

*Cloud*

*Computing*

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*If you thought Cloud Computing was about what Amazon launched in 2004 or it is something that will save your IT organization lots of money? You could be wrong. This whitepaper explains why.*

**Datacenters and the technology behind cloud computing.** The technology behind Cloud Computing has existed in Data Centers for well over the last decade. Namely those technologies are Virtualization and Automation. Virtualization allows using high end physical machines with multiple virtual machines running on them. Automation usually means that these virtual machines can be snapshot'd and kept on a network storage and provisioned dynamically within minutes, also in case of hardware failure or needs they can be migrated to other physical machines, providing failover and scalability.

This leads to the conclusion by some that Cloud Computing is another name for advanced Data Centers. Which is not very accurate because usually a cloud provider provides add-on infrastructure or platform services.

**Centralized And Distributed Clouds.** Most of the talk about Cloud Computing deals with Centralized Clouds. Which means the Cloud Provider will setup virtualized data centers in a geographical spread providing for failover zones and accommodating special regional requirements e.g of collocation from EU. Amazon pioneered this approach with its Amazon Web Services offering in 2004 which it has continuously built upon since then.

The second category is distributed clouds. Which means things like SETI@Home but not exactly. A distributed cloud is usually based on P2P technologies and allows global distribution and pooling of compute resources, storage and enterprise integration. MetaASO is the pioneer in Distributed Clouds with its OneWorld P2P Cloud Platform.

**SaaS, Platform and Infrastructure Clouds.** The simplest and earliest of Cloud Offerings were SaaS (Software as a Service) offerings. Which basically provided a hosted multitenant application for use using a pay as you go model. E.g. Google Apps, Office Live and Zoho. There was no customization or plugins that end users or developers could add to its functionality.

Then came the Platform cloud offerings which offered a Platform to users in a pay as you go cloud hosted model. These were usually limited to a specific domain like CRM e.g. Salesforce or Social Collaboration e.g. Facebook but offered an API that could be used to extend their features. Mostly accompanied by a marketplace for buying third party features.

Infrastructure clouds are usually those offerings which give you an infrastructure like Windows Azure or Amazon upon which you can build almost any application.

**Public, Private & Hybrid Clouds.** Offerings from companies like Amazon AWS and Google App Engine are categorized as Public Clouds they have a limited on premise functionality which is usually a sandboxed environment not a replica of the production cloud environment.

Private clouds on the other hand are the virtualized, automated clouds that completely run on the corporate premises. They offer the scalability, reliability benefits of public Cloud Computing and the security in a compliant corporate controlled environment.

Hybrid clouds are a combination of Public and Private clouds such that the secured components are usually contained on premises and the compute load is usually spread over the public cloud. These are planned for the future by major vendors like Microsoft for Windows Azure. But this can be custom assembled as of now using Public and Private cloud offerings.

**Storage & Compute Clouds.** These are early categorization of clouds based on what people wanted to do on them. If you wanted a whole lot of storage and distribution you could use a storage cloud e.g. Blob Storage in Windows Azure or Amazon S3+CloudFront.

If you wanted to utilize clouds for computation intensive parallelized super computing like requirements you could use Queues and Workers on Azure or Amazon Map Reduce.

**Myth Buster- Capex, Opex, Human, Business costs of Clouds.** How does one save costs on a public cloud? Two ways by consolidation and the other Zero CapEx. How does one spend money on the public clouds? On OpEx, Training/Skills, Change/Migration. Human costs to build and operate cloud infrastructures has been found to be almost the same as that in conventional data centers so there is no savings on that front. But Business costs of control, security, compliance are very high.

