

# The business case for HP BladeSystem with HP Integrity server blades

A guide for financial and IT managers



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# The modular and integrated design of HP BladeSystem with HP Integrity server blades provides a clear advantage over traditional infrastructures in terms of total cost of acquisition (TCA) and total cost of ownership (TCO).

## Introduction

This paper will help financial managers and IT managers understand the benefits of TCO so you can build a solid business justification for your technology purchase.

This paper is not a hypothetical benchmark or magic answer for how much less blades cost versus traditional server and storage infrastructures in all cases. There are simply too many variables. Instead, we will illustrate our points with a sample configuration and common-sense examples of how blades save upfront costs, reduce administrator time, and extend your IT budget.

## Total cost of ownership (TCO)... the basics

TCO is what it costs you not just to buy, but to maintain and use what you buy. TCA analysis only reveals upfront costs, but TCO analysis can help you uncover areas of potential cost savings over time. For example, when you purchase a car, the sticker price is not the end of all car-related expenses. You need to pay for taxes and insurance; buy fuel, oil changes, new tires, filters, belts, hoses and so on. All of this contributes to the total cost of owning the vehicle. TCO also includes unscheduled problems, such as mechanic's fees and expense of a broken-down car keeping you from a critical business appointment.

The typical economic life of a server is three to five years. TCO for servers is estimated to be as much as four times the cost of the initial server purchase due to the additional infrastructure needed to support the

server, plus facility power, cooling, space and administrator time required to set it up and maintain it. TCO for a server also includes hardware and software upgrades, technical support, software upkeep, training, and other maintenance.

TCO analysis can help you uncover a variety of hidden costs. For example, servers deliver a critical service to the business, its employees, customers and partners. This includes customer database access, customer communications or online stores. The costs of these services being unavailable vary from business to business, but can be substantial.

### Total cost of acquisition (TCA)

The total cost, including taxes and fees of an asset, including peripheral equipment and the infrastructure needed to support it.

### Total cost of ownership (TCO)

The total cost of acquisition plus costs for upkeep and maintenance incurred during the lifecycle of an asset.

## How blades deliver savings

Blades have the same features as standard servers or storage and run the same applications. The key difference is that blades share a common infrastructure called a "blade enclosure." In a nutshell, a blade enclosure is an all-in-one infrastructure in a box.

Traditional servers and storage require additional infrastructure to run your applications, connect to other systems and deliver services to the business. These include cables, network switches and specific options on each server. In addition, each server has its own

HP c7000 enclosure with HP Integrity BL870c server blades



HP c3000 tower enclosure with Onboard Administrator module and HP BL860c server blades



power supplies, cables and fans. And, servers are typically managed and updated individually. To protect against downtime, an additional server is often needed as a spare.

Within an HP BladeSystem with HP Integrity server blades, modular resources are pooled and shared. This makes it easier to build, adapt and maintain the common elements of your infrastructure. It saves money and time by reducing maintenance events, cables and switch connections. It also provides shared power and cooling that save up-front costs and help reduce monthly energy and air conditioning bills. Finally, the enclosure adds redundancy to each server to prevent unplanned downtime and makes it easier to allocate a single spare to protect many servers at once.

#### How expensive is a blade enclosure?

A typical blade enclosure starts at US\$3,000 to \$6,000. In most cases, individual server blades will cost less than comparable rack or tower servers, depending on configuration. In many cases, the break-even point for Integrity server blades versus a similar number of rack servers is as low as two to three blades per enclosure.

## Sample TCO configurations

HP provides the HP BladeSystem TCO Analysis tool, independently developed by Alinean, Inc. ([www.alinean.com](http://www.alinean.com)) that helps you create a savings estimate based on your specific configuration needs. This calculator is available at [https://roianalyst.alinean.com/ent\\_02/AutoLogin.do?d=158111260533428510](https://roianalyst.alinean.com/ent_02/AutoLogin.do?d=158111260533428510).

Using the HP BladeSystem TCO Analysis tool, we created a sample set of data (see Tables 1, 2, 3, 4) based on a purchase of 16 HP Integrity BL870c server blades in BladeSystem c7000 enclosures compared to 16 traditional rack-mount rx6600 servers, each with LAN and SAN connectivity (see Appendix A for server configurations). When you create your own comparison, you can choose more or less equipment plus change the assumptions to suit your real and quoted costs. You can even calculate very small configurations using the BladeSystem c3000 enclosure for small businesses and branch offices.

