RED HAT ENTERPRISE LINUX

redhat

INTEGRATING RED HAT ENTERPRISE LINUX WITH MICROSOFT WINDOWS IN THE DATACENTER

TECHNOLOGY OVERVIEW

RED HAT ENTERPRISE LINUX DELIVERS OUTSTANDING PERFORMANCE, SCALABILITY, AND RELIABILITY FOR NEXT-GENERATION DATACENTER WORKLOADS

INTRODUCTION

In today's challenging economic environment, IT planners are continuously seeking innovative ways to enhance service levels and contain costs.

Forward-looking organizations are revamping IT infrastructure and deploying virtualization solutions and private cloud services to improve business agility and reduce equipment and operating expenses.

Many organizations are choosing Red Hat® Enterprise Linux® for datacenter modernization initiatives. Standards-based Red Hat Enterprise Linux meets stringent workload performance and reliability demands at significantly lower cost than a proprietary operating system such as Windows. And since Red Hat Enterprise Linux is used in heterogeneous environments, it can be deployed in a manner that protects and extends previous Windows infrastructure investments. The platform runs on industry-standard x86 servers and integrates with existing storage and networking technologies, so businesses can retain existing hardware purchasing and support agreements, preserve existing hardware administrative and maintenance procedures, and continue using unified data backup and recovery solutions.

This whitepaper reviews the advantages of Red Hat Enterprise Linux for new business workloads, and explains how the platform can be easily integrated into existing Windows environments.

RED HAT ENTERPRISE LINUX FOR SCALABLE, RELIABLE, AND COST-EFFECTIVE VIRTUALIZATION AND CLOUD COMPUTING MODELS

Red Hat Enterprise Linux helps organizations make a seamless transition to emerging datacenter models that include virtualization and cloud computing, while still delivering high performance, reliability, and security. It also provides a predictable and consistent application environment across physical, virtual, and cloud deployments. Certified by leading hardware and software vendors, the platform supports major hardware architectures, hypervisors, and cloud providers, and scales from workstations to servers to mainframe systems. This high-performing operating system has delivered outstanding value to IT environments for more than a decade.

RED HAT ENTERPRISE LINUX EXTENDS WINDOWS INFRASTRUCTURE

Enterprises are implementing Red Hat Enterprise Linux to handle virtualization, cloud computing, big data and other new business workloads. As shown in figure 1, many organizations are deploying the platform in mixed IT environments, using Windows systems for traditional office productivity and collaboration tools, and Red Hat Enterprise Linux systems for web and IT infrastructure as well as line-of-business applications and services.

