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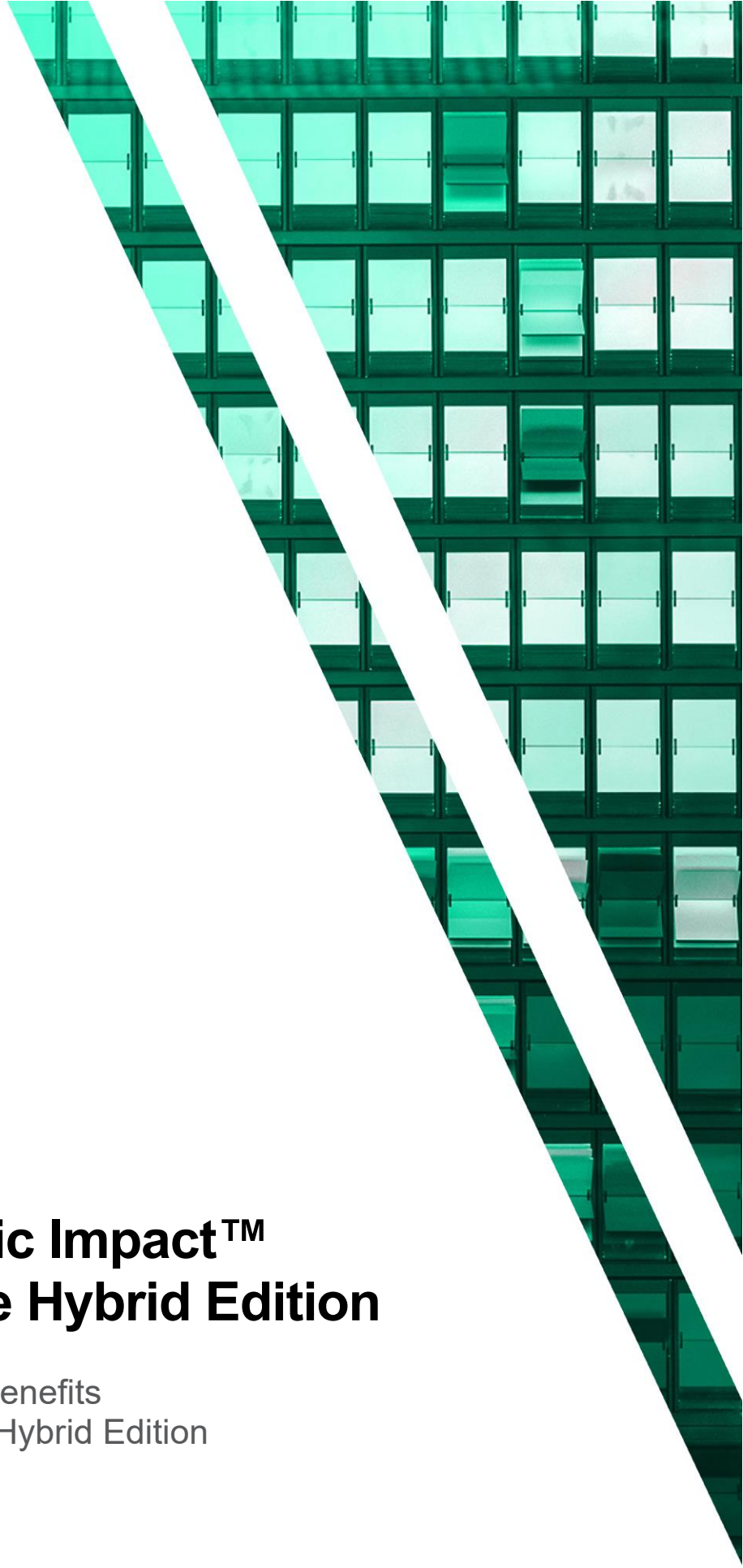


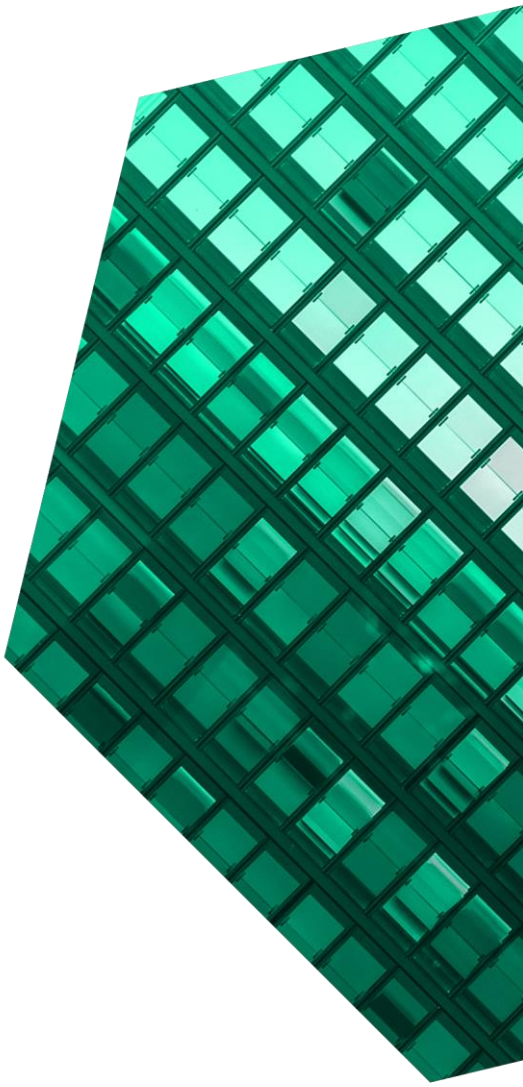
The Total Economic Impact™ Of IBM WebSphere Hybrid Edition

