White Paper

The Economic Impact of Red Hat Enterprise Linux: Trillions, Yes Trillions, of Dollars

Sponsored by: Red Hat

Cushing Anderson Stephen Belanger John F. Gantz

May 2019

IN THIS WHITE PAPER

This White Paper sizes the economic impact of Red Hat Enterprise Linux (RHEL) in three dimensions: the revenue and expenses that are "touched" in the enterprises that use RHEL and the economic advantage accrued, the impact of IT expenses on technology and staff labor by enterprises using RHEL, and the size and reach of the ecosystem whose products and services sit on RHEL.

This document is based on IDC research and forecasts on IT markets, internal IT models on the economic impact of IT, third-party economic data, and a global survey of 600+ line-of-business and IT executives.

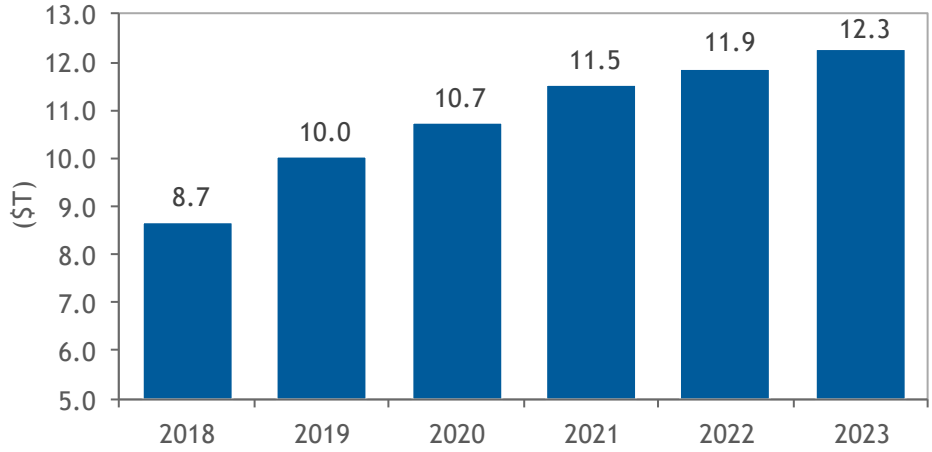
EXECUTIVE SUMMARY

- The software and applications running on RHEL will "touch" $10 trillion of business revenue this year and grow at twice the rate of the economy. Business revenue will top $188 trillion.
- The use of RHEL in support of these business activities will provide economic benefits of more than $1 trillion a year to customers.
- The use of RHEL by IT organizations will save those organizations nearly $7 billion this year.
- The RHEL ecosystem will make more than $82 billion this year and will grow to $119 billion in 2023 with a CAGR of 11.5%. For every dollar of revenue made by Red Hat in 2019, the ecosystem will make $21.74.
- With the ecosystem growing 11% a year from 2019 to 2023, net-new ecosystem revenue (from 2018) will add up to more than $150 billion.
- This year, Red Hat and its ecosystem will employ nearly 900,000 workers, and among customers, the IT professionals who work with the software, hardware, and services stacked on RHEL will number more than 1.7 million.
- While some firms in the ecosystem are multinationals, most are not. As a result, the ecosystem will invest nearly $48 billion locally in 2019 (see Figure 1).

May 2019, IDC #US45007819

FIGURE 1

Red Hat Enterprise Linux's Worldwide Economic Footprint



Note: Data shows the worldwide financial impact of applications/workloads running on RHEL.

Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

PUTTING A TRILLION DOLLARS IN CONTEXT

How could the footprint of a software operating system, basically built on free software, "touch" anything like a trillion dollars?

The answer starts with the size of the global economy, where GDP is expected to exceed $86 trillion in 2019.[1] But while GDP is a measure of output, it is *not* a measure of business revenue. While the latter counts dollars when companies sell goods and services to each other, GDP doesn't. Depending on a country's industrial makeup, aggregate revenue may run from two to three times GDP.[2]

For 2019, IDC has estimated global business revenue of $188 trillion.

Of this, IDC estimates that at least 40% is touched by software. Think email for employees, production management systems, inventory control software, engineering design software, customer relationship management (CRM), website management, and so on. Probably the *only* part of global revenue *not* touched by software is the revenue generated by very small enterprises that don't use computers, pick-and-shovel operations, and personal and professional service outfits that still rely on paper or human memory.

For 2019, IDC has estimated the IT "footprint" at $81 trillion.

Now, consider that *all* of that software driving the IT footprint has to run on an operating system … and that much of the software "touching" enterprise functions run on servers … and that IDC's server

