CHAPTER 39

Status Information Management System by NIC: A G2G Application

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ABSTRACT

Government departments prepare and implement various schemes for the benefit of society. Monitoring the progress of these schemes is mandatory to track scheme implementation and for decision making. The methodology adopted by the government is to prepare various formats and ask for a periodic status report from the nodal or executing agency in the field. This methodology of calling for a status report on paper or fax or by phone is cumbersome and time-consuming. The departments of the Government of Maharashtra (India) approached NIC from time to time to prepare an application to automate this work of collecting information. Many monitoring systems were developed for collecting the status of projects from districts offices. From the experience gained in designing and developing these monitoring systems, a new system 'Status Information Management system by NIC' (SIMNUC) was conceptualised, designed and developed. This article describes various features and benefits of using SIMNIC for creating electronic formats and its usefulness to government departments as part of the e-governance initiative.

Introduction

Domain knowledge of the working of government departments and their various schemes empowered NIC Mumbai to prepare a quick data collection application. These applications were developed and designed for a specific requirement, and are a base for the SIMNIC design. The need was to use existing structures in the application and implement a data collection application screen. SIMNIC is a dynamic format-building and data-collection application; it generates the data entry screen on the fly, data collection and compilation are done as per the format design parameters. It addresses the need of preparing and circulating status/progress data collection in the Government for its various projects/ schemes so as to facilitate effective decision making. SIMNIC also ensures easy and timely submission of data from various departments. The multi-lingual interface feature enables data collection in scripts of most languages as per the Eighth Schedule of the Government of India. The application is supported by Unicode or C-DAC iPlugin which is an Activex control programme from C-DAC India for Indian language computing

Objective

- Enable government departments to build their data collection (MIS) formats on the fly for timely collection, compilation of data from online departments spread across state/nation.
- Presenting the format to end user for data entry.
- Building departmental hierarchy, which can be used across all formats of the department.
- Maintain and present previous data.
- Dynamic query for retrieval of very specific data.
- Support for Indian language scripts.
- Consolidation of data for various levels in hierarchy.
- Access to citizens by guest login (if required) facility.

Background

NIC Maharashtra has been providing computer and communication support to the state government from 1987. It has computerised the State Secretariat and Collector offices; developed various applications for offline information collection from districts; compiled the information at state level; and if required, helped in information dissemination to the government of India by e-mail or delimited data files. Applications such as the Twenty Point Programme, fortnightly godown stock information collection system, community TV sets monitoring system, CM Relief Fund accounting system (showing daily receipts of donations district-wise at the time of the Latur earthquake) are used extensively at the state level.

In the year 2002, the Employment Guarantee Scheme (EGS) project was taken up to collect data of monthly expenditure and attendance of weekly labourers at various EGS works at 33 districts. The non-availability of uninterrupted connectivity constrained the EGS application to be designed as a client-server software at the district level and web-based at the state level. At the district level, once data entry is done, files containing data in XML tags is prepared and sent to the state server as e-mail attachments. A demon programme written in Java was used at the state server to extract data from e-mails and dynamically insert them in respective table(s) of data base at the State NIC server. The data from the data base is then presented at state headquarters on LAN by a web application.

The MAHANET – a V-sat-based disaster management network of the Government of Maharashtra, providing uninterrupted high-speed e-mail, videoconferencing, fax and wireless connectivity – was upgraded with funding from the government of India in 2003. The up-gradation of MAHANET was used as an opportunity to further enhance the EGS application to a web-application for online data collection. Use of C-DAC tools made it possible to use the application in Marathi. The application was further generalised for

other languages, hierarchies and departments as a complete functional system. The system is also used for collection of data about freedom fighters. In 2006, SIMNIC was further modified to accept Unicode data.

Analysis

The technical documents of all the applications developed for collecting and compiling information offline was studied. Similar tables and their attributes were grouped together; changing/ variable entities were gathered. It was observed that in most applications, location (hierarchy) master, code master(s), and some tables for storing actual data were the main three groups of entities. The tables of actual data could be combined if the column sequence/ names were known. This problem is well addressed by XML.

Design

The design of SIMNIC is depicted in the entity relation diagram shown in Fig. 1.

