



LINUX AUTOMATION

USING RED HAT ENTERPRISE LINUX TO EXTRACT MAXIMUM VALUE FROM IT INFRASTRUCTURE



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SUMMARY STATEMENT

With Red Hat, information technology (IT) managers can build out an architecture that enables their businesses to scale IT capacity and fuel business growth while reducing IT costs. Red Hat is unique in its ability to enable IT managers to drive out both capital and operating costs, while simultaneously improving service levels and flexibility.

This approach to architecture from Red Hat significantly reduces the cost of owning applications, bridges the silos of IT capacity, and makes infrastructure more efficient, cost-effective, and reliable.

These aren't marginal improvements. They dramatically improve the bottom line and, at the same time, enable IT to consistently deliver better service.

Red Hat uses open standards and open source software to provide customers greater compatibility with existing infrastructure, more flexibility, better software quality, and greater leverage over other IT vendors. All of this ensures the best economics and technology access in the short, medium and long term.

Red Hat calls this architecture Linux Automation.

RED HAT'S LINUX AUTOMATION ARCHITECTURE ENABLES CUSTOMERS TO:

- Create a more flexible and efficient IT infrastructure
- Reduce IT operating and capital costs
- Improve IT service levels

Linux Automation reduces the cost of owning applications and makes IT infrastructure more efficient and flexible. It is ideal for organizations of any size because

- It is easy to deploy and maintain. With more than 1,500 certified hardware servers, 3,000 certified applications, and tens of thousands of certified administrators everything you need is readily available.
- It extends the performance, value, and reliability of any Red Hat® Enterprise Linux® application. And, of course, Red Hat Enterprise Linux is the platform of choice for application development. Most of today's technologies are created on Linux first.
- It requires no large upfront investments. Red Hat Enterprise Linux and the applications required to implement Linux Automation run on existing hardware and are supported by yearly maintenance subscriptions.
- Red Hat Enterprise Linux has a proven track record for security, so much so, it is the base for the Department of Defense's trusted computing.
- Red Hat is the leader in open source software, with the industry's best track record of delivering the highest degree of compatibility, interoperability, and software quality.



BACKGROUND

Today, businesses and governments face the key challenge of scaling their infrastructures and IT departments to meet demands while IT budgets are falling or flattening. They must deliver new applications and services quickly, improve service levels, and be responsive to business needs. In other words, they must do more for less, now and in the future.

Red Hat's open source solutions uniquely enable CIOs and IT managers to improve the flexibility and responsiveness of IT, while at the same time reducing both capital and operating expenses.

Linux Automation is Red Hat's framework for achieving these goals. Using Linux Automation, customers can reduce the cost of owning applications and make their IT capacity more efficient and flexible. Because it is an open platform, it works with the infrastructure a customer already has. And every Red Hat Enterprise Linux customer already has the core components needed to realize these advantages.

CREATING A MORE EFFICIENT INFRASTRUCTURE: ANY APPLICATION. ANYWHERE. ANYTIME.

Today, capacity in a typical enterprise IT infrastructure is very fragmented. There are physical servers and virtual servers. Many companies are now taking advantage of distributed computing "clouds," where capacity is available for purchase on-demand. Capacity is further fragmented into Red Hat Enterprise Linux servers, Microsoft® Windows® servers, VMWare® servers, and Unix servers (among others). This fragmentation results in systemic inefficiencies. Servers are under-utilized. Capacity to run applications is not evenly distributed. Management and administration resources are duplicated making management and provisioning a real headache. Money is wasted and service delivery goals go unmet.

Linux Automation bridges these silos of capacity, making all capacity available for any application. It allows applications to be deployed on any server type – physical, virtual, or cloud – regardless of the underlying OS – Red Hat Enterprise Linux, Microsoft Windows, VMWare, or Sun Solaris™. And as the silos are bridged, one set of tools manages this more flexible capacity as one unified pool.

Linux Automation allows customers to build on-demand distributed computing clouds, creating a flexible inventory of servers that yield redundancy, balanced performance, and additional capacity during peak times – all at a lower cost than before.

New hardware can be utilized immediately, with no need to update and re-qualify each application in the stack. So while application deployments may be in mid-life, the underpinnings can be as recent and up to date as desired with no negative impact on the running applications.



MAKING APPLICATION OWNERSHIP MORE COST-EFFECTIVE

Linux Automation dramatically reduces the cost of owning applications and increases the flexibility and responsiveness of IT.

In a traditional IT infrastructure, applications are expensive to own. Consider the life-cycle. An application must be procured, along with an operating system to run it on. Both the application and OS must be installed, configured, tuned, and tested. Then the application must be qualified, deployed, and managed. Each stage of implementation incurs significant costs, direct and indirect. This is an expensive process—one which must be repeated every time a new model of server is deployed or a change to the application, operating system, or middleware is made.

Linux Automation eliminates the need to go through this cycle time and time again by enabling every Red Hat Enterprise Linux-certified application to be run as a software appliance. For the first time, developers, independent software vendors (ISVs), and users can realize the advantages of software appliances without increasing the complexity or cost of their development and testing effort. A software appliance is created by combining an application with an operating system into a virtual machine image which can be executed anywhere.

