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Application of Information Technology in Consumer Indexing through Geographical Information System for Power Utilities

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I. INTRODUCTION

For operations as complex as described above, the system must be designed in a way that it stands to the rigorous needs of Rajasthan Distribution Companies. As part of our approach this research takes into consideration certain design aspects of the system with reference to which the system is conceptualized and developed to cater the need for GIS and its uses.

Design considerations are the parameters that have been used as basic philosophy to begin the thought process for evolving a solutions approach. There are four basic considerations based on which any IT system is designed. Based on these considerations GIS and other applications will work upon.

- Reliability
- Availability
- Scalability
- Security

Taking these considerations as fundamental, this research has assured their presence in each of the system building block.

- Application Software
- DC
- DR
- Network
- Hardware
- Services

Based on the design considerations mainly SOA need to have a robust integration engine, Microsoft BizTalk Server 2009 is being proposed as the integration middleware and MSSQL Server 2008 as database layer.

Moreover the utilities want the solution to be designed in such a way that in future it is possible to segregate one or more of the entities at the application and database level. Moreover the segregation mechanism should be flexible and at no cost to the DISCOMs. This therefore calls for an innovative approach on part of the ITIA to deliver such a solution at a competitive price.

The research specifies that no Separate instances are acceptable for each individual DISCOMs as per PFC guidelines but it is possible to create Logical partitioning for the individual DISCOMs in the same set of common servers. Therefore system design research would use a single set of application & a single set of database servers and will create logical partitions for different DISCOMs so as to fulfill the stipulation.

The global competition and swiftness of changes emphasize the importance of human capital within organizations, as well as the swiftness and ways of knowledge gaining of that capital. In the economy where uncertainty is the only certainty, knowledge is becoming a reliable source of sustained competitive advantage. Knowledge is becoming basic capital and the trigger of development. Previously built on foundations of possessing specific resources and low costs, present day competition is based on knowledge possessing and efficient knowledge management. Modern organizations therefore use their resources (money, time, energy, information, etc.) for permanent training and advancement of their employees. Organizations which are constantly creating new knowledge, extending it through the entire organization and implementing it quickly inside the new technologies, develop good products and excellent services.

II. GEOGRAPHICAL INFORMATION SYSTEM (GIS)

In order to obtain a new connection or other CRM workflows, the business workflow user needs to visit GIS link in systems Integrated Home Page Or CRM application where he/she wish to provide site verification. Following different roles can open a GIS map.

- i. Business Work Flow User (To create a new connection.)
- ii. Technical User
- iii. General Viewer
- iv. CCC Viewer

