



WEBLOQ PRIVATE EMAIL
PERFORMANCE VALIDATION



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EXECUTIVE SUMMARY

During Q2, 2009 NSS Labs conducted an in-depth performance test of the WebLOQ Private Email system. This report is based upon empirically validated evidence gathered by NSS Labs during testing.

The WebLOQ Private Email system provides excellent performance under all normal traffic conditions, and is suitable for Enterprise, Hosting/Service Provider, and Carrier environments. In addition, we found the WebLOQ Private Email to be very stable and reliable, coping with our extensive reliability tests with ease.

NSS Labs observed bursting throughput in excess of 18.24 Gigabits per minute as well as long term sustainable throughput of 6.2208 Terabits per day with the larger one (1) MB emails. In our most stressful connection dynamics tests, the WebLOQ system was able to achieve 46 SMTP connections per second (CPS) and 320 concurrent connections.

With a 10-minute burst capability of 28 CPS and long term sustained rate of 10 CPS with 70 KB emails (found on typical corporate networks), the WebLOQ Private Email system as configured for the test is capable of supporting roughly 6000 users, where each user sends 48 emails per 8 hour day. Increasing the email size to one (1) MB only slightly diminished long term performance to 9 CPS, and 5400 users. If email usage is staggered over multiple time zones and work shifts, the capacity increases accordingly.

In summary, the WebLOQ Private Email system is a robust and stable email solution that should be on everyone's short list for secure, end-to-end private email. NSS Labs is pleased to award **NSS Tested** to the WebLOQ Private Email system.

Product:	WebLOQ Private Email
Test Date:	May 2009
Performance:	6.2208 Terabits per day



CONTENTS

1	<i>Introduction</i>	1
2	<i>Test Results</i>	2
2.1	Performance	2
2.2	Stability & Reliability	4
2.3	Management & Usability	4
3	<i>Test Results Scorecard</i>	5
4	<i>The Product Under Test – WebLOQ Private Email</i>	7
4.1	WebLOQ Private Email	7
5	<i>Test Methodology – Email Performance</i>	8
5.1	Maximum Capacity	8
5.2	SMTP Capacity With No Transaction Delays – 1 byte Email Payload	9
5.3	SMTP Capacity With No Transaction Delays – 20 KB Email Payload	9
5.4	SMTP Capacity With No Transaction Delays – 70 KB Email Payload	10
5.5	SMTP Capacity With No Transaction Delays – 1 MB Email Payload	11
	<i>Appendix A: Test Infrastructure</i>	12

1 INTRODUCTION

Several trends are converging to make security a prescient issue for enterprises. Compliance with various regulations means not only securing communications, but also maintaining records of those communications for audit and forensic purposes.

End-to-end private email offers an alternative to traditional PKI based solutions which (while secure) can be overly complex and burdensome depending on the application and the business need.

ABOUT THIS TEST

The NSS Labs test reports are designed to address the challenges faced by IT professionals in selecting security products. While NSS Labs methodologies include comprehensive analysis of security effectiveness, performance and management/usability, this particular test analyses the performance of WebLOQ's Private Email system across a range of traffic sizes.

These tests were performed during Q2 of 2009 by NSS Labs in our Austin, TX offices according to the detailed methodology described below.

2 TEST RESULTS

A WebLOQ Private Email system consisting of two Dell 1435 servers and 1,000 desktop clients was installed in our real world test lab.

