

Comparing the Cost of Leading Email Systems

An Osterman Research White Paper

Published June 2011

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Osterman Research, Inc.

P.O. Box 1058 • Black Diamond, Washington • 98010-1058 • USA
Tel: +1 253 630 5839 • Fax: +1 253 458 0934 • info@ostermanresearch.com
www.ostermanresearch.com • twitter.com/mosterman

Executive Summary

Email is critical to the operation of virtually any organization for a variety of reasons:

- As a communications tool, more time is spent using email than the telephone, instant messaging and social media combined.
- Because of the ease with which it can be used to send files, email is the primary content transport system in most organizations.
- Despite the availability of additional tools for the purpose, email is still the chief way that many users collaborate with one another on projects and documents both inside and outside their organizations.
- Individuals are normally easier to reach by email than by the telephone or instant messaging.

The bottom line is that email is critical and, despite the increasing use of other types of communication tools, email will continue to be the dominant communication and file transport tool for many years to come.

KEY TAKEAWAYS

Because email is so critical, it has become a utility in most organizations. And, like a utility, it must be available as close to 100% of the time as possible and at the lowest possible cost. However, there is significant variability in both of these critical parameters – some email systems experience more downtime than others as a result of system errors, patches that do not work as advertised, design flaws and other issues. Further, and perhaps more importantly, the cost to manage email systems can vary widely based primarily on the amount of IT labor required to maintain the systems. In short, not all email systems are created equal.

ABOUT THIS WHITE PAPER

This white paper discusses the results of a major survey undertaken by Osterman Research to determine the total cost of ownership for three major email systems: Novell GroupWise, Microsoft Exchange and IBM Lotus Notes/Domino. Although Novell sponsored this white paper, the research was conducted independently by Osterman Research using only members of the Osterman Research survey panel for input.

AN IMPORTANT CAVEAT

There have been a number of cases in which analyst firms that directly compare the cost of ownership for competing systems have created controversy – we anticipate that this white paper might do just that. However, Osterman Research wants to make two things absolutely clear:

- This white paper presents the results of independent research; the data collection and presentation was not designed to favor one vendor over another.
- All of the email systems discussed in this white paper are leading systems from reputable vendors, and all provide excellent functionality and a robust roadmap for the future of their

respective systems. This white paper does not take a position for or against any particular platform; our goal is simply to present research results and let the reader determine how best to interpret the data and apply it to his or her own environment.

We invite readers who might disagree with our calculations or conclusions to contact us directly – we look forward to discussing our methodology and conclusions.

On-Premise vs. Hosted Email

While there will be decisions about using on-premise OR hosted email, Osterman Research believes that most mid-sized and large organizations will ultimately decide how best to use a combination of solutions, not one or the other.

WHY ON-PREMISE EMAIL?

On-premise email solutions permit more control over the custody of data. A company using a hosted provider may not be able to exercise this level of control over how and where their data is managed, resulting in possible legal and/or regulatory problems. For example, personal data held by European companies, such as personnel records or customer financial information, cannot be transferred out of the European Economic Area (EEA) – the 27 countries that belong to the European Union – without violating the EU Data Protection Directive (95/46/EC). The only US companies permitted to transfer such data outside of the EEA are those that have self-certified under the Safe Harbor framework, a rigorous set of requirements designed to protect the integrity of sensitive data about residents of the EEA. If a non-certified company in the EEA uses a cloud-based provider that hosts data outside of the EEA, that company could be in violation of the EU Data Protection Directive if it cannot control the location of its data storage.

Similarly, the Health Insurance Portability and Accountability Act (HIPAA) in the United States imposes strict requirements on protecting sensitive data like patient records – an on-premise system allows an organization to maintain rigorous controls over where this data is archived, how it can be accessed, etc.

Moreover, there are some very high volume email-generating applications that are often better managed using on-premise infrastructure, particularly when communications are highly time sensitive or when confidential information is being sent. For example, some brokerage houses send out very large volumes of email early each trading day to customers and prospects – an inability to send high volumes of email during a tight time window means that fewer customers are informed of opportunities which, in turn, leads to fewer investments by these customers.

