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Cloud Computing in Russia: The Formation of Foundations of the Right

Key words: *Cloud computing, cloud, service, infrastructure, software, pooling, security, provider, network, rapid elasticity, service model, SaaS, IaaS, PaaS, deployment models, private cloud, public cloud, hybrid cloud, community cloud, Russia, Parallels®, market*

Annotation: *Cloud services are rapidly evolving and are becoming increasingly popular among organizations around the world. Executives of companies are seeking to improve the adaptability without significantly increasing costs, providing mobile users with more opportunities to work, combining functionality and upgraded applications. Of greatest interest to the Russia will be decisions IaaS (Infrastructure as a Service) and SaaS (Software as a Service). One of the main tasks is the formation of the foundations of law.*

1. Introduction

Cloud computing is treated by most of the experts as one of the main trends of information technologies development for forthcoming years. Cloud Computing is one of the major technologies predicted to revolutionize the future of computing. The model of delivering IT as a service has several advantages. It enables current businesses to dynamically adapt their computing infrastructure to meet the rapidly changing requirements of the environment.

2. Methodology

Based on a conceptual model of evaluation of commercial cloud services have become the subject of studies around the world.

3. Results

Computing paradigm, the Cloud service features to be evaluated have been discussed mainly over Cloud computing-related introductions, surveys, or research agendas (1). The topic of «the cloud» has attracted significant attention throughout the past few years. Things have changed drastically and rather rapidly in the world of information technology. Cloud computing is a relatively new term in the technology world and like every other relatively new term or IT concept it has its history and chronology. Such as Bruce Schneier (2) is an internationally renowned security technologist, called a «security guru» by The Economist believe it is a modern version of the timesharing model from the 1960s when computers were expensive and hard to maintain which was eventually killed by the rise of the personal computer. In the very near future all companies will use this type of service as it is

cheap, simple and as easily accessed service. It allows the company to be as productive as it can be without having to pay and invest a lot of money and time.

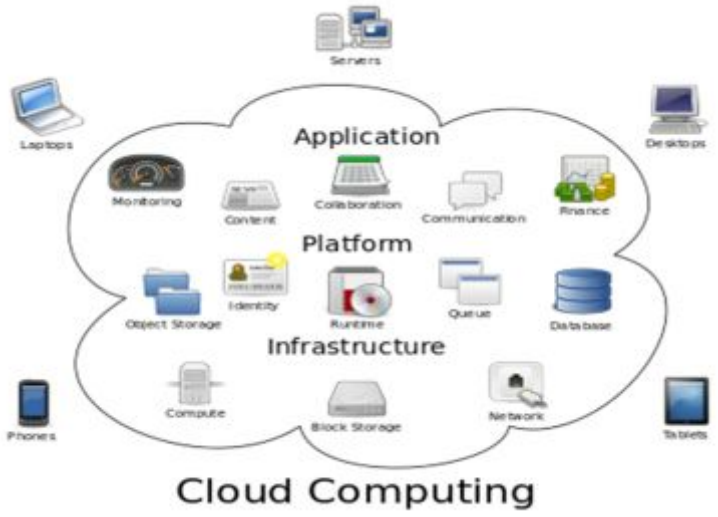
Companies are always on the hunt for the most flexible, convenient and cheap IT solutions that would provide the company with the IT services it needs. Unfortunately, with the current economic situation, most companies are trying to lower their costs. The best way that companies can go to cut down on their IT budget without harming the IT quality of their company, is to adapt the cloud storage services. This kind of service is very cost effective, as it is very cheap and will provide the company with all of the complements that it needs for their servers. Using cloud storage for one's small business or medium sized business is very crucial and essential (3,4).

Another major advantage that makes most companies to choose this type of computing is that any provisioning needed, will be the responsibility of the service provider and not the company (5). This means that the company will be supplied with server provisioning without having to put in any money or time into managing or monitoring the cloud storage, which is not the case with the traditional physical server that most companies use. Safety, this can be considered as one of the most important advantages of using cloud storage.

According to Gartner's Hype cycle, Cloud computing has reached a maturity that leads it into a productive phase. This means that most of the main issues with Cloud computing have been addressed to a degree that clouds have become interesting for full commercial exploitation. Microsoft decided to expand its suite of applications and reinvent their cloud offerings. According to Bloomberg interview with the President of Microsoft International Jean-Philippe Courtois, Microsoft had planned to 90% of its $9.6 billion research and development budget on cloud strategy in 2011 (6).

Evaluation of commercial Cloud services emerged as soon as those services were published (7,8). In fact, Cloud services evaluation has rapidly and increasingly become a worldwide research topic during recent years. As a result, numerous research results have been published, covering various aspects of Cloud services evaluation. Although it is impossible to enumerate all the existing evaluation-related studies, we can roughly distinguish between different studies according to different evaluation aspects on which they mainly focused. Note that, since we are interested in the practices of Cloud services evaluation, Experiment-Intensive Studies are the main review objects in this SLR. Based on the rough differentiation, the general process of Cloud services evaluation can be approximately summarized and profiled using a conceptual model (9).

