# 2016 Top Markets Report Cloud Computing

## Overview and Key Findings

### Introduction

According to the U.S. Department of Commerce's National Institute of Standards and Technology, cloud computing is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".[1] Essentially, the cloud allows users to easily tap into applications, virtual environments, or more basic computing tools that may be supplied from technical and software infrastructures other than their own.

Three commonly used designations for deployment models are private, public, and hybrid cloud. In a private cloud environment, a client or its vendor manages a cloud infrastructure and makes a shared pool of technical resources available exclusively to the client's users. On the other end of the spectrum, a public cloud provider allows the general public to access and use services it offers from its own facilities, typically for a fee. A hybrid cloud environment is one which combines these elements.

Another way to categorize cloud computing is by the type of service provisioned. Note that the specific firms mentioned below may offer a range of services falling across multiple categories, and that many other cloud providers offer similar products.

Software-as-a-service (SaaS) enables a user to remotely access software applications from a cloud provider. The client may do so from different locations or devices, and the experience in this instance generally involves logging in and gaining access to some form of software interface.

Prominent examples include Microsoft's Office 365 web-based e-mail and scheduling products, or Salesforce.com's customer relationship management offerings.

Users of platform-as-a-service (PaaS) solutions gain virtual access to programming resources and tools, provided and controlled by the cloud vendor that enables them to develop their own web applications. These applications are hosted through the vendor's cloud infrastructure. Google's App Engine and Red Hat's OpenShift are examples.

Finally, infrastructure-as-a-service (IaaS) enables users to virtually access more foundational computing resources to support their operations. Among other potential IaaS offerings, a vendor may provide file storage, processing power, or networking-related services. Some examples would be Amazon Web Services' Elastic Compute Cloud (EC2), VMware's vCloud Air, or IBM's SoftLayer.

As we did in the 2015 Cloud Computing report, this study provides a ranking for the top twenty cloud computing export markets for 2016. Issues including, but not limited to market environment, barriers, policies, regulations and competition are discussed in each country profile.

### Key Findings: Top Markets and Methodology

From a general global industry standpoint, addressing concerns about data privacy while maintaining open, competitive and innovative digital markets continues to be a delicate matter. Government efforts to maintain national security and address data privacy issues for their citizens remain a central challenge for the industry. Technologically-speaking, the consolidation of SaaS continues to be successful, as do the increasing applications of IaaS and PaaS. Hybrid clouds also

continue to do well with increasing market prevalence and utilization.

As a whole, the cloud computing industry continues to see healthy expansion as strong data reflects an increase in sales, adoption and business acceptance. Furthermore, according to Gartner, by 2020, a corporate "no-cloud" policy will be as rare as a "no-Internet" policy is today.[2]

Despite some potential market barriers encountered when entering international markets, U.S. companies are very well-positioned to continue being global market leaders and expand their market opportunities abroad.

According to the World Economic Forum's Global Information Technology Report (2015) (which includes a wide array of topics such as Internet penetration and cost, regulatory environment and laws relating to ICT, infrastructure and digital content and ICT use for business-to-business and business-to-consumer transactions), the top 20 countries in the Network Readiness Index are all high income advanced economies.[3] Even though some non-OECD countries are making significant advances regarding their ICT development efforts, most development, market opportunities and business needs are among the wealthiest and most technologically developed nations. However, some of the less advanced IT societies are increasing demand of cloud-based services, thus becoming significant markets for U.S. exporters.

The rankings in this Cloud Computing Top Markets Report were determined by analyzing the export data from the U.S. Bureau of Economic Analysis (BEA), various reports and statistics on factors

deemed significant to cloud computing adoption, original research and input from the U.S. Department of Commerce staff stationed in the profiled countries.

The methodology followed in this report was the same as the one followed in the 2015 report. The predictions made in the 2015 report turned out to be quite accurate: Eighteen of the top markets predicted in the report remained in the top 20 ranking according to the latest 2014 BEA data.

For more information about the methodology followed for this report, please check the methodology appendix.

**Industry Overview and Global Landscape**

As in previous years, forecasts for global cloud adoption are bullish. For example, Forrester believes that businesses will spend about $191 billion on cloud services by 2020, compared to $72 billion in 2014.[4] This projection suggests that the future cloud market will be 20 percent larger than what had previously been forecasted by the firm, which reveals that the sector has entered a "hypergrowth" stage and is displacing on-premise setups faster than expected. International Data Corporation (IDC) predicts the market in 2017 will be worth $107 billion, over twice as much as its 2013 estimate of $47.4 billion.[5]

A key trend shaping the cloud ecosystem over the next several years is the continued prominence and even quicker rise of SaaS, widely expected to show the strongest growth in both revenues and deployments. One prediction is that in 2016, worldwide SaaS revenues will total approximately $106 billion.[6] Other forecasts call on more than $132 billion in sales of SaaS by 2020, or a $50.8 billion revenue in 2018 from SaaS-based business applications alone.[7, 8] While dollar figures differ, usage projections are equally compelling.

