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HYBRID CLOUD: THE NEXT FRONTIER

A MICROSOFT ZINNOV WHITEPAPER

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TABLE OF CONTENTS

INTRODUCTION

Cloud computing worldwide has been talked about as the biggest transformation in the IT industry in the last 10 years. A number of organizations, small or large, are now starting to embrace the cloud in an intent to reduce the CAPEX investments on IT and paying only for what they consume. Unlike several other passing technology trends, the concept of "computing as a utility" is a reality now with leading analyst firms and consulting companies estimating the global cloud computing market to be over US$150 billion in 2013.

While the market has evolved (and will continue to in the foreseeable future), there are a few concerns with respect to the adoption of cloud computing. Data security continues to remain the biggest concern for the IT decision makers. Some CIOs are concerned about critical data residing outside of their network, whereas others fear lack of control on their IT environment. The recent outages of Amazon, Google etc. have also put the reliability of the cloud model into question. The perception of lack of control actually heightens the lack of reliability concerns. CIOs are used to high level of customization and are unsure of the level of customization possibilities with cloud computing. Compliance & regulations further puts stringent controls on security as well as transparency for some IT decision makers. Additionally cloud also changes the way IT departments buy or develop, deploy and maintain applications and it also changes the way IT interacts with the business users.

Clearly, reaping the cloud benefits comes along with the challenges it poses. Enterprises and SMBs are realizing the pros and cons of using public or private cloud models. Given the rise in number of cloud service providers, it has become a difficult task for IT decision makers to make an informed choice for such deployments. Most progressive companies are beginning to adopt a combination of public & private cloud scenarios that are ideal for all business needs. While private cloud deployments are favoured for handling mission critical applications and data, public cloud supports peak demands of computing resources, testing scenarios and niche/ non-critical applications etc. However, private cloud deployments are capital intensive and public cloud is perceived to offer fewer security, compliance and privacy guarantees to customers.

This whitepaper explores how hybrid cloud is the next frontier for cloud adoption and offers an optimal solution towards the concerns on both public & private cloud deployments.

THE EMERGING NEED FOR HYBRID CLOUD APPROACH

Cloud computing models have historically been classified into 2 broad categories, namely private & public cloud. While the exact definitions & standards on cloud models are still evolving, following is the broad coverage on both these models:

- **Private Cloud:**
  - In case of private cloud, the IT infrastructure could be owned on premise or sourced from a 3rd party in a managed services model. Private cloud models are perceived to be providing the highest degree of control and data security to IT users and is usually preferred for handling sensitive data and applications that are of strategic importance to the organization or are subject to regulatory compliances
  - Private cloud in general is capital intensive and is complex to manage. The high costs have actually given rise to a managed or hosted private cloud and is slowly emerging as a preferred sourcing strategy by large enterprises

- **Public Cloud:**
  - The key benefit of public cloud model is the ability to share resource (and hence optimize cost) and achieve better flexibility (scale up & scale down on a need basis). Public cloud infrastructure is generally leveraged for non-mission critical scenarios, to handle peak compute demands and building & deploying Line of Business (LOB) applications in no time. Public cloud is highly optimized to offer economies of scale
  - In case of public cloud, the storage and processing of data are both in a publically shared infrastructure and comes with limited integration to on premise resources. This poses a significant concern for organizations as they do not know where there data is hosted. Additionally the perception on the security, privacy and compliance adherence is lower in case of public cloud deployments

Private cloud deployments amount to a little over 80% of the total cloud market and public cloud takes up the remaining share in the total global cloud spending. While both forms of cloud deployments are rapidly growing, none of these completely address all the challenges perceived by IT decision makers on such deployments.

Following are the major gaps that keeps the IT departments challenged towards a successful cloud strategy:

- Selection of right fit cloud model aligned to the needs of IT and business users
- Seamless and secure integration between cloud & on premise resources, as well as public & private cloud resources
- Definitive return on investments in both short term as well as long term
- Adherence to in-country and industry regulations and compliances
- Change management and skill requirements

Given these challenges, cloud vendors are starting to position hybrid cloud model as the way forward. Hybrid cloud claims to dynamically adjust the amount of capacity/ resources being used in the public or private cloud environment and ensure high levels of agility, flexibility and cost savings. Clearly, the decision of hybrid cloud deployment is not only based on least costs but also on the business requirements ("time to market") and capability maturity ("Federation", "Interoperability" & "Security" needs).