Other reasons that favor the on-premise delivery model for messaging include:

- There is less dependence on variations in Internet performance in an on-premise model, meaning that the user experience of opening messages and attachments is often faster and more responsive than it is with cloud-based solutions.
- On-premise systems can provide tighter integration with ancillary software tools that provide additional functionality.

- On-premise systems normally provide more configuration options, particularly when integrating with third-party systems like archiving, data loss prevention or policy-based encryption.
- On-premise systems can be less susceptible to downtime.

WHY HOSTED EMAIL?

There are a number of benefits associated with using hosted email, such as the Hosted Enterprise Mail powered by Novell GroupWise offering recently introduced by a Novell managed services partner. These benefits include:

- More predictable cost of ownership because of the long-term contracts that are normally established by mid-sized and large companies that opt to use a third-party solution to host email for at least some of their users.
- Potentially lower cost of ownership because IT staff are not required to maintain servers and other infrastructure devoted to email management.
- Freeing up of IT staff for other activities that might provide more value to their employer.

CONSIDERING A HYBRID APPROACH

One of the fundamental advantages of opting for a vendor whose solutions are available using both on-premise and hosted delivery models is the greater flexibility provided in determining how to manage email and collaboration capabilities. For example, organizations that have a headquarters with a large number of employees and a large number of field offices, each of which has only a handful of employees, can use hosted and on-premise email to minimize their total cost of ownership. Moreover, the availability of both models allows an organization to migrate from one to the other easily and with minimal impact on end-user training, help desk and IT staff.

Understanding the True Cost of Email

FORGET THE CONVENTIONAL WISDOM: EMAIL IS STILL KING

The press and blogosphere is rife with forecasts about the demise of email:

- "Email has had a good run as king of communications. But its reign is over."ⁱ
- "...in 2010, we're officially declaring email to be DOA."ⁱⁱ
- "...email is "probably going away."ⁱⁱⁱ

Will email go away? Perhaps someday, but it continues to be the dominant communication tool in the workplace and Osterman Research anticipates that it will be for a long time to come. For example, in an Osterman Research survey conducted in late 2010, we found that the typical corporate email user spends 134 minutes per day doing something in email – sending or receiving messages, looking for content, managing tasks, managing contacts, etc. That translates to nearly 30% of an eight-hour workday. Further, time spent in email dwarfs time

spent using other communication tools, such as the telephone (61 minutes per day), instant messaging or other real-time communications (28 minutes) and social media (11 minutes).

The bottom line is that while social media, real-time communications, Web conferencing and collaboration tools are all very useful, they are primarily *complements* to the use of email, not *substitutes* for it.

EMAIL IS A UTILITY – AND ITS COST NEEDS TO BE DRIVEN DOWN

In essence, email is a utility in the modern enterprise as vital as electricity or plumbing – organizations cannot operate efficiently without it. As a result, while email is absolutely essential, its cost should be driven as low as possible. However, email is typically not a trivial expense in most organizations. The initial cost to deploy an email system can be several hundred dollars per user and the ongoing cost can be anywhere from \$10 to \$50 per user per month depending on the size of the organization, the geographic distribution of the employees served, the ease with which the solution can be managed and other factors.

LABOR CAN BE A MAJOR COST OF MANAGING EMAIL

Although the cost of the hardware and software required to deploy and maintain an email system is not trivial, labor is a major expense in maintaining the typical email system, particularly in smaller organizations. The cost of the full-time equivalent (FTE) IT staff that are required to maintain the typical, on-premise email system normally represents a major part of the total lifecycle cost of an email system, although this can vary based on a number of factors, including local labor rates, real estate costs, power costs, etc.

