

Automated Network Inventory creation using Web based solution

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Abstract:

Telecom service providers have their assets located in facilities in public domain. The assets are connected to each other to form a network with specific technical and business workflow properties to serve customers in the area of installation. For efficient project set-up, commissioning, operations and accounting it is extremely critical to maintain this inventory not only in classical ERP systems but more importantly should have a spatial context. RJIL which is putting up a pan-India 4G telecom network has recognized this need from the outset and has gone in for end-to-end inventory management and business process automation on GIS platform.

This web application has helped RJIL in automating creation of physical network inventory on GIS platform within the project schedule, at minimum efforts and maintaining a high data quality. Entire process has been customized through web application, which enables the stakeholders to track, analyze and update progress through the portal. Custom application with built-in workflow and notifications are developed transforming traditional paper based processes to completely electronic, GIS based processes. This helped the team to design and manage physical network inventory in an easy, intelligent and cost effective manner and thus deliver tangible business results to the organization. This application maintains data integrity and has minimized hand over- take over time for respective teams and resulted in increased momentum.

About the Author:



Mr. Cheriyen Oommen

Cheriyen Oommen, a professional with 15 years of experience, is a Senior Manager at Reliance Jio Infocomm Ltd, Mumbai. He has experience of implementing GIS systems at major telecom service providers in India, Europe and Middle-East. He is a certified Trainer on Ericsson's Network Engineer™. He has handled a wide range of activities covering network inventory modelling, NE configuration, business analysis, consulting and training. He has presented a paper in ESRI India User Conference 2013. His paper was also accepted in ESRI International User Conference 2014.

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Introduction

Reliance Jio Infocomm Ltd. (RJIL) is the only company to have high-speed wireless broadband spectrum across the country. RJIL is in the process of rolling out its PAN-India 4G services. In order to provide uniquely differentiated customer service experience and to manage its inventory & network, it has developed web based solution for automatic creation of network inventory in Ericsson’s Network Engineer™

In order to extend support to Network Planning and Engineering (NPE) team for creation and configuration of electronics / utility devices at any network location, RJIL has integrated GIS with other systems and made GIS system as a central integrating thread for entire network plan & build process. This application allows automatic creation of physical network inventory in Ericsson’s Network Engineer™. Various templates with all physical network element information including site, device with its configuration, floor plan, rack layout and connectivity have been created to support this application.

Creation of network inventory of 85,000 sites with devices & connectivity was cumbersome and time consuming. It is mandatory to create the network inventory in Network Engineer for sending to OSS for enrichment and alarm monitoring. This is when the need of automating entire process has been initiated to speed up the activities in rolling out the services. The desired solution has been achieved by customizing Ericsson Network Engineer, which is built on ESRI ArcGIS.