[1] The Economist Intelligence Unit, 2019

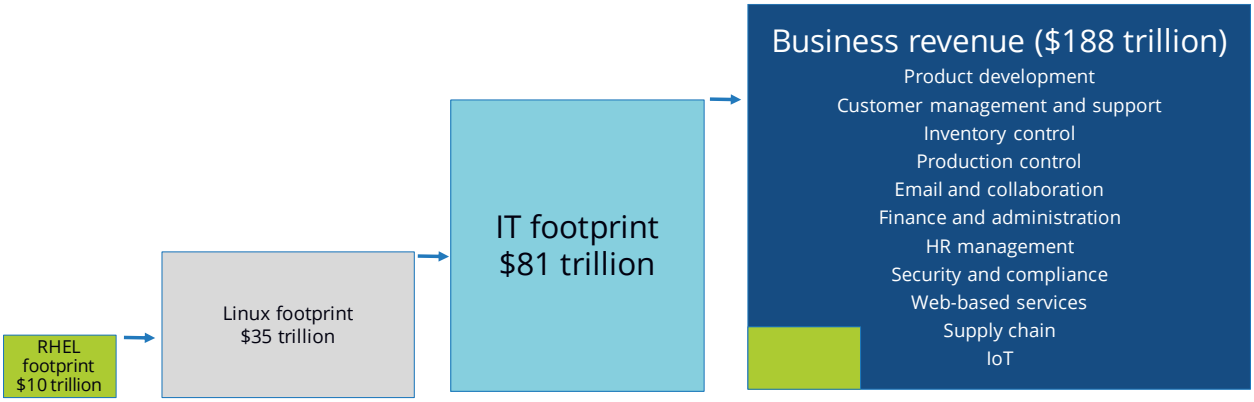
[2] The closest proxy to business revenue traditionally measured by governments is “gross output.” This, however, misses some distribution channel revenue.

workloads tracker has more than 50% running on Linux … and that RHEL accounts for around 25% of Linux operating systems deployed (including paid and free versions). Then do the math.

For 2019, IDC has estimated the RHEL "footprint" at $10 trillion (see Figure 2).

FIGURE 2

Red Hat Enterprise Linux's Place in the Global Economy



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

FROM WHENCE $10 TRILLION?

Figure 2 shows some of the enterprise functions that will drive the IT, Linux, and RHEL footprints. But in 2019, the workloads running on RHEL with the most impact are shown in Figure 3.

The individual workload footprints vary somewhat as a result of the investment in software, but more on the portion of enterprise activity affected. For instance:

- Enterprise resource management (ERM) and production applications affect a huge portion of many enterprises' expenses, which, in turn, make up generally 70% or more of revenue.
- Collaboration applications, say email, may affect every employee in an enterprise – but not necessarily impact large chunks of revenue or expenses. Labor costs, most "touched" by email, are less than production and raw material costs in many industries.
- Supply chain management can affect a significant portion of expenses, but the software application itself is deployed less than other major enterprise applications.
- IT infrastructure – security, networking, servers, and web services to customers and suppliers – permeates all companies with computers, touching both revenue and expenses.
- Customer relationship management may touch many enterprise customers, but usually not all – or at least all at once.

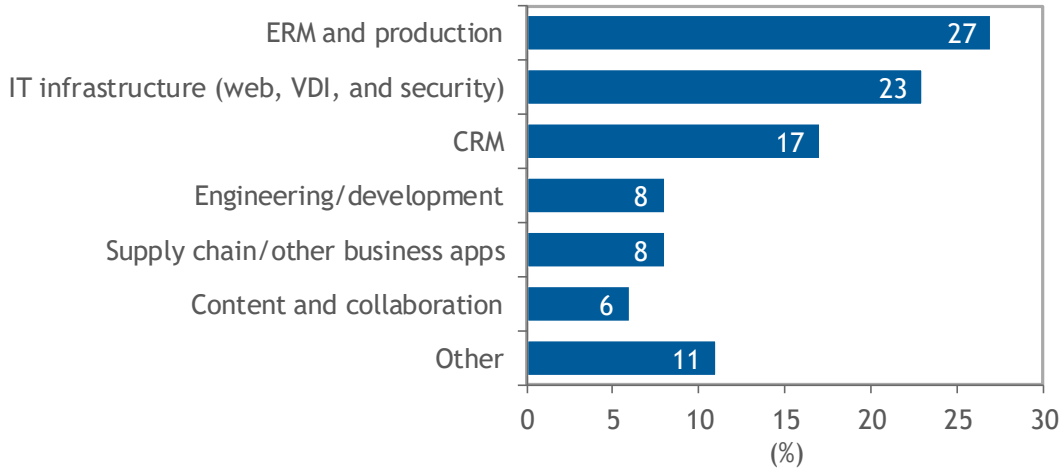
And so on.

By region, the RHEL economic footprint is fairly evenly distributed – 35% from the Americas, 33% from Asia/Pacific, and 32% from EMEA (the rest of the world).

Over time, the Asia/Pacific region will switch shares with the Americas share as a result of faster-growing business revenue and an uptick in automation.

FIGURE 3

Workloads Behind Red Hat Enterprise Linux's Footprint, 2019



Source: IDC's *Economic Impact of RedHat Enterprise Linux Study,* 2019

THE RED HAT ENTERPRISE LINUX FOOTPRINT ADVANTAGE

The methodology to compute footprint by workload starts with an estimate (based on surveys and IDC's software tracker) of what percentage of enterprises automate that particular workload, then what percentage of the organization is touched by that particular workload, and finally whether the workload primarily affects expenses or revenue.

The rest is calculation.

But IDC also asked executives whether using RHEL provided any advantage in each workload – an increase in revenue from using RHEL, a decrease in expenses, or an increase in employee productivity. And we asked them to estimate the impact.

In all cases, there was *some* benefit. These organizations had chosen to invest in RHEL, after all.[3] There was a good distribution around the mean for each benefit-related question for each workload, but the mean was always positive (if not huge).