There are several important conclusions that can be drawn from this:

- In smaller organizations, email systems should be evaluated with the cost of labor as a primary cost consideration; in larger organizations, software-licensing costs are often a more important consideration. While the cost of labor may be more difficult to quantify than the cost of hardware or software licensing, it is an important consideration when evaluating on-premise email systems in any size of organization.
- The cost of downtime for an email system should also be considered, in part because of its impact on overall employee productivity and IT labor costs. For example, email downtime requires IT staff to detect, diagnose and remediate the cause(s) of the outage, which drives up labor costs and disrupts other IT tasks. More importantly, however, email downtime typically results in reduced end user productivity. Osterman Research estimates that the typical desktop email user is about 25% less productive during periods of email downtime, and because a downtime incident can potentially impact thousands of users, even short periods of downtime can impose a significant cost on an organization. This is particularly true for mobile or remote workers who might be completely unable to work when email is not available.
- Despite the concerns that many have about the need for the latest and greatest hardware for some email systems, the cost of hardware represents a fairly small part of the overall cost of deploying and managing an email system over a normal three-year lifecycle. For example, an organization can purchase very high-performance and expensive hardware to run email infrastructure and deploy high-performance, redundant servers and yet make

relatively little impact on the overall cost of their email infrastructure over the lifetime of the system unless their organization is quite small.

MIGRATING TO A NEW EMAIL SYSTEM IS EXPENSIVE

Another major expense – and one that every IT department considers every few years – is migrating from one on-premise email system to another. While many decision makers are eager to migrate to another system to gain additional capabilities or because one vendor's roadmap may be more appealing than another's, they should take into account the major initial expense involved in doing so, as well as the ongoing costs that they might incur as a result. This is a particularly difficult decision during trying economic times when IT departments attempt to balance the improved efficiency that might be available in a new email system with the economic reality of a static or shrinking IT budget that would be used to pay for it.

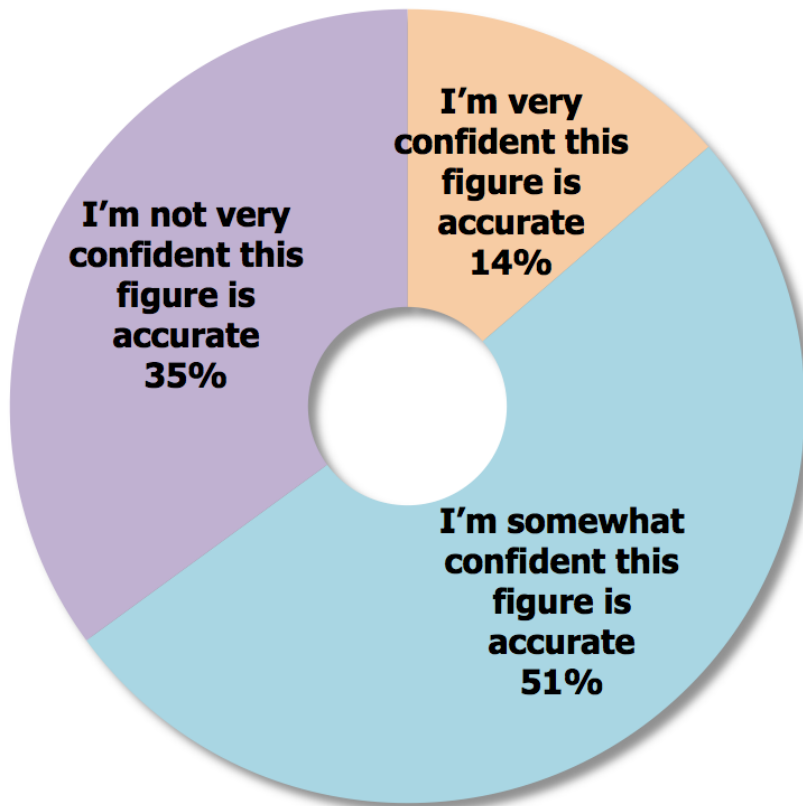
It is important to note that upgrades from one version of a vendor's messaging platform to another can be expensive, migrating from one vendor to another can be dramatically more expensive. These costs are driven not only by the major impact that such a migration has on IT, but more importantly on the changes in processes, the additional training and the other impacts on end users. Migrating from one vendor's messaging platform to another needs to be driven by significant and compelling issues and not just change for change's sake.

