

# Red Hat Virtualization Increases Efficiency And Cost Effectiveness Of Virtualization

Technology organizations are rapidly seeking ways to automate operations and dedicate more talent to business-enabling and future-thinking projects. Red Hat Virtualization is a virtualization solution that includes a Kernel-based Virtual Machine (KVM) hypervisor and a web-based virtualization resource manager (Red Hat Virtualization Manager). The platform suits organizations starting new virtualization initiatives and those that are migrating from proprietary virtualization technologies. In addition to infrastructure virtualization, Red Hat Virtualization sets the foundation for organizations that are considering deploying future technologies like containers and cloud-enabled workloads.

To better understand the benefits, costs, and risks associated with Red Hat Virtualization, Forrester Consulting conducted a Total Economic Impact™ (TEI) study, based on an interview with a large European transportation manufacturer that has used Red Hat Virtualization for over six months. This summary of the business impact enterprises may realize by deploying Red Hat Virtualization is based on a full TEI study (Forrester Total Economic Impact of Red Hat Virtualization, November 2016), which can be obtained from Red Hat.

Based on the TEI analysis, the interviewed customer has experienced a ROI of 103%, net present value (NPV) of \$447,665, and a payback period of 5.6 months. Readers can use this organization's case to understand the economic impact of choosing Red Hat Virtualization and apply or adapt the model to their own situation and experience.

## QUANTIFIED BENEFITS OF RED HAT VIRTUALIZATION

Based on the customer interview, benefits of Red Hat Virtualization include:

- › **Faster resource provisioning and deployment.** This benefit focuses on reduction in time and effort to set up a virtual machine (VM). The customer highlighted that achievements in automating workflows reduced the five-day process, which included 1 hour of work, to 20 minutes with minimal to no lead time. The customer estimates that 10% to 20% of an infrastructure developer's time is saved each year by increased virtualization task and process efficiency.
- › **Higher virtualization performance.** This benefit centers on the ability to get more virtualized performance out of physical hosts. The customer mentioned a higher ratio of overcommit with Red Hat Virtualization over the legacy solution. The ratio of cores to VM was 1 to 1 with the legacy solution and 1 to 1.75 with Red Hat Virtualization. The customer also found that Red Hat Virtualization scaled better and had fewer issues when virtualizing above a certain threshold of cores.

## Financial Summary Of Three-Year Risk-Adjusted Results

  
**ROI**  
**103%**

  
**NPV**  
**\$447,665**

  
**Payback Period**  
**5.6 months**

## SUMMARY

Results from the Red Hat-commissioned study, "The Total Economic Impact Of Red Hat Virtualization, November 2016."

## METHODOLOGY

Red Hat commissioned Forrester to conduct a Total Economic Impact (TEI) study to provide IT and business leaders an understanding of the potential return on investment (ROI) they may realize by deploying Red Hat Virtualization to their enterprises.

Forrester developed a TEI analysis based on an in-depth interview with a Red Hat Virtualization customer that has been using the platform for more than six months.

## INTERVIEWED CUSTOMER

The interviewed customer is a large European transportation manufacturer that has 6,000 staff in IT services, with 70 in Linux infrastructure operations, 3,000 Linux servers, and 80% virtualized. Prior to Red Hat Virtualization, this customer used a single virtualization solution for all workloads. When given the flexibility to choose best-of-breed solutions for specific workloads, the customer chose Red Hat Virtualization and achieved material efficiencies in virtualization time, effort, and cost.

## TEI Analysis Based On Interview With A Large European Transportation Manufacturer

From the information provided in the interviews, Forrester constructed a TEI framework for those organizations considering implementing Red Hat Virtualization, covered in greater detail in the full study. The TEI methodology includes analysis of benefits and costs with risk-adjustment, as well as consideration of long-term, or “flexibility,” benefits that affect investment decisions, to help organizations understand how to take advantage of specific opportunities, reduce costs, and improve the overall business goals of winning, serving, and retaining customers. Specifically, Forrester:

- › Interviewed Red Hat marketing, sales, and consulting personnel along with Forrester analysts to gather data relative to the Red Hat Virtualization product and marketplace.
- › Interviewed one organization currently using Red Hat Virtualization to obtain data with respect to costs, benefits, risks, and long-term flexibility. Constructed a financial model representative of the interviews.
- › Risk-adjusted the financial model based on issues and concerns from the interviewed organization.

For this study, Forrester interviewed a large European transportation manufacturer with the following characteristics:

- › 6,000 staff in IT services, with 70 in Linux infrastructure operations, 18 on the transition team, and 17 in service design.
- › 3,000 Linux servers, with 80% virtualized, and 10% of the virtualized environment was done with Red Hat Virtualization.
- › Red Hat Virtualization is part of the organization's larger plan to implement a private cloud with Red Hat Cloud Infrastructure (RHCI).

