INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN: 2278 – 0211 (Online)

Cloud Computing

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Abstract:
Why cloud computing:
Cloud computing can be a cheaper, faster, and greener alternative to an On-premises solution. Without any infrastructure investments, you can get Powerful software and massive computing resources quickly—with lower Up-front costs and fewer management headaches down the road. Cloud-based solutions when evaluating options for new IT deployments Whenever a secure, reliable, cost-effective cloud option exists. Shifting your agency into the cloud can be a big decision, with many Considerations. This guide is the first in a series designed to help you Get started. The most important is the right choice software as a service as a service, infrastructure as a service, and platform as a service or hybrid cloud. While addressing administration goals of scalable, interactive citizen Portals. The cloud can also help your agency increase collaboration across Organizations, deliver volumes of data to citizens in useful ways, and reduce IT costs while helping your agency focus on mission-critical tasks. Plus, the Cloud can help you maintain operational efficiency during times of crisis.

1.An Introduction TO Cloud Computing

Virtualization and cloud computing are two of the most popular and exciting new technologies to emerge in the last few years. Companies are turning to these approaches to help cut down on their internal resources, help applications and software run much more efficiently, and perhaps, most importantly, help them save money. With this large migration toward cloud computing, many companies are trying to find additional ways to expand their capacity without blowing out their budgets, and that is where hybrid cloud computing comes into play.

Hybrid cloud computing gives companies control over multiple cloud instances with the power to move data and applications back and forth almost instantaneously. But a lot more goes into hybrid cloud computing than simply setting up two clouds and going to work. We'll give you a better understanding of how it works, point out some of the key features and benefits, and help you decide whether hybrid cloud computing is a fit for your company.

2.What Is Cloud Computing?

Cloud computing is an umbrella term used to refer to Internet based development and services. The cloud is a metaphor for the Internet. A number of characteristics define cloud data, application services and infrastructure:

Remotely hosted: Services or data are hosted on someone else's infrastructure.

Ubiquitous: Services or data are available from anywhere.

Commoditized: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity. You pay for what you would like.

3.Software As A Service (Saas)

SaaS is a model of software deployment where an application is hosted as a service provided to customers across the Internet. SaaS is generally used to refer to business software rather than consumer software, which falls under Web 2.0. By removing the need to install and run an application on a user's own computer it is seen as a way for businesses to get the same benefits as commercial software with a smaller cost outlay. Saas also alleviates the burden of software maintenance and support but users relinquish control over software versions and requirements. The other terms that are used in this sphere include Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

4.Cloud Storage

Over time many big Internet based companies (Amazon, Google…) have come to realize that only a small amount of their data storage capacity is being used. This has led to the renting out of space and the storage of information on remote servers or "clouds". Information is then temporarily cached on desktop computers, mobile phones or other internet-linked devices. Amazon's Amazon Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are the current best known facilities.

5.Data Cloud

Cloud Services can also be used to hold structured data. There has been some discussion of this being a potentially useful notion possibly aligned with the Semantic Web], though concerns, such as those resulting in data becoming undifferentiated, have been raised.

6.Opportunities And Challenges

The use of the cloud provides a number of opportunities:

It enables services to be used without any understanding of their infrastructure.

Cloud computing works using economies of scale. It lowers the outlay expense for startup companies, as they would no longer need to buy their own software or servers. The cost would be by on-demand pricing. Vendors and Service providers claim costs by establishing an ongoing revenue stream.

Data and services are stored remotely but accessible from 'anywhere'.

In parallel there has been a backlash against cloud computing:

Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation. The 'others' are likely become the bigger Internet companies like Google and IBM who may monopolize the market. Some argue that this use of supercomputers is a return to the time of mainframe computing that the PC was a reaction against.

Security could prove to be a big issue. It is still unclear how safe outsourced data is and when using these services ownership of data is not always clear.

There are also issues relating to policy and access. If your data is stored abroad whose FOI policy do you adhere to? What happens if the remote server goes down? How will you then be accessing files? There have been cases of users being locked out of accounts and losing access to data.

