

WHITE
PAPER

Leveraging LDAP for
Quick Migration from
Legacy Platforms



Migrating to the Sendmail/HP
Carrier Class Messaging Solution
on Intel Architecture and Linux.



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on Intel Architecture and Linux**

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EXECUTIVE SUMMARY

The proliferation of email as a daily communication tool has spawned exciting new opportunities for businesses—and especially for Internet service providers (ISPs) who can now reach out to hundreds of thousands of customers.

Yet this rapidly increasing volume of both business and consumer email also creates challenges. With message quantity, size and usage growing at more than 40% per year (according to Gartner), there's an ever-increasing strain placed on email systems. Support issues are escalating. User expectations of 24 x 7 email availability with quick and easy browser-based access are becoming the new standard. In addition, the propagation of malicious viruses, spam and hacker attacks has made security a major concern.

Scaling email infrastructure to meet this increased demand can be costly, time-consuming and difficult to manage. Therefore, service providers that consider email a mission-critical piece of their day-to-day operations have both a need and an opportunity to address some of the common pressure points:

- Reducing costs of the email infrastructure
- Extending email access while simplifying administration
- Building a secure network to protect against growing security risks
- Providing wireless access, such as Intel® Centrino™
- Meeting today's needs, yet providing scalability for the future

If an organization is facing these challenges, Sendmail can help. Sendmail is a leading provider of powerful email systems for enterprise and service providers. With proven technology and unmatched expertise, Sendmail works with customers to address their most complex messaging challenges and to provide dependable email infrastructure that's easy to manage and built to grow.

Sendmail, in partnership with HP, Intel, McAfee and others, provides "best-in-class" email solutions that take advantage of industry-standard software and server platforms to maximize availability and significantly improve the price/performance ratio. One of the most superior solutions utilizing this combination of software and platform, according to our research, is a Carrier Grade Linux-based Sendmail solution running on the Intel Architecture.

This white paper outlines the use of industry-standard Lightweight Directory Access Protocol (LDAP) to migrate and integrate Sendmail's messaging solution on the Intel Architecture from legacy platforms. It also highlights the features and benefits of the Sendmail software on the HP and Intel hardware, versus legacy platforms. This document is ideal for IT managers, system administrators and CIOs of service providers that are considering installing a large-scale messaging solution or migrating from their existing environment.



The Marketplace

With more than 20 billion messages sent each day in 2002, according to IDC, email has clearly come of age. Gartner estimates that the amount of data transferred through email will continue to grow at 275% per year as more users send more messages with larger files attached.

This increase—in both importance and volume—puts pressure on service providers to establish email infrastructures that can handle the load, to improve communications security, and to better manage the content flowing through these systems. And with the prevalence of mobile access devices such as wireless phones and PDAs growing, customers are also demanding access to their messages anytime and anywhere. In fact, according to IDC, more than \$3 billion was spent on email and collaboration software in 2001 alone.

Many ISPs, however, are hampered by ineffective systems that are costly to scale, leaving them to continually juggle customer satisfaction and retention with the opportunity to grow. As a result, many ISPs are looking for an email infrastructure that offers seamless migration while leading to more efficient email operations, including simplified user administration.

Assessing the Architecture

Who is Sendmail?

Sendmail is an email pioneer, having played a key role in the evolution of email and the Internet's beginning. The sendmail Mail Transfer Agent (MTA), the de facto standard implementation of SMTP (Simple Mail Transfer Protocol), has been the foundation of Internet messaging for almost 25 years—and still powers more than 60 percent of the Internet's mail domains. Recently honored by the Smithsonian Institution for its contributions to the advancement of information technology, Sendmail remains a leading contributor to the ongoing evolution of email and the Internet.

