



White Paper

Acceleration Performance Tests for IBM Rational ClearTeam Explorer

Conducted by Array Networks for IBM
Ready for Rational ClearTeam Explorer Certification

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Executive Summary

IBM Rational ClearCase is an industry-leading software configuration management (SCM) solution that improves productivity by providing sophisticated version control, work space management, parallel development support and build auditing. It is typical for developers using IBM Rational ClearCase to be geographically distributed, working remotely either in small branch offices or from home.

The IBM Rational ClearTeam Explorer allows remote developers to connect to distributed ClearCase databases and perform all SCM-related operations remotely; however, wide area network (WAN) latency can negatively impact application response time for operations that modify and transfer files across the WAN. This can result in lost productivity and higher development costs. For mission-critical applications such as IBM Rational ClearCase, alleviating the performance degradation of both unsecured and secure content over the WAN is imperative.

This white paper discusses the demonstrable response time performance gains that can be achieved by the IBM Rational ClearCase application suite when used with Array Networks® WAN Series for application acceleration. The performance tests discussed in this document were conducted by Array for the Ready for Rational ClearTeam Explorer Certification effort. The testing scenarios illustrate an improvement of up to 85 percent in ClearTeam Explorer response time.

This paper also provides an overview of Array WAN Series and its unique application acceleration blueprint for IBM Rational ClearCase. It discusses Array's SSL acceleration blueprint, which allows Array to effectively accelerate encrypted SSL traffic over the WAN without compromising data integrity.

Key findings from these performance tests:

- WAN Series speeds ClearTeam Explorer performance up to 85 percent
- ClearTeam Explorer performance with WAN Series improves as documents increase in size
- ClearTeam Explorer performance with WAN Series is consistent as the number of users increases.

Introduction

This technical white paper describes the impact of the WAN on the performance of centralized virtual applications, as experienced by remote office users. It also introduces Array's WAN Series WAN optimization controllers, the first virtual and physical appliances to improve remote application performance for both encrypted and unencrypted WAN traffic.

Specifically, the paper describes how WAN Series improves remote application and file access response time using application acceleration blueprints for IBM Rational ClearTeam Explorer. Actual results of testing were completed by Array using the IBM Rational Performance Tester Agent to illustrate how WAN Series can improve ClearTeam Explorer remote response time by up to 85 percent.

The Impact of the WAN on Remote Application Access

More and more enterprises are consolidating application and file resources and services at the data center in order to manage costs and maintain control of management and security. As consolidation moves data and applications away from remote office users – one of the largest groups of consumers of these resources – those users must carry out their daily work by accessing these services remotely over the WAN.

The negative effect of the WAN on application performance has long been recognized. This negative effect has roots in the generally inferior characteristics of these long-range networks, as compared to the 1Gbps LAN networks deployed locally within a corporate office or campus.

These poor WAN characteristics include:

- Limited bandwidth: tens of Mbps and often far less
- Latency: tens to hundreds of ms

Depending on the protocol or application running between the remote office and the data center, the WAN can significantly impact performance. Some protocols, such as FTP or HTTP, suffer mainly from bandwidth limitations, especially when they are used to transfer large files. Chatterier protocols such as CIFS, which provide file-sharing services, are sensitive to both limited bandwidth and high latency on the WAN, and suffer even poorer performance.

Increasingly, IT managers are addressing WAN issues by adopting WAN optimization appliances and clients. Deployed both in the data center and in remote office locations, these physical and/or virtual appliances and clients work together to intercept traffic flows between remote office workers and data center servers and to perform operations that accelerate these flows.

They typically perform some or all of the following operations:

- Data compression and de-duplication
- Protocol optimization
- TCP optimization
- Traffic prioritization or shaping

If implemented correctly in the WAN optimization appliance or client, these techniques can mitigate the WAN effect and significantly improve the performance of consolidated applications accessed by remote office users. Array's WAN Series product line delivers these WAN optimization techniques via physical or virtual appliances, and is also available for Windows 7 and Windows Server 2008 to support individual users or branch offices.

Application Acceleration Blueprint for ClearTeam Explorer

Array's application blueprints, which are embedded in the WAN Series software, understand application protocols and semantics with greater accuracy than traditional packet compression and optimization solutions do. WAN Series accelerates all generic HTTP/HTTPS traffic and, with the help of blueprints, optimizes specific mission-critical applications such as IBM Rational ClearTeam Explorer, Microsoft Office, and SharePoint. A unique object differencing engine works with the knowledge provided by the blueprints to transmit only changes in the data, thus significantly reducing the amount of traffic that goes over the network. This reduction in network traffic over the WAN dramatically cuts down application and file access response times, in some cases by more than 85 percent.

