Data Center Establishment to Run the IT System in Power Utilities

Dr. Utkarsh Seetha[1], Rajesh Kumar Rolen[2] and Hitesh Sharma[3]

[1] Singhania University

Abstract

In this research we will focus the details of the IT System and business process requirements of IT Package need to be installed at Data Centers. This research details the project requirements, which are to be met by the applications and interfaces required within Data Center between different hardware and software systems. The objective of this research includes the design and development of Data Center architecture, hardware availability, proper installation and commissioning of all related networking equipments, storage devices and high end servers as per the current international standards.

Index terms— LAN, WAN, MAN, IPS, Switch, VLAN, DC, DR, ACL, SCR, SCC, SaaS, DTMF, SAN.

1 Data Center Establishment to Run the IT System in Power Utilities

Utkarsh Seetha, Rajesh Kumar Rolen & Hitesh Babu Sharma

Objective -In this research we will focus the details of the IT System and business process requirements of IT Package need to be installed at Data Centers. This research details the project requirements, which are to be met by the applications and interfaces required within Data Center between different hardware and software systems. The objective of this research includes the design and development of Data Center architecture, hardware availability, proper installation and commissioning of all related networking equipments, storage devices and high end servers as per the current international standards.

Keyword : LAN, WAN, MAN, IPS, Switch, VLAN, DC, DR, ACL, SCR, SCC, SaaS, DTMF, SAN.

I.

2 RESEARCH SCOPE FOR DATA CENTRE

he data centre project scope shall include the deliverables as mentioned in the document. The brief descriptions of the project scope have been described below in this document. HCL Scope as per the requirements given in the tender document as follows:

? Data Cabling ? Computing Setup with DR Solution ? WAN Connectivity II.

3 OVERALL SOLUTION DESCRIPTION

The overall solution describes the required hardware need to be installed to run the applications/modules for the purpose of the Subdivision Automation of State Electricity Departments in respect to the business functionality. This solution covers the functionality as mentioned and required in the Document as this is an advanced engineered office management tool. It is developed to manage all types of useful databases, analyzes them by applying standard concepts and implement them in a manner consistent with its purpose or design the logic of electrical engineering and subdivision level management in a modernize way.

After a deep study of RAPDRP requirements and the difficulties of DISCOMs, our research has suggested the solution with additional amenities. DISCOMs related business functionality would be customized in the product on the base of the Document.

Author : Restructured Power Development and Reforms Programme, Rajasthan.

The Data Center solution has the capability to integrate with other Business Process Applications as per the requirement captured in system study and suggested by Document. The integration architecture of Data Center solution is based on SOA (Service Oriented Architecture) and due to this it is easily mapped with the integration middleware for exposing the business functionality to external systems as well as to consuming the business functionality of external systems and other future needs which will be fulfilled by the installed hardware, networking equipments and storage devices for coming decades.

4   Features:

? Flawless Integration of Functions and Processes ? Increase Operation Efficiency

5   BASIC HARDWARE DESIGN CONSIDERATIONS

In this research we will study the Basic Design Principles for the data centre and disaster recovery solution for APDRP which has been arrived at in conformance with the RFP Guidelines, Industry Best Practices, Critical Nature of the Centralized application and our experience in handling such large data centre and Multi-location projects.

We have considered the following key design considerations for architecting the Data centre -? Scalability ? Availability ? Reliability ? Performance ? Security a) Scalability

In Utility segment the no of consumers are bound to grow with the increase in population and the usage of IT. Also as the various facilities are extended to new geographical areas the no. of offices / no. of consumers are bound to grow. This necessitates the scalability requirement at the Design level to ensure that there is enough room for growth to meet the future requirements.

To meet the Scalability requirements Horizontal scalability, vertical scalability or a combination of both can be used. As per the RFP guidelines we have both horizontal and vertical scalability based on the product set and the application for which it is being used.

6   b) Availability

This is a one of the most important design objective for the datacenter set-up, especially when all the applications are centralized in nature. Highly available Datacenter design ensures that the end users are able to operate and access the applications at all times with desired response time.

To meet this objective we have taken care of redundancies at all levels and the choice of technology is to ensure that the applications are made available to the users in any event of failure or disaster.

There are two strategies that we have followed in order to meet the above design objectives -? High Availability within the datacenter.

?

7   d) Performance

We also understand that the systems should be designed keeping in view the performance requirement so that the desired response is met at all times. This requires capacity planning at all level to meets the performance availability criteria. Some key aspects which have been taken care in the design to meets the performance requirements are: ? All the Servers have been sized keeping in mind the appropriate concurrency at User Level ? The Servers are being load balanced to ensure that there is no performance choke due to excess load on one server ? The Interconnectivity between servers are on high performance network with Non-Blocking Architecture ? The Bandwidth Capacity planning is done keeping in mind the appropriate user load.

8   e) Security

It's an inevitable fact that security is required at all levels to ensure that the application is available to the users as well as the data is protected from any kind of unauthorized access. In today's environment where the users access the Datacenter from both Intranet as well as Internet it becomes a challenge to ensure that we protect the datacenter from any damage due to different attacks. We have taken care of the following design considerations on the Infrastructure side to ensure end to end security from edge location to the Datacenter - ? [1] [2]

Figure 1: ?