WHAT DOES EMAIL REALLY COST YOUR ORGANIZATION?

Interestingly, respondents to a major Osterman Research survey^{iv} conducted during the second half of 2010 believe that it costs their organization just over \$23 per month per user to provide corporate email capabilities, but only 15% are very confident of their cost estimate. What this indicates to us is two things:

- Most decision makers are unaware of the actual cost of providing messaging capabilities.
- Moreover, many of them are making decisions about migrating to new messaging platforms based on erroneous and incomplete information about the true cost of ownership for these systems.

Confidence in Estimates of Messaging Costs



The lack of confidence about the monthly cost of email capabilities could signal a couple of things. First, that respondents don't really care. Providing email capabilities is an essential part of work, and a strategic decision has been made to provide them via in-house means. If this is true, then positioning outsourced messaging services as less costly is irrelevant; it's pushing a marketing message that simply will not resonate with many decision makers. Secondly, it could signal that respondents simply do not know the cost of their messaging system because of the complexity of correctly answering the question once all cost elements are included in the calculations.

A key part of the latter conclusion, which Osterman Research believes applies to most organizations, is that email systems are deployed over time without an accurate accounting of the total costs involved. Because email is so mission-critical, it is simply a cost of doing business like any other utility, and so determining its cost is not a high priority for most decision makers. That said, determining the cost of email should be a high priority for two reasons: a) it is an unavoidable expense, and b) there are dramatic cost differences between leading email systems.

Analyzing the Cost of Leading Email Systems

SURVEY BACKGROUND AND METHODOLOGY

To determine the cost of leading email systems, Osterman Research conducted a survey during April 2011 using members of its own survey panel. The goal of the survey was to ask IT decision makers and influencers several key questions about their email infrastructure:

- The distribution of email users by platform and version today and in 24 months.
- The number of FTE staff required to support these users.
- The amount of unplanned downtime that systems experience during a typical month.

A total of 192 surveys were completed. A subset of these results was then drawn from the survey results so that we could compare the cost of labor required to manage Novell GroupWise 8, Microsoft Exchange (2010 and 2007) and Lotus Notes/Domino (all versions, but with a primary focus on R8.5). Only organizations with at least 100 email users were considered in this analysis. The demographics of the various subsets are shown in the following table.

Demographics of Survey Sample

ALL RESULTS	GroupWise 8	Exchange 2010/2007	Notes/Domino
Mean users	6,376	18,440	33,786
Median users	1,200	750	6,500
Mean FTE IT staff members	9.5	26.9	4.5
Median FTE IT staff members	1.0	2.0	3.0
Mean minutes of downtime per month	8	24	42
Median minutes of downtime per month	3	11	0

