Choice Case Study

Primary and DR Datacenter for National Institute for Smart Government and AOC

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Project Background

Choice Solutions Limited was allotted by National Institute for Smart Government (NISG), Hyderabad, to architect the primary and disaster recovery datacenters for the Indian Army (AOC). The datacenter once implemented would be responsible for inventory tracking and ERP data for the entire client's location, which is distributed across India.The applications in the datacenter would be responsible for all the data pertaining to provisions, receipts, accounting, warehouses; stocking and issue as well as disposal of all types of stores, fuel, medicines, army gear and specialized engineering spares required by the army. The datacenter would also be used by allied services and other government departments. There would be 4 broad categories of inventory namely

1. Ordnance
2. Ammunition
3. Vehicles
4. Aviation related equipment

The architecture includes sizing for a design of
1. Main Datacenter at Delhi,
2. Main Disaster Recovery Center at Pune
3. Near Line Datacenter at Delhi and
4.Connectivity to 34 near and remote locations within India

The Network and Security part was one of the major and critical components of the project and this was the roadway for efficient and secure information data travel.

Project Challenges or Requirements

In this project, Choice Solutions Ltd. was expected to understand the requirements of the customer, size the required IT hardware, and design the datacenter layout. Security, both physical and logical, was key concerns. The data had to be categorized into 3 levels of criticality, each being accessible from certain network and servers and to a certain set of users within the client base.

Some other requirements from the client side were that the service should be available all the time. The architecture must provide for no data loss, in the face of natural or man-made disasters, wars and enemy attacks. This amounted to zero-RPO architecture.

Another challenge that came to the forefront was to provide access to users spread across several regional offices across India. The regions would have building and the users would be separated by several miles. These had to be connected internally and then to the primary data center. Another requisite was that the users at remote regions, if and when isolated, due to enemy activities or war, must be capable of continuing online operations. The architecture must provide access to services and data during periods of network and physical isolation. The architecture of the project must be such that at all levels it must be modular and scalable. This should apply to facilities infrastructure and IT hardware, such as servers, storage and network equipment.

Project Scope

i.   Providing required applications and sizing for software users

ii. Providing complete network & security architecture, to protect confidential data from out siders with multiple security layers.

iii. As per the requirement, design and solution, provide the product specifications, RFP preparation and submitting tentative project budget.

iv. Provide for applications such as ERP, Messaging, AD, DNS, and Backups with high security and availability.

v.   Server and storage sizing for users at the primary and DR locations as well as remote regions.

vi. Designing the layouts for the primary and DR datacenters.

vii. Architecting the network layouts within the datacenters and remote regions.

viii. Estimate the electrical requirements and size of the transformers, diesel gen-sets, UPS, panels and PDUs with redundancy at all levels.

ix. Ensure high physical security and monitoring at all access points.

x.   Provide for datacenter cooling and best possible air flow of cold and hot air considering dense servers and storage disks.

xi. Architect the electrical and passive network cabling to be scalable to accommodate future growth.

Choice Role and Solution Offered

Choice Solution Ltd. worked in closely with the client to provide a reliable and scalable solution for the facility and IT aspect of the primary and DR datacenter. It includes,

i.   Type of applications, present and for the near future

ii.   Server infrastructure (number of servers and type of servers)

iii. Storage requirement and availability

iv.   Distances between the DC, DR & NLDC for datacenter storage redundancy design

v.   Availability within the data center to the locations (Redundancy)

vi.   Identification of risk factors to take precautions in our design

vii. WAN bandwidth service provider (Type of interfaces)

viii. Total data flow on WAN bandwidth (present & future) from the locations

ix. Number of ERP and mail users (present & near future) from each location to identify the WAN bandwidth requirement to the main datacenter.

x. Future growth in locations and users.

xi. What type of access required for the users.

xii. What level of security required for different levels of AOC employees.

xiii. Bandwidth will be completely given by Army or depending on any third-party (such as BSNL).

xiv. Identification of security levels for software developers& FM engineers who are outsiders and internal data quality checking officers and higher officials within the AOC-CICP.

xv. At the locations need to identify the number of buildings.

xvi. Number of users for each building.

xvii. Distances between the buildings.

xviii. Total number of users for identifying the Core router and security box.

IT Solution for Data Replication to DR Site

By taking care of all the above points we designed the entire

(a) Datacenter at Delhi,
(b) Near-line Data Center at Delhi at a different location,
(c) Disaster Recovery Center at Pune
(d) 34 remote locations across the country with WAN and Campus-wide Network part
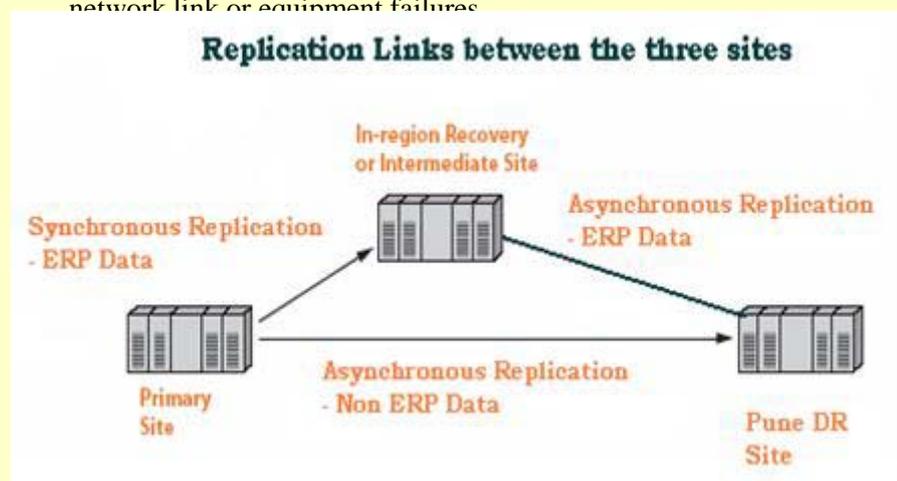
In this design we also took care of performance (connectivity and design without bottlenecks with QoS-enabled devices and security at different levels (port level, access lists, policies, VLANs and VPNs.

