

Pilot Installation of a Document Management System at  
the Food and Agriculture Organization of the United  
Nations Regional Center for Latin America and the  
Caribbean (FAORLC)

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## Introduction

An Electronic Document Management System (EDMS) is a software tool for storing and retrieving materials that are received within an organization. The software can manage materials such as email messages, WORD documents, Excel spreadsheets, Powerpoint presentations, images of faxes, and images of scanned documents. When a document is stored in the EDMS, meta-level information about it is also stored. This information describes the content of the document, such as the creator, the date of creation and/or modification, the nature of its content, its size, and so forth. Both the meta-data about the document and the contents of the document itself are indexed by the EDMS. Users of the EDMS can search the EDMS for words that appear inside the document, such as the contents of a cell in a spreadsheet, or information about the document, such as "all documents created by a particular employee on a specific date". Many of these software systems also support so-called *workflow management* or *document routing* as part of their capabilities. This feature allows documents to be forwarded electronically to individuals, with due-dates assigned, follow-up messages generated, and status reports issued to the originator of the routed document.

The Food and Agriculture Organization of the United Nations Regional Office for Latin America and the Caribbean (FAORLC) previously conducted a study of the user need and requirements for an EDMS. See [1].<sup>1</sup> This current report discusses a pilot program to install and customize the selected EDMS software package for the FAORLC environment. It also discusses the issues that arose as a result of installing the program, including hardware and software considerations, training problems, and testing issues. The report concludes with an evaluation of the installation and the software system.

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<sup>1</sup> Numbers in square brackets refer to items in the Bibliography.

## Software Selection

A number of EDMS software systems were evaluated for possible adoption for the pilot installation in Santiago. Based on the requirements set out by Cooper [1], the *Documentum*, *DocuShare*, *DOCS Open* (formerly known as *PC Docs*), and *Document Management Extensions for Microsoft Exchange* products were evaluated as candidate EDMS systems. The *Keyflow*, and *Ultimus* software packages were reviewed for their document workflow capabilities.

The *Documentum* (<http://www.documentum.com/>) software offers the standard structure for a full scale EDMS: a repository in which the documents and the indexes to the documents are stored, a server program which retrieves information from the repository and dispenses it to users, and an administrator program which allows system functions to be controlled. The repository is stored and maintained by a relational database management system (DBMS) such as *Oracle* or the *SQL Server*. The DBMS products are quite complex to install, operate, maintain, and administer and often require a dedicated piece of hardware on which to operate. The features offered by *Documentum* are excellent, comprising the full set needed for all EDMS functions, including workflow management and a document repository. After a review of its functions and features, and a hands-on review of the system in Santiago, it was decided that while the system was excellent, it was more than was needed for the pilot program. The decision was based on the fact that FAORLC was trying to determine a *proof of concept* of using an EDMS, not a complete and final installation of the system. The price tag of the system, including installation and training, amounted to around US\$350,000, which far exceeded the planned budget. In addition to this amount, additional server hardware would have to have been procured to support the relational database management software.

Information about *DocuShare*, another EDMS reviewed for this pilot project, is available from <http://www.xerox.com> by searching for the product name at the site. Like *Documentum*, *DocuShare* has a large number of features, but in contrast to *Documentum* it does not require a database management system to store the document repository. If it has one available, however, the functionality of the system is increased. One of the key requirements of an EDMS is that it works within the existing computing environment at FAO, and this means it must work with the *Microsoft Exchange Server* and *Microsoft Outlook* client programs, which it does not. The system was installed and tested at FAO Santiago and it was found that there was limited ability to add customized fields to the meta-data and that the installed system lacked a facility for the user to check out a document to use outside the system, then

check it back in once work was completed. At the time of testing it was not possible to obtain any pricing information because pricing policies had not yet been established for Latin America. If one were to estimate, the cost of the system would likely be around US\$30,000. The main reason, however, for not selecting *DocuShare* is that it does not integrate well with Exchange, Outlook, or Office, and it lacks some basic EDMS functionality.

*DOCS Open* (formerly *PC DOCS*) from Hummingbird Communications Limited (<http://www.hummingbird.com/>) is another full-featured system. The base product is called *DOCS Open* and there are a series of add-on products that add management of images and allow routing of documents to its base functions of meta-data searching, content searching, document version control, document check-in and check-out, and other standard features. By itself, *DOCS Open* maintains its own document store, but one can use the system with a full-featured DBMS to add additional capabilities. Likewise, *DOCS Open* works alone in encapsulating documents with meta-data when it stores them in its repository. Like *DocuShare*, it is not intrinsically integrated with Exchange, Outlook, or Office. It has another add-on product, called *DOCS Interchange for Microsoft Exchange* which *publishes* documents to Exchange. This is interpreted to mean that Exchange is not tightly integrated into *DOCS Open*, rather when a document is to be used in an Exchange environment, it is encapsulated and then transferred to Exchange. This additional step results in additional overhead for the system, and presents difficulty for the user trying to understand the procedure. In addition, to support the workflow processing functions, *DOCS Open* implements a proprietary messaging system which is not compatible with the Exchange messaging system. Thus users would be compelled to work with two parallel messaging structures rather than one. A demonstration of the system was provided by a representative in Chile. While the cost of acquisition was modest compared to *Documentum* (about US\$50,000), the lack of good integration with Exchange was a major deficiency that prevented its adoption for the pilot study.