What is the «cloud» «is a metaphor. Scientists and we agree with NIST (The National Institute of Standards and Technology), (10) which defined Cloud computing as» a model for enabling 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. However there are other definitions proposed by other authors in various research papers. For example, the author writes: «It is an information technology service model where computing services (both hardware and software) are delivered on-demand to customers over a network in a self-service fashion, independent of device and location.» (11).



Figure

The service and deployment models are the five essential characteristics are stated by NIST:

On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider. This is made possible by self-service and automation. Self-service means that the consumer performs all the actions needed to acquire the service herself, instead of going through an IT department, for example. The consumer's request is then automatically processed by the Cloud infrastructure, without human intervention on the provider's side (13).

1) Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations). A novel framework is proposed for adaptive service selection in mobile Cloud computing (13,14).

2) Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth. This procedure example demonstrates how you can create a resource pool with the VMware ESX\ESXi host as the parent resource. Assume that you have an VMware ESX\ESXi host that provides 8GHz of CPU and 4GB of memory that must be shared between your marketing and QA departments. You also want to share the resources unevenly, giving one department (QA) a higher priority. This can be accomplished by creating a resource pool for each department and using the Shares attribute to prioritize the allocation of resources (13,14).

3) Rapid elasticity. Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time (13,15,16).

Elasticity is basically a 'rename' of scalability, which has been a known non-functional requirement in IT architectures for many years already. Scalability is the ability to add or remove capacity, mostly processing, memory, or both, to or from an IT environment when this is needed. This it typically done in two ways:

1. Horizontal scalability: Adding or removing nodes, servers or instances to or from a pool like a cluster or farm.
2. Vertical scalability: Adding or removing resources to an existing node, server or instance to increase the capacity of the node, server or instance (Edwin Schouten, 2012) (17).

4) Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability1 at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service (18). For example, the company ARTEMES the report generator, able to read and assess any measurement data:

- local files
- Data in a Network
- Data in the ARTEMES Cloud (19).

Service Models:

1) SaaS - Software as a Service (20,21). The capability provided to the consumer is to use the provider's applications running on a Cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying Cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings. For outside, such conglomerate could be a large SaaS provider. For inside, it turns to a shared resource pool (22,23).

2) PaaS - Platform as a Service. The capability provided to the consumer is to deploy onto the Cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying Cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment (24).

3) IaaS - Infrastructure as a Service. The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying Cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls) (25). Examples of IaaS are Google Compute Engine, Google Cloud Storage and Google Big Query (24).

4) Deployment Models: Today Cloud computing is a hot topic, and according to Gartner Inc. there are three cloud-related topics (Hybrid Cloud and IT as Service Broker, Cloud/Client Architecture, The Era of Personal Cloud) among the top 10 strategic information technology list for 2014 (25).

1) Private cloud. The Cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units).

It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises (26).

2) Public cloud. The Cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider. At the moment, however, the public cloud model sometimes comes with security risks (13,27).

3) Community cloud. The Cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises. Three typical cloud modes, i.e. private cloud, community cloud and public cloud are supported in the system, that enables companies to create different cloud modes for the irperiodic business goals (13,28).

4) Hybrid cloud. The Cloud infrastructure is a composition of two or more distinct Cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)(13,29,30).

The Cloud computing is an evolving technology as against a one off technology discovery, it is a result of previous research and improvement in computing. Extensive surveys on Cloud computing can be found in the literature (31,32,33).

Cloud computing is pretty obvious as the IT world seek to find ways to provide cheaper and more sophisticated computing; cheaper computing because the cost on IT has shifted from the scale of expensive hardware like the mainframes to issues such as energy consumption, office space, need for collaboration, ubiquitous computing etc. It is an efficient and cost-effective solution for both small, medium and large companies and also will increase your ROI (34).

This shows that the history of Cloud computing dates back to the origin of computing itself and its evolution, from the super-computers to the era of cluster computing, where computers were brought together to form a single larger computer to create a sense of super computer, it was aimed at harnessing greater processing power. Clustering later led to the concept of Grid computing in the early 1990's and this was thought to be the future of computing because of its cost effectiveness, ability to solve problems with enormous amount of computing power, and because it proved that the computing resources can be pulled together to achieve a common objective, according to Cloud computing found its origin in the success of server virtualization and the possibilities to run IT more efficiently through server consolidation. The trend later moved to utility computing as the name implies it is simply the consumption of computing services as a utility whereby charges are placed on actual consumption rather than a flat rate; these entire concepts have evolved to make what we today call Cloud computing (35).