SSL Acceleration Blueprint

Enterprises today are increasingly concerned about the security of information, especially in remote-office locations where security is weaker and IT and security staffing is limited. For this reason, enterprises have adopted SSL to ensure privacy between authorized users and corporate servers. In Web-based portals and applications, this takes the form of HTTPS, a transport protocol between clients and servers.

SSL presents a fundamental problem for products that accelerate application or file traffic between remote offices and data center servers. With SSL, all session-layer data is encrypted and is not compressible. Because SSL uses cryptographic keys that vary depending on time of day and individual user session, no two sessions' traffic streams look the same; thus, differencing of this encrypted data is not possible. In order to address these problems, Array has implemented an SSL acceleration blueprint within its WAN Series product line.

The SSL acceleration blueprint achieves two key goals:

- Transparency — WAN Series utilizes native server certificates for SSL session initialization, eliminating the cost and complexity of managing certificates on individual acceleration devices
- Security — Private server keys never leave the secure data center

By achieving these goals, WAN Series can inspect and accelerate SSL-encrypted traffic over the WAN securely and with neither additional management of certificates nor private keys.

Array ClearTeam Explorer Performance Tests

The following tests demonstrate how WAN Series dramatically improves ClearTeam Explorer performance over a WAN. The results collected using the IBM Rational Performance Tester Agent show the benefits of the performance improvements achieved before and after adding vWAN virtual appliances to the test configuration.

Test Configuration

The test configuration, (see Table 1 and Figure 1) was made up of a ClearCase Content Server, a Rational Performance Tester Agent simulating a ClearTeam Explorer client, and two WAN Series physical appliances, each "residing" on either side of the WAN. vWAN virtual appliances can be loaded

on an industry-standard server and configured with either VMware ESXi, KVM, Hyper-V or Microsoft Windows Server 2008 hypervisors. In this configuration, WAN2100 physical appliances were used.

The test configuration variables included file sizes and types. All but one of the test scenarios were configured for a single user. For all of the test configurations, the network bandwidth was limited to 1Mbps speed with 200 ms of latency.

Table 1 – Test Configuration

	ClearCase Content Server	ClearTeam Explorer Client using Rational Performance Tester Agent	WAN Series Physical Appliances
Server Class	Xeon	Xeon	Xeon
Number of CPUs	4	4	2 CPUs
CPU Details	2.6 GHz	2.3 GHz	2.3 GHz
Main Memory	16 GB	2 GB	2 GB
Operating System	Windows Server 2008 R2	Windows 7	Array Proprietary



Figure 1: Test Configuration

Test Case Scenarios

Array performance was examined in multiple tests with the following attributes:

- 1Mbps link speed and 200 ms latency
- Multiple file types

Test Results

The tests results demonstrate the performance of the first pass of traffic over the WAN, where the WAN Series appliance has not learned about the ClearTeam Explorer traffic, compared to the performance of the second pass, where the WAN Series appliance has learned about the traffic and performed optimization and differencing of ClearTeam Explorer traffic. Performance improvements in the certification tests varied depending on a number of factors (e.g. different file types, file size, utilization of the WAN Series by other applications). These tests resulted in Array receiving the IBM "Ready for Rational" certification for ClearTeam Explorer.

Test 1 – HTTP Check-In Response Time (Seconds)

Goal: Compare the effects of check-in files with different file sizes (1MB, 10MB) and types (Word and PPT), both with and without Array's WAN Series enabled.

Results: Array WAN Series appliances reduced the check-in response time by as much as 83%. Response time improved as files sizes increased.

Array Connection	1 MB PPT	10 MB PPT	10 MB Doc
Without WAN Series	14	142	218
1st pass with WAN Series	7	47	17
2nd pass with WAN Series	3	16	8
Improvement %	58%	77%	83%