Sendmail, Inc. has expanded its mail system expertise beyond the sendmail Open Source project to develop comprehensive email solutions that address the specific needs of businesses today. These include Mailstream Manager, an enterprise solution combining commercialized sendmail MTAs that support encryption and Local Directory Access Protocol (LDAP) lookups with anti-virus security, content management filters and robust network management tools, and Mailcenter, a cost-effective mailbox hosting solution for service providers, universities and enterprises with a large, dispersed workforce.



Linux Versus UNIX

UNIX operating systems generally have the reputation of being robust, secure and scalable. Sendmail and HP have demonstrated, however, that this is not the case. In fact, Sendmail on the Intel Architecture outperforms UNIX-based systems—and is more cost-efficient.

ProLiant Performance Beats Sun		
Hardware Platform	HP ProLiant DL580 4-way	Sun Fire V880 4-way
Maximum Users	14,000	9,000
Cost with Storage	\$48,603	\$190,095

ProLiant Performance Beats Sun		
Hardware Platform	ProLiant DL380	Sun Fire 280R
Messages per Second	30	19
Cost with Storage	\$6,463	\$16,490

Sendmail on the Intel Architecture outperforms UNIX-based systems—and is more cost-efficient.

Acquisition costs of hardware, when considered in the total cost of ownership equation, are under increasing scrutiny from cost-conscious messaging architects. Most UNIX operating systems are only available with the purchase of expensive server hardware. That’s one of the reasons why Carrier Grade Linux on the Intel Architecture is growing in popularity as a cost-effective alternative to the expense of vendor hardware-specific UNIX.

Linux has matured, and so have the Linux operating system vendors that distribute commercial Linux. Linux continues to benefit from its large open source contributor base. Linux vendors SuSE and Red Hat have struck a balance between the rapid evolution of the operating system and the reliability demands of business, as evidenced by the creation of "enterprise-hardened" versions of Linux. Like Sendmail and its products, these hardened Linux versions are tested and exercised by both the open source communities and the vendors themselves. The result is a robust operating environment, complete with advanced features such as a journalled file system—as secure and reliable as a similarly configured UNIX system, and yet, when combined with an Intel-based server, available at a fraction of the cost.

Furthermore, Carrier Grade Linux-based systems outperform legacy systems, such as Solaris, by as much as 20% to 50%. In fact, results from recent testing by HP and Sendmail showed that the HP ProLiant DL380 running SuSE Linux Enterprise Server was capable of 30 messages a second, compared to only 19 on the Sun 280R with Solaris. The maximum user count or capacity of users on the message store was also found to be significantly higher, with 14,000 maximum users on the ProLiant DL580 versus 9,000 users on the Sun.

“The capabilities now available through the CGL edition of SuSE’s Enterprise Server, will provide our Sendmail Mailcenter users a higher standard in availability while enabling the organization with increased manageability, additional security and performance.”

— Dr. Sami Akabawi, Associate Vice President for Computing & Professor of Information Systems, at the American University in Cairo.

For more information on these test results, please go to:
<http://www.hp.com/hpinfo/newsroom/press/2002/021031b.html>



Intel Architecture

Hardware and operating environment are key considerations in planning and implementing a messaging architecture. The platform choice has a profound effect on performance, availability, scalability, security and manageability—not to mention basic business considerations such as cost-efficiency, user experience and deployment time.

Performance and Standards Based solutions make the Intel Architecture the most superior platform for customers implementing or migrating to a Sendmail messaging solution. Also of key importance is the fact that the Intel roadmap extends well into the future (i.e., Itanium2), unlike legacy architectures, such as Sun and IBM, which are dying or migrating to Intel themselves.

HP has produced hardware
that yields increased uptime and
maximum server performance.

HP Advantages

The industry-standard Intel-based HP ProLiant line of servers are increasingly becoming a top choice for customers. HP is the leading provider of messaging and collaboration solutions for large, medium and small businesses. With its ProLiant servers, HP has produced hardware that yields increased uptime and maximum server performance for increasingly large and complex applications, such as large-scale messaging, clustering and database management.