Cost Savings And Business Benefits Enabled By IBM WebSphere Hybrid Edition

AUGUST 2021

Table Of Contents

Consulting Team: Richard Cavallaro
Sam Sexton



ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. For more information, visit forrester.com/consulting.

Executive Summary

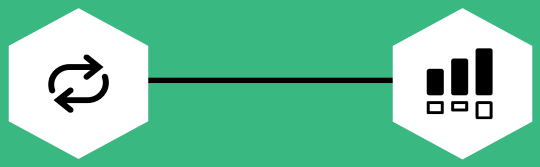
IBM WebSphere Hybrid Edition allows organizations to embrace cloud modernization and technologies such as containers and microservices to increase capacity, reduce costs, and reduce IT complexity — all while removing friction from the day-to-day duties of their developers and IT staff. This yields increased productivity, flexibility, and shorted development cycles.

For organizations to drive infrastructure efficiency, increase the speed of software development, and transform apps with cloud enablement at the forefront, they must embrace technologies such as containerization and microservices while continuing to enable their developers and IT staff with the tools they need to flexibly deliver timely and secure functionality to the business.[1]

WebSphere Hybrid Edition is comprised of multiple IBM solutions that support an organization's application modernization journey all under one license. WebSphere Liberty is a Java Enterprise Edition (Java EE), Jakarta EE, and a MicroProfile server runtime provides a low-overhead Java runtime environment that is well-suited for hosting cloud applications and microservices. WebSphere Liberty is designed to be highly composable, to start fast, to use less memory than other solutions, and to easily scale. Developers have access to popular tools and Liberty features that increase their productivity. A more modern administrator console simplifies administration of the Liberty environment. Open Liberty is also an option for developers looking for the flexibility and community of an open-source option. Included in WebSphere Hybrid edition is additional functionality, like IBM Cloud Transformation Advisor and IBM Mono2Micro, which ensures an optimized and efficient path to cloud for an organization's workloads.

IBM commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying WebSphere Hybrid Edition. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of WebSphere Hybrid Edition on their organizations.

KEY STATISTICS



Return on investment (ROI)
195%

Net present value (NPV)
$4.69M

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed four customers with experience using WebSphere Hybrid Edition. For the purposes of this study, Forrester aggregated the experiences of the interviewed customers and combined the results into a single composite organization.

Prior to using IBM WebSphere Hybrid Edition solutions, the interviewed organizations struggled to maintain a balance of application modernization and related infrastructure savings, developer and IT staff efficiency, and application innovation.

After the investment in IBM's WebSphere Hybrid Edition, the organizations embraced technologies such as containers and microservices to reduce costs and IT complexity, all while removing friction from the day-to-day responsibilities of their developers and IT staff. This yielded increased productivity and shorted development cycles.

> **From my point of view, WebSphere [Hybrid Edition] has helped us make the bank cloud-ready.**
>
> — Product manager, banking

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Improved developer productivity by up to 50%.** Developers reap productivity benefits along both application migration and application development workstreams, allowing each developer to accomplish more while shortening development cycles by up to several months per project.
- **Improved IT administrator productivity by 40%.** IT administrators save time from tasks supporting their developers such as web application server instance provisioning, patching, and monitoring.
- **Accelerated profit from customer-facing application development of $1.8 million.** By enabling developers to more quickly develop and iterate on applications, functionality, and microservices, organizations recognize the revenue and profit associated with these applications and services faster.
- **Infrastructure cost savings of $2.6 million.** Interviewees reported infrastructure savings (and savings related to power, cooling, and maintenance) from an improvement in density by up to 40%, as well as utilization of less-expensive hardware because their organizations adopted IBM WebSphere Hybrid Edition.

Unquantified benefits. Benefits that are not quantified for this study include:

- **Improved security posture.** Interviewees said their organizations gained the ability to be more flexible with application security on WebSphere, which improved their organizational security posture.
- **End-user productivity.** While not quantified for this analysis, end users benefit from the iterative application performance and uptime improvements that come from migrating to WebSphere Liberty, Open Liberty, and containers.
- **Developer experience.** Interviewees said WebSphere Hybrid Edition enhanced the quality of life for developers. They are now free to do their jobs and flexibly create and deploy applications, microservices, or functionality.

Costs. Risk-adjusted PV costs include:

- **License fees of $274,000 paid to IBM over three years.** Interviewees said their organizations' license fees are based on their specific WebSphere Hybrid Edition deployments.
- **Implementation and ongoing management costs of $2.1 million over three years.** Interviewees said their organizations' initial and ongoing levels of personnel effort were around modernization efforts on WebSphere Hybrid Edition.

