Cloud Computing Risks, Challenges & Problems Businesses Are Facing

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Everywhere you turn these days “the cloud” is being talked about. This ambiguous term seems to encompass almost everything about us. While “the cloud” is just a metaphor for the internet, cloud computing is what people are really talking about these days. It provides better data storage, data security, flexibility, increased collaboration between employees, and changes the workflow of small businesses and large enterprises to help them make better decisions while decreasing costs.

It is clear that utilizing the cloud is a trend that continues to grow. We have already predicted in our business intelligence trends article the importance

and implementation of the cloud in companies like Alibaba, Amazon, Google and Microsoft.

The significance of the cloud is increasing exponentially. Gartner forecasts that the cloud services market will grow 17.3% in 2019 ($206.2 billion) and by 2022, 90% of organizations will be using cloud services.

Table 1. Worldwide Public Cloud Service Revenue Forecast (Billions of U.S. Dollars)

	2017	2018	2019	2020	2021
Cloud Business Process Services (BPaaS)	42.2	46.6	50.3	54.1	58.1
Cloud Application Infrastructure Services (PaaS)	11.9	15.2	18.8	23.0	27.7
Cloud Application Services (SaaS)	58.8	72.2	85.1	98.9	113.1
Cloud Management and Security Services	8.7	10.7	12.5	14.4	16.3
Cloud System Infrastructure Services (IaaS)	23.6	31.0	39.5	49.9	63.0
Total Market	**145.3**	**175.8**	**206.2**	**240.3**	**278.3**

BPaaS = business process as a service; IaaS = infrastructure as a service; PaaS = platform as a service; SaaS = software as a service
Note: Totals may not add up due to rounding.

Source: Gartner (September 2018)

Considering all the potential and development cloud computing has undergone in recent years, there are also many challenges businesses are facing. In this article, we have gathered 10 most prominent challenges of cloud computing that will deliver new insights and aspects in the cloud market. But first, let's start with a simple explanation of the general characteristics and basic definitions.

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What Is Cloud Computing?

Cloud computing is the delivery of various hardware and software services over the internet, through a network of remote servers. These remote servers are busy storing, managing, and processing data that enables users to expand or upgrade their existing infrastructure.

The capabilities and breadth of the cloud are enormous. The IT industry broke it into three categories to help better define use cases.

1. **a) Software as a Service** (SaaS) – software is owned, delivered and managed remotely by one or more providers. To start, Software-as-a-Service, or SaaS, is a popular way of accessing and paying for software. Instead of installing software on your own servers, SaaS companies enable you to rent software that's hosted, this is typically the case for a monthly or yearly subscription fee. More and more CRM, marketing, and finance related tools use SaaS business intelligence and technology, and even Adobe's Creative Suite has adopted the model.
2. **b) Infrastructure as a Service** (IaaS) – compute resources, complemented by storage and networking capabilities are owned and hosted by providers and available to customers on-demand.
3. **c) Platform as a Service** (PaaS) – the broad collection of application infrastructure (middleware) services. These services include application platform, integration, business process management and database services.

All of this is a deviation from traditional on-premise computing which is done via a local server or personal computer. These traditional methods are increasingly being left behind. In fact, the IDG's recently published Enterprise Cloud Computing Survey (2018) found that 73% of organizations have at least one application, or a portion of their computing infrastructure already in the cloud – 17% plan to do so within the next 12 months.

It is evident that the cloud is expanding. Since we live in a digital age, where data discovery and big data simply surpass the traditional storage and manual implementation and manipulation of business information,

companies are searching for the best possible solution of handling data. Traditional spreadsheets no longer serve their purpose, there is just too much data to store, manage and analyze. Be it in the form of online BI tools, or an online data visualization system, a company must address where and how to store its data. Even the most traditional sectors have to adjust:

“In an effort to do everything from offer better in-store customer service to fully leverage advances in manufacturing, companies from even most traditional and change-resistant sectors are seeing the writing on the wall: Cloud technology strategies cut cost and risk.” – Lalit Bhatt, Project Leader at Maruti Techlabs.