Software appliances significantly improve the economics and simplicity of application ownership:

- **Rapid deployment.** With complete tool sets and developer programs, applications can be designed, implemented, tuned, and maintained very quickly.
- **Improved service levels.** Software appliances make IT more responsive to changes in demand. They encapsulate an application and an operating system into a virtual image which can be deployed and executed in seconds. New application capacity can be brought online in seconds.
- **Reduced administration cost.** Applications can be configured once into an appliance container and can be deployed on any server. It does not have to be reinstalled, reconfigured, or retested when deployed on new hardware, nor when the underlying host operating system is revised.
- **Better service levels at lower cost.** Red Hat Enterprise Linux appliances can be run on virtually any IT capacity available—Red Hat Enterprise Linux servers, VMWare servers, Windows servers, or Solaris servers. This can significantly increase server utilization, reduce the amount of hardware necessary to meet service level objectives, and reduce the management and administration burden of infrastructure.
- **Reduced testing and support cost.** With appliances, application software is installed in a standardized virtual environment. By contrast, traditional application deployment is on servers which vary from system to system, increasing testing and support costs. Software appliances solve a wide range of problems. Consider the effect of parameters which vary from system to system, causing unexpected side effects which can take hours to identify and fix. Or the added expense of writing, testing, and supporting each application to run on different platforms.

With Linux Automation, an application needs to be written only once—for Red Hat Enterprise Linux. After that, it can run anywhere.



PERFORMANCE AND COMPATIBILITY

Linux Automation extends the reach of Red Hat Enterprise Linux applications, so that any certified application runs on all deployment models – physical servers, virtual servers, and cloud servers – identically and without any change to the application.

Included in Red Hat Enterprise Linux is virtualization functionality that has been married to the Red Hat Linux kernel. This virtualization layer provides all the functions needed to create and manage virtual machines, so it is able to power Windows, Solaris, Red Hat Enterprise Linux or any other x86 or x86_64 operating system. Red Hat already offers virtualization support for Windows and will support it on Solaris in the near future.

The key benefit of virtualization is the broad range of hardware and software compatibility. Every Red Hat Enterprise Linux-certified server and software application works with or without virtualization. And because all of the Linux knowledge your IT team has acquired apply, no additional training is needed to run this new combination. And the economics are compelling. Unlike competitors who require additional payment or charge a premium to use virtualization, this technology is included at no extra charge with Red Hat Enterprise Linux.

Some examples of the Linux Automation advantage

- **Need to test scalability?** Fire up a few hundred or a few thousand servers on the cloud and see how your workloads respond. If they do not scale, Red Hat development tools like Frysk and SystemTap will dynamically find problem areas.
- **Need to tune an application environment quickly?** Use Red Hat Network(RHN) Satellite to select the group of machines running that software, and with one mouse click push the parameter change out to all of them. Or maybe a code change is required. Again, you can use Red Hat Network to make the change, test it on a few machines – whether they are virtual, real or cloud – and push updates out to the appropriate systems.
- **Need to upgrade to the latest servers to reclaim some floor-space and reduce electrical and cooling costs?** After testing the new servers, use RHN to provision them with your standard image, migrate workloads, and even decommission the older servers. Move workloads from system to system in real time with Live Migration.
- **Need applications to be highly available?** Linux Automation uses Red Hat Cluster Suite, included with Red Hat Enterprise Linux 5, that detects idle servers and moves applications as needed to maintain service levels.
- **Need to use new hardware which isn't supported by your legacy environment?** Red Hat virtualization provides abstraction that allows the older software to see the new device as a standard disk without any changes to the application or its operating system.



DISTRIBUTED COMPUTING

Red Hat Enterprise MRG (Messaging, Realtime, Grid) is a platform that brings the values of Linux Automation—flexibility, efficiency, value, and performance—to distributed computing. With Red Hat Enterprise MRG, you can not only run your applications flexibly across a variety of environments, you can scale them for any size workload, with the performance and reliability crucial to your distributed computing needs.

With Red Hat Enterprise MRG, you can

- Fully utilize all computing resources available, from dedicated grids in your data center, to remote servers in other physical locations, to desktop workstations via cycle stealing, to dynamically provisioned grids in the cloud.
- Schedule not just applications but any workload, from sub-second to long-running, from single-threaded to massively parallel, from Windows jobs to Linux jobs, from virtualized environments to native environments, across all your computing resources from desktops to the cloud in a highly efficient manner.
- Distribute data via MRG's AMQP-compliant messaging bus with performance up to two orders of magnitude better than previously available.
- Provide deterministic performance, especially for messaging and networking workloads in distributed environments, and meet stringent SLAs via MRG's realtime kernel.
- Submit, manage, and monitor various distributed workloads with a single, unified interface.
- Simplify your software architecture and deployment stacks by leveraging one integrated platform rather than deploying numerous, specialized, incompatible point products to cover the spectrum of distributed computing.

Linux Automation's significant benefits at the application level compound greatly when deployed using a grid scale. Red Hat Enterprise MRG brings the benefits of Linux Automation to all your workloads across all your computing resources, both native and virtual.

CONCLUSION

Building an efficient, flexible IT infrastructure is the key to containing both capital and operational costs while boosting business growth, capacity, and performance. Red Hat Enterprise Linux allows IT managers to certify applications once and deploy them anywhere, bridge silos of IT capacity, and build an efficient dynamic architecture that can scale as needed. Linux Automation, Red Hat's holistic approach to IT architecture, leverages all of the technical and economic advantages of open standards and open source for enterprise customers.



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Toll free numbers:

Europe, Middle East and Africa (EMEA): 00800 7334 2835

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Israel: 1809 449 548

UAE: 80004449549

Email: europa@redhat.com