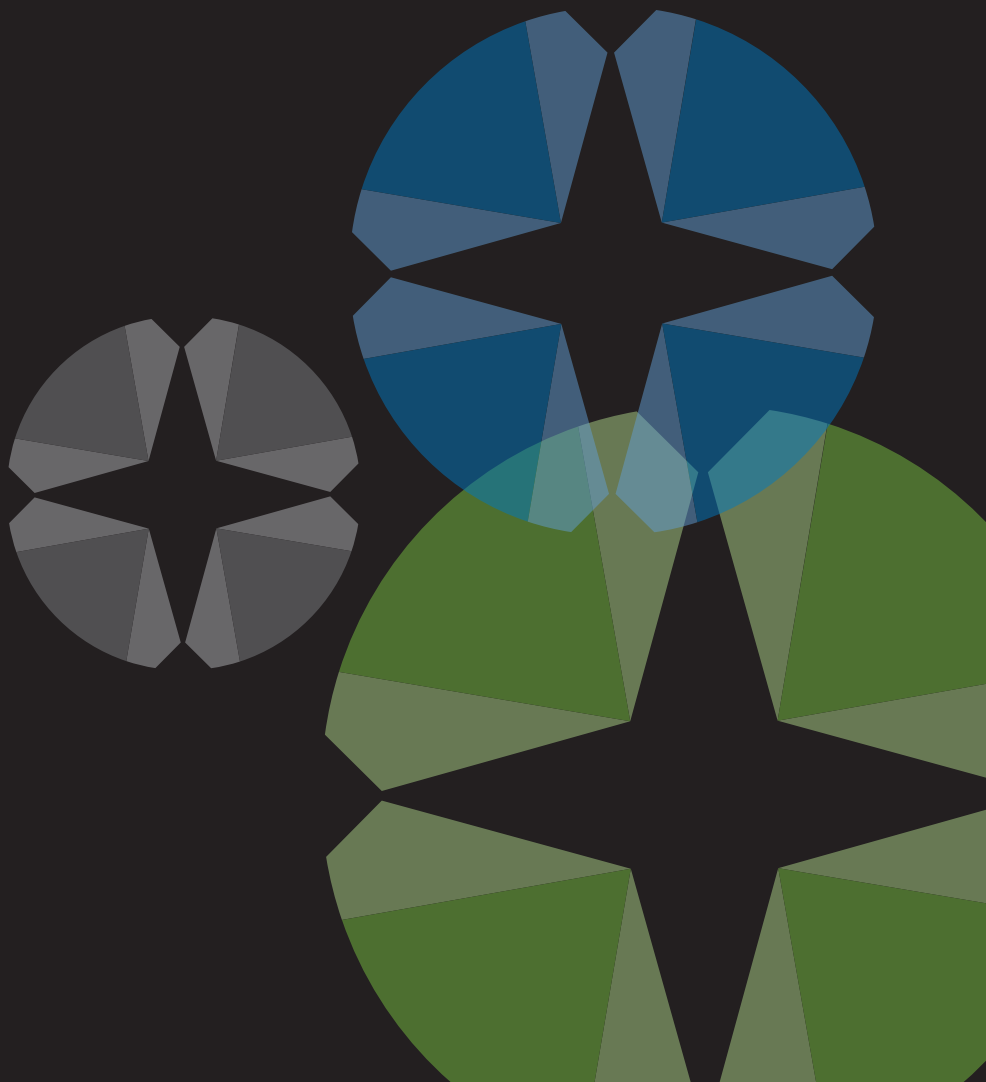
Optimize Your Microsoft Infrastructure

Leveraging Exinda's Unified Performance Management



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Executive Summary

Organizations are being challenged to centralize server infrastructure as a means to reduce costs, eliminate complexity, and ensure regulatory compliance. This trend towards server consolidation and centralization places new and increased demands on the wide area network often resulting in application performance issues.

