Sponsored by: **Red Hat**

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Business Value Highlights

368%
three-year ROI

5 months
to payback

35%
lower three-year cost of operations

32%
lower infrastructure costs

38%
more efficient IT infrastructure teams

21%
more productive development teams

63%
less unplanned downtime

The Business Value of Red Hat Solutions and Cost Relationship to Unpaid Alternatives

IDC OPINION

Open source software (OSS) has long held the allure of being available for free use in the form of community-supported projects, in addition to being available in commercially packaged and supported versions that are targeted at business users. That allure of free software has carried with it the belief that by avoiding subscription fees, customers can save money in the long term. Numerous IDC Business Value research studies have found that higher operational costs associated with self-supporting community-based infrastructure software far outstrips the cost of commercial subscription support, when that software is used in a mission-important or mission-critical capacity. The opex associated with maintenance of unsupported infrastructure software begins with the need to maintain expertise on staff to stay close to the project's community; then to vet, qualify and apply upstream fixes and patches to live systems, along with upgrade activities from time to time to stay in synch with the fast-moving upstream code base. That fast churn leads to substantial testing and validation costs for existing applications along with verification of backward compatibility. Those opex costs can quickly meet, and in most cases, exceed the costs associated with a commercial distribution based on that same community project.

This IDC Study takes a look at such a comparison of several Red Hat products including Red Hat Enterprise Linux (including Red Hat Satellite and Red Hat Insights); Red Hat OpenStack, Red Hat OpenShift, and Red Hat Ansible, with community-based alternatives. The cost of deploying, managing and life-cycling these products, both individually and collectively, was considered in comparison to community-based alternatives. In addition, the impact of user productivity — the impact of time to deploy, cost of outages, and related metrics — was considered for these two sets of technologies.

To develop this comparative analysis, IDC interviewed organizations that have deployed subscription-based Red Hat solutions instead of using alternative unpaid community-supported software. The experiences of these study participants demonstrate that the value of subscribing to and using commercially supported Red Hat software substantially outweighs the subscription costs, especially as organizations deploy and use more Red Hat solutions collectively.

Study participants reported not only enabling their development and business operations but reducing the cost of running workloads in their Red Hat environments despite subscription costs. Overall, IDC calculates that interviewed Red Hat customers will realize additional value worth an annual average of $17,195 per 100 users compared with using unpaid community-supported alternatives and achieve an average three-year ROI of 368% in their investment by:

- **Lowering IT infrastructure costs** by raising server virtualization levels, increasing usage of server capacity, and reducing training and support costs due to leverage of support services available with Red Hat solutions and avoiding the need for do it yourself code patching that is often required when using community supported alternatives

- **Making IT teams more efficient** by providing them with higher functionality including automated patching and updates, as well as high-quality support from Red Hat

- **Delivering more agile and reliable IT operations** by leveraging higher-performing Red Hat solutions and taking advantage of Red Hat provisioning and development functionalities, and avoiding downtime incidents impacting end users

- **Improving business results** by enabling IT organizations to better support ongoing business initiatives, which results in higher revenue.

All told, IDC's research highlights the additional costs to IT operations and businesses that organizations can avoid by reducing IT friction and ensuring higher IT performance through investment in paid Red Hat solutions across their infrastructure stacks.

SITUATION OVERVIEW

Over the past 20 years, open source software has transitioned from an enterprise hopeful option in a few niche market segments, to a respected mainstream solution across the vast majority of the infrastructure software, application development, and application deployment market categories. These categories include mainstream solutions like operating systems, virtualization software, systems management, development tools, and DevOps-enabling lifecycle, deployment, configuration and operational management products, middleware,

database software — and the list continues for dozens of additional types of software. Today, there are few markets where there is not at least one open source solution available, and oftentimes, there are multiple open source technologies offering alternatives to traditional closed-source solutions.

For the majority of these product categories, there are vendors that have taken a popular open source project/technology and provided a commercial distribution with a support subscription service of that technology. The value proposition of commercially supported OSS is multi-fold, with the following attributes offering examples of that value:

- **A partner in security.** When a problem does arrive, commercial vendors provide security fixes and patches that they have qualified, greatly reducing the due diligence that customers must make to verify that the solution not only solves the security concern, but also that the fix itself won't break existing installed software. Further, if there should be a problem post-installation, the commercial vendor provides support to resolve any issues. Community supported technologies provide none of those resources. In the case of a newly-identified hardware or firmware risk, commercial OSS vendors often are notified about problems prior to the general public, allowing them to have a solution in place prior to any public disclosure. Most individual enterprises are not able to get that close to the security process for a multitude of OSS technologies.

- **Hardened, commercially ready software.** A commercial vendor provides a highly valued service of "hardening" community software products. That work may include hardening of new features in a community project, and may exclude features that are unstable, or are still in heavy development, or otherwise not yet ready for mainstream consumption. In addition, commercial providers may make security or other reliability enhancements to the community code base. There may also be work done to offer better integration with other OSS and closed source technologies. While those improvements are generally returned to the upstream community, the commercial product may see the first implementation of those attributes.