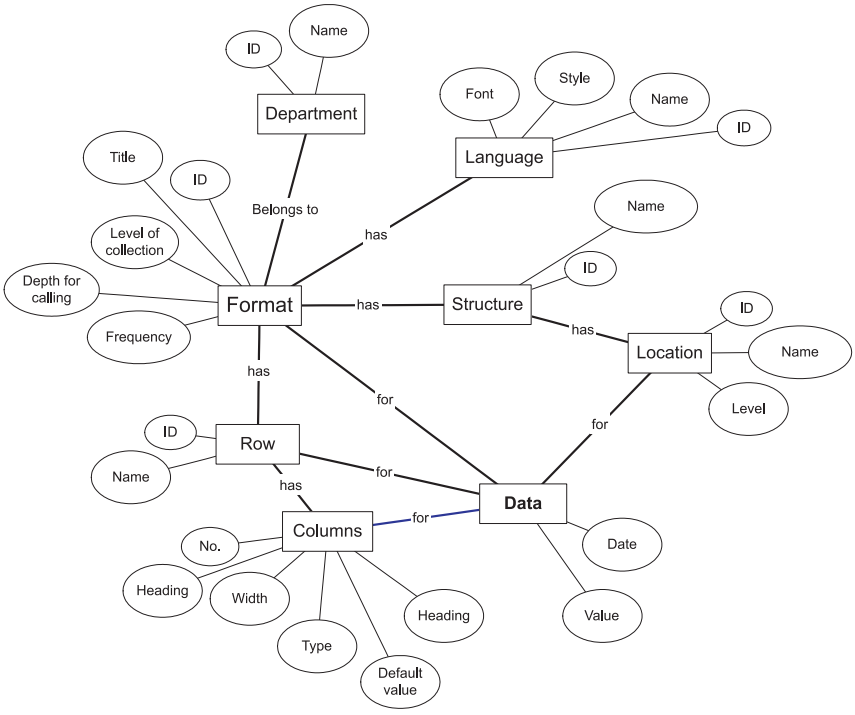

Fig. 1 *Entity relation diagram for SIMNIC*

Each format to be collected is broken into four major parts – title, rows, column and hierarchy of data collection. Various attribute data such as frequency of collection, language, column data types, format/ row/ column headings, aggregate/derived columns are defined.

Methodology

Use of latest technology and open source: Open source technology was used to build the project. This reduced development and deployment costs. The proven J2EE architecture was used to build the web application. MySql data base is used for data base support. The use of XML tags made the system flexible enough to accommodate heterogeneous information. The application was developed and deployed on a Jakarta Tomcat application server.

Building e-format: The desired MIS format is scrutinised and all building blocks such as title, reporting hierarchy, rows, columns, headings, computation formula etc are understood. Separate modules are prepared for collecting all this information, keeping in mind, that other departments might have similar requirements. Building an e-format is nothing but identifying this information, placing it in a format and feeding it to SIMNIC. A data entry screen is then prepared on the fly when a user desires to enter data in a particular format.

Inline department: The hierarchy of offices is different for different departments of government. Therefore, a need arose to add a module for capturing these hierarchies. Many a time, the same hierarchy has different coding structures in use (election, census, revenue divisions, transport authority etc.). A separate set of entities for structure, their hierarchy (levels) and actual inline departments/offices of ministries/departments participating in SIMNIC are defined. XML tags were used for storing data like name of district in English, Hindi, Gujarati etc. with same location identifier.

Time limit: The reports are needed weekly, monthly, and sometimes quarterly. Therefore it was required to fix different time-limits for allowing data entry in such formats, say 2 days, 5 days and 10 days. A module was added to capture the time limit (in days) for each format. This module allowed the administrator of the format to force end users to submit information in the stipulated time and also prevents the manipulation of previously entered data.

Data entry: One of the main goals was to prepare the data entry screen based on the MIS/ data collection format needed, allow only the authenticated user to enter data for his location in the desired format within the allowed time limit. Also, the data entered should be validated for data type, length etc. The user is to be allowed to see his or her old SIMNIC data, but

barred from changing it. Similarly, data for a future date should not be accepted.

