

A Forrester Total Economic Impact™  
Study Commissioned By Alibaba Cloud  
And Intel  
April 2020

# The Total Economic Impact™ Of Alibaba Cloud Apsara Stack

Cost Savings And Business Benefits  
Enabled By Apsara Stack

# Table Of Contents

<b>Executive Summary</b>	<b>1</b>
Key Findings	2
TEI Framework And Methodology	6
<b>Customer Journey Of Alibaba Cloud Apsara Stack</b>	<b>7</b>
Interviewed Organizations	7
Key Challenges	7
Solution Requirements	8
Key Results	8
Composite Organization	9
<b>Analysis of Benefits</b>	<b>10</b>
Increased Productivity From Optimized Business Continuity	10
Cost Savings From Replacing Legacy Systems	12
Cost Savings From Improved Application Development Efficiency	13
Increased Profits From Expanded Service Capacity	15
Increased Profits From Faster Response To Business Needs	17
Unquantified Benefits	19
Flexibility	20
<b>Analysis of Costs</b>	<b>21</b>
Costs Of Hardware for Expanding Deployment.	21
Costs Of Alibaba Cloud Solution	22
Costs Of Ongoing Support	22
Costs Of Internal Deployment And Learning	23
<b>Financial Summary</b>	<b>25</b>
<b>Solution Overview</b>	<b>26</b>
<b>Appendix A: Total Economic Impact</b>	<b>28</b>
<b>Appendix B: Endnotes</b>	<b>29</b>

**Project Director:**  
Diane Deng

**Project Consultant:**  
Yi Qin Teow

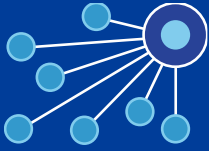
## ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit [forrester.com/consulting](https://forrester.com/consulting).

© 2020, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to [forrester.com](https://forrester.com).

# Executive Summary

## Benefits



Increased profits from expanded service capacity:

**¥219M**



Increased productivity from optimized business continuity:

**¥56.63M**



Cost Savings from Improved application development efficiency:

**¥42.28M**

### Composite Organization

- Has an annual revenue of tens of billions of RMB.
- Uses enterprise-level applications and is gradually migrating to Alibaba Cloud.
- The IT team reaches 100 personnel.
- The number of servers running Alibaba Cloud reaches 2,000.

Cloud computing platform is representative of digital technology. After more than a decade of development, it has become the core value-creating platform in the process of digital transformation and the key driver in shaping and achieving digital experience, operations, innovation, and ecosystem in the age of the customer. Particularly, private cloud takes up an essential part of digital transformation's cradle due to its innate strengths over a public cloud platform in application migration cost, security and regulatory compliance, the integration level of business processes, and the real-time convenience of cloud services. This provides strong support for enterprises to streamline the process of operations, ensure business continuity, and save migrating cost. In addition, the development of cloud-native technologies, hybrid cloud management, and other emerging areas like big data, artificial intelligence (AI), internet of things (IoT) pave the way for continuous iteration of private clouds. According to a Forrester Consulting study commissioned by Alibaba Cloud and Intel on cloud computing blueprints of midsize to large organizations around the world, 79% of respondents chose hybrid cloud that combines both public cloud and private cloud and 18% preferred models built only on private cloud.<sup>1</sup>

As private cloud becomes a trending topic, the management of private and hybrid clouds is difficult for many enterprises. According to the research of Forrester Business Technographics®, infrastructure leaders in Chinese enterprises face challenges on multiple aspects, including cloud application support (32%) and enterprise security in hybrid cloud environments (26%). The survey also shows technology stacks and integration complexity reduce the efficiency of application development and delivery; the complexity of the deployment model seriously affects operation and maintenance; and the complexities of private cloud in hybrid scenarios of deployment model, technology stack, integration and personnel challenge decision makers to measure return on investment.

To address challenges that enterprises face in their adoption of private cloud, Alibaba Cloud provides Alibaba Cloud Apsara Stack, a full-stack cloud solution that helps its customers with cloud migration of IT infrastructure, digitization of core technologies, development of data-driven smart applications, and the building of middle platform on the cloud. Alibaba Cloud and Intel commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Alibaba Cloud Apsara Stack. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the solution on their organizations.

To better understand the benefits, costs, flexibility and risks associated with this investment, Forrester interviewed four organizations with at least one year of experience using Alibaba Cloud Apsara Stack on medium to large scale. Based on information provided by the interviewees, Forrester discovered that Apsara Stack brings multiple benefits, including cost savings, productivity improvement, and business value.

**Composite organization.** Forrester summarized the actual usage of interviewed organizations and constructed a virtual organization as the composite organization to show the potential financial impact of Alibaba Cloud Apsara Stack. The composite organization is a large, state-owned enterprise that covers a wide business scope with annual revenue of tens of billions of RMB. The organization is undergoing comprehensive digital



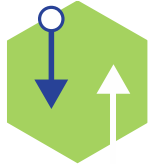
**ROI**  
**262%**



**Benefits PV**  
**¥360M**



**NPV**  
**¥260M**



**Payback**  
**7 months**

See definitions in Appendix A.

transformation, and it gradually migrates its enterprise-level applications to Alibaba Cloud Apsara Stack. To this end, the IT team expands from 50 to 100 employees within three years. The number of servers running Alibaba Cloud Apsara Stack reaches 2,000 (most of which are legacy machines), and the organization purchases 400 new servers for expanded deployment. Forrester built the financial model in this study based upon reasonable summary of the composite organization and interviewed organizations. Due to high scalability of Alibaba Cloud's hybrid cloud architecture, the benefits and costs of the composite organization can serve as a useful reference for organizations that use Apsara Stack on medium to large scale (e.g., with 50 to 10,000 servers in use).

Prior to using Alibaba Cloud Apsara Stack, the interviewed organizations faced multiple challenges, such as market environment, technology, budget, and employee capabilities. Traditional IT architecture could do little in response to the ever-changing market needs. While interviewed organizations sought agile operations, they also demanded controllable security. Their organizational structures and employee capabilities could not keep up with rapid development of emerging technologies, making it difficult to effectively share IT resources and digital assets. Moreover, cooperating with different technology vendors on the journey of digital transformation complicated project implementation and management.

The speed of IT operation, maintenance, and application development and iteration could not keep pace with the growing business. IT resource utilization was low. Deploying Alibaba Cloud Apsara Stack could improve business continuity, service capacity, and response speed to demands, which provided stronger support for digital transformation.

The interviewed organizations proved that deploying Alibaba Cloud Apsara Stack increases profits due to higher service capacity, faster response, improved business continuity, and efficient application development. Replacement of legacy systems also significantly reduces the costs.

## Key Findings

**Quantified benefits.** The interviewed organization experienced the following risk-adjusted present value (PV) quantified benefits estimated based on the usage of the composite organization:

- › **Cost savings from replacing legacy systems.** After choosing Alibaba Cloud Apsara Stack, the interviewed organizations had one-stop purchase of network infrastructure, saving the cost for separate purchasing by different departments and improving resource utilization.
- › **Improved business continuity on multiple dimensions after IT infrastructure goes on cloud.** Troubleshooting was 67% more efficient with no need for downtime during upgrades. After using Alibaba Cloud Apsara Stack, the interviewed organizations reported evidently less unexpected downtime caused by failures and shorter time for troubleshooting and repairs. Hot upgrading capability ensured that the upgrading process did not interrupt business. Automated operation and maintenance (O&M) also relieved the pressure on O&M personnel.

- › **Efficiency of system expansion, operation, and maintenance increased by 98%.** System expansion on physical machines required work on many levels. It took O&M personnel a great deal of time to purchase and configure new servers to go live, and downtime during upgrades was inevitable. After using Alibaba Cloud, the scalable cloud environment reduced operation and maintenance work required for system expansion.
- › **Efficiency of application development improved by 83%, greatly saving time for internal and outsourced developers.** Application development that was challenging in the past could be achieved with the new system. Previously, it took a lot of time and work force to develop an enterprise-level application. After using Alibaba Cloud Apsara Stack, the middleware-based distributed computing framework divided the development process into independent modules, which effectively enhanced application differentiation and architecture agility, reduced repetitive development, and improved efficiency. Application development that used to be tricky for the team became achievable on the new system.
- › **Service capacity surged by 220 times, contributing to higher profits.** After using Alibaba Cloud, the interviewed organizations' website hosting capacities increased by 220 times, the number of new users tripled and business growth rate outperformed that of competitors during the same period.
- › **Response speed for business demands increased by 80%.** Earlier launch brought more profits. By splitting a system into microservice modules, IT departments could more quickly respond to demands of different regions, business departments, and the market based on higher code reuse rate.