- **Improved lifecycle attributes.** With a supported commercial solution, customers are not forced to track the frequent revisions to the upstream code that the community supports. Return on investment cannot be realized in weeks or months, but rather depends on the ability of customers to be able to install a stable solution that can then be utilized for a longer period.

- **A more consumable upgrade path.** Because most customers are unable to embrace OSS software that is revised daily, weekly, or monthly, they must selectively upgrade on a cadence that works for their business, and offers a suitable level of backward compatibility

from version to version. If using community OSS solutions, that may make for a disruptive upgrade, especially if multiple interim releases were skipped. A commercially-supported OSS solution will offer version-to-version upgrades that maintain compatibility for customer investments, made possible by the porting of older features, APIs or other points of dependence, forward from older builds to the new version. Customers typically get the option to retain their products for long periods of time — often up to 10 years –— so they can deploy a solution, and once it is fully qualified, stabilize that solution for long term benefit (lowering ongoing opex investments).

• **Predictable costs.** Customers can easily predict their licensing costs based on the number of servers, installations or other use metrics. These costs are not dependent upon internal employees who have deep expertise in a community OSS technology — people who could change jobs and leave an organization with a technology it must then hire new talent to deeply support.

RED HAT SUBSCRIPTION-BASED SOLUTIONS

The products included in this IDC Business Value study include:

• Red Hat Enterprise Linux, used in conjunction with Red Hat Satellite and Red Hat Insights

• Red Hat OpenStack

• Red Hat OpenShift

• Red Hat Ansible Tower

Red Hat Enterprise Linux (RHEL) and Red Hat Satellite

Red Hat has expanded its portfolio well beyond the operating system (OS) layer, however Red Hat Enterprise Linux (RHEL) remains its flagship product and leading revenue producer, providing a proven foundation for deploying traditional and next-generation applications across different deployments and delivery methods. Red Hat has the largest Linux operating system market share from a revenue standpoint. For the first half of 2018, IDC estimates Red Hat accounted for 78% of Linux operating systems and subsystems functional market revenue.

From a unit shipment standpoint, IDC data shows Red Hat accounted for 65.5% of commercial Linux shipments during 2017.

Red Hat Satellite is an infrastructure configuration management platform designed specifically to maintain the health and security of RHEL and related Red Hat and third infrastructure products that are distributed as RPMs. Satellite is based on several open source projects including Foreman, Katello, Pulp and Candlepin. Satellite is packaged as an on-premise management platform and architected for large-scale operation across distributed environments.

This product enables RHEL users to define and maintain standard operating environments across their RHEL environment. Users can pre-define configuration states and policies and then automatically ensure that systems are maintained as desired. When important security patches are available, Satellite can automatically apply them to all impacted systems. New systems can be quickly provisioned and patched using pre-defined profiles.

Red Hat Insights, previously offered as a standalone RHEL configuration analytics SaaS service, is being included as part of the Red Enterprise Linux subscription upon release of RHEL 8 for use by RHEL 6, 7, and 8 users alike with their existing subscriptions. Insights helps customers to proactively identify systems that are at risk of critical security vulnerabilities, performance or stability issues due to oversights or misconfigurations. Insights can proactively recommend configuration remediations and generate Ansible playbooks to automate many recommended actions.

Collectively Satellite and Insights enable RHEL customers to proactively maintain state, configuration, compliance and security of systems across traditional on-prem, private cloud, and public cloud footprints.

Red Hat OpenStack

OpenStack is an open source project that develops software to build infrastructure clouds. It can deploy and manage software defined compute, storage, and networking with an open driver model that allows broad compatibility. For the user and operator, OpenStack provides a modern cloud interface, offering API driven infrastructure automation and orchestration.

Red Hat OpenStack Platform is a commercial, production-ready distribution of OpenStack. It is a hardened and tested distribution that is built with the same principles that made Red Hat a success in commercial enterprise open source with Linux:

- Red Hat provides an ecosystem of hardware, software, and services partners to help customers build and deploy robust OpenStack-based clouds

- Red Hat backs Red Hat OpenStack Platform with enterprise-level support and training/certification materials

- Red Hat provides a long support lifecycle for certain releases of OpenStack, currently three years of production with two years of optional extended support for a total of five years

- Red Hat is a leader in the OpenStack community and has consistently been a top code contributor to the project since it joined.

Red Hat OpenStack Platform also includes the Red Hat Virtualization KVM hypervisor and the Red Hat Enterprise Linux operating system. KVM serves as the hypervisor for OpenStack virtualized compute nodes, and Linux as a host server OS for OpenStack services and a guest VM OS for users.

Beyond the core OpenStack modules, Red Hat OpenStack Platform focuses on management tools to improve the deployment and operations experience. Red Hat provides the Red Hat OpenStack Platform Director for managing the OpenStack lifecycle. It also containerizes OpenStack services, simplifying lifecycle operations such as upgrades. Red Hat OpenStack Platform also includes CloudForms which adds resource monitoring and reporting, compliance assurance, chargeback and showback, service cataloging, user management, and heat template management.

