

Hearing on  
**International Trade in the Digital Economy**

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Subcommittee on International Trade,  
Customs, and Global Competitiveness

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Chairman Wyden, Ranking Member Crapo, and Members of the Committee, thank you for holding this hearing and for inviting me to share my views with you. Cloud computing technology is emerging as an engine for economic growth, jobs and trade. It is vital that we create a policy framework that supports it. As the Senior Vice President for Global Public Policy at Salesforce.com, I am deeply involved in policy discussions about cloud computing, and as the former President of the Council on Competitiveness I applaud the efforts of this Committee to address international trade in the digital economy.

### **About Salesforce.com**

Salesforce.com is a leading enterprise cloud computing company that provides Internet-based solutions to organizations of all sizes in all industries globally. Our main service offerings are applications that allow organizations to input, store, process, and access data to manage their sales and customer services. In addition, we provide an enterprise collaboration tool called Chatter and a development platform called Force.com. In September, Salesforce.com was ranked 4<sup>th</sup> on Fortune's 2010 "100 Fastest Growing Companies" list.

Salesforce.com delivers its services over the Internet through commercially available Web connections and browser software. Before cloud computing, the customers we service today would typically purchase software and hardware from different vendors and integrate this technology in their own data centers. Today, instead of building and maintaining costly IT infrastructure, our customers simply log on to the Salesforce.com Website and access their cloud services using a unique username and password. Over 82,000 organizations globally, including governments and businesses in highly regulated industries like financial services, healthcare, insurance and communications trust Salesforce.com with their data.

In my remarks today, I will make reference to the Salesforce.com *enterprise* cloud computing model, not the consumer cloud computing model. In doing so, I will emphasize two themes:

- 1. Cloud computing is a powerful economic stimulus that is changing the face of trade.**

- 2. In order to maximize the economic benefits of cloud computing, public policy should facilitate international data flows, spur adoption, and encourage transparency.**

### **I. Cloud Computing is a powerful economic stimulus that is changing the face of trade.**

Cloud computing lets individuals and organizations use the Internet to access their applications and data as a service without having to buy or maintain hardware or software. Every major analyst firm believes that cloud computing will expand its share of the overall IT market. According to Gartner, the worldwide market for cloud services will be worth \$148.8 billion by 2014.<sup>1</sup> According to Saugatuck Technology, 45 percent of all new business and IT spending will go to cloud services within the next five years.<sup>2</sup> According to a recent Goldman Sachs report the shift toward cloud computing is “unstoppable” and has likely been accelerated by the macroeconomic downturn that has prompted business to look for lower-cost solutions.<sup>3</sup>

A good analogy for enterprise cloud computing is a high-rise office building. Just as a high-rise allows multiple tenants to lease separate offices in the same building while sharing core services like plumbing and electricity, multi-tenant enterprise cloud computing allows organizations to subscribe to customized software applications while sharing core computing services like database and security. For the tenants, it’s cheaper, more efficient and often more secure than the alternatives. By eliminating the need for costly and duplicative infrastructure, multi-tenant cloud computing frees users to focus on their core business, not their IT.

In a multi-tenant cloud, data and applications are separated logically within the hardware and software so different users can view only the information and services that pertain to them. In this respect, multi-tenant cloud computing is like online banking – it allows large numbers of individuals to

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<sup>1</sup> Gartner, Inc., “Forecast: Public Cloud Services, Worldwide and Regions, Industry Sectors, 2009-2014,” June 2, 2010.

<sup>2</sup> Saugatuck Technology, “Ageing IT Infrastructure: A Boon for Cloud Adoption?” March 12, 2010.

<sup>3</sup> Goldman Sachs, SaaS Survey, February 2010.

use their accounts at the same time while keeping their information private through the logical separation of data.

In order to appreciate the power of multi-tenant cloud computing, it is useful to contrast it to single-tenant computing architecture. While multi-tenant computing can satisfy the needs of numerous organizations with the hardware resources and staff needed to manage one large computing stack, single-tenant computing requires a dedicated set of resources for each organization. As more and more customers are added to the single-tenant model, the sheer scale, cost and complexity of maintaining a separate computing stack for each customer becomes very difficult to manage.

With multi-tenant cloud computing, the configurations of each user are stored as metadata that describes the base functionality of their application and corresponds to their data and customizations. This metadata is then interpreted by the platform's runtime engine. In a robust multi-tenant, metadata cloud architecture there is a clear separation of the compiled runtime engine (kernel) and the application data. As a result, the kernel can be upgraded without disrupting customer's applications or data, thus allowing for large scale operations and continuous improvements in performance.