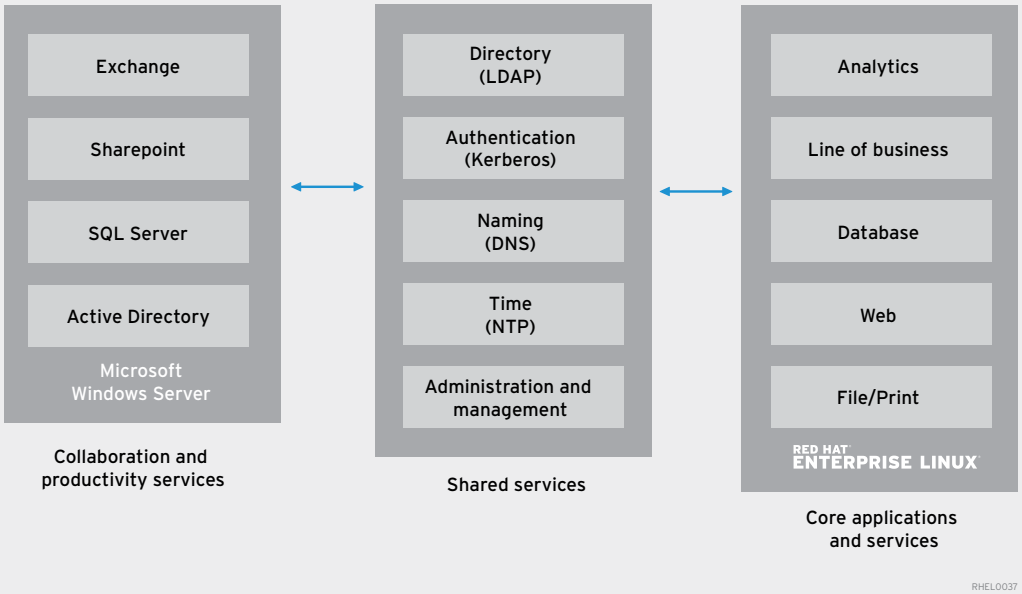

Figure 1: Integrated heterogeneous datacenter environment

STRAIGHTFORWARD DEPLOYMENT AND INTEGRATION

Red Hat Enterprise Linux readily integrates into existing Windows datacenter environments. The platform runs on a wide variety of x86 servers and works with existing storage and networking technologies, so IT organizations can continue using current hardware purchasing and support agreements, and preserve existing hardware administrative and maintenance procedures. A unified IT infrastructure with common compute, storage, and networking resources for Windows and Red Hat Enterprise Linux workloads can help businesses accelerate the deployment of new applications and services, while containing costs. In addition, by combining identity management technologies from Microsoft and Red Hat platforms, IT organizations can enable single sign-on, support uniform security, and streamline user and system administration.

INTEGRATING RED HAT ENTERPRISE LINUX IDENTITY MANAGEMENT SERVICES WITH MICROSOFT ACTIVE DIRECTORY

Red Hat Enterprise Linux includes integral Identity Management (IdM), a centralized and efficient way to create and maintain accounts (users, machines, services, etc.) and access control policies within Linux and UNIX environments. Similar to Microsoft Active Directory, IdM provides centralized management of identity stores, and authentication and authorization policies. IdM defines a domain, with servers and clients who share centrally managed services. Examples of such services include Kerberos for authentication and DNS for naming.

As shown in Figure 2, IdM can be integrated with Active Directory to centralize and unify identity administration functions. Using Identity Management with Active Directory in this manner maintains user information in a common repository, while allowing Linux and UNIX-specific attributes[1] to be centrally managed.

Unified user log-on capabilities allow single sign-on and unify administration of user accounts across separate platforms.

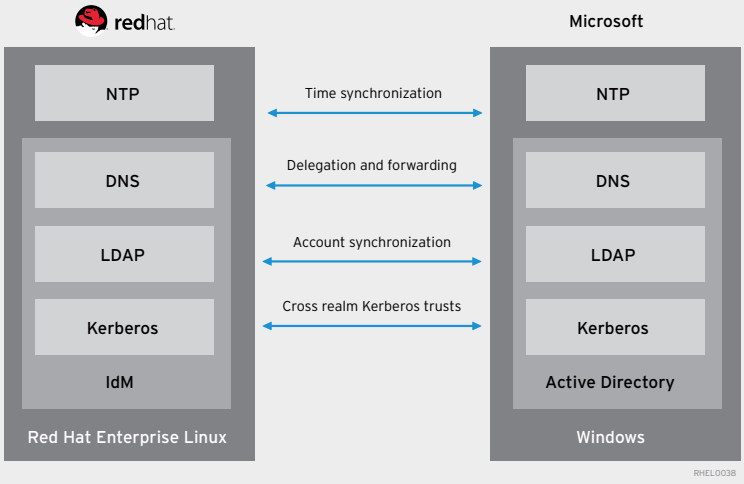

Figure 2: Integrating Red Hat Enterprise Linux IdM with Microsoft Active Directory

1 Such as netgroups, sudo rules and automount maps

USING RED HAT ENTERPRISE LINUX FOR CENTRALIZED FILE AND PRINT SERVICES

Red Hat Enterprise Linux can act as a print and file server for Windows clients, as well as for Linux, UNIX, and Mac OS clients.

IT teams can reduce expenses and simplify administration by deploying Red Hat Enterprise Linux systems as centralized print and file servers—often replacing older Windows or UNIX-based systems. Red Hat Enterprise Linux can act as a print and file server for Windows clients, as well as Linux, UNIX, and Mac OS clients. Windows users can access files and storage space through Red Hat Enterprise Linux file servers the same way they access Windows-based file servers using "My Network Places" or "Map Network Drive" functions.