Process Work-Flow

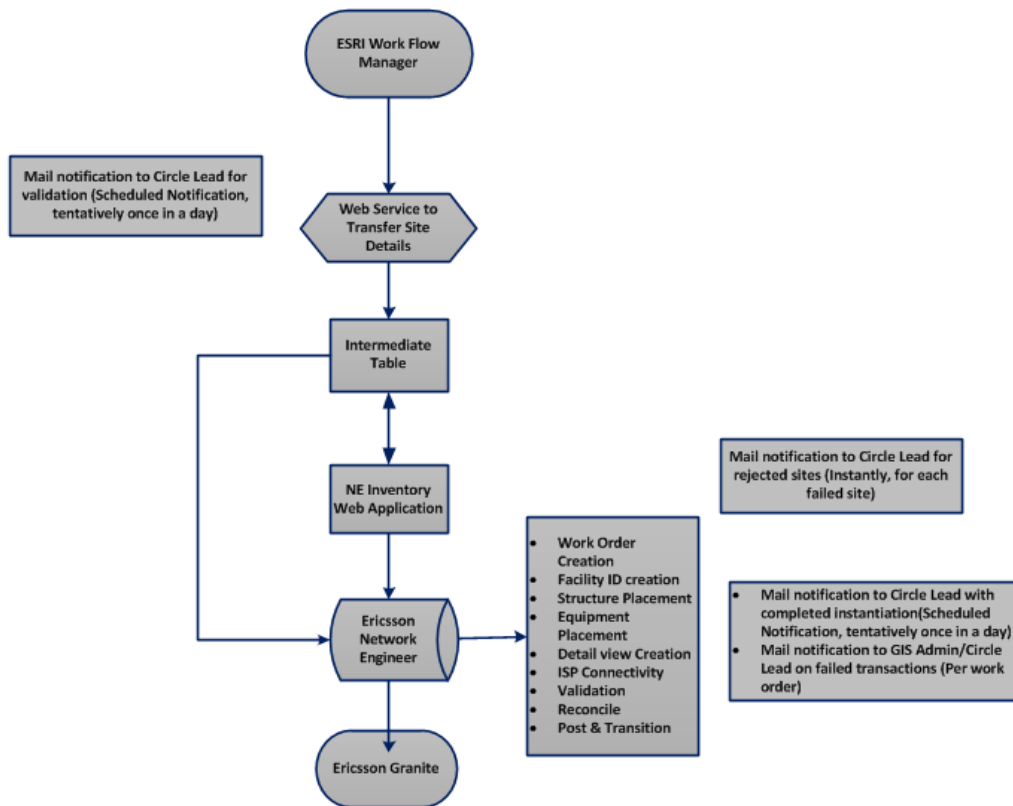


Figure: 1 Process Work-Flow

Detailed Steps

The solution has been achieved by automating applications on web as well as desktop. The various steps of these are given below.

1. Data is captured in ESRI Work Flow manager by RF Planning team
2. When the site is ready for installation, it is pushed to NE inventory portal
3. User validates/modifies and approves the details in NE inventory portal
4. Data sent to Intermediate table
5. Batch process trigger the site inventory creation in Network Engineer
6. Upon successful transition, site details gets transferred to Granite

A batch process has been created for initiating the creation of inventory in Ericsson Network Engineer. Clicking on 'Run Process' (Refer figure: 2) activates the batch mode trigger.

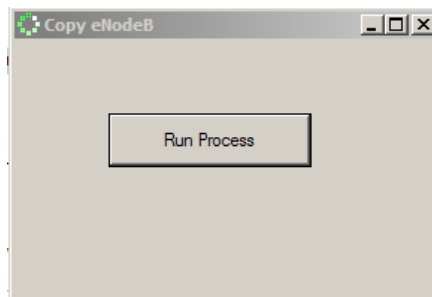


Figure: 2 Batch Process

Details of various sites are displayed on a web portal (Refer figure: 3) for users to select the site specific inventory and site type.