Two workflow packages were also evaluated: *Keyflow* and *Ultimus*. The *Keyflow* package from the Keyfile Corporation (<http://www.keyfile.com>) is not an EDMS, but rather a package designed to manage the flow of electronic forms and to create forms and routing schemes. It lacks the fundamental part of a EDMS, namely a document repository, but it has excellent routing and workflow processing capabilities. To use the routing capability, one creates an electronic form or document and designs the workflow—the flow of the electronic item through the organization. This flow may be as straightforward as sending the document to a set of recipients in a specified order. Or it may be conditional, based on the actions that one or more recipients take on the item. Due dates may be assigned, and status reports generated. The initiator or the administrator may view the status of documents in real time. *Keyflow* has all these capabilities. The software was installed at the FAO

RLC site and tested. It proved to be a capable contender should the EDMS that is selected not have workflow capabilities integrated into it. The price quoted for the product was also reasonable; about US\$10,000-20,000.

*Ultimus* is another workflow product. (See <http://www.workflowzone.com/>). The product has all the standard features of a workflow system including some originals: if the user wishes, the system can take advantage of an organization chart and the individuals who are assigned and responsible to organizational units to assist in routing. One route that can be specified is a queue. In this case when an item is sent to a queue, any person authorized can remove the item from the queue for handling. When the flow of an item through a route is initiated, *Ultimus* sends email notifications to the user who will receive the item. Then the user accesses the document with his/her browser and performs the necessary tasks on it. *Ultimus* can be integrated with the full set of Microsoft BackOffice products, including Microsoft Exchange, Microsoft SQL Server and Microsoft Transaction Server. It also fully integrates with the Internet Web environment, enabling workflows with off-site staff or counterparts. The product was evaluated via an on-site demonstration and found to have more relevant features and functions than *Keyflow*. The cost of acquisition is estimated at about US\$60,000.

The final product reviewed for the pilot project was the *Document Management Extensions for Microsoft Exchange* (DME) from 80-20 Software (<http://www.80-20.com>). The product is billed as extensions to the Microsoft *Exchange* system, and it is true to its name. The system is tightly integrated into *Exchange* and takes advantage of all the functions and features of that system. In addition, of course, it adds the standard features of an EDMS, such as a repository (using the *Exchange* system to file documents), an index of meta-data and document contents, version control, document modification history information, stored queries, templates to facilitate storing materials in the repository, customizable fields for describing document content, and check-in and check-out facilities. The system does not have a sophisticated workflow system, nor any forms creation capabilities. Although the price is modest, about US\$10,000, it is being deployed in organizations with more than 50,000 users. It requires no additional hardware or software to run, again relying on the *Exchange Server* for many of its functions and features. Based on a comparison of its features and functions with the other products, as well as the stated system requirements [1], it was decided to select the DME system for the pilot installation. The DME does not include workflow control, and thus a piece of workflow software will have to be selected for that part. Nevertheless, either of the two workflow packages discussed earlier could fill the bill and the total cost of both pieces of software would be less than one of the full-featured EDMS systems described above.

## System Installation

The *Document Management Extensions for Microsoft Exchange* (DME) software package was chosen for the pilot installation. A contract was negotiated to supply the software and send two employees of 80-20 Software to Santiago, one for one week and one for two weeks, to assist in the installation. The total cost of this contract (software and consulting) was US\$20,000. No additional hardware, software, or communications systems were needed for the installation.

Installation of the system proceeded in stages, beginning with agreement on the nature of the customization of the software itself to meet the identified needs at RLC. A major issue was deciding whether the default fields that were available in the system to externally identify a document were sufficient for RLC. A document has two parts, one is the document itself—the content of the document. This can be a spreadsheet, a Word document, a database, or the like. In addition, meta-data identifies the content of the document. The meta-data and the document itself comprise a unit that is then filed in the DME document store. The first issue to decide was whether the default meta-data fields were sufficient.

Several decisions had to be made about customization of the meta-data. They included whether the variables that DME defines are adequate, what new variables should be added, and what values are permissible for each variable, be they DME defined or newly defined.

The structure of the DME system is object oriented. One of the fundamental objects in the system is a *document*.<sup>2</sup> The key properties of a document include a document id, the name of the document, history information, the location in the file system where the document can be found, an indicator of whether the document can be opened for reading, writing, or both, version information, and check-in and check-out information. In addition, each document object has an extendable set of predefined and user defined fields for identification. The predefined fields include (among others) the author name, date the document was created, person creating the document (which may be different than the author), modification date, document status (e.g. draft), document type, document extension (e.g. .xls), keywords, and who checked the document out (if at all).