**Unquantified benefits.** The interviewed organizations experienced the following benefits, which are not quantified for this study:

- › **Time savings for procurement, integration, and communication with one-stop vendor.** Interviewed organizations stated that before using Alibaba Cloud Apsara Stack, they needed to integrate several business systems from different vendors. After deploying Apsara Stack, costs for procurement, integration, and communication dropped significantly.
- › **Improved employee experience (EX) due to large-scale data sharing and scheduling.** The interviewed organizations indicated that big-data sharing broke down information barriers among different regions and business units. This has saved time for waiting and matching when searching user information and improved EX.
- › **Enhanced brand image due to faster response to business needs.** The interviewed organizations said the microservice architecture of Alibaba Cloud Apsara Stack effectively supported IT in designing differentiated interactive experience for different brands, thus enhancing the brand image.
- › **Improved customer experience (CX) due to timely adjustment of service according to customer needs.** The interviewed organizations said, by leveraging big data analytics platforms, they were able to collect user behavior data three times faster, and they had a better understanding of user habits to improve user experience (UX).

**Cost.** The interviewed organizations using Alibaba Cloud Apsara Stack experienced the following risk-adjusted PV costs:

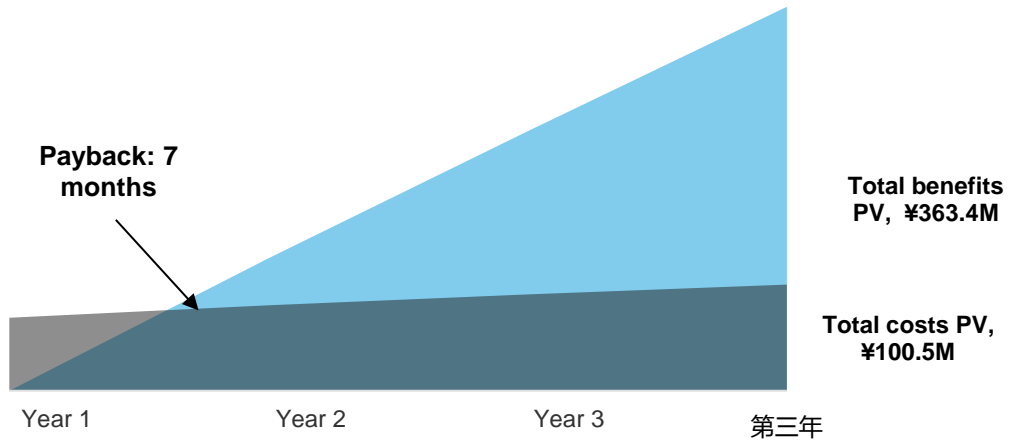
- › **Costs of hardware for expanding deployment.** To support ever-expanding applications and deployment, enterprises needed sufficient hardware servers. Costs mainly included the initial purchase fee and maintenance fee per annum.
- › **Costs of Alibaba Cloud solutions.** Alibaba Cloud Apsara Stack offered a wide range of software services, and the cost varied greatly depending on the needs and usage of the organizations. It included the licensing cost of private cloud and annual renewal fee. The ratio of renewal fee to the initial licensing cost was 3:1.
- › **Costs of ongoing support.** Besides software and hardware services, Alibaba Cloud provided a one-stop service system that covered the organizations from development to operation and maintenance. During infrastructure deployment and application migration, Alibaba Cloud offered development facilitation and consulting services for microservice division. After the new system was put into use, Alibaba Cloud could provide onsite O&M service and continuous support. The costs varied significantly according to the demands of organizations and capabilities of IT teams.
- › **Costs of internal deployment and learning.** Despite receiving support from Alibaba Cloud's service team, the organizations needed to invest sufficient human resources in deployment and use of Apsara Stack to ensure smooth deployment. Infrastructure construction in the early stage required efforts of the organizations in architecture, technology, system, network, and machine rooms. On this basis, the time to train IT staff to use Alibaba Cloud Apsara Stack was another indirect cost.

**Risk.** The investment may not meet the business or technology needs of an organization, resulting in lower overall total benefits. While the interviewed organizations gained considerable benefits after deploying Alibaba Cloud Apsara Stack, some worried about the difficulty of distributed architecture for the IT team, and those with high standards for regulatory compliance were concerned that operation and maintenance complexities would restrict system uptime. Alibaba Cloud Apsara Stack has ensured security that meets the criteria of Level 4 in Multi-Level Protection Scheme (MLPS) 2.0, while providing one-stop cloud services including delivery, deployment, cloud migration, operation and maintenance, and security and training, which further reduces risks that might occur while using private cloud.

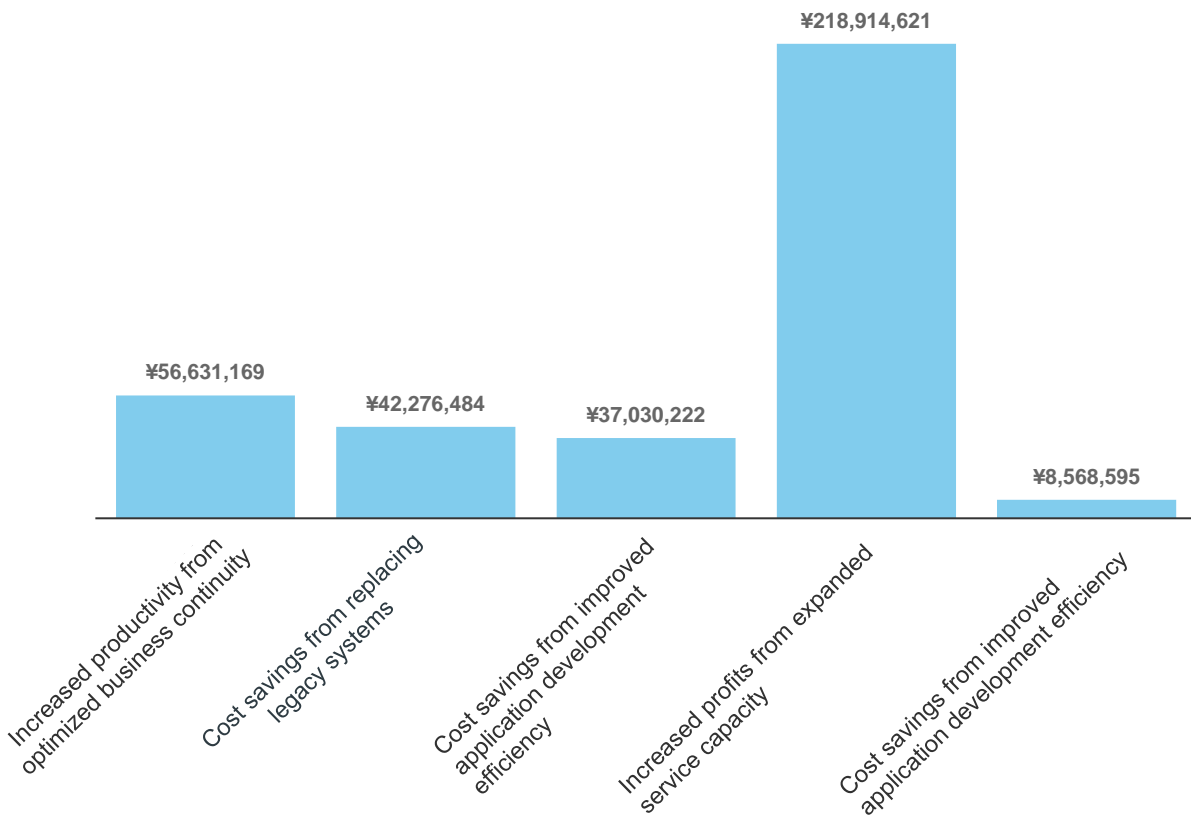
**Flexibility.** Flexibility means the investment could bring unexpected capabilities or capabilities that can turn into benefits in future investments. In this study, some interviewed organizations indicated that unified adoption of Alibaba Cloud Apsara Stack allowed them to use consistent programming languages in simplified development environments, making it easier for IT management. After simple training, developers could share resources across groups and businesses, which indirectly improved employee utilization and flexibility to respond to changing or emerging business needs.

Forrester's interviews with four organizations that used Alibaba Cloud Apsara Stack for more than one year revealed that the composite organization would experience benefits of ¥360 million over three years versus costs of ¥100 million, adding up to a net present value (NPV) of ¥260 and an ROI of 262%.