The customer interviews and financial analysis found that a composite organization experiences benefits of $7.10 million over three years versus costs of $2.41 million, adding up to a net present value (NPV) of $4.69 million and an ROI of 195%.

"WebSphere has allowed us to mitigate issues related to staff shortages, staff skills, and time pressure to deliver applications and changes as quickly as possible to production."

– AVP and business transformation architect, banking

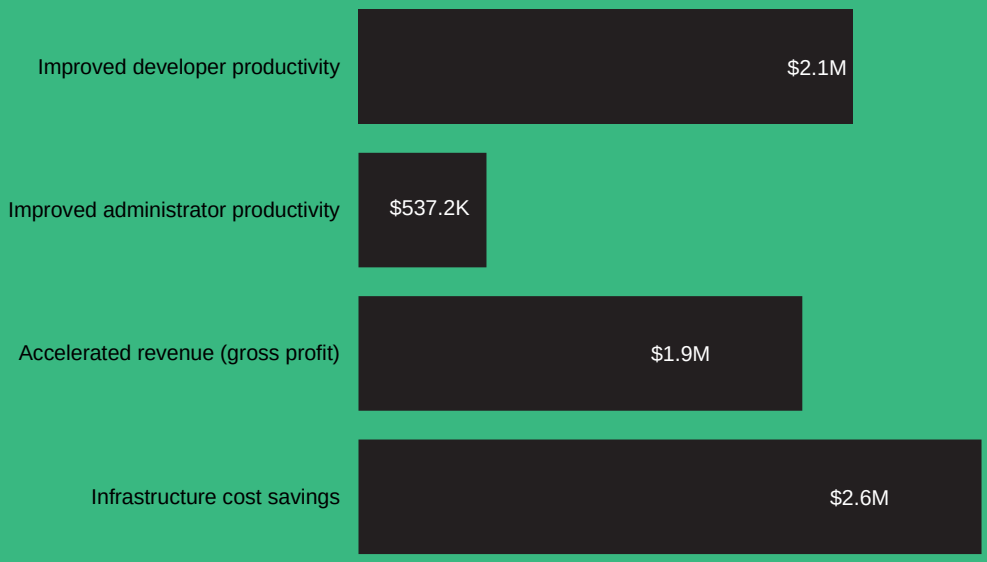
ROI
195%

BENEFITS PV
$7.10M

NPV
$4.69M

PAYBACK
8 months

Benefits (Three-Year)



TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in IBM WebSphere Hybrid Edition.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that IBM WebSphere Hybrid Edition can have on an organization.

DUE DILIGENCE

Interviewed IBM stakeholders and Forrester analysts to gather data relative to WebSphere Hybrid Edition.

CUSTOMER INTERVIEWS

Interviewed four decision-makers at organizations using IBM WebSphere Hybrid Edition to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed organizations.

FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.

CASE STUDY

Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The IBM WebSphere Hybrid Edition Customer Journey

Drivers leading to the WebSphere Hybrid Edition investment

Interviewed Organizations

Industry	Region	Interviewee	Revenue
Banking	United Kingdom	Product manager	$20B+
Banking	Middle East	AVP and business transformation architect	$1.5B+
Retail	United States	System administrator, middleware team	$150B+
Healthcare	United States	Systems analyst	$650M+

KEY CHALLENGES

The interviewed organizations struggled with common challenges, including:

- **Complexity with legacy application server solutions which greatly taxed developers and administrators already struggling with staffing issues.** Every interviewee said administrator and developer shortages necessitated solutions to maximize efficiency in their respective roles.
- **The need for application modernization and containerization.** Interviewees said their organizations' legacy application server tools did not support their journeys to cloud technologies, notably in their support for microservices and containers. This led to unnecessary complexity and cost throughout the organizations' application estates.
- **Increasing infrastructure costs.** As the organizations' application estates continued to expand, infrastructure utilization and the related power, cooling, and maintenance costs continued to expand as well.

"We wanted to start to get into microservices as a means of modernization given our [retail] services, which these applications run. Historically, in order for us to deploy those services, we ended up needing a new environment. With WebSphere, we wanted to enable our developers with a self-service option to build cloud-native applications."

System administrator, retail

INVESTMENT OBJECTIVES

The interviewed organizations searched for a solution that could:

- Support the journey to containerization.
- Enable the continued development of business-critical microservices.
- Allow developers flexibility and efficiency to develop applications in the format they see fit, addressing the skills shortage while improving the delivery of business-critical functionality to the organizations.