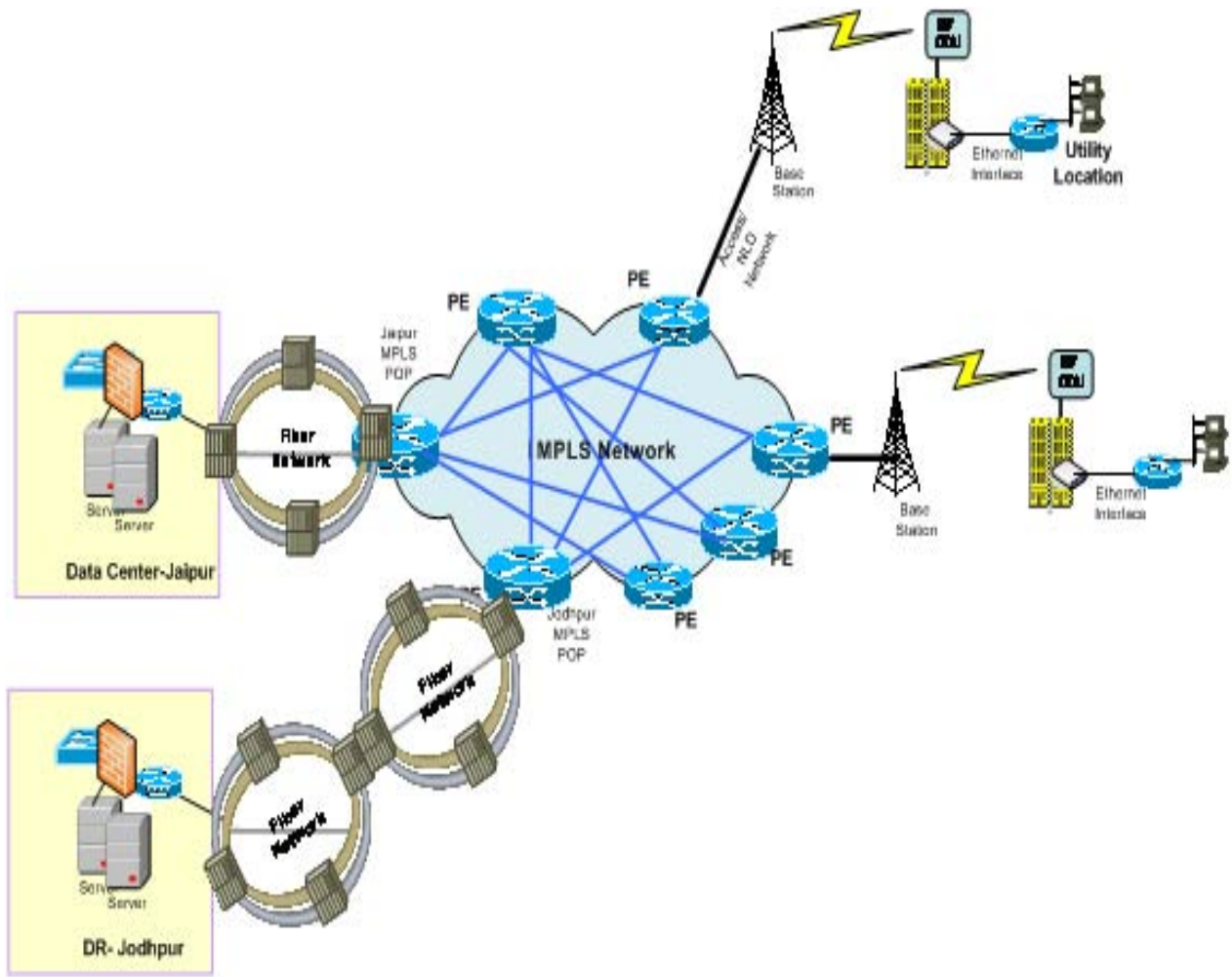
a) *Remote (Utility location) Connectivity to use GIS applications at site*

➤ Service Provider(s) selected by SI will connect all the 834 locations on RF last mile or any other feasible technology.