Many organizations have deployed Microsoft applications in their networks including windows file sharing, Exchange and Outlook for email, SharePoint services for portal and collaboration, database services using MS-SQL, and domain and directory services with Active Directory.

Moving Microsoft application servers across a wide area network in a centralization strategy has created many challenges that organizations must face. Application performance will deteriorate, end user productivity will be reduced and there will be new demands for network bandwidth resulting from applications that have historically run over the LAN. Various technologies are available to help organizations overcome these challenges. Eventually all data and applications will be served to users over a WAN.

Introduction

As organizations consolidation efforts continue they are finding that response times for critical applications are no longer acceptable. Users are finding that these applications are not designed to operate efficiently over a wide area network due to the following characteristics –"low bandwidth" , "high latency" and application "chattiness". The critical applications that are being impacted are Excel, PowerPoint, Word and Outlook which use common internet file system (CIFS) or Messaging Application Programming Interface (MAPI) protocols.

Windows File Sharing using CIFS

CIFS was designed back in the 1980s (formally known as SMB) when the networking paradigm was quite different from today. At that time, no consideration was made for how CIFS would operate over a high latency WAN link. As many network managers have discovered, CIFS operates very poorly over such a link. Fundamentally CIFS is by design is a very "chatty" protocol, meaning a large number of round trip transactions are required to complete a request. For example, the largest chunk of data that CIFS can transfer in a single round trip between client and server is 61,440 bytes (61KB). Each CIFS request requires a response before the next request is sent to the CIFS server. Therefore CIFS is a latency-bound protocol, meaning that as latency increases the performance of CIFS decreases.

To put this in perspective, in order to transfer a single 30MB file, the CIFS protocol would have to make hundreds of round trips between client and server. On a typical LAN, this would take a few seconds but on a 2 Mbps WAN link with 300msec latency it would take around 7.5 minutes! Clearly this level of performance degradation has a severe negative impact on user productivity.

Outlook/Exchange using MAPI

Outlook primarily communicates to clients, or users using the MAPI protocol. MAPI is short for messaging application programming interface. It uses the Microsoft remote procedure calls as a transport mechanism to deliver email, calendaring, collaboration, address books etc. It is similar to CIFS in chattiness and performs poorly over low bandwidth high latency links.

"The problem is that CIFS and MAPI are just plain poor network citizens. They were designed to run over local area networks, where the performance price for application protocol "chattiness" is negligible. Unfortunately, when run over a WAN, such chattiness (application turns) exacts a heavy toll."

~ Network World – Sevick and Wetzel

SharePoint and SQL Server

SharePoint allows distributed teams to collaborate and share documents using a web browser interface. A SharePoint server acts as a centralized repository for collaboration, document and content management, portal services, business process work flows and the integration with business systems. By its nature, it is a very challenging application as each of these services produce large amounts of data that users are accessing over wide area networks.

Most organizations that utilize database technology have a similar set of problems. Database transactions using SQL are often chatty, small, and transactional. Use of a database generally means there is replication which involves large amounts of data being transferred and often it is highly repetitive in nature. Direct SQL communications or replications are both sensitive to latency, packet loss, and low bandwidth. Also, in the event a recovery needs to be performed, organizations can't wait for days to complete the recovery; it needs to be fast and happen in a timely manner.

Measuring End User Response Times

Application response measurements (ARM) provide valuable information so the network administrator is informed when users complain about an application's performance. Viewing the network and bandwidth usage is not only important, it is absolutely critical to be able to see what's happening on the network. However, just being able to see bandwidth usage and the network resources applications are using doesn't necessarily providing the complete picture. It is also critical to understand application response times. When there are performance issues, what is to blame? Is it the Network, Server or Application? Application response measurements provide objective, data based analysis of the actual user traffic in the network rather than synthetic measurements such as ping tests. This type of data can help prevent expensive network upgrades when the problem really might be a slow overloaded server or vice versa.

