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Virtualization with Data Center

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Abstract--*Global data is increasing, in terms of scale, complexity and functionality, making a way for data centers to be more intuitive, coherent, holistic, and easily accessible. With disruptive technologies such as Big Data, Mobile Technologies, Social Network and Cloud Computing gaining incredible speed, there is an increasing need for data centers to proportionately bear the characteristics of these technologies too.*
That being said, what are the benefits and advantages of data centers boarding the cloud, what are the enterprise challenges involved in adopting a virtualized data center model and what critical steps are to be taken to enhance its operational efficiency? This paper intends to profoundly envelope solutions to the above questions and more in detail.

Keywords-*Virtualization;Virtual DC; Data Center; IT; Cloud Computing; Storage; SAN*

I. INTRODUCTION

Animpressive transformation in the way Information Technology departments operate has put their directors and managers at intersections. On the first side, the IT departments are under pressure to deliver andbring higher levels of service and be very responsive to enablecontentious business objectives. On the other side, IT departments are equally pressured to constrain their budgets, “do a lot more with a lot less,” and reflect ROI that is as positive as possible from optimization initiatives.

Clever IT leaders have begun to resolve both sides of this disagreement by thinking more on their virtualization plans. Initiallyconsidered a way to refine and upgrade utilization of physical servers, virtualization has since been developed to turn entire data centers into dynamic, agile, services-oriented architectures. These architectures can now to get a move on business objectives and competitiveness.

Data center virtualization is a golden opportunity for IT. The cost savings are incredible to a great range. The effective sharing of servers, storage space and network assets translate into far lower capital purchases and operating costs. Excessive application “silos” are eliminated. With virtualization at the data center level, it can now be well matched with more applications, get them implemented quicker, and stick to higher levels of service. It also delivers IT managers and admins powerful new tools for scheduling, protection and recovery.

Now, with the anticipation of cloud computing on the near horizon, IT organizations also face another transformative landscape: How best to use data center virtualization as a springboard to either access third-party cloud services to build their own private cloud platform — with many of the same economies and efficiencies touted by third-party cloud providers. (For more information about evolving your virtual dynamic data center into a cloud platform, see the Happiest Minds white paper "IT and the Cloud: Buy, Build or Both?")

For some organizations, full data center virtualization offers the most benefit. While some others take data centervirtualization even further and develop a highly automated and standardized "cloud model."

Either way, IT must become more efficient and agile to meet increasing business demands and remain relevant andstrategic to the organization. It also risks creating operational challenges as virtualization scales up.

Virtualization was originally a way to improve utilization of physical servers. Now it’s being expanded to turn entire datacenters into a more dynamically, service-centered architecture — ones that accelerate business objectives andcompetitiveness.

II. CHALLENGES FOR IT

In most companies, IT departments are cost centers. It caters the support required for increasing revenue and profits, certainly, but its operations still weigh on the expense side of the spreadsheet. IT directors and managers are under constant pressure to deliver more services and resources to the organization while reducing both capital outlays and expenses. Here are some challenges they face:

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2.1. Low utilization

Server virtualization has highlighted the traditionally low utilization of applications running on physical servers — sometimes as low as five to ten percent. The tremendous growth of applications and their supporting infrastructure put IT under pressure to optimize physical resources — storage and internal networks.

2.2. Energy and environmental costs

A data center full of hardware consumes a lot of energy to both power the systems and keep them cool. Energy costs can add up to a significant percentage of the IT budget, while utility rates typically increase every year. In some communities, additional power does not exist. To top it up, some companies have adopted “green” operating principles that put extra pressure on IT departments to conserve energy at the same time they’re asked to provide more services.

2.3. Complex operations

Application-centric data center architectures can lead to silos of architecture of the infrastructure. These arrays of resources are provably redundant and not so efficient, prevent resource sharing, and add complexity to the number of environments that must be managed.

2.4. Lack of agility

Every new enterprise application takes time to install, configure, patch, debug and put into production. Meanwhile, almost every smart-phone user has become accustomed to downloading and installing applications in minutes.

Business owners recognize that new delivery models can significantly reduce the time required to provision applications — thus increasing competitiveness and profits. Organizations simply can’t afford to waste time building whole new infrastructures every time somebody wants a new tool. Delivering applications much more efficiently than in the past is a major IT challenge.