## Financial Summary



## Benefits (Three-Year)





The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

## TEI Framework And Methodology

From the information provided in the interview, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Alibaba Cloud Apsara Stack.

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 Alibaba Cloud Apsara Stack can have on an organization:



### **DUE DILIGENCE**

Interviewed Alibaba Cloud stakeholders and Forrester analysts to gather data relative to Apsara Stack.



### **CUSTOMER INTERVIEW**

Interviewed four organizations using Apsara Stack 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 interview using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organization.



### **CASE STUDY**

Employed four fundamental elements of TEI in modeling Alibaba Cloud Apsara Stack's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

## DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Alibaba and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Alibaba Cloud Apsara Stack.

Alibaba Cloud reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Alibaba Cloud provided the customer names for the interviews but did not participate in the interviews.



# Customer Journey Of Alibaba Cloud Apsara Stack

## BEFORE AND AFTER THE INVESTMENT IN ALIBABA CLOUD APSARA STACK

### Interviewed Organizations

For this study, Forrester interviewed four enterprises that used Alibaba Cloud Apsara Stack on medium to large scale. On this basis, Forrester constructed the financial model of the composite organization and case analysis of medium-scale to large-scale usage. Interviewed organizations include:

INDUSTRY	SIZE	INTERVIEWEE	TIME OF USE	SCALE OF USE
Public sector		IT leader	>2 years	5,000 servers
Telecommunication	>500,000 FTEs	Operation and maintenance manager	>4 years	2,000 servers
Financial services	>50,000 FTEs	Chief architect	>3 years	800 servers
Internet	>2,000 FTEs	Operation and maintenance leader	>1 year	200 servers

### Key Challenges

All four of the interviewed organizations were undergoing large-scale digital transformation. They experienced varied challenges from market environment to internal organization, prompting them to adopt Alibaba Cloud Apsara Stack. Key challenges included:

- › **Ever-changing market needs.** Internet companies had raised consumer expectations for products and services with innovative, efficient, and convenient services. However, traditional IT architectures of large enterprises and organizations could hardly keep pace with the changing user needs.
- › **Dual requirements of large organizations for controllable security and efficient IT support.** Because the interviewed organizations were undergoing large-scale digital transformation, it called for efficient and flexible support of IT applications. But unlike enterprises that deploy public clouds on a large scale, the interviewed organizations had large amounts of highly sensitive data and applications of high-security levels, so they had greater concerns about security and stability when choosing partners.
- › **Internal IT teams could not catch up with rapid technological development.** Digital transformation had brought considerable pressure on internal IT teams. It meant making significant upgrades from infrastructure, platforms, to applications. It has also been challenging to keep up with emerging technologies like big data analysis, IoT and AI.

"In our initial plan, server and database resources could be sufficient for more than 10 years. The popularization of 4G brings skyrocketing data growth, and our resources could only hold for three or four years. Traditional architecture can hardly support the ever-changing needs for expansion."

*Operation and maintenance manager, telecommunication*



- › **IT resources and digital assets could not be shared effectively within enterprises.** The interviewed organizations had a large amount of scattered systems and fragmented user and business data. Difficult data sharing between departments and regions hindered employee efficiency and CX, and it caused a waste of resources.
- › **Inconsistent products and vendors for infrastructure, application and data complicated project implementation and management.** During their digital transformation journeys, the interviewed organizations adopted different technologies and services on the dimensions of infrastructure, data, and application in search of business agility and controllable security. Nevertheless, different vendors meant varied systems, which was complicated for IT departments to integrate and manage.

"Before using Alibaba Cloud, each department purchased its own database and servers. To ensure sufficient resources, departments usually bought more than they needed, which indirectly caused waste."

*Operation and maintenance manager, telecommunication*



## Solution Requirements

The interviewed organization searched for a solution vendor that could:

- › Provide scalable cloud infrastructure to improve operation and maintenance efficiency.
- › Meet the needs for user information security.
- › Enhance data utilization to streamline operations and improve CX.
- › Provide industry-related services.
- › Become a strategic partner for digital transformation.

"When considering vendors, if we did not use Alibaba Cloud Apsara Stack, we would have [needed] to integrate with seven to eight business systems, each with its own capabilities and systems, increasing the time and difficulty of the project."

*Chief architect, financial services*



## Key Results

The interviews revealed that key results from investment in Alibaba Cloud Apsara include:

- › Improved business continuity.
- › Replacement of scattered legacy systems.
- › Improved application development capability and efficiency.
- › Expanded service capacity.
- › Faster response to business needs.
- › Increased customer and employee satisfaction.

"For our application development employees who developed only in part time, source code development was very difficult and the error rate was high. The internal team could hardly meet technical requirements of government affairs."

*Technical leader, public sector*



## Composite Organization

Based on the interviews, Forrester constructed a TEI model and a ROI analysis that illustrates the financial impact of Alibaba Cloud Apsara Stack to a composite organization. The composite organization that Forrester synthesized from the customer interviews has the following characteristics:

### Organization Z

**Description:** Forrester integrated the actual usage of the interviewed organizations into a virtual composite organization to show potential financial impact of Alibaba Cloud Apsara Stack. The composite organization, referred to as Organization Z, is a large, state-owned enterprise that covers a wide business scope with annual revenue of tens of billions of RMB. Affected by the rising internet industry, the profit margin of major business shrank in 2015, and the customer acquisition rate showed a downward trend. Driven by external competitive pressure and internal cost reduction requirements, the enterprise began to seek ways to reduce costs, broaden business channels, and develop innovative businesses in the long run. It began the digital transformation journey in 2016. To this end, the internal IT team expanded from 50 to 100 employees within three years. The number of servers running Alibaba Cloud Apsara Stack reaches 2,000 (most of which are legacy servers), and the organization purchases 400 new servers for expanded deployment.

**Features of deployment:** Due to the large size of the enterprise, application systems of various regions and branches were independent from each other and very complicated. To streamline the operation and to support business diversity, Organization Z chose to migrate part of its business to Alibaba Cloud Apsara Stack. The first step was to reconstruct systems and websites directly linked to business on Apsara Stack. The company was also active in expanding digital business, so it established a live-streaming platform based on Alibaba Cloud.



#### Key information of the composite organization

- Organization Z is pursuing comprehensive digital transformation.
- It has an annual revenue of tens of billions of RMB.
- Enterprise-level applications are gradually migrating to Alibaba Cloud.
- The size of the IT team has reached 100.
- The number of servers running Alibaba Cloud has reached 2,000. (The statements are based on customer interview output and reasonable assumptions.)

# Analysis of Benefits

## QUANTIFIED BENEFIT DATA

### Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Increased productivity from optimized business continuity	¥22,875,863	¥22,433,044	¥23,019,943	¥68,328,850	¥56,631,169
Btr	Cost savings from replacing legacy systems	¥17,000,000	¥17,000,000	¥17,000,000	¥51,000,000	¥42,276,484
Ctr	Cost savings from improved application development efficiency	¥10,326,683	¥14,516,226	¥20,824,090	¥45,666,999	¥37,030,222
Dtr	Increased profits from expanded service capacity	¥86,400,000	¥88,128,000	¥89,890,560	¥264,418,560	¥218,914,621
Etr	Increased profits from faster response to business needs	¥1,382,400	¥3,317,760	¥6,082,560	¥10,782,720	¥8,568,595
	Total benefits (risk-adjusted)	¥137,984,945	¥145,395,031	¥156,817,153	¥440,197,129	¥363,421,091

## Increased Productivity From Optimized Business Continuity

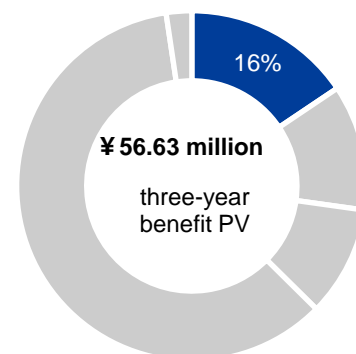
Business continuity is a top concern for many large enterprises and government organizations. Both the scheduled downtime for system upgrade or expansion and the unscheduled downtime due to failures can severely restrict business continuity. For traditional enterprises, system expansion on physical machines requires work on many aspects. It takes O&M personnel a great deal of time from purchasing and configuring new servers to go live. Downtime during upgrades is inevitable. After using Alibaba Cloud, the scalable cloud environment reduces operation and maintenance work required for system expansion. Hot upgrading capability ensures that system upgrades no longer interrupt the business. Automated operation and maintenance also relieve the pressure on O&M personnel. Support from Alibaba Cloud Apsara Stack reduces unexpected downtime caused by failures to enhance business continuity.