? Continuous Replication of data to
DR Site for disaster recovery
? Transparent failover of users to the
DR site in case of a Primary site
failure
c) Reliability
Product reliability is a very important design
criterion while designing various components of the
Datacenter. Some of the key aspects which have a
direct implication on product reliability are as
follows:
? Provision for Redundant Power Supplies
? Provision for Redundant Cooling Fans
? Mirrored Hard Disk Drives
? Redundant Ethernet Connectivity
? Redundant Storage Connectivity
? ECC Memory

[Note: High Availability at DC Core Network level ? Application Load Balancing for all Web and Application Servers ? Clustering and failover for all Database servers ? Application Availability in case of DC Site Failure ? 100% replica of the DC site so that there is no impact on the response time of the application.]

Figure 2:

IV. As per our research and available international BASIC COMPONENTS OF THE PROJECT standers, the overall data centre project will include the following modules: e) Enterprise Management System (EMS) ? The IT platform shall assist in capturing and validating the energy and revenue model to gather in a transparent manner with accuracy. ? To monitor network and server infrastructure for fault and performance issues reducing outages

a) Active Directory Implementation and interruptions by proactive monitoring of ? Validating the proper installation Windows 2008 Operating System as per best practices and basic OS hardening to be configured in New AD servers ? Design & Implementation of Active Directory Infrastructure for APDRP ? Active Directory Integrated DNS will be configured. ? Creation of users and their mailboxes (email addresses) as per defined naming convention infrastructure. ? To improve IT staff efficiency by enabling process-driven management, automated actions based on business policies and rapid root-cause analysis ? To improve service availability by integrating event and performance management across all domains: systems, network, storage, database and applications ? To improve IT support management by providing a thorough, versatile set of by customer functionality that leverages ITIL principles and ? Configuration required for Integration with IAM other practices and improves IT governance (if any) ? Testing AD functionality and GPOs b) Enterprise Messaging Setup on Exchange 2007 -DC & DR ? To collect hardware and software inventory for network devices, servers and desktops and to deploy software packages / patches remotely. ? To Setup customer care center in the towns along with supply, installation, testing and ? Validating the proper installation Windows 2008 commissioning of all necessary hardware, Operating System as per best practices and software and managing the facilities. basic OS hardening to be configured ? Design & Implementation of Exchange Server ? To setup Data center & Disaster Recovery center at identified location and set up the Local for Enterprise wide messaging setup Area Network and Wide Area

? Configuring the web based secure mail access ? Predictive Dialing -leverage the capabilities for the use needed to make your outbound collections, ? Configuring Outlook on 10 Sample User sales or telemarketing strategies successful Desktops for Exchange 2007. ? Voice Portal -deliver rich voice self-service ? Testing of mail flow, routing, failover and other applications to your customers via standard Exchange 2007 features speech enabled Voice XML or dual tone multi c) ISA 2006 Server -DC & DR frequency (DTMF) applications ? Gateway level Security -Multi Layered Antispam and Antivirus for Mail Messaging; AV, Content filtering and URL Filtering for Web. ? Transmission Security -IPSec for edge to DC encryption. ? Datacenter Security - ? Perimeter security -Intrusion Prevention, Firewall and extended ACLs on required VLANs. ? Identity and Access Management for user authentication, authorization and accounting ? Security at OS Level by OS Hardening ? Web Interaction Management -offer assisted ? Validating the proper installation Windows 2003 service to customers who visit your website Operating System as per best practices and ? Email Management -efficiently handle the basic OS hardening to be configured ? Integrate with Windows domain for basic authentication and users directory ? Installing and configuring ISA servers in 2 Node NLB at DC & DR sites ? Configuration of reverse proxy rules on ISA volume of email messages by providing service levels, prioritization, queuing, auto acknowledgement, auto response and reporting ? Knowledge Base -manage a repository of frequently asked questions (FAQs) and empower your agents with information to server for Exchange web access & MOSS Portal quickly respond to customer inquiries ? Testing and validating web publishing ? Contact Recording and Quality Management - d) MS Infra Enablement for Applications -DC, DR & 3 whether for quality control or compliance CC Sites purposes, Aspect Unified IP provides

January 2012

89   ? Management Zone -This Zone will comprise of Management Servers. We have created a separate Management
90 Zone as per Industry best practices. This zone will be created using the firewall Blade given in Core Switch or
91 using Extended ACLs feature as per the need basis. ? Administration Zone -One zone will be created for the
92 Administrative users of the Data Center. ? LAN Users -One zone will be created for the LAN users of the Data
93 Center.
94   Switch or using Extended ACLs feature as per the need basis.

95 [Itia ()] , Rapdrp Itia . 2010.

96 [Ministry Of Power ()] , Govt Ministry Of Power . India -2009-10.

97 [Jvvnl ()] , Jaipur Jvvnl . Rajasthan -2009-10.

98 [R-Apdrp ()] *Power Finance Corporation of India*, R-Apdrp . 2009-10.