Though the opportunities are great, this explosion hasn’t come without issues in cloud computing. We discussed already some of these cloud computing challenges when comparing cloud vs on premise BI strategies. Now let’s go over more of those challenges organizations are facing, and how they are being addressed.

What Are The Challenges Of Cloud Computing?

In January 2018, RightScale conducted its annual State of the Cloud Survey on the latest cloud trends. They questioned 997 technical professionals across a broad cross-section of organizations about their adoption of cloud infrastructure. Their findings were insightful, especially in regards to current cloud computing challenges. To answer the main question of what are the challenges for cloud computing, below we have expanded upon some of their findings and provided additional cloud computing problems that businesses may need to address.

1. Security issues

Security risks of cloud computing have become the top concern in 2018 as 77% of respondents stated in the referred survey. For the longest time, the lack of resources/expertise was the number one voiced cloud challenge. In 2018 however, security inched ahead.

We already mentioned the hot debate around data security in our business intelligence trends 2019 article, and security has indeed been a primary, and valid, concern from the start of cloud computing technology: you are unable to see the exact location where your data is stored or being processed. This increases the cloud computing risks that can arise during the implementation or management of the cloud. Headlines highlighting data breaches, compromised credentials, and broken authentication, hacked interfaces and APIs, account hijacking haven't helped alleviate concerns. All of this makes trusting sensitive and proprietary data to a third party hard to stomach for some and, indeed, highlighting the challenges of cloud computing. Luckily as cloud providers and users, mature security capabilities are constantly improving. To ensure your organization's privacy and security is intact, verify the SaaS provider has secure user identity management, authentication, and access control mechanisms in place. Also, check which database privacy and security laws they are subject to.

While you are auditing a provider's security and privacy laws, make sure to also confirm the third biggest issue is taken care of: compliance. Your organization needs to be able to comply with regulations and standards, no matter where your data is stored. Speaking of storage, also ensure the provider has strict data recovery policies in place.

The security risks of cloud computing have become a reality for every organization, be it small or large. That's why it is important to implement a secure BI cloud tool that can leverage proper security measures.

2. Cost management and containment

The next part of our cloud computing risks list involves costs. For the most part cloud computing can save businesses money. In the cloud, an organization can easily ramp up its processing capabilities without making large investments in new hardware. Businesses can instead access extra processing through pay-as-you-go models from public cloud providers. However, the on-demand and scalable nature of cloud computing services make it sometimes difficult to define and predict quantities and costs.

Luckily there are several ways to keep cloud costs in check, for example, optimizing costs by conducting better financial analytics and reporting, automating policies for governance, or keeping the management reporting practice on course, so that these issues in cloud computing could be decreased.

3. Lack of resources/expertise

One of the cloud challenges companies and enterprises are facing today is lack of resources and/or expertise. Organizations are increasingly placing more workloads in the cloud while cloud technologies continue to rapidly advance. Due to these factors, organizations are having a tough time keeping up with the tools. Also, the need for expertise continues to grow. These challenges can be minimized through additional training of IT and development staff. A strong CIO championing cloud adoption also helps. As Cloud Engineer Drew Firment puts it:

"The success of cloud adoption and migrations comes down to your people—and the investments you make in a talent transformation program. Until you focus on the #1 bottleneck to the flow of cloud adoption, improvements made anywhere else are an illusion."

SME (small and medium-sized) organizations may find adding cloud specialists to their IT teams to be prohibitively costly. Luckily, many common tasks performed by these specialists can be automated. To this end companies are turning to DevOps tools, like Chef and Puppet, to perform tasks like monitoring usage patterns of resources and automated backups at predefined time periods. These tools also help optimize the cloud for cost, governance, and security.