2.5. Fiscal impact

In the era of Return on Investment, even cost centers such as IT are expected to show an immediate return on their expenditures. This is especially difficult given the typically low utilization of existing systems, plus the fact that most of the IT budget is dedicated to be under the limelight. As companies take incremental steps toward data center virtualization, they should expect positive capex returns with operational improvements.

III. ABOVE& BEYOND SERVERS;

THE LATESTFRONTIER OF DATACENTER VIRTUALIZATION

Virtualization across the data center can provide spectacular savings on floor space power cooling costs, as well as utilization of existing assets across network, storage devices, and servers. While the financial benefits alone are compelling, the largest gains can be obtained by reducing complexity and streamlining the speed at which IT accelerates the business.

These benefits cannot be maximized with server virtualization alone. Below highlighted the differences between the scope of virtualization, server virtualization, and the wider concept of data centervirtualization.

3.1. Defining different types of virtualization

3.1.1. Virtualization

This technology allows multiple logical units to operate "virtually" on one physical unit or resource. Alternately, virtualization technology can also allow multiple physical units or resources to appear and act as one "virtual" or logical unit or resource.

3.1.2. Server Virtualization

Server virtualization Software is used to make the most of the physical resources of a server. In server virtualization, a software-based "hypervisor" (such as VMware or Microsoft® Hyper-V) partitions one physical server into multiple virtual servers. Virtual servers are also often known as virtual machines. Each virtual server typically uses its native operating system and its own set of resources. Each virtual server can also operate its own application stack separately from the operation of other applications and other virtual servers on the same core machine.

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3.1.4. Data Center Virtualization

Extends the concept of server virtualization to consolidate and maximize other key physical resources inside the data center. This goes on to include:

- **Server virtualization**
- **Network virtualization**
- **Storage virtualization**

Data center virtualization abstracts the relationship between services offered and the underlying physical hardware needed to make them run.

It consolidates each resource into a virtual resource "pool." By then integrating and coordinating each virtual pool with the other pools, organizations can go beyond virtualization "silos." This results in multiplied benefits and more synergies.

IV. THE ADVANTAGES OF DATA CENTER VIRTUALIZATION

A virtualized data center takes a holistic approach to the management of server, storage and network processes. This creates an infrastructure with the following attributes or benefits:

- **Dynamic, efficient and agile**
- **More efficient resource sharing (thanks to virtual pooling)**
- **Reduced complexity that now means fewer things to manage**
- **Deeper gains in degree of consolidation, better resource planning and sharing and simplified management of a unanimous infrastructure**

This last set of benefits produce the largest gains in efficiency and productivity. Such benefits can be gained by applying advances in virtualization infrastructure management and unified infrastructures. These technologies offer greater virtualization management capabilities and deeper integration that let organizations develop and leverage virtual resources at multiple levels simultaneously—from compute through to storage, networks and management and security resources.

The power of virtualization thus becomes multiplied as integration with compute, storage, network, management and security technologies create a synergistic approach.

The opportunity is to expand from islands of virtualization — with virtualized servers for some applications and virtualized storage for others — to a more coordinated virtualization strategy. This is where servers, storage and network strategies are combined.

Virtualized applications platform Instead of building separate infrastructures according to the needs of individual applications, data center virtualization lets you build a dynamic platform of infrastructure that supports all (or most) apps. Abstracting applications from physical resources gives you management capabilities that you can't get from hardware. This would include:

- **The competencies required to migrate from one physical server to another without disruption**
- **Increased availability for applications during hardware failure**
- **Resource scheduling and load balancing across existing infrastructure**
- **Improved backup and disaster recovery**
- **Increased performance, scale and security**
- **Integration with storage and network infrastructures**

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The result is a platform that will support many—if not most—IT applications. The availability, performance, and security are provided by the platform, which reduce the need to build those services into each individual application. The resulting common shared infrastructure is much more flexible and agile.

V. A BRIEF OF DATA CENTER VIRTUALIZATION

One of the most important things to remember about the transformation to data center virtualization is that this is a long-term commitment and process — a journey. Most organizations cannot simply change from existing infrastructures and processes to a dynamic virtual data center overnight. So, you need to plan, break your strategy down into do-able phases, and take its advantages to consideration. In the Happiest Minds white paper "IT and the Cloud: Buy, Build or Both," a detailed, five-phase cloud maturity model helps explain the transition from consolidation to virtualization and, ultimately, cloud computing. Figure 1 shows a high-level view of this model.