Red Hat OpenShift Container Platform

Red Hat OpenShift Container Platform is a comprehensive, enterprise ready container solution built around Docker containers and Kubernetes orchestration. It includes both infrastructure and operations tools as well as tools to enable a full developer software build experience. Red Hat OpenShift is built on the foundation of Red Hat Enterprise Linux and extends Kubernetes infrastructure in several ways:

- Advanced networking with multi-tenant SDN and a service mesh (based on Istio)

- Advanced management such as monitoring (Prometheus), logging, chargeback, and tracing

- Access to prebuilt container images (Red Hat Container Catalog), Operators (templates that codify operational knowledge and workflows to automate management of Kubernetes applications) and cloud service brokers.

OpenShift supports both stateless and stateful workloads for compatibility with both legacy and cloud native applications. Deployment and operation of OpenShift is enhanced by Red

Hat's full stack automated install and over the air updates. OpenShift also includes all the OS entitlements for the control plane and the worker nodes, with a choice of traditional Red Hat Enterprise Linux or the minimal footprint, container-focused Red Hat Core OS.

For developers, OpenShift also offers a full developer experience that includes automated container builds and CI/CD pipelines. OpenShift also supports Knative for building serverless and functions-as-a-service applications and CodeReady Workspaces, a browser-based IDE based on Eclipse Che. OpenShift is fully pluggable and works with a wide range of technologies.

OpenShift can be deployed on nearly any infrastructure. For on-premise deployments, OpenShift can be deployed on bare metal, virtualized servers, or private clouds such as OpenStack. OpenShift can also be deployed on any public cloud that supports Red Hat Enterprise Linux. OpenShift is also available in hosted deployment models with OpenShift Online, operated and supported by Red Hat, and OpenShift Dedicated, a managed, single tenant version.

Red Hat Ansible Tower

Red Hat Ansible Tower is the enterprise scheduling, analytics and access control platform used to optimize Ansible automation playbooks and roles. Based on technology available in the AWX open source community, Tower has the option to be deployed as a clusterable container service to take advantage of Kubernetes autoscaling.

Tower supports large-scale and cross-domain Ansible environments by providing:

- An open REST API that enables integration with source control systems to maintain ansible modules, tasks, playbooks and roles and to enable developers and third-party platforms, including container application platforms such as OpenShift, to integrate with Ansible workflows using API calls

- A visual dashboard for creating and managing complex, multi-playbook automation templates, tracking automation status, generating compliance and usage reports and connecting multiple Tower clusters for large-scale environments

- Integrations with the Galaxy and Ansible.com community sites to easily assess, evaluate and share modules, tasks, roles and playbooks

- Log monitoring and integrations with third-party log analytics tools

- Centralized and auditable system credential management, security and access control.

BUSINESS VALUE OF USING SUBSCRIPTION RED HAT SOLUTIONS

Interviewed organizations had experience with both Red Hat solutions and unpaid community-supported alternatives, either through use or proof of concept testing. They concluded that, despite taking on a subscription cost, their use of Red Hat solutions would enable them to create more value through better and more efficient delivery of IT services in support of their business operations. This study considers the experiences of organizations using four Red Hat solutions compared with the unpaid community-supported alternatives.

Interviewed Red Hat customers spoke of their experiences with unpaid community-supported alternatives and how they relate to their decisions to invest in Red Hat solutions. A healthcare organization using Red Hat Ansible Tower commented: *"We used [the unpaid alternative] for about three years. We chose to move to Red Hat Ansible for several reasons: role-based access and dashboard automation."* A higher education organization using Red Hat OpenStack noted that it could not ensure the functionality it needed with the unpaid alternative: *"The unpaid alternative really wasn't beneficial to us, because it didn't give us the features that Red Hat OpenStack does. . . For us, the benefit of Red Hat is lower cost of security and faster application deployment."*

Firmographics of Study Participants

In total, IDC interviewed 12 organizations using Red Hat Enterprise Linux, Red Hat OpenStack, Red Hat OpenShift, and Red Hat Ansible Tower about their experiences with the Red Hat solutions compared with unpaid community-supported alternatives. The typical profile of interviewed organizations was that of a large enterprise (32,400 employees, $13.27 billion in annual revenue). Study participants were all based in the United States but represented diverse experiences by industry vertical including: Automotive, Communications, Financial Services, Government, Healthcare (3), Higher Education (2), Hospitality, Real Estate, Utilities.

TABLE 1 Demographics of Interviewed Organizations

	Average	Median	Range
Number of employees	32,400	17,650	4,000 to 175,000
Number of IT staff	1,862	470	20 to 12,500
Number of developers	903	165	3 to 7,500
Number of business applications	767	135	15 to 5,000
Revenue per year	$13.27B	$2.25B	$30M to $130B
Industries	Automotive, Communications, Financial Services, Government, Healthcare (3), Higher Education (2), Hospitality, Real Estate, Utilities		

n=12   Source: IDC, 2019

Use of Red Hat Solutions by Study Participants

IDC interviewed a mix of Red Hat customers by solution to gather information about using Red Hat Enterprise Linux, Red Hat OpenStack, Red Hat OpenShift, and Red Hat Ansible compared with unpaid community-supported alternatives. Interviews focused on the impact on IT and business operations of using of one or two Red Hat solutions. Table 2 provides additional firmographic details about the organizations interviewed based on Red Hat solution use, reinforcing the significant size and scale of these organizations' IT and business operations supported by Red Hat.