Furthermore, the executives divided their advantages pretty evenly – one-third to increased revenue, one-third to decreased expenses, and one-third to increased productivity.

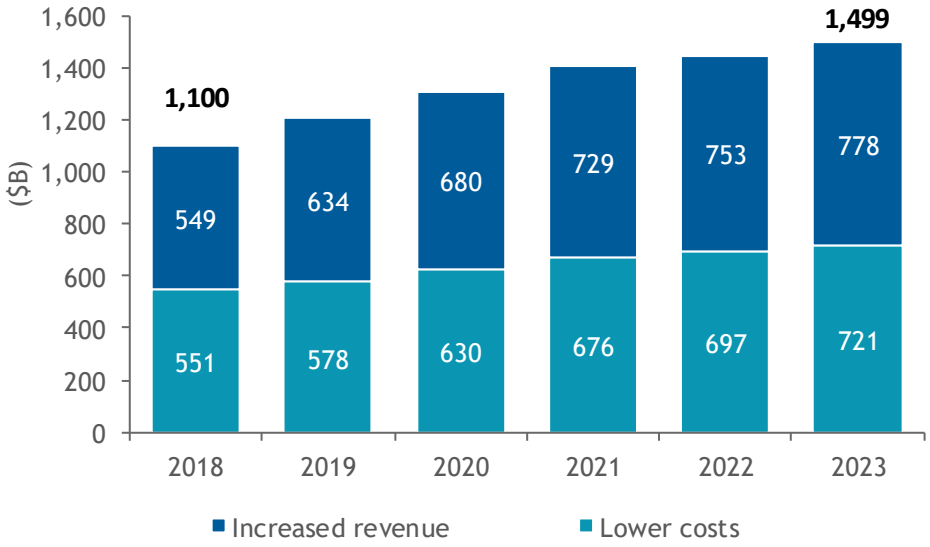
[3] While respondents were RHEL users, on average, RHEL accounted for less than 25% of their investments in IT infrastructure.

But because aggregate revenues are greater than aggregate expenses, and labor expenses are a subset of total expenses, the final calculation left the expense benefits and revenue benefits at about equal.

These are shown in Figure 4.

FIGURE 4

The Red Hat Enterprise Linux Advantage



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

The Red Hat $3 Billion Story

When Red Hat was founded back in 1993 and software was distributed on floppy disks, it wasn't at all clear if a business could be built out of distributing what was considered by the industry to be free, the open source Linux operating system. Today, Red Hat is a $3 billion company and growing at double digits.

How that happened was a decision in 2002 to combine the freedom of open source with an assurance of reliability and quality support through a subscription model. The company then committed resources to building Linux to where it could be a viable enterprise operating system, started supporting its partner community, and built up skills and tools to support the IT pros working with Linux.

An early concentration on security and in automatic updates of the operating system has helped Linux customers manage more servers with fewer staff.

To be continued …

How Red Hat Enterprise Linux Benefits IT Organizations

Among the questions asked in the survey for this project, some were specific to IT departments. How does RHEL stack up against other operating systems across various benchmarks?

The benchmark metrics included:

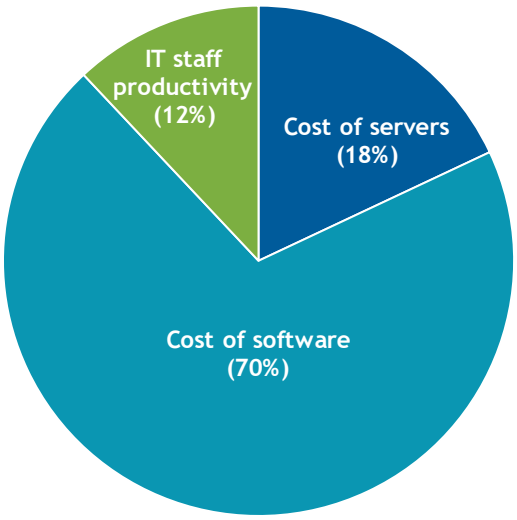
- The purchase cost of servers
- The maintenance cost of servers
- The cost of software running on servers
- IT staff time managing servers
- IT staff time doing routine IT tasks
- Time to resolve support calls
- Time to recover from unplanned downtime
- Time to deploy new business apps
- Time to upgrade mission-critical apps

Not every benchmark yielded an advantage from using RHEL in every region, but across the survey sample in aggregate, there were significant benefits.

Applied to all the organizations in 2019 that use RHEL, the total aggregate benefit came to $6.8 billion on nearly $200 billion of costs. Those benefits could be bracketed into three main areas, as shown in Figure 5.

FIGURE 5

Red Hat Enterprise Linux's Worldwide IT Savings by Category, 2019



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

THE $80 BILLION RED HAT ENTERPRISE LINUX ECOSYSTEM

Consider an operating system, even a free one. It sits on top of hardware (contributing dollars to the ecosystem) and supports application software (contributing dollars), which needs application development software (contributing dollars) to exist. All that software usually requires support and ongoing IT services (contributing dollars), and those IT services sometimes require associated business services (more dollars). Much of this hardware, software, and services is distributed through third parties (and, more dollars).