Compilation and queries: This was the most complicated module. It had to gather all the information about a format from different entities and prepare the search screen on the fly. Also, the report is generated using all these entities and actual entered data. They are required for location, region, specific period etc. Query options are needed for providing filters on the actual data for matching data in each column of the SIMNIC format.

Data linkages: In the SIMNIC development cycle, there was a need was found to get data from some other format by providing links. Links are defined to point to a value in some other format having similar reporting structure, e.g., census data, say, population, areas etc. are constant (for a large amount of time – 10 years or more) and are required in many formats. A good system should avoid repeated data entry so as to maintain consistency. The feature of linkages was foreseen in the first version of SIMNIC itself. In the future, these linkages will be used to prepare dynamic analysis/summary reports from MIS data of other formats. This should enable grouping of data by period, locations and rows.

Participating departments: As the SIMNIC is becoming more and more popular amongst MIS users, formats are being grouped according to departments/ministries. Formats are attached to departments for grouping under the department name. The department names are again stored in different languages using XML tags keeping single department ids.

Access control: The number of modules increased from 4–5 to 10–12. Because of this large growth, well-defined access control is required for remotely administrating/operating the site using different roles and authorisations. The access to SIMNIC is primarily grouped under SIMNIC internal users, department users, structure users and format users (Fig. 2)

These users need to be provided with different areas of access:

- Administrator: A format administrator is a user who needs to set attributes of format, its rows and columns and also set time limits, assign passwords. Therefore restricted access to these modules is needed so that these tasks are accomplished without touching other formats data.
- Operator: An Operator is a user who, if required, makes data entry in the SIMNIC format, and also compiles reports from data by querying the data. This user requires access to all data of a particular format and also authority to retrieve data as per the various search criterions.
- Guest: The Right to Information Act of the Government of India requires some information be made available to citizens. Hence, the concept of the guest user came into place. The guest user requires access to data restricted to compilation of data (if the format admin-

istrator desires so). This is done by setting a blank guest password, so that the public can see reports based on the data entered in SIMNIC format. Also if a guest user is to be restricted, then the administrator can give the password to guest and circulate it amongst the internal users wanting to see SIMNIC reports.

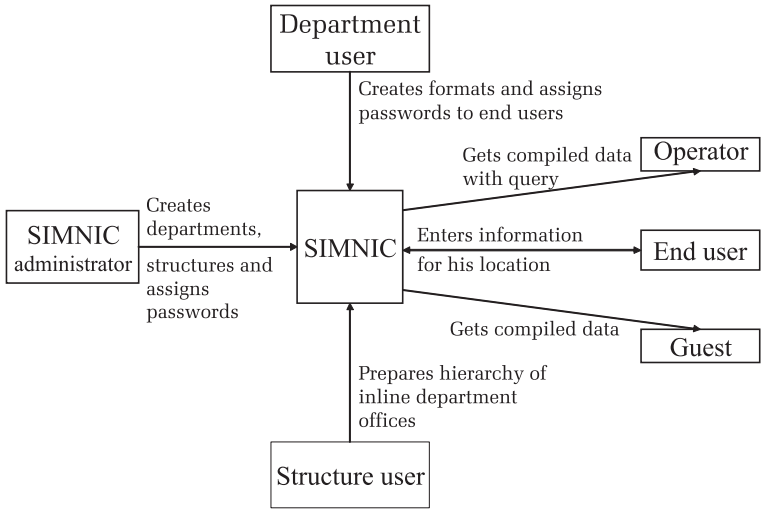

Fig. 2 *User approach by category and login*

- End users at location/office/places: These are the inline department users (at various levels of hierarchy), who once logged in SIMNIC, are presented the desired SIMNIC formats. They also generate limited reports for self and inline offices. This is the module used for actual feeding of MIS data. So, all consistency checks are forced, such as data type, time limit, etc.
- SIMNIC internal user: SIMNIC is a web application deployed at a remote location from the developer, end user and administrator. Therefore, any change in access control, addition of departments, structures, formats or passwords are to be done remotely. The internal user does these things as well as maintaining SIMNIC internal settings such as scripts and dictionary.
- Department user: Departments users are empowered to create various formats, thereby eliminating the procedure of approaching SIMNIC administrator for each and every format. The user also set passwords for his formats and the users of the formats. Password maintenance (creating, informing concerned personnel etc.) has increased since departments started participating in SIMNIC.
- Structure user: The growing number of departments have very specific hierarchy, therefore hierarchy maintenance is also given to various

administrators who maintain and keep the hierarchy updated. This generally involves assigning codes to various inline departments as per their level in the hierarchy.