TABLE 2 Firmographics by Red Hat Product Use

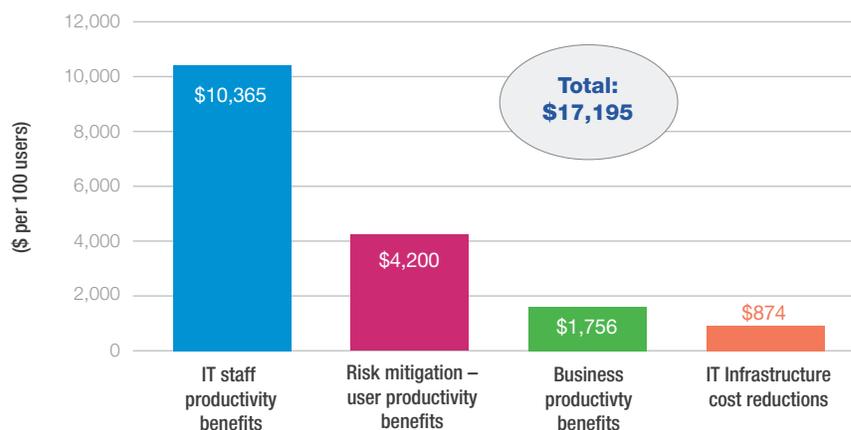|	Overall Average	Red Hat Enterprise Linux	Red Hat OpenStack	Red Hat OpenShift	Red Hat Ansible Tower
Number of interviews for study	12	4	5	4	4
Number of servers in Red Hat environment (physical and cloud-based)	138	67	206	142	127
Number of employees	32,400	25,000	40,700	22,750	22,325
Number of IT staff	1,862	366	2,737	997	1,826
Number of business applications	767	178	647	243	1,340
Revenue per year	$13.27B	$3.66B	$26.67B	$2.89B	$3.31B

n=12   Source: IDC, 2019

Quantifying the Value of Investing in Red Hat Subscription-Based Solutions

Interviewed organizations consistently described achieving value through their investment in Red Hat solutions that outweighed investment costs. Importantly, they not only reported benefiting from increased functionality with Red Hat solutions, but also from making their IT environments more cost effective and efficient. A telecommunications company using Red Hat OpenStack described these dual benefits: *"Red Hat OpenStack helps us scale up and down and meet the dynamic needs of the business, which is a very high priority for us. . . Of course, economics is also relevant because if we do cloud right with Red Hat OpenStack, then it means significant savings in capex and opex."*

Based on interviews with study participants, IDC quantified the value it projects they will realize by investing in and using paid Red Hat solutions rather than using unpaid community-supported alternatives. In total, IDC calculates that this value will be worth $17,195 per 100 users per year on average ($4.84 million per organization) in the following areas (see Figure 1):

- **IT infrastructure cost reductions.** By increasing server virtualization (due primarily to the greater confidence Red Hat customers have that servers will not fail), improving usage rates, and reducing training costs (due to Red Hat training and eliminating maintenance related to community supported component changes and releases), IDC calculates that interviewed Red Hat customers will save an average of $874 per 100 users ($0.25 million per organization) in IT costs.

- **IT staff productivity benefits.** By enabling IT infrastructure and support teams to work more efficiently, and development teams to be more effective, IDC projects that study participants will realize IT team time savings and efficiencies worth an average of $10,365 per 100 users ($2.92 million per organization).

- **Risk mitigation – user productivity benefits.** By limiting the frequency and duration of unplanned application outages, interviewed Red Hat customers will reduce the impact of outages on user productivity and business operations. IDC puts the value of higher productivity and revenue that will result at an annual average of $4,200 per 100 users ($1.18 million per organization).

- **Business productivity benefits.** By positioning their IT organizations to better support business operations, study participants will win more business and improve the productivity of employees. IDC estimates the value of higher revenue and user productivity at an average of $1,756 per 100 users per year ($0.49 million per organization).

FIGURE 1   Average Annual Benefits per 100 Users

n=12   Source: IDC, 2019

IT Infrastructure and Staff Efficiencies

Study participants reported that paying for Red Hat solutions helps them build, maintain, and operate a more cost-effective IT environment than using unpaid community-supported alternatives. Table 3 below lays out efficiencies that these organizations are achieving both overall and by Red Hat product in terms of: number of servers required, cost per server for equivalent workloads, IT infrastructure staff time required, and IT helpdesk staff time required.

