A Case Study in Exchange Management: HP's Experience

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Abstract

Exchange is the leading messaging application for businesses today. This presentation will be a case study focused on how HP uses Exchange and how it is managed from a day to day perspective. HP, like other enterprises, depends on messaging flowing quickly and effortlessly. Managing the Exchange environment effectively is important to ensure that business communication keeps flowing.

The management of Exchange is centered on the day-to-day operations side of IT and on ensuring that SLAs are being met, servers are available and servers are performing fundamental tasks that provide quality of service for the end user. Adding complexity to these fundamental tasks are the distributed nature of the HP enterprise (HP is worldwide) and the vast HP user community.

Setting the Stage: HP Fast Facts

- HP is a technology solutions provider to consumers, businesses and institutions globally. The company's offerings span IT infrastructure, personal computing and access devices, global services and imaging and printing. For the four fiscal quarters ended April 30, 2004, HP revenue totaled $76.8 billion.
- Hewlett-Packard Company (NYSE, NASDAQ: HPQ)
- Headquarters: Palo Alto, California
- CEO and Chairman: Carly Fiorina
- **HP serves more than one billion customers in more than 160 countries on five continents.**
- **HP has 145,600 employees worldwide.**
- HP's 2003 Fortune 500 ranking: No. 14
- HP's mission is to invent technologies and services that drive business value, create social benefit and improve the lives of customers—with a focus on affecting the greatest number of people possible.
- HP dedicates $4 billion (U.S.) annually to its research and development of products, solutions and new technologies.

Setting the Stage: HP Detailed Demographics

- 150,000 workers
- 800 physical locations worldwide
- IT infrastructure deployed at around 100 locations
- 453 Exchange servers (212 Exchange2003, 79 Exchange2000, 162 Exchange5.5)
- 234,000 Exchange mailboxes (170,000 Exchange2003, 44,000 Exchange2000, 20,000 Exchange5.5)
- 100 Million messages per month (6.9 Terabytes per month)
- 50,000 groups
- 200+ Windows 2003 Domain Controllers, 100 AD Sites
- Over 2 million AD objects

Setting the Stage: HP, Microsoft, Exchange Capabilities

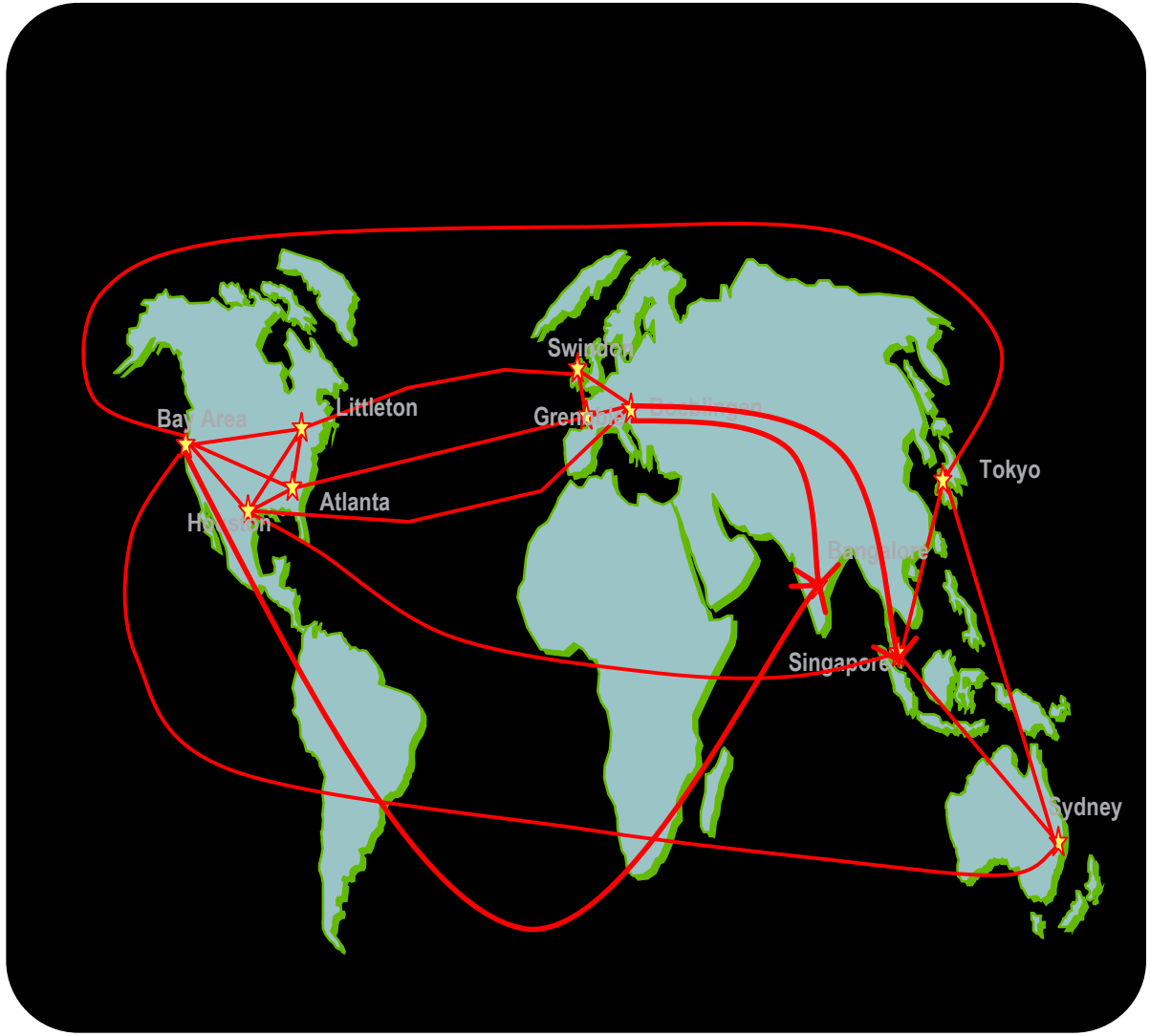
- 12,000,000+ Microsoft Exchange Server 2000/2003 seats under contract or deployed by HP Services
- 850+ dedicated technical Microsoft Exchange consultants
- Only designated Microsoft Prime Integrator for Exchange
- A hardware, software, services leader. 40% of installed Exchange servers world-wide*

