IT Advisory

A Top-Down Approach to Managing Application Delivery

Presented by Network Instruments®

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Introduction

On an ever-increasing basis, the primary components of a company's key business processes (e.g., sales, customer relationship management, quote-to-cash) are automated. If the applications supporting those key business processes are unavailable or underperforming, the company's key business processes are negatively impacted. This typically results in the company losing revenue and alienating at least some of its customers. If the impact to business processes is significant, it could tarnish the company's reputation and result in a reduction of the company's market capitalization.

Because of the impact applications have on key business processes, most IT organizations have begun to place greater emphasis on application delivery. Throughout this brief, the phrase *application delivery* will refer to the task of ensuring that the applications an enterprise uses:

- Exhibit acceptable performance levels
- Can be effectively managed
- Incorporate appropriate levels of security
- Are cost effective

While it is undeniable that application delivery is critical to business success, it is also undeniably complex and difficult. In order to help IT organizations get better at application delivery, Ashton, Metzler and Associates developed a framework IT organizations can customize for use in their environment. The four primary components of the framework are:

- Planning
- Network and application optimization
- Management
- Control

This brief will discuss some of the existing and emerging challenges that complicate application delivery and will focus on the management component of the application delivery framework.

Existing and Emerging Application Delivery Challenges

As noted, application delivery is complex and difficult. Some of the factors currently complicating application delivery include:

Server Consolidation

Most companies have consolidated or are in the process of consolidating servers from branch offices into centralized data centers. This consolidation typically reduces cost and enables IT organizations to have better control over company data.

One impact of server consolidation is that users who used to access applications over the branch office LAN now access applications over the WAN connecting the branch office to the company's data centers. Server consolidation also results in the use of chatty protocols such as Common Internet File System (CIFS), designed to run over a LAN, now running over the WAN. As depicted in Figure 1, a chatty protocol requires hundreds, or possibly thousands, of application turns to complete a single transaction.

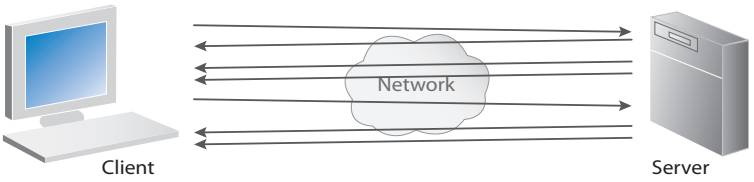

Figure 1: The Impact of Chatty Protocols

Running a chatty protocol over a LAN seldom creates a problem. Unfortunately, running the same protocol over a WAN often does. For example, assume it takes two hundred round trips to complete a transaction. If that transaction is completed over a LAN that has one millisecond of round trip delay, the result is one fifth of a second of additional delay. Virtually nobody would notice an extra one fifth of a second of delay. However, if the transaction is completed over a WAN that has one hundred milliseconds of round trip delay, the result is twenty seconds of additional delay. People will notice an extra twenty seconds of delay in most cases.

Ashton, Metzler & Associates
Leverage Technology For Success

The Webification of Applications

The phrase *webification of applications* refers to the growing movement to implement Web-based user interfaces and utilize chatty Web-specific protocols such as HTTP. As noted in the preceding section, a chatty protocol typically performs poorly when run over a WAN, such as the one connecting branch office users with data centers.

In addition, the webification of applications results in increased use of protocols such as XML. Unfortunately, XML is a dense protocol. This means communications based on XML consume notably more IT resources (e.g., WAN capacity, CPU cycles) than do communications not based on XML.

Distributed n-Tier Applications

The applications that run in a traditional mainframe environment are often referred to as being *monolithic* because the user interface, the business logic and all of the data the application needs reside on the mainframe. As such, it is relatively easy to manage and monitor these applications and there are relatively few factors that can impact their performance.

Most companies have moved away from deploying monolithic applications toward a form of distributed computing often referred to as *n-tier applications*. Because these tiers are implemented on separate systems, WAN performance impacts n-tier applications more than it does monolithic applications. For example, the typical 4-tier application (Figure 2) is comprised of a Web browser, a Web server(s), an application server(s) and a database server(s). The information flow in a 4-tier application is from the Web browser to the application server(s) to the database, and then back again over the Internet using standard (chatty) protocols such as HTTP or HTTPS.