Licensed Software	Software as a Service (Saas)
-Capital Expenses- You pay up front -Annual maintenance costs -Cost for applications, maintenance, infrastructure, Database server and IT/application resources -Time taken to install is much higher & configure applications -Not much control over vendor after purchase -You are responsible for the management of the software installed -Customers may be on many different releases of the software -Upgrading to the newest version of the software could cost you	-Pay-as-you- USE -The subscription fee is based on the number of users per month -Minimal Cost for annual subscription IT/application resources -Faster implementation and Productivity optimization -More control over relationship with vendor -Better risk sharing with vendor -Exit options are simple and easy

Table 1: Licensed Software Via Software As A Service (SaaS)

Economic Reasons	Functional Reasons	Expected Results
-"Pay as you go" operational expense rather than a capital expenditure -A subscription-based on usage metrics (instead of a perpetual license) -Lower cost-of-business solution ownership -Predictability of costs over time -The management, support, and upgrading of the software and the infrastructure that supports it is the responsibility of the solution provider	-More rapid access to state-of-the-art technology -Highly responsive and scalable (upwards and downwards) solutions that cover entire business processes -Greater ability to scale as business needs change User access to the application is over the Internet -Ubiquitous and relatively inexpensive -Flexible and customizable solutions	-Reliable access to data, anywhere, anytime -Increased risk mitigation with better support for compliance -More rapid time-to-production -Improved security, performance, and availability -Avoidance of vendor lock-in -Shift in focus to core business management, rather than disproportionate attention on the computer environment; redeploy headcount to strategic IT initiatives

Table 2: Top Reasons Why You Should Consider HR Cloud (SaaS)

7.Analyzing TCO Cost Drivers

When comparing on-premises software to cloud applications, be sure to look beyond the initial license price of on-premise software.

Cost Drivers	Traditional On-Premises Software	Cloud Application
Capital Expenses	Upfront purchase of software and hardware May require network infrastructure enhancements, facilities Need to support third party monitoring, test tools, security products	None Pay-as-you-go subscription pricing All inclusive: maintenance, support, training, and upgrades all hardware, networking, storage, database, administration
Design and Deployment	May take months to deploy Professional services can cost up to 3X the initial software purchase Difficult for vendor to build best practices Requires staff or contract labor to research, design, integrate, test, tune, launch, and train	Deploy in weeks Lower cost using consistent set of best practices
Ongoing Infrastructure	Ongoing software maintenance, upgrades Ongoing hardware replacement once every three years Requires a network monitoring and management tools May require additional networking equipment and bandwidth to accommodate incremental traffic	The vendor provides as part of the subscription

Table 3

	Cost Benefit analysis	On premise Vs SAAS E			
#	Item	On Premise		SAAS	
		Number	Value	Number	Value
1	Infrastructure		29,000.00		-
1.1	Servers with OS	2	6,000.00	0	-
1.2	Software licenses (Database)	1	4,000.00	0	-
1.3	Internal server security	1	2,000.00	0	-
1.4	Backup	1	2,000.00	0	-
1.5	DR site	1	5,000.00	0	-
1.6	Other overheads	1	10,000.00		
2	Software		100,000.00		
2.1	License fee	1	80,000.00	0	-
2.2	ESS licenses (cal)	50	20,000.00	0	-
3	Setup		150,000.00		100,000.00
3.1	Installation and setup	100	150,000.00	60	90,000.00
	Total onetime cost		279,000.00		100,000.00
4	Recurring cost		225,000.00		300,000.00
4.1	Annual maintenance -5 yrs @ 20%	5	80,000.00	0	-
4.2	Monthly subscription -5 yrs @10 $	0	-	500	300,000.00
4.3	Server maintenance	5	25,000.00	0	
4.5	Resource overheads	5	120,000.00		
	Total cost for 5 years		504,000.00		400,000.00
	Total saving $		104,000.00		

Table 4

8.Hybrid Cloud

9.Introduction

The economic benefits offered by public clouds are attractive enough for many organizations to push some of their non-critical workloads to such services while also using private clouds for their mission-critical needs. Such hybrid cloud deployments have proven to be advantageous not just in terms of better economics but also in terms of business agility. The best-of-both worlds

Approach of hybrid cloud lets organizations take advantage of public clouds to reduce capex while still keeping their mission-critical workloads inside the organization. However, by combining private and public cloud models, hybrid clouds have the largest attack surface

Businesses must deploy security across both the private and public cloud elements. We will discuss the business benefits of hybrid clouds, the security considerations, and how one can mitigate the risks involved with the use of public clouds along with a private cloud.

10.What Is A Hybrid Cloud?