HP ProLiant servers combine a number of important features and benefits:

- Exceptional affordability
- HP Blade platform, providing high density and low power benefits
- HP Rapid deployment software, allowing re-deployment and manageable growth
- HP Openview management software capabilities



Sendmail Mailcenter on HP ProLiant and Linux

Goals for Service Providers

Service providers are looking for a large-scale, standards-based, cost-effective message hosting and access solution to serve their growing customer demands. They require a modular design that enables them to:

- Scale the messaging system across inexpensive hardware
- Accommodate a wide range of business requirements such as geographic dispersion
- Deliver breakthrough message processing capabilities to their entire user community

In addition, service providers are also looking for ways to increase their revenue by offering more add-on services. New services include: MMS, SMS, Calendaring, Content filters like Anti-Spam, and GSM gateways.

Solution Features and Benefits

Sendmail Mailcenter offers a cost-effective growth, reliability and manageability model for large email systems, while introducing new freedoms for end users and improved controls for cost-conscious mail administrators. These include:

- **Increased User Productivity**—Users control powerful server-side, personal delivery filters to presort mail as it is delivered to their mailbox; to set personal spam management policies including sender blacklists and rejections; to generate notifications when important messages arrive; and to personalize their auto-replies.
- **Accessibility**—Mailcenter users have the liberty to choose multiple access clients from traditional user agents like Outlook, Eudora, Netscape or Pine, combined with PDAs, smart phone, and Webmail to give them true anytime, anywhere, any device, email access, including Intel® Centrino™.
- **Tested Scalability and Performance**—Mailcenter's strength is its capability to grow without redesign and to thrive in rigorous environments. Mailcenter has been performance tested to support thousands of (IMAP) users on a single dual-processor Intel server, and up to 30 million (POP) users on Carrier Grade Linux clusters.
- **Ease of Administration**—Administrators maintain complete control of the email system and are equipped with centralized and easy-to-use secure interfaces from which they can configure and manage the Sendmail software, set and maintain policies and provision domains, accounts, features and quotas.
- **Content Policy Enforcement**—Sendmail filters are designed for customers to scan incoming and outgoing mail for spam, inappropriate email, viruses and corporate policy breaches.



Sendmail Product Suite

Sendmail, Inc. offers the Internet's only set of solutions whose core technology—sendmail—helped define how Internet mail operates. This core technology is considered the benchmark for open standards email and Internet mail innovation. Sendmail, Inc. delivers simplified administration and management tools, encryption and authentication, scalable POP/IMAP message stores, LDAP services, mail network unification and spam and virus filtering support.

Sendmail provides advanced wireless and Webmail capabilities to meet Internet messaging needs. These enable enterprises and service providers to deploy highly reliable and scalable email anywhere, anytime via any web browser, Wireless Application Protocol (WAP) or i-Mode enabled wireless device.

Sendmail's email routing, storage and access solutions can be combined in a number of ways to address the challenges of today's businesses. The Sendmail Mailstream Manager offers essential email applications and services that ensure the reliable and secure flow of email.

The Sendmail Mailcenter provides the only complete suite of bundled, fully integrated, rapidly implemented and affordable email applications.

The Migration Process

Using LDAP for Seamless Integration and Migration

Maximizing user uptime is critical, so companies integrating a messaging solution must ensure any transition is as seamless and smooth as possible.

Migration can be accomplished through one of two methods: bulk migration or gradual migration. Bulk migration requires shutting down both systems and turning off access so user accounts, passwords and email can be migrated in one step. This method works best for smaller sites, with a few thousand users, the maximum number that can be migrated without causing undue stress to the users and the new system. For larger sites, Sendmail employs an “on-line” or gradual migration (moving users from the old system via IMAP or POP in segments of 15 to 20 users at a time).

The biggest challenge with migration is obtaining user passwords to move data off the proprietary server. If the data is stored in LDAP or any type of local database, however, Sendmail can gain access to it. In fact, sometimes the passwords can be pulled out directly.