KEY RESULTS

The interviewees highlighted key results, including:

- **Efficiency for key staff.** With WebSphere Liberty, the interviewed organizations can quickly migrate applications to Liberty, easily provision and configure runtimes, minimize the size of the servers for fast start-ups, and provide developers access to innovative features like microservices, containers, and cloud connections to speed application modernization. Interviewees noted that these efficiencies help to address the skills shortages their organizations often face for developer and IT talent.
- **Support for business-critical microservices and migration to containers.** Some interviewees noted that WebSphere Hybrid Edition allows their organizations' developers to create and support microservices that reduce application complexity while supporting the objectives of the businesses. Some applications can be refactored as microservices on WebSphere Hybrid edition via Mono2Micro. Other interviewees cited migration to containers as a major step in reducing costs and complexity, while interviewees from organizations at the beginning of their containerization journeys expressed optimism about these additional benefits in the future. One interviewee also touted their organization's ability to build and deploy simultaneously to multiple container platforms.
- **Flexibility for developers to leverage open source and deploy applications.** Interviewees said WebSphere Hybrid Edition gives developers the flexibility to select traditional WebSphere Application Server, WebSphere Liberty, and Open Liberty for their applications, which greatly increases their productivity while supporting the best path forward for their applications. Interviewees also cited the benefit of community support with Open Liberty for their developers, regardless of the WebSphere option selected.
- **Improvement to hardware and infrastructure utilization and increased capacity both on-premises and in the cloud.** Components of WebSphere Hybrid Edition allow organizations to continually evaluate their on-premises applications to determine which ones may be primed for modernization. This yields infrastructure savings as workloads are moved to the cloud while reduced complexity allows organizations to take advantage of less-expensive, less-specialized hardware. Organizations also realize savings remaining on-premises with Liberty. Mono2Micro allows organizations to reconfigure applications into more efficient microservices.

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Key assumptions

- **$10B revenue**
- **20 affected developers**
- **10 affected IT admins**
- **40 applications migrated to WebSphere Liberty**

Description of composite. The global, $10 billion-dollar, 40,000-employee organization wants to modernize its ever-growing estate of internally facing and customer-facing applications as part of an organizationwide cloud transformation initiative. A team of 20 developers and 10 IT administrators primarily interact with the organization's collection of application servers including WebSphere (traditional web-based applications and services [WAS], Liberty, and Open Liberty) and some competitive solutions.

Deployment characteristics. The organization migrates 40 applications (roughly 20% of its application estate) to WebSphere Liberty from traditional WAS and other Java Enterprise Edition (EE) servers at the beginning of this analysis and leverages Cloud Transformation Advisor to continually migrate applications to Liberty, Open Liberty, and a container platform over the subsequent years.

"For us, evergreen is hard. Keeping systems up to date is hard. If you can remove some of the complexity, then that's got to be an advantage. Our [WebSphere deployment] helps us there."

— Product manager, banking

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits

Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Improved developer productivity	$835,313	$835,313	$835,313	$2,505,938	$2,077,299
Btr	Improved administrator productivity	$216,000	$216,000	$216,000	$648,000	$537,160
Ctr	Accelerated revenue (gross profit)	$459,000	$918,000	$918,000	$2,295,000	$1,865,657
Dtr	Infrastructure cost savings	$1,260,000	$992,250	$868,219	$3,120,469	$2,617,801
	Total benefits (risk-adjusted)	$2,770,313	$2,961,563	$2,837,531	$8,569,406	$7,097,917

IMPROVED DEVELOPER PRODUCTIVITY

Evidence and data. Each of the interviewees noted to Forrester that enabling their organization's developers to be productive as possible while solving for their respective business demands was a top priority — especially given the short supply of skills in this domain. Interviewees also said developer efficiency increases during both application migration and application development workstreams are some of the most significant benefits of WebSphere Hybrid Edition.

- Interviewees said on-premises application modernization with WebSphere using IBM Cloud Transformation Advisor is very simple, and workloads from many different application servers can be quickly analyzed for migration without manual developer effort. Integration with WebSphere Liberty or container platforms allows for a facilitated migration for eligible workloads, compounding the productivity benefit for developers tasked with this work.
- WebSphere Hybrid Edition improved application startup times and decreased complexity due to excessive infrastructure requirements. One of the banking interviewees said: "The start-up times and the ability to refresh our environments quickly and easily [on WebSphere Liberty] is absolutely brilliant. It really significantly moves the needle on productivity through the roof." The same interviewee estimated that WebSphere Liberty deployments require up to 80% fewer developer FTE resources because of reduced footprint and complexity.
- WebSphere Liberty applications are simple to deploy, and the debugging experience is easier, with error messages to guide developers toward root issues with a reduced level of investigation. One banking interviewee told Forrester: "We've reduced the latency between the discovery of a problem and actually fixing it. Our developers are able to find problems faster and go through the debugging cycle and get to feedback a lot quicker. As a result of that, we're able to deliver [applications] to the business faster."
- Updates require less developer recoding on WebSphere Liberty than other solutions, further enabling increased productivity. The retail interviewee said WebSphere's integration with developer tools and workflows enables an increased level of collaboration when managing

updates and reduces rework that was prevalent on previous application servers.

- Several of the interviewees' organizations have reconfigured applications as microservices with Mono2Micro without rewriting them. This drives additional developer efficiency on an ongoing basis.