Prior to engaging Red Hat, the customer used a single virtualization solution for all workloads and operating systems. Through a reorganization effort, application hosting teams were given the flexibility to choose best-of-breed virtualization technologies for their respective applications. This flexibility resulted in three main tracks of virtualization for Java, mainframe, and hosting for a third application framework.

The Java application hosting team decided to investigate further into a new version of KVM for Linux systems. The customer noted KVM's usability and maintainability were better than the legacy solution. As the customer needed an enterprise solution and did not intend to deploy KVM without a centralized VM tool, Red Hat Virtualization became the leading option for the customer.

The interviewed customer's prior deployment of RHEL and subsequent vision to deploy RHCI solidified its choice to centralize and adopt Red Hat Virtualization. Although Red Hat Virtualization quickly became the predominant choice for the customer, readers may also want to consider the following criteria during their technology selection process:

- › Capability to automate processes and tasks and how the time and effort compare with the legacy or alternative solution.
- › Asset efficiency, virtualization, or physical server limits, and capability to achieve the same or better performance with the same capital investment in infrastructure.
- › Alignment with the organization's long-term strategies for virtualization, private cloud, and hybrid cloud deployments.

Based on the criteria above, organizations can select a technology vendor and set up goals related to the selection criteria such as:

- › Improve staff productivity by reducing time and effort dedicated to virtualization tasks and setting up environments.
- › Increase VM density and reduce long-term infrastructure capital expenditures.
- › Create opportunities for natural synergies among solutions from the same vendor.

# Red Hat Virtualization Increases The Speed Of Virtualization Tasks And Improves Virtualization Performance

The interviewed customer experienced two primary benefits by deploying Red Hat Virtualization. The first benefit centers on simplifying and automating processes and tasks related to virtualization. This measures the hours saved and available for reallocating to more value-added tasks. The second benefit focuses on the cost effectiveness of virtualization and the virtual machine-to-core ratios.

Over three years, the interviewed customer expects risk-adjusted total benefits to be a present value (PV) of \$881,113, as shown in Table 1, based on:

- › **Faster resource provisioning and deployment.** The customer started with 70 staff on the infrastructure operations team and scaled with a growth of 10% each year. The model conservatively assumes that only 30% of staff will handle any type of manual virtualization tasks or processes. Based on the customer's estimation of 10% to 20% of time saved, the model conservatively uses a 10% efficiency gain in Year 1 and scales up to a 15% efficiency gain by Year 3.
- › **Higher virtualization performance.** The customer noted there were 3,000 Linux servers initially, and the organization would typically decommission 100 existing servers while deploying 200 new servers each month. In Year 1, 80% of the 3,000 servers were virtualized, and only 10% were virtualized with Red Hat Virtualization as the customer used it to set up test environments. The model assumes the organization scales this effectiveness and grows its Red Hat Virtualization share to 50% by Year 3. The customer highlighted that Red Hat Virtualization produced 30 VMs with a 20-core blade compared with 20 VMs with a 20-core blade using the legacy solution. This creates a difference of a 1 to 1 legacy ratio and a 1 to 1.5 ratio with Red Hat Virtualization. As Red Hat Virtualization is licensed per socket pair, the model then assumes four cores per socket and takes the difference in licensing costs between Red Hat Virtualization and the legacy solution to produce the same amount of VMs.

## Red Hat Virtualization Solution Overview

### › Red Hat Virtualization Host.

- A high-performance, open source hypervisor based on the Red Hat Enterprise Linux kernel with the KVM hypervisor technology.
- An image-based hypervisor with a minimized security footprint.

### › Red Hat Virtualization Manager.

- Centralized web-based virtualization management engine with graphical admin console and interfaces.
- Built on Red Hat Enterprise Linux and Red Hat JBoss Enterprise Application Platform for performance and scalability.
- Virtual workload life-cycle and operations management, visibility into storage, network, and management of compute and hardware.

**TABLE 1: Total Benefits (Risk-Adjusted)**

Benefit Category	Initial	Year 1	Year 2	Year 3	Total	PV
Virtualization task and process efficiency	\$0	\$199,500	\$282,542	\$384,144	\$866,186	\$731,902
Virtualization cost effectiveness	\$0	\$14,250	\$39,900	\$128,250	\$182,400	\$149,211
<b>Total benefits (risk-adjusted)</b>	<b>\$0</b>	<b>\$213,750</b>	<b>\$322,442</b>	<b>\$512,394</b>	<b>\$1,048,586</b>	<b>\$881,113</b>

Source: Forrester Research, Inc.