If the data is stored in a proprietary format (such as Sun, iPlanet, Openwave and Critical Path), Sendmail can place a proxy server between the users and the existing server to harvest their passwords as they log in. Once the user passwords are obtained, the migration process can begin.



Use of Gradual Migration Tactics

“On-line” or gradual migration is the recommended strategy for transitioning organizations with more than 1,000 users. In this scenario, the passwords have already been harvested, and the Sendmail migration daemon is used as a coordinator to run through the list of users to spawn transfer processes that will actually move their mail using IMAP or POP protocols.

By using the Sendmail Advanced Proxy Server and incoming MTA, Sendmail can perform an incremental migration with almost zero down time. Users that have not been migrated will continue to be routed to the legacy systems by the proxy. Users that are being migrated will either be temporarily locked out of their mailbox or logged into the new server as the migration tools bring messages over, depending on site policy. Users that have been migrated will be directed to the new server transparently, with no reconfiguration to their mail client needed. The migration daemon has the intelligence to determine when it's appropriate to schedule a migration for a specific individual, such as when a user is not logged in.

During the migration process, users who haven't been migrated will continue using the old system and those who have migrated will use the new one. Sendmail will automatically shuffle between the systems. In the event of a problem, the migration daemon proactively alerts an administrator. However, Sendmail has discovered that typically less than 1% of users in a migration will have problems. In larger ISPs, that figure drops to .01%.

Even though it takes just a few minutes to migrate each individual user, Sendmail usually limits each session to ten or twenty users at a time during daytime hours, when there will be normal user load. During off-peak hours, each migration session usually consists of twenty or thirty users at a time.

Most gradual migrations can be accomplished in less than 24 hours time. As an example, Sendmail and HP recently completed a gradual migration for a European ISP with approximately 150,000 users in just ten hours total, with no perceived downtime for users.

Benefits of Sendmail's Rapid Migration Process

With innovative migration tools, Sendmail eases the transition from legacy systems through automated processes, minimized downtime and robust security features. Sendmail employs a three-step Rapid Migration Process to help lower the risk, build a business case and adopt new collaborative processes to migrate fast.

Step 1. Sendmail Audit—Sendmail experts will examine an organization's current Sendmail software to identify hidden functionality. They will also show how to extend the current solution with additional services and software including performance tuning, high availability, security and integration.

Step 2. Sendmail Email Assessment—The Sendmail Email Assessment delivers a comprehensive evaluation of the organization's needs, including a full Messaging Architecture and Design Strategy which provides an integrated design of the entire system, plus recommended software and hardware to provide the best price/performance.

Step 3. Sendmail's Parallel Deployment Approach—We work with the organization to map all application and functionality deployments so that they happen simultaneously, rather than sequentially. This approach reduces testing, benchmarking and stabilization periods.

In addition, Sendmail works with service providers to maximize functionality and increase customer service and value. This can include performance tuning, fault tolerance, policy enforcement and security. Sendmail can also integrate new solutions or add analytical and reporting functions to help optimize an email system.



Customer Examples

For complete customer case studies and other information relating to the Sendmail/HP solution, please visit: www.sendmail.com/hpintel

Example # 1: European Wireless Internet Service Provider

Seamless migration accommodates new users and wireless capabilities

Industry	Telecommunications
Company & Location	MobiFon Bucharest, Romania
Business Need	Migrate existing users to more reliable and scalable system without interruption
Solution	Sendmail Mailcenter Master directory server / Sendmail Multi Switch Two Sendmail Message Switches Two Sendmail Message Store servers Two Sendmail POP/IMAP/Mobile Message Servers Storage, Back-up, and Fail-over servers Sendmail Directory Services and billing integration
Results	<ul style="list-style-type: none"> • Sendmail migrated 150,000 mailboxes seamlessly in less than 24 hours • System is ready to grow with new customers