*Source: Windows & .NET magazine study 9/2003

High Level Messaging Design Goals

- A single global managed Exchange service delivering the commodity email service to Outlook, IMAP, POP and Web Browser clients
- Optimized message routing topology based on the global WAN design
- Optimized Internet mail routing via the RIM/Bastion design
- RIM/Bastions using directory-enabled Postfix together with the HP Enterprise Directory for optimal inbound mail routing.
- Targeted server configurations from a few hundred to 4000+ mailboxes per server
- Consolidate where networks, demographics, politics and data center strategy allow.
- Protect by multiple layers of anti-virus and anti-spam
- Provide a platform for value added services (Fax, Mobility, workflow)
- Provisioning and Service management with a high degree of self service
- Standard tools for monitoring and metrics

HP WAN Core Backbone and the 11 Core Sites



- High speed core backbone (circuits from10Mb to 600Mb)
- Regional WAN's connect to one or more core locations
- Multiple carriers, multiply redundant
- Very reliable

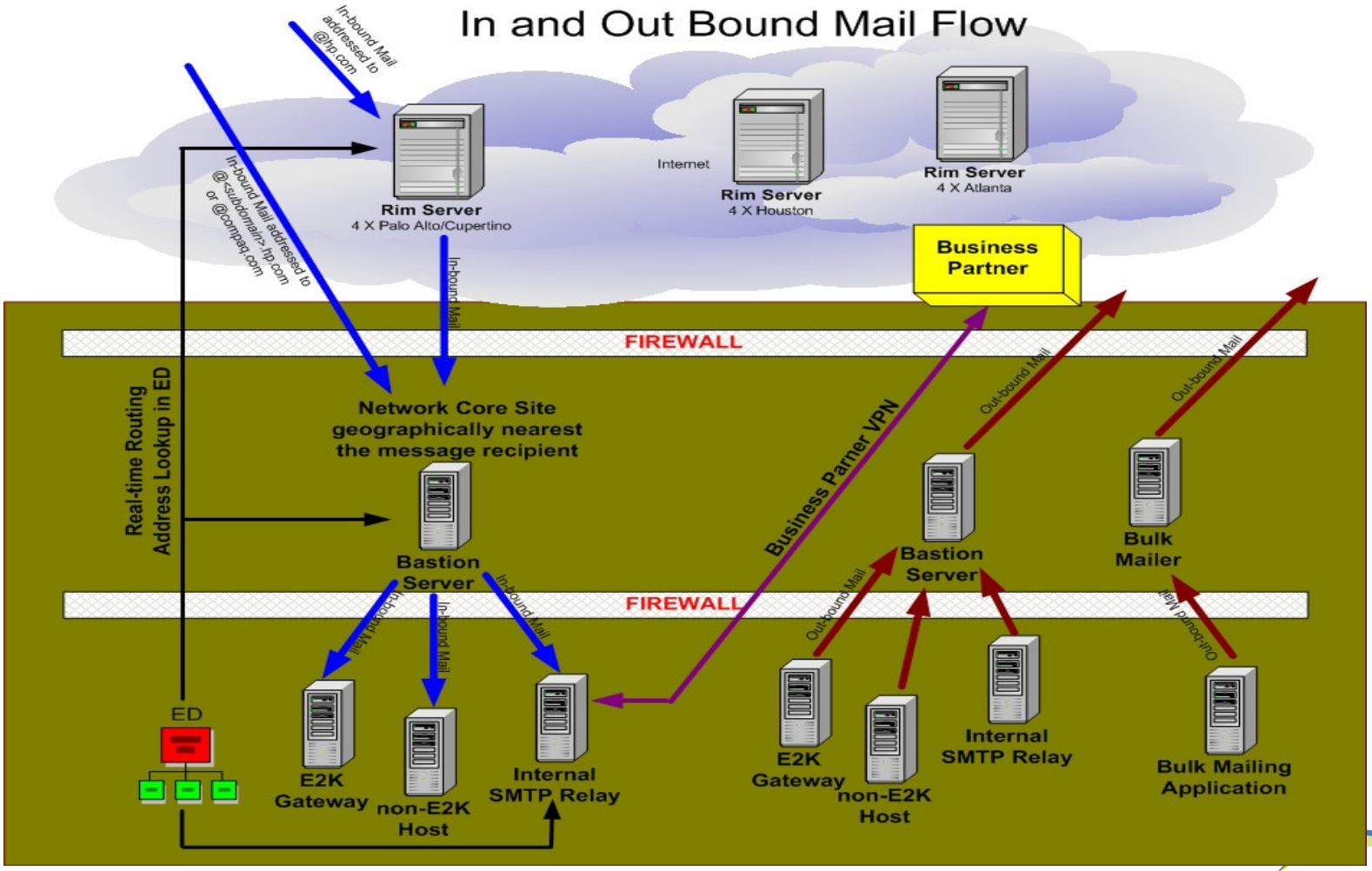
Active Directory

- Single AD Forest for users, computers, Exchange, Employee Portal authentication etc
- Root domain holds only a few key accounts with very strict policies.
- Very limited number of key roles such as schema admin
- Centrally designed and evolved with regional participation
- AD integrated DNS and DDNS works with Bind to provide a global DNS service for static and dynamic clients.