Improving Performance

Optimization techniques can increase application performance by using various application and protocol acceleration technologies. These will lead to improved response times for critical applications. The result is that users are spending their time using the application rather than waiting for their applications to respond, open, or download. Not only does the application feel better to the user but the quality of experience is also improved – users aren't frustrated, help desks are overwhelmed with calls about poor performance, management isn't racking their brains dealing with the problems.

Through the use of wan memory caching and compression, acceleration technologies are going to reduce the traffic footprint to allow the network to support more users, additional applications, or prevent the need for bandwidth upgrades.

One of the primary goals of CIFS Acceleration is to reduce the latency experienced by the CIFS client from latency of the wide area network. By using the WAN efficient Exinda appliance to communicate across the WAN and between the client and server computers, the Exinda devices can utilize highly efficient WAN communications, pre-fetch data, serve data to the client from the local cache, and also compress data sent over the WAN. These all act to streamline the application communications.

The Proof

The benefits of introducing application streamlining technologies are significant. For example, we can see that normal windows file download took over 200 seconds on a 512 Kbps WAN link with 250ms of latency. Then when application streamlining was introduced this transfer was reduced to less than 15 seconds. From roughly 3 and 1/2 minutes to under 15 seconds. The experience change to a user is dramatic. They won't let you turn it off!

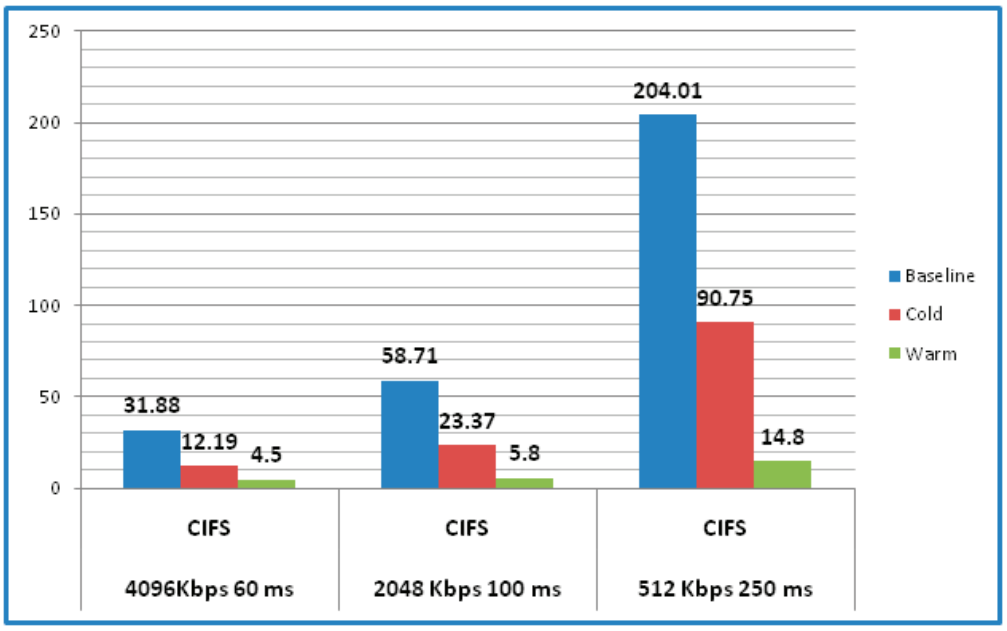

Figure 1: CIFS file download improvements

Note: Baseline indicates that no optimization technology has been deployed. Cold pass is the first transfer of the data. Warm pass represents subsequent data transfers.

In another scenario, we will see how branch email communications can be improved. In this case, when an attachment was sent, all subsequent recipients were served the data from a local LAN cache using wan memory caching and MAPI application streamlining technologies. This led to a 94% reduction of WAN traffic and service to users at LAN speeds.