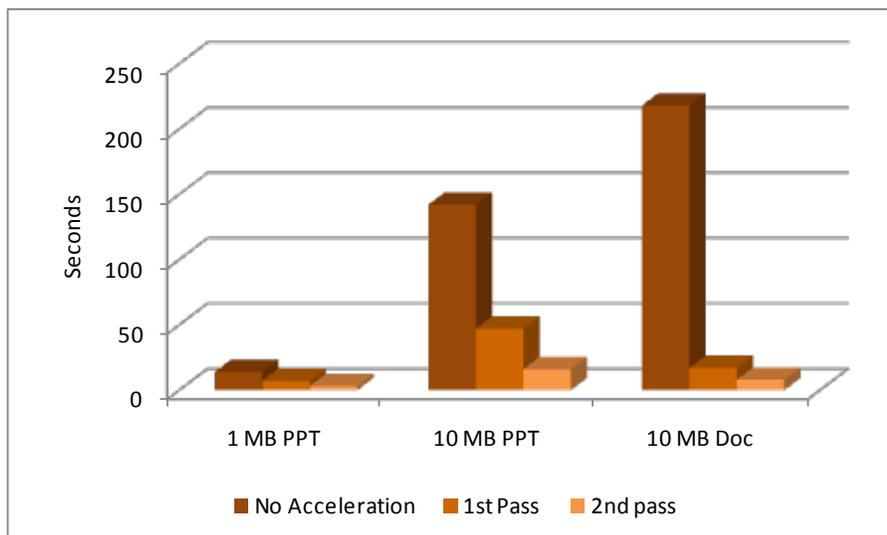


Chart 1: HTTP Check-In



Test 2 – HTTP Check-Out Response Time (Seconds)

Goal: Compare check-out of files with different file sizes (1MB, 10MB, and 45MB) and types (Word and PPT), both with and without Array’s WAN Series enabled.

Results: Array WAN Series appliances reduced the check-out response time by as much as 85%. Response time improved as files sizes increased.

Array Connection	1 MB PPT	10 MB PPT	10 MB Doc	45 MB Multi
Without WAN Series	9	44	118	643
1st pass with WAN Series	6	14	59	194
2nd pass with WAN Series	2	7	18	104
Improvement %	78%	84%	85%	84%

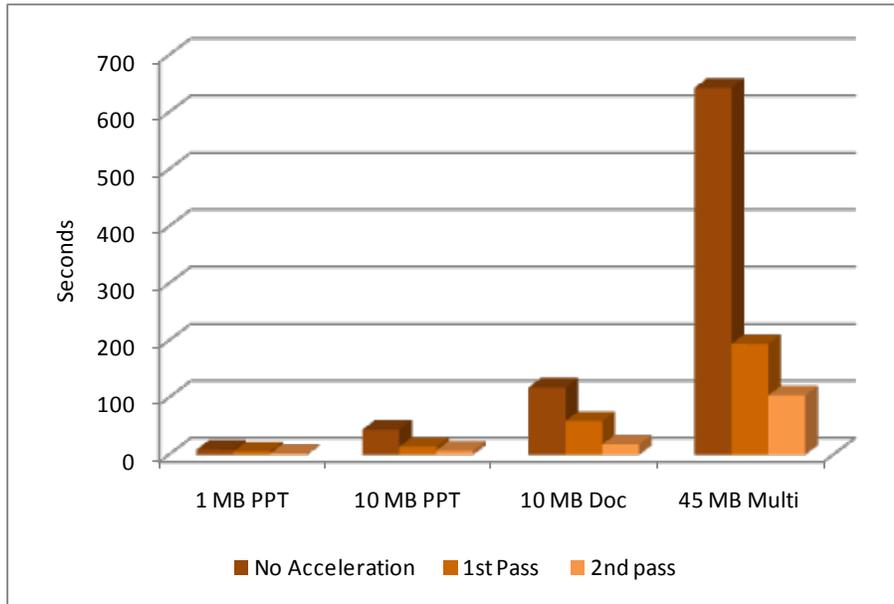


Chart 2: HTTP Check-Out

Test 3 – HTTP Add File to Source Response Time (Seconds)

Goal: Compare response times when adding file to source with different file sizes (1MB and 10MB).

Results: Array WAN Series appliances reduced the add file to source response time by as much as 86%. Response time improved as files sizes increased.

Array Connection	1 MB Doc	10 MB Doc
Without WAN Series	17	120
1st pass with WAN Series	11	28
2nd pass with WAN Series	8	17
Improvement %	53%	86%