GC Hardware and placement

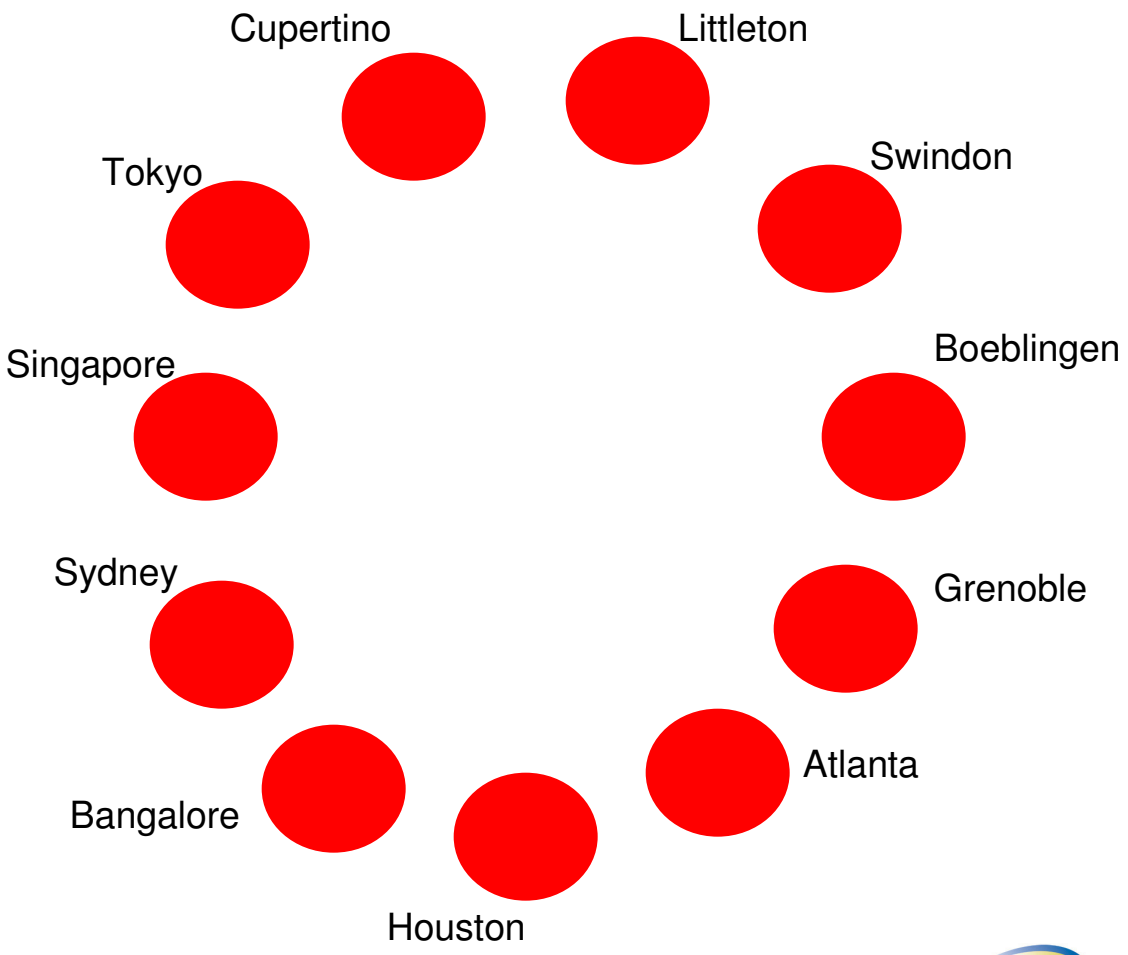
- Using Dual 2.5ghz processor DL380 with 4GB, 512K cache, separate RAID1 arrays for system, DIT and logs.
- Tests with 64 bit Itanium look very promising. 10 times LDAP performance, 15 fold improvement in DNS startup time.
- With Windows 2003 and modern HW, budget 5000-6000 users per GC (increase from 4000 with previous generation HW/SW)
- Always co-locate GC with Exchange
- Modern versions of Outlook and Exchange are more or less immune from a single GC failure

Internet Mail Routing



Exchange Topology

- 11 Routing Groups based on the 11 global WAN core backbone sites
- RG Bridgeheads sit on high speed core backbone network
- Peer mesh routing between RG's



Server Configurations

- Standard configurations based on the server role
- Dedicated servers for each role
- Dedicated functions within a role (eg inbound gateway and outbound gateway)
- Mailbox servers sized for regional variations
  - Tiny
  - Small
  - Medium
  - Large
  - Proliant DL580 is the main workhorse for large, medium and small configurations (4U, 6 PCI slots)

Storage and Disaster Recovery Strategy

- SAN storage in large data centers, attached SCSI in smaller locations
- Using EMA, EVA and XP SAN's
- 100 MB mailbox quota
- Up to 4 Storage Groups with 5 Databases each
- Keep individual DB size to < 30GB
- Using 16 head Tape Library and Fiber Channel
  - Simultaneously back up 4 Large Exchange servers in under 4 hours (4 servers x4 SG's=16 backup threads)
  - Recover a single DB in an hour or less

Storage Rules

- Each database is designed for 250 Mailboxes with 100MB quota. Target size is 25-30GB per database
- Databases are hosted on 4x36GB drives configured RAID5 and split into 2x54GB partitions (one for .EDB, one for .STM)
- Each SG has 2x36GB drives configured RAID1 for logs.
- Servers have Utility space to hold at least 1SG.
- Internal drives (4) configured as 2 2x36GB RAID1 and used for System and Page File space
- On med and large servers MTA gets dedicated space (2x36 RAID1)
- Large and Med-Large servers use Mount Points to overcome drive letter limitations
- No single point of failure (adapter, cable, switch, controller, shelf, disk)