Hybrid cloud is being described as a catalogue of services to choose from for each category of applications. This model provides:

- On demand elasticity by leveraging both public & private cloud infrastructure depending on the application needs
- Control on data location and security (similar to private cloud) for mission critical applications
- Economies of scale for non-critical and mass usage applications
- Highly flexible, self-serve and shared governance model for its customers

PLANNING A HYBRID CLOUD DEPLOYMENT

The cloud market in general and hybrid cloud in particular is an evolving phenomenon. Vendors operating in this space are currently very dynamic and few have reached a desired level of maturity. At the same time, cloud standards are rapidly being conceptualized and implemented. The regulatory environment (at vertical level or geographic level) is ever changing. While planning the hybrid cloud strategy, enterprises should be able to anticipate these changes and plan the roadmap accordingly. Early mover companies suggest to assess the application landscape in detail to make an informed hybrid cloud strategy. Following key components are usually considered:

- Quantum of application usage (load), location (geographic diversity) & frequency of application usage
- Criticality of the process under consideration
- Criticality of the application for business
- Data security/ regulatory requirements
- Need for interoperability between cloud & legacy systems

This can be illustrated by a simple example of an e-commerce application used by a large e-retailer (with multi city offices and delivery centres):

- The website witness a predictable traffic for most part of the year except festival season in the month of October where the peak traffic is 10X of the average for the rest of the year. The traffic majorly comes from 8 key metros in India and 5 countries outside the parent country
- Within the entire workflow, transaction process is the most critical process where a customer makes the final purchase and uses a debit or credit card to make the payments. Drop-out rate is the highest at this level as potential customers hesitate in punching their card details
- The website is the only medium of engagement for the company and the experience of navigation is rated the most critical by the potential customers
- Since the transaction process captures individual customer and credit/ debit card details, the data captured is highly confidential in nature
- The transactions need to link back with the purchase profile of the customer and re-targeting is done basis the previous engagement levels of the customer

In the traditional model, the e-retailer would have to choose between a private cloud and a public cloud scenario. While the private cloud would address the risk profile of data, however, the company would need to invest in infrastructure for the peak load because the experience of navigation is rated as most critical. However the peak load is only seasonal and investing in infrastructure for peak load would be very costly. On the other hand, public cloud would solve the rapid scaling during the peak season however the sensitivity of customer data would be deterrent.

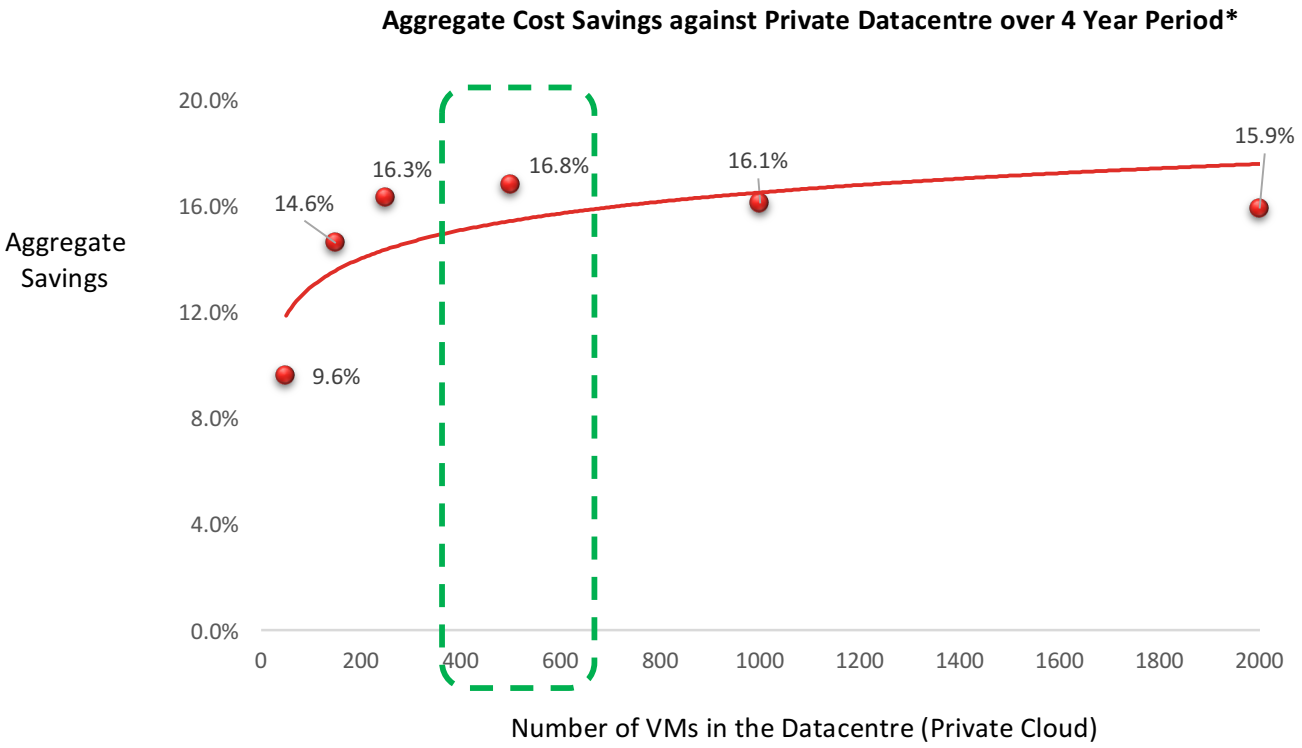
This presents the opportunity for hybrid cloud deployment where it will allow the e-retailer to:

a) Host non-mission critical applications straightaway on a secure public cloud infrastructure
b) Burst to public cloud instances for peak or highly elastic workload (in this case the website). For access to the application during the festive season, public cloud capabilities could be leveraged. Once the customer decides on the purchase and is about to make the transaction, it can seamlessly come back to the internal private cloud scenario ensuring that the customer data is stored locally within the territory and not on a shared public cloud infrastructure
c) Fully integrate the on premise applications (like a CRM etc.) with the cloud
d) Plan disaster recovery to take place at another local or third party managed cloud

In essence, it is important for business to understand their IT environment and the core elements in the value chain. This will help them identify the business application needs and accordingly take a strategic decision on the cloud model that would make business and economic sense to them.

ECONOMIC VIABILITY OF HYBRID CLOUD

It is evident that deploying a hybrid cloud strategy enables enterprises to develop and launch services rapidly & efficiently. A rigorous analysis of several enterprise workload scenarios further suggests that hybrid cloud also makes a strong economic sense for enterprises from a total cost savings perspective.



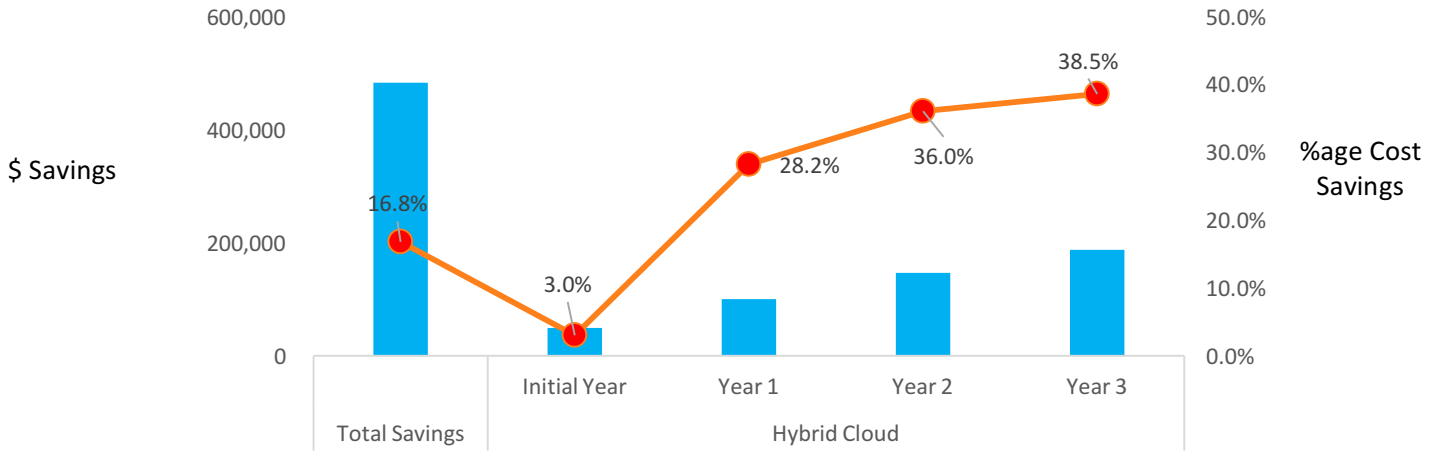
Based on a theoretical cost modeller comparing cost between a complete private cloud datacentre vs. hybrid cloud deployments, it is concluded that hybrid deployments could actually result into cost savings of anywhere between 35% to 45% at steady state (depending on the growth of virtual machines in an enterprises datacentre and a proportion of workloads moving from private datacentre to public cloud infrastructure). The cost savings amount to about 9-17% at an aggregate level over a 4 year period, including the initial capex costs in both scenarios