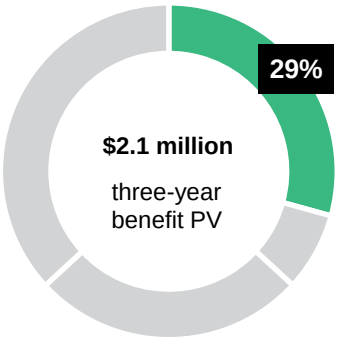
Modeling and assumptions. Forrester makes the following assumptions about the composite organization:

- Five developer FTEs tasked with workload migrations save 25% on ongoing migration efforts resulting from IBM Cloud Transformation Advisor and WebSphere Hybrid Edition.
- 20 developers working on applications, microservices, and updates save 50% of their effort on WebSphere Hybrid Edition.
- The average burdened annual salary for a developer is $165,000.
- Productivity capture is 50% because Forrester conservatively assumes that not all reclaimed time will be repurposed for value-adding work.

Risks. This benefit may vary among organizations based on:

- The skill and capacity of the organization's developers.
- The organization's application estate as it relates to development, updates, and modernization activities.
- The level of adoption of WebSphere Liberty by the organization's developers. This includes increasing familiarity with the Liberty platform over time, the use of new tools and features, and the ability to use features to achieve time savings.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $2.1 million.



"The collective controller dynamic routing and the routing rule feature allow us to simulate Kubernetes capabilities with canary release and blue-green [deployment] models. We can bring in a new application and just feed it traffic. If a team wants to test this, they can test it without sending live traffic. They can send in requests from a test perspective and make sure that it's ready and available. These are key features that are absolutely invaluable to our application estate."

Product manager, banking

Improved Developer Productivity					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
A1	Developer FTEs tasked with migration on WebSphere Liberty	Composite	5	5	5
A2	Reduced migration effort	Interviews	25%	25%	25%
A3	Developer burdened salary	Composite	$165,000	$165,000	$165,000
A4	Productivity capture	Assumption	50%	50%	50%
A5	Subtotal: Improvement to application migration effort	A1*A2*A3*A4	$103,125	$103,125	$103,125
A6	Developers using WebSphere Liberty	Composite	20	20	20
A7	Reduced development effort	Interviews	50%	50%	50%
A8	Subtotal: Improvement to development effort	A3*A4*A6*A7	$825,000	$825,000	$825,000
At	Improved developer productivity	A5+A8	$928,125	$928,125	$928,125
	Risk adjustment	↓10%			
Atr	Improved developer productivity (risk-adjusted)		$835,313	$835,313	$835,313
	Three-year total: $2,505,938		**Three-year present value: $2,077,299**		

IMPROVED ADMINISTRATOR PRODUCTIVITY

Evidence and data. Reduced complexity among organizations' application estates also yields productivity savings for IT administrators through reduced configuration requirements.

- The retail interviewee noted that with WebSphere, their organization's IT administrators could minimize their involvement with developers after development environments have been spun up. The interviewee said: "[The developers] do their updates, and we don't get involved in it after initial deployment. We templatized all the XMLs behind their services so that one looks the same everywhere. The only difference is that they have to supply an application XML that is specific to that specific application. We the admins are not involved. We build it, deploy it, and say, 'If we build it, they will come.'"

"[Our IT administrators have] become self-sustaining despite attrition. We don't worry so much about it because our developers have become so much more efficient that we don't need as many hands to support them. WebSphere has made us all more efficient and a little more knowledgeable."

System administrator, retail

- One interviewee told Forrester that WebSphere Hybrid edition nearly cut their organization's IT administrator effort in half (just less than 55%).
- The AVP at a banking organization cited a greatly facilitated admin experience as a highlight of WebSphere Liberty, noting that the solution simplifies admin tasks to a point where skills shortages become less of a concern.

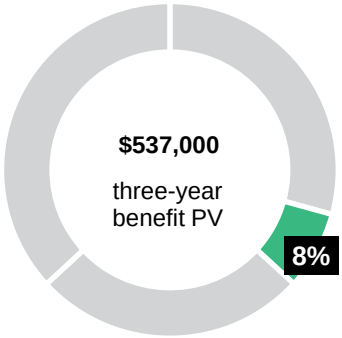
Modeling and assumptions. Forrester makes the following assumptions about the composite organization:

- 10 IT administrators save 40% effort on WebSphere Hybrid Edition. This is a conservative estimate based on the interviews.
- The average burdened annual salary for an IT administrator is $120,000.
- Productivity capture is 50% because Forrester conservatively assumes that not all reclaimed time will be repurposed for value-adding work.

Risks. This benefit may vary among organizations based on:

- The skill and capacity of the organization's IT administrators.
- The organization's application estate as it relates to an IT administrator's required tasks.
- The level of adoption and learning curve for administrators.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of more than $537,000.



Improved Administrator Productivity

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Affected administrators	Composite	10	10	10
B2	Improved efficiency due to WebSphere Liberty	Interviews	40%	40%	40%
B3	Average burdened annual administrator salary	Composite	$120,000	$120,000	$120,000
B4	Productivity capture	Assumption	50%	50%	50%
Bt	Improved administrator productivity	B1*B2*B3*B4	$240,000	$240,000	$240,000
	Risk adjustment	↓10%			
Btr	Improved administrator productivity (risk-adjusted)		$216,000	$216,000	$216,000
	Three-year total: $648,000			**Three-year present value: $537,160**	

ACCELERATED REVENUE (GROSS PROFIT)

Evidence and data. Productivity boons for both developers and IT administrators led to a reduction in development cycles for business-critical applications, updates, microservices, and functionalities. Delivering key services faster yields additional revenue on an ongoing basis.