4. Governance/Control

There are many challenges facing cloud computing and governance/control is in place number 4. Proper IT governance should ensure IT assets are implemented and used according to agreed-upon policies and procedures; ensure that these assets are properly controlled and maintained, and ensure that these assets are supporting your organization's strategy and business goals.

In today's cloud-based world, IT does not always have full control over the provisioning, de-provisioning, and operations of infrastructure. This has increased the difficulty for IT to provide the governance, compliance, risks and data quality management required. To mitigate the various risks and uncertainties in transitioning to the cloud, IT must adapt its traditional IT governance and control processes to include the cloud. To this effect, the role of central IT teams in the cloud has been evolving over the last few years. Along with business units, central IT is increasingly playing a role in selecting, brokering, and governing cloud services. On top of this third-party cloud computing/management providers are progressively providing governance support and best practices.

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5. Compliance

One of the risks of cloud computing is facing today is compliance. That is an issue for anyone using backup services or cloud storage. Every time a company moves data from the internal storage to a cloud, it is faced with being compliant with industry regulations and laws. For example, healthcare organizations in the USA have to comply with HIPAA (Health Insurance Portability and Accountability Act of 1996), public retail companies have to comply with SOX (Sarbanes-Oxley Act of 2002) and PCI DSS (Payment Card Industry Data Security Standard).

Depending on the industry and requirements, every organization must ensure these standards are respected and carried out.

This is one of the many challenges facing cloud computing, and although the procedure can take a certain amount of time, the data must be properly stored.

Cloud customers need to look for vendors that can provide compliance and check if they are regulated by the standards they need. Some vendors offer certified compliance, but in some cases, additional input is needed on both sides to ensure proper compliance regulations.

6. Managing multiple clouds

Challenges facing cloud computing haven't just been concentrated in one, single cloud.

The state of multi-cloud has grown exponentially in recent years. Companies are shifting or combining public and private clouds and, as mentioned earlier, tech giants like Alibaba and Amazon are leading the way.

In the referred survey, 81 percent of enterprises have a multi-cloud strategy. Enterprises with a hybrid strategy (combining public and private clouds) fell from 58 percent in 2017 to 51 percent in 2018, while organizations with a strategy of multiple public clouds or multiple private clouds grew slightly.

While organizations leverage an average of almost 5 clouds, it is evident that the use of the cloud will continue to grow. That's why it is important to answer the main questions organizations are facing today: what are the challenges for cloud computing and how to overcome them?

7. Performance

When a business moves to the cloud it becomes dependent on the service providers. The next prominent challenges of moving to cloud computing expand on this partnership. Nevertheless, this partnership often provides businesses with innovative technologies they wouldn't otherwise be able to access. On the other hand, the performance of the organization's BI and other cloud-based systems is also tied to the performance of the cloud provider when it falters. When your provider is down, you are also down.

This isn't uncommon, over the past couple of years all the big cloud players have experienced outages. Make sure your provider has the right processes in place and that they will alert you if there is ever an issue.

For the data-driven decision making process, real-time data for organizations is imperative. Being able to access data that is stored on the

cloud in real-time is one of the imperative solutions an organization has to consider while selecting the right partner.

With an inherent lack of control that comes with cloud computing, companies may run into real-time monitoring issues. Make sure your SaaS provider has real-time monitoring policies in place to help mitigate these issues.

8. Building a private cloud

Although building a private cloud isn't a top priority for many organizations, for those who are likely to implement such a solution, it quickly becomes one of the main challenges facing cloud computing – private solutions should be carefully addressed.

Creating an internal or private cloud will cause a significant benefit: having all the data in-house. But IT managers and departments will need to face building and gluing it all together by themselves, which can cause one of the challenges of moving to cloud computing extremely difficult.

It is important to keep in mind also the steps that are needed to ensure the smooth operation of the cloud:

- Automating as many manual tasks as possible (which would require an inventory management system)
- Orchestration of tasks which has to ensure that each of them is executed in the right order.