Red Hat Enterprise Linux includes Samba, an open source suite of programs for providing file and print services to Microsoft Windows clients. It also includes Network File System (NFS), which provides file access for Linux, UNIX, and Mac OS clients, as shown in Figure 3. Both Samba and NFS are mature, well-established technologies. Samba interfaces with Windows clients using the Windows Server Message Block (SMB) and Windows Common Internet Filesystem (CIFS) protocols.

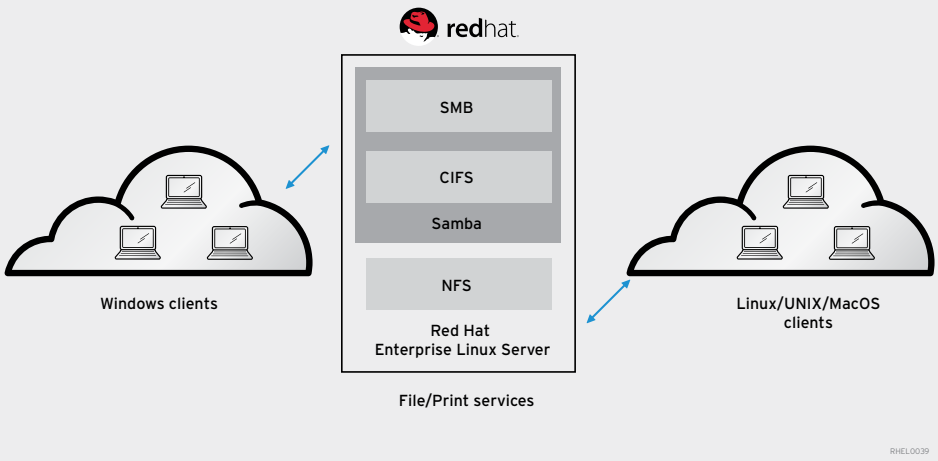

Figure 3: Using Red Hat Enterprise Linux for centralized file and print services

UNIFIED AUTHENTICATION ACROSS RED HAT ENTERPRISE LINUX AND MICROSOFT WINDOWS ACTIVE DIRECTORY DOMAIN

For many organizations, Microsoft Active Directory is the central hub for user identity management inside the enterprise. The systems that users access (including Linux) need access to Active Directory to perform authentication and identity look-ups.

Identity management in Red Hat Enterprise Linux 7 provides two paths to integrate Linux systems into the Active Directory environment:

- **Direct integration** – Linux systems can be connected to Active Directory directly by configuring the System Security Services Daemon (SSSD), which acts as an identity and authentication gateway, into a central identity store. SSSD can be easily configured using a component called realmd. Realmd detects an available domain based on the DNS records and configures SSSD to interact with the right identity source. Realmd can connect a Linux system to either IdM or Active Directory as shown in Figure 4. Once the system is joined into the domain, users managed by this domain can access the joined systems. They can authenticate their identity, and their POSIX attributes and group membership will be recognized by the Linux system. The SSSD in this architecture replaces the winbind component that was used with Red Hat Enterprise Linux 6. Note that Samba enables file sharing between Windows and Linux environments, providing a Linux-based file sharing server for Windows and Linux clients. Since the integration of SSSD with the CIFS client is currently limited, consider using the Samba windbind component to share file services.