Before deploying Alibaba Cloud, Organization Z used virtualization technology based on physical machines, and it scheduled downtime for upgrades to meet the needs of business growth. With Alibaba Cloud and its automated scaling capability, the system no longer needs downtime during upgrades, which increases expansion efficiency by 98%. At the same time, Alibaba Cloud's professional O&M services help reduce the frequency of failures and improve troubleshooting efficiency by 67% within one year of deployment.

For the composite organization, Forrester assumes that:

- › The average loss due to 1 hour of downtime is about ¥2 million.<sup>2</sup>
- › The cloud migration process is divided into several stages. There are five systems running on Alibaba Cloud in Year 1, then 12 in Year 2 and 22 in Year 3.
- › It has two expansion requirements due to rapid business growth over the three-year period.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expected risk-adjusted total benefits to be a PV of more than ¥ 360 million.



Increased productivity from optimized business continuity: 16% of total benefits

- › With improved employee efficiency, 70% of time savings are converted to productivity and redirected at new work.

The requirements for capacity expansion and hardware upgrade may vary because:

- › Some industries have strict requirement for system uptime. Although Alibaba Cloud Apsara Stack has a robust operation and maintenance system, some enterprises may be concerned that using multiple IT products with complicated operation and maintenance might affect business continuity.
- › Salary level of operation and maintenance personnel varies across industries and enterprises, affecting the total benefits.
- › Different company sizes and IT infrastructure environments lead to different needs for capacity expansion and application upgrades over the three years.
- › To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of ¥56.63 million.

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

### Increased Productivity From Optimized Business Continuity: Calculation Table

REF	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Annual unscheduled downtime for troubleshooting before using Alibaba Cloud	6 hours*3	18	18	18
A2	Annual unscheduled downtime for troubleshooting after using Alibaba Cloud	3 hours*2	6	6	6
A3	Improvement of troubleshooting efficiency	(A1-A2)/A1	67%	67%	67%
A4	Average loss due to 1 hour of downtime	Third-party data	¥2,070,000	¥2,070,000	¥2,070,000
A5	Reduced loss due to unscheduled downtime	(A1-A2)*A4	¥24,840,000	¥24,840,000	¥24,840,000
A6	Annual scheduled downtime for expansion and upgrades of one system before using Alibaba Cloud	3 hours*20	60	60	60
A7	Annual scheduled downtime for expansion and upgrades of one system after using Alibaba Cloud	Composite organization	0	0	0
A8	Number of systems running on Alibaba Cloud	Composite organization	5	12	22
A9	Per capita cost for system maintenance	Year 1: Estimated according to third-party data  Years 2 and 3: 103% of the previous year	¥343,000	¥353,290	¥363,889
A10	Benefit loss due to unscheduled downtime	A6*A8*A9/2080	¥49,471	¥122,293	¥230,929
A11	Number of system expansion times	Composite organization	1		1
A12	Total time for system expansion before using Alibaba Cloud	30 days*8 hours*20 FTE	4800		4800
A13	Total time for system expansion after using Alibaba Cloud	3 days*8 hours*4 FTE	96		96
A14	Improvement of system expansion efficiency after using Alibaba Cloud	(A12-A13)/A12	98%		98%

## Increased Productivity From Optimized Business Continuity: Calculation Table

REF	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A15	Savings due to Increased system expansion efficiency	(A12-A13)/2,080*A9	¥775,708		¥822,948
A16	Percentage of work efficiency into productivity	Assumption	70%	70%	70%
At	Benefit of Increased productivity due to optimized business continuity	A5+(A10+A15)*A16	¥25,417,625	¥24,925,605	¥25,577,714
	Risk adjustment	↓10%			
Atr	Benefit of optimized business continuity (risk-adjusted)		¥22,875,863	¥22,433,044	¥23,019,943

## Cost Savings From Replacing Legacy Systems

Prior to using Alibaba Cloud Apsara Stack, different business departments and systems purchased their own servers and databases. After deploying Alibaba Cloud, the organization can purchase network infrastructure at one stop, and the costs of separate purchases is effectively reduced. One respondent from an interviewed organization said: "Before using Alibaba Cloud, each department purchased its own database and servers. To ensure sufficient resources, departments usually bought more than they needed, which indirectly caused waste."

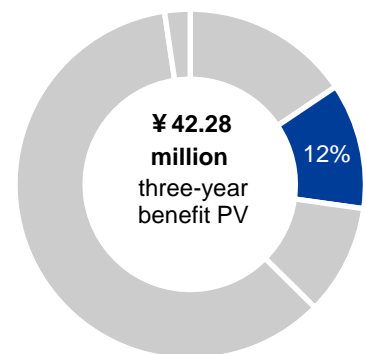
For the composite organization, Forrester assumes that:

- › Alibaba Cloud replaces all the old database systems once and for all, and the organization continues leveraging the legacy hardware.
- › Costs of databases purchased independently by each department are the same for three years.

Costs of software and hardware systems may vary due to the following factors:

- › The process of replacing legacy systems varies across enterprises. Legacy systems that cannot be replaced immediately still incur cost.
- › Different software types across enterprises before the adoption of Alibaba Cloud.
- › Number of software licenses varies according to the usage scale.
- › Time required for software integration and development.

To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of ¥42.28 million.



Cost Savings from replacing legacy systems: 12% of total benefits



## Cost Savings From Replacing Legacy Systems: Calculation Table

REF	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Cost savings from replacing legacy systems	Composite organization	¥20,000,000	¥20,000,000	¥20,000,000
Bt	Costs of legacy systems	B1	¥20,000,000	¥20,000,000	¥20,000,000
	Risk adjustment	↓15%			
Btr	Cost savings from replacing legacy systems (risk-adjusted)		¥17,000,000	¥17,000,000	¥17,000,000

## Cost Savings From Improved Application Development Efficiency

Application development consumes a lot of internal and outsourced resources, which may still be short for business development given today's skyrocketing digital service. To address this challenge, distributed computing framework based on middleware divides the development process into independent modules. Featuring language independence, high-density deployment in small batch, and API-based capacity, it can effectively enhance application differentiation and architecture agility, reduce repetitive development, and improve efficiency.

This is particularly evident with large enterprises like Organization Z. Due to its nationwide business scale, it had dispersed data storage and different needs for application functions and interfaces across regions and business branches. The legacy architecture could take internal and outsourced IT teams three to five months to develop one enterprise-level application. The use of Alibaba Cloud brings an 83% increase in development efficiency.

Moreover, the internal development team used to find it hard to develop certain applications, or it could not develop without data from various departments or third parties. With API data management and analysis tools on Alibaba Cloud Apsara Stack, enterprises are capable of developing these applications.

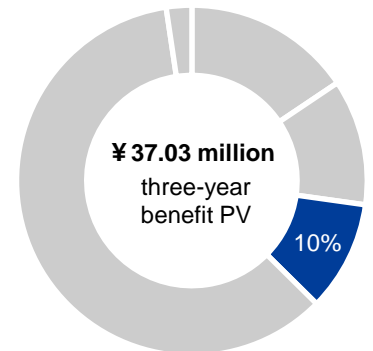
One interviewee said: "Source coding was difficult for our internal development staff, and the error rate was very high. So, we adopted Alibaba Cloud Apsara Stack and handed it over to professionals. Development efficiency improved, and error rate was reduced significantly."

Organization Z also rebuilt the systems of customer service, information search, and online sales backed by Alibaba Cloud Apsara Stack. It also managed to expand business channels, enhance CX, and develop large-scale applications that were difficult for the legacy framework.

For the interviewed organization, Forrester assumes that:

- › The first-year annual salary of a full-time enterprise application developer is ¥340,000.
- › The hourly salary of outsourced developers is ¥175.
- › It gradually divides the application development process into microservices and moves them to Alibaba Cloud. The organization also develops new applications on Alibaba Cloud Apsara Stack, namely five applications in Year 1, seven in Year 2, and 10 in Year 3.

Application development environment and efficiency vary across



Cost Savings from improved application development efficiency: 10% of total benefits



Organization Z rebuilt the systems of customer service, information search, and online sales backed by Alibaba Cloud Apsara Stack, and managed to expand business channels, enhance customer experience and develop large-scale applications that were difficult for the legacy framework.



enterprises due to the following factors:

- › Alibaba Cloud Apsara Stack uses distributed architecture, and it requires enterprises to replan the basic infrastructure and application architecture with and corresponding work of design, development, and deployment. Although, in the long run, these efforts improve the reuse of application modules, increase development efficiency, and reduce the error rate, some enterprises have concerns about energy and human resources that need to be invested in the early stage.
- › Application development environment varies across enterprises before deploying Alibaba Cloud.
- › Different employee and outsourced developer salaries across industries and regions.
- › Difference in the quantity and quality of application request have impact on the improvement of development efficiency.