The lines between public and private cloud will blur and customers will be either in the private or the public cloud. Google has started offering applets (downloadable appliances), that let users deploy the company's cloud-based offerings internally. An offline version of its Gmail product is also available. IBM and Juniper have collaborated together and have aimed at managing hybrid clouds. Initiatives like these will make more enterprises look at the hybrid cloud. In its simplistic definition, a hybrid cloud is a combination of both public and private clouds. If we apply the definition from the National Institute of Standards and Technology (NIST), "a hybrid cloud

is a combination of public and private clouds bound together by either standardized or proprietary technology that enables data and application portability." It could be a combination of a private cloud inside an organization with one or more public cloud provider or a private cloud hosted on third-party premises with one or more public cloud providers. Trend Micro, a cloud security company, recently conducted a survey which indicated that public cloud services fail to meet IT and business requirements of some of the business organizations

A hybrid cloud environment can help meet their needs. In some ways, hybrid clouds can be considered an intermediate stage as enterprises prepare to move most of their workload to public clouds.

11.Trend Micro Survey Results

A recent survey conducted by Trend Micro offers some insights into the expectations and concerns businesses have about cloud technologies. The survey was conducted in six different countries with 1200 respondents from companies with at least 500 employees. Some of the key results are:

- 38% of the survey respondents say that their IT requirements are not being met by the cloud providers. Similarly, 38% claimed that their current cloud service providers are not meeting their business needs.
- For companies that have public cloud or hybrid applications currently in production, 45% of the existing applications are already deployed in the cloud and an average of 53% of new applications will be deployed in the cloud © Krishnan Subramanian 2011 Hybrid Clouds Page | 2
- 49% of the survey respondents indicated that if they knew how to secure their data in the cloud, it would increase their consideration for cloud adoption.
- Increasingly, companies are realizing that the use of a hybrid cloud expands the number of applications they deploy into the cloud. However, almost half (49%) feels they need to improve their knowledge of cloud security to further increase cloud adoption. Using hybrid clouds will help them understand the security implications of the public clouds better before they move all their workloads
- Benefits
  Hybrid clouds offer the cost and scale benefits of public clouds while also offering the security business benefits of and control of private clouds. We will highlight some of the hybrid clouds.
- Cost Savings
  Reduces capital expenses as part of the organization's infrastructure needs are outsourced to public cloud providers.
- Improves resource allocation for temporary projects at a vastly reduced cost because the use of public clouds removes the need for investments to carry out these projects
- helps optimize the infrastructure spending during different stages of the application lifecycle. Public clouds can be tapped for development and testing while private clouds can be used for production. More importantly, public clouds can be used to retire applications, which may be no longer needed because of the move to SaaS, at much lower cost than dedicated on-premise infrastructure

12.Business Agility

- Offers both the controls available in a private cloud deployment along with the ability to rapidly scale using public clouds
- Supplies support for cloud bursting, tapping the public clouds for an unexpected need for additional compute resources.
- Provides drastic improvements in the overall organizational agility, because of the ability to leverage public clouds, leading to increased opportunities hitherto unavailable in traditional infrastructure or pure private clouds.

13.Security Considerations

As organizations use hybrid clouds for their business needs, they must understand the new security requirements of a hybrid cloud environment. While hybrid clouds offer the security

The advantages of private clouds, there are some unique security challenges that arise as the Perimeter extends beyond the organization's boundaries. Along with the typical security

Considerations associated with private clouds, there is some additional factors one should consider in a hybrid environment.

14.Recommendations For Hybrid Cloud Adoption

Hybrid Cloud Implementation

In the Trend Micro survey, 10% of respondents had a hybrid cloud in production and another 45% were implementing or were in the midst of piloting a hybrid cloud.

15.Hybrid Cloud Use Cases

There are many different scenarios for employing hybrid clouds but we will list out some of the most prominent ones:

Using the private cloud for mission-critical applications and pushing the non-critical ones to public clouds. For example, a company might use a public cloud for test and development while using a private cloud inside the organization for production

Deployment. Another example would be using public clouds for external facing applications while using a private cloud for internal applications.

- Cloud burst, a dynamic deployment of an application running in a private cloud into public clouds to meet an unexpected demand, such as a retail company's need to meet increasing traffic associated with holiday shopping.
- Another example is non-destructive Disaster Recovery (DR) testing. Organizations can test if their production environment is DR ready by tapping the public clouds and without any disruption.

16.Hybrid Deployments

If a dedicated server is required to run a high speed database application, that hardware can be integrated into a private cloud, in effect, hybridizing the solution between virtual servers and dedicated servers. This can't be achieved in a public cloud.

As opposed to public clouds, private clouds are not delivered through a utility model or pay-as-you-go basis because the hardware is dedicated. Private clouds are generally preferred by mid and large size enterprises because they meet the security and compliance requirements of these larger organizations and their customers.