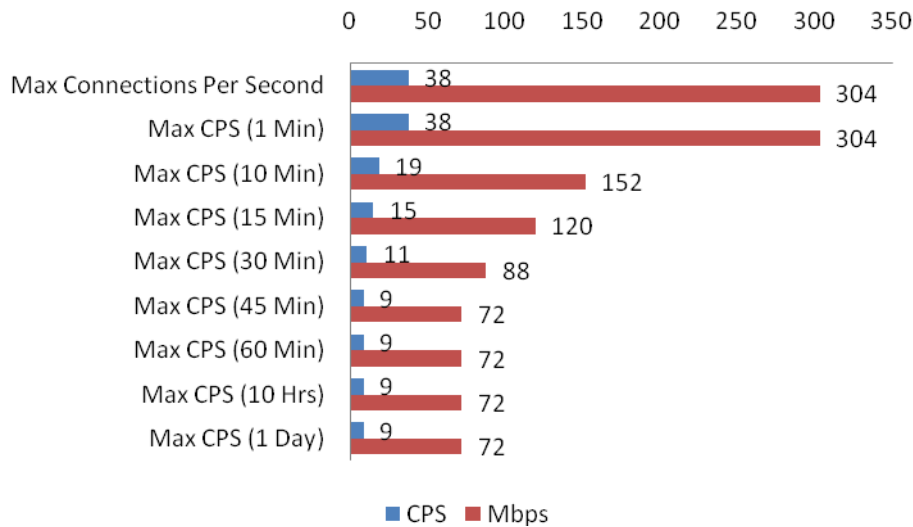
2.1 PERFORMANCE

The WebLOQ Private Email system was tested up to and beyond 6 Terabits per day. Performance varied at the different levels of test depending on the email sizes and connections per second. The limit of approximately 46 SMTP connections per second and 320 concurrent connections provides a balanced weighting of connection rate / payload size.

Based on the data (below), it is NSS Labs' judgment that the WebLOQ Private Email system has earned a 304 Mbps burst and 72 Mbps long-term sustained performance rating.

2.1.1 LARGE EMAIL THROUGHPUT

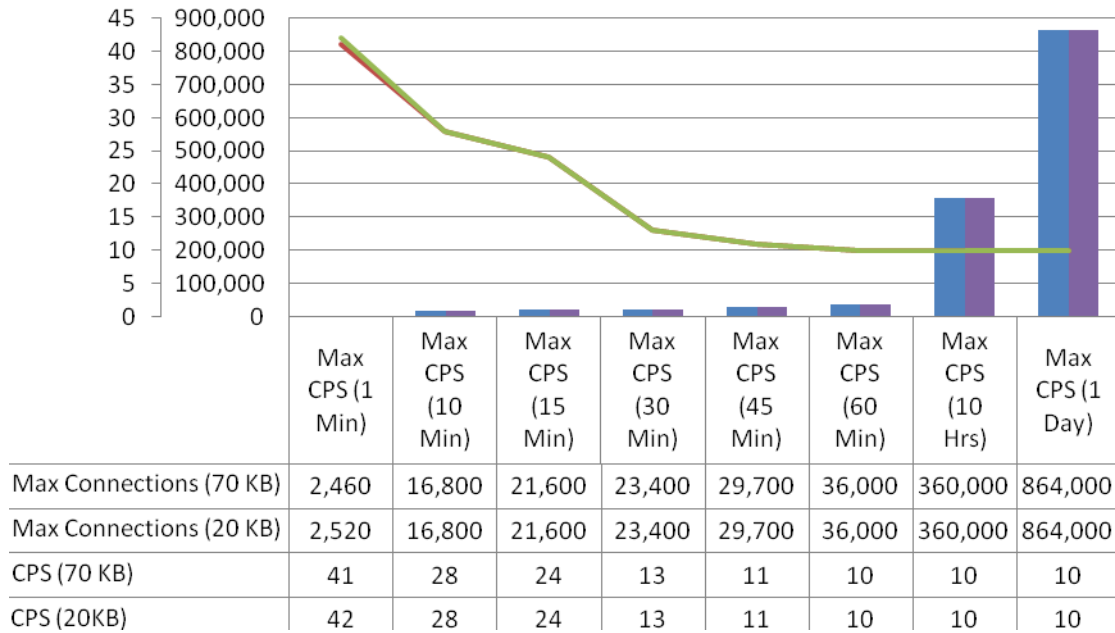
In our large email throughput tests, the WebLOQ Private Email system exceeded 72 Mbps throughput over extended periods of time.