## Case study: Alibaba Cloud Apsara Stack helped a government agency develop large-scale applications.

### › Key Challenges

Before using Alibaba Cloud Apsara Stack, the department had a complicated database, and there was little data sharing between departments or branches. It often took days or even months to search information in different systems or even onsite. At the same time, employees only developed and maintained large-scale IT applications for the department in their spare time, so the error rate was high, and amateur developers had limited capability to develop complicated large-scale applications.

### › Solution

Facilitated by the partner development service team from Alibaba Cloud Apsara Stack after deploying the new system, the government department developed a customized and intelligent search platform with cloud-based capabilities like data analysis, database, and cloud computing.

### › Results

**Improved operation and maintenance:** There was no dedicated team in the department. Operation and maintenance was so stressful and inefficient that it often took about 6 hours to troubleshoot physical machines. After deploying Alibaba Cloud Apsara Stack, a professional O&M team from Alibaba Cloud provided services to build, operate, and maintain the system. It could resolve urgent problems within 2 to 4 hours in 90% of the cases.

**Improved application development efficiency and quality:** The government department did not have a full-time IT team. Before using Alibaba Cloud, employees only wrote and debugged code in their spare time. Due to limited professionalism, source code development was of low efficiency. After deploying the private cloud, the Alibaba Cloud Apsara Stack partner service team helped the department with large-scale application development that was previously difficult. This effectively saved time for the internal staff to focus more on their own work, as they only needed to take communication and coordination roles during the development process.

**Improved citizen satisfaction:** With the new intelligent search platform, information that used to take a few days to obtain could be searched within seconds. Enhanced administrative efficiency improved citizen satisfaction. In the past, the department could not fulfil suggestions from the public due to lack of data. Such problems reduced after using the new search platform.

To account for these risks, Forrester adjusted the benefits downward by 15%, yielding a three-year risk-adjusted total PV of ¥37.03 million.

### Cost Savings From Improved Application Development Efficiency: Calculation Table

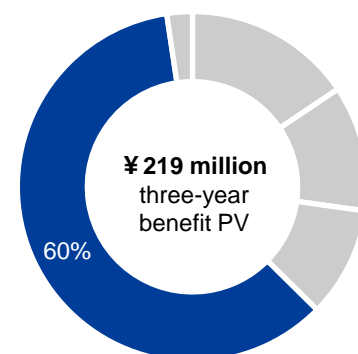
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YE
C1	Time required for application development and test management before using Alibaba Cloud (hour)	Composite organization	480	480	480
C2	Improvement of development efficiency	Composite organization	83%	83%	83%
C3	Time required for application development and test management after using Alibaba Cloud (hour)	$C1*(1-C2)$	80	80	80
C4	Average number of internal staff required for application development	Composite organization	5	5	5
C5	Average improvement of internal staff efficiency during application development (hours)	$(C1-C3)*C4$	2,000	2,000	2,000
C6	Average number of outsourced developers required for development of each application (non-Alibaba Cloud developers)	Composite organization	30	30	30
C7	Average improvement of outsourced developers during application development (hour)	$(C1-C3)*C6$	12,000	12,000	12,000
C8	Per capita cost of enterprise-level applications	Year 1: Estimated according to third-party data Years 2 and 3: 103% of the previous year	¥343,000	¥353,290	¥363,000
C9	Average hourly salary of outsourced developers	Assumption based on third-party data	¥175	¥175	¥175
C10	New enterprise-level applications developed each year based on Alibaba Cloud's distributed architecture	Composite organization	5	7	10
C11	Cost savings due to improved application development efficiency	$(C5*C8/2,080)+(C7*C9)*C10$	¥12,149,038	¥17,077,913	¥24,400,000
Ct	Improved application development efficiency	C11	¥12,149,038	¥17,077,913	¥24,400,000
	Risk adjustment	↓15%			
Ctr	Improved application development efficiency (adjusted for risks)		¥10,326,683	¥14,516,226	¥20,800,000

## Increased Profits From Expanded Service Capacity

Alibaba Cloud develops its private cloud technology based on public cloud architecture, so it has accumulated experience in supporting large-scale business and user activities and it can provide fundamental support for business integration and expansion of large-sized enterprise. Supported by the powerful infrastructure, the data middle platform helps enterprises integrate and make better use of dispersed resources, improve business quality, and expand business scale.

Organization Z uses Alibaba Cloud Apsara Stack in its core business, and witnesses evident profit growth after deployment. Quantified benefits brought by the expanded service capacity take up the highest proportion in the total benefits.

Before using Alibaba Cloud Apsara Stack, distributors across the country handled business management. Enterprises could not control sales channels or service quality, and they lacked comprehensive understanding of user behaviors. At the same time, the official sales website could not achieve large-scale user activities and purchase. After using Alibaba Cloud, service capacity of the website surged by 220 times, the number of new users tripled, and business growth rate



Increased profits from expanded service capacity: 60% of total benefits

outperformed that of competitors during the same period.

For the composite organization, Forrester assumes that:

- › Before using Alibaba Cloud, it has a user base of 250 million. The number of users rises by 4% in Year 1, and then it maintains the increase in years 2 and 3.
- › After using Alibaba Cloud, the number of new users rises by 12% in Year 1, and then it maintains the increase years 2 and 3.
- › The annual per capita revenue is ¥ 600 in Year 1, and it rises by 2% in years 2 and 3.
- › As the number of users and annual revenue are closely related to factors like pricing, marketing planning, and market environment, 3% of increase in annual revenue is attributed to Alibaba Cloud.
- › The pre-tax profit margin after depreciation and amortization is 30%.

Due to varied business, revenues, and development efficiency of across enterprises, Forrester adjusted the benefits based on the following:

- › As enterprises may use private cloud in different scenarios, the relevance between improved business performance and the use of private cloud varies considerably.
- › Varied enterprise size, customer base, industry, and region lead to different per capita revenue and profit margins.
- › Service capacity before using Alibaba Cloud has evident effect on the degree of improvement.
- › To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of ¥200 million, the highest in the total quantified benefits.

#### Increased Profits From Expanded Service Capacity: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Daily click-through supported by website capacity before using Alibaba Cloud	Composite organization	5,000,000	5,000,000	5,000,000
D2	Times of website capacity increase	Composite organization	220	220	220
D3	Daily click-through supported by website capacity after using Alibaba Cloud	D1*D2	1,100,000,000	1,100,000,000	1,100,000,000
D4	New users before using Alibaba Cloud	Base: 250,000,000 Increase rate: 4%	10,000,000	10,000,000	10,000,000
D5	New users after using Alibaba Cloud	Base: 250,000,000 Increase rate: 12%	30,000,000	30,000,000	30,000,000
D6	Annual revenue per capita	Year 1: Estimated according to the composite organization  Years 2 and 3: Increase of 2%	¥600	¥612	¥624
D7	New users mobile turnover after using Alibaba Cloud	(D5-D4)*D6	¥12,000,000,000	¥12,240,000,000	¥12,484,800,000
D8	Percentage of annual revenue attributed to Alibaba Cloud	Composite organization	3%	3%	3%

## Increased Profits From Expanded Service Capacity: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D9	EBITDA profit margin	Composite organization	30%	30%	30%
Dt	Increased profits from expanded business capacity	D7*D8*D9	¥108,000,000	¥110,160,000	¥112,363,200
	Risk adjustment	↓20%			
Dtr	Increased profits from expanded business capacity (risk-adjusted)		¥86,400,000	¥88,128,000	¥89,890,560

## Increased Profits From Faster Response To Business Needs

The distributed architecture of Alibaba Cloud Apsara Stack not only improves IT development efficiency, it also supports faster response to business needs. The distributed architecture divides the application process into microservice modules, allowing the IT department to more quickly respond to demands of different regions and business departments for differentiation based on higher code reuse rate. In this sense, enterprises can respond to the market more efficiently.

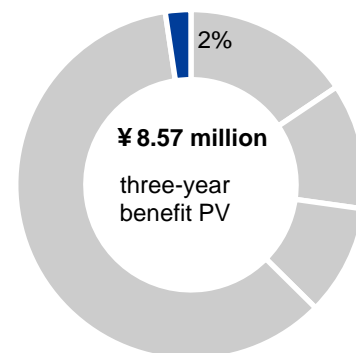
One decision maker at an interviewed organization said: "Departments have different requests regarding business, interface design, and user experience. It was too complicated for us to develop an ideal IT solution. Now, with After Alibaba Cloud, we can respond faster to their needs for differentiation. It used to take us about two person-months to realize a customized service. Now only one person and one to two weeks would suffice."