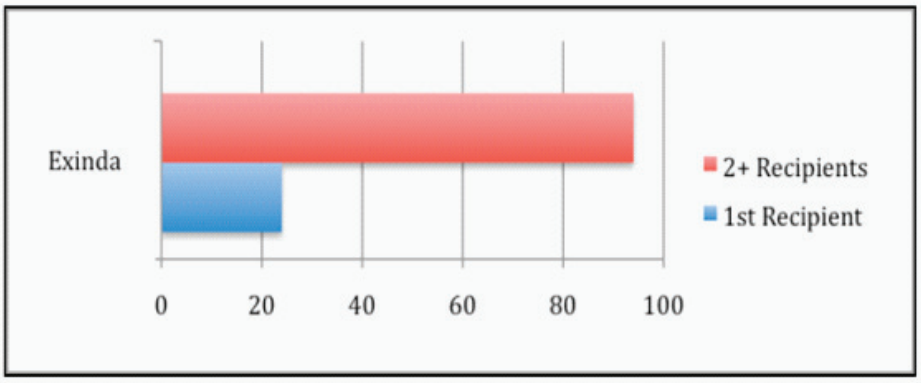

Figure 2: 2nd and subsequent email attachment recipients: 3.3MB was compressed to 0.2MB – 94% reduction

SharePoint can suffer from all the same issues as CIFS and MAPI. Application and protocol inefficiencies exposed in high latency WAN environments can be addressed with http application layer 7 acceleration and TCP protocol layer 4 acceleration. Bandwidth limitations are helped with caching and compression technologies to reduce the amount of data sent over the WAN and increase the amount served to the user locally from the LAN cache. Application or business policies can aid when the network is congested and bandwidth needs to be guaranteed for SharePoint applications.

A transfer taking almost 20 seconds is now completed in less than 2 seconds delivering LAN like performance over a 512 Kbps WAN with 250 ms latency. It truly makes the WAN perform like a LAN.

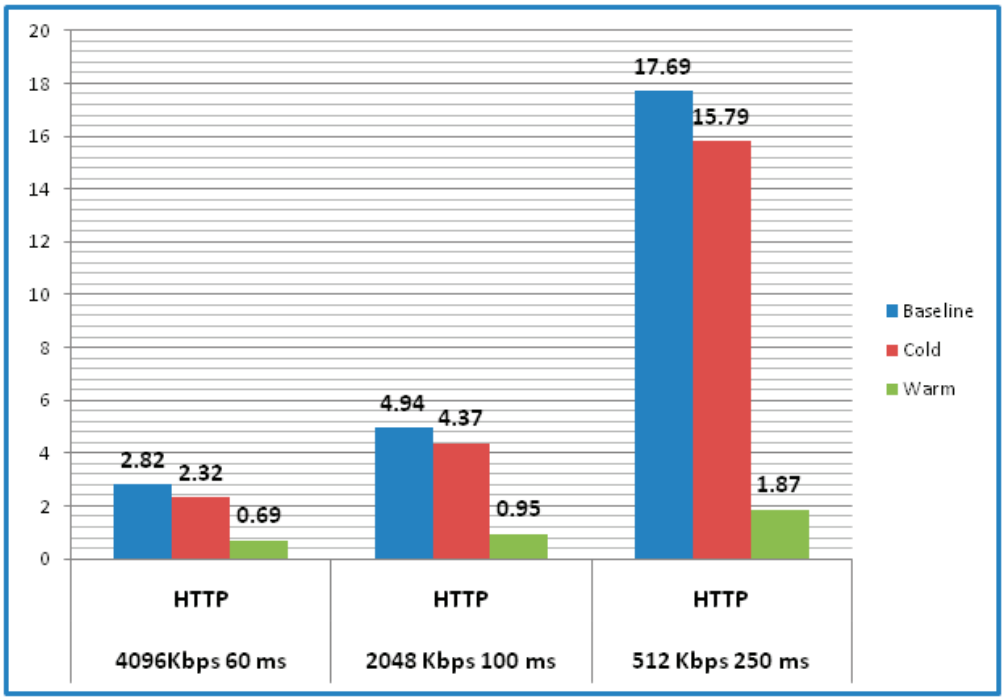

Figure 3: SharePoint file download improvements

When application streamlining is applied to MS-SQL database driven applications and communications the results are again significant. A communication on the same 512 Kbps WAN with 250 ms latency was originally over 70 seconds reduced to just over 5 seconds.