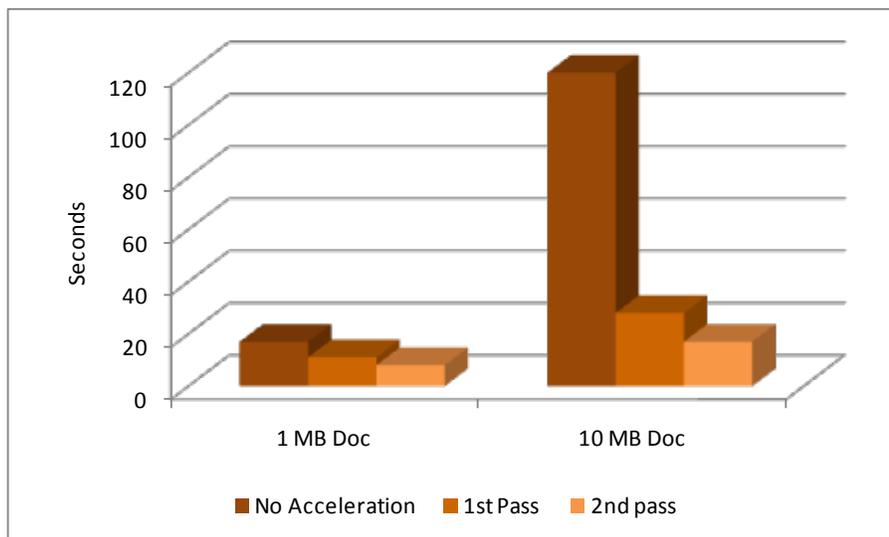


Chart 3: HTTP File Add File to Source



Test 4 – HTTPS Check-In Response Time (Seconds)

Goal: Compare check-in of files with different file sizes (1MB, 10MB) and types (Word and PPT), both with and without Array’s WAN Series enabled.

Results: Array WAN Series appliances reduced the check-in response time by as much as 90%. Response time improved as files sizes increased.

Array Connection	1 MB PPT	10 MB Doc
Without WAN Series	16	144
1st pass with WAN Series	9	49
2nd pass with WAN Series	5	14
Improvement %	67%	90%

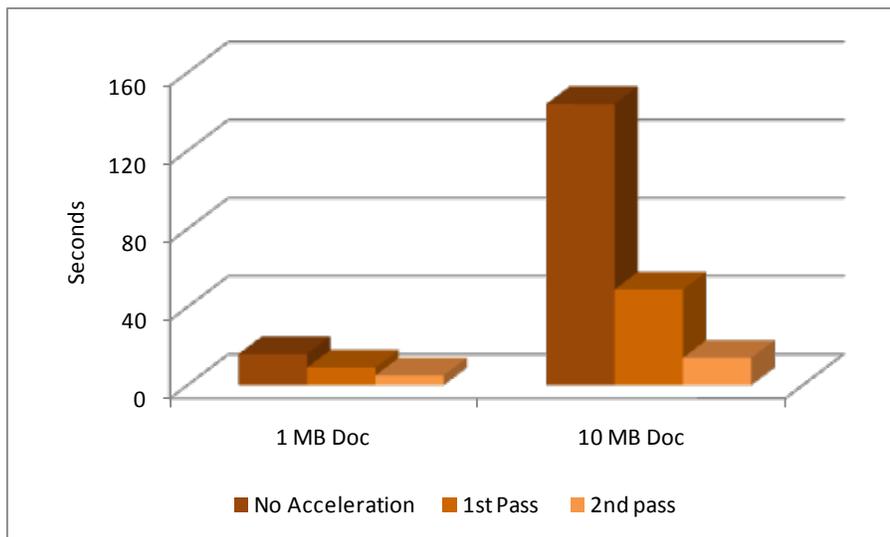


Chart 4: HTTPS Check-In Response Time (Seconds)

Test 5 – HTTPS Check-Out Response Time (Seconds)

Goal: Compare check-out of files with different file sizes (1MB, 10MB) and types (Word and PPT), both with and without Array’s WAN Series enabled.

Results: Array WAN Series appliances reduced the check-out response time by as much as 94%. Response time improved as files sizes increased.

Array Connection	1 MB Doc	10 MB Doc
Without WAN Series	13	124
1st pass with WAN Series	11	17
2nd pass with WAN Series	3	7
Improvement %	77%	94%