SURVEY METHODOLOGY

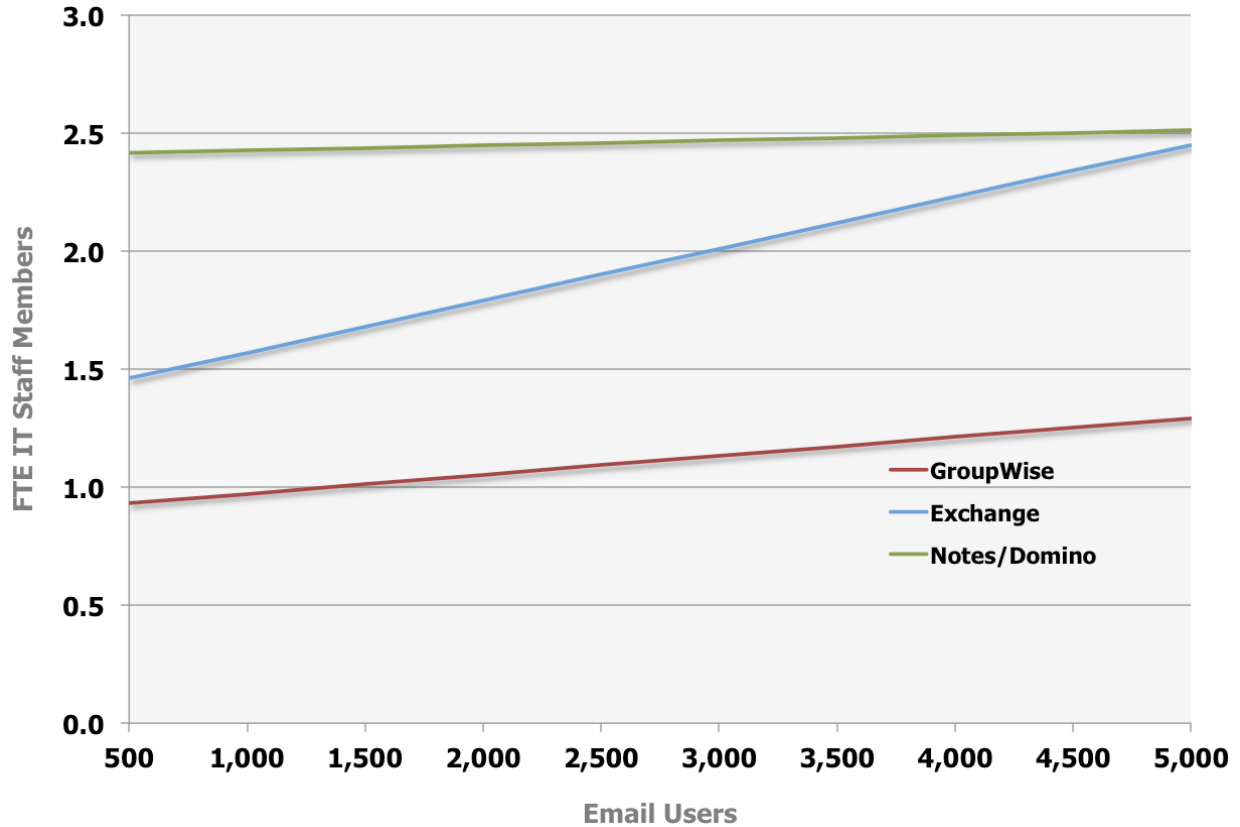
To calculate the relationship between the number of email users and the number of FTE IT staff required to support them, we plotted the number of each for the mail systems noted in the table above and applied a linear "line of best fit." To be sure, there will be variations from this line because of a number of factors that apply to specific situations, geographies, etc., but this methodology allows us to calculate the relationship between the number of users and FTE IT staff.

Using this methodology, we developed the following formulae for each platform:

- **GroupWise 8**
FTE IT staff = $((0.00008 * \text{number of users}) + 0.89245) * 100\%$ of IT staff for email
- **Exchange 2010/2007**
FTE IT staff = $((0.00022 * \text{number of users}) + 1.35098) * 100\%$ of IT staff for email
- **Notes/Domino**
FTE IT staff = $((0.00003 * \text{number of users}) + 3.43760) * 70\%$ of IT staff for email^v

Using these formulae, we calculated the relationship between the number of users and the number of FTE staff required to support them over the range of 500 to 5,000 users, as shown in the figure below.

FTE IT Staff Required at Different User Counts



KEY LESSONS LEARNED FROM THE RESEARCH

The figure above clearly demonstrates that GroupWise requires a lower level of IT support than many other leading email systems. Certainly, there will be variations based on a number of different factors, including the number of physical locations served by the email infrastructure, the skill level of the IT staff employed to manage the system, etc. However, our research finds that GroupWise requires a lower level of IT involvement than most other email systems.

CALCULATING THE TOTAL COST OF OWNERSHIP (TCO)

The results used in this analysis were not selected according to any particular criteria, nor were they “high-graded” so that a particular slant on the data could be obtained, although we did eliminate some of the more obvious outliers in the data. Instead, we used every survey in which respondents provided complete answers to our questions where it made sense to do so.