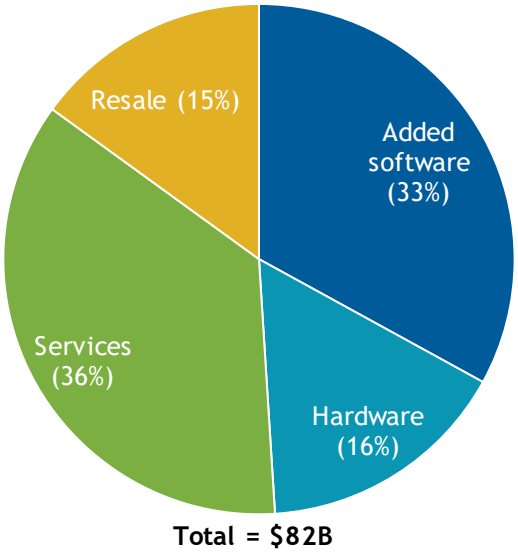
Welcome to the RHEL ecosystem!

Using IDC market studies and survey data, it is possible to quantify the spending that goes into all the products and services loaded onto RHEL in IT deployments.

Figure 6 shows the breakdown of that quantification for 2019 by category.

FIGURE 6

Red Hat Enterprise Linux Ecosystem Revenue by Category, 2019



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

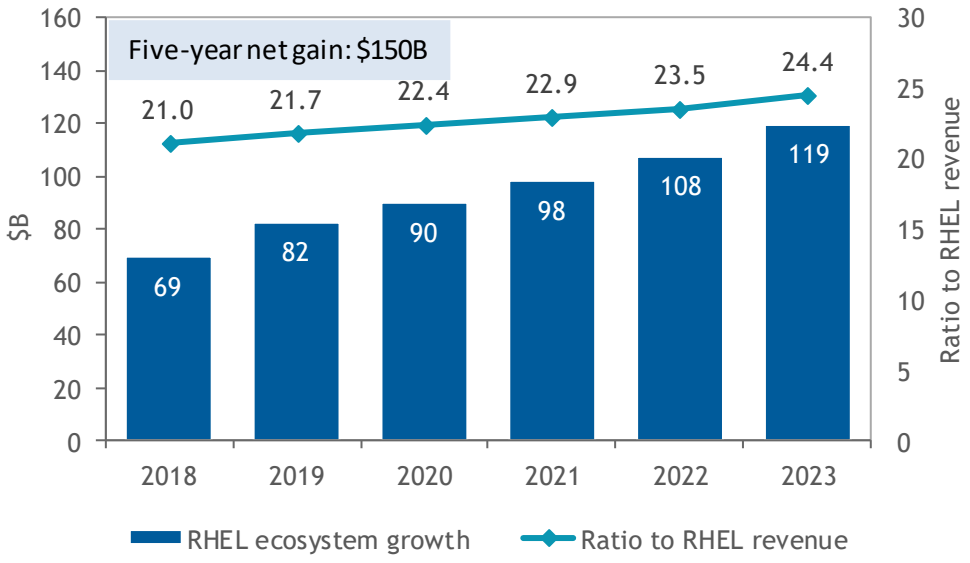
The specific ingredients of the categories are:

- **Added software** includes application software, application development software, and systems infrastructure that might not be part of RHEL.
- **Hardware** includes servers, networking, storage, line charges, and some small portion of end-user or IoT hardware involved in implementations anchored by RHEL.
- **Services** include both IT services (like support, training, and systems integration) and business services (like process and strategy consulting). This category excludes Red Hat's services revenue.
- **Resale** is the gross margin of resellers of both Red Hat and ecosystem software. This gross margin adds to revenue for resold software to equal user spending.

Growth of the RHEL ecosystem is rapid. The RHEL ecosystem will make more than $82 billion this year and grow at a CAGR of 11.5% to $119 billion by 2023. The ecosystem's revenue today is almost 22 times that of Red Hat alone. In total, the RHEL ecosystem will add $150 billion in net gain to the global economy from 2019 to 2023 over 2018 (see Figure 7).

FIGURE 7

Red Hat Enterprise Linux Ecosystem Growth



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

This ecosystem is quite an engine. Including Red Hat, the ecosystem employs nearly 900,000 workers worldwide. By the end of 2023, it will add nearly 250,000 more.

Although these figures include all employees in hardware, software, services, and channels companies (not just the software engineers or programmers), most of the additions will be high-skill, high-pay jobs.

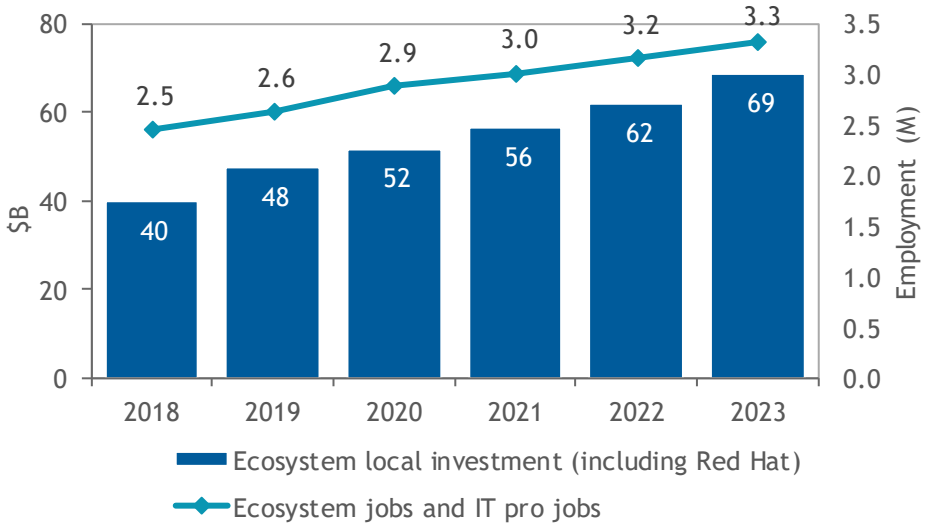
That's not all. The employees in the ecosystem have partners within their customers – the IT professionals who work with the software, hardware, and services stacked on RHEL. IDC sizes this community of RHEL-focused IT pros at 1.7 million worldwide by the end of 2019 and 2.1 million by the end of 2023. When we combine ecosystem employment with IT professionals working for RHEL clients, we see that more than 3.3 million people could work in Red Hat-related positions by 2023.