Example # 2: Regional Wireless Service Provider

Company adds mobile messaging and email capability to its wireless network

Industry	Telecommunications
Company & Location	MobileCom, Wireless Service Provider Middle East – Jordan
Business Need	Build innovative Internet services to differentiate its wireless offerings with secure, highly available, cost-effective email and mobile messaging capabilities in local languages
Solution	Sendmail Mailcenter⁴ on HP ProLiant and Linux: <ul style="list-style-type: none"> • Sendmail Switch (routing): <ul style="list-style-type: none"> – Four ProLiant DL360 servers • Sendmail Mobile Messaging <ul style="list-style-type: none"> – Two ProLiant DL380 G2 servers • Sendmail Advanced Messaging: <ul style="list-style-type: none"> – Two ProLiant DL580 (clustered) servers – StoraGeworks RA4100 Storage Area Network – SteelEye LifeKeeper for Linux and Application Recovery Kit • Proxy Server: ProLiant DL360 server • Sendmail Directory Service: ProLiant DL360 server • Operating System: SuSE Linux Enterprise Server • Services from HP and Sendmail, Inc.
Results	MobileCom has full control over its email environment and plenty of room to expand its user base <ul style="list-style-type: none"> • Operational costs are down 40% • Sendmail and HP deployed the solution in two weeks



Sendmail Solution Benefits

There are many customer issues associated with installing a new messaging solution or upgrading from an existing infrastructure. The most common themes, however, focus on three areas:

- Price/performance
- Quick and smooth implementation
- Simplified administration once the system is in place

Other concerns include reliability in the messaging system, scalability to meet growing customer demands, flexibility on economical hardware and security.

Exceptional Price/Performance

The Sendmail solution boasts a price/performance ratio 40% better than competitor Mirapoint, nearly 70% better than Critical Path and over 80% better than iPlanet. Beyond these proven facts, do customers think Sendmail is a good value for the money?

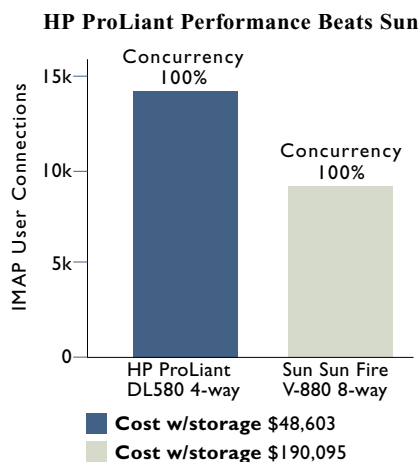
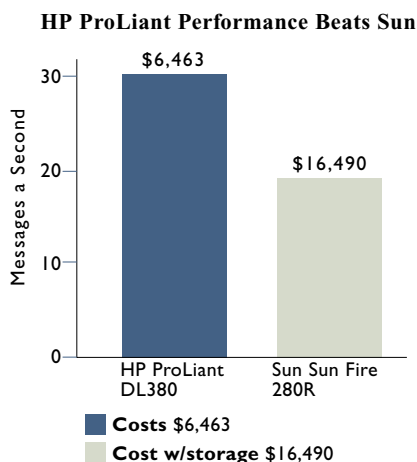
“It really, really is. That's the bottom line for me. We looked at using Microsoft Exchange, Notes and Novell. All I really wanted were the mailboxes. The ability to write your own administration tools, that was an overwhelming plus for us – just try to do that with Exchange. I'm a really big believer in the Sendmail product.”

— Rob Arnold, Technology Strategist for Waddell & Reed, Inc.

Sendmail solutions deliver exceptionally high performance. Sendmail can support 30 million users on one LDAP server and still route one million messages per hour. Since Sendmail always deploys LDAP servers in pairs, depending on the number of MTAs that it's feeding, the LDAP server could actually handle two million messages or more per hour. Theoretically, there is no limit to the number of users, as additional servers can always be added to the cluster. Sendmail supports the Itanium2 platform for the Sendmail LDAP directory, ensuring customers the highest level of scalability and commitment to the Intel Architecture roadmap.