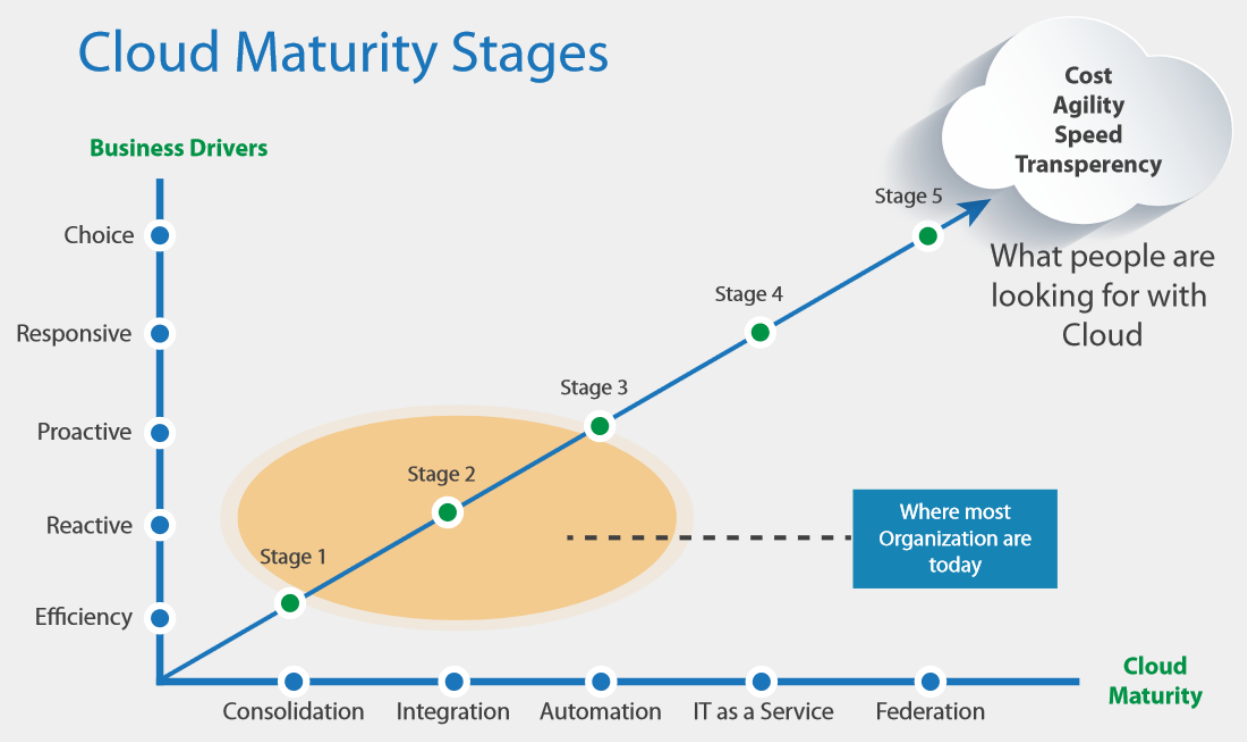

Figure 1. Cloud Maturity Stages

REFERENCES

[1] Namdeo, Jyoti, and NaveenkumarJayakumar. "Predicting Students Performance Using Data Mining Technique with Rough Set Theory Concepts." International Journal 2.2 (2014).

[2] Jayakumar, M.N., Zaeimfar, M.F., Joshi, M.M. and Joshi, S.D., 2014. INTERNATIONAL JOURNAL OF COMPUTER ENGINEERING & TECHNOLOGY (IJCET). Journal Impact Factor, 5(1), pp.46-51.

[3] Naveenkumar, J., Makwana, R., Joshi, S.D. and Thakore, D.M., 2015. Performance Impact Analysis of Application Implemented on Active Storage Framework. International Journal, 5(2).

[4] Raval, K.S., Suryawanshi, R.S., Naveenkumar, J. and Thakore, D.M., 2011. The Anatomy of a Small-Scale Document Search Engine Tool: Incorporating a new Ranking Algorithm. International Journal of Engineering Science and Technology, 3(7).

[5] Naveenkumar, J., Makwana, R., Joshi, S.D. and Thakore, D.M., 2015. Offloading Compression and Decompression Logic Closer to Video Files Using Remote Procedure Call. Journal Impact Factor, 6(3), pp.37-45.

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