In its "Predicts 2016: Cloud Computing to Drive Digital Business" report, Gartner provides several insightful, forward-looking key findings and strategic business assumptions: [9]

- The defensive stance that dominated the large software vendor strategies toward the cloud has

**Figure 1: Top Cloud Computing Export Markets (through 2016)**

| | |
|---|---|
| 1. Canada | 11. China |
| 2. Japan | 12. France |
| 3. United Kingdom | 13. Netherlands |
| 4. Brazil | 14. Italy |
| 5. South Korea | 15. Sweden |
| 6. Germany | 16. Singapore |
| 7. Switzerland | 17. Spain |
| 8. India | 18. South Africa |
| 9. Mexico | 19. Chile |
| 10. Australia | 20. Malaysia |

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been replaced in recent years with a cloud-first approach. By 2020, a corporate "no-cloud" policy will be as rare as a "no-Internet" policy is today.

- Hybrid will be the most common usage of the cloud, but it requires the public cloud to be part of the overall strategy.

- By 2020, more computing power will be sold and deployed by IaaS and PaaS cloud providers than by enterprise data centers.

- The IaaS computing market has been growing more than 40 percent in revenue per year since 2011 and is projected to continue to grow more than 25 percent per year through 2019.

- While some applications and data will remain locked on-premises in older technologies, more new solutions will be cloud-based, thus further increasing demand for integration infrastructure.

- By 2019, the majority of virtual machines will be delivered by IaaS providers. Revenue from computing IaaS and PaaS in 2016 will be only 13 percent less than the revenue for all servers worldwide. By 2020, the revenue for IaaS and PaaS will exceed $55 billion and likely surpass the revenue for servers.

- By 2018, 50 percent of enterprises with more than 1,000 users will be using products provided by a cloud access security broker (CASB) to monitor and manage their use of SaaS and other forms of public cloud.

Although security concerns will probably continue pushing many towards hybrid cloud deployments, public cloud expenditure will still grow six times as quickly as overall IT spending over the 2013-18 timeline, more than double in value, reaching $127 billion by the end of this period.[10] Other estimates are even more optimistic, calling for $250 billion in public cloud spending by 2017, up from $158 billion in 2014.[11]

Possible explanations for this trend include the growing understanding that cloud vendors offer state-of-the-art security; the innovative security-related services actually being marketed by those vendors; a gathering boom in value-added offerings available through public clouds; the popularity of

"cloud first" approaches in procurement ecosystems; and greater overall trust in public clouds.[12-14]

This does not preclude the continued popularity of hybrid approaches, which could be in use in 50 percent of businesses by 2017, especially given that security remains a paramount concern and the response is often to hold some data in-house.[15] It also does not mean that private clouds will become irrelevant in the next few years. There are at least two credible surveys pointing to their continued importance (although one case predicted a slight decline in usage and corresponding rise in public cloud utilization).[16, 17]

With time, maturity and familiarity, public cloud services are likely to become an even more important factor than they are today.[18] Indeed, public cloud is expected to constitute "more than half of worldwide software, server and storage spending growth," by 2018, according to IDC.[19] One prominent example of this trend is General Electric, a U.S.-based but global company that in 2014 rolled out over 90 percent of its applications in a public cloud environment.[20] In addition, greater public cloud adoption may spur wider SaaS usage, since SaaS will account for approximately 55 percent of all public cloud spending by 2018.[21]

**Challenges, Barriers and Opportunities**

U.S. companies are very well-positioned to continue in leadership positions within the cloud computing global market. Factors such as a very innovative and competitive domestic market, high levels of expertise and talent, name recognition and first-mover advantages provide a competitive advantage to U.S. companies expanding their operations abroad.

Leadership today, however, guarantees neither that U.S. cloud vendors will succeed in every global market they enter, nor that they will remain on top. Some foreign-based companies (e.g., Germany's SAP or Japan's Fujitsu) are strong global competitors, while others have solid or growing stakes in their home countries (e.g., Alibaba's Aliyun in China).

Competition is not the only challenge for U.S. companies. In some large markets, there has been discussion or enactment of regulatory measures that may impose disadvantages to foreign firms. In addition to general privacy considerations, many foreign buyers have expressed concerns about who

might have access to their data. Following some surveillance disclosures in recent years, trust-related issues have increasingly caused hesitations amongst those considering purchasing of cloud services from U.S. vendors, especially those vendors who do not store data locally. Thus, some U.S. companies operating in foreign markets are storing data in-country due to strict data policies. Data localization requirements (i.e., requirements to store user data in domestic servers) increase costs and create servicing and technical inefficiencies, which adds complexity and financial stress for U.S. exporters.

The United States is in the process of negotiating and implementing several multi-national agreements that should alleviate some of the industry market barriers, as well as increase opportunities for U.S. companies.

The Trans-Pacific Partnership (TPP), a trade agreement signed among 12 countries within the Pacific Rim (including the United States and three countries profiled in this report – Australia, Canada and Japan), should provide a framework to further liberalize the digital economy moving forward.

The United States is also currently negotiating the Transatlantic Trade Investment and Partnership (TTIP) with the European Union and the Trade in Services Agreement (TiSA) with 22 other parties from around the world. In both agreements, the United States seeks to further facilitate trade in the digital economy and promote global innovation and entrepreneurship.

In addition, the U.S. Department of Commerce reached agreement with the European Commission in February 2016 on the EU-U.S. Privacy Shield Framework, which will enable U.S.-based companies to meet EU data protection requirements when transferring personal information to the United States. The United States is working closely with European partners to help restore trust in transatlantic data transfers and provide needed certainty for U.S. companies.

**Citations**
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