Server and storage blades install into a blade enclosure without wires. All network signals are combined and sent to outside network and storage through blade switches in the back. These switches can reduce the number of network cables by up to 94 percent as well as use fewer switch ports on more expensive core switches. The up-front cost advantages of blades primarily come from the integrated networking design that eliminates many cables, options and additional equipment. This is why, in almost all cases, blades are the most affordable way to connect your servers to a SAN environment, even with as few as one to three servers. The HP BladeSystem also eliminates the need for KVM switches and cables by providing built-in remote management capability. This feature can save as much as US\$25,000 for each rack of 1U rack-mount servers.

**Table 1. Sample TCA savings**

	BL870c server blades	rx6600 server	Blade savings
Server costs	\$299,636	\$578,784	\$279,148
Ethernet cable costs	\$500	\$2,400	\$1,900
Ethernet port costs	\$23,392	\$30,160	\$6,768
SAN cable costs	\$8,016	\$12,080	\$4,064
SAN port costs	\$23,996	\$31,996	\$8,000
Rack costs	\$1,489	\$4,467	\$2,978
<b>Savings</b>			<b>\$302,858</b> <b>45.90%</b>

HP management software and services offer many cost savings. They allow you to fully take advantage of the shared design of blades, easy installation and maintenance to pass substantial savings along to your business.

**Table 2. Sample software and services savings**

	BL870c server blades	rx6600 server	Blade savings
Software costs	\$31,840	\$31,840	\$0
Service costs (includes software services)	\$115,935	\$129,410	\$13,475
<b>Savings</b>			<b>\$13,475</b> <b>8.36%</b>

**Economies of scale are key to the value of blades.**

Even in a small installation, such as two or three BL870c server blades, the more you fill the enclosure with blades, the more you save. Infrastructure costs are spread across more servers and improve the power, cooling and management efficiency of the enclosure.

Similarly, a large installation of 300 or more blades will deliver similar cost advantages in terms of rack space, floor space, peripheral equipment costs and, of course, power, cooling and maintenance time.

There are dozens of other areas of potential operational cost savings in administrative time, uptime and flexibility—beyond just space, power and cooling. HP account managers and partners have access to even more robust TCO analysis tools backed by cost benchmarks collected from hundreds of clients and industries to help you create a comprehensive report specific to your upcoming project.

**Table 3. Sample operational cost savings**

	BL870c server blades	rx6600 server	Blade savings
Data center space costs	\$2,028	\$6,081	\$4,053
Power usage costs	\$26,603	\$41,118	\$14,515
Cooling costs	\$53,206	\$82,236	\$29,030
<b>Savings</b>			<b>\$47,598</b> <b>36.77%</b>

**Table 4. Sample TCO savings**

	BL870c server blades	rx6600 server	Blade savings
Totals	\$586,641	\$950,572	\$363,931
<b>Savings</b>			<b>\$363,931</b> <b>38.29%</b>

**Variables affecting blade purchase cost**

If a \$5,000 blade enclosure is shared by only five BL860c server blades versus the full eight available, the cost per blade will be higher because the amortized cost of the blade enclosure—shared cables, rack space, network switches—is divided among fewer blades. As a general rule, more blades per enclosure yields lower acquisition costs.

**According to the GigaGroup...**

up to 25 percent of a system administrator's time is spent on cable management. To make matters worse, cable failures are a prime cause of downtime.

## Hidden costs and additional TCO advantage

Many different aspects of blade design help reduce costs and mitigate risk. The most common TCO improvements come from administrator productivity gains, the flexibility of the modular design, power and cooling savings, and less planned and unplanned downtime. (See Table 5)

### Tools to help you collect data

HP provides a variety of tools and services available from your account representative or HP partner to help you outline and compare the TCO of different options. There are also a number of professional firms that undertake TCO analysis for a fee.

**Detailed BladeSystem TCO analysis:** Contact your HP account manager or HP partner representative to discuss a complete TCO analysis or proof of concept.

**Build your blade configuration:** With this online tool, you can build a very precise technical configuration which also includes details for power, cooling and facilities planning. These details will help make an accurate TCA and TCO comparison. Go to: [www.hp.com/go/bladesystem/configurator](http://www.hp.com/go/bladesystem/configurator)

### Techniques beyond TCO

While TCO spurs better dollars-and-cents thinking, it's really just a start. Technology tends to defy, rather than comply, with common-sense purchasing rules. Reducing server and infrastructure costs doesn't necessarily increase return on investment. People who drive a cheap car often delude themselves into thinking they're frugal. But when the car breaks down and they lose money, time and opportunity, they obviously haven't come out ahead.