Table 1 summarizes the default fields supplied with DME and the fields that were added in the RLC installation. The document ID, document name,

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<sup>2</sup> The discussion that follows generalizes the names of objects in the DME system to associate them more closely with the concept of document properties, which may be more familiar to the reader than objects.

document type, status, author, created by, reference, and keywords fields are all standard in the system. The groups, priorities, distribution, and registry code fields were added. While the document type, status, author, and created by fields existed in the default configuration, the values that could be inserted in these fields were altered. Table 2 shows the values allowed in the document type field. In this case an extensive list of types of documents appropriate to FAO was prepared and installed. When a user selects the document type of *Administrative Form*, a list of all the FAO Administrative Forms appears from another list. This allows the user to select which particular FAO form is being stored in the EDMS repository. The list of forms (as of March 2000) is given in Appendix A.

The *Status* field is another field that existed in the default installation but was customized for RLC. Its values are given in Table 3. As can be seen, the status codes indicate the current state of the document, such as in draft, in review, published, or archived. In addition to giving information about completed works, these codes can be used to indicate what further action is to be taken when the document moves to the next organizational unit to process it (workflow). However, as the system lacks message routing capabilities, real workflow automation is not possible.

Both the *Author* and *Created by* fields store information about the person who originated the document. The user fills in the "Author" name from a pick list of all FAO email addresses maintained by the Exchange system. This feature, of using the FAO email list in an EDMS context, shows the power of the close coupling of the DME system with Exchange. As the list of Exchange users changes, the pick list changes automatically. It is also possible to enter in an author name from outside the Exchange environment as simple text. The *Created by* field is automatically inserted as the name of the person creating the DME entry; in other words it indicates the person who puts the document into the DME system, drawing the information from the active MAPI profile on the machine.

The *Groups* field stores the organizational group within FAORLC whose interests most closely coincide with the content of the document. These include the Forestry group, the Fisheries group, or the Policy Assistance Unit. See Table 4. Likewise, the *Priorities* field allows the user to select one of the nine major FAO priority areas to which this document belongs, along with appropriate sub-areas. Table 5 lists these areas.

Documents, or rather pointers to the documents in the DME, can be forwarded to DME-enabled individuals or mailing lists through the Exchange mail system. The *Distribution* field allows the document to be identified by the people who will receive it or take action on it. The Distribution field opens on a list of RLC Exchange users at the time of installation. This list will have to

be manually updated from time to time to include any changes in the Exchange recipients list.

And finally, the *Registry Code* field allows the Registry Unit within RLC to assign a unique subject identification category to the document in accord with general FAO registry practices.

**Table 1**

**Existing and Customized Meta-Data Fields for DME**

## Table 2

### Values of the Document *Type* Field

Administrative Forms  
    *See Appendix A*

Agenda

BTO Report

Circular  
    Administrative Circulars  
    Communications Circulars  
    Correspondence Directory  
    Director-General's Bulletin  
    DSA Rates  
    Geographic Distribution Table  
    Key Information Circulars  
    Mission Memorandum  
    Manual Sections  
    Vacancy Announcements

Contract  
    SSA  
    Authors Contract  
    Retired  
    Consultant  
    RLA

Curricula Vitae/Personal History Form

Declaration

Distribution List

Email

Fax

Invoice

Letter

Meeting Document

Memo

Minutes  
    Administrative Committee  
    Field Program Committee  
    Food Security  
    International Commerce  
    Management Team  
    Natural Resources  
    Program Committee  
    Publications Committee  
    Rural Development

Multimedia Files  
    Audio clip  
    Image  
    Video clip

Nota verbal

## Table 2 (Continued)

### Values of the Document *Type* Field

Note for the File  
Other  
Personal  
Presentation  
Project Document  
    GCP  
    TCP  
    Trust Fund  
    UTF  
Publication  
    Article  
    Bibliography  
    Monograph/Book  
    Newsletter  
    Press Release  
    Other  
Quotations  
Record (Paper)  
    Nota Verbal  
Speeches  
Spreadsheet  
Technical Report

## Table 3

### Values of *Status Codes* Field

Approved  
Archived  
Draft  
For Action  
For Archive  
For Approval  
For Information  
For Payment  
For Review  
In Review  
Not Approved  
Not Paid  
Paid  
Published  
Reviewed

## Table 4

### Values of *Groups* Field

Group Name	Description
RLCA	Agriculture Group
RLCD	Office of Deputy Regional Representative
RLCE	Economics and Social Group
RLCI	Fisheries Group
RLCO	Forestry Group
RLCP	Policy Assistance Group
RLCR	Operations Branch
RLCS	Sustainable Development Group
RLCX	Management Support Unit
SLCD	Office of the Subregional Representative
SLCM	Multidisciplinary Team
SLCP	Policy Assistance Unit