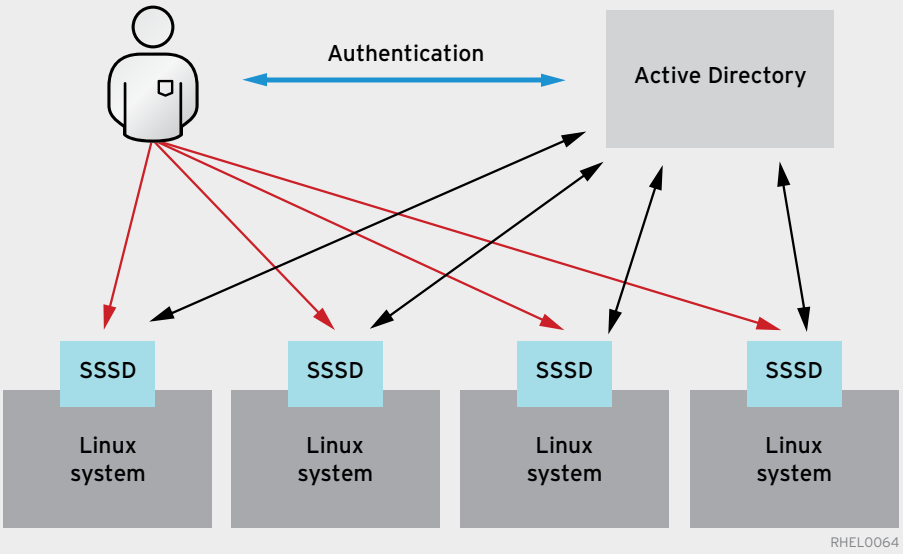

Figure 4: Direct integration with Windows Active Directory

- **Indirect integration** – With indirect integration, the Linux systems are connected to a central server that relies on cross-realm Kerberos trust technology to interact with Active Directory on behalf of the Linux clients. Direct integration is limited to using only the authentication and identity information related to users – systems do not receive policies and data, which limits their identity and access control potential in the enterprise environment. However, through indirect integration, Linux systems can get policies like SUDO, host-based access control rules, automount, netgroups, SELinux user mappings, and other capabilities from a central identity management server. The Red Hat Enterprise Linux identity management server provides centralized management of Linux systems giving them identity, credentials, and providing centrally managed policies for the Linux features listed above. In most environments, users that are stored and authenticated by Active Directory need to have access to Linux resources. That can be accomplished by establishing a trust relationship between the identity management server and Active Directory. Figure 5 shows how users from an Active Directory forest gain access to the Linux systems joined into the IdM domain. For information on how to establish trust between the Active Directory and IdM, see the Red Hat Identity Management Guide.

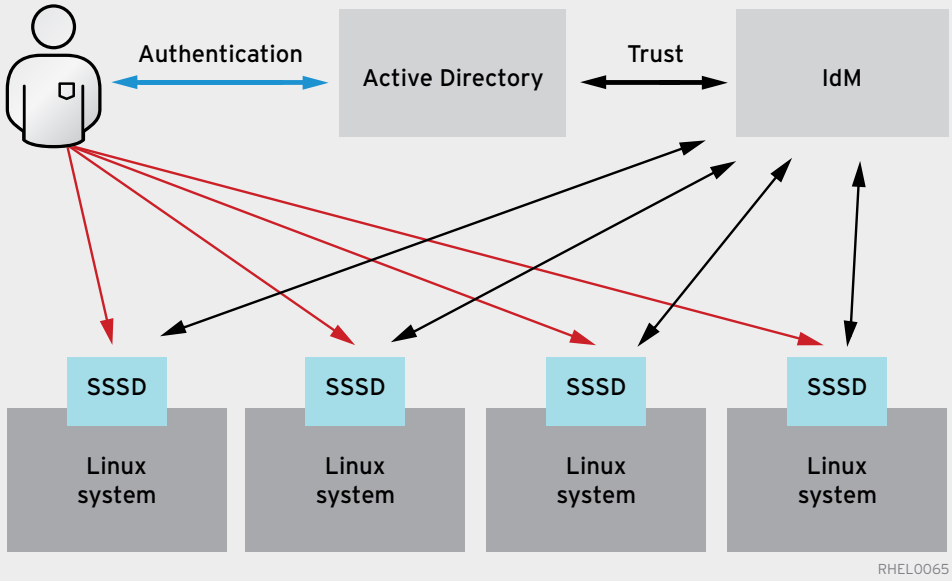

Figure 5: Indirect integration with Windows Active Directory

INTEGRAL VIRTUALIZATION

In addition to providing a highly scalable and reliable physical server operating environment, the Red Hat Enterprise Linux platform also includes rich integral virtualization capabilities. Based on Kernel-based Virtual Machine (KVM) technology, Red Hat's virtualization functions are integrated into Red Hat Enterprise Linux, and use the latest hardware virtualization capabilities found in Intel and AMD processors. Organizations can contain equipment and operating expenditures, and improve service agility by deploying both Red Hat Enterprise Linux and Microsoft Windows systems as fully supported guests in a Red Hat Enterprise Virtualization environment.

