Data Centre Design - Physical to Cloud

Putting in place scalable and dynamic virtualised IT architectures, as well as a management framework that enables service-level orchestration across technology domains, is essential to a successful data centre transformation, writes Tapan Kanti Sarkar

DATA Centre Design concept is evolving and is analogous to moving technology. Over the decades, the data centre has gone through a tremendous evolution. It really wasn't that long ago computers didn't exist. To better understand how this evolution is taking place, we have to get to a point where consolidation has become necessary. Mainframes, minicomputers, and distributed computing systems have played in the evolution of the data centre in a historical context. However, it is important to note that many of the qualities mentioned affect the choices IT architects make today. While mainframes are still the first choice of many large corporations for running very large, mission-critical applications, the flexibility and affordability of other options have undoubtedly altered the design and functionality of data centres of the future. However, industry trends such as data centre consolidation, server virtualisation, advancements in processor technologies, increasing storage demands, rise in data rates, and the desire to implement "green" initiatives is causing stress on current data centre designs.

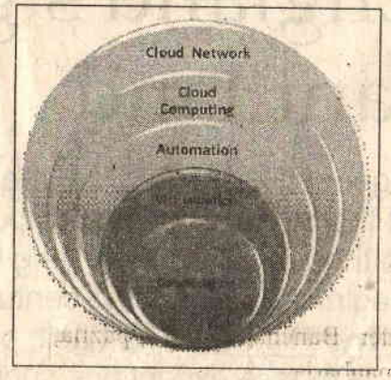


Fig. Evaluation of Data Centre Design Concept

Despite the desire for Data Centre transformation, the practical reality is that IT Managers are facing some considerable challenges that can impede their journey to an evolved and transformed data centre due to following challenges:

i. Capex and Opex Constraints with Data Centre Growth
ii. Need for Automation while virtualised management tools
iii. Right IT Service for Applications and Business Units
iv. Determination of Clouds suited for organization

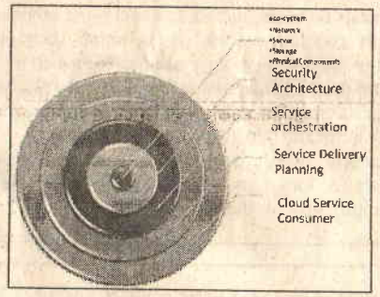
Challenges mentioned above and the legacy infrastructure that exists, data centre transformation will be evolutionary rather than revolutionary. There is no single tool or product a firm can buy to gain a new dynamic, scalable data centre of the future. This transformation comes through the use of and integration of technologies such as service catalogues to gain IT service automation, data centre orchestration tools that can work with and across technology domains, converged infrastructure to streamline management, cost model and advanced scaling for servers and storage infrastructure to keep pace with data and processing requirements, and unified management of different technology domains. Putting in place scalable and dynamic virtualised IT architectures, as well as a management framework that enables service-level orchestration across technology domains, is essential to a successful data centre transformation.

However, given that virtual infrastructure is an underlying component of a dynamic, next-generation data centre, it is important to understand the adoption of virtual infrastructure and where firms are in terms of deployment. The adoption of virtual infrastructure has tended to follow overall stages of technology adoption, from test/development to technology maturity to technology expansion.

Virtualised infrastructure is a practical reality today, providing real operational benefits, while true IT service automation remains a vision and longer-term objective for the most mature organisations. Scalable, virtualised IT architectures are also a reality today. However, as an industry, we will continue to struggle with automating tasks that have relation between technology domains. To gain the advantages of true data centre transformation and IT service management, organizations must address several challenges, including:

- Technology integration at the infrastructure level and across infrastructure domains
- Integration of multiple management stacks including legacy frameworks and virtualisation management tools
- IT organisational changes as IT roles change and/or converge because of the increased reliance on technology to automate IT tasks
- Policy setting and standardisation, specifically catalogue definitions to describe workloads, service objectives, and ongoing monitoring and measurement (This requires extensive planning, policy setting, and detailed ongoing communications between business units and various IT domains.)

In cloud computing, applications, computing and storage resources live somewhere in the network, or cloud. Users don't worry about the location and can rapidly access as much or as little of the computing, storage and networking capacity as they wish-paying for it by how much they use-just as they would with water or electricity services provid-



ed by utility companies. These providers are providing virtual infrastructure, different services provisioning and different mode of payment method.

Fig. Reference Architecture: Cloud in Data Centre Design

Cloud computing and server virtualisation complement each other in the following ways.

- Cloud computing services can be implemented on top of virtual data centres. Virtualization can support cloud architecture.
- Cloud computing software can be used to orchestrate virtual server deployments. Cloud management software can be used for command and control of virtualization services.
- Cloud computing adds another virtualisation layer between end users and the entire IT environment, implementing a pay-per-use model.
- Both demand robust physical infrastructure. They both rely heavily on the network and are demanding changes in traditional assumptions about network architecture and design.

Proper design, planning, knowledge of the impact of virtualisation on the data centre, as well as an understanding of how to implement virtual machines in a manner that is complimentary and compatible with the rest of the data centre is critical for successfully moving toward a truly Virtualization or Cloud in Data Centre. Once these issues are addressed they can easily be managed and factored into the implementation plan, ultimately resulting in successful platform deployments and a dynamic, provisional Data Centre.

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