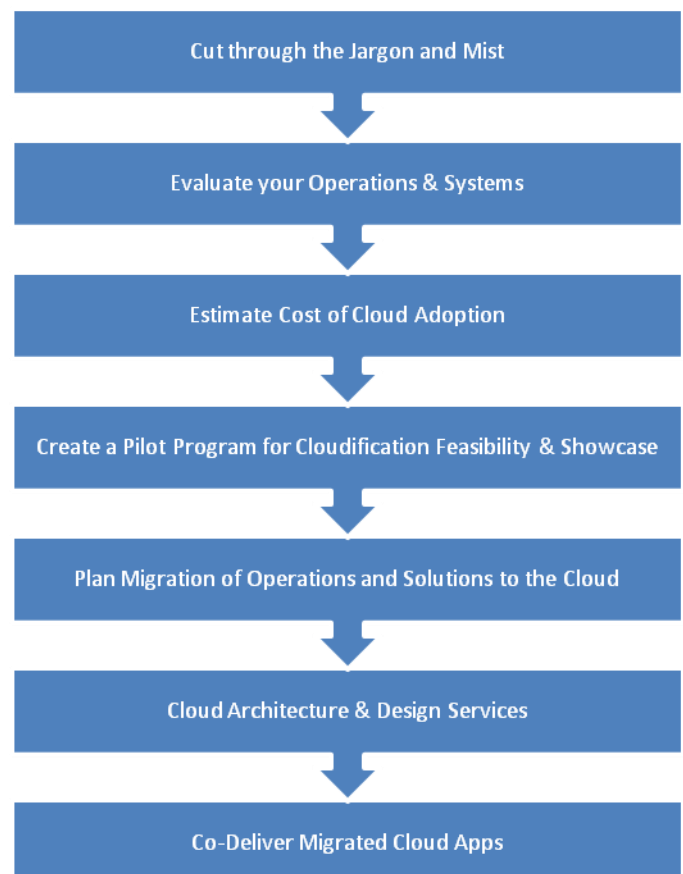
During our Opex cost comparisons of a Real Life application running on a DataCenter and a Public Cloud showed a Public Cloud costs 3-

4x of conventional data center in running a Real Life- Production 24x7x365 application.

Public Clouds are found to be useful only when you earn as you go and you pay the cloud provider a percentage as you go and hence balancing the Cash Flows coupled with low CapEx barrier to entry this makes a strong case for Pilots, Experiments, Once in a While jobs, Startups etc.

**Aditya Yadav & Associates, Pioneers in Cloud Adoption.** While we pioneered Distributed Cloud Platform Offerings on the planet. We also have been pioneers in cutting through the mist, haze and jargon and adopting Public, Private and Hybrid cloud computing. We also offer professional services to our customers for all of the above.

### What can we do for you?



## The Best Analogy.

Lets try to understand the implications in terms of an analogy. Since the last 3 years people have been asking me for explanations and this is the one of the explanations I have come up with. I'm sure everyone can relate to this one very easily.

Lets think of a car you own. That's your enterprise system running in your own data center. Hardware/Car which you have invested Capital Investments to purchase, The Driving lessons is the training your team took to keep it running. The Service center the Salary you pay your people to maintain the system and the petrol the operational expenditure to keep the system running everyday.

Cloud Service Vendors are like Taxi Car Providers. You can rent their car in case you need to. The Taxi Company provide scale in case you need more cars. In case one of their car fails they will give you another car, failover/reliability. You don't have to spend upfront capital costs to acquire the taxi but rather you pay as you use/go. Lots of people use taxi's making it multi-tenant.

Now in case you want to consolidate and aggregate your systems 4 of you can travel in the taxi instead of just you. Leading to cost savings but you could do the same thing using virtualization on a private cloud i.e your own car and if you purchase 3-4 cars you get reliability, scalability etc. too.

But have you ever seen someone take a taxi everytime? No. because even with that scale of operations of a taxi company it is prohibitively

expensive to us. And you can't use a taxi all the time. They are purchasing the cars, maintaining it etc. and they will pass the costs to us. Similarly according to McKinsey report and us, we have done studies to conclude something which holds true in our analogy too which is that in case of a real life application running 24x7x365 on clouds are prohibitively expensive about 3-4x the costs of owning cars/dedicated. Its like using a taxi 24 hours a day, 365 days a year.

The best way I can think of using taxi's is to use my own car(s) for everyday needs and use a taxi for airport drop or occasionally when you need to transport loads of people to an event your family is organizing or a picnic. Which is similar to using private clouds for most things and spreading intensive tasks to the public clouds in a hybrid cloud computing model.

Next lets talk about standardization and interoperability. Now think Trucks. You need to transport luggage and there are all kinds of trucks, freezer trucks, jumbo trucks. While standardization and interoperability would be desirable but market leaders who have distinct offerings and advantages wouldn't choose the lowest common subset i.e. offer mediocre trucks. Perhaps some standardization will evolve over time analogous to container trucks but not all trucks will go that way. So on that front we think these issues will remain even if a large majority would converge to common standards.

## How do you start?

Write to us and we will setup a private virtualized, managed cloud for you. We think the best way to learn is to try things out on your own with some guidance.

Write to us today!

## References:

- 1) Windows Azure (<http://www.microsoft.com/azure/>)
- 2) Amazon Web Services (<http://aws.amazon.com/>)
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- 4) Aditya Yadav & Associates – Cloud Computing (<http://adityayadav.com/cloudcomputing.aspx>)
- 5) McKinsey Report on High Opex of Cloud Computing (<http://www.businessinsider.com/mckinsey-cloud-computing-overhyped-still-too-expensive-2009-4>)