Finally, not all but many of these ecosystem companies will be locally based – serving the region in which they are based. As a result, they will be making investments in the regions in which they are based. These are investments in marketing, local offices, staff, and services. All told, these investments should hit nearly $48 billion this year.

Figure 8 charts this job growth and local investment.

FIGURE 8

Red Hat Enterprise Linux Ecosystem Reach: Jobs and Local Investment



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

By region, the ecosystem tracks RHEL revenue, with a few slight differences:

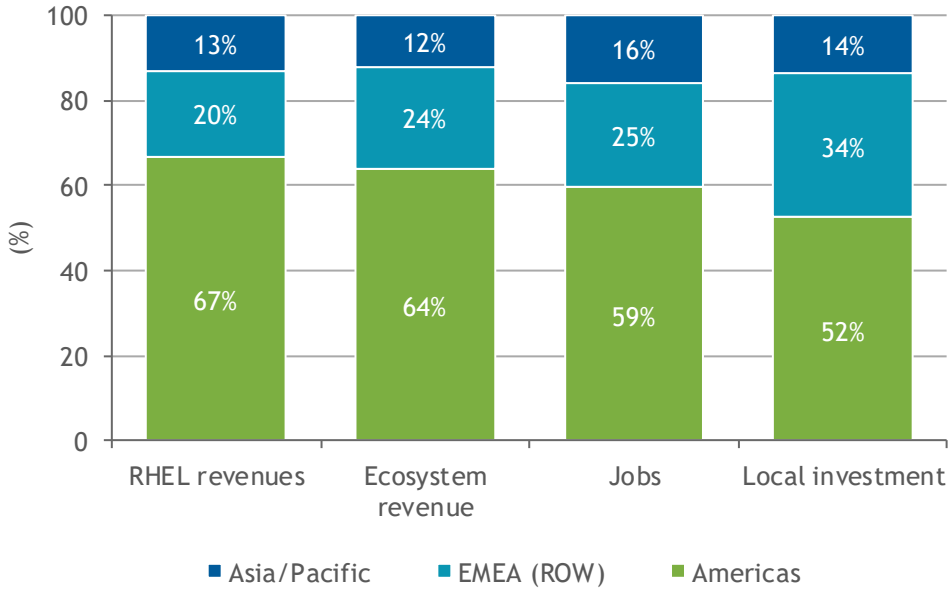
- The Americas' share of worldwide revenue is higher than local investment because the region hosts more multinationals.
- EMEA's share of jobs is higher than revenue share as a result of higher concentration in IT and business services and higher regional salaries. Local investment is driven by the in-region nature of services and distribution channels.
- Asia/Pacific's job share is higher than revenue because of lower average salaries.

But the upshot: no surprises.

Figure 9 shows the regional shares.

FIGURE 9

Red Hat Enterprise Linux Ecosystem Share by Region, 2019



Source: IDC's *Economic Impact of Red Hat Enterprise Linux Study,* 2019

CALL TO ACTION

A call to action usually implies strategic or operational change to adapt to an ever-changing environment. And we are surely in a period of dramatic change in the deployment of IT in businesses … from growth of cloud computing and the Internet of Things to the wide understanding that deploying the new technologies at hand will require a wholesale transformation of organizational culture, workforce skills, and operations.

For some of the respondents of our survey, the call to action might well be … stay the course.

But for others, not so. We found in our survey that there were slightly more respondents below the mean than above the mean when it came to the benefits of RHEL affecting their financials — especially when it came to cost cutting, which has the greatest bottom-line impact.

What's more, there was a fairly flat bell curve around the mean — in other words, a measurable distance between leaders and laggards when it came to achieving benefits from IT deployments.

So besides staying the course for those who are already at the far end of the bell curve, a call to action would include the traditional road map for embracing digital transformation:

- Build a strategy across the organization.
- Train and reskill the workforce.
- Integrate data sets across the organization.

- Drive implementation through the business units.
- Measure, measure, measure.

There might be one more. Implement more on RHEL.

When we divided respondents into two groups – those with more RHEL servers than average and those with fewer – we found some wide disparities in IT benefits.

For instance, 50% more high-RHEL respondents said RHEL server life was longer than non-RHEL servers compared with low-RHEL respondents. High-RHEL respondents had more RHEL staff, but also higher staff productivity, higher staff productivity per server, fewer support calls per 100 users, and fewer unplanned downtime events.