2.1.2 MAX SMTP CONNECTION RATE WITH 70KB & 20 KB EMAILS

The rated connection per second rate was 10 CPS over extended periods of time.

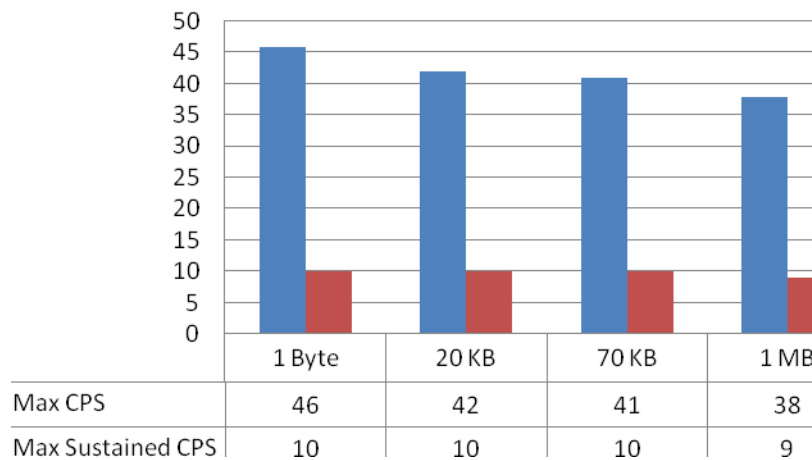
Max Connection Rate



2.1.3 SMTP CONNECTIONS & CAPACITY

The following chart depicts the relationship between maximum connection rates, max sustained connection rates, and email sizes. Different deployment scenarios will exhibit varying email sizes and connection requirements.

SMTP Connections & Capacity



2.2 STABILITY & RELIABILITY

The WebLOQ Private Email system comes with two 1U Dell Servers. We had no issues and the system worked smoothly from the start.

Long term stability is important for email systems, as users and administrators have come to expect systems to be available when needed. The WebLOQ Private Email system remained stable throughout our testing.

2.3 MANAGEMENT & USABILITY

The Email client integrated seamlessly into Microsoft Outlook 2007 and Mozilla Thunderbird 2.0. Even the most remedial email users will not have any difficulty sending private emails using this system.

2.3.1 CONFIGURATION

The back end system required some configuration for additional users, but those comfortable with command line will find it to be simple and straightforward.

2.3.2 POLICY MANAGEMENT

The mail server is able to serve multiple domains which may or may not be allowed to communicate with one another based upon policy settings. By right clicking the WebLOQ Taskbar Icon and selecting 'Manage Accounts' a Private Email user or Administrator can sign in to gain access to some or all of the following:

- Account Management
- Account Creation
- Change Passwords
- Member Directory
- Manage Services
- Invitations
- Notifications
- Downloads
- Support

Advanced Management is available via SSH & command line.

2.3.3 ALERT HANDLING

Alert handling is configured via command line and is a function of the system logs. As the email system runs on Linux, configuring SNMP or syslog should not be difficult for most administrators.

2.3.4 REPORTING AND ANALYSIS

Compliance reporting provides reporting by dates, recipients, size, encryption type and tracking number. Administrators can search by date, tracking number or recipient's name. Reports can be saved in CSV (Comma Separated Value), Excel and XML formats. Every private transaction has a receipt – a requirement of many compliance regimes.

3 TEST RESULTS SCORECARD

The following chart depicts the status of each test with quantitative results where applicable.