- Passwords: Since many users access SIMNIC for a variety of roles, it is necessary to build a robust password module, that appears different to different users. The administrator gives passwords to the department/ format administrator and the administrator/operator of structures. The administrator of a format can set passwords for inline offices/places, operators and guest users. A module is also required for generation of passwords and sending them over e-mail to various end users.
- Languages**:** An increasing number of Indian languages are supported by SIMNIC, therefore a separate module was required by the SIMNIC administrator to manage properties for various language scripts available in SIMNIC. This includes font names, font size and downloads of font file names.
- Sorting and ordering: The hierarchy has different levels and data is required to be sorted/ ordered as per the levels and within the levels as per office/location names. As the levels are not fixed and reports are needed for different levels, a separate sort module is required to sort the location table as per office names at every level. This enabled viewing of reports alphabetically, irrespective of the level at which it is generated.
- Dictionary: The dictionary is maintained for converting English labels to Indian language labels. It enables presenting the interface in major Indian languages supported by SIMNIC. As and when a new language is added to SIMNIC, the dictionary needs to be updated.

Result

The aforementioned methodology was adopted after fine-tuning various processes during the course of application development, for accommodating minute but required variants such as multi-level heading, computed columns, masking of column values etc. The SIMNIC application build was found to be acceptable for simple formats such as EGS weekly data collection and the complex formats of the Directorate of Municipal Administration. New features are added to de-centralise the role of the administrator to a supervisory position only. The SIMNIC was easily scaled for Indian language scripts of C-DAC in ver 2.0 and further for Unicode in ver 3.0

Case study

Weekly labour attendance: The first department to use SIMNIC was the Employment Guarantee Department (EGS) of Government of Maharashtra.

This department captures weekly labourers' attendance on EGS works in 33 districts of the state. Every monday morning, the district EGS offices enter actual data for the completed week. The compilation is available at the state centre by noon.

Freedom fighter information: Freedom fighters residing in various districts of Maharashtra state receive monthly pensions from the state/central government for their participation in various freedom movements. Data of around 9,000 freedom fighters who receive pension are collected in a format put on SIMNIC for quick retrieval of information by the General Administration Department.

12 MIS formats for the Directorate of Municipal Administration: 248 municipal bodies in the state need to submit monthly/quarterly information regarding physical and financial progress of various schemes. This information is grouped in 12 different MIS formats and is available to DMA at Mumbai for further analysis and submission to the government of India.

(All the above SIMNIC formats are in Marathi language)

Training

NIC has its presence in every district of India with offices in each collectorate, state secretariat and ministries. Awareness training is provided to under secretaries and desk officers of all departments in the state government. NIC officials in the district train staff at the line department/offices. The Directorate of Municipal Administration arranged training at 12 districts for 121 municipal bodies in the state from which they are expecting information in MIS formats.

Replication

Being a web application, SIMNIC has large acceptance in government departments. Request for SIMNIC implementation have been received not only from state government departments but also from central government departments for the possibility of using it as a quick MIS for collection of information from 550 districts of India. The Department of Agriculture and Cooperation has prepared two formats 1) Extension Reforms (ATMA) Scheme Activity Monitoring and 2) Macro Management of Agriculture Scheme, and is looking for monthly/quarterly collection of data from all districts of India.

A lifecycle of any data collection format in SIMNIC is shown in Fig. 3.