For the composite organization, Forrester assumes that:

- › On average, each enterprise-level application generates one request per month, and the number of requests maintains the same over the three years.
- › Requests directly linked to turnover account for 30% of the total.
- › Different sizes of requests lead to gaps in profitability. After comprehensive consideration, the average turnover generated within one week after launch is estimated at ¥50,000.

Due to differences in business, revenue, and development efficiency, Forrester adjusted the benefits based on the following:

- › Apart from capabilities of the private cloud platform, the capacity to respond to business demands is affected by business complexity and proficiency of IT staff.
- › Contribution to turnover varies across enterprises and businesses.
- › To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of ¥8.57million.



Increased profits from faster response to business needs: 2% of total benefits

## Case study: Alibaba Cloud Apsara Stack sped up the go-live of a financial product and improved brand effect.

### › Key Challenges

The technical department of the interviewed financial enterprise served many brands and products. In the process of digital transformation, the team could not swiftly respond to the needs of all business departments, iterate the applications, or customize for different brands and products.

### › Solution

After deploying Alibaba Cloud Apsara Stack, the department replanned the system architecture and conducted distributed development and microservices division.

### › Results

**Enhanced brand differentiation:** After using Alibaba Cloud Apsara Stack, the department no longer needs to start over the development process for same products of different brands. With microservice architecture, it could customize the interface, services, and experience for different customer groups. This effectively helped with marketing promotion and customer retention.

**Faster response to the market:** Time required for responding to the needs of business departments used to be calculated on a monthly basis. Now it's calculated daily. It became more efficient to add new functions to applications, allowing the enterprise to more quickly respond to market changes.

**Increased Profits From Faster Response To Business Needs: Calculation Table**

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
E1	Time required to add online service function before using Alibaba Cloud (weeks)	Composite organization	8.0	8.0	8.0
E2	Increase of response speed	Composite organization	80%	80%	80%
E3	Time required to add online service function after using Alibaba Cloud (weeks)	$E1*(1-E2)$	1.6	1.6	1.6
E4	Average time saving for earlier launch (weeks)	$E1-E3$	6.4	6.4	6.4
E5	Average turnover within one week after launch	Assumption	¥50,000	¥50,000	¥50,000
E6	Average number of requests generated by each application	Composite organization	12	12	12
E7	Percentage of requests directly linked to business	Composite organization	30%	30%	30%
E8	Annual business requests for cloud-based applications directly linked to turnover	$A8*E6*E7$	18	43.2	79.2
E9	Increased benefits from earlier launch	$E4*E5*E8$	¥5,760,000	¥13,824,000	¥25,344,000
E10	EBITDA profit margin	Composite organization	30%	30%	30%
Et	Increased profits from faster response to business needs	$E9*E10$	¥1,728,000	¥4,147,200	¥7,603,200
	Risk adjustment	↓20%			
Etr	Increased profits from faster response to business needs (adjusted for risk)		¥1,382,400	¥3,317,760	¥6,082,560

## Unquantified Benefits

The interviews revealed that Alibaba Cloud Apsara Stack not only brings tangible business values and cost savings, its agility and consistency from infrastructure to application architecture also yields benefits that cannot be quantified in the short term. Unquantified benefits include:

- › **Improved CX due to timely adjustment of service according to customer needs.** Most of the interviewed organizations applied Alibaba Cloud Apsara Stack to build systems for end customers. One interviewed organization used the big data function of private cloud to analyze stutters of online videos. It then became three times faster in collecting data like network stuttering and video views, from collecting data every 30 seconds to every 10 seconds or even more frequently. Through big data analysis, the enterprise gained better understanding of user behaviors and could thereby improve the viewing experience.
- › **Enhanced brand image due to faster response to business needs.** One respondent from an interviewed organization stated that their company's internal IT department needed to develop, upgrade, and maintain applications for similar businesses of different brands. Under the traditional development environment, it would have been difficult for IT to differentiate the experience and establish digital brand images. With microservice architecture of Alibaba Cloud, the IT department could create differentiated experience for different brands and help improve brand images.
- › **Time savings for procurement, integration, and communication with a one-stop vendor.** Alibaba Cloud Apsara Stack has a wide range of capabilities, including cloud infrastructure, databases, big data, internet middleware application platforms, and software and hardware of AI platforms, and it also provides services from consulting, development, operations, and maintenance. One-stop procurement and services reduce costs for procurement, integration, and communication between the enterprise and different vendors. One respondent said: "When we chose a partner, if we did not use Alibaba Cloud, we would need to integrate with seven to eight business systems, each with its own functions. The engineering time and difficulty could be daunting."
- › **Improved EX due to large-scale data sharing and scheduling.** One interviewed organization matched users' biometric information with purchase and usage data related to the business, and it built a knowledge graph with an artificial neural network, breaking the information barriers between different regions and businesses. Then employees did not need to wait long for data matching when searching user information, thus greatly improving their experiences.



Alibaba Cloud Apsara Stack has a wide range of capabilities. It provides one-stop procurement, and services reduce costs for procurement, integration, and communication between the enterprise and different vendors.

## Case study: Alibaba Cloud Apsara Stack built a big data platform.

### › Key challenges

Before using Alibaba Cloud Apsara Stack, the interviewed internet enterprise had bulk website user data, but data analysis was not on the paralleled scale.

### › Solution

After deploying Alibaba Cloud Apsara Stack on 200 servers, the enterprise constructed a big data platform with support from Alibaba Cloud's service team. The platform empowered big data processing, analysis, mining, operation, management, and applications, and it provided efficient storage, offline calculation, stream calculations, and analysis of massive data.

### › Results

Improved data collection efficiency: With big data function of the platform, collecting user data (e.g., stutter rate of video playback and viewing time) became more efficient, from collection per 30 seconds to 10 seconds or even more frequently. That increased data points for analysis.

Improved UX brought by data analysis: With richer and higher quality data, the enterprise realized faster analysis of website running problems like network jitter. Analysis of user data also helped optimize advertising performance.

Reduced operation and maintenance pressure on internal staff: Teams from Alibaba Cloud provided professional on-site services from the underlying deployment to platform construction, significantly reducing the pressure on internal staff in deployment, debugging, operations, and maintenance.

## Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Alibaba Cloud Apsara Stack and later realize additional uses and business opportunities, including:

- › **Sharing of resources enabled by consistent development environment.** For large enterprises and government organizations, using diverse IT systems not only complicates the management, but inconsistency of programming languages also restricts resource sharing between IT staff. After deploying Alibaba Cloud Apsara Stack, one interviewed organization shifted to a Java environment in a unified manner, and the requirement for programming languages became consistent. With simple training, development resources could be shared across groups and businesses, which indirectly improved the efficiency of IT personnel.

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

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so.



# Analysis of Costs

## QUANTIFIED COST DATA

Total Costs							
REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Ftr	Costs of hardware for expanding deployment.	¥42,525,000	¥4,725,000	¥4,725,000	¥4,725,000	¥56,700,000	¥54,275,376
Gtr	Costs of Alibaba Cloud Solution	¥14,850,000	¥4,950,000	¥4,950,000	¥4,950,000	¥29,700,000	¥27,159,917
Htr	Costs of ongoing support	¥11,000,000	¥2,200,000	¥2,200,000	¥2,200,000	¥17,600,000	¥16,471,074
ltr	Costs of internal deployment and learning	¥667,920	¥1,138,500	¥569,250	¥569,250	¥2,944,920	¥2,601,060
	Total costs (risk-adjusted)	\$69,042,920	\$13,013,500	\$12,444,250	\$12,444,250	\$106,944,920	\$100,507,427

### Costs Of Hardware for Expanding Deployment.

When making strategic investment plans for cloud computing, enterprise decision makers are prone to using value software while neglecting or even ignoring hardware investment. In fact, CX in a private cloud platform depends not only on flexible mashup of full-stack software services, but it also depends on the underlying hardware infrastructure. High-performance, low-power, and high-stability CPU is the core engine for supporting computing-intensive workloads, especially AI applications. According to a Forrester survey commissioned by Alibaba Cloud and Intel, more than 80% of the respondents stressed the urgent need for high-performance CPUs. They want to team up with partners in rapid construction of modern infrastructure to safeguard the digital transformation journey.<sup>3</sup>

Organization Z leverages legacy machine rooms and servers in its cloud adoption and purchases more than 400 new servers for storage, data processing, component service, etc. The number of servers running Alibaba Cloud Apsara Stack reaches 2,000. Cost of hardware mainly includes the initial purchase fee and maintenance fee per annum.