Note: *Cost factors include only server (hardware & software), storage, data transfer and system management software costs. Assuming VM growth in the considered enterprise is 5% and storage growth is of 8%. Percentage of workloads moving from private datacentre to public infrastructure is assumed to increase from 5% in initial year to 35% in year 3. The models considers Microsoft infrastructure (including Windows server R2 and System centre R2 software deployments) for both public & private cloud scenarios

Considering a hypothetical enterprise with 500 VMs in the datacentre and industry standard configurations (of server & storage systems, outbound data and infrastructure software),

the model suggests that the enterprise could essentially save approximately $1,500 per year per VM (average) hosted on public cloud infrastructure. At an aggregate level, this results into ~$500,000 savings over a 4 year period against an otherwise total investment of ~$2.9 million in private datacentre

Hybrid Cloud Savings against Private Datacentre (500 VMs)*



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The model suggests that the savings for a hybrid cloud solution grows over a period of time compared to a purely private cloud datacentre. However, when moving the VMs from own datacentre to public infrastructure, companies do consider the criticality and data sensitivity of the workloads being moved and decide on a public cloud to private cloud ratio. Accordingly, the cost savings may vary from those shown in the graph depending on the rates and configurations considered. In general, the cost savings are better when a relatively higher number of VMs are moved on to the public cloud infrastructure. It was further observed that in case the enterprises are using common management framework to manage on premise and cloud applications (i.e. common application development, management and identity across private and public cloud environments), the total cost of ownership (TCO) over a 4 year period could be as low as 2 to 3 times compared to heterogeneous management of infrastructure between public & private infrastructure.

PROMINENT HYBRID CLOUD SCENARIOS

Enterprises & cloud vendors are increasingly realizing the relevance of hybrid cloud model to ensure the most efficient use of the infrastructure and resources. For the hybrid cloud to work successfully, workloads or applications must be able to seamlessly move between public & private clouds. The flexibility achieved in deploying the hybrid cloud model ensures that businesses do not have to keep investing in new infrastructure to get more and more out of their applications. Based on several discussions with key IT decision makers and business users, here are the key hybrid cloud scenarios that are fast becoming a reality:

- **Lift & Shift VMs:** This indicates the cloud bursting scenario from an on premise infrastructure/ private cloud. Simply shift the VMs from private to public cloud in case of addressing peak loads, geographic coverage or planning for unexpected success or failure of a new venture. This also extends to keep confidential data locally whereas leveraging public cloud capabilities for processing. This provides businesses rapid scalability of their application scenarios and cost savings due to optimized usage of existing resources

- **Application Test Bed:** Enterprise applications are often developed on dedicated servers and most of the functionality can be tested in such environments. However, the scalability related testing of the applications would require extendable infrastructure. While the production scenario can reside on a private cloud, public cloud presents an ideal environment for scalability testing

- **Moving Existing Workloads to Public Cloud**: One of the evolving trend in IT today is to move existing workloads to the public cloud. As the IT infrastructure is slowly moving to the cloud, customers expect the existing applications to seamlessly work on the cloud infrastructure the way it did with on premise infrastructure. Moving existing workloads such as HRM, CRM, Database etc. creates a duplicate production system in the cloud and frees up hardware resources on premise for other purposes on a need basis

- **Hybrid Cloud Storage:** The typical data profile of enterprises suggest that cold data could be as high as 50% of all data which is rarely used but companies have to still store it for occasional future references or compliance requirements. With hybrid cloud deployment, it is now possible to automatically tier the storage into hot, warm and moderate data and start pushing the in-frequently used data on to a public cloud infrastructure thereby reducing the storage TCO significantly