Further, it is important to note that we have not focused on all of the costs of deploying each email system, since we chose to focus on the differential costs between the systems. For example, we did not include the cost of the anti-virus spam servers, appliances or third-party

services, since these will be similar across all of the platforms and are not truly a direct cost of the email platform itself.

COMPARING TCO FOR ORGANIZATIONS OF DIFFERENT SIZES

The following tables compare the TCO of GroupWise, Exchange and Notes/Domino for typical 500- and 5,000-seat deployments. For the 500-seat deployment, we have assumed a simple deployment for GroupWise and Exchange built on Windows Server 2008. Note that we did not compare Notes/Domino in this analysis based on the lack of sufficient research data to support any meaningful conclusions about the total cost of ownership for the platform – Notes/Domino is not commonly used in small organizations.

For a larger deployment of 5,000 seats, we have assumed a somewhat more complex environment:

- **GroupWise**
We have assumed that the Post Office and eDirectory server roles are deployed on two servers.
- **Exchange**
We have assumed the use of four server roles: Client Access, Mailbox, Hub Transport and Active Directory. We have not included the Unified Messaging or Edge Transport server roles in this analysis, since we are comparing just email functionality.
- **Domino**
We have assumed the use of IBM Lotus Domino Express, which combines the server and client licensing costs into a single, per-user fee.

Three-Year TCO for a 500-Seat Deployment

HARDWARE	GroupWise on Windows	GroupWise on Linux	Exchange
E-mail server (Dell PowerEdge R510 Rack Server)	\$1,099	\$1,099	\$1,099
Three-year 24x7 support, two-hour response	\$1,400	\$1,400	\$1,400
SOFTWARE	GroupWise on Windows	GroupWise on Linux	Exchange
Server software	\$0	\$0	\$799
Client access licenses, 500	\$71,500	\$71,500	\$33,500
Software maintenance for 500 clients	\$48,500	\$48,500	\$52,500
Windows Server 2008 or SUSE Linux Enterprise Server	\$279	\$279	\$799
Server OS software client access licenses or equivalent, additional 475 (Windows only)	\$14,231	\$0	\$14,231
Client software (e.g., Outlook), 500	\$0	\$0	\$50,000
LABOR	GroupWise on Windows	GroupWise on Linux	Exchange
Full-time equivalent IT admins	0.93	0.93	1.46
IT admin cost (Year 1)	\$74,400	\$74,400	\$116,800
IT admin cost (Year 2)	\$78,120	\$78,120	\$122,640
IT admin cost (Year 3)	\$82,026	\$82,026	\$128,772
DOWNTIME	GroupWise on Windows	GroupWise on Linux	Exchange
Unplanned downtime, minutes per month	8	8	24
Employee productivity loss during downtime	25%	25%	25%
Cost of downtime (Year 1)	\$6,250	\$6,250	\$18,750
Cost of downtime (Year 2)	\$6,563	\$6,563	\$19,688
Cost of downtime (Year 3)	\$6,891	\$6,891	\$20,672
INCLUDING COST OF DOWNTIME			
TOTAL THREE-YEAR TCO	\$391,258	\$377,027	\$581,649
TOTAL THREE-YEAR TCO PER USER	\$782.52	\$754.05	\$1,163.30
TOTAL ANNUAL COST PER USER	\$261	\$251	\$388
EXCLUDING COST OF DOWNTIME			
TOTAL THREE-YEAR TCO	\$371,555	\$357,324	\$522,540
TOTAL THREE-YEAR TCO PER USER	\$743.11	\$714.65	\$1,045.08
TOTAL ANNUAL COST PER USER	\$248	\$238	\$348