## Table 5

### Values of Priorities Field

CA-Internacional-Acuerdos agrícolas regionales y bilaterales  
CA-Internacional-Negociaciones comerciales multilaterales  
DR-Derechos de propiedad-Procesos de privatización  
DR-Programas de alianzas y asociaciones productivas  
DR-Reforma a las instituciones agrarias-Apoyo a instituciones locales  
DR-Reforma a las instituciones agrarias-Decentralización  
DR-Reforma a las instituciones agrarias-Reconstrucción de instancias públicas  
RN-Manejo Local de Recursos Naturales  
RN-Recursos-Agua y suelos  
RN-Recursos-Arboles y bosques  
RN-Recursos-Biodiversidad y recursos genéticos  
RN-Recursos-Pesca  
CA-Internacional-Normas y regulaciones-Codex Alimentarius  
SA-Acceso a Alimentos-Empleo e ingreso rural  
SA-Acceso a Alimentos-Programas alimentarios y nutricionales  
SA-Acceso a Alimentos-Programas de apoyo al ingreso rural  
SA-Estabilidad en la oferta alimentaria-Ayuda de emergencia  
SA-Estabilidad en la oferta alimentaria-Estabilidad de precios  
SA-Estabilidad en la oferta alimentaria-Inventarios agrícolas  
SA-Estrategias por país- por región- por sector rurales  
SA-Producción Alimentaria-Acuicultura  
SA-Producción Alimentaria-Agroindustria y Postcosecha  
SA-Producción Alimentaria-Animal Producción Vegetal y Protección Fitosanitaria  
CA-Internacional-Normas y regulaciones-Convención Fitosanitaria  
SA-Producción Alimentaria-Extensión e Investigación Agrícolas  
SA-Producción Alimentaria-Producción y Sanidad Animal  
SA-Producción Alimentaria-Riego  
SA-Programa Especial para la Seguridad Alimentaria (PESA)  
CA-Nacional-Competitividad (control de calidad- información mercadeo)  
CA-Nacional-Impacto de la liberalización comercial  
CA-Nacional-Infraestructura y servicios comerciales  
DR-Derechos de propiedad-Agua y tierra-Catastro y sistemas de información  
DR-Derechos de propiedad-Agua y tierra-Instituciones de apoyo (registro de propiedad)  
DR-Derechos de propiedad-Agua y tierra-Legislación Agropecuaria- de aguas y forestal

## Hardware and Software Configuration

The next step in the installation of the DME was to review the existing hardware and software configuration at RLC and make decisions on where the DME document repository and the DME software would reside.

Table 6 summarizes the major hardware and software system at RLC. The machines RLC\_S01 and RLC\_S02 form what is referred to as the HP Cluster and are logically related. This cluster is the primary data store for RLC with two large RAID5 disk systems attached. RLC\_S03 runs the Microsoft Exchange system, stores Exchange Public Folders, and handles the processing of all user mail. RLC\_S04 serves as a backup to RLC\_S03 in case of failure, and also handles a number of message switching and communications functions. RLC\_S04 and RLC\_S03 are used as the primary and back-up domain controllers, as well as running the network services DNS, WINS and DHCP.

With the high redundancy and capacity of the HP Cluster, it was originally planned to install the DME system on this platform. However, discussions with the software providers revealed that neither the DME itself, nor the supporting indexing server, Fulcrum Knowledge Server, were “cluster aware”, or capable of performing appropriately in a “fail over” situation.<sup>3</sup> It was therefore decided to install the DME and Fulcrum programs on another platform and to store the document repository on the cluster, along with the indexes to the repository. The final configuration leaves DME and Fulcrum on a new NT platform, RLC\_S06<sup>4</sup>, while the Fulcrum index and the DME document store reside on the cluster. During the testing phase of the installation, both the DME and Fulcrum programs and the DME store and Fulcrum indexes were installed on the RLC\_S06 machine, so as to not cause any possible conflicts with the production environment.

The software installation process was relatively straightforward. With Exchange and Outlook already installed on RLC\_S06, the DME Server was then installed, followed by the Fulcrum index Server, the DME Web Interface Server, the DME Client program on each client machine, and DME Web Interface programs on client machines. The configuration of the system involved specifying where the DME and Fulcrum stores were to reside, and where the Exchange Server resided. The main DME configuration file was altered significantly with all the new values for existing DME meta-data fields, and new fields with new FAORLC values. New Exchange folders were created to store the DME routines. Problems occurred in having the latest

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<sup>3</sup> The Fulcrum Knowledge Server is a separate program employed by DME to index each document in the store, to maintain the index structure, and to support searching of the store.

<sup>4</sup> This server is in fact just a standard PC installed with the server software. It is strongly recommended that a more robust server hardware platform with redundancy be procured for this purpose.

version of various data link library routines and the correct NT service packs installed. They were not serious, but did require time to resolve. In general, the installation went relatively smoothly, requiring no changes to the configuration of the Exchange Server or Outlook client configurations.

The client software installation is very simple, requiring no operator inputs at all if Microsoft Office and an appropriate MAPI profile exist on the machine. The client software automatically detects the DME server on the network and gets all necessary configuration information from this server. The client software consists of several components. There is a "Document Manager" icon, which is installed on the desktop, and which opens a standard Windows Explorer style window to show a set of predefined DME searches, such as "My Documents", "Recent Documents", "Favorites", and "Personal". Next there is a system tray icon, which opens the DME search and retrieval interface. Finally, the client software modifies all Microsoft Office applications in a subtle but important way: when the user selects the "save" or "save as" options, rather than seeing the usual Microsoft save screen, with a view of the file system, a new DME document entry dialog box appears, allowing the user to fill the appropriate document property fields and store the document to the repository. The DME can be bypassed, if desired, by selecting the "Tools, Save to File System" option. The "Open" file function in all MS Office applications is similarly modified.