TABLE 3 Impact on IT Infrastructure and IT Teams by Red Hat Product

	With Unpaid Alternatives	With Red Hat Solutions	Difference	% Efficiency with Red Hat Solutions
Overall study results				
Number of servers required per organization	203	116	85	32% fewer servers
Total three-year server infrastructure cost per server	$31,100	$21,100	$10,000	32% lower costs
IT infrastructure team time requirements, FTEs per organization	12.1	7.5	4.6	38% fewer required FTEs
IT help desk team time requirements, FTEs per organization	16.7	7.4	9.2	55% less help desk time
Red Hat Enterprise Linux				
Number of servers required per organization	108	69	40	38% fewer servers
Total three-year server infrastructure cost per server	$16,400	$10,250	$6,150	38% lower costs
IT infrastructure team time requirements, FTEs per organization	14.5	9	5.5	38% fewer required FTEs
IT help desk team time requirements, FTEs per organization	36	19.1	16.9	47% fewer required FTEs
Red Hat OpenStack				
Number of servers required per organization	275	206	69	25% fewer servers
Total three-year server infrastructure cost per server	$26,700	$20,000	$6,700	25% lower costs
IT infrastructure team time requirements, FTEs per organization	11	7.4	3.6	33% fewer required FTEs
IT help desk team time requirements, FTEs per organization	6.2	2.2	3.9	64% fewer required FTEs
Red Hat OpenShift				
IT infrastructure team time requirements, FTEs per organization	20.4	18.1	2.3	11% fewer required FTEs
IT help desk team time requirements, FTEs per organization	29.8	11.2	18.6	63% fewer required FTEs
Red Hat Ansible				
Number of servers required per organization	159	127	32	20% fewer servers
Total three-year server infrastructure cost per server	$32,300	$25,800	$6,500	20% lower costs
IT infrastructure team time requirements, FTEs per organization	7.5	5.6	2	26% fewer required FTEs
IT help desk team time requirements, FTEs per organization	8.2	4.1	4.1	50% fewer required FTEs

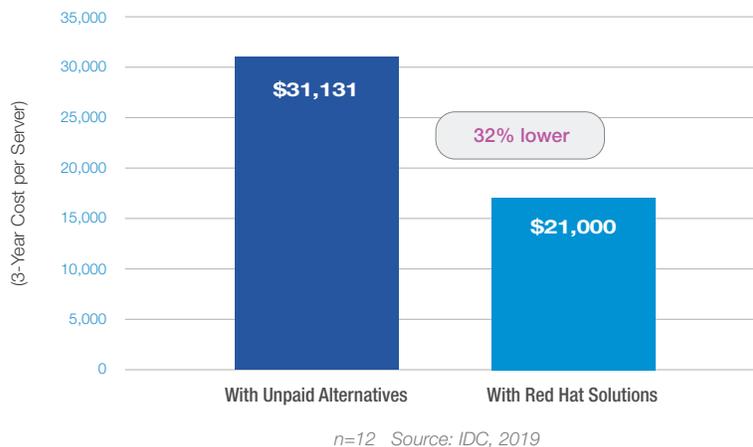n=12   Source: IDC, 2019 (*FTE = Full-time Equivalent, or the time of one staff member working full-time for an entire year)

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IT Cost Savings

Study participants reported leveraging paid Red Hat solutions to lower IT infrastructure-related costs. Several organizations maintain higher server virtualization density levels with Red Hat solutions (26% higher server virtualization density levels on average), which allows them to use server resources more cost effectively. IDC believes the higher virtualization rates are likely due to the fact that Red Hat solutions are well integrated with management tools (Red Hat Insights and Red Hat Satellite). The greater level of automation enables easier and faster provisioning and maintenance, which in turn results in customers that have the confidence to virtualize these servers at high densities without worry of failure.

A Red Hat OpenStack customer from the telecommunications sector noted: *"Our server virtualization density keeps going up year after year — I think we can go up to 84 per physical server or close to 100 with Red Hat OpenStack. For the unpaid version, that would be lower — probably less than half of that."* For study participants, this helps maintain a more streamlined infrastructure with fewer servers for equivalent workloads. On average, as shown in Figure 2, IDC projects that study participants can deploy and run servers at a 32% lower cost with paid Red Hat solutions.

FIGURE 2 Total Three-Year Cost per Server

n=12   Source: IDC, 2019

In addition, Red Hat customers benefit from having a more robust ecosystem and support, which helps them avoid costs related to support and training. An organization in the automotive sector running RHEL and Red Hat OpenShift commented: "*If we had the unpaid version of OpenShift, we would probably find someone to support us so we would have to pay additional support costs. Right now, that would be half a million dollars per year."* Meanwhile, an interviewee from the hospitality sector using Red Hat OpenStack would take on additional training costs by using unpaid community-supported solutions: *"If we were on the free version, we'd have to train more. We'd have to train about 25 people. They'd each have to get 4-6 weeks of training per year at a cost of about $2,500/week per person."*