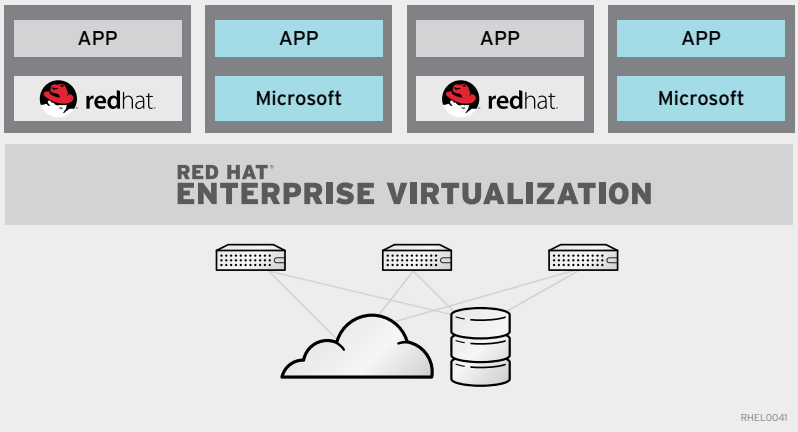

Figure 6: Virtualized environment with Windows and Red Hat guests

ENABLING UNIFIED BACKUP, DATA RECOVERY, AND MIGRATION IN MIXED OPERATING ENVIRONMENTS

Red Hat partners offer unified backup and disaster recovery solutions for heterogeneous IT environments.

Backup, data recovery, and disaster recovery all depend on a resilient, back-end storage platform. In addition, Windows and Linux servers often share storage resources. For these reasons, administrators should consider solutions that overlay both environments and use common storage.

Several Red Hat independent software vendor (ISV) partners, such as Acronis and Symantec, offer unified backup and disaster recovery solutions for heterogeneous IT environments that provide backup and recovery of files, applications, and entire physical or virtual servers, for both Windows and Red Hat Enterprise Linux environments—in a single solution, with a centralized management console. Administrators can create image-based backups, or snapshots, of an entire system, including operating system (boot image), applications, configuration, and data; and can recover the image (or a subset) to the same hardware or dissimilar hardware. A unified backup solution can recover a heterogeneous system as efficiently as one built on a single operating system. Features of a superior solution include:

- Fast and easy image backup: Take a disk image backup, or snapshot, of entire server.
- File backup: Back up and recover individual files and folders, including files on network shares.
- Bare-metal recovery: An image backup can be easily recovered to a bare-metal machine.
- Granular file recovery: Search and recover individual files from disk image backup.
- Data optimization: Exclude unused blocks and files; provide compression and block-level deduplication.
- Superior virtualization support: Supports all major hypervisors; allows physical-to-virtual, virtual-to-virtual, and virtual-to-physical migrations.
- Supports all major file systems.
- Offers centralized management for Windows and Red Hat Enterprise Linux environments.

WHY OPEN SOURCE?

Red Hat believes the open source model results in higher-quality, more secure, more easily integrated software at a vastly accelerated pace, and often at a lower cost. It's at the heart of software innovation thanks to development driven by a wide range of contributors from commercial IT vendors, including original equipment manufacturers (OEMs) and independent software vendors (ISVs), to customers, academia, and government.

The open source model :

- Contributors who collaborate to define, design, and implement software that meets their needs
- Lower costs because development is amortized across contributors
- Open standards, which reduce vendor lock-in, product incompatibilities, and forced upgrades
- Licenses that give free access to the source code

As the world's leading supplier of open source software, Red Hat is the largest contributor to many open source projects—including the Linux kernel—and works to promote and support open standards across the industry.

ACHIEVING DATACENTER EFFICIENCY: CONSIDERATIONS AND BEST PRACTICES

Standards-based Red Hat Enterprise Linux meets the most stringent performance and reliability demands at significantly lower cost than a proprietary operating system.

Forward-looking Windows customers are turning to Red Hat Enterprise Linux for initiatives aimed at establishing datacenter efficiency. Standards-based Red Hat Enterprise Linux meets the most stringent performance and reliability demands at significantly lower cost than a proprietary operating system like Windows. And since Red Hat Enterprise Linux readily integrates with existing Microsoft infrastructure and established operational practices, it can be introduced with minimal impact to the IT organization and help drive greater operational efficiency.