NE Inventory Management Portal											
Welcome, Cheriyan.Oommen											
Home											
SAP_ID = OWN BUILD Refresh Report Total records :860											
SAP_ID	SITENAME	SITE ADDRESS	R4G STATE	CITY_NAME	TOWER TYPE	SITE TYPE	SITE BACKHAUL	TOWER HEIGHT	FDP/FDMS1	FDI CO	
I-AS-GWHT-ENB-0017 Lat: 26.101590 Long: 91.612850 CandidateID: C4	Ranigate	Jogeshwar Das, Abhiruchi Bhanalaya, Rani Gate, P.O.P.S. Azara, Guwahati - 781019, Ph- 9859529338	Assam	Azara	RTT	Metro AG1	Fiber	15M	FDP-004-96T-2x96RFC		
I-AS-GWHT-ENB-0104 Lat: 26.1109 Long: 91.736650 CandidateID: C2	Lalung Gaon	Lankeswar Das ; Vill. Lalung Gaon (Milan Para) ; P.O. Saowkudhi ; P.S. Lokhora ; Dist. Kamrup ; Pin. 781034 ; Ph.no.7896581632	Assam	Guwahati	GBT	Metro AG1	Fiber	40M	FDP-004-96T-2x96RFC		
I-DL-DLHI-ENB-2395 Lat: 28.508990 Long: 77.318940 CandidateID: C4	SAURAB VIHAR	BUDHA DEVI S/O MALKHAN SINGH R/O HNO-N-532, SAURABH VIHAR, JAITPUR, BADARPUR, NEAR DAYA RAM MEMORIAL PUBLIC SCHOOL, NEW DELHI-110044	Delhi	Delhi	RTT	Metro AG1	Fiber	12	FDP-002-96T-1xRFC		
I-GJ-BROH-ENB-0018 Lat: 21.711840 Long: 72.994330 CandidateID: C3	GUJARAT GAS OFFICE	Open Plot of Bharuch Nagarpalika Beside Over Bridge Opp Gujarat Gas Office, Bharuch	Gujarat-South	Bharuch	GBM	Metro AG1	Fiber	30	FDMS-002-GBM-AG1-1		
I-HR-SNPT-ENB-0023 Lat: 29.002910 Long: 77.039330 CandidateID: C1		777/15 SEC. 15 SONEPAT 131001	Haryana	Sonipat	GBM	Metro AG1	Fiber	25M	FDP-002-96T-1xRFC		

Figure: 3 Web portal for validation

User will select the particular site and verify/modify the details of inventory and approve/reject. (Refer figure: 4) Approved sites will be disappeared from the portal and sent to the intermediate table for batch process queue. Rejected site will be sent to the concerned team to correct the data as desired. Upon reaching the defined count of sites to trigger the inventory creation, it will initiate the activities in Network Engineer.

TOWER HEIGHT	FDP/FDMS1	FDMS1 COUNT	FDP/FDMS2	FDMS2 COUNT	NE_STATUS	REMARKS	EDIT
15M	FDP-004-96T-2x96RFC						APPROVE EDIT
40M	FDP-004-96T-2x96RFC						APPROVE EDIT
						RF Ok, FDMS will install by fiber team once fiber available on site	APPROVE EDIT
							APPROVE EDIT

Message from webpage


 Are you sure to approve this site? Approved site network inventory will be created in NE and transferred to Granite.

Figure: 4 Approval of site info

As per the input provided by the user in the web portal, system will select the predefined template along with all inventories for the particular site in the batch. It includes creation of Work Order, site, electronics as well as utility devices, detail views and connectivity. (Refer figure: 5) upon completion of inventory creation in Network Engineer, this application publishes the data and completes the work order by transferring the same to OSS.