“Performance testing shows that Sendmail software running on Intel-powered HP ProLiant server clusters significantly surpasses more expensive RISC-based servers in message throughput—and at a significantly lower acquisition price.”

— Greg Olson, Chairman and Co-Founder for Sendmail, Inc.





Quick and Smooth Integration

Maximizing user uptime is extremely important, so companies integrating a messaging solution must ensure any transition is as seamless and smooth as possible. To that end, Sendmail researches the customer needs and requirements to determine if a bulk migration (done during downtime, such as over a weekend) or a phased migration (moving users from the old system via IMAP or POP in segments of fifteen to twenty users at a time) is the best option. Sendmail can take an existing user base and move it from the current system to the Sendmail Advanced Message Server (SAMS). As part of that process, Sendmail can also create LDAP accounts that didn't exist before to better manage the large amount of data associated with the mail system and its users.

Simplified Management and Administration

To simplify user management and administration, Sendmail provides the Sendmail LDAP console (SLC). The SLC is a delegated administration tool that allows administrators to log in as a user, not as root. Because the SLC is a standard browser-based GUI, it doesn't require a special Java applet, like those of competitive products.

Sendmail also helps reduce the time it takes for an administrator to complete day-to-day tasks, such as Adding or Deleting users. One large company with about 50,000 people was using a Domino environment, and they noted that administration was extremely high. Simply creating an account would take a trained Domino administrator twenty or thirty minutes to accomplish, between the time they started and when a user could actually log in. This company asked Sendmail to help them move all the users that didn't need anything other than email from the Domino system onto Sendmail. Using the Sendmail LDAP server and the SLC to create, delete and administer accounts for those people drastically reduced the account creation time—from thirty minutes to about five seconds.

Proven Reliability

Eight of the top Fortune 10 companies, 84 of the Fortune 100 companies and 29 of the 36 largest Internet Service Providers (ISPs) rely on Sendmail technology. Those are impressive figures.

To ensure reliability, a Sendmail deployment always involves at least two redundant servers. With any given Sendmail product, such as the Switch MTA or SAMS server (which also uses LDAP for authentication), at least one LDAP server will be available at any given time. If for some reason one server goes off-line, customers would still have full, realtime access to all the information that's being delegated.

“Where things go kaboom the most is on the filtering side because you can fill up files very quickly. There's just a million and one things that can go wrong in that aspect. Sendmail is more bullet-proof than any other MTA in the world. It's really well- tested. We've had Sendmail servers that had almost three years of uptime.”

— Rob Arnold, Technology Strategist for Waddell & Reed, Inc.



High Scalability

All Sendmail products are LDAP enabled. Sendmail uses the LDAP replication to provide additional scalability in a horizontal fashion—the easiest to manage from the system administrator's perspective. If customers need to add more MTAs or other services, they can simply add more LDAP server capacity as needed. In fact, using the HP Blade technology, customers can re-deploy with “adaptive infrastructure technology,” the LDAP capacity to larger CPU Blades or more servers in quantity. Using LDAP from a single administration point, Sendmail allows users to get distributed information to any number of systems in any number of geographical locations.

Customers also have the same level of scalability for SMTP servers doing end-user relay from the Internet using SMTP authentication, to help prevent against hacker and spam attacks. Companies using the Sendmail Mailcenter suite have the comfort of knowing that the scalability of the Sendmail LDAP server provides a roadmap to virtually unlimited scalability.

For example, if a customer wanted to add another 50,000 POP or IMAP clients to a large ISP, they simply could install one or two more SAMS servers to handle the load, depending on the level of concurrency. If a customer needed to have another 5,000 users on web mail at any given time, they could put in another SMMS server—side-by-side-by-side, with cloned configurations running the same information stored in LDAP.