Salesforce.com is a good example of the efficiencies that multi-tenant cloud computing enables. With its multi-tenant architecture, Salesforce.com is able to run approximately 230,000 applications for its more than 82,000 customers on just 3,000 servers. No other computing model delivers that kind of efficiency. A single-tenant computing model (sometimes referred to as a "private cloud") would require a minimum of 2 servers per application (one database server and one application server), plus additional servers for redundancy and disaster recovery. Consequently, a single-tenant computing model could require several hundred thousand servers to manage the computing needs of the customer base that Salesforce.com manages with just 3,000 servers.

The rise of apartment buildings offers a good example of the power of multi-tenancy. In 1869 the first apartment house ever constructed in America opened in New York City. It was named the Stuyvestant and was controversial from its beginning. One wealthy New Yorker declared, "Gentlemen will never consent to live on mere shelves under a common roof." But to builders and tenants, the benefits were compelling – by living

in separate apartments in one large building and sharing amenities, tenants could enjoy space and service that would otherwise be beyond their means. By 1910 apartment houses were being built alongside private mansions on Fifth Avenue, and after 1913 they displaced new private residences on that fashionable street altogether. “Soon almost everyone in New York – rich and poor and everyone in between – was living in the same kind of house: an apartment house.”<sup>4</sup>

Electric utilities also demonstrate the power of the multi-tenant model. In his book, The Big Switch, Nicholas Carr chronicles the career of Samuel Insull and the rise of electric utilities. Insull became president of the Chicago Edison Company in 1892 and set out to convince industrial businesses to stop producing their own power and instead buy it as a service from central plants. In 1900 the U.S. Census Bureau counted 50,000 private electric plants in the United States but only 3,600 central utility stations. The economic benefits of electric utilities were so compelling, however, that by 1930 their share of total electricity production had jumped to 80 percent. In just three short decades, the electric utility had supplanted the private power plant.<sup>5</sup>

Just as there was a massive shift to apartment buildings and electric utilities soon after their introduction, so is there a massive shift to cloud computing today. To echo the Goldman Sachs report cited earlier, it is “unstoppable.” The reasons for this shift are easy to understand. Cloud computing is cost-effective, fast, easy-to-use, scalable and available anywhere there is Internet access. It is also a powerful driver of innovation. This combination of benefits allows organizations that use cloud computing to dramatically boost their performance.

- Cost-Effective – Because customers do not have to invest in costly IT infrastructure, they enjoy significant upfront savings. And because they pay on a per subscriber basis that includes system upgrades, costs are more predictable.

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<sup>4</sup> “Houses in the Sky” from New York, An Illustrated History by Ric Burns and James Sanders, with Lisa Ades, Knopf 1999.

<sup>5</sup> Nicholas Carr, The Big Switch: Rewiring the World, from Edison to Google, New York: Norton, 2008.

- Fast – Because customers do not have to procure, install or maintain servers and networking equipment, cloud applications can be implemented quickly (from a few days to a few months) and deployed simultaneously to thousands of users in different locations.
- Easy to Use – Because many enterprise cloud services are modeled after popular consumer Web applications, interfaces are easy to use, user adoption is robust, and customer satisfaction is high.
- Scalable – Because enterprise cloud computing is built on Internet scale platforms, it provides a flexibility that traditional computing cannot. For example, it took only three weeks for the 2008 Presidential Transition Team to launch its Change.gov application on the Salesforce.com platform. During the week that the application was live, it registered 40 million hits and at its peak handled 145 hits per second – all without any investment in IT infrastructure on the part of the customer.
- Available Anytime, Anywhere – Because enterprise cloud applications are accessed over the Internet and housed in large data centers that run 24 hours a day, users can securely access real-time data anytime and from anywhere with an Internet browser.
- Continuous innovation – Because multi-tenant cloud architecture enables automatic upgrades, customers benefit from new features immediately without having to worry about legacy software. Moreover, developers that build and host their applications on multi-tenant cloud platforms, such as Force.com, can bring innovative ideas to life quickly and share them widely.

Together, these benefits constitute a powerful engine for economic growth. Cloud computing has already spawned scores of new companies. IDC estimates that there are more than 1,000 worldwide cloud software-as-a-service providers alone. In the coming decade, thanks to the proliferation of cloud services, low-cost bandwidth, and inexpensive access devices like smart-phones, the market for cloud computing will continue to grow rapidly.

Cloud computing is also having a major impact on trade. Ten years ago, most digital goods came in the form of compact disks that were packaged

and shipped around the world. Today digital goods arrive seamlessly over the Internet. As a result, the international exchange of digital data has exploded. The trade implications for content industries like software, movies, books and video games are enormous, but the impact is not limited to these items. Service industries like finance, consulting and technical support are also embracing the cloud. As a result, more and more international trade consists of the transfer of electronic bits.

The traffic that cloud companies like Salesforce.com manages attests to the shift to digital goods and services. Over the past few years, we have seen the number of transactions that we handle soar, and at present we process about 350 million transactions for our worldwide customers each business day. The sheer scale of these transactions shows just how rapidly industry is migrating to the cloud and underscores the importance of open data flows.