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Four imperatives for success with hybrid IT

Success in today's hybrid computing environment requires a rebalancing of investments. Optimizing and reducing resources spent on infrastructure will allow increased strategic investments in integration, intelligence and innovation.

Infrastructure. Infrastructure optimization generally requires consolidation, standardization and upgrades at the server, data center and application levels, as well as across IT processes. Efficiencies across all these levels free up resources to invest in other areas. However, business leaders often cannot wait for IT to reach optimization goals, often demanding new capabilities and supporting systems. Cloud products bridge the gap, accelerating adoption of new systems while freeing resources to facilitate optimization efforts and other strategic initiatives. The benefits of hybrid IT are clear in HCM, where legacy applications have failed to keep pace with the latest innovations in process and user experience. It is now commonplace to integrate on-premises core HR and payroll systems with cloud-based talent management applications, and in this way, HR has been effectively undeterred from the constraints of legacy IT. Embracing a hybrid computing model enables organizations to balance the need for business-level agility and speed with the need to maintain data control and continue to leverage investments in core enterprise systems.

Integration. Quality and sustainability of integrations continue to be a top concern for CIOs. Historically, integrations required myriad tools and processes, lacked standardization, and were largely managed and supported by users. Frequent updates of SaaS applications meant frequent maintenance of complex and often tenuous system touch points. But integration concerns need not slow down HR processes in the cloud. In fact, a hybrid IT approach can accelerate the success of cloud HR systems by freeing up IT resources to focus on improved integrations spanning data, metadata, business processes and, ideally, even the user experience. Other initiatives, such as managing integration libraries, ensuring master data management and improving access to "big data" stored in both internal and external systems, all contribute to the sustainability and efficacy of cloud systems integrated with the core, on-premises applications.

Intelligence. Today's IT department typically spends less than 15% of its overall technology budget on business intelligence (BI) initiatives. Infrastructure optimization via hybrid IT unencumbers resources that can instead be applied to BI initiatives that in turn can improve business outcomes. For example, liberating data from core transactional systems, such as finance and manufacturing systems, and then connecting it with workforce data from cloud and/or on-premises HR systems will vastly improve business insight, scenario planning and decision support. Further investments in improving data quality, increasing mobile accessibility and the establishment of key performance indicators (KPIs) will set the stage for even greater advances in business insight and forecasting through big data analytics.

Innovation. For HR and IT managers to remain relevant in the future, they need to collaborate with business leaders when introducing innovative new technology. Social, mobile and cloud approaches are just a few of the disruptive technologies enabling new innovations across the enterprise. In addition, HR cloud deployments are challenging the constraints of legacy infrastructure as they introduce innovations in mobile accessibility, user experience and new social workflow processes. IT organizations can either constrain the reach of these innovations or embrace them and propel their success through a well-crafted hybrid technology infrastructure that supports experimentation with disruptive technologies and ensures enterprise-wise flexibility.

As the lines of engagement between employees, customers and partners -- and the boundaries between the systems through which they interact -- blur and converge, best-in-class hybrid infrastructures will emerge to support the resulting heterogeneous composition of technology platforms. SaaS HCM is at the forefront of this transformation, serving as a template for how organizations can optimize their technology infrastructure without putting off critical investments in integration, intelligence and innovation.

Going forward, business technology environments will be collections of on-premises, private and public cloud systems. Hybrid IT is not just a step along the journey to cloud -- it is the destination.

17.Conclusion

Cloud computing can be a cheaper, faster, and greener alternative to an
On-premises solution
The most important is the right choice software as a service saas infrastructure as a service platform as a service or hybrid cloud.
Hybrid clouds offer a greater flexibility to businesses while offering choice in terms of keeping control and security. Hybrid clouds are usually deployed by organizations willing to push part of their workloads to public clouds either for cloud bursting purposes or for projects requiring faster
Implementation. Because hybrid clouds vary based on company needs and structure of implementation, there is no one-size-fits-all solution. Since hybrid environments involve both on-premise and public cloud providers, some additional infrastructure security considerations come into the picture, which are normally associated with public clouds. . Any businesses
Planning to deploy hybrid clouds should understand the different security needs and follow the industry best practices to mitigate any risks. Once secure, a hybrid cloud environment can help businesses transition more applications into public clouds, providing additional cost savings.
Public and private clouds are considered in two other whitepapers where security considerations and solutions on these environments are discussed

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