For the composite organization, Forrester assumes that:

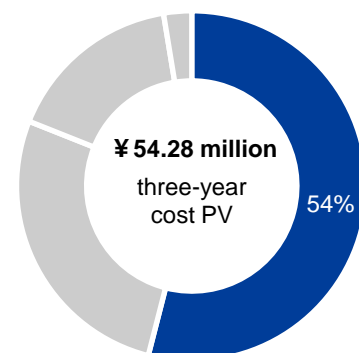
- › The ratio of initial purchase fee to maintenance fee per annum is 9:1.

The cost of hardware varies according to:

- › The number of legacy servers reused.
- › The purpose and scale of using Alibaba Cloud Apsara Stack.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of ¥54.28 million.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total costs to be a PV of more than ¥100 million.



Costs of hardware for expanding deployment: 54% of total costs

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

### Costs Of Hardware For Expanding Deployment: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Hardware investment	Composite organization	¥40,500,000	¥0	¥0	¥0
F2	Hardware maintenance costs	Composite organization	¥0	¥4,500,000	¥4,500,000	¥4,500,000
Ft	Hardware costs for expanded deployment	F1+F2	¥40,500,000	¥4,500,000	¥4,500,000	¥4,500,000
	Risk adjustment	↑15%				
Ftr	Hardware costs for expanded deployment		¥42,525,000	¥4,725,000	¥4,725,000	¥4,725,000

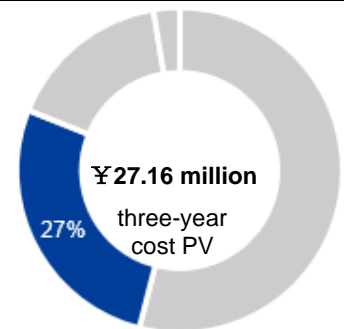
### Costs Of Alibaba Cloud Solution

The composite organization uses the entire Alibaba Cloud Apsara Stack solution, including infrastructure, databases, big data services, and AI. The cost includes the licensing cost of private cloud and annual renewal fee. The ratio of renewal fee to the initial licensing cost is 3:1.

The cost of solution varies according to:

- › Different modules used by enterprises.
- › The purpose and scale of using Alibaba Cloud Apsara Stack.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of ¥27.16 million.



Costs of Alibaba Cloud solution:  
27% of total costs

### Costs Of Alibaba Cloud Solution: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Licensing costs of Alibaba Cloud Apsara Stack	Composite organization	¥13,500,000			
G2	License renewal fee of Alibaba Cloud Apsara Stack	G1*33%		¥4,500,000	¥4,500,000	¥4,500,000
Gt	Cost of Alibaba Cloud solution	G1+G2	¥13,500,000	¥4,500,000	¥4,500,000	¥4,500,000
	Risk adjustment	↑10%				
Gtr	Costs of Alibaba Cloud solution (risk-adjusted)		¥14,850,000	¥4,950,000	¥4,950,000	¥4,950,000

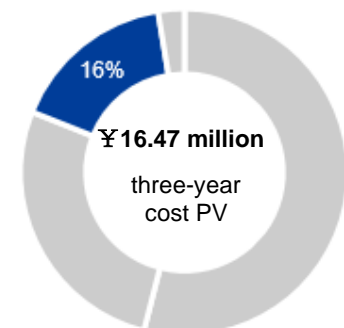
### Costs Of Ongoing Support

Besides software and hardware services, Alibaba Cloud provides a one-stop service system that covers development to operation and maintenance. During infrastructure deployment and application migration, Alibaba Cloud offers development facilitation and consulting services for microservice division. After the new system is put into use, Alibaba Cloud can provide onsite O&M service and continuous support.

Cost of ongoing support varies according to:

- › The complexity of Alibaba Cloud Apsara Stack deployment, development, operation, and maintenance.
- › Internal development and O&M resources of the enterprise.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of ¥16.47 million.



Costs of ongoing support:  
16% of total costs

## Costs Of Ongoing Support: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	Professional consulting and service fees during deployment	Composite organization	¥10,000,000			
H2	Ongoing professional service fees	Composite organization		¥2,000,000	¥2,000,000	¥2,000,000
Ht	Costs of ongoing support	H1+H2	¥10,000,000	¥2,000,000	¥2,000,000	¥2,000,000
	Risk adjustment	↑10%				
Htr	Costs of ongoing support (risk-adjusted)		¥11,000,000	¥2,200,000	¥2,200,000	¥2,200,000

## Costs Of Internal Deployment And Learning

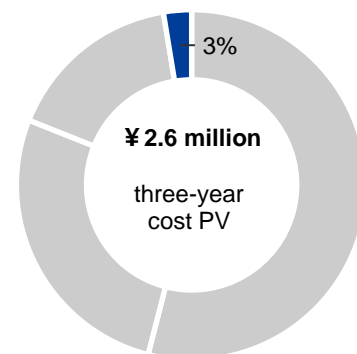
Despite receiving support from Alibaba Cloud's service team, enterprises need to invest sufficient human resources in deployment and use of private cloud to ensure smooth deployment. For Organization Z, infrastructure construction in the early stage requires support from dozens of employees in architecture, technology, system, network, and machine rooms. Organization Z assigns six employees to fully engage in the two-month deployment. On this basis, its IT team keeps expanding over the three years to meet the requirements for large-scale application migrations and digital transformations. The time for training IT staff in Alibaba Cloud Apsara Stack is another indirect cost. Organization Z's IT staff received one month of pre-project training and two months of on-the-job training. For the composite organization, Forrester assumes that:

- › After building the infrastructure, the next important step for application development on Alibaba Cloud Apsara Stack is to build a distributed architecture. Even with support from a large number of experts and documents from Alibaba Cloud, the organization needs 10 person-months of internal effort to complete the construction of distributed architecture.
- › The IT team expands along with its large-scale digital transformation. The model assumes that there are 50 IT personnel using Alibaba Cloud Apsara Stack in Year 1, and that rises to 100 by Year 3.

Cost of Internal deployment and learning varies according to:

- › Different complexity of business applications that can affect the difficulty level of the microservices division.
- › Time needed for infrastructure deployment, which is affected by physical environment, professionalism of employees, and efficiency of coordination and communication.
- › Requirements for IT staff in mastery of Alibaba Cloud vary across enterprises. Some interviewees expected that Alibaba Cloud could take care of all tasks related application development, operations, and maintenance, while some wanted to use private cloud without relying on external support.

To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year risk-adjusted total PV of ¥2.6 million



Costs of internal deployment and learning: 3% of total costs



**Two months**

Total implementation and deployment time



**10 Person-months**

On building distributed architecture

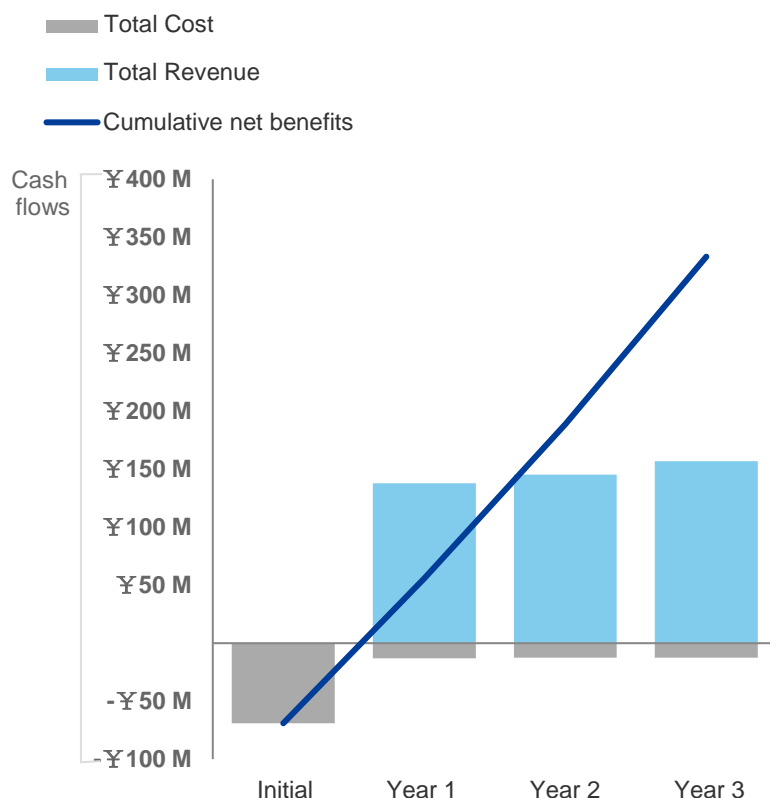
## Costs Of Internal Deployment And Learning: Calculation Table