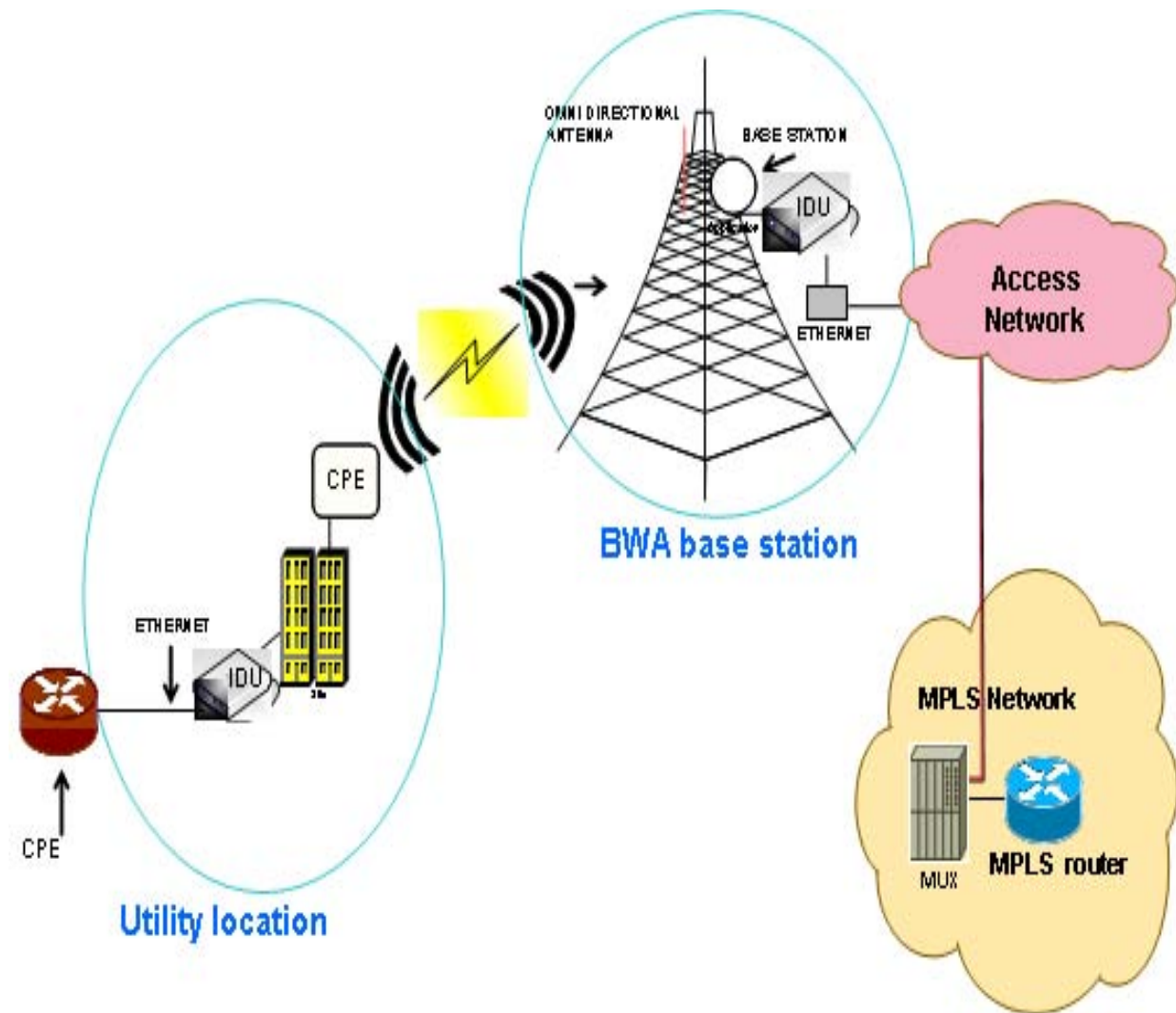
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Author ^σ : Restructured Power Development and Reforms Programme.

- Service Provider(s) selected for this project already have a presence in terms of Base Stations from where last mile will be extended.
- All the RF or equivalent last miles will be backhauled on Service Provider's Access or NLD network to the nearest MPLS POP in Rajasthan
- All the locations will become part of specific VRF that will have route towards Data center and also to DR in case of failure of DC.
- Service Provider will provide the RF ODU and IDU at all the locations
- Interface of IDU will be Ethernet and which will terminate to router.



Considering the geographical constraints maximum locations in Rajasthan are proposed on RF connectivity. As shown in the diagram, Service Provider can reach out to any site via RF medium. Using the existing BTS coverage Service Provider shall deploy the P2P/ P2MP radio at the locations to terminate the circuit at the nearest BTS. The BTS is connected with BCS, who in turn is connected with MSC. To carry the intercity traffic, MSC is connected with SDH backbone.



b) *Secondary Link Connectivity plan to use GIS and other related applications at site*

Option – 1:- VSAT Connectivity

- Service Provider will provide secondary link on VSAT last mile which is a different technology.
- Service Provider will implement VSAT at all the 834 locations.
- VSAT will terminate on Ethernet Interface of Bidder's router.
- On utility router a dynamic (BGP) protocol will be configured for Primary Path (MPLS on RF last mile) and static protocol with 100 metric will be configured for secondary path
- Primary link will be on Priority and traffic will be always routed to Primary link.
- On failure of Primary link router will route the traffic to secondary VSAT link.
- When Primary link will be restored, traffic will again be routed to Primary link.