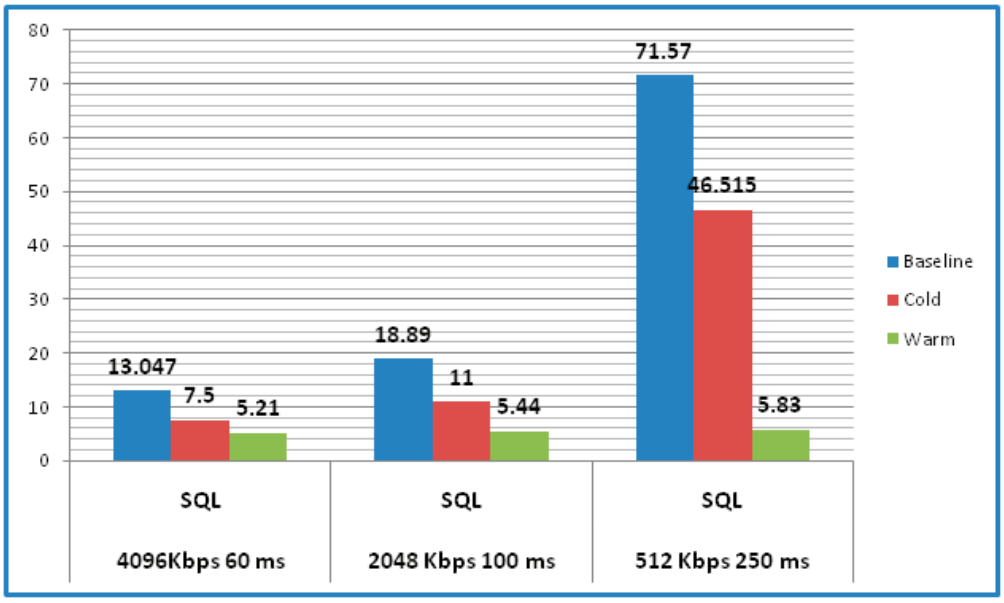

Figure 4: MS-SQL transaction improvement

Tying it all together with Active Directory

With Active Directory, the administrator can add a users to Active Directory and through that single entry enable remote access to the network, enable Exchange messaging, database access for accounting, client relationship management, or other applications. Not only is it possible to use Active Directory as a multi-purpose directory in this fashion but by doing so a company enables single sign-on for its users. Once a user logs into Windows with their Active Directory credential, it will automatically unlocks all of the applications or services that they have authority to access; including 3rd party applications that utilize Windows integrated authentication.

The Exinda appliance brings this simple single sign on to the WAN. The Exinda Active Directory integration allows tracking of network usage directly to individual users. Organizations have invested a lot of time, effort, and expense to integrate active directory across their infrastructure and now Active Directory integration on the Exinda makes life a lot easier to leverage that investment. You can view traffic usage by user names and create policies to manage bandwidth for users rather than IP addresses, especially in dynamic address environments or policies can be applied to whole Active Directory groups such as the finance department or all printers. This allows you to report and digest information the way you want it, saving you time and money and the ability to make decisions and react quicker.

How it Works: An agent simply resides on domain controller(s) to map username to IP address and inject Active Directory username and group information into Exinda appliances.

The ability to analyze traffic conversations and usage will allow an organization to reduce troubleshooting time and improve the experience of the user. This provides the ability to quickly isolate precise traffic flows down to the user, instantly providing feedback on network usage and the source of congestion or inappropriate network usage.

