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Management of Business Process & Database for Power Utilities

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Abstract - Through this study we would like to underline the particulars of the IT System and business process requirements of IT Package need to be architected for better understanding of ongoing business in power utilities. This research details the requirements need to be addressed for better synchronization within current system and the upcoming IT solution.

The objective of this research includes the study of current ongoing business process of power utilities and understands the business and administrative impact due to the IT system inclusion. This study will show the existing business process and how the current process will work in the forthcoming IT environment.

Keywords : *Rapdrp, Utilities, Nc, Rc, Dc, Pdc, Gis, Mdas, Iams, Ea, Mis, Eam*

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Management of Business Process & Database for Power Utilities

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I. Objective

Through this study we would like to underline the particulars of the IT System and business process requirements of IT Package need to be architected for better understanding of ongoing business in power utilities. This research details the requirements need to be addressed for better synchronization within current system and the upcoming IT solution.

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II. Overall Solution Description

The overall solution describes the required software modules need to be installed to run the business process 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.

The business process solution has the capability to integrate with other Process Applications as per the requirement captured in system study and suggested by Document. The integration architecture of BPA 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.

Features :

- Point to Point mapping of all ongoing business process
- Flawless Integration of all Functions
- Increase business Operational Efficiency
- Business Process Streamlining
- Enhance Customer Service
- Business Assessment Support for Strategic Issues
- Business Revenue Augmentation
- Process Scalability, Flexibility for future application integration

III. Research Scope

The scope of this research will not limited to the study of current business process but also give suggestions and recommendations on how to improve the productivity, scalability, reliability and flexibility with the use of Information Technology in Utility business.

IV. Implementation Mythology

This research will study following business process of the power utilities and suggesting/Providing the solution for all :

- Meter Data Acquisition
- Energy Audit
- New Connection
- Disconnection & Dismantling
- GIS based customer Indexing and asset mapping
- GIS based integrated network analysis module
- Centralized Customer Care Services
- Management Information System (MIS)
- Web Self Service
- Identity and Access Management system
- System Security Requirement
- Development of Commercial Database of Consumers
- Metering

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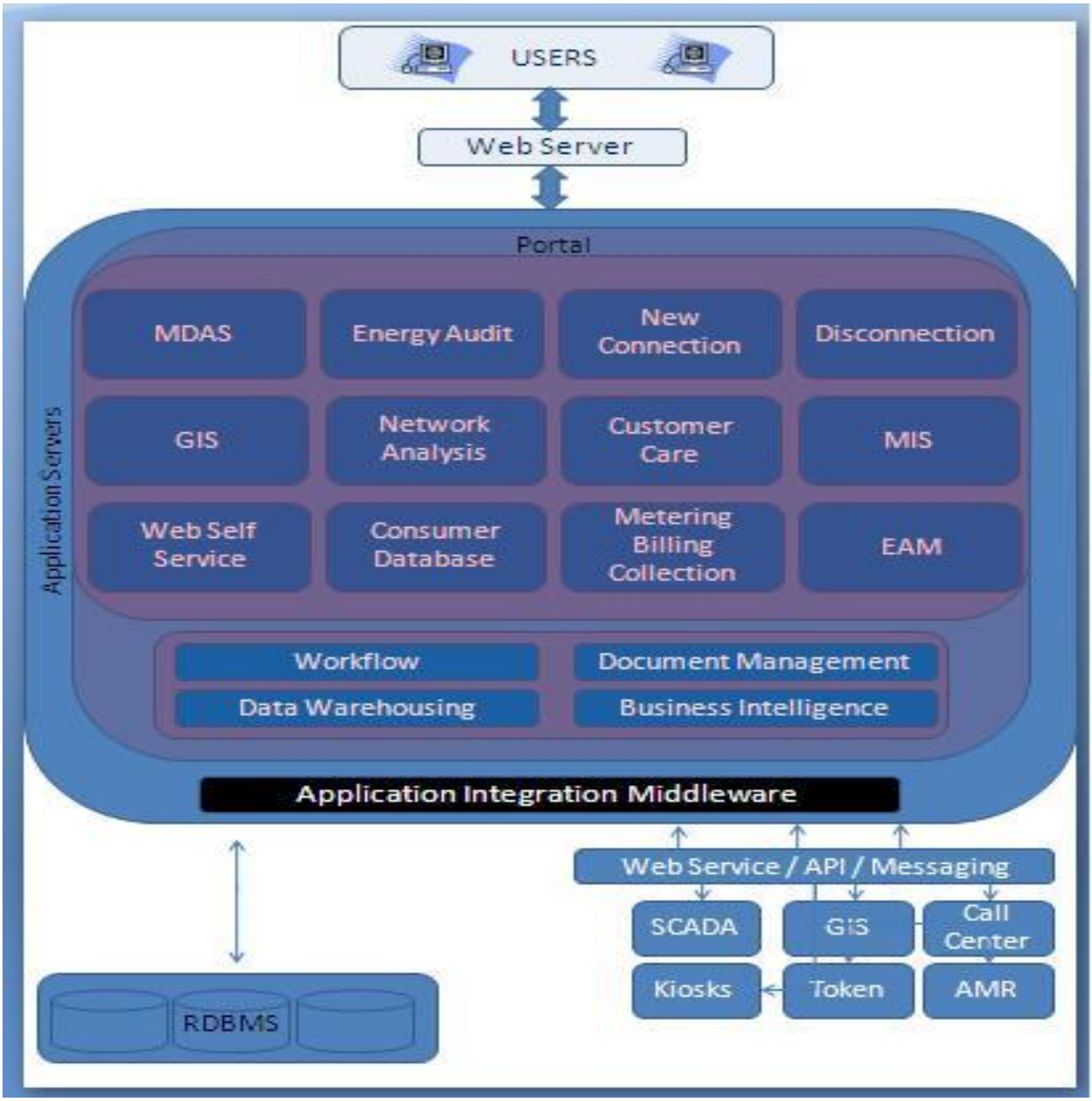
- Billing
- Collections
- Asset Management
- Maintenance Management