The network will be configured on Ku Band shared hub of Service Provider. The network is proposed on MFTDMA star technology. The network will

cover a total of 834 locations for secondary connectivity. Jaipur will be configured as the central site for the network. This site will have backhaul connectivity to Service Provider's VSAT NoC. Disaster recovery site for the network will be setup at Jodhpur. The topology for the network is shown in the figure below

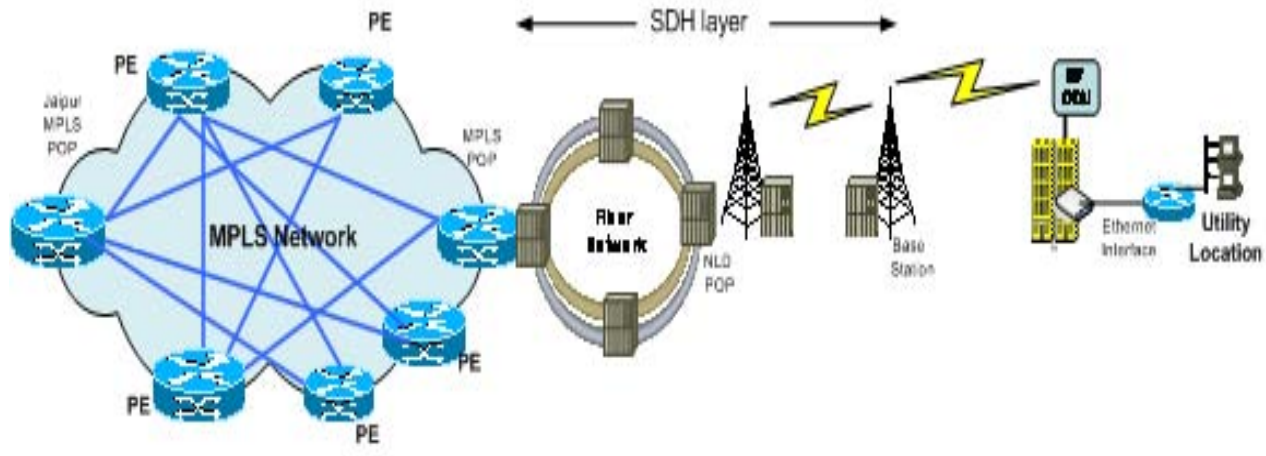
i. *Transmission Security on WAN Network*

MPLS VPN provides layer 3 connectivity throughout the network in a secure manner. A single circuit provides the needed connectivity for all sites. Each customer's routing information is kept securely separate from every other customer's routing information through the use of a route distinguisher (RD) that is unique to a particular customer. The use of the RD allows the provider to give each customer a logically separate PE router. PE routers will remain a shared resource unless otherwise negotiated. The customer routing information is maintained by a specific routing protocol instance tied to its RD. The routing table assembled by this routing protocol instance is known as a virtual routing and forwarding (VRF) table. In essence, it is simply an extension of the customer's routing table,

because it includes all of the customer's advertised prefixes and hence it is inherently secure.

Service Provider will ensure the security of the traffic from CE Router to PE Router even if they not

directly connected as in case of non availability of MPLS POP. In case of non availability of MPLS POP traffic will be on SDH layer and which is highly secure.

