PRIVATE CLOUD AT
IIT DELHI

SUCCESS STORY

ENGAGEMENT:
Long Term

INDUSTRY:
Education

OFFERING:
Private Cloud Deployment

BUSINESS CHALLENGE

IIT Delhi, one of India’s leading educational institutes, wanted to deploy a Private Cloud solution with high availability, scalability, and ease of management. Moreover, they wanted to consolidate their all department into one account so that transaction time and monitoring can be significantly improved.
IIT Delhi chose a Private Cloud Solution using VMware infrastructure to consolidate hosts while improving the reliability and manageability of overall IT department.

SOLUTION

Indian Institute of Technology - Delhi is one of the premier technical education institution in India. It is a center of excellence in providing higher training, research and development in engineering, science and technology in the country. IIT Delhi has 13 departments, 11 multi-disciplinary centres and 2 centres of excellence. Each department is specialized in engineering or science discipline and IIT Delhi offers around 7000 courses in each semester. Computer Services Centre (CC) of IIT Delhi is a central computing facility providing email, Web, DNS, FTP, Internet access, High Performance Computing file servers, PC’s and other services 24X7, 365 days a year. CC also provides various advanced and special purpose software for all the campus users. Being a research oriented institute of higher learning, IIT Delhi Computer Centre always faced high demand for computing. Resource intensive statistical, Artificial intelligence, simulation and other applications from Genetics to Management departments required CC to device capacity management strategies including advance bookings to manage the requirements. Faculty members and researchers across departments used to request for HPC servers availability and run their jobs once they are assigned slots. Many a times the researchers had to wait over months to run their experiments. Management of Computer Centre was on lookout for innovative solutions to improve the computing ability and mechanism to share redundant ng power across the centre and campus to facilitate speedier research.
IIT Delhi CC faculty evaluated several options and considered cloud computing as a better solution to optimize their IT operations and reduce operating costs. The faculty was aware that the cloud posed certain challenges, such as setting up and running applications in the cloud and managing them may be from off-premise, or running services as a one-time event. Migrating existing services, applications, and virtual machines to the cloud also posed immense networking complexities, more so if performed outside a local data center. Moving live services without user interruption was another major challenge.

To investigate the feasibility of moving to a private cloud, IIT Delhi required a proof of concept (POC). Progressive Infotech, with help from CC faculty, based on VMware technologies showcased live migration, VMotion and other technologies.

**PROGRESSIVE'S PRIVATE CLOUD ARCHITECTURE WITH VMWARE SOLUTIONS**
The Progressive and VMware cloud migration solution moves VMotion™ from the binds of the local data center of IIT Delhi and enables live migration of both VMs and the back-end storage across the WAN between data centers and clouds. Progressive prepared, with help from CC faculty, a workflow that automates the majority of the migration, making it possible to execute these migrations with a minimum of manual configuration.

To provide a single point of control, Virtual Center Server running on top of Windows 2003 server was designed to provide essential datacenter services such as access control, performance monitoring, and configuration. It unifies the resources from the individual computing servers to be shared among virtual machines in the entire datacenter. The solution has been devised such that computing servers will continue to function even in the unlikely event that Virtual Center Server becoming unreachable (for example, the network is severed). When designing a solution for VMotion over distance, the goal was to create a system that enables secure live migrations between cloud-based data centers without any interruption in the application service or user downtime. To capture the learning, identify best practices and develop them into work flows, VMware vCentre Orchestrator has been considered. It standardizes the way virtual machines are requested, deployed and decommissioned with VMware vCenter Lifecycle Manager. Ensure consistency of virtual machine deployments with a service catalog of virtual machine configurations and automated workflows for routine lifecycle management tasks. Lifecycle Manager gives IT administrators more control over virtual machine deployments and optimizes resource utilization for greater ROI. Fiber Channel SAN and NAS arrays were deployed to meet IIT Delhi’s datacenter storage needs. Sharing the storage arrays between groups of servers via storage area networks allows the IIT to pool storage resources and provides more flexibility in provisioning storage resources for virtual machines. Moreover, to provide high bandwidth and reliable networking to the entire datacenter each computing server has been designed with multiple gigabit Ethernet network interface cards. The POC was successful, so IIT Delhi decided to move forward with the full project. IIT Delhi charged its leadership team with communicating the results internally to achieve organizational buy-in. “With any new technology, there is resistance,” showcasing the POC helped build their confidence in the private cloud approach” says Progressive’s solution architect. This integrated solution enables long distance VMotion for the first time as a Private Cloud. The solution works with existing network and IT infrastructure; and does not require re-architecture of their local or remote networks.

**PRIVATE CLOUD ROLLOUT**

IIT Delhi moved forward by first refreshing its server architecture with VMware vSphere 4.
We are happy with the support provided by VMware and Progressive to IIT Delhi CSC team to implement a private cloud at IIT Delhi, especially in setting up the physical infrastructure. They have been responsive to our needs and helped us in setting up a facility that has been well appreciated by the user community.

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Progressive aligned with VMware to address a solution that optimizes, secures, and manages VM migration and user connections between data centers. Beyond network optimization and security, emphasis was laid on transitioning user connections from one cloud to another, a key element in moving VMs between data centers. To ensure application does not suffer any significant downtime or loss of application data during or after a cross-site live migration, vCenter deployment was carried out.

IIT Delhi's Private Cloud Solutions

- VMware vSphere
- VMware vCenter Orchestrator 4.0.1
- VMware Virtual Machine with SAN
- VMware VMotion
- VMware Life Cycle Manager

The Infrastructure deployed in the Private Cloud Computing Setup is as under

- 32 Nos of HP BL460G6 Blade Server each with Dual Quad Core Intel Nehalem CPU.
- Virtualised Storage with NetApp V3140A NAS Header in the Front with HP EVA 6400 & Sun Storage 6580 at the back with 40 TB Storage Space.
- VMware vSphere, VMware vCentre & VMware Life Cycle Manager for Private Cloud Setup.
Benefits

The virtualization helped IITD Computer centre additional flexibility for deployment and customization, including the provision for automatically switching off/on nodes during lean/demand periods. With the rolling of private cloud, faculty can request for dedicated virtual cluster indicating the number of nodes and disk space required OS and computing environments preferred and the usage period (few hours to couple of weeks). Faculty can also authorize others (typically the research student/project associate involved with the project) to access the machines. IIT D Computer centre supports 32 and 64 bit versions of OS environments and has created virtual machines from available template. A major advantage is once the VMs were developed they could be stored and reused as and when required. Considering the size of data storage, IITD CC stores the outputs for a certain period so that the researchers can copy the same. Major beneficiary of the private cloud has been critical research/consulting projects that required high computing requirements and some repetitive experimentations.

IIT Delhi has achieved consolidation of physical computing resources onto fewer hardware servers that host virtual machines, thereby reducing capital expenditure as well as power, cooling and recurring administrative costs. The solution has offered flexibility to move workloads around more easily for load balancing purposes and to prioritize/allocate computing resources.

ABOUT PROGRESSIVE INFOTECH

Trusted IT partner since 1998, Progressive Infotech provides comprehensive suite of transformation and support services. The offerings span across cloud, digital and support operations, delivered through a matured and scalable service delivery model. In every client engagement, Progressive ensures clients realize higher ROI, stretch the intrinsic value of existing IT investments and are better prepared for emergent market changes.

Progressive Infotech is consistently featured as a “mature vendor for IT Outsourcing” in the Gartner hype cycle report for ICT in India for last few years.

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