**Table 5. Blade features that save costs**

Blades need fewer cables and other network equipment	<ul style="list-style-type: none"> <li>• Saves hours or more in initial setup time and accelerates server replacement and maintenance</li> <li>• With technologies like Virtual Connect, blades can be added, replaced and recovered through software, saving the time of LAN, SAN and server administrators</li> <li>• Each cable is a potential point of failure; blades offer redundant connections to more servers, but with fewer cables</li> <li>• By obstructing server vents, racks or air circulation underneath raised floors, cable sprawl can force server fans and air conditioners to use more power for cooling</li> </ul>
Blades are modular with fewer moving parts	<ul style="list-style-type: none"> <li>• Capacity planning is simplified because the infrastructure behind the servers is already in place</li> <li>• Asset management and retirement are streamlined</li> <li>• Modularity means faster expansion and upgrade of an existing infrastructure</li> <li>• Maintenance, initial setup and repairs are simplified</li> <li>• Blades are interchangeable, with fewer spare parts to order and less spare inventory to stock</li> </ul>
Blades use less floor space with more servers per rack	<ul style="list-style-type: none"> <li>• Enables more efficient utilization of data center floor space</li> <li>• Delays future data center construction, upgrade and expansion</li> <li>• Reduces overhead expenses based on square footage and depreciation of the HVAC infrastructure</li> </ul>
Blades use less power and require less cooling	<ul style="list-style-type: none"> <li>• Lowers monthly power costs</li> <li>• Reduces strain on air conditioning by generating less heat</li> <li>• Improves ability to increase power and cooling efficiency by identifying hot and cool spots</li> <li>• Delays future data center construction, upgrade and expansion</li> </ul>
Integrated management tools improve administrator productivity	<ul style="list-style-type: none"> <li>• A shared view of infrastructure assets simplifies resource management and makes it more efficient</li> <li>• Reduces troubleshooting and repair time</li> <li>• Accelerates project time lines and the deployment process between development, testing and production</li> <li>• Reduces maintenance needs by reducing the number of servers running given applications</li> <li>• Can be a significant step forward to standardize on a given OS or hardware platform</li> <li>• Speeds maintenance to reduce planned downtime</li> </ul>
Blades provide built-in redundancy and self-monitoring	<ul style="list-style-type: none"> <li>• Opportunities for improvement in reliability and quality of service</li> <li>• Fewer places for failure improve mean time between failure and reduce unplanned downtime</li> </ul>
Blades feature remote monitoring improvements in TCO	<ul style="list-style-type: none"> <li>• Reduces travel to remote locations for service</li> <li>• Saves administrator time by eliminating tasks performed within the data center</li> <li>• Helps avoid unplanned downtime outside of business hours</li> </ul>

What does this mean to an IT manager or financial decision-maker? It means increased IT utilization, improved productivity for your IT staff, faster time to market for new products and services that rely on your IT purchases. It means a shorter payback time on your investments and a lower server break-even point. Costs alone mean nothing. What really matters is how your investments pay you back. Here are several techniques beyond TCO that help you measure the financial attractiveness of any IT project.

**Return on investment (ROI):** How much profit or cost saving is realized. If your business has immediate objectives of winning a new account or adding new customers, gaining market revenue share, positioning itself for sale, or other objectives, a return on investment might be measured in terms of meeting one or more of these objectives rather than in immediate profit or cost savings.

**Payback period:** The length of time required to recover the cost of an investment. It can be calculated by dividing the cost of the project by the annual cash inflows that result. All things being equal, a shorter payback period is the better investment.

**Net present value (NPV):** A standard method for the financial appraisal of long-term projects. It measures the excess or shortfall of cash flows, in present value (PV) terms, once financing charges are met.

**Internal rate of return (IRR):** A capital budgeting metric used to decide whether or not to make investments. It is an indicator of the efficiency of an investment (as opposed to NPV, which indicates value or magnitude). You can think of IRR as the rate of growth a project is expected to generate. Generally speaking, the higher a project's internal rate of return, the more desirable it is.