Flexible Hardware Infrastructure

LDAP is completely client-agnostic—it doesn't care what machine you're connecting from, as long as you're using the LDAP protocol. You do not have to worry about different client modules or product installations because LDAP is an open standard protocol. Sendmail's Directory Services based on LDAP allows large-scale messaging environments to consolidate authentication, routing information, and end-user address book information into one highly scalable repository.



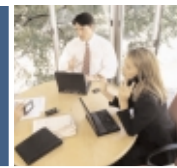
Conclusion

The rapid growth of email, in both volume and importance, has created exciting new opportunities for service providers who can now provide value-added services to hundreds of thousands of customers. Yet the rising activity of both business and consumer email also creates challenges, particularly for legacy or homegrown systems that cannot support the increasing message quantity, size and usage. User expectations of 24 x 7 email availability with quick and easy browser-based access are becoming the new standard, while email security is also a concern. At the same time, scaling your email infrastructure can be costly, time consuming and difficult to manage.

For services providers that consider email a mission-critical piece of their day-to-day operations, there's both a need to address some of the common pressure points:

- Reduce costs of the email infrastructure
- Extend email access while simplifying administration
- Build a secure network to protect against growing security risks
- Provide wireless access, such as Intel® Centrino™
- Meet today's needs, yet provide scalability for the future

Sendmail has partnered with HP, Intel, McAfee and other vendors to help service providers address their most complex messaging challenges. This superior offering takes advantage of industry-standard software and server platforms to maximize availability and significantly improve the price/performance ratio. Specifically, it leverages industry-standard Lightweight Directory Access Protocol (LDAP) to migrate and integrate Sendmail's messaging solution onto the Intel Architecture, from legacy platforms. The result is dependable email infrastructure that is easy to manage and built to grow.



COMPONENTS

Sendmail Mailcenter combines all the components necessary to deploy a complete email system of any size:

Sendmail Mobile Message Server – Provides Webmail and wireless access.

Sendmail Advanced Message Server – A high-performance mailbox hosting and POP/IMAP access server made infinitely scalable by the inclusion of a robust, secure message access proxy.

Sendmail Directory Services – Integrated directory management service for business-critical email systems.

Sendmail Price/Performance on Linux – Maximum availability and superb price performance for Linux and HP ProLiant Intel-based server platforms.

Sendmail Intelligent Inbox – Personal delivery filters operate before mail is delivered to individual mailboxes and are mail-reader independent, providing end-users the ability to easily choose multiple access clients, devices, sorting and notification methods.

Log Management – Sendmail Log Management Service (SLMS) provides a consolidated, manageable method for generating detailed usage statistics about enterprise-wide email infrastructure via scheduled or on-demand reporting. SLMS enables companies to drill down into per-message, per-user and per-component forensics to quickly diagnose and, ultimately, prevent potential problems.

Mailstream Manager? – Email is scanned for viruses, spam and other malicious code, filtered against content management policies and transmitted through secure channels—all controlled from a central administration system.

Servers

- HP ProLiant DL class 2 and 4 way Xeon Servers
- HP ProLiant High Density BL “Blade” Class Servers
- HP Itanium2 Servers

High Availability and Management

- HP Insight Management Suite
- SteelEye LifeKeeper for Linux HA

Supported Server OS

- SuSE Linux Enterprise Server
- Red Hat Linux Advanced Server

Client Systems

- Compaq Evo Business Class PC (can be used as Breakroom Kiosk)
- HP XW Series Workstation with Intel Xeon
- Compaq Evo Series Notebooks with Mobile Intel Pentium (with WiFi for Hotspot access)
- Compaq iPAQ Handheld PDA for remote users with Bluetooth and WiFi (Hotspot access)
- Compaq Tablet PC for workforce members in the field



**WHITE
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Leveraging LDAP for
Quick Migration from
Legacy Platforms



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