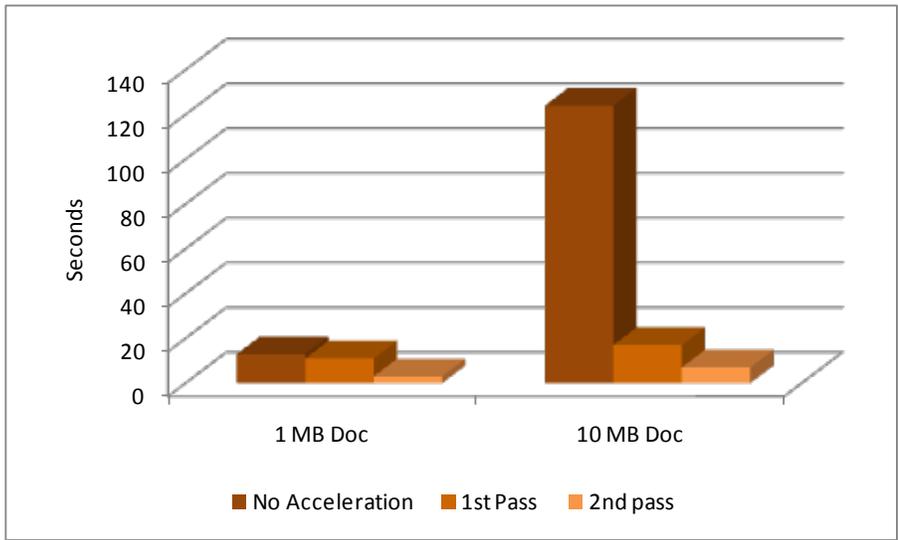


Chart 5: HTTPS Check-Out Response Time (Seconds)

Test 6 – HTTPS Add File to Source Response Time (Seconds)

Goal: Compare response times when adding file to source with different file sizes (1MB and 10MB).

Results: Array WAN Series appliances reduced the add-to-source response time by as much as 90%. Response time improved as files sizes increased.

Array Connection	1 MB Doc	10 MB Doc
Without WAN Series	19	122
1st pass with WAN Series	13	25
2nd pass with WAN Series	9	16
Improvement %	53%	90%

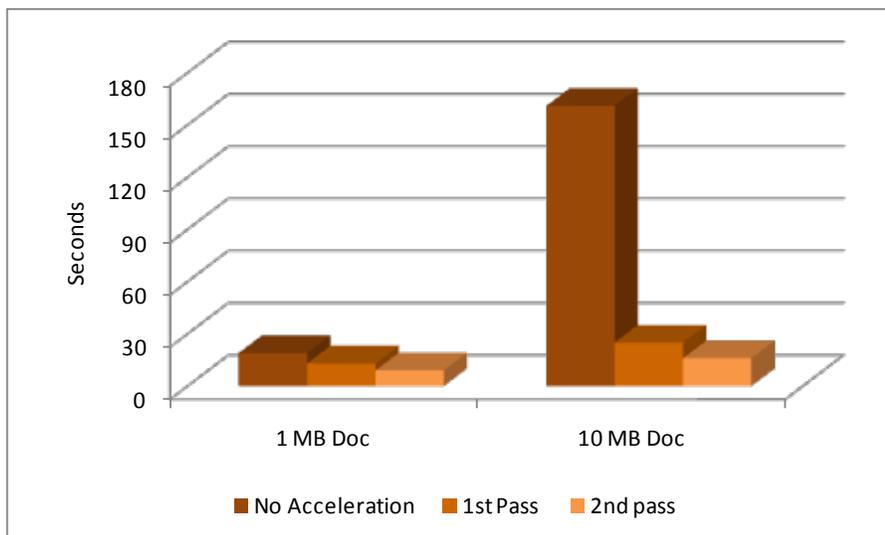


Chart 6: HTTPS Add-File-to-Source Response Time (Seconds)



Conclusion

Array's WAN Series, with its embedded application blueprint for IBM Rational ClearTeam Explorer, accelerates content transfer across the WAN for content formats employed by ClearCase Content Servers, without modification to client, server, or application software. In addition, this testing effort resulted in Array receiving IBM Ready for Rational certification for ClearTeam Explorer.

WAN Series securely accelerates content transfer over the WAN to enable outstanding performance – an improvement of up to 85 percent. Response time performance improves with larger file sizes.

With Array WAN Series, ClearTeam Explorer users can reduce the response time of remote transactions to mere seconds. The reduction in network bandwidth utilization and improvements in IBM Rational ClearCase application responsiveness cuts down on time-consuming delays. This results in increased productivity for developers in remote source control management environments.

To learn more about Array's WAN Series, visit www.arraynetworks.com.

White Paper

WAN Series I Acceleration Performance Tests

About Array Networks

Array Networks is a leader in application delivery networking with over 5000 worldwide customer deployments. Powered by award-winning SpeedCore® software, Array application delivery, WAN optimization and secure access solutions are recognized by leading enterprise, service provider and public sector organizations for unmatched performance and total value of ownership. Array is poised to capitalize on explosive growth in the areas of mobile and cloud computing, analysts and thought leaders including Deloitte, IDC and Frost & Sullivan have recognized Array Networks for its technical innovation, operational excellence and market opportunity.