The figure below is an example of how to provide protection from network link or equipment failures.

Figure 1

A 3-datacenter architecture would enable zero data loss in case of a probable disaster.

The data from the primary datacenter was replicated synchronously to near-line datacenter over dedicated dark fibre, from where the data was replicated asynchronously to the DR site over redundant WAN links as shown in Figure 1

Replication Links between the three sites

In-region Recovery or Intermediate Site

Synchronous Replication - ERP Data

Asynchronous Replication - ERP Data

Asynchronous Replication - Non ERP Data

Primary Site

Pune DR Site

Choice Solutions Ltd. provided the needed server and storage solutions for ERP and non-ERP applications including an enterprise-wide, highly-available email solution with an AD and DNS architecture. **Figure 6**above shows two high-end servers.

Virtual machines (VM) would be created to host ERP and non-ERP applications. The VMs would be in failover mode, so that if one server fails, its VMs would move to the other server. The architected ERP environment thus provides for high availability using clustering for database servers and load-balancing for applications.

Network Design for Remote Regional Offices

For all the remote regions, Choice Solutions Ltd. surveyed the sites and proposed a redundant, fast network layout that would serve the current needs and would be scalable to accommodate new buildings within the region.

Client Benefits

The client would be able to take advantages of the following benefits from the proposed architecture of this project,

i.   **High Service Uptime:** This was ensured using server-level clustering and failover as well as application load balancing using software or hardware devices

ii. **Protection from Equipment Failure:** There is redundancy for UPS, Diesel Gen-sets, PACs (Precision Air Conditioners) and for various IT devices such as routers, network and SAN switches, FCIP routers, and production servers

iii. **Server Utilization:** The architecture uses server virtualization to provide the benefit of resource scheduling in real time (based on application and user needs) and enables high utilization of deployed resources

iv. **Storage Consolidation:** The architecture for a centralized SAN storage will allow the client to provide storage space to any production or non-production application as and when required. This will increase utilization and reduce the time to allocate resources

v.   The scope of implemented ERP application will include several functional areas such as procurement, inventory and warehouse management, budget control, maintenance management, HR administration, finance and business information warehouse.

vi. ERP application will provide several user-level and business benefits to the client's which are,
   a.   Improved information access and management throughout the enterprise
   b.   Increased control of invoicing and payment processing and thereby boosting productivity
   c.   Improved frequency of reports
   d.   Greater accuracy of information with detailed content, better presentation
   e.   Improved cost control
   f.   Faster response and follow up on user needs
   g.   Better monitoring and quicker resolution of queries
   h.   Quicker response to changes in operations
   i.   Improved supply-demand linkage with remote locations and branches
   j.   Access to an up to-date, unified database for all applications

vii. Deployment of user applications such as messaging, document management system and employee self service programs

Benefits to Choice Solutions

1. The AOC project provided a prestigious Government of India reference account for Choice Solutions Limited.

2. The width of the project included almost all of the C.O.E. teams' viz., DC Consulting, Electrical, Software, Civil, IT and Physical Infrastructure.

3. This project thus brought up an excellent opportunity to all the team to interface and work closely.

4. If we take up the case of the customer, they were able to leverage the skills of several technical verticals by giving the contract to Choice Solutions Ltd.

5. The project being executed worked for the best interests of both the customer and Choice Solutions Ltd.

About Choice Solutions

Established in 1991 Choice Solutions Ltd. is a leading IT and Facilities solutions provider. Choice Solutions Ltd. business comprises of Six different practices, namely

IMS

- Desktop, Server, Network, Storage, Support, OS, Assets, Apps, Non IT
- Hardware - A-Add, M-Modify, I-Install, C-Change, R-Repair
- Assets, Security, Software Distribution, Upgrades

Networking

- Packaged Services Monitoring & Management
- Products, Security, Design, Deploy, Maintain
- Auditing & Compliance, SOC

Datacenter

- DC Audit, Monitor & Manage, Training
- Assess, Design, Built, Deploy, Disaster Recovery

Consulting

- Business Consulting, CIO & Technology Services, Physical Security, Power Devices, IT Consulting
- DC Consulting, ERP, CRM & Custom Apps

Cloud Computing

- Cold Site – Backup, Disaster Recovery
- Hot Site – HaaS, Software, Manage
- Public Cloud, Private Cloud, Hybrid Cloud
- CaaS, License Software, IaaS
- Disaster Recovery

Power

- Power Audit, Equipment Management
- Physical Security, Power Devices
- Power Saving Devices
- Design & Audit
- Renewable Energy Products

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