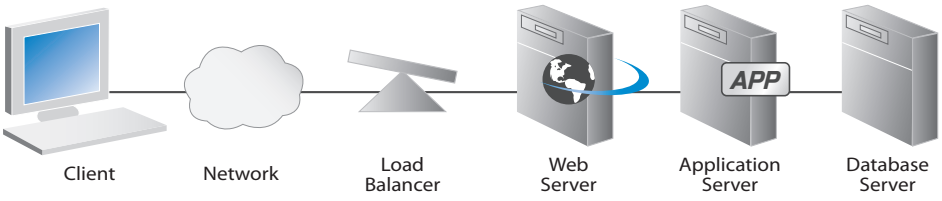

Figure 2: A 4-Tier Application

Application Dependencies

One of the primary reasons an n-tier application architecture complicates application delivery is that n-tier applications are inherently complex. For example, the typical n-tier application is composed of myriad browsers and servers and often includes one or more application delivery controllers (ADCs). At minimum, an ADC balances the load over multiple servers and typically offloads computationally intensive processes from the servers.

In addition, networks that support n-tier applications are composed of switches, routers, access points, WAN optimization controllers, firewalls, intrusion detection systems and intrusion protection systems. If any of these components are not available or not performing well, the performance of the applications running on these components is impacted. In some instances, each component of the application architecture is performing well, but overall delay builds up to a point where some function such as a database query fails due to the sheer number of components.

Virtualization

One of many emerging trends that will further complicate application delivery is server virtualization. As shown in Figure 3, server virtualization refers to the ability of a single physical server to be partitioned to appear as multiple independent virtual machines (VMs).

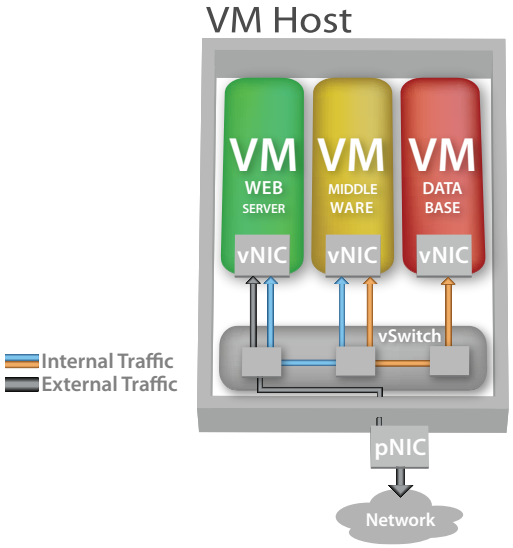

Figure 3: A Virtualized Server

Server virtualization typically results in a reduction of server hardware in the corporate data center, which leads to significant savings in both capital and operating expenses. Unfortunately, server virtualization can lead to significant management challenges. For example, after virtualizing a server, the IT organization typically loses visibility into the traffic flowing between VMs on the same physical server.

A Framework for Managing Application Delivery

Most IT organizations focus their management attention on individual technology domains (e.g., the LAN, WAN, servers, databases, mainframes, etc.) with the assumption that if each of these technology domains is performing well, the applications that utilize these domains are performing well. Unfortunately, this assumption is often wrong. To be successful with the management component of application delivery, IT organizations need to implement a top-down approach comprising a number of functions, including:

Discover the Applications

In order to manage application delivery, IT organizations need to know what applications are running over their network. The typical enterprise, however, has hundreds of applications. It is impossible to accurately discover hundreds of applications manually. Hence, IT organizations need to implement tools that will enable them to discover the applications running over their networks.

Identify Business Critical Applications

As noted, the typical enterprise has hundreds of applications. However, not all of these applications are equally important. An IT organization will not be successful with application delivery if it attempts to focus its management attention equally on each application. Instead, IT organizations must use a combination of technology and an understanding of their company's business processes to identify and focus on a small set of applications that are critical to the successful execution of the company's key business processes. IT organizations also need to identify other key classes of traffic. For example, they need to identify recreational applications, and eliminate or control the use of these applications based on company policy.

Develop Service Level Agreements (SLAs)

Once the IT organization has identified the company's business-critical applications, the next step is to begin to craft an SLA for those applications. The SLA should contain a brief description of each application, some key features of each application and a couple of availability and performance metrics.

For example, the SLA might state that application response time will never exceed 6 seconds. Or, the SLA might say that application response time will not exceed 6 seconds for any US user, and will not exceed 8 seconds for international users. Alternatively, it might state that response time will be 6 seconds or less, 99 percent of the time.

Identify Key Components of IT

Once the IT organization has identified the handful of critical business applications, they must identify the key components of the IT infrastructure. The phrase *key components of the IT infrastructure* sounds vague. It is not. Key IT infrastructure components are those specific infrastructure components (e.g., WAN links, servers) supporting the company's critical applications. These components are key because if one of them is unavailable or is not performing well, one or more of the company's critical business applications are likely to be impacted. Conversely, if some other WAN link or server is not available or not performing well, it has little or no impact on the company's critical business applications.