Test ID	Description	Comment
5.1	Maximum Capacity	
5.1.1	Maximum SMTP Connections Per Second w/1 byte	46 CPS
5.1.2	Maximum Concurrent SMTP Connections	320 connections
5.1.3	Maximum Throughput (1MB Attachments)	6.22 Terabits / Day
	Maximum for various periods of time without failure	
5.2	With a 1-Byte SMTP payload	
5.2.1	Connections Per Second	46
5.2.2	Max CPS (1 Min)	2,760
5.2.3	Max CPS (10 Min)	19,200
5.2.4	Max CPS (15 Min)	23,400
5.2.5	Max CPS (30 Min)	25,200
5.2.6	Max CPS (45 Min)	32,400
5.2.7	Max CPS (60 Min)	36,000
5.2.8	Max CPS (10 Hrs)	360,000
5.2.9	Max CPS (1 Day)	864,000
5.3	With a 20KB email	
5.3.1	Connections Per Second	42
5.3.2	Max CPS (1 Min)	2,520
5.3.3	Max CPS (10 Min)	16,800
5.3.4	Max CPS (15 Min)	21,600
5.3.5	Max CPS (30 Min)	23,400
5.3.6	Max CPS (45 Min)	29,700
5.3.7	Max CPS (60 Min)	36,000
5.3.8	Max CPS (10 Hrs)	360,000
5.3.9	Max CPS (1 Day)	864,000
5.4	With a 70KB email (including 50KB attachment)	
5.4.1	Connections Per Second	41
5.4.2	Max CPS (1 Min)	2,460
5.4.3	Max CPS (10 Min)	16,800

Test ID	Description	Comment
5.4.4	Max CPS (15 Min)	21,600
5.4.5	Max CPS (30 Min)	23,400
5.4.6	Max CPS (45 Min)	29,700
5.4.7	Max CPS (60 Min)	36,000
5.4.8	Max CPS (10 Hrs)	360,000
5.4.9	Max CPS (1 Day)	864,000
5.5	With a 1MB email	
5.5.1	Max Connections Per Second	38
5.5.2	Max CPS (1 Min)	2,280
5.5.3	Max CPS (10 Min)	11,400
5.5.4	Max CPS (15 Min)	13,500
5.5.5	Max CPS (30 Min)	19,800
5.5.6	Max CPS (45 Min)	24,300
5.5.7	Max CPS (60 Min)	32,400
5.5.8	Max CPS (10 Hrs)	324,000
5.5.9	Max CPS (1 Day)	777,600

4 THE PRODUCT UNDER TEST – WEBLOQ PRIVATE EMAIL

4.1 WEBLOQ PRIVATE EMAIL

The WebLOQ Private Email system is comprised of two 1RU appliances designed to operate as an overlay in conjunction with existing email infrastructure. The appliances are standard Intel platforms with a Linux OS. The first appliance serves as a beachhead server that collects and communicates with WebLOQ clients. The second appliance serves as the back-end mail store and provides storage, identity management, and other critical services. This architecture enables WebLOQ to scale horizontally as needed by adding additional hardware components to the system.

5 TEST METHODOLOGY – EMAIL PERFORMANCE

This section measures the performance of the Device Under Test (DUT) using various traffic conditions that provide metrics for real world performance. Individual implementations will vary based on usage, however these quantitative metrics provide a gauge as to whether a particular DUT is appropriate for a given environment.

In order to generate various levels of email traffic, we configured our BreakingPoint Elite Chassis to send email from one thousand (1,000) unique email addresses to one another using Authenticated SMTP. This created 1,000,000 unique emails and represented the worst-case scenario for any mail server. On the receiving end, one thousand (1,000) live POP-3 email clients with unique usernames and email addresses were run simultaneously. Each was set to automatically download email every 10 minutes in order to flex the system using the most realistic settings.

5.1 MAXIMUM CAPACITY

The use of multiple BreakingPoint appliances allows us to create true “real world” traffic at multi-Gigabit speeds as a background load for our tests.

The aim of these tests is to stress the mail server and determine how it copes with large numbers of SMTP connections per second and concurrent open connections. All packets contain valid payload and address data, and these tests provide an excellent representation of a live network at various connection/transaction rates.