As this article stated: *the cloud software layer has to grab an IP address, set up a virtual local area network (VLAN), put the server in the load balancing queue, put the server in the firewall rule set for the IP address, load the correct version of RHEL, patch the server software when needed and place the server into the nightly backup queue.*

That being said, it is obvious that developing a private cloud is no easy task, but nevertheless, some organizations still manage and plan to do so in the next years.

9. Segmented usage and adoption

Most organizations did not have a robust cloud adoption strategy in place when they started to move to the cloud. Instead, ad-hoc strategies sprouted, fueled by several components. One of them was the speed of cloud adoption. Another one was the staggered expiration of data center contracts/equipment, which led to intermittent cloud migration. Finally, there also were individual development teams using the public cloud for specific applications or projects. These bootstrap environments have fostered full integration and maturation issues including:

- Isolated cloud projects lacking shared standards
- Ad hoc security configurations
- Lack of cross-team shared resources and learnings

In fact, a recent survey by IDC of 6,159 executives found that just 3% of respondents define their cloud strategies as “optimized”. Luckily, centralized IT, strong governance and control policies, and some heavy lifting can get usage, adoption, and cloud computing strategies inline.

Nearly half of the decision makers believe that their IT workforce is not completely prepared to address the cloud computing industry challenges and managing their cloud resources over the next 5 years. Since businesses are adopting the cloud strategy more often than ever, it is eminent that the workforce should keep up and carefully address the potential issues.

10. Migration

One of the main cloud computing industry challenges in recent years concentrates on migration. This is a process of moving an application to a cloud. An although moving a new application is a straightforward process, when it comes to moving an existing application to a cloud environment, many cloud challenges arise.

A recent survey conducted by Velostrata showed that over 95% of companies are currently migrating their applications to the cloud, and over

half of them find it more difficult than expected – projects are over budget and deadline.

What are the challenges faced during storing data in the cloud? Most commonly cited were:

- Extensive troubleshooting
- Security challenges
- Slow data migrations
- Migration agents
- Cutover complexity
- Application downtime

In another survey, although not that recent, but a picturesque perception of the migration to the cloud; IT professionals stated they would rather “get a root canal, dig a ditch, or do their own taxes” than address challenges in cloud computing regarding the deployment process.

In the End - the Cloud Still Wins

It is no secret; cloud computing is revolutionizing the IT industry. It is also shaking up the business intelligence (BI) landscape, and well, pretty everything else it touches. As the cloud adoption exponentially grows, businesses of all sizes are realizing the benefits. For startups and small to medium-sized businesses (SMEs), that can’t afford costly server maintenance, but also may have to scale overnight, the benefits of utilizing the cloud are especially great.

While cloud computing challenges do exist, if properly addressed, these 10 issues don’t mean your IT roadmap has to remain anchored on-premise. Business intelligence (BI) and the cloud are an ideal match, as the first one provides the right information to the right people while the latter is an agile way to access BI applications.

So, what are the challenges faced during storing data in the cloud and how to overcome them?

To make the best out of it and overcome issues, you should take a strategic iterative approach to implementation, explore hybrid cloud solutions, involve business and IT teams, invest in a CIO, and choose the right BI SaaS partner. All this will ensure that the benefits of cloud business intelligence will far outweigh the challenges.

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Clearly, organizations have some demanding work ahead of them, especially since the adoption of the cloud is becoming a business standard that will grow exponentially. Cloud is not just an idea to implement overnight, but a strategic approach, management details, and professionals' involvement can help reduce potential risks, costs, and flaws in the implementation process. The future of cloud lies upon introducing industry standards, that will help in addressing regulatory, management and technological matters.

To summarize, here are the top challenges in cloud computing:

1. Security issues
2. Cost management and containment
3. Lack of resources/expertise
4. Governance/Control
5. Compliance
6. Managing multiple clouds
7. Performance
8. Building a private cloud
9. Segmented usage and adoption
10. Migration

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