IT Team Time Savings and Efficiencies

Study participants recognized the criticality of their IT teams to their business efforts and cited efficiencies for these teams as a major driver of their decision to invest in Red Hat solutions. They understand the need to provide these teams with robust and modern IT solutions, tools, and platforms to work effectively and efficiently. As a result, they described a common outcome of lowering the cost of delivering IT services to their businesses by freeing up staff to move away from day-to-day activities through automation and functionalities of Red Hat solutions.
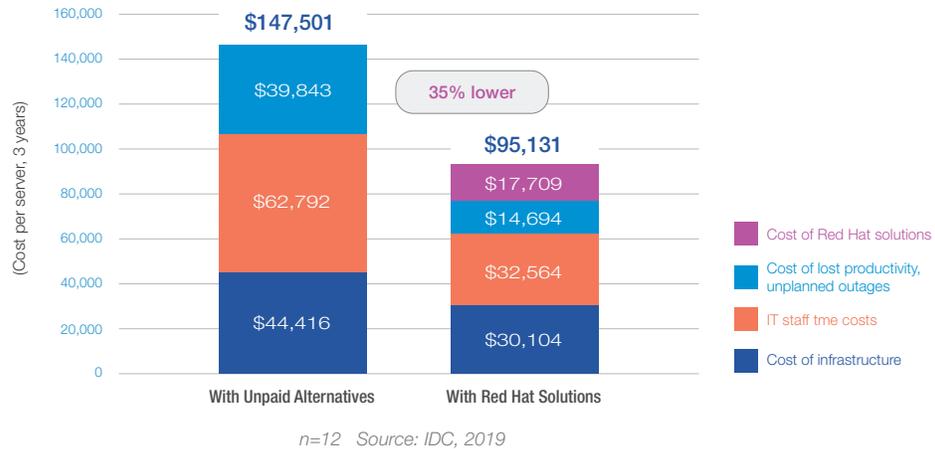
Several organizations cited this core benefit to IT infrastructure teams running IT operations and linked IT efficiencies to their businesses:

- **Red Hat Enterprise Linux: Financial Services.** *"We lower our labor costs with Red Hat Enterprise Linux because we're able to do more with less — there's less time spent in terms of our IT staff, which gives us a bigger return on their investment, and intensifies our revenue by creating value through cutting-edge software."*

- **Red Hat Ansible: Higher Education.** *"We used to spend a lot of time rushing, and when we rush, we make mistakes, which then have to be dealt with. . . Now, with Red Hat Ansible, we've got a vetted playbook. . . Our IT infrastructure team is 75% more productive as a result because we're able to do more automation."*

As shown in Table 3 above, IDC found that IT infrastructure teams realize significant efficiencies from the capabilities and features of paid Red Hat solutions and are an average of 38% more efficient than working with an alternative unpaid community-supported solution. Meanwhile, help desk teams realize even more significant relative gains with Red Hat solutions as they benefit from improved performance and Red Hat support, requiring 55% less staff time on average for equivalent workloads.

As shown in Figure 3, IT infrastructure cost savings and IT staff time efficiencies — in addition to higher reliability — reduce the costs for study participants of running equivalent workloads. On average, IDC calculates that they will incur 35% lower costs per server with Red Hat solutions despite the fact that they take on Red Hat subscription costs.

FIGURE 3 Three-Year Cost of Operations per Server

n=12   Source: IDC, 2019

Higher Performance and Better Reliability

Study participants also cited the need to ensure system and application availability as a driver of their investment in paid Red Hat solutions. They alluded to various ways that having subscription-based Red Hat solutions helps them minimize the frequency and duration of unplanned outages, including: receiving robust and timely updates and patches; access to Red Hat support and knowhow; delivery of more robust applications and features; and automation that can stem the potential impact of problems and outages.

An organization in the automotive vertical using RHEL and Red Hat OpenShift commented on having a more robust ecosystem with Red Hat and how this reduces unexpected outages that can impact its business: *"With the paid Red Hat version, we know what we're getting and we can plan for that. With the unpaid version, there are always these little bugs that creep up that you don't know about, and that's going to cause downtime."*

As Table 4 shows, study participants reported that they experience fewer outages that impact business operations with Red Hat solutions and can resolve outages that do occur faster. This means that employees who rely on constant access to applications lose less productive time due to outages — 63% on average — and study participants face a lower risk of consequential impact to their business operations from outages to important customer-facing systems, applications, or services.

TABLE 4 Impact on Unplanned Downtime

	With Unpaid Alternatives	With Red Hat Solutions	Difference	% Efficiency with Red Hat Solutions
Unplanned outages per year per organization	25	17.5	7.5	30%
MTTR (hours)	4.9	2.8	2.1	43%
Hours of lost productive time per year per user	1.5	0.6	0.9	63%
Value of lost productive time per year per organization, FTEs	26.1	9.6	16.5	63%

n=12   Source: IDC, 2019 (*FTE = Full-time Equivalent, or the time of one staff member working full-time for an entire year)

Greater Agility and More Effective Development

Interviewed Red Hat customers cited their need to ensure agile IT environments in support of development and business operations as another reason for choosing to invest in Red Hat solutions. These organizations know that, when their IT environments cannot provide sufficient flexibility, scalability, and performance, their businesses will ultimately bear the consequences. As a result, they viewed investment in Red Hat solutions through the prism of reducing friction that their IT operations exerts on business efforts, including in terms of delivering IT resources in support of development and business activities.