Ref.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
I1	Number of employees involved in planning and deployment	Composite organization	6			
I2	Average working hours per employee required for infrastructure deployment (hours)	Composite organization	320			
I3	Total time for planning and deployment preparation (hours)	$I1 \times I2$	1,920			
I4	Construction time of distributed architecture in the business system (hours)	Composite organization	1,600			
I5	Per capita cost of system maintenance (hours)	Third-party data	¥165			
I6	Internal staff deployment costs	$(I3 + I4) \times I5$	¥580,800			
I7	Number of internal staff using Alibaba Cloud	Composite organization		50	25	25
I8	Per capita time for Alibaba Cloud training and hands-on practice (hours)	Composite organization		120	120	120
I9	Per capita cost of internal staff using Alibaba Cloud	Third-party data		¥165	¥165	¥165
I10	Learning cost of Alibaba Cloud	$I7 \times I8 \times I9$		¥990,000	¥495,000	¥495,000
I1t	Costs of Internal deployment and learning	$I6 + I10$	¥580,800	¥990,000	¥495,000	¥495,000
	Risk adjustment	↑15%				
I1tr	Costs of Internal deployment and learning (risk-adjusted)		¥667,920	¥1,138,500	¥569,250	¥569,250

# 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 interviewed 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 Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	¥-69,042,920	¥-13,013,500	¥-12,444,250	¥-12,444,250	¥-106,944,920	¥-100,507,427
Total benefits	¥0	¥137,984,945	¥145,395,031	¥156,817,153	¥440,197,129	¥363,421,091
Net benefits	¥-69,042,920	¥124,971,445	¥132,950,781	¥144,372,903	¥333,252,209	¥262,913,664
ROI						262%
Payback period (month)						7.0

# Solution Overview

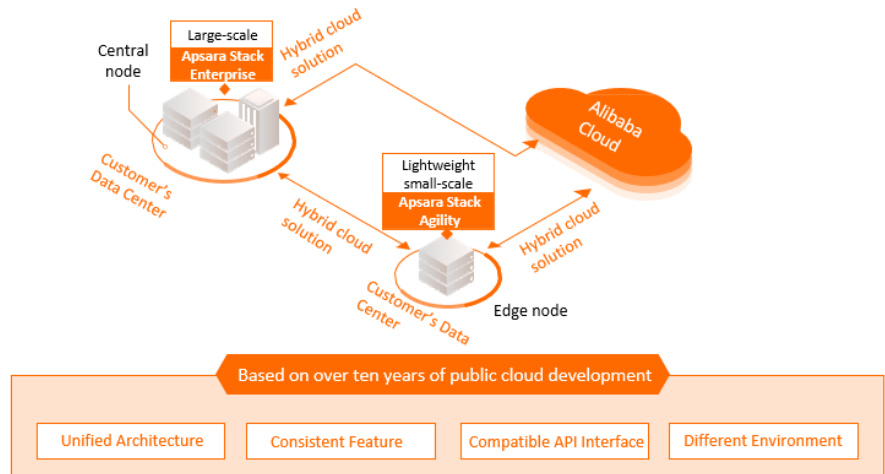
The following information is provided by Alibaba Cloud. Forrester has not validated any claims and does not endorse Alibaba Cloud or its offerings.

## Alibaba Cloud Apsara Stack

Alibaba Cloud Apsara Stack is an open, unified, and trustworthy enterprise-level cloud platform tailored for customers based on the proprietary Apsara Distributed Operating System developed in house at Alibaba Cloud. Apsara Stack is based on the same technologies that support Alibaba Cloud, which means customers can deploy public cloud products and services locally in any environment, and scale to the public cloud with one single click, allowing customers to get flexible hybrid cloud solution anytime, anywhere. Apsara Stack provides both large and stable full-stack cloud platforms as well as small but specialized agile products customized for different business scales and scenarios of customers.

### Alibaba Cloud Apsara Stack ■

Serve as the enterprise-level infrastructure that provides safe, stable, autonomous and controllable hybrid cloud solution



## Strengths of Apsara Stack



**Hyper-scale.** Apsara Stack supports hyper-scale clusters that have more than 10,000 servers in each region, meeting the requirement of operating large business systems and applications to support large numbers of users.



**Comprehensive.** Based on the same technologies that support Alibaba Cloud, Apsara Stack is a full-stack cloud solution designed for enterprise-level customers who require a highly capable and flexible hybrid cloud solution. Hot upgrading capability allows customers to use the products and services of Alibaba Cloud in local environment constantly.



**Enterprise infrastructure.** Apsara Stack provides flexible pricing plans for customers to achieve the most cost-efficient solution, convenient management, and improved operation and maintenance efficiency. With rich experience in constructing enterprise-level clouds in the government, finance, and other industries, Apsara Stack safeguards the cloud adoption journey of customers.



**Safe and stable.** Layered security architecture provides multi-level and integrated security protection services. It has passed the latest national security MLPS 2.0-Level 4 Certification, Trusted Cloud, ISO27001, etc. Disaster solutions guarantee the system's high reliability and business continuity.



**Dual middle platforms for digital transformation.** As enterprise-level infrastructure, Apsara Stack can assist enterprises to establish dual middle platforms-"data middle platform" and "business middle platform", to boost digital transformation of business. Data middle platform is a big data platform built upon Apsara Stack to support enterprises in integrating data resource, R & D management, and asset management into one data resource pool, and use its data-driven capabilities to connect fragmented business systems, eliminate data barriers and realize data sharing. The business middle platform is based on the proprietary large-scale high-stable middleware developed by Alibaba Cloud. It can empower a complete set of services, application, and organization of front-end applications in internet businesses. It also supports sharing of business and system capabilities, and it uses standardized modules to support rapid innovation of business and applications.

For more information, please visit the official website of Alibaba Cloud Apsara Stack: [apsara-stack.aliyun.com/](https://apsara-stack.aliyun.com/)

## Intel® Xeon® Scalable Platform

With ever-expanding cloud computing and iteration of cloud products, organizations need flexible and scalable hardware platforms to build private and hybrid clouds. Intel has thereby introduced the 2<sup>nd</sup> Gen Intel® Xeon® Scalable processors.



The 2<sup>nd</sup> Gen Intel® Xeon® Scalable processors have many innovative and enhanced features. The dual-socket system provides 112 cores and supports higher DDR4 native bandwidth. The processors also have a 1.33 times average performance gain on workloads compared to the previous generation of chips, which is revealed in improved integration level, computing, storage, memory, network, and security functions. Chip performance is more consistent, universal, and transformative. The new processors integrate Intel® Deep Learning Boost, and they are optimized for AI workloads, with a performance of up to 14 times higher than the previous generation, providing solid foundation for deploying AI applications on the cloud and edge.

### Improved Efficiency and TCO

Intel® Xeon® Scalable Platform is designed for data center modernization to drive operation efficiencies that lead to improved total cost of ownership (TCO) and higher productivity for users. Systems built on the Intel® Xeon® Scalable platform are designed to deliver agile services and transformative features.

The 2<sup>nd</sup> Gen Intel® Xeon® Scalable processors provide end-to-end, software-hardware collaborated IT support to help enterprise customers build new data centers and diversified, efficient private cloud and hybrid cloud environments.

#### World-leading performance accelerates data analysis and technological innovation

Up to <b>1.33X</b> Average Performance Improvement	Up to <b>3.5X</b> 5-Year Refresh Performance Improvement	Up to <b>14X</b> AI Performance Improvement (with Intel® Deep Learning Boost)
Compared to Intel® Xeon® Gold 5100 processor	Compared to VM density of Intel® Xeon® E5-2600 v6	Compared to Intel® Xeon® Platinum 8180 processor

For more information, please visit the official website of Intel:

[intel.cn/content/www/cn/zh/products/processors/xeon/scalable.html](https://intel.cn/content/www/cn/zh/products/processors/xeon/scalable.html)



# 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

---

<sup>1</sup> Source: “Develop Your Cloud Roadmap,” Forrester Consulting, Inc., January 30, 2020.

<sup>2</sup> Source: Statista.

<sup>3</sup> Source: “Build A Next-Generation Hybrid-Driven Private Cloud Platform To Accelerate New Digital Business,” Forrester Consulting, Inc., March 2019.