## HP Services enhance business outcomes

Increasing the success of any data center implementation requires thorough planning, expert implementation and committed support. HP offers a full portfolio of services that enable successful planning, design and implementation of HP BladeSystem with Integrity server blades. HP is committed to providing responsive long-term support to maintain the value of your IT investments throughout the complete lifecycle of your IT solution. HP and its partners can help you increase performance and successfully meet and exceed your IT service-level agreements with your business and your customers.

One of the most critical aspects of adopting HP BladeSystem is providing data center readiness. HP offers a complete data center assessment service, covering security issues, legacy system audits, data

center thermal analysis, hardware and software support requirements, IT Service Management, proactive mission-critical support, and more.

To simplify the ordering, configuration and deployment of complete HP BladeSystem solutions, you may choose HP Factory Express services. Our factory-direct capabilities speed project implementation by delivering plug-and-play blade solutions completely integrated and shipped in a fully configured rack. HP Factory Express provides you with unique capabilities like fully integrated blade rack solutions built and configured to your own unique specifications that are preloaded, wired, racked, tested and ready to deploy within six to ten days of an order. Each solution is fully tested and validated in an ISO 9002 environment prior to shipment. HP engineers are available to help you install your preconfigured system on site, and you have access to HP technical expertise from day one to assist with familiarization and usage questions.

HP provides a complete IT lifecycle services methodology for IT consolidation and virtualization—from consolidation assessment and planning services to implementation and startup services to availability assessment and support services. To help you increase application availability, HP also offers services to provide an extra level of support beyond standard warranty coverage, including 24x7 technical hardware and software support, and proactive remote monitoring and management services that alert administrators to faulty conditions before you are affected.

### HP Financial Services

HP Financial Services makes it easy for you to intelligently and economically manage business technology investments. Leasing affords companies the opportunity to expand or renew IT infrastructure, independent of budget cycles. As a partner, we develop flexible solutions that address your business needs and fit within your budget.

### HP Services benefits

Companies across the globe rely on HP Services to help them implement and support IT solutions. To meet these needs, we supplement our own Services team with a carefully selected network of authorized channel partners. This provides a fuller set of services anywhere you do business—no matter how remote the location.

It's the best of both worlds: a strong global presence and proven experience from HP, and a familiar local presence from our trusted partners. Together, our goal is to help you reap cost and productivity benefits from your HP BladeSystem infrastructure.

- Gain greater performance from your HP BladeSystem investment
- Increase system utilization rates
- Improve productivity

## Summary

Ultimately, determining the TCO of any project depends upon careful research of all variables, not just the initial purchase cost. In almost all cases, the TCO of any IT purchase will greatly exceed the initial purchase price within the first five years. These costs were top-of-mind for HP engineers when they designed the HP BladeSystem. Savvy financial decision-makers carefully research their server investments by conducting power, performance and reliability tests and pilot programs of new hardware and software before making a purchase. With a comprehensive TCO analysis, your organization can better track its spending and make accurate budget projections. If at the end of your analysis you choose to adopt HP BladeSystem using HP Integrity server blades, you are not merely making a choice about servers, but a commitment to fundamentally improve the cost structure across your entire infrastructure.

## Additional resources

To connect with other blade customers, partners and experts, visit the HP Blade Connect online community at go to [www.hp.com/go/bladeconnect](http://www.hp.com/go/bladeconnect).

To learn more about HP BladeSystem, visit [www.hp.com/go/bladesystem](http://www.hp.com/go/bladesystem).

To learn more about HP Integrity server blades, visit [www.hp.com/go/integrityblades](http://www.hp.com/go/integrityblades).

# Appendix

**Table 6. Sample server configuration assumptions**

	BL870c server blade	rx6600 server
Processors	(2) 1.6GHz/18M Intel Itanium processors	(2) 1.6GHz/18M Intel Itanium processors
Memory	16GB PC2-53000 2x1	16GB PC2-53000 2x1
HDD	(2) 72GB 10K SAS drives	(2) 72GB 10K SAS drives
SAN	PCIe 4GB dual-port Fibre Channel mezzanine card	PCIx 4GB dual-port Fibre Channel card
NICs	Included in base unit	GbE NIC
Redundant power and cooling	Included in base unit	Redundant supplies and fans
Cost per server	\$17,992	\$38,939

**Table 7. Other assumptions**

Cost per square foot	\$62.50
Data center port cost	\$450
Edge switch port cost	\$287
Electricity cost (per KWh)	\$0.12
Ethernet cable cost	\$25
FC cable cost	\$103
SFP cost	\$199
Server operating hours	8,736
Cooling factor	2
Years of power and cooling	3

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