**II. In order to maximize the economic benefits of cloud computing, public policy should facilitate international data flows, encourage adoption and promote transparency.**

Much of the policy discussion about cloud computing has tended to emphasize infrastructure and geography, but the preoccupation with these issues misconstrues the real dynamic of the cloud model. For example, policies aimed at influencing data center location overlook the fact that data centers do not spin-off many new businesses because of the tight security controls that surround them. Similarly, policies that lock computing applications and data behind government firewalls erode the speed, flexibility and cost advantages that cloud computing enables. And policies that try to bottle up data inside national borders put a brake on the efficiencies that the cloud affords local industry.

If policymakers want to maximize the benefits of cloud computing to their local economies, they should focus on promoting its use, not restricting its deployment. Herein lies the central lesson for public policy – *the greatest economic benefits of cloud computing will accrue to those communities that use it to boost productivity and innovation, not to those that try to control it.* As a result, policymakers should drive the adoption of proven cloud services. The best way to do so is to focus on three objectives: 1) facilitate the transmission of secure cross-border data flows, 2) move government IT operations to the cloud, and 3) encourage cloud providers to be more transparent about their operations.

## 1. Facilitate the transmission of secure cross-border data flows.

As long as basic security and privacy concerns are met, most data is allowed to move readily around the world. With the exception of some sector-specific regulations and government operations, organizations are largely free to determine if they want to implement enterprise cloud services and whether a specific vendor's safeguards are adequate. For many customers, privacy and security issues can be resolved with commercial contracts. For others, however, especially those outside the United States, commercial contracts are not enough – these customers also want assurances that government will not access data processed in overseas cloud data centers without deliberate due process. As the demand for cloud computing services has grown, so have these concerns about cross-border data flows and undue government access.

In order to address these concerns, U.S. trade officials should reach out to other governments to understand their reservations about cloud computing and enter into discussions to address them. These discussions can take place in the context of bilateral policy discussions that are already underway, such as the US-Japan bilateral dialogue on cloud computing; regional data privacy deliberations, such as those at the Asia-Pacific Economic Cooperation (APEC) forum; or at multilateral institutions, such as the Organization for Economic Cooperation and Development (OECD). The purpose of these discussions is not to deny legitimate government access to privately-held data, but to make sure that it is exercised in a predictable, transparent way that recognizes due process. Notably, the Aspen Institute has launched a new policy project named IDEA (International Digital Economy Accords) that brings together representatives from government, industry and civic organizations to address this set of issues.

## 2. Move government IT operations to the cloud.

Led by US Federal CIO Vivek Kundra, the Obama Administration has already sent a compelling signal to the international community about the power of cloud computing. The Administration, like many large organizations, is convinced that it can improve performance and cut costs by shifting IT programs to the cloud. In order to drive Federal adoption, the Office of Management and Budget has issued budget guidance about cloud computing, the General Services Administration has taken measures to



streamline the procurement of cloud services, and the National Institute for Standards and Technology has adapted Federal IT controls to cloud architecture. These efforts have already paid-off. For example, 10 of the 15 Federal Cabinet-level agencies are already using Salesforce.com cloud computing applications. The next step is to build on this early success with significant appropriations for Federal cloud computing projects that will make government a lead example of the power of cloud computing.

### 3. Encourage cloud providers to be more transparent about their operations.

Like any new technology, cloud computing will succeed to the measure that it earns the trust of its customers. The best way to create this trust is to promote transparency. A diverse set of issues -- including privacy, security, interoperability and portability -- usually top the list of policy priorities. A good way to tackle these issues is to insist on greater transparency from cloud computing providers. By establishing industry norms and encouraging cloud providers to map their performance against these norms, policymakers can give users the tools they need to evaluate different cloud services. In doing so, they will create a strong incentive for cloud providers to improve their performance in each of these areas.

In order to drive transparency, Salesforce.com recommends that enterprise cloud platform providers explain their information handling practices and disclose the real-time performance and reliability of their services on their public Web sites. Because privacy and security are so important, enterprise cloud companies should claim no ownership rights to client data and use it only as their customers instruct them or to fulfill contractual or legal obligations. Client data should be disclosed only if required to do so by law and, to the extent permitted by law, enterprise cloud companies should provide affected customers prior notice of any such compelled disclosure. Moreover, they should adopt an internationally accepted security framework (such as ISO 27000) and use third-party auditors to ensure compliance. To see how Salesforce.com measures up to these standards, interested parties can visit our public website, <https://trust.salesforce.com>.

### Conclusion

Just as apartment buildings and electric utilities made it economically feasible to deliver enhanced services to a large number of users a century ago, so does multi-tenant cloud computing today. The wholesale adoption

of cloud computing is just beginning. As it gathers momentum, it will have a powerful impact on economic growth and international trade. In order to assure that its benefits are captured and shared widely, public policy should focus on maintaining open data flows, getting government IT operations on the cloud and driving transparency.