And, as the analysis in this White Paper shows, small benefits can cascade upward.

APPENDIX

Red Hat Enterprise Linux's Economic Impact

TABLE 1

Red Hat Enterprise Linux Economic Impact: Worldwide

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Economic footprint								
Enterprise revenue ($B)	178,264	187,787	193,199	198,280	203,889	209,848	3.3	101,683
IT and business app footprint ($B)	76,009	80,642	83,622	86,500	89,654	93,021	4.1	53,394
RHEL economic footprint ($B)	8,670	10,020	10,731	11,508	11,876	12,268	7.2	13,054
The RHEL advantage								
Increased revenue ($B)	548	634	680	730	753	779	7.3	836
Lower costs ($B)	552	579	630	675	697	721	5.5	542
RHEL advantage ($B)	1,100	1,213	1,310	1,405	1,450	1,500	6.4	1,378

Notes:

Economic footprint is the revenue/expenses touched by IT hardware, software, and services running on or supporting RHEL.

RHEL advantage is the benefit of using RHEL over other OSs.

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 2

Red Hat Enterprise Linux Economic Impact: Americas

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Economic footprint								
Enterprise revenue ($B)	61,463	62,912	64,309	65,310	66,550	67,974	2.0	19,739
IT and business app footprint ($B)	27,436	28,308	29,170	29,868	30,686	31,605	2.9	12,458
RHEL economic footprint ($B)	3,399	3,527	3,754	3,985	4,078	4,183	4.2	2,533
The RHEL advantage								
Increased revenue ($B)	213	221	235	250	255	262	4.2	158
Lower costs ($B)	217	226	239	253	259	266	4.2	159
RHEL advantage ($B)	430	446	474	503	515	528	4.2	317

Notes:

Economic footprint is the revenue/expenses touched by IT hardware, software, and services running on or supporting RHEL.

RHEL advantage is the benefit of using RHEL over other OSs.

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 3

Red Hat Enterprise Linux Economic Impact: Asia/Pacific (Including Japan)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Economic footprint								
Enterprise revenue ($B)	60,263	64,605	67,512	70,347	73,372	76,454	4.9	50,978
IT and business app footprint ($B)	24,864	26,867	28,307	29,742	31,278	32,866	5.7	24,742
RHEL economic footprint ($B)	2,676	3,306	3,598	3,920	4,104	4,293	9.9	5,843
The RHEL advantage								
Increased revenue ($B)	181	224	244	266	278	291	9.9	396
Lower costs ($B)	186	202	219	239	250	262	7.1	244
RHEL advantage ($B)	367	426	463	505	528	553	8.5	641

Notes:

Economic footprint is the revenue/expenses touched by IT hardware, software, and services running on or supporting RHEL.

RHEL advantage is the benefit of using RHEL over other OSs.

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 4

Red Hat Enterprise Linux Economic Impact: EMEA

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Economic footprint								
Enterprise revenue ($B)	56,538	60,270	61,378	62,623	63,967	65,420	3.0	30,968
IT and business app footprint ($B)	23,709	25,467	26,145	26,890	27,690	28,550	3.8	16,197
RHEL economic footprint ($B)	2,595	3,187	3,379	3,603	3,694	3,792	7.9	4,680
The RHEL advantage								
Increased revenue ($B)	154	189	201	214	220	226	7.9	280
Lower costs ($B)	149	151	172	183	188	193	5.3	142
RHEL advantage ($B)	303	340	373	397	408	419	6.6	422

Notes:

Economic footprint is the revenue/expenses touched by IT hardware, software, and services running on or supporting RHEL.

RHEL advantage is the benefit of using RHEL over other OSs.

Source: IDC's *Economic Impact of RHEL Study,* 2019

Red Hat Enterprise Linux Ecosystem Opportunity

TABLE 5

Red Hat Enterprise Linux Ecosystem Opportunity: Worldwide ($)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Additional software	22,603	27,263	29,866	32,717	35,909	39,355	11.7	52,095
Additional hardware	11,649	13,486	14,800	16,482	18,573	21,188	12.7	26,284
Additional services	24,969	29,520	31,691	34,153	36,888	40,859	10.4	48,266
Resale of Red Hat software and services (Margin above Red Hat revenue)	10,163	12,162	13,321	14,648	16,170	18,063	12.2	23,549
Total (Products and services running on or supporting RHEL)	69,384	82,431	89,678	98,000	107,540	119,465	11.5	150,194
Ratio to RHEL revenue	21.0	21.7	22.4	22.9	23.5	24.4		

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 6

Red Hat Enterprise Linux Ecosystem Opportunity: Americas ($)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Additional software	16,058	19,046	20,845	22,685	24,708	26,827	10.8	33,821
Additional hardware	6,854	7,533	8,243	9,183	10,440	12,029	11.9	13,158
Additional services	16,098	18,589	19,947	21,342	22,883	24,543	8.8	26,814
Resale of Red Hat software and services (Margin above Red Hat revenue)	6,763	7,910	8,660	9,471	10,401	11,444	11.1	14,071
Total (Products and services running on or supporting RHEL)	45,773	53,078	57,695	62,681	68,432	74,843	10.3	87,864
Ratio to RHEL revenue	20.7	21.5	22.2	22.9	23.7	24.3		