One area in which interviewed Red Hat customers benefit is in terms of fulfilling service requests for capacity and other matters (see Table 5). With Red Hat solutions' functionality, customers can handle these requests substantially faster (49% less time on average) and with less staff time required (37% less time on average). This reduces the burden on IT teams and ensures that developers and line of business users benefit from enhanced IT agility. Several study participants described how Red Hat enables efficiencies in delivering against service requests. A financial services company using RHEL explained: *"We are more agile with RHEL because we're able to quickly deploy technology to fuel any of the different systems we have."*

TABLE 5 Efficiencies in Service Request Fulfilment

	With Unpaid Alternatives	With Red Hat Solutions	Difference	% Efficiency with Red Hat Solutions
Time to handle per service request, days	5.0	2.6	2.4	49%
Staff time to handle per service request, hours	2.4	1.5	0.9	37%
Staff time in FTEs required to handle service requests per year per organization	3.0	1.9	1.1	37%

n=12   Source: IDC, 2019 (*FTE = Full-time Equivalent, or the time of one staff member working full-time for an entire year)

One of the teams that benefits substantially from increased agility at interviewed organizations is application development teams. Further, they benefit from having a much more robust development platform with Red Hat OpenShift, or deepening automation with Red Hat OpenStack and Red Hat Ansible Tower. Study participants recognized that they could not develop so efficiently and effectively with unpaid community-supported alternatives.

As a result of using paid Red Hat products, their development teams deliver significantly more value to their businesses by delivering more new applications (32%) and features (47%), and reducing the time required to provide users and customers with new applications (34%) and features (28%), as shown in Table 6. Overall, this means that developers working with Red Hat solutions are much more effective and thus more productive, with IDC quantifying the average productivity gain for development teams at 21% with Red Hat solutions.

Study participants explained how they have leveraged Red Hat solutions to better development activities:

● **Red Hat Enterprise Linux and Red Hat OpenShift: Automotive.** *"Our developers can reference Red Hat libraries and when there are issues, we can more easily rule out infrastructure as being an issue. . . Our developers are more productive on the Red Hat OpenShift and RHEL platforms — probably 50% more productive."*

● **More agile development activities and Red Hat Ansible: Healthcare.** *"Red Hat Ansible has definitely helped us move forward with a DevOps strategy. When we have a new client, we can quickly double-up the applications to give them a testing environment and then move into a full testing development environment, and then to production. . . We can reduce resource management and extra maintenance by re-using templates, and we can invest and spend more time on everything inside."*

TABLE 6 Line of Business Application Development Impact

	With Unpaid Alternatives	With Red Hat Solutions	Difference	% Efficiency with Red Hat Solutions
Application developer productivity				
Productivity level in terms of FTEs per organization	78	94	16	21%
Application development metrics, new applications				
Number of new applications per year)	16.9	22.4	5.5	32%
Development lifecycle, new applications, weeks	27.7	18.2	9.6	34%
Application feature development metrics				
Number of new application features per year	1,523	2,234	711	47%
Development lifecycle, new application features, weeks	5.9	4.3	1.6	28%

n=12   Source: IDC, 2019 (*FTE = Full-time Equivalent, or the time of one staff member working full-time for an entire year)

Better Supporting Business Operations

Interviewed Red Hat customers also attributed improved business and operational results to their use of paid Red Hat solutions. They cited benefits explained in this study such as better performance, greater agility, and more effective development efforts. Again, this reflects the reality for these Red Hat customers of making an investment for increased functionality and performance that they can translate through to improvements to core business results and how their organizations operate. On average, these organizations attributed increased revenue worth $3.54 million per year to their use of Red Hat solutions ($12,600 per 100 users) by helping them better address and win business opportunities.

Interviewed Red Hat customers spoke to how paying for subscription-based Red Hat solutions enables their broader businesses and operations:

- **Red Hat Enterprise Linux and Red Hat Ansible: Hospitality.** *"We're more agile with Red Hat because we're able to provide services for our internal users a lot faster and they are happier when we're able to meet their deadlines. They like to give us unrealistic deadlines but we're able to meet them better with Red Hat than we would with an unpaid solution. We meet probably 95% of their deadlines with Red Hat compared with probably 75% with unpaid. There's no revenue impact, but the end users are more productive."*

- **Red Hat Ansible: Higher Education.:** *"Because we're an academic and research institution, we'll often have requirements that are driven by the Dean's office. They will want to try*

something, and want to try it by the end of the week. Now, because we moved a lot of our infrastructure to code and automation as a first principle with Red Hat Ansible, we're able to meet those requirements. We can not only do it much faster, but also with verification around it. . . So it has made a really big impact in how we're able to support the institution."

ROI Analysis

IDC based its ROI analysis on interviews with organizations that are using Red Hat subscription-based solutions that can compare their experiences with alternative unpaid community-supported versions of these Red Hat products. Based on these interviews, IDC has calculated the benefits and costs to these organizations of deploying and using Red Hat solutions compared with unpaid community-supported alternatives (see Appendix for details of IDC's Business Value Methodology).

Table 7 provides IDC's analysis of the benefits and costs for interviewed organizations of deploying and using paid Red Hat solutions compared with unpaid community-supported alternatives. IDC projects that, over three years, these Red Hat customers will realize discounted benefits worth $83,795 per server ($11.53 million per organization) based on an average discounted investment cost of $17,909 per server ($2.46 million per organization). These levels of benefits and costs would result in an average three-year ROI of 368%, with breakeven on investment occurring in an average of five months.