Three-Year TCO for a 5,000-Seat Deployment

HARDWARE	GroupWise on Windows	GroupWise on Linux	Exchange	Notes/Domino
E-mail server (Dell PowerEdge R515 x 2)	\$7,978	\$7,978	\$15,956	\$7,978
Three-year 24x7 support, four-hour response	\$1,002	\$1,002	\$2,004	\$1,002
SOFTWARE	GroupWise on Windows	GroupWise on Linux	Exchange	Notes/Domino
Server software	\$0	\$0	\$15,980	\$0
Client access licenses, 5,000	\$715,000	\$715,000	\$335,000	\$560,000
Software maintenance, 5,000	\$485,000	\$485,000	\$525,000	\$201,600
Windows Server 2008 or SUSE Linux Enterprise Server	\$5,998	\$1,398	\$11,996	\$5,998
Server OS software client access licenses or equivalent, additional 4,975 (Windows only)	\$198,751	\$0	\$198,751	\$198,751
Client software (e.g., Outlook), 5,000	\$0	\$0	\$500,000	\$545,000
LABOR	GroupWise on Windows	GroupWise on Linux	Exchange	Notes/Domino
Full-time equivalent IT admins	1.29	1.29	2.45	2.51
IT admin cost (Year 1)	\$103,200	\$103,200	\$196,000	\$200,800
IT admin cost (Year 2)	\$108,360	\$108,360	\$205,800	\$210,840
IT admin cost (Year 3)	\$113,778	\$113,778	\$216,090	\$221,382
DOWNTIME	GroupWise on Windows	GroupWise on Linux	Exchange	Notes/Domino
Unplanned downtime, minutes per month	8	8	24	42
Employee productivity loss during downtime	25%	25%	25%	25%
Cost of downtime (Year 1)	\$62,500	\$62,500	\$187,500	\$328,125
Cost of downtime (Year 2)	\$65,625	\$65,625	\$196,875	\$344,531
Cost of downtime (Year 3)	\$68,906	\$68,906	\$206,719	\$361,758
INCLUDING COST OF DOWNTIME				
TOTAL THREE-YEAR TCO	\$1,936,099	\$1,732,747	\$2,813,671	\$3,187,765
TOTAL THREE-YEAR TCO PER USER	\$387.22	\$346.55	\$562.73	\$637.55
TOTAL ANNUAL COST PER USER	\$129	\$116	\$188	\$213
EXCLUDING COST OF DOWNTIME				
TOTAL THREE-YEAR TCO	\$1,739,067	\$1,535,716	\$2,222,577	\$2,153,351
TOTAL THREE-YEAR TCO PER USER	\$347.81	\$307.14	\$444.52	\$430.67
TOTAL ANNUAL COST PER USER	\$116	\$102	\$148	\$144

The distribution of costs for the major cost elements for each platform is summarized in the following tables.

Distribution of Costs for a 500-Seat Deployment

	GroupWise on Windows	GroupWise on Linux	Exchange
Hardware	1%	1%	0%
Software	34%	32%	26%
Labor	60%	62%	63%
Downtime	5%	5%	10%

Distribution of Costs for a 5,000-Seat Deployment

	GroupWise on Windows	GroupWise on Linux	Exchange	Notes/Domino
Hardware	0%	1%	0%	0%
Software	73%	69%	56%	47%
Labor	17%	19%	22%	20%
Downtime	10%	11%	21%	32%

WHAT THIS DATA TELLS US

There are three key takeaways from this data:

- Labor costs are significantly lower for Novell GroupWise than for Exchange or Notes/Domino: an organization of 500 users will save more than \$133,000 in labor costs over three years, while an organization of 5,000 users will save between \$293,000 and \$308,000.
- Although client access license costs are higher with GroupWise, overall software costs are lower than for Exchange or Notes/Domino.
- Downtime – and the cost impact it imposes on organizations – is significantly lower for GroupWise. However, even if downtime is not factored into the total cost of ownership, the “hard” costs for GroupWise are still lower than for the other two platforms.

Quotes from Novell GroupWise Customers

The following are data and quotes taken directly from Osterman Research surveys of Novell GroupWise customers:

- **Colorado Department of Corrections**
"We are enjoying unprecedented performance with Novell GroupWise running on SUSE Linux Enterprise Server. We have had no recent support calls related to Novell GroupWise performance... We would need a lot more hardware and staff to run any other e-mail application."
- **Hotel Camino Real**
"Novell GroupWise has proven its performance and reliability, more than satisfying our expectations. It has provided a definite improvement over Microsoft Exchange, especially in

terms of administration. Since the implementation, it has needed barely any upkeep, a massive advantage for our staff who are free to focus on more profitable work."