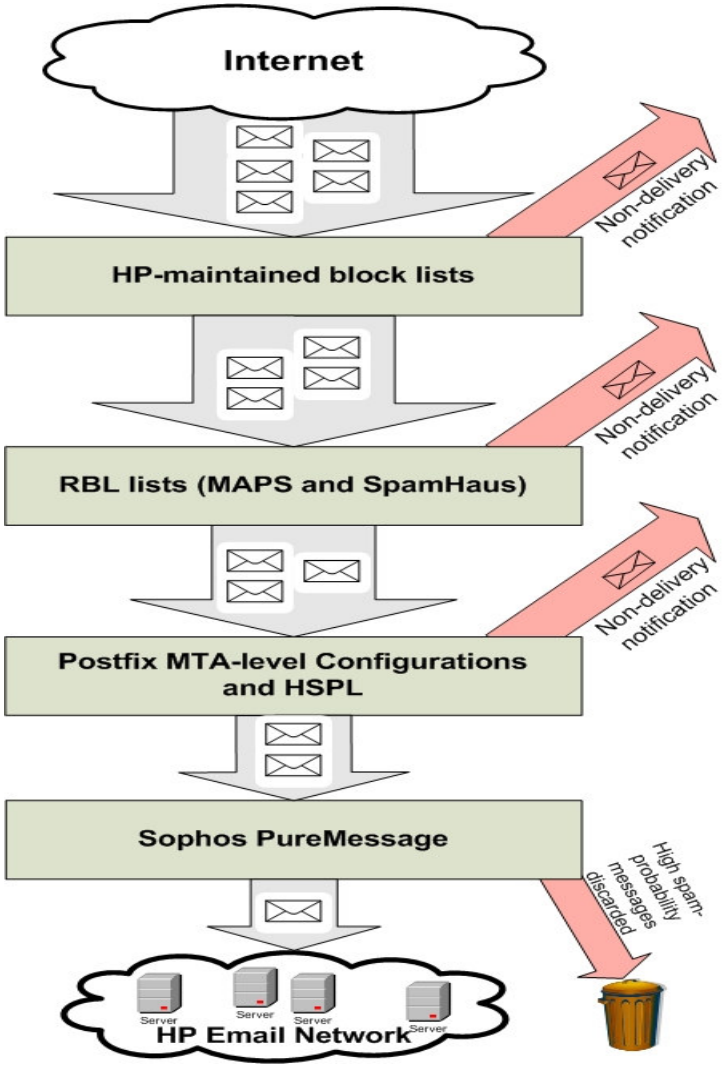
AntiVirus

- Multiple Layers, multiple vendors, multiple engines
  - Initial gross level scan (headers, sender, sending domain, specific messages etc) at the RIM/Bastions
  - Sybari Antigen build on the Exchange servers using CAVet and Sophos on the gateways, CAVet on the mailbox servers (different engines provide more coverage)
  - Symantec (NAV CE) on the desktop and for Server file level antivirus

Anti-Spam

- Bastion Hosts
  - HP uses anti-spoofing and sender-domain lookup configurations at the Postfix MTA level. We subscribe to 3rd party RBL blacklists (Mail-Abuse.org and Spamhaus.org), as well as maintain our own. This comprises the network based anti-spam techniques we use.
- RIM Servers
  - Use the same network based anti-spam techniques as the Bastion host
  - PureMessage (by Sophos) is implemented to provide content based spam filtering
  - HSPL (High Spam Probability List) is implemented to block sending domains that send HP spam based on analysis of PureMessage logs
- Metrics
  - Using the above methods we block on average 1.2 million messages per day.

HP's Spam Blocking Filter Order



Management, Monitoring and Backup

- HP OpenView for monitoring and problem/change management.
  - HP OpenView Operations for Unix
  - HP OpenView Operations for Windows
- Home grown metrics and reporting
- Home grown provisioning and service management
- HP Data Protector for backup
- HP Systems Insight Manager for hardware management

Thank You

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