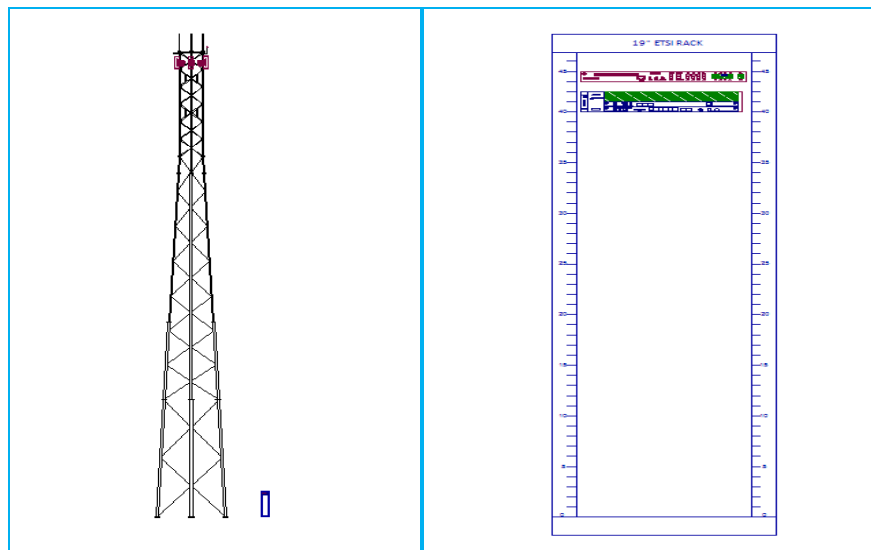


Figure: 5 Inventory created in NE

A mail notification to the user (Refer figure: 6) regarding successful and failed transaction of a batch would be sent automatically soon after the transition of respective Work Order. This notification helps the user to initiate enrichment of

data for logical inventory creation of particular sites in OSS, which in turn will be used for service provisioning and activation and assurance.

Creation of this huge telecom network inventory is the foundation of this effort and would not have been possible without extensive automation in creation of such inventory.

Sat 2/22/2014 11:55 AM
 jaganmohan.kudikala@ril.com
 eNodeB Batch load process Auto-22Feb14-1
 To: Jaganmohan Kudikala; Jaganmohan Kudikala
 Cc: Jaganmohan Kudikala; Cheriyan Oommen; Anand Chopra

Following sites are loaded successfully in GIS

SNO	FACILITY ID	SAP_ID	STATUS	REMARKS
1	INDLDLHIBLSLNB0001	I-DL-DLHI-ENB-0001	Success	Successfully placed facility Model_Name:eNodeB-15M-RTT Objectid: 15041
2	INDLBJURPRNMTW0001	I-DL-BJUR-ENB-1459	Success	Successfully placed facility Model_Name:eNodeB-40M-GBT Objectid: 15042
3	INKLKOCHNTRTW0001	I-KL-KOCH-ENB-0188	Success	Successfully placed facility Model_Name:eNodeB-30M-GBM Objectid: 15043
4	INMHNLPRLPDNB0001	I-MH-MUMB-ENB-5138	Success	Successfully placed facility Model_Name:eNodeB-6M-RTP Objectid: 15044
5	INAPHDBDAKBRNB0001	I-AP-HDBD-ENB-0283	Success	Successfully placed facility Model_Name:eNodeB-15M-RTT Objectid: 15045
6	INMUMBHBDNGNB0001	I-MU-MUMB-ENB-1574	Success	Successfully placed facility Model_Name:eNodeB-6M-RTP Objectid: 15046
7	INMUTHNESMRTNB0001	I-MU-MUMB-ENB-2466	Success	Successfully placed facility Model_Name:eNodeB-3M-RTP Objectid: 15047
8	INAPHDBDVYSRTW0001	I-AP-HDBD-ENB-0231	Success	Successfully placed facility Model_Name:eNodeB-40M-GBT Objectid: 15048
9	INMPRPURDUMTNB0001	I-MP-RPUR-ENB-0078	Success	Successfully placed facility Model_Name:eNodeB-15M-RTT Objectid: 15049
10	INASGWHTAZRRNB0001	I-AS-GWHT-ENB-0249	Success	Successfully placed facility Model_Name:eNodeB-15M-RTT Objectid: 15050
11	INMUMBHLDHANB0001	I-MU-MUMB-ENB-1564	Success	Successfully placed facility Model_Name:eNodeB-3M-RTP Objectid: 15051

Figure: 6 e-Mail Notification

Integration with other systems

This application is integrated with OSS and ERP. Upon creating the inventory, it sends the data automatically to OSS. This ensures that same data and inventory are maintained in all enterprise systems and the same version of all critical information is used various by all end users.

Conclusion

1. This helped the team to design and manage physical network inventory in an easy, intelligent manner and reduced the cost by 957% in terms of man hours.
2. This automation and integration with other systems has enabled decentralized network inventory record management process.
3. This web automation has helped the organization in reducing the desktop application license cost to 86%.
4. This application helped to maintain data integrity and has minimized hand over- take over time for respective teams and resulted in increased momentum.