## **Table 6**

### **FAORLC Hardware and Software System Configuration**

## **Software Customization and DME Data Store Testing**

Many issues arose once the DME Server and Client software was installed and testing began. They include issues related to the Microsoft Office suite of programs, the DME mass migration and mass update tools, document profile templates and stored searches, fax documents and scanned documents, Web access to the DME, and ODMA compliance.

### **Microsoft Office-Related Issues**

The Office suite of programs forms the backbone software at RLC. Users employ Word, Outlook, Excel, and PowerPoint on a daily basis. The DME software was tested with all of the Office products to see that they worked as expected.

Users of the Word program have the option of saving a version of their current document so that they can revert to a previous version if necessary. The DME system also has version control which works the same way as Word – the first time a document is saved one can not save a version of it but rather just save the document itself. The second time the document is saved, one has the option of saving a version. The problem, with both Word and DME, is that when one saves the “first” version, the “original” document is overwritten. This was flagged as an important training issue. The critical installation issue was to globally shut off the ability in Word to save versions, and inform users that they should employ the DME function of the same name. A workaround was found to remove the “version” option from the Word “save” menu.

### **Mass Migration and Mass Update Tools**

The DME software comes with tools that allow existing documents to be moved into the DME store in batches. The mass migration tool allows the user to select documents by a directory, subdirectory, or set of files, and have them moved into the repository in one operation, not individually. The advantage of this approach is that it expedites filling the repository. The disadvantage is that meta-data properties of each document are inherited by globally specifying the parameters for the batch of documents to be migrated. For example, if one were to move into the store all the files in the subdirectory C:\MYFILES\CORRESP, the meta-data for each file would contain the file

name and the *reference* field would contain the path from which the document came. All the other fields in the meta-data could only be filled in once – only one specification of, say, program area could be made for all documents checked in with the mass migration tool. This suggests that for accurate filing, each document needs to be moved individually unless the directory structure is highly indicative and sufficient to describe the contents of all documents in the directory.

The DME mass update tool allows the contents of one meta-data field to be changed in all selected documents. This is similar to a *replace all* operation in a word processing or spreadsheet program. One specifies the text to find and the field in which to find it, and indicates what text should replace it. The only difference is that in the DME context, the mass update tool is operating on meta-data not the contents of the document. For example, one use of the tool might be to change all the registry codes in all documents from one code to another based on a change in the registry code structure. In the testing of the DME system, there was an occasion to change the author name on a set of documents from one author to another. Unfortunately, the tool failed. The vendor is working on a revised version.

## **Templates and Stored Searches**

To speed storing a document in the repository, the DME offers a feature which allows the user to specify a customized set of default values to be used to fill in meta-data properties. This is very useful because it speeds completion and thereby encourages the user to store documents accurately. The template feature was tested and found to perform as specified. Training in the use of customized templates will be take place to encourage their use.

Another similar feature is one to customize the process of document retrieval. When a user searches the DME for documents, certain search criterion are specified, which correspond to the properties of the document object discussed earlier in this report. Once the search is completed and the list of documents that match the search displayed, the user can select a document for viewing or modification. The search that retrieved the documents can be saved and named for future use. Individual users can save searches, and the DME system administrator can create searches that can be used by all. Again, this is a very useful tool, one that allows the user to retrieve, for example, only his or her documents, only those documents created yesterday, etc. This feature was tested and worked well. The only difficulty was in storing public searches, but the problem was solved by changing the permissions on an Exchange public folder.

The stored searches feature is of fundamental importance and helps in addressing many user acceptance and training issues which might normally arise with the introduction of such a system. The default stored searches, such as “My Documents” or “Recent Documents”, can be supplemented by personalized stored searches, such as “All documents of type *Administrative Circular* and *Vacancy Announcement* in the past one month”, making it very simple for users to navigate in the new system. The stored search feature is also essential to the basic workflow capabilities of the system. For example, if a document is stored with a status of *To Review* and a distribution of “David Dion”, then the user David Dion needs to have a stored search that looks for all documents marked for “David Dion”, *To Review* in the past few days. With a stored search, this is nearly automatic and is very close to workflow automation.

## **Fax Documents and Scanned Documents**

Two types of documents may come into an organization in a non-electronic form: faxes and printed documents. The DME system has the ability to handle paper documents, and RLC is working on receiving faxes electronically, instead of in paper form.

At the time of the DME installation, RLC was installing the RLC\_S07 machine (see Table 6) as a fax server. This machine, with its specialized hardware (Brooktrout fax board) and software (*FaxServe* from Computer Associates), will have the capability of receiving faxes on a number of incoming lines, storing the faxes in a digital form, and forwarding them electronically to the appropriate individuals for action. The documents would come to the users' Outlook mailbox, where they could be filed in the DME. The DME system is designed to accept this form of material. While this feature was not available for testing with the DME, it promises to improve productivity in handling faxes and integrate well with the DME. The fax server allows users to transmit faxes of documents they have prepared electronically as well. Users could prepare a fax document, file it in the DME, forward it to the fax server for transmission, and receive an electronic confirmation that it was transmitted.