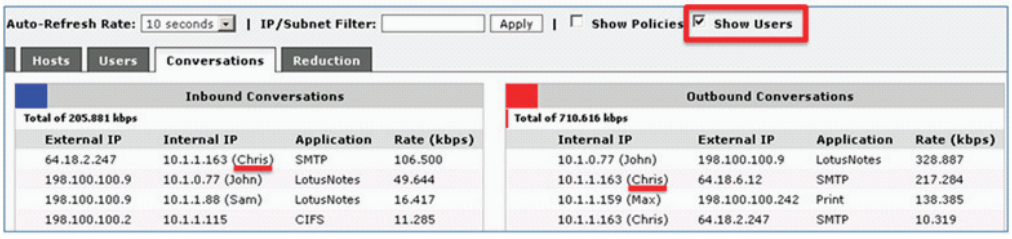

Figure 5: Real time Inbound and Outbound monitoring of users conversations

Historical reporting provides long term trending of network usage for applications, application groups or views down to a specific user. This provides better accountability of network use policies or improved planning when additional bandwidth is required due to increased number employees using the network or the deployment of new networked applications like voice over IP, video conferencing, or CRM.

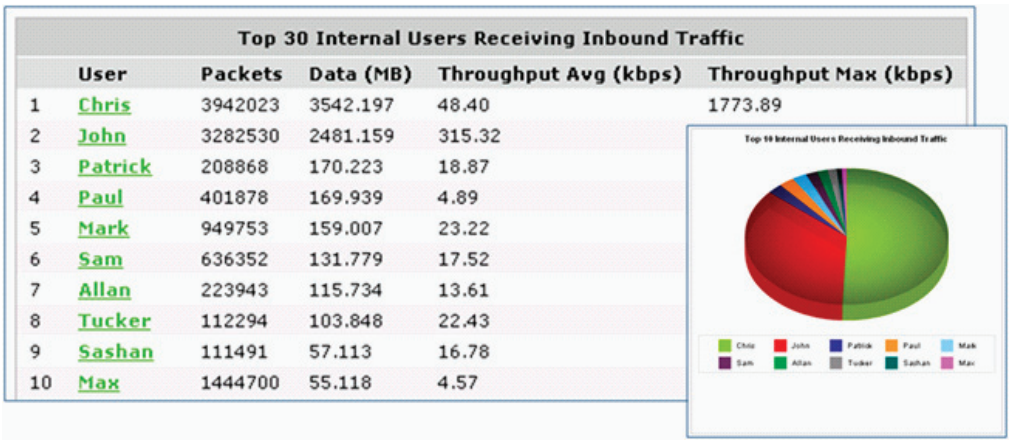

Figure 6: Historical User based reporting

In summary

All network communications down to the application; conversation, URL, or communicating hosts is viewable down to the user level. Several technologies are vital when implementing Microsoft applications over a wide area network. This is due to the inherent inefficiencies of running these chatty applications over a WAN; they were never designed to run over WAN links.

Visibility ensures you can view all network traffic, including recreational and unwanted traffic. It also provides objective application performance information using application response measurements to analyze actual traffic on the network. Controls and QoS are needed to deliver bandwidth guarantees and prevent non critical applications from impacting business critical applications.

Application streamlining, or application specific acceleration allows inefficiencies of the Microsoft application to be addresses and caching and compression further aid in improving the performance by delivering data to users at LAN speeds and reducing the amount of data sent on the network.

Exinda makes your WAN perform like a LAN.

About Exinda

Exinda is a global provider of WAN optimization and application acceleration products. Exinda has helped over 2,000 organizations worldwide reduce network operating costs and ensure consistent application performance over the WAN. The Exinda Unified Performance Management (UPM) solution encompasses application visibility, control, optimization and intelligent acceleration – all within a single network appliance that is affordable and easy to manage.

Founded in 2002, Exinda is headquartered in Boston, Massachusetts with regional offices in Canada and the United Kingdom. Research and Development is centralized in Melbourne, Australia.

To learn more about Exinda's award-winning solutions, contact your local reseller or visit www.exinda.com.

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