- One of the banking interviewees estimated that revision cycles are cut by up to 70% on WebSphere Liberty and Open Liberty, which increases developer productivity while decreasing time-to-market for key applications, microservices, and functionalities.
- Interviewees said support for their organizations' application estates is a benefit that leads to less lost revenue via delay of key functionality to the businesses. One banking interviewee said: "Having the level of support we have is a massive benefit. It really is critical to the bank to have this support during critical incidents. The faster you can deliver, the bigger the impact of even a small delay. As an organization, we're starting to focus on daily deployments, which is an agile, DevOps mentality. WebSphere [Hybrid Edition], drives our ability to deliver on our business commitments."
- The retail interviewee said WebSphere Hybrid Edition reduced complexity, which increased performance and availability of their organization's application estate. They said their organization is able to strive for five-nines availability as a result.

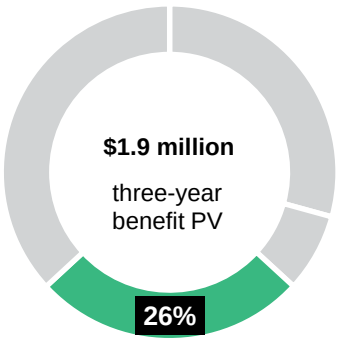
Modeling and assumptions. Forrester makes the following assumptions about the composite organization:

- The composite organization's developers deliver two applications and/or microservices to the business per month. Forrester conservatively estimates that the organization delivers one application and/or microservice per month as developers ascend the learning curve.
- A typical application or microservice is worth $60,000 in revenue or business value per month to the composite organization.
- WebSphere Hybrid Edition enables developers and IT administrators to deliver key functionality to the business at an average of three months faster.
- Industry gross margin is 25% because Forrester calculates this benefit in terms of gross profit.

Risks. This benefit may vary among organizations based on:

- The skill and capacity of the organization's developers and IT staff to meet its business objectives.
- The organization's size and industry, which can affect the functionality demands of the business and gross margin.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of just less than $1.9 million.



Accelerated Revenue (Gross Profit)					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
C1	Newly developed customer-facing applications or microservices	Composite	12	24	24
C2	Monthly average revenue per application	Composite	$60,000	$60,000	$60,000
C3	Accelerated development time (months)	Interviews	3	3	3
C4	Subtotal: Accelerated revenue attributable to WebSphere Hybrid	C1*C2*C3	$2,160,000	$4,320,000	$4,320,000
C5	Incremental gross profit margin	Assumption	25%	25%	25%
Ct	Accelerated revenue (gross profit)	C4*C5	$540,000	$1,080,000	$1,080,000
	Risk adjustment	↓15%			
Ctr	Accelerated revenue (gross profit) (risk-adjusted)		$459,000	$918,000	$918,000
	Three-year total: $2,295,000			**Three-year present value: $1,865,657**	

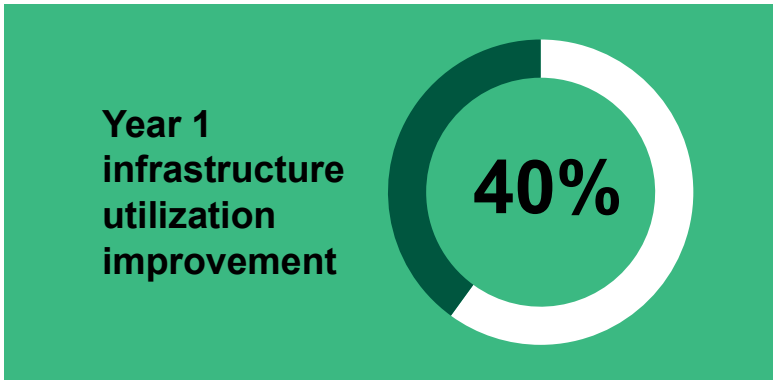
"With Liberty, we've been flexible to move to more commodity hardware rather than purchase expensive power chips."

Product manager, banking

INFRASTRUCTURE COST SAVINGS

Evidence and data. WebSphere Hybrid Edition and WebSphere Liberty improve infrastructure utilization and generate savings from the data center, infrastructure purchases, power, cooling, and other related costs. Compared to prior application server environments, WebSphere Liberty runs at a higher throughput with less memory, and it needs fewer resources to run workloads. Refactoring applications as microservices with Mono2Micro drives additional infrastructure (in additional to developer productivity) savings. Migration to containers also allows for additional savings.

- The healthcare interviewee told Forrester that migrating workloads to Liberty allowed their organization to avoid infrastructure refresh cycles and to free up budget for other initiatives.
- One of the banking interviewees said their organization saw considerable savings from moving into containers, supported by Liberty. They said: "One of the greatest benefits of

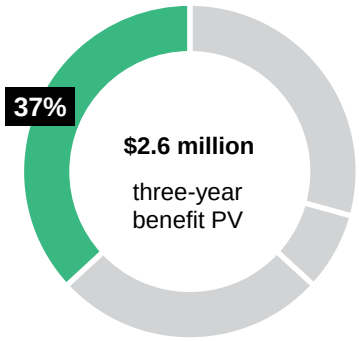


[containers] is taking advantage of almost community-funded hardware where you pay for your slice when you need it. Liberty plays very well in those environments."