RLC is also acquiring an Hewlett Packard *HP Digital Sender 9100C* scanner. This device scans documents in color and black and white and connects directly into the Exchange network. After a document is scanned it is sent directly to an Exchange folder as an email message with a PDF, TIFF, or PCL scanned image attachment. This piece of equipment will be installed in the RLC Registry and will be used to convert paper documents into electronic images. The device scans documents, creates an electronic file of the scanned images, and forwards the file to a selected location, in this case the

Registry. The plan is for the Registry to receive the item, and then store it in the DME. The hardware was selected for its compatibility with the DME, and according to the DME technical representatives, adding the scanned images to the DME store is an integral part of the DME system.

### **Web Access to the DME**

The DME system allows access to the repository through terminals connected to the RLC servers at the RLC facility. In addition, users can access the DME repository when they are connected to RLC through the Internet via a Web browser. The user first connects to RLC, logs onto Outlook, and then accesses the DME system. All functions available locally are available via the browser. This feature was tested and worked well. For the time being, for security reasons, external access to this service has not been enabled.

### **ODMA Compliance**

The Open Document Management Application Program Interface (ODMA) specifies a protocol by which application programs can communicate with one-another. The ODMA protocol makes it possible, for example, for a user to drag a document from the File Manager's list of files to the DME's icon on the screen and have the DME begin the process of adding the document to the DME repository. Currently, there are two versions of the ODMA standard, Version I and Version II. DME supports filing of documents from applications such as Word, Adobe Acrobat, Corel WordPerfect, and the Visio drawing program, which are ODMA Version II compliant. The meaning of this is that when documents of these types are dropped into the DME, it is able to fill in the meta-data automatically. With other document types, the process is not automatic. This includes Outlook messages, and HTML documents. The 80-20 vendor has built a special interface to allow Excel documents to be stored by dragging and dropping, but Excel is not ODMA Version II compliant.

## Training Issues

Part of the process of installing the DME involved developing a plan for introducing the concepts of an Electronic Document Management System, and specifically the *Document Management Extensions for Microsoft Exchange* system to FAORLC. Beginning in March 1999, a year before the software was selected, open meetings were held in which staff were introduced to the EDMS concepts and in which they could ask questions. Demonstrations were given at these meetings of systems so users could see how they appeared on their screens. Throughout the evaluation and software selection phase of the project, the Information Technology Officer at RLC was meeting with a small committee to discuss EDMS issues and keep them informed of progress on the project. Once the pilot software package was selected, the Information Technology Officer (ITO) assembled an installation team consisting of two representatives from the vendor (80-20 software), the author of this present report, and the ITO himself. He also assembled a team to develop training materials, consisting of a person within FAORLC who currently conducts staff training, and another FAO employee from Mexico City.

The installation team began installing the software, and in approximately six working days the production system was in place. The sequence of events to bring this to completion involved setting up a test machine, installing the software on it, verifying that the system worked as expected, and then moving the software and empty data file structures to the production environment. Creating a test machine was valuable for all involved, since it allowed testing and training for the team without fear of jeopardizing the production environment. In addition, the test environment allowed testing and experimentation with the document property fields and other customizations possible with the system. All custom fields eventually adopted were first tested on a significant set of real documents on the test computer system configuration before deployment.

The work plan for the training team was to develop an introductory course on the DME, consisting of five meetings of one hour each meeting. In addition, this team developed a training manual in Spanish which described all the customized document properties and other features of the system. Training began during the second week of software installation with a general meeting in which all staff at RLC were invited to attend a brief demonstration (30-40 minutes) of the operation of the DME. Attendance was voluntary. A scripted presentation of basic DME concepts was presented and there was a lively discussion period following the presentation. It was clear that the attendees were interested in the system and saw its power. Subsequent to that meeting, the ITO selected ten key employees (identified as early and proficient adopters of technology) to attend the first training course. That

class will be followed by other classes to gradually introduce all staff to the system.

The first course covers EDMS concepts, the nature of meta-data and document encapsulation, searching the DME, storing materials in the DME, and the nature of the customized fields created for the RLC installation of the DME. It is expected that follow-up training will be required once users have become more familiar with the system and the administrators have time to evaluate user behavior and acceptance.

## Future Implementation Issues

One important issue in DME implementation is how the system could be used throughout the area covered by RLC, namely Latin America and the Caribbean. FAO has a central regional office in Santiago, with a subregional office in Barbados, and other offices throughout Latin America. These offices are in constant contact with Santiago, have their own electronic resources, and share electronic resources with Santiago. Thus an important issue in DME implementation is how access to the DME repository could be provided to all the offices in the region.

Currently, the Exchange Server in Santiago and the Exchange Servers in Rome and Barbados replicate folders and files. In the Exchange System, on a continuous basis, information about certain files and folders that are maintained in Rome in its Exchange Server is replicated in Santiago on its Exchange Server. The updating takes place as file and folder contents change or as new files and folders are added or deleted. Replication is defined in this context as maintaining an index on the Santiago machine of the folder structure, but not making copies of the files themselves on the Santiago machine, unless so specified by the respective Exchange administrators. For access to the files to be assured, a data communications connection must exist between Santiago and Rome and an explicit folder contents replication configuration defined. Obviously, this replication is not the same as what is normally considered a distributed database – one in which the master database is partitioned, perhaps by the sub-unit creating and storing the materials. In a partitioned database a search of the entire database may result in retrieval of materials from multiple physical sites.