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 7

Red Hat Enterprise Linux Ecosystem Opportunity: Asia/Pacific (Including Japan) ($)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Additional software	2,030	2,295	2,480	2,685	2,903	3,146	9.2	3,359
Additional hardware	2,659	3,167	3,527	3,924	4,315	4,783	12.5	6,421
Additional services	2,880	3,161	3,340	3,529	3,682	4,171	7.7	3,483
Resale of Red Hat software and services (Margin above Red Hat revenue)	1,243	1,423	1,551	1,691	1,830	2,045	10.5	2,325
Total (Products and services running on or supporting RHEL)	8,812	10,046	10,898	11,829	12,730	14,145	9.9	15,588
Ratio to RHEL revenues	20.7	22.4	22.8	23.1	25.1	26.1		

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 8

Red Hat Enterprise Linux Ecosystem Opportunity: EMEA ($)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Additional software	4,515	5,922	6,541	7,347	8,298	9,382	15.8	14,915
Additional hardware	2,136	2,786	3,030	3,375	3,818	4,376	15.4	6,705
Additional services	5,991	7,770	8,404	9,282	10,323	12,145	15.2	17,969
Resale of Red Hat software and services (Margin above Red Hat revenue)	2,157	2,829	3,110	3,486	3,939	4,574	16.2	7,153
Total (Products and services running on or supporting RHEL)	14,799	19,307	21,085	23,490	26,378	30,477	15.5	46,742
Ratio to RHEL revenue	22.2	22.1	22.8	22.8	22.3	24.1		

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 9

Red Hat Enterprise Linux Ecosystem Employment and Local Investment: Worldwide

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Industry ecosystem jobs (including Red Hat)	824,817	888,582	969,301	1,015,120	1,065,056	1,124,881	6.4	300,064
IT professional jobs	1,629,380	1,747,211	1,913,173	1,996,352	2,086,035	2,202,409	6.2	573,029
Ecosystem local investment (including Red Hat) ($)	39,915	47,567	51,717	56,468	61,894	68,772	11.5	86,843

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 10

Red Hat Enterprise Linux Ecosystem Employment and Local Investment: Americas

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Industry ecosystem jobs (including Red Hat)	535,348	565,378	615,363	640,841	668,778	693,941	5.3	158,593
IT professional jobs	960,119	1,003,911	1,096,231	1,132,285	1,172,201	1,205,082	4.6	244,963
Ecosystem local investment (including Red Hat) ($)	21,343	24,945	27,047	29,285	31,801	34,591	10.1	40,954

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 11

Red Hat Enterprise Linux Ecosystem Employment and Local Investment: Asia/Pacific (Including Japan)

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Industry ecosystem jobs (including Red Hat)	121,242	124,797	136,250	141,593	146,013	155,229	5.1	33,987
IT professional jobs	282,255	288,029	318,043	333,547	346,457	373,786	5.8	91,531
Ecosystem local investment (including Red Hat) ($)	5,487	6,555	7,127	7,847	8,672	9,921	12.6	12,687

Source: IDC's *Economic Impact of RHEL Study,* 2019

TABLE 12

Red Hat Enterprise Linux Ecosystem Employment and Local Investment: EMEA

	2018	2019	2020	2021	2022	2023	2018–2023 CAGR (%)	Five-Year Net Gain
Industry ecosystem jobs (including Red Hat)	168,227	198,407	217,688	232,686	250,265	275,711	10.4	107,484
IT professional jobs	387,006	455,271	498,899	530,520	567,377	623,541	10.0	236,535
Ecosystem local investment (including Red Hat) ($)	13,085	16,067	17,543	19,336	21,421	24,260	13.1	33,202

Source: IDC's *Economic Impact of RHEL Study,* 2019

METHODOLOGY

Since 2005, IDC has used its extensive research and forecast base along with surveys to calculate and forecast the impact various vendors have on local economies. There are several variations of these products:

- **Economic impact studies:** Studies showing the economic "footprint" of the vendor ecosystem – how much business revenue is "touched" by the ecosystem's products interacting with various business functions
- **Vendor advantage views:** Studies based mostly on surveys or interviews that demonstrate the comparative advantage from using the vendor's products
- **Vendor ecosystem sizing:** How big, in terms of revenue and/or employment, is the ecosystem supporting the vendor's products

This project for Red Hat software entails versions of all three, specifically:

- The Red Hat Enterprise Linux economic footprint
- The Red Hat Enterprise Linux advantage
- The Red Hat Enterprise Linux ecosystem opportunity

The RHEL Economic Footprint Model

This model quantifies the amount of business revenue and expenses "touched" by the applications and workloads running on RHEL and supported by the RHEL ecosystem:

- The term *touched* means that IT (or software or RHEL) drives, supports, aids, or otherwise interacts with the processes and people involved in the activities of organizations. IT may "touch" expense activities – people, inventory, and so forth – or specific revenue-creation activities – sales management, advertising, and so forth – but, for convenience, is compared to revenue. "Touch" is not a measure of what specific percentage of revenue is directly driven by IT, as in, say, internet commerce or automated customer support, but its reach into organizational activities.

It is a simple concept but a somewhat complex calculation. The economic footprint in this project progresses as follows:

- What is the footprint of IT – not all enterprises use computers and not all parts of computerized organizations use computers?
- What is the footprint of Linux? What percentage of the applications/workloads touching enterprises run on Linux?
- What is the footprint of RHEL? That is, what is RHEL's share of the Linux footprint?