During the study of the above listed modules we have segregated all of them into the following categories for better understanding of business process:

Solution Offerings	Solution\System Features and Strengths
Field / Subdivision Automation	• Billing and collection • New Connection/ Disconnection / Load Extension • Electrical System Augmentation • Power Network Control • Store & Inventory • Meter Management • Vigilance & Enforcement • Revenue Section • Energy Audit • Consumer Grievance
Advanced/ Smart Metering Infrastructure	• Two way Communication • Real Time Meter status, tamper detection, Energy Audit • Event based Remote disconnect function • Load Cycling and Load limiting functions • Capability of time of use of tariff • In built Pre Paid System • Monitoring of Automatic Outages and its restoration • Integration with complete IT Infrastructure • Contribution in building Smart Grids.
AMR/ LT SCADA	• GPRS based devices that are highly reliable in terms of scalability and performance • Identification of suspected cases for theft or pilferage. • Remote switching (ON/OFF) of the consumers supply through centralized SCADA software • Monitoring of captive diesel generator sets consumption and operating hours, load patterns and other important parameters • Comparison of consumption of two sources of supply to monitor any unauthorized electricity extraction, etc • Monitor Captive Power generation utilization by industrial customers.
Energy Audit Services	• Addresses High AT & C Losses and Poor Network infrastructure. • Based on field proven methodologies supported with Industry wide benchmarking. • IT based powerful tools to handle huge Databases and extract the useful information to review at all levels of utility. • Data Security, integrity remains intact with reliable security features. • Data Analysis supported by BEE certified Energy Auditors. • Service Model that minimizes the investment required by the Utility. • Hierarchical accounting for performance tracking of Electrical System & Geographical Administrative Hierarchies. • Coverage of entire Power System Network
Integrated Energy Management	• Capture detailed near real-time consumption data for each energy-consuming process • Transmits data efficiently • Storage of data in a secure, centralized warehouse • Providing analytic and operational functionality that can forecast peaks and control processes based on this analysis.
Sub Station set up/ Distribution Automation	• Technology and products from a very old firm that played vital role in America's rural electrification in last 60-70 years. • Highly reliable, line mounted products that creates self healing networks, save land requirements, manpower & cost that helps in fast rural electrification. • Enable Discoms to release high voltage industrial connections with huge saving in costs.

V. Application Solution Overview

Following solution has come up during the initial system study:



VI. New Connection

Objective:

The proposed system should serve the prospective consumers to avail the electricity supply from the Utility. At present, applicants register their requests in concerned Sub-Division for New Connection at their premises.

The proposed system should aim at enhancing the customer's convenience, when an application for new connection is received. It should enable the customer to collect, submit applications, and deposit the demand amount at Consumer Section. The system should enable updating customer data to be captured in the GIS based customer indexing database in a reliable way. The system should ensure validates and checks whether the integrity of this data is maintained. Revenue Section should release the New Connection after completing all required activities, and send the consumer data for billing. This module should also check the customer record with existing consumer records (i.e. Defaulters and disconnected consumers).