In Exchange, all sites belonging to the same organization replicate the Public Folders structure. This is automatic and cannot be disabled. Thus the Exchange Servers in RLC and at the subregional office in Barbados have the same Public Folder tree structure as in Rome, as they are all sites of the entire FAO organization. For the contents of a specific folder to be replicated, an administrator at the host site must configure the folder for replication to one or more other sites. If a folder's contents are not replicated, then users in another site cannot see the contents whether the connection between the sites is in operation or not.. DME replication piggy-backs on Exchange replication and is therefore as robust as Exchange replication.

A test was made to see how replication of the DME system would operate. Two machines were set up, one the existing test system, and the second

another test system. The primary test system was configured to replicate its DME files to the second machine. A number of possible types of connection are possible between Exchange Servers, and the appropriate connection is a function of the bandwidth and quality of the communications line. They include site replication, when the bandwidth is high, and X400 Message Transfer Agent connection when the communication lines are unstable or low speed. The X400 connector was used for replication, and the test proved satisfactory. It demonstrated that the DME system could be installed at a remote location, and by using the facilities of Exchange Servers at each end, the indexes and data store could be maintained and be made accessible.

## Evaluation and Conclusions

The installation of the *Document Management Extensions for Microsoft Exchange* software package was successfully customized and installed at the RLC offices in Santiago. Training has started and is proceeding. Users understand the potential of the software and are interested in it.

As with any software package, there are problems and deficiencies. One major component of an EDMS is missing from the DME product, good workflow support. This problem can be solved by the selection and purchase of one of the workflow products discussed earlier. Even with the purchase of the DME system and a workflow product, the total software cost will be small and performance high. Other deficiencies include relatively inadequate mass migration tools, and incomplete handling of ODMA objects.

From a cost-effectiveness standpoint, the software represents a very good value. The purchase price is modest, the software required no additional hardware purchases, it integrates extremely well with Exchange, Outlook, and Office, and offers remote access through the Internet. Since there are installations of the system with more than 50,000 users in an Exchange/Outlook environment, there is no reason to believe that the system at RLC will not operate well as the repository grows in size. Final evaluation will depend on user acceptance, and possible problems with the system that can only be discovered over time.

## Bibliography

1. Cooper, Michael D. *User Requirements and Institutional Needs for an Electronic Document Management System at the Food and Agriculture Organization of the United Nations Regional Center for Latin America and the Caribbean (FAORLC)*. Technical Report. School of Information Management and Systems, University of California, Berkeley, Berkeley, California 94720-4600, March 1999, 86pp.

# Appendix A

## FAO Administrative Forms

Fx97	Facsimile Transmission
Fx97f	Télécopie
Fx97s	Transmisión Facsímil
Letthd97	Letterhead
Mem97	Office Memorandum
Rsli-f97	Fiche De Transmission
Rsli97	Routing Slip
Tsli-f97	Fiche De Transmission/Message Téléphonique
Tsli97	Transmittal Slip
LeaveRLC	Leave Application
Adm1e	Declaration Of Loyalty
Adm1f	Déclaration
Adm1s	Declaración
Adm2e	Request For Official Visiting Cards
Adm2f	Demande De Cartes De Visite Professionnelles
Adm2s	Peticion De Tarjetas De Visita Oficiales
Adm3e	Groupe Life Accident And Disability Insurance (GLADI) - After Service Coverage
Adm6e	Complimentary Slip (English Version)
Adm6f	Complimentary Slip (French Version)
Adm6s	Complimentary Slip (Spanish Version)
Adm6i	Complimentary Slip (Italian Version)
Adm11e	Personal History
Adm11f	Notice Personnelle
Adm11s	Formulario De Antecedentes Personales
Adm19e	Application For Language Allowance - Non Official Language
Adm23e	Group Life, Accident And Disability Insurance (GLADI)
Adm23f	Assurance - Groupe Vie, Accidents Et Invalidite (GLADI)
Adm23s	Seguro Colectivo De Vida, Accidentes E Invalidez (GLADI)
Adm24e	Furniture And Equipment Requisition
Adm26e	Document Processing Request
Adm28e	Education Grant Claim
Adm28f	Demande D'indemnité Pour Frais D'etudes
Adm29t	Certificate Of Attendance And Statement Of School Expenditure
Adm31e	Library Acquisition Request
Adm33e	Request For Exemption From Registration Tax Or Leases
Adm35e	Request For Conference Staff
Adm36e	Circular State Letter Submission Form
Adm37e	Request For Education Grant Advance
Adm37f	Demande D'Avance Sur L'Indemnité Pour Frais D'Études
Adm39e	Request For Salary Advance
Adm39f	Demande D'Avance Sur Traitement
Adm40e	Request For Administrative Forms (For Field Use Only)
Adm41e	Report Of Equipment Purchased Locally From Imprest Account
Adm41f	Rapport Sur L'achat Local De Matériel Au Moyen Du Compte D'avances De
Caisse	
Adm46e	Request For Temporary Secretarial Assistance
Adm48e	Overtime Request
Adm53e	Stationery And Supplies Requisition
Adm55e	Leave Application

Adm55f Demande De Congé  
 Adm56e Accrued Annual Leave Memorandum  
 Adm60e Designation Of Beneficiaries (Money From FAO)  
 Adm60f Designation De Beneficiaires (Sommes Dues Par La FAO)  
 Adm60s Nombramiento de beneficiarios (Fondos Pagaderos Por La FAO)  
 Adm62t Report Of Accident, Illness Or Death  
 Adm66e Terms Of Employment  
 Adm66f Conditions D'Emploi  
 Adm66s Condiciones De Empleo  
 Adm69e Details Of Meeting Held Away From Headquarters  
 Adm75e Application For Vacancy (For Use By Staff Members Only)  
 Adm79e Request For Parking Permit  
 Adm83e Report Of Loss, Damage, Or Unserviceability Of Property (M.S.503)  
 Adm83f Déclaration De Perte, Détérioration Ou Non-Fonctionnement De Matériel (SM 503)  
 Adm85e Request For Replenishment Of Imprest Account  
 Adm85f Demande De Réapprovisionnement Du Compte D'avances De Caisse  
 Adm96e Memo Re. Imprest Account Returns  
 Adm96f Memo Re. Imprest Account Returns  
 Adm101e Covering Letter To Field Purchase Order  
 Adm101f Lettre D'Accompagnement Au Bon De Commande De Terrain  
 Adm101s Carta De Presentación Del Pedido Local De Compra  
 Adm103e Quality Assessment Of Short Term Professional Staff  
 Adm104e Quality Assessment Of Consultants/Contractors  
 Adm105e Inventory Of Furniture, Household Effects, Automobiles And Valuables  
 Adm110e Change Or Claim Notification  
 Adm110f Déclaration De Changement De Situation  
 Adm111e Request To Place Personal Long Distance Telephone Calls  
 Adm112e Request To Place Official Long Distance Telephone Calls  
 Adm113e Request For Telephone Facilities  
 Adm114e ICSC Job Description  
 Adm118e Submission To: Professional/General Service Staff Selection Committee  
 Adm119e Booking Of Meeting Room  
 Adm120e Session Programming Form  
 Adm121e Request For Enrolment In Withdrawal From 1% For Development Fund  
 Adm126e Secondment Report  
 Adm132e Imprest Account Reconciliation  
 Adm132f Etat De Concordance Bancaire Du Compte D'avance De Caisse  
 Adm139e Salary Allotment Instructions  
 Adm139f Instructions Pour Le Versement Des Émoluments  
 Adm144e Separation Clearance For Consultants And Professional Short Term Staff  
 Adm160e Post Description  
 Adm161e Request For Establishment Action:- New Post/Ext. Of Post/Abolit. Of Post  
 Adm162e Request For Establishment Action: - Upgrad./Downgrad./ Revision Of Post Description  
 Adm170e Disbursement Voucher  
 Adm170f Attestation De Paiement  
 Adm190e Probationary Performance Appraisal Report  
 Adm196e Contract For Technical Writers, Technical Editors And Illustrators  
 Adm196f Contract Pour Rédacteurs Techniques, Éditeurs Techniques Et Illustrateurs  
 Adm196s Contratos De Autor, Editor Tecnico O Ilustrador  
 Adm200e Staff Associations/Union Payroll Deduction Of Membership Dues  
 Adm201e Performance Appraisal Report - Field Project Personnel  
 Adm201f Rapport D'Evaluation Professionnelle - Personnel De Terrain  
 Adm201s Informe De Evaluacion Profesional - Personal De Proyectos De Campo

Adm202e Performance Appraisal And Achievement Record - Headquarters And  
 Established Offices - Professional Staff  
 Adm203e Performance Appraisal and Achievement Record - Headquarters and  
 Established Offices - General Service Staff  
 Adm206e Form Owner Agreement  
 Adm207e Form Version Release Agreement  
 Adm210e Office Information Services - Data Dissemination Agreement  
 Adm212e Request For Internet Access  
 Adm213e Vacancy Announcement (Professional)  
 Adm213f Avis De Vacance De Poste  
 Adm213s Anuncio De Vacante  
 Adm214e Reimbursable Loan Agreement  
 Adm214f Accord De Prêt Remboursable  
 Adm214s Acuerdo De Prestamo Reemborsable  
 Adm215e Waicent Internet Services - FTP Data Dissemination Agreement  
 Adm216e Internal Vacancy Announcement  
 Adm217e Request For Remote Computer Access  
 Adm218e Request For Establishment Sub-Committee Action - Field  
 Adm219e Computer Training Request Form  
 Adm220e Request For Authorization To Despatch Telex/Fax Messages (Automated  
 System)  
 Adm221e Staff member's training needs  
 Adm222e Group Training Needs Form  
 Adm223e Waicent Internet Services - Data Dissemination Agreement  
 Adm224e Translation and Revision Contract  
 Adm225e Waicent Internet Services - Mail List Agreement  
 Adm226e Payment Request Form - Consultants  
 Adm227e Consultant Contract Checklist  
 Adm228e Payment Instructions (Consultants)  
 Adm229e Consultant Change Of Address Instructions  
 Adm230e Vendor Record Update Request Form  
 Adm231e Payment Instructions (Staff Members)  
 Adm232e Payment Request Form - General  
 Adm233e Accounts Payable Referral Form