Note that in all tests, the following critical “breaking points” - where the final measurements are taken - are used:

- **Excessive concurrent TCP connections** - latency within the DUT is causing unacceptable increase in open connections on the server-side
- **Excessive response time for SMTP sessions** - latency within the DUT is causing excessive delays and increased response time to client
- **Unsuccessful SMTP sessions** - normally there should be zero unsuccessful transactions. Once these appear, it is an indication that excessive latency within the DUT is causing connections to time out

5.1.1 MAXIMUM SMTP CONNECTIONS PER SECOND

This test is designed to determine the maximum TCP connection rate of the DUT with a 1 byte SMTP email size. The email size defines the number of bytes contained in the body, excluding any bytes associated with the SMTP header. A 1 byte email size is designed to provide a theoretical maximum SMTP connections per second rate.

5.1.2 THEORETICAL MAXIMUM CONCURRENT SMTP CONNECTIONS

This test is designed to determine the maximum concurrent TCP connections of the DUT with no data passing across the connections. This type of traffic would not typically be found on a normal network, but it provides the means to determine the maximum possible concurrent connections figure.

A maximum of 7.5 million Layer 4 TCP sessions are opened across the DUT. Each session is opened normally and then held open for the duration of the test as additional sessions are added up to the maximum possible. Load is increased until no more connections can be established, and this number is recorded.

5.1.3 THEORETICAL MAXIMUM SMTP THROUGHPUT WITH 1 MB DATA

This test is identical to 5.1.1 except that the email size is one (1) Megabyte instead of one (1) byte.

5.2 SMTP CAPACITY WITH NO TRANSACTION DELAYS – 1 BYTE EMAIL PAYLOAD

The aim of these tests is to stress the email server's SMTP & POP-3 engines and determine how the device copes with network loads of varying average packet size and varying connections per second. By creating genuine session-based traffic with varying session lengths, the device is forced to track valid TCP sessions, thus ensuring a higher workload than for simple packet-based background traffic. This provides a test environment that is as close to "real world" as it is possible to achieve in a lab environment, while ensuring absolute accuracy and repeatability.

Each transaction consists of a single SMTP Authenticated Email and there are no transaction delays (i.e. the mail client and server respond immediately to all requests). All packets contain valid payload (a mix of binary and ASCII objects) and address data, and this test provides an excellent representation of a live network (albeit one biased towards SMTP traffic) at various network loads.

Connection rates are measured over intervals of 1, 10, 15, 30, 45, 60, 600, and 1,440 minutes. The maximum sustainable for each interval without failure is reported.

5.2.1 MAX CONNECTIONS PER SECOND

5.2.2 AVERAGE MAX CPS – 1 MINUTE

5.2.3 AVERAGE MAX CPS – 10 MINUTES

5.2.4 AVERAGE MAX CPS – 15 MINUTES

5.2.5 AVERAGE MAX CPS – 30 MINUTES

5.2.6 AVERAGE MAX CPS – 45 MINUTES

5.2.7 AVERAGE MAX CPS – 60 MINUTES

5.2.8 AVERAGE MAX CPS – 10 HOURS

5.2.9 AVERAGE MAX CPS – 1 DAY

5.3 SMTP CAPACITY WITH NO TRANSACTION DELAYS – 20 KB EMAIL PAYLOAD

The aim of these tests is to stress the email server's SMTP & POP-3 engines and determine how the device copes with network loads of varying average packet size and varying connections per second. By creating genuine session-based traffic with varying session lengths, the device is forced to track valid TCP sessions, thus ensuring a higher workload than for simple packet-based background traffic. This provides a test environment that is as close to "real world" as it is possible to achieve in a lab environment, while ensuring absolute accuracy and repeatability.

Each transaction consists of a single SMTP Authenticated Email and there are no transaction delays (i.e. the mail client and server respond immediately to all requests). All packets contain valid payload (a mix of binary and ASCII objects) and address data, and this test provides an excellent representation of a live network (albeit one biased towards SMTP traffic) at various network loads.

Connection rates are measured over intervals of 1, 10, 15, 30, 45, 60, 600, and 1,440 minutes. The maximum sustainable for each interval without failure is reported.