New Connection module should have integration with various set of services, some them may be common with other module :

1. GIS Based application for Feasibility Checking, VR Map & Report Generation
2. Asset Management for issuing and receiving meter/item from the Store
3. Billing application to generate new consumer's electricity bill

VII. Disconnection & Dismantling

Objective:

This Module aims at improving recovery through a disciplined disconnection and dismantling mechanism that serves as a deterrent for defaulters.

It is capable of generating the defaulter consumer's list; i.e. the consumers who do not make their bill payment by the due date or the date on which list is generated, whichever is later. This module also generates the disconnection notices list automatically as per utility defined criteria, and dispatches disconnection notices to consumer via email. It is also capable of registering disconnection request made by consumer. Finally it updates the consumer status, which may affect the consumer's next billing.

This module should have integration with following applications:

1. Dismantling Module provides the dismantling information for New Connection Module
2. Asset Management for receiving the items/meter.
3. Billing Application to generate the final bill.
4. GIS Application for updating dismantling information in GIS Database.

VIII. Management Information System (MIS)

Objective:

The main objective of MIS system is to have mainly two modes of Reporting

Basic Internal Reporting – The system must provide basic low-cost, integrated reporting that does not require administration, external processors or external storage. Both real time reports and historical reports are required. Historical reports must be available for hourly or half hourly intervals. The proposed system must be capable of displaying reports on a video display terminal in real time or emailing them.

Custom Reporting - Fast, easy creation of custom reports from scratch is required as is modification of existing reports to customize them for reporting purposes. Report customization must include the ability to create custom data items and define custom calculations.

IX. Web Self Service

Objective:

The goal is to provide a high quality experience for the customers and business associates that will provide them a user friendly portal that will make it easy for them to communicate with the utility though the web instead of direct phone calls or visits. This portal will also act as a source of information for the customers regarding policies and procedures. This in turn will improve customer satisfaction and reduce work load on the employees.

Web Self Service should provide the facility to the consumer to register complaints or lodge grievances himself online by creating his username. This facility should enable the consumers to get the access to the personalized form of application, where they can themselves lodge complaints and grievances, and get access to the varied useful information.

This application should enable the consumer to register no-current complaints and grievances themselves. The user should be able to view all the personal information including his account number. The user should be able to view the details of all the Energy Bill payments made by him, his current bill, the information of complaints lodged by him in this application or lodged at CRM or at Customer Care Center for him. The user should be able to view the duplicate copy of his Current Bill, this can also be printed.

This application should have integration with following applications:

1. CRM Application for processing of complaints and grievances.
2. Customer Care Center for processing the complaints and viewing grievances.
3. Billing Application for viewing and printing of Duplicate Bills.

X. Identity And Access Management System

Objective:

Utilities are envisaging an enterprise level Identity and Access Management System which has features of Adapter/Connector Support, Access Rights Capabilities and Access Control and other key features like Mechanism to essentially allow or deny specified user IDs to access other key feature envisaged in the system are:

The Identity and access management solution shall support two factor authentications (Biometrics, tokens etc.) The solution shall have feature to generate reports in the lines of ISO 27001 standard. The solution shall provide secure environment for transmitting Information across the Internet. The Access