Cloud computing popularity keeps growing across all industries. More and more businesses are starting to use Cloud services for their software, applications or infrastructure. The benefits associated with Cloud computing are enormous. However, due to the rapidly

evolving Cloud market and dynamic technical information, most organisations are unsure of how to proceed with the migration into the Cloud. In addition, many enterprises have pushed back on Cloud computing due to security concerns. Cloud computing is nevertheless fraught with risks. Security, confidentiality, audit ability, regulatory compliance and a host of other risks should be carefully examined before any engagement in this area (36). Certainly, Cloud computing faces several security challenges as any other computing concepts. However, Cloud computing has brought many security benefits that were not available in traditional networks (37).

Neelie Kroes, Vice-President of the European Commission, in 2011 said: «I think the Cloud is critical to Europe's growth, and essential for making the best internet available to all. Now we need to work on three things: **First, the legal framework.** We've got the right platform: strong fixed and mobile communication networks. Now we need to work on three things: First, the legal framework. This clearly has an international dimension and it concerns for example **data protection and** privacy, clear rules for the allocation of jurisdiction, responsibility and liability, and consumer protection. Everyone needs clear rights here. Second, technical and commercial fundamentals. International standardisation efforts will also have a huge impact on Cloud computing. Third, the market» (38).

4. Conclusion

In Russia, Cloud computing is still in its early stages of development. What is the situation on the Russian market. Parallels (Parallels® is a global leader in hosting and cloud services enablement and cross-platform solutions) has refreshed its research for 2013, conducting 400 new interviews to determine what changes have taken place in the last year. Research addressed SMBs' cloud service use with respect to four specific categories: infrastructure as a service (IaaS), web presence and web applications, hosted communication and collaboration, and online business applications (a category also known as software as a service, or SaaS), this growth will likely accelerate through 2016 (39).

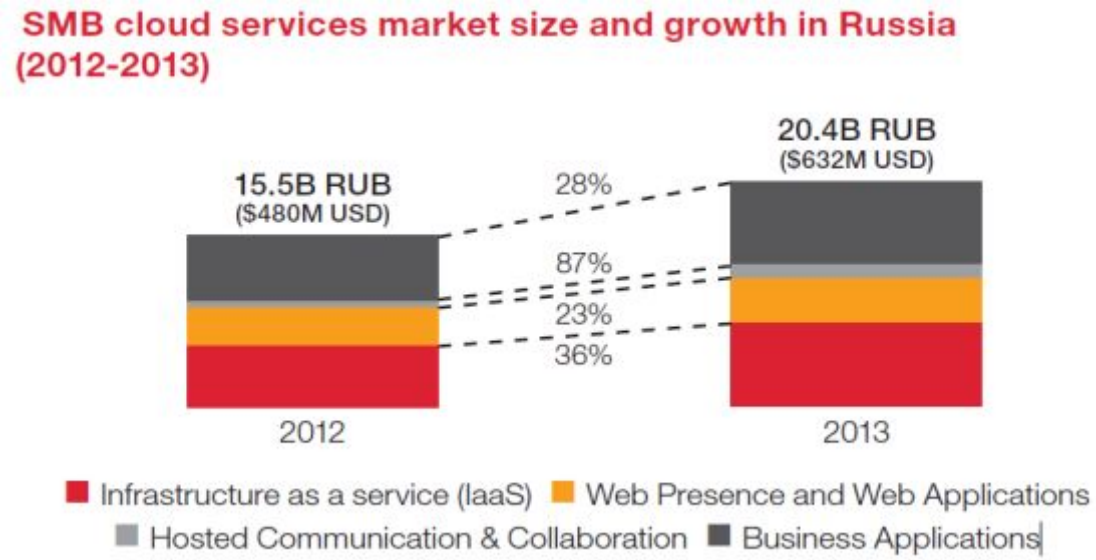


Figure 2: SMB cloud services market size and growth in Russia.

As of early 2013, Parallels calculated the Russian SMB market across all categories of cloud services to be 20.4B RUB ($632M USD). As shown in Figure 2, IaaS constitutes a large portion of the market, at 7.8B RUB ($242M USD), web presence and web applications contribute 4.2B RUB ($128M USD), hosted communication and collaboration (consisting of hosted premium email and hosted PBX) adds 1.1B RUB ($33M USD), and business applications account for the remaining sizeable portion of 7.4B RUB ($228M USD). Parallels predicts the Russian SMB market will grow by 40% year over-year for the next 3 years, expanding to 55.6B RUB ($1.7B USD) by late 2016 (39). Cloud computing an important area for IT innovation and business investment.

For widespread adoption of the cloud need a legal framework as a guarantor of legal protection and protection. For widespread adoption of the cloud need a legal framework as a guarantor of legal protection and protection. The main accents is standards and legal definitions.

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