- The interviewee from the retail organization described an improved ability to scale to the demands of the business on Liberty. They said: "We can scale on the same host or multiple hosts as we need to. We can scale up or scale down."

Modeling and assumptions. Forrester makes the following assumptions about the composite organization:

- The organization historically spends an average of $3.5 million per year on infrastructure, which grows by 5% annually.
- The organization reduces its infrastructure utilization costs by 40% utilization in Year 1. This levels off at 25% by Year 3.



Risks. This benefit may vary among organizations based on:

- The configuration and size of prior application servers.
- The scope, complexity, and current utilization of the organization's infrastructure.
- The current and future computing demands of the organization.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $2.6 million.

Infrastructure Cost Savings

Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Yearly spend on infrastructure (e.g., hardware, data center, etc.)	Composite	$3,500,000	$3,675,000	$3,858,750
D2	Improvement to infrastructure utilization	Interviews	40%	30%	25%
Dt	Infrastructure cost savings	D1*D2	$1,400,000	$1,102,500	$964,688
	Risk adjustment	↓10%			
Dtr	Infrastructure cost savings (risk-adjusted)		$1,260,000	$992,250	$868,219
	Three-year total: $3,120,469			**Three-year present value: $2,617,801**	

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Improved security posture.** Interviewees said their organizations gained the ability to be more flexible with security on WebSphere Liberty, which improved their security postures. One of the banking interviewees told Forrester: "Liberty takes away a lot of the complexity when it comes to configuring SSL [secure sockets layer], and that gives us great flexibility. You can control the certificates that the application uses in the Liberty configuration and you can change how you isolate key stores and trust stores within the Liberty configuration. That is a developer headache that you can change overnight." Another interviewee echoed that WebSphere Liberty allows their organization the flexibility to remain in security compliance with its critical applications, updates, and common vulnerability scorning system (CVSS) targets.
- **End-user productivity.** While not quantified for this analysis, end users benefit from iterative application performance and uptime improvements resulting from migration to WebSphere Liberty and Open Liberty. The interviewed product manager at one the banks noted improvement to supporting their organization's applications They said: "You're not having to wait until 2 a.m. — when the traffic drops off — to make application changes. That brings value to both [IT staff] and the end users."
- **Developer experience.** Interviewees said WebSphere Hybrid Edition improved the quality of life for developers. They are now free to do their jobs and flexibly create and deploy applications, microservices, or functionalities to the most appropriate runtime environments. With Open Liberty, developers take advantage of crowdfunded support, regardless of whether they're on WebSphere Liberty or Open Liberty.

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement WebSphere Hybrid Edition and later realize additional uses and business opportunities.

The compounding value of self-sufficiency and innovation for developers. Each of the interviewees expressed optimism about their organization's developers and their improved ability to innovate on their approaches to application development on WebSphere Hybrid Edition. Open Liberty gives developers a line into a support community and the ability to "get under the hood when needed," as one banking interviewee put it. Each interviewee also spoke about WebSphere's impact on cultivating a self-service, frictionless, developer mindset. Over time, these tools and related cultural changes may contribute to a deeper connection between the needs of the business and the developers who deliver on these needs.

> **"For our developers, there's definitely a better quality of life because they don't have to wait [IT administrators]. As a middleware team, we meet our SLAs, and our developers are freed up to do their jobs."**
>
> *System administrator, retail*

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Analysis Of Costs

Quantified cost data as applied to the composite

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Etr	License costs	$220,000	$22,000	$22,000	$22,000	$286,000	$274,711
Ftr	Implementation and ongoing management (migrations)	$1,232,000	$363,000	$363,000	$363,000	$2,321,000	$2,134,727
	Total costs (risk-adjusted)	$1,452,000	$385,000	$385,000	$385,000	$2,607,000	$2,409,438

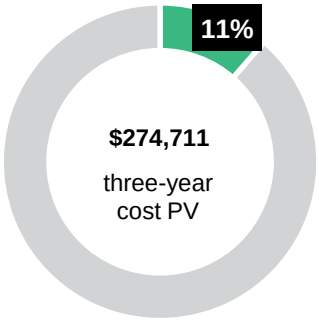
LICENSE COSTS

Interviewees said their organizations paid license fees based on their specific WebSphere Hybrid Edition deployments. Pricing is based on factors pertaining to each organization's unique application estate, and Forrester and IBM estimated the migration cadence for the composite organization. For pricing specific to your organization, please contact IBM.

Modeling and assumptions. Forrester assumes the composite organization pays $200,000 in WebSphere Hybrid Edition license costs (including first-year support) up front, and it pays an additional 10% for support in years 2 and 3.

Risks. This cost may vary among organizations based on:

- Pricing variances based on organizational specifics.
- Deployment and migration specifics.