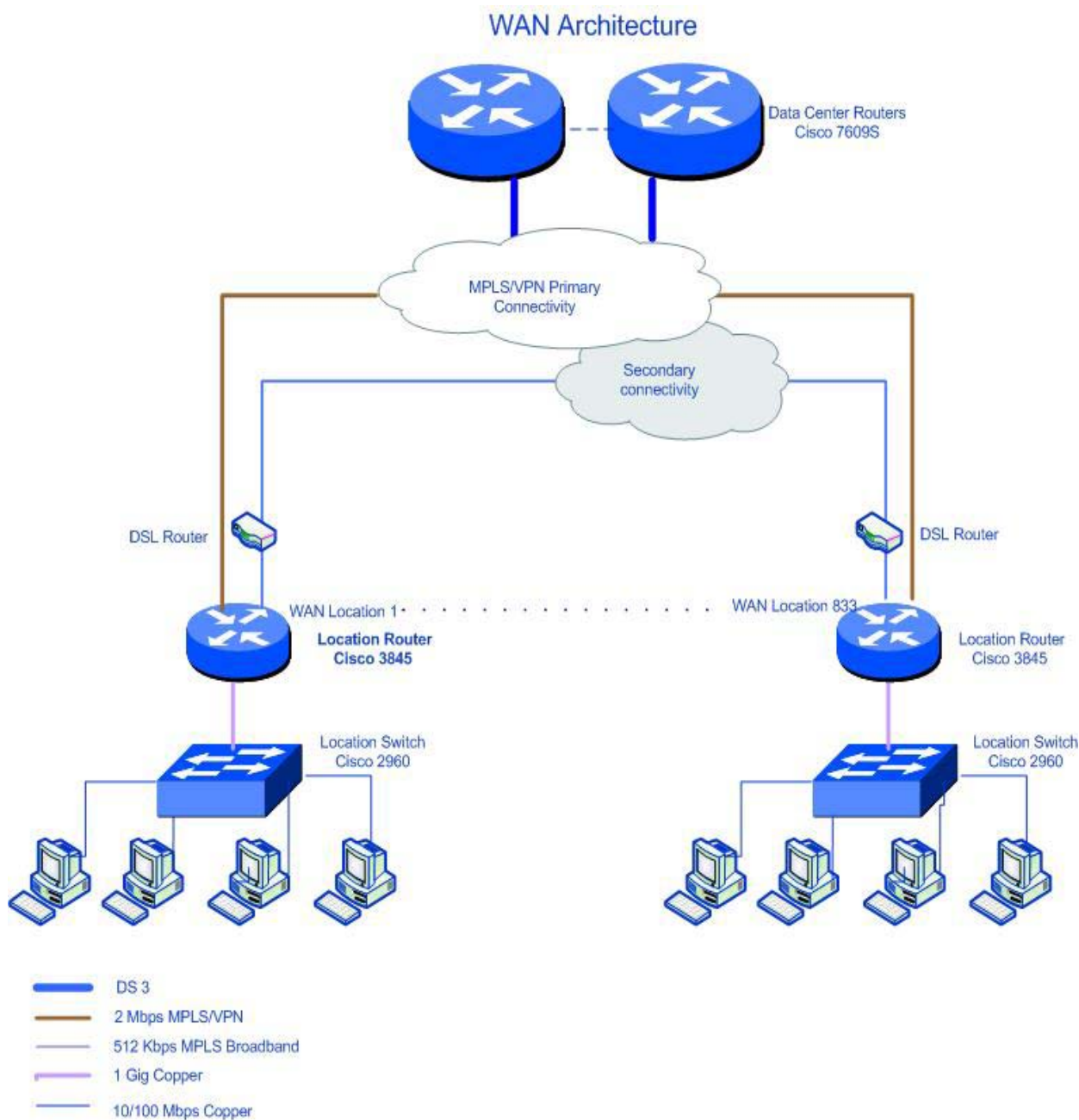


WAN Architecture Diagram to use GIS application at site

c) WAN Connectivity Requirements

The WAN Connectivity requirements as specified in the SRS and RFP are as stated below –

- Provide MPLS VPN connectivity for 834 of locations to Data Centre in Hub and Spoke topology
- All the applications will be hosted in Centralized Data Centre at State Level and which is required to be connected to all the locations.
- High Availability connectivity solution for Data Centre and DR
- The Data Centre shall have facilities for connecting to Utility HQ, all the remote utility offices in Circles, divisions, Sub divisions etc. as per the requirement of utility and all the Customer care Centers
- The Sub divisional offices and Other Offices would be connected to the Data centre through minimum 2 Mbps VPN connectivity
- The Customer care centers would also be connected to the Data centers through a minimum 2 Mbps VPN connectivity
- The Internet connectivity at the Datacenter will be 20Mbps primary and 5Mbps Backup from different Service Providers. At the DR Site, 2Mbps Internet connectivity will be provided. It will be terminated on separate Internet router.
- WAN link of 5 Mbps is required between DC and DR for replication of Data.



REFERENCES RÉFÉRENCES REFERENCIAS

1. R-APDRP project, Power Finance Corporation of India 2009-2010
2. Ministry of Power, Government of India 2009-2010
3. Jaipur Vidyut Vitiran Nigam Limited, Jaipur 2009 – 2010
4. Ajmer Vidyut Vitiran Nigam Limited, Ajmer 2009 – 2010
5. Jodhpur Vidyut Vitiran Nigam Limited, Jodhpur 2009 – 2010
6. ITIA (Information Technology Implementation Agency), Restructured – Accelerated Power Development and Reform Programme (R-APDRP), Rajasthan 2009 – 2010.