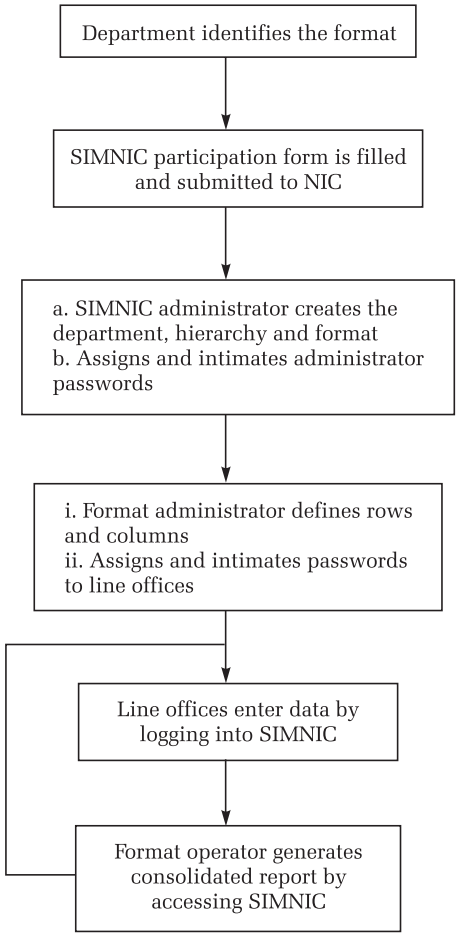

Fig. 3 *Lifecycle of SIMNIC format*

Security and Availability

The very rigid access control, authorisation and authentication checks at every page has enabled SIMNIC to put very heterogeneous things together while still avoiding any unauthorised changes in data. SIMNIC is hosted in secured and high end server with SAN (Storage Area Network) at iNOC (Integrated Network Operations Centre) of NIC HQ, New Delhi (India) for round-the-clock availability.

User Interface

The user interface is dynamic and the options available are presented as per the role of the logged-in user and the language selected. The user selects the language from the home page, and the user interface is changed with labels into selected language. A Marathi user interface is shown in Fig. 4.

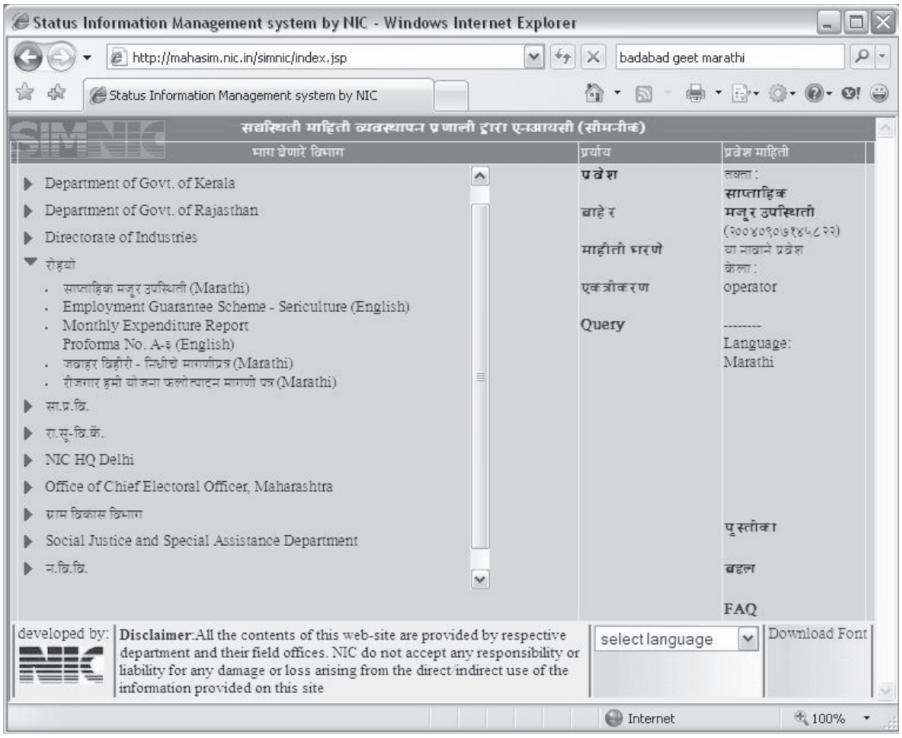

Fig. 4 *SIMNIC interface in Marathi Language* (http://mahasim.nic.in)

Concluding Remarks

SIMNIC has enjoyed acceptance in government departments. Any government department can make use of this application to get their timely reports from fields offices geographically spread across the state or nation. Increasing number of participating departments has tested the capabilities of SIMNIC towards meeting their requirements. All organisations have a set hierarchy, and therefore SIMNIC suits these organisations that collects periodic data from line offices.