5.3.1 MAX CONNECTIONS PER SECOND

5.3.2 AVERAGE MAX CPS – 1 MINUTE

5.3.3 AVERAGE MAX CPS – 10 MINUTES

5.3.4 AVERAGE MAX CPS – 15 MINUTES

5.3.5 AVERAGE MAX CPS – 30 MINUTES

5.3.6 AVERAGE MAX CPS – 45 MINUTES

5.3.7 AVERAGE MAX CPS – 60 MINUTES

5.3.8 AVERAGE MAX CPS – 10 HOURS

5.3.9 AVERAGE MAX CPS – 1 DAY

5.4 SMTP CAPACITY WITH NO TRANSACTION DELAYS – 70 KB EMAIL PAYLOAD

The aim of these tests is to stress the email server's SMTP & POP-3 engines and determine how the device copes with network loads of varying average packet size and varying connections per second. By creating genuine session-based traffic with varying session lengths, the device is forced to track valid TCP sessions, thus ensuring a higher workload than for simple packet-based background traffic. This provides a test environment that is as close to "real world" as it is possible to achieve in a lab environment, while ensuring absolute accuracy and repeatability.

Each transaction consists of a single SMTP Authenticated Email and there are no transaction delays (i.e. the mail client and server respond immediately to all requests). All packets contain valid payload (a mix of binary and ASCII objects) and address data, and this test provides an excellent representation of a live network (albeit one biased towards SMTP traffic) at various network loads.

Connection rates are measured over intervals of 1, 10, 15, 30, 45, 60, 600, and 1,440 minutes. The maximum sustainable for each interval without failure is reported.

5.4.1 MAX CONNECTIONS PER SECOND

5.4.2 AVERAGE MAX CPS – 1 MINUTE

5.4.3 AVERAGE MAX CPS – 10 MINUTES

5.4.4 AVERAGE MAX CPS – 15 MINUTES

5.4.5 AVERAGE MAX CPS – 30 MINUTES

5.4.6 AVERAGE MAX CPS – 45 MINUTES

5.4.7 AVERAGE MAX CPS – 60 MINUTES

5.4.8 AVERAGE MAX CPS – 10 HOURS

5.4.9 AVERAGE MAX CPS – 1 DAY

5.5 SMTP CAPACITY WITH NO TRANSACTION DELAYS – 1 MB EMAIL PAYLOAD

The aim of these tests is to stress the email server's SMTP & POP-3 engines and determine how the device copes with network loads of varying average packet size and varying connections per second. By creating genuine session-based traffic with varying session lengths, the device is forced to track valid TCP sessions, thus ensuring a higher workload than for simple packet-based background traffic. This provides a test environment that is as close to "real world" as it is possible to achieve in a lab environment, while ensuring absolute accuracy and repeatability.

Each transaction consists of a single SMTP Authenticated Email and there are no transaction delays (i.e. the mail client and server respond immediately to all requests). All packets contain valid payload (a mix of binary and ASCII objects) and address data, and this test provides an excellent representation of a live network (albeit one biased towards SMTP traffic) at various network loads.

Connection rates are measured over intervals of 1, 10, 15, 30, 45, 60, 600, and 1,440 minutes. The maximum sustainable for each interval without failure is reported.

5.5.1 MAX CONNECTIONS PER SECOND

5.5.2 AVERAGE MAX CPS – 1 MINUTE

5.5.3 AVERAGE MAX CPS – 10 MINUTES

5.5.4 AVERAGE MAX CPS – 15 MINUTES

5.5.5 AVERAGE MAX CPS – 30 MINUTES

5.5.6 AVERAGE MAX CPS – 45 MINUTES

5.5.7 AVERAGE MAX CPS – 60 MINUTES

5.5.8 AVERAGE MAX CPS – 10 HOURS

5.5.9 AVERAGE MAX CPS – 1 DAY

APPENDIX A: TEST INFRASTRUCTURE

Special thanks go to our test infrastructure partners who provide much of the equipment, software, and support that make this testing possible:

