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One Organization's Use of Lotus Notes

The Housing and Development Board (HDB) of Singapore was established as the country's public housing authority. Its mission is to provide high-quality affordable housing and to build communities. Apart from its main role, HDB is in charge of many other tasks, ranging from enforcing parking regulations in HDB developments to leasing shops to vendors. Information technology is the major tool that supports the attainment of HDB's goals.

The HDB's Office Automation (OA) initiative is a series of projects aimed at raising HDB staff productivity (see [2]). A key OA project is the Integrated Office System (IOS), which facilitates organization-wide communication and provides shared access to information and documents. The IOS was implemented with Lotus Notes software in 1993. Chosen for its full application development environment and integrated imaging and voice functionality, Notes also facilitates the development of department filing registries with free-text search capabilities. In addition, Notes supports the Microsoft Windows interface and Novell LANs as well as shared documented databases. Initially, HDB's Notes infrastructure configuration included: three hub servers; 17 departmental servers; 19 branch servers; 17 database/image servers; 12 ID servers; one communications server; one voice server; one OCR server; one optical jukebox; 18 scanners; and about 3,000 licensed users.

HDB's Notes applications can be divided into three levels: corporate applications, departmental applications, and interorganizational applications. By mid-1996, the first two were in use. Corporate applications are classified as core, business, or other. The initial five core applications are maintained by the corporate IS department (ISD). They are the HDB Email Database, which enables internal and

external email communication; the Electronic Filing Registry, which enables the efficient filing, retrieval and management of documents; the HDB Circulars Database, which enables the preparation, filing and retrieval of intra- and inter-department circulars; the HDB Papers/Reports Database, which enables HDB staff to prepare, distribute and save all papers/reports designated for discussion, distribution or approval; and the HDB Meeting Template Database, which facilitates the preparation, dissemination, tracking and access to documents pertaining to meetings. The HBD has four major corporate business applications (systems).

The press reply system routes complaints or stories published in local newspapers to departments, keeps track of the status of department replies, and retrieves previous information and replies, as well as generates detailed analysis and reports for top management.

The helpline system routes records of calls received through a quality service management employee, distributes to departments images of letters addressed to the quality service manager, keeps track of the status of department replies, retrieves previous information and replies, and generates detailed analysis and reports for top management.

The staff information system provides access to staff information and information needed to locate and contact HDB officers.

Workflow management has improved since routing and tracking information to all employees is possible at relative ease and low cost.

The telephone inquiry system enables the storage and retrieval of policy and procedures information to facilitate the public enquiry services regarding sales, resale, rental, and management of residential, commercial, and industrial properties.

Other corporate applications include the Parliamentary Debates Database, which maintains the extracts from the Singapore Parliamentary Debates Official Report in the *Government Gazette* pertaining to HDB; the Medical Benefits Scheme Database, which enables quick identification of the medical benefit program for each employee; the HDB Employees' Collective Agreement Information Database, which contains information regarding the latest terms contained in the Collective Agreement; the HDB Conduct and Discipline Rules Database, which disseminates information about the provisions of the HDB Conduct and Discipline Rules; the HDB Financial Regulations Database, which disseminates information to all HDB staff about HDB's financial regulations; and the HDB Staff Benefits Database, which disseminates information regarding staff benefits.

In addition to corporate applications, departmental applications are available thanks to the relative ease of developing such applications, mainly by end users. Examples developed in the Secretariat Department (an administrative department providing such services as public relations to human resources management) include:

- *Sectional Leave Database*. When key employees know when they will be away (on leave, excluding medical), they key-in the leave dates from their workstation (1/2 day or more) and where they can be reached.
- *Staff Suggestion Scheme Database*. This application allows staff to submit suggestions for improvements. The suggestions are evaluated electronically.
- *Staff Bungalow Database and Application*. Employees can apply for short-term use of HDB-owned recreation bungalows using the workflow capability in Notes.

Applications in the Contracts and Administration Department, which manages the interactions with several hundred vendors, include:

- *Quotation Information System Database*. This system enables faxing of documents and sharing of information; requests for quotations are emailed or faxed to vendors.
- *Finalization of Accounts Database*. This database helps monitor the finalization of payments for contracts.
- *Contracts Department Senior Officers Leave Tracking Database*. This system permits the sharing of information about when a senior employee goes on leave.
- *Contracts Directory*. This database lists all the current and past contracts, including essential information.
- *Construction Industry Development Board Form Database*. This includes the forms prepared by contract officers when a bid is closed.
- *Contracts Department Meeting Tracking Database*. This database helps control section's meeting actions.
- *Duty Roster Database*. This database helps plan the swapping of duties among employees.

In addition, a Contract Administration System provides particulars of each contract, and expiration of maintenance agreements. It also includes images of all warranty certificates.

User Reaction

Feedback about the IOS from users has been generally positive and management support has been strong [1]. Users' comments solicited in interviews cite many advantages. For instance, Notes makes information access, retrieval, storage, consolidating, editing, and manipulation easier and more efficient. Information sharing is enhanced through the replication of databases. Workflow management has improved since routing and tracking information to all employees is possible at relative ease and low cost. Procedures to

increase information accuracy and efficiency, such as removing the need for white-boards to display who is on leave, have been streamlined. Information requests have been enhanced due to mail-enabled applications. Document imaging is also possible as documents are scanned into and stored in databases.

Finally, there is increased security, since servers, databases, views, and forms are all under Notes' tight security. Advance planning is also possible. Users have experienced cultural, technological, and psychological changes, and have been able to cope with these changes. One cited disadvantage was the fact that users must be prepared and trained relatively well in Notes in order to reduce resistance to implementation. Initially, only half of the more senior employees went through the vendor's training. The other users were trained in-house.

Users and developers have been positive about Notes. Advantages cited include the relative ease of learning how to develop basic applications, the relatively short development cycle—from a few days to a couple of weeks per application—and the fact that users' suggestions and feedback can be incorporated into the applications with relative ease and can be done on a continuous basis.

However, some pitfalls of Notes were also cited. These include applications being difficult to build due to insufficient basic training. Since Lotus Notes is not a programming language and relies on macros, it is inflexible in programming. Hopefully the next release will reduce the problem. In addition, the fact that Notes is not a relational database and relies on third-party software to integrate data obtained for sharing is also cited. For example, Visual Basic is used as a development tool for end users to integrate and update programs. Finally, transferring data from a third-party application to Notes may be problematic.

Problems also exist when implementing Notes' routing capability. The lack of documentation (there is no user application developer's guide) and the fact that the Notes concept is new both to users and developers are also cited as problems. Moreover, the IOS as a whole is undergoing a consolidation as the core applications are rolled out. Seeing the benefits, many departments are extending the system to more users. Going beyond the basic core applications, efforts now focus on developing and implementing

image-enabled systems. HDB is also beginning to use Notes for inter-organizational applications through the Internet and is planning an integrated Notes-Internet-Intranet system.

Conclusion

It has been about four years since Notes was implemented. Based on our interviews, we conclude that several key factors have contributed to its success. One is the government's desire to provide Singaporeans with the best possible dwelling conditions at affordable cost. Notes clearly enhances this objective. Championship provided by the HDB's CIO, the reengineering of the ISD [3], and top management's desire to provide superb customer service to about one million customers have all contributed to the success of the implementation.

Finally, such factors as the lengthy feasibility study that preceded the introduction of Notes, involvement by the vendor in installation and training (although the perceived amount of training was inadequate), the strong support of the IS department, and the magnitude of a system large enough to justify many support activities also contributed to its success. When the project was planned, there was no indication the Internet would surface to provide several of Notes capabilities. However, the ease with which applications are being built by end users, along with workflow capabilities, database replications, strong security, and more, convinced HDB to continue using Notes. Whenever possible, Notes is now being integrated with the Internet, especially for external cooperation and communication with organizations without Notes infrastructures. **C**

REFERENCES

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