- **BAFA**

"It used to be very frustrating for users that they had to continually clean out their mailboxes, and large attachments were a big problem. Novell GroupWise offers us ten times the capacity for an equivalent price—so we have addressed a major pain-point for our users without increasing our IT budget."

- **Rempp Küchen**

"The easy-to-use interface meant our employees were happy to switch to Novell GroupWise, especially as they discovered the added functionalities. In terms of the business case, the unparalleled stability, reasonable cost of Novell GroupWise and the ease of administration keep our long-term operational costs low."

- **Lentis**

"In our experience, Novell GroupWise offers far better support for multiple locations and e-mail domains than Lotus Notes. We are now hosting four different internal mail domains; such an expansion would have been extremely difficult to manage in the past. With the Novell solution, we can manage our growing organisation more efficiently and at lower cost."

About Novell GroupWise

Novell GroupWise is a comprehensive collaboration platform that combines e-mail, instant messaging, calendaring, contact management, task management and Web 2.0 tools into a coordinated platform. GroupWise permits users to create personalized dashboards for various projects, team roles or activities. GroupWise provides server and client support on a variety of platforms and features Web access via Internet Explorer, Firefox or Safari. The GroupWise product family also includes a mobile server that runs on either Windows or Linux.

More information is available at <http://www.novell.com/products/groupwise/>.

Appendix – Raw Survey Data

Novell GroupWise		Microsoft Exchange		Lotus Notes/Domino	
Users	FTE Staff	Users	FTE Staff	Users	FTE Staff
110	2	100	1	100	1
125	1	100	1	101	1
125	1	100	<1	540	1
150	1	100	1	800	2
170	3	100	3	880	2
170	<1	105	1	2,700	1
260	<1	110	2	3,000	3
350	1	110	3	4,600	2
365	1	110	2	5,000	3
400	2	125	<1	6,000	5
475	<1	220	1	7,000	8
500	2	226	5	8,500	4
580	<1	245	<1	12,000	3
600	1	250	1	12,500	6
600	1	250	1	13,000	3
728	1	300	3	24,000	7
1,000	1	300	1	25,000	7
1,200	1	325	1	70,000	11
1,200	1	350	<1	80,000	6
1,300	1	350	1	400,000	15
1,500	1	370	3		
2,000	<1	390	1		
2,500	3	400	2		
3,000	1	500	1		
3,500	1	510	1		
4,200	1	551	4		
8,000	1	800	<1		
8,500	1	1,350	2		
9,000	1	1,370	2		
9,000	2	1,500	3		
22,000	1	2,000	2		
27,000	10	2,000	2		
30,000	4	2,000	2		
30,000	1	2,200	2		
30,000	2	2,800	1		
35,000	2	3,000	4		
		3,000	4		
		3,250	3		
		3,500	1		
		3,700	2		
		3,800	1		
		4,000	2		
		4,000	1		
		5,000	2		
		5,000	5		
		5,500	5		
		6,000	1		
		7,000	4		
		9,000	6		
		10,000	4		
		11,000	4		
		12,000	12		
		18,100	2		
		45,000	25		
		90,000	2		
		200,000	20		
		200,000	50		
		250,000	40		
		325,000	100		

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ⁱ <http://online.wsj.com/article/SB10001424052970203803904574431151489408372.html>

ⁱⁱ <http://blog.socialcast.com/social-networks-spur-the-demise-of-email-in-the-workplace/>

ⁱⁱⁱ http://www.huffingtonpost.com/2010/06/17/facebook-coo-email-is-pro_n_615816.html

^{iv} *Messaging Server Market Trends, 2010-2013*, Osterman Research, Inc.

^v We applied the 70% factor because Notes/Domino is often primarily used for applications, not email