ADDRESSING THE KEY BARRIERS TO HYBRID DEPLOYMENTS

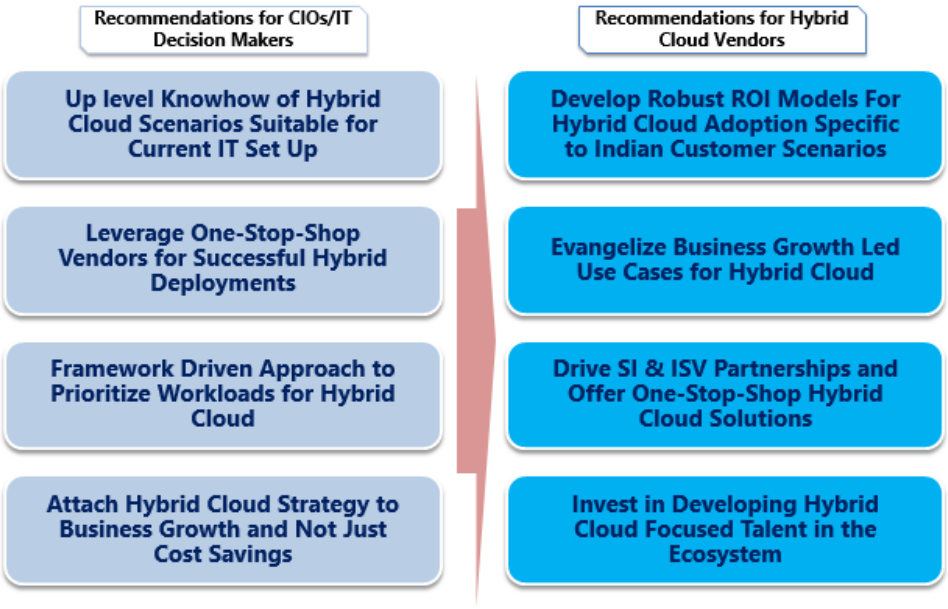
While the businesses and vendors are unlocking the potential of hybrid cloud, it is important to note that hybrid cloud brings in a set of its own challenges. Since hybrid cloud deployments require a mix of technologies and vendors, it invariably demands capabilities to manage the complexities towards successful deployments. Following are the broad set of challenges that are most commonly talked about:

- **Need for increased management efficiency for a diverse datacentre**
    - As the hybrid cloud model encompasses several vendors and technologies, IT departments are often looking for consistent management of datacentre resources that are diverse in nature. Efficient local and remote management of infrastructure resources is a critical requirement cited by the IT stakeholders. Moreover, cost effective management of hybrid deployments is a key consideration
- **Complexity of managing multiple vendor billing & provisioning**
    - In view of the higher TCO and complexity involved in managing multiple cloud vendors for hybrid deployments, integrated billing & provisioning of all services in all locations across multiple clouds becomes extremely important. IT departments find this as the most intriguing of challenges and might prefer working with vendors who can offer unified management framework of the hybrid cloud deployments
- **Consistent and flexible user access to corporate resources while protecting data**
    - With increasingly mobile resources accessing critical and non-critical applications controlled access to business data from users device of choices becomes an important ask. Common user identity to access on premise and cloud resources is quintessential for successful hybrid cloud deployments. Last but most important, protecting corporate data and ensuring regulatory compliance is a must have

As the hybrid cloud model evolves, IT stakeholders will look for cloud providers to address these challenges and explore for offerings that make it easier for them to deploy hybrid cloud scenarios

CONCLUSION

The implications of adopting a hybrid cloud is expected to encourage IT decision makers and businesses alike to strategically plan towards such deployments. Embracing cloud in general and hybrid cloud in particular need not always be complex for the current IT environments and should provide better control to the IT departments. Encouraged by this evolving phenomenon and existing needs of businesses, cloud vendors are enabling better scalability, agility & flexibility with hybrid cloud modes in order to massively improve the efficiencies of the organizations.



As it has been the case in the past, many of the innovations for cloud (and now for hybrid cloud) will be based on ecosystem collaboration & partnerships. Having realized the immense opportunities, it will be extremely important for companies in the IT value chain to come together and enable collaborative innovation to address evolving customer needs and pain points.

Large global cloud vendors should play the role of an evangelist to encourage businesses towards adopting the hybrid model. They should also enable smaller ISVs and IT companies to leverage the potential of hybrid cloud and incubate niche solutions that would evolve the hybrid cloud use cases further.

Key focus should also be on developing the hybrid cloud talent/ skill availability in the ecosystem and enabling the IT services companies/ system integrators to drive significant adoption among their customer base.

Thank You

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