TABLE 7 Red Hat Solutions ROI Analysis

	Three-Year Average per Organization	Three-Year Average per Server	Three-Year Average per 100 Users
Benefit (discounted)	$11.53M	$83,795	$40,940
Investment (discounted)	$2.46M	$17,909	$8,750
Net Present Value (NPV)	$9.07M	$65,886	$32,190
Return on Investment (ROI) (%)	368%	368%	368%
Payback period	5 months	5 months	5 months
Discount Rate (%)	12%	12%	12%

n=12   Source: IDC, 2019

CHALLENGES AND OPPORTUNITIES FOR RED HAT

Challenge: Perception that free OSS is less expensive. The commercial OSS vendor community has long faced the dilemma that the costs associated with long-term support of community OSS are buried in the organization's staffing costs, staff productivity and other factors such as time to deploy and uptime. Identifying and measuring these costs requires a thoughtful, long-term analysis. By comparison, the cost of a subscription is immediately obvious because the total shows up on a requisition or a purchase order. This can lead to IT professionals needing to defend the decision to use commercial products over community solutions.

Opportunity: This is an opportunity for education of IT Professionals. The reality is that, unless you are a software supplier yourself, your core business is likely something unrelated to infrastructure software. Banks are better off focusing on improving the customer's banking experience, a retailer about the store and online experience, and a manufacturer focusing on improving manufacturing efficiency. Differentiation for winning businesses does not come from infrastructure software directly, but rather for what you build on top of infrastructure software, along with the reliability and opex associated with that infrastructure.

Challenge: The commoditization of OSS. Today, every public cloud vendor offers services based on OSS, and it becomes less clear why any individual commercially supported OSS solution is a preferable alternative.

Opportunity: Today, few companies operate all their IT in a single physical location. Most companies have a traditional on-premise (or hosted) datacenter, they may have a private cloud, and likely use one or more public cloud environments. While each deployment environment offers certain unique value to the customers, cross-platform portability usually is not one of these value propositions. A solution from a software vendor that is not tied to a singular cloud environment offers customers portability, flexibility, and the opportunity to change their mind in the future.

CONCLUSION

Open-source software has matured in the last 20 years to the point that most enterprises today consider it a mainstream choice for their infrastructure, application development, and application deployment environments. Enterprises may find free versions of open-source

software enticing, believing that they can optimize IT costs by lowering software costs. While they may intuitively understand that free software can carry additional operational costs, they often have insufficient understanding of those costs to accurately evaluate the actual costs of free software as they use it to support their business operations over time.

Numerous IDC studies done in this timeframe have demonstrated that use of free software often carries operational costs and inefficiencies that substantially outweigh the cost of commercial subscription support, especially when the software is used for business-critical applications and workloads. In particular, free software places additional burdens on IT teams with regard to requisite expertise, application of fixes and patches, and executing upgrades. These activities not only can consume significant amounts of staff time, but also put the performance and reliability of key applications at risk if not done properly.

This IDC study once again demonstrates that the value of using paid Red Hat subscription software — specifically, Red Hat Enterprise Linux (including Satellite and Insights), Red Hat OpenStack, Red Hat OpenShift, and Red Hat Ansible — substantially outweighs the subscription costs for these Red Hat products. Interviewed organizations explained that they have not only made their IT environments more cost effective and efficient by paying for Red Hat solutions, but that they have established a more robust and higher performing IT foundation for their business operations. Based on interviews with this sample of Red Hat customers, IDC calculates that they will reduce their three-year cost of operations by 35% by paying for Red Hat subscriptions compared with using free open-source software alternatives, and will realize an average three-year ROI of 368% on their investment in paid Red Hat solutions.

APPENDIX - METHODOLOGY

IDC used the following three-step method for conducting the ROI and Business Value analysis informing this study's results and conclusions:

1. **Gathered quantitative benefit information** during the interviews using a before-and-after and/or comparative assessment for interviewed organizations of using subscription-based, paid Red Hat solutions (Red Hat Enterprise Linux, Red Hat OpenStack, Red Hat OpenShift, Red Hat Ansible Tower) compared with using an unpaid community-supported version of these Red Hat solutions. In this study, the benefits of using these Red Hat solutions included IT cost savings, IT staff efficiencies, application development productivity gains, higher revenue, and other increases to user productivity levels.

2. **Created a complete investment (three-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of deploying and using the Red Hat solutions, and can include additional costs related to migrations, planning, consulting, and staff or user training.

3. **Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of Red Hat solutions compared with unpaid community-supported alternatives over a three-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of Red Hat subscription-based solutions as the foundation for the model. Based on interviews with 12 organizations, IDC performed a three-step process to calculate the ROI and payback period:

- Measure the benefits from use of Red Hat solutions in terms of application developer efficiencies, IT staff time savings and productivity gains; user productivity gains; revenue gains; and IT cost savings.

- Ascertain the investment made in deploying Red Hat solutions and associated migration, training, and support costs.

- Project the costs and savings over a three-year period and calculate the ROI and payback for use of Red Hat solutions.

IDC bases the payback period and ROI calculations on assumptions that are summarized as follows:

- Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and productivity savings. IDC assumes a fully-burdened salary of $100,000 per year for IT staff, including developers, and $70,000 for other employees, with an assumption of 1,880 hours worked per year.

- Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.

- The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.

- Lost productivity is a product of downtime multiplied by burdened salary.

- The net present value of the three-year savings is calculated by subtracting the amount

that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.

- Because every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each company what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

- Further, because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may not be exact due to rounding.

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