Establish and Monitor Performance Targets

Once the IT organization has identified their key IT infrastructure components, they must quantify how the performance of those components affects performance of the company's critical business applications.

For example, assume the IT organization has established an SLA for one of the company's critical applications which states that application response time will not exceed 6 seconds. The IT organization needs to understand how WAN delay impacts application response time.

Let's assume that as part of testing the application, the IT organization determines that as long as the round trip WAN delay is less than 70 ms, the application response time is acceptable. This knowledge, combined with the appropriate management tools and processes, enables the organization to monitor the WAN links to identify when WAN delay approaches 70 ms. so that appropriate action, such as increasing the capacity of one or more WAN links, can be taken.

Baseline Critical Applications and Key IT Resources

Application and subtending IT infrastructure performance varies by time of day, day of the week, week of the quarter, and quarter of the fiscal year. Having a baseline to define normal application behavior and that of other key IT components enables the organization to identify anomalous behavior. In some cases, this behavior reflects a potential security incident or degradation in performance due to a transient event, such as a user downloading a large file. It also enables an IT organization to measure the impact of deploying a new application or making a change to the IT infrastructure.

Implement Rapid Problem Identification and Resolution

Despite a network management organization's efforts to become more proactive, there will always be unpredictable incidents. IT organizations must implement the tools and processes necessary to quickly respond to a situation once it has impacted the end user. Part of this initiative is prioritizing troubles based on their potential business impact.

For example, IT organizations should respond to troubles that impact key IT components before responding to troubles that impact other components of the IT infrastructure.

In Conclusion

Successful application delivery is critical to the success of all IT organizations. It is complex and demands that IT organizations move away from a bottom-up management approach that focuses on individual technology domains toward a top-down approach composed of:

Discover the Applications

- Identify all networked applications
- Automate the process

Identify Business Critical Applications

- Use technology and business knowledge to define critical applications
- Concentrate planning and management on the critical applications

Develop Service Level Agreements

- Focus on critical applications
- Include availability and performance goals

Identify Key Components of IT

- Map critical applications to the supporting components of the infrastructure
- Concentrate planning and management on key components

Establish and Monitor Performance Targets

- Understand normal behavior and identify performance thresholds
- Have systems in place to automatically notify IT teams when thresholds are exceeded

Baseline Critical Applications and Key IT Resources

- Identify anomalous behavior
- Measure impact of change

Implement Rapid Problem Identification and Resolution

- Employ tools and processes necessary to respond to incidents
- Prioritize troubles based on their potential business impact

As noted in this brief, many factors complicate application delivery. There are also several emerging challenges, from virtualization to n-tier environments, which can serve as substantial obstacles to on-time application delivery. As a result, as IT organizations adopt a top-down management approach, they must do so in a way that takes into account both current and emerging challenges.

Network Instruments helps firms worldwide develop strategies for monitoring, managing, and resolving application performance challenges. Our solutions provide the top-down approach necessary for enterprise to increase its application uptime and decrease Mean Time To Resolution (MTTR).

To accomplish this, we provide a number of benefits.

Application Discovery and Baselining

As noted in the previous brief, it is imperative to identify the organization's most critical applications and define normal performance. Our monitoring and reporting tools automate application discovery, help categorize critical components, benchmark and report performance, and alert you when performance deviates.

Multi-Tiered Application Support

Use our powerful application analytics to manage response time for hundreds of applications, or rely on our in-depth transaction analytics for unsurpassed detail on overall performance.

Clear Views of Application Dependencies

Map your critical application dependencies to gain a valuable infrastructure view of application performance. Use this to quickly isolate device problems and find the missing link in the application delivery chain.

Unsurpassed Application Problem Resolution

Streaming aggregate application reports, powerful analytics, and clear application-dependency views, all lead to rapid problem isolation and resolution.

To learn more about our complete Application Analysis approach, visit our website at www.NetworkInstruments.com or e-mail us at sales@networkinstruments.com.

About Network Instruments

Network Instruments, a leading provider of innovative analysis solutions, helps organizations and enterprises ensure the delivery of business-critical applications on their networks. The company's monitoring and reporting products provide comprehensive visibility into networks and applications to optimize performance, speed troubleshooting, and assist long-term capacity planning. Network Instruments solutions provide integrated enterprise-wide reporting and back-in-time investigation capabilities for troubleshooting networks. The company is headquartered in Minneapolis with sales offices worldwide and distributors in over 50 countries. For more information about the company, products, and technology, please visit www.networkinstruments.com.