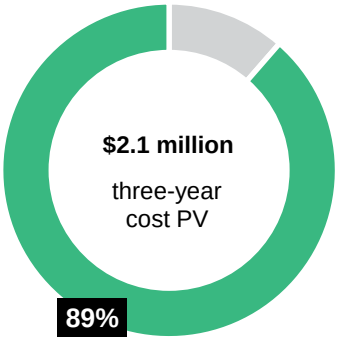


Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of just less than $275,000.

License Costs						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
E1	WebSphere licenses	Interviews	$200,000	$20,000	$20,000	$20,000
Et	License costs	E1	$200,000	$20,000	$20,000	$20,000
	Risk adjustment	↑10%				
Etr	License costs (risk-adjusted)		$220,000	$22,000	$22,000	$22,000
	Three-year total: $286,000			**Three-year present value: $274,711**		

IMPLEMENTATION AND ONGOING MANAGEMENT (MIGRATIONS)

The interviewees described their organizations' initial and ongoing levels of personnel effort around modernization efforts on WebSphere Hybrid Edition. Forrester aggregated the level of personnel effort for the composite organization based on these interviews.



Modeling and assumptions. For the composite organization, Forrester assumes:

- Eight developer and IT FTEs take 12 months to migrate 40 applications from a traditional WebSphere Application Server and other Java EE application servers to WebSphere Liberty, Open Liberty, and containers. They leverage tools such as IBM Cloud Transformation Advisor to make the most impactful migrations first.
- After the initial migration effort, two developer FTEs serve as leads on other WebSphere migration activities in subsequent years. These activities are not limited to ongoing migrations of on-premises workloads to WebSphere Liberty and/or containers, microservice reconfiguration activities (with Mono2Micro), and other related tasks.
- The blended average burdened annual salary for an implementation FTE is $140,000.
- The average burdened annual salary for a developer FTE is $165,000.

Risks. This cost may vary among organizations based on:

- The skill and capacity of the organization's developer and IT administrator FTEs.
- The initial and ongoing migration requirements with IBM WebSphere Hybrid Edition.

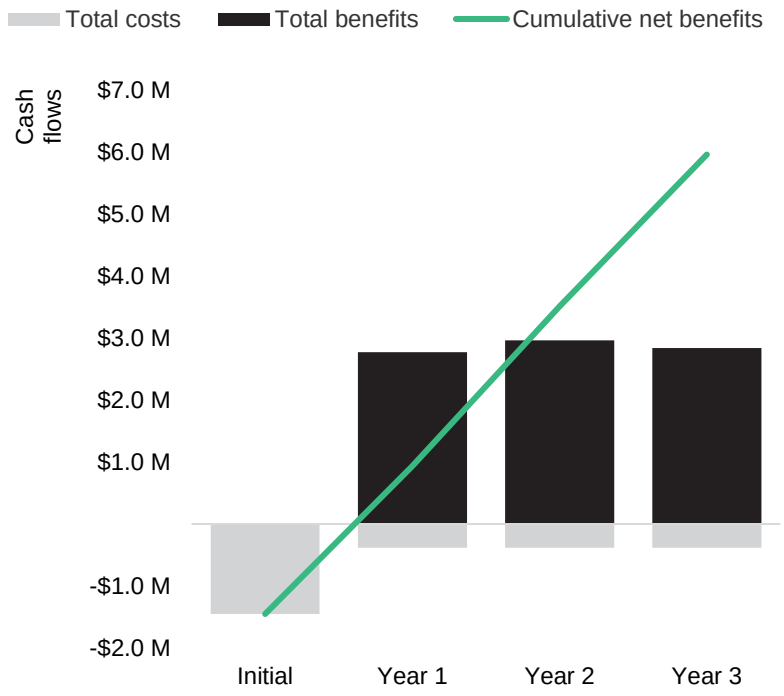
Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $2.1 million.

Implementation And Ongoing Management (Migrations)						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
F1	FTEs responsible for initial migration and planning	Composite	8			
F2	Implementation duration (years)	Interviews	1			
F3	Average burdened salary	Composite	$140,000			
F4	Subtotal: Initial migration and implementation	F1*F2*F3	$1,120,000			
F5	FTEs tasked with ongoing migration effort	Composite		2	2	2
F6	Average burdened salary	Composite		$165,000	$165,000	$165,000
F7	Subtotal: Ongoing migration effort	F5*F6		$330,000	$330,000	$330,000
Ft	Implementation and ongoing management (migrations)	F4+F7	$1,120,000	$330,000	$330,000	$330,000
	Risk adjustment	↑10%				
Ftr	Implementation and ongoing management (migrations) (risk-adjusted)		$1,232,000	$363,000	$363,000	$363,000
	Three-year total: $2,321,000			**Three-year present value: $2,134,727**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($1,452,000)	($385,000)	($385,000)	($385,000)	($2,607,000)	($2,409,438)
Total benefits	$0	$2,770,313	$2,961,563	$2,837,531	$8,569,406	$7,097,917
Net benefits	($1,452,000)	$2,385,313	$2,576,563	$2,452,531	$5,962,406	$4,688,479
ROI						195%
Payback period (months)						8.0 months

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Endnotes

[1] Source: “Adoption Profile: Containers In North America, Q1 2021,” Forrester Research, Inc., January 6, 2021.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