There are many reasons to choose Red Hat Enterprise Linux for datacenter modernization initiatives, including:

- Greater reliability, stability, security, and performance
- Cost savings
- Flexibility and customization
- Other advantages of open source software

When formulating a datacenter modernization strategy, be sure to evaluate and specify:

- A phased implementation plan based on a prioritized list of target applications
- A plan for identifying and integrating shared services
- Ways to extend existing management systems and practices
- Systems and procedures for enabling high availability, disaster recovery, and business continuity

When planning and executing the strategy, be sure to consider:

- Organizational issues – such as staffing and expertise
- Resource planning and procurement – system, storage, and networking requirements
- Support – updating methods and procedures; identifying and filling process gaps
- Training – educating users, administrators, and help desk and support personnel
- System deployment and integration
- Application migration
- Evaluation and testing – defining and verifying success criteria

"Because Red Hat Enterprise Virtualization is based on open source, we can also expect it to progress rapidly in the user community, which is a good thing. And even though we're using this technology in a mixed Windows-and-Linux environment, it has been a very smooth deployment."

KAZUYASU YAMAZAKI
GROUP MANAGER OF
IT INFRASTRUCTURE,
CASIO INFORMATION SERVICE

RED HAT SUPPORT AND CONSULTING SERVICES

Red Hat offers world-class technical support and consulting services to help you design, deploy, and support your Red Hat Enterprise Linux IT infrastructure.

Red Hat Global Support Services is your connection to the knowledge of leading engineers in the industry for the Red Hat solutions your business depends on. Our first priority is getting you the information you need—whether it's issue resolution or just advice. We are a partner who will provide recommended practices and resources, and collaborate with your IT teams to answer any question. At Red Hat, support is more than just break-fix solutions.

For more information visit www.redhat.com/support.

Red Hat Consulting can help you craft a datacenter strategy and implement a Windows and Red Hat Enterprise Linux hybrid integration. Our seasoned consulting professionals have helped leading enterprises all over the world like Casio transform IT infrastructure and optimize business processes. With unparalleled expertise in open source technology and industry best practices, Red Hat Consulting offers an array of professional services to help you solve strategic technology challenges, maximize product performance and infrastructure efficiency, and deliver greater value to your business.

Red Hat Consulting can help you:

- Make smart architectural decisions
- Reduce risk
- Accelerate project completion and time to value
- Integrate open and closed source software components
- Reduce internal support requirements and overhead
- Maximize product performance
- Institute best practices

For more information visit www.redhat.com/consulting

NEXT STEPS

For an overview of how Red Hat Enterprise Linux helps organizations operate a heterogeneous environment, see the Dual Platform Strategies for the Modern Datacenter technology overview.

To learn how Red Hat can help you take advantage of standards-based services and open source economics for new business workloads, while also protecting and extending your Windows infrastructure, visit www.redhat.com/contact/sales to contact a Red Hat sales representative.

FOR MORE INFORMATION

Red Hat reference architecture library

Red Hat Enterprise Linux reference architectures provide instructions for implementing best practices for provisioning, management, configuration, and performance tuning for various solutions. redhat.com/rhel/resource_center/reference_architecture.html

Red Hat Training

Red Hat offers a variety of learning styles, delivery methods, certifications, savings programs, and customized solutions to maximize return on your Red Hat Enterprise Linux investment.

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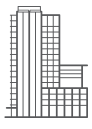

ABOUT RED HAT

Red Hat is the world's leading provider of open source solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux, and middleware technologies. Red Hat also offers award-winning support, training, and consulting services. Red Hat is an S&P company with more than 70 offices spanning the globe, empowering its customers' businesses.

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NORTH AMERICA
1-888-REDHAT1

EUROPE, MIDDLE EAST AND AFRICA
00800 7334 2835
europe@redhat.com

ASIA PACIFIC
+65 6490 4200
apac@redhat.com

LATIN AMERICA
+54 11 4329 7300
latammktg@redhat.com

redhat.com
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