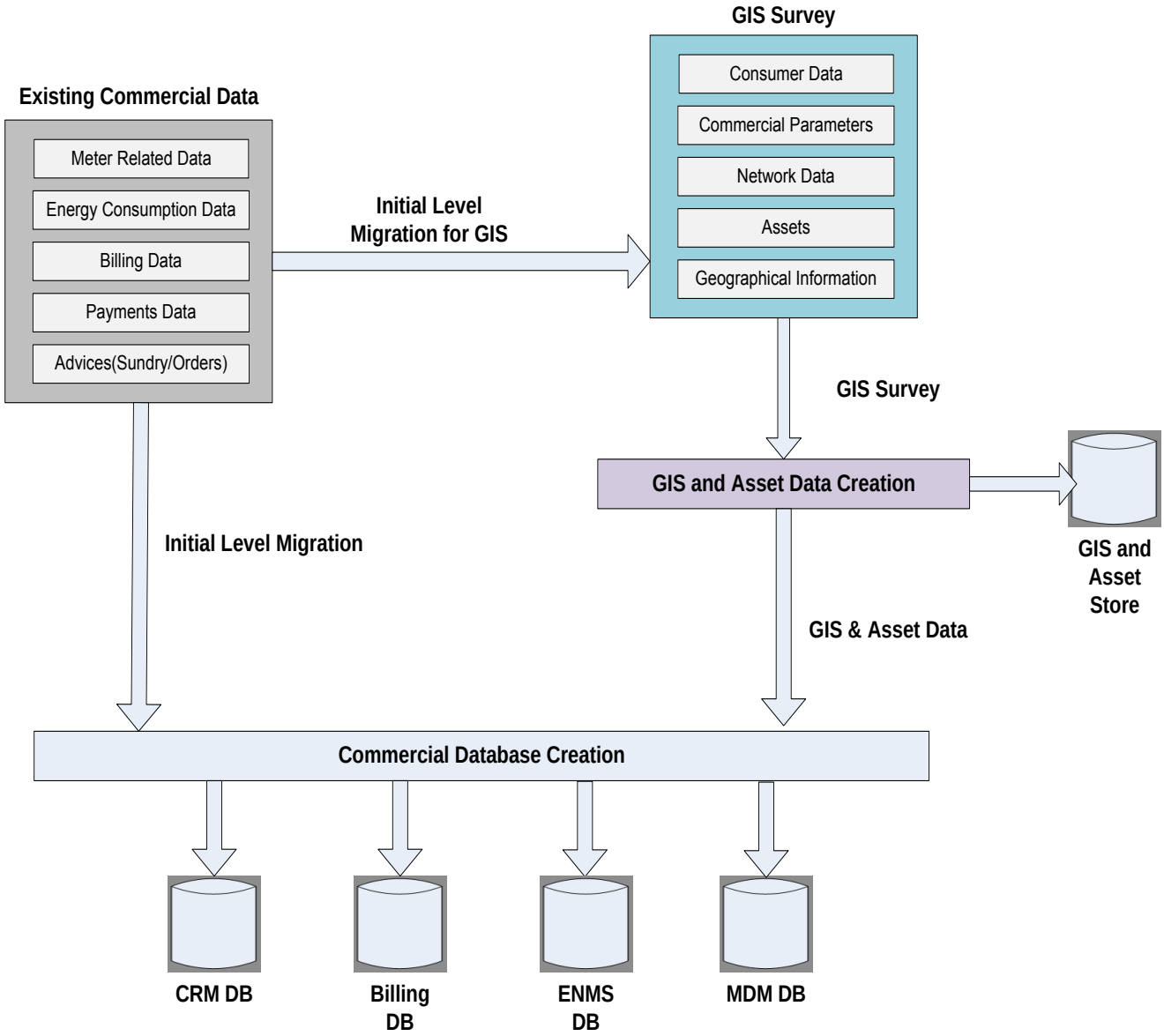
Management solution should be capable of running on web servers as well as application servers.

XI. System Security Requirement

The system must be capable of generating log trails, which contain details about any read / write access to sensitive data. Details must relate activity to an identifiable person. They must be configurable, so that filters and switches can be used to lower performance overheads and focus on areas of concern. It is important that the audit trail that is generated contain enough information to support after-the fact investigation of loss or impropriety.

XII. Development of Commercial Database of Consumers

Database Migration and Data Store Creation has the structured process in which commercial data available in the DISCOMs, asset data and the data captured from GIS survey would be considered. The Data Migration and Data Store creation process follows the flow as illustrated in the diagram:



The Commercial Data Creation is done by using the existing Automated Data as well as for some cases it is done by using the approach of Data Punching. For the purpose of the Data Punching, Application provides the interfaces which internally create the commercial data in the same manner in which the Automated Process does.

As shown in the diagram the Data Migration and Data Store creation process has the following steps:

1. Initially before starting the GIS Survey work, existing commercial data will be taken from the discom for the particular town/location for which GIS Survey has to be done. The migrated existing data will be delivered to the GIS Survey Team for the Survey purpose.
2. After the completion of the GIS Survey work, GIS Survey Team will provide the Survey Data to the Data Migration Team which will update the migrated data (Data prepared in Step.1). The GIS Survey Team will provide the Commercial, Technical and Asset Data.
3. In the final step, the Data Migration Team will define a cut over date in consultation of the discom for the first billing from the IT Package for the particular Town/Location. At this time, Discom will again provide the Commercial Data which will be used for final data update

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