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## Red Hat Virtualization Costs Include Purchase, Deployment, And Management

The interviewed customer experienced the following risk-adjusted costs:

- › **Red Hat Virtualization solution cost.** The Red Hat Virtualization solution cost primarily focuses on the 3,000 VMs, 80% virtualization ratio, and growth rates. By reducing the 3,000 Linux servers to 20 socket pairs related to Red Hat Virtualization in Year 1, readers can replicate the formula to the following years for scale. Based on Red Hat's licensing model, investments related to licensing would be folded into the annual expense as opposed to being an initial capital expenditure. Readers should adjust this portion of the costs based on their scale and if any third-party or Red Hat professional services are needed.
- › **Internal labor and implementation.** The customer highlighted that deployment would take 800 to 1,500 hours depending on which components of RHCI are deployed. The model conservatively assumes 1,200 hours for initial deployment and a 10% maintenance and operations commitment thereafter.

Table 2 shows the total of all risk-adjusted costs as well as associated present values (PVs), discounted at 10%.

Cost Category	Initial	Year 1	Year 2	Year 3	Total	PV
Red Hat Virtualization solution cost	\$0	\$31,500	\$88,200	\$283,500	\$403,200	\$329,835
Internal labor and implementation	\$81,900	\$8,190	\$8,436	\$8,689	\$107,214	\$103,613
<b>Total costs (risk-adjusted)</b>	<b>\$81,900</b>	<b>\$39,690</b>	<b>\$96,636</b>	<b>\$292,189</b>	<b>\$510,414</b>	<b>\$433,448</b>

Source: Forrester Research, Inc.

## Benefit And Cost Results Are Risk Adjusted

Risk adjustment is included in the TEI analysis to allow that a proposed investment in Red Hat Virtualization may deviate from the original or expected requirements, resulting in higher costs than anticipated, or the business or technology needs of the organization may not be met by the investment in Red Hat Virtualization, resulting in lower overall total benefits. Benefit and cost results have been adjusted by a factor based on the likelihood and severity of any deviation from estimated results. Benefit and cost adjustments for this study is 5% for call categories. Readers are urged to apply their own risk ranges.

## Red Hat Virtualization Investment Today Can Help Future Opportunities

Flexibility represents an investment in additional capacity or capability that could be turned into future opportunity or business benefit for some future additional investment. Put another way, it represents the value that can be obtained for some future additional investment. This provides an organization with the ability to engage in future initiatives at a lower incremental cost, but not the obligation to do so.

The interviewed customer identified two areas that they might consider in the future:

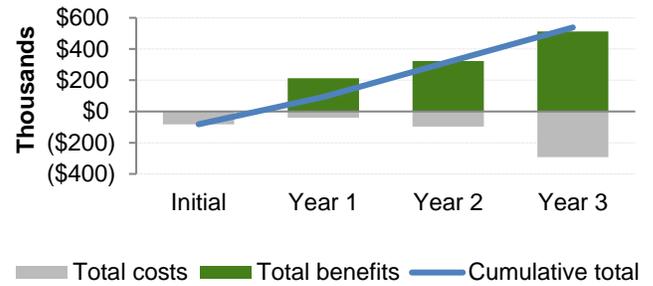
- › The customer's initial Red Hat Virtualization deployment only included setting up test environments for Java application hosting. As the customer grows the Red Hat Virtualization footprint, the organization will experience the scaled benefits of both staff productivity and long-term infrastructure cost avoidance.
- › Also, Red Hat Virtualization plays into the organization's longer-term plan to implement RHCI and achieve virtualization and private cloud goals.

## Financial Summary

The risk-adjusted financial results calculated in the Benefits and Costs sections (including expected growth in client deployment) can be used to determine the ROI, NPV, and payback period for the interviewed customer's investment in Red Hat Virtualization. Table 3 shows the risk-adjusted ROI, NPV, and payback period values.

For more information, visit the Red Hat Virtualization home page ([www.redhat.com/rhv](http://www.redhat.com/rhv)), where you can download a full, more-detailed Total Economic Impact (TEI) analysis of the benefits and costs of Red Hat Virtualization.

**TABLE 3: Cash Flow and Financial Summary**



	<b>Result</b>
Present Value of Costs	(\$433,448)
Present Value of Benefits	\$881,113
Net Present Value (NPV)	\$447,665
ROI	103%
Payback period (months)	5.6

Source: Forrester Research, Inc.

### DISCLOSURES

The reader should be aware of the following:

- › The study is commissioned by Red Hat and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.
- › Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Red Hat Virtualization.
- › Red Hat reviewed and provided feedback to Forrester. Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning.
- › Red Hat provided the customer names for the interviews but did not participate in the interviews.

### ABOUT FORRESTER CONSULTING

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### ABOUT TEI

Total Economic Impact™ (TEI) is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders. The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility. <http://www.forrester.com/marketing/product/consulting/tei.html>