The allocation exercise is enabled by IDC research products that track server installed base by operating system and reports that provide vendor market share of Linux (paid and unpaid).

More specific steps of the calculation rely on the following:

- Data on business revenue by target region is based on GDP and gross output figures from government and third-party sources (e.g., the U.S. Bureau of Economic Analysis and the Bureau of Labor Statistics and the Economist Intelligence Unit).

- We break down the aforementioned revenues by category – gross margin, expenses, labor costs, external IT spending, and IT staff costs based on generally accepted economic ratios and company analysis by IDC.
- We estimate the "footprint" of various business applications/server workloads by category; for this project, those apps/workloads, taken from IDC's server workload taxonomy and supported in IDC's server workload tracker, are:
  - AI and analytics
  - Content and collaboration
  - CRM
  - ERM and production
  - Supply chain/other
  - Engineering and development
  - IT applications (app dev and data management)
  - IT infrastructure (security, file and print, web serving, etc.)
  - Other
- For each application/workload, the model estimates the percentage of enterprises using that app/workload, based on survey data, and the app/workload's "footprint" – or percentage of revenue/expenses likely affected by such an app/workload. These estimates are also informed by IDC surveys in similar projects, the relative share of software spending for each application/workload, and estimates from predecessor models.
- These percentages are then applied to the regional revenue/expenses to get the total app/workload footprint.
- From this point, the RHEL footprint is derived by applying the RHEL share of Linux by workload and the Linux share of all enterprise operating systems by workload.

Note that while the resultant RHEL footprint may seem inordinately large (trillions of dollars), that is a footprint across global business revenue, which is >$185 trillion in 2019.

The RHEL Advantage Model

This model augments the footprint model by taking survey data on the benefits of RHEL and applying it to the RHEL footprint previously described.

The output is driven by the percentage of respondents reporting on each app/workload as to whether using the app/workload raised revenue, cut costs, or improved productivity … and by what percentage. (Note that a single app/workload may provide benefits in more than one of these three categories.)

By app/workload by region, these benefits are then aggregated into a total.

The survey supporting this benefit analysis was conducted in 2019 and included 607 responses across China, Germany, Italy, Japan, the United Kingdom, and the United States. These six countries account for 65% of global IT spending.

The RHEL IT Advantage Model

This model takes survey data on the benefits of RHEL to IT organizations and applies it to organizations using RHEL. The survey data benchmarks results across nine IT functions/metrics:

- Purchase cost of servers
- Maintenance cost of servers
- Cost of software running on servers
- IT staff time managing servers
- IT staff time doing routine IT tasks
- Time to resolve support calls
- Time to recover from unplanned downtime
- Time to deploy new business apps
- Time to upgrade mission-critical apps

The model then applies the RHEL advantage/disadvantage enumerated in the survey to regional spending by RHEL customers on software, servers, and IT staff.

The RHEL Ecosystem Opportunity Model

To size the opportunity for Red Hat partners and potential partners, this model first estimates Red Hat's RHEL revenue and then estimates all the ancillary software, hardware, and services tied to RHEL. Some of the specific steps are:

- **Capturing Red Hat's annual revenue and forecasting it to 2023.** Revenue until 2019 is derived from Red Hat financials (validated with IDC's software tracker data). For 2019, IDC uses the analyst average posted on Yahoo! Finance for revenue. Beyond that, IDC grows Red Hat revenue at the market growth rate for Linux systems software. Regional splits are derived using the IDC software tracker.
- **Estimating the software running on RHEL.** This is done using standard ratios of application, application development, and some system software to Linux operating system software from IDC's software tracker and IT spending guide.
- **Estimating the hardware supporting RHEL and ancillary software.** This uses ratios from IDC's IT spending guide to compare hardware spending with the relevant software spending. The calculation incudes primarily enterprise hardware (servers, storage, and networking) but also a small amount of end-user hardware and IoT hardware.
- **Estimating IT and business services supporting RHEL, ancillary software, and the underlying hardware.** This too uses ratios from IDC's spending guide to develop a ratio of services spending to software spending.
- **Estimating resale margin.** The purpose is to estimate the difference between end-user spending and vendor revenue, which is represented by the difference between reseller revenue and reseller expenses selling RHEL and ancillary hardware and software. This relies on IDC's software and hardware channels research and an annual survey of software resellers' business models, including resale margins.

Ecosystem revenue is then added up to four main categories: additional software, supporting hardware, IT and business services, and resale margin. The total excludes RHEL revenue. Ecosystem revenue is ~20-25 times that of Red Hat. This is consistent with past work on the ratio of software, hardware, and services to an operating system.

With the ecosystem sized, it is also possible to estimate the number of people employed by Red Hat and its ecosystem, using revenue-per-head data from IDC's long-running internal Economic Impact of IT Model, which sizes industry head count and company count by country. IDC then used IT spending ratios per IT pro from the same model to estimate IT pro jobs related to RHEL and the products and services of its ecosystem.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-community.com
www.idc.com

Copyright Notice

External Publication of IDC Information and Data – Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request. IDC reserves the right to deny approval of external usage for any reason.

Copyright 2019 IDC. Reproduction without written permission is completely forbidden.