DIAS, DIGITIZED IMAGE ARCHIVES SYSTEM CONNECTED TO WWW

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Keywords:

Database, Multimedia, Distributed Database, Client server, Image Archive

Klíčová slova:

Databáze, multimédia, distribuovaná databáze, klient - server, archiv obrazů

ABSTRACT

Already during the implementation of Network Wageningen the need for storing and exchanging data increased with the number of connected co-workers and students. In order to enable data storage and data exchange Wageningen Agricultural University drafted the project: 'Distributed Storage and Retrieval of Digitized Images'. This project was funded by SURFnet BV as part of a joint-project 'Storage, Retrieval and Processing of electronic documents' in which nearly all Dutch universities participated. The aim of the DIAS-project was to construct an images database for the Agricultural University. DIAS was to have a user-friendly interface which could also serve as a WWW database server. An important condition was that large investments on hardware and/or software had to be avoided. Existing software

licenses and the available network infrastructure should be used. The desired environment was realized in a Paradox for Windows-application as client for an Interbase images database server which also could be retrieved from WWW. This database server runs on a Silicon Graphics INDY. The user application provides a flexible and tunable archiving mechanism. Each department can continue using the archiving terms they used formerly. Images are bundled in collections. Some collections are expected to contain several thousands of images. After some time the number of collections per department will increase. For each image, view rights can be defined which then overrule the view rights for the collection. View levels are: world-wide, campus-wide and defined. The definition of the defined level is according to a Banyan Vines address-(streettalk) list. The digitized original images are compressed to JPEG format and a thumbnail by software. Both the thumbnail and the JPEG-file are stored in the database. The display of the stored images is done by software decompression. The implementation of the database started as a distributed Paradox database. General information is stored in joint-tables. The digitized images are physically stored as close as can be to the department to avoid possible network overload. The WWW-database started as a copy of the Paradox database. Only by redefining table-aliases the users at Wageningen Agricultural University will be guided transparantly through the database-server. The WWW-retrieval is guided by a form from which the SQL-statement on the database will be generated. Retrieving images will be restricted to those marked with world-wide view rights. After retrieving the textual information one can get the specific images.

Anotace:

Pro usnadnění ukládání a výměny dat řešila zemědělská univerzita ve Wageningenu projekt „Distribuované ukládání a přenos digitalizovaných obrázků“. Tento projekt byl financován SURFnet BV jako součást projektu „Ukládání, výběr a zpracování elektronických dokumentů“, na kterém participují skoro všechny holandské univerzity. Cílem projektu DIAS bylo vytvoření databáze obrázků pro zemědělskou univerzitu. DIAS měl mít uživatelsky příjemný interface, který by také sloužil jako WWW databázový server. Měly být využity stávající licence na software a disponibilní síťová infrastruktura. Požadované prostředí bylo realizováno v Paradoxu pro Windows jako klient aplikaci pro databázový server obrázků, který by také mohl být natažen z WWW. Tento databázový server běží na INDY, Silicon Graphics. Uživatelská aplikace poskytuje flexibilní mechanismus pro archivaci. Obrázky jsou

seskupeny v kolekcích. Kolekce mohou obsahovat až několik tisíc obrázků. Pro každý obrázek mohou být definována práva pro prohlížení a zrušit tak práva nastavená pro celou kolekci. Jsou následující úrovně prohlížení: celosvětová, univerzitní a definovaná. Definice poslední zmiòované úrovně je v souladu se seznamem adres Banyan Vines. Digitalizované originální obrázky jsou zkomprimovány na formát JPEG. JPEG soubory jsou uloženy v databázi. Při zobrazení uložených obrázků dochází k softwarové dekompresi. Implementace databáze začala jako distribuovaná databáze Paradoxu. Obecné informace jsou uloženy v propojených tabulkách. Digitalizované obrázky jsou fyzicky uložené tak blízko příslušnému oddělení jak jen to je možné, aby se předešlo možnému přetížení sítě. Databáze WWW začala jako kopie databáze Paradoxu. Uživatelé na univerzitě ve Wageningenu budou vedeni transparentně databázovým serverem na základě předefinování tabulky alias jmen. WWW výběr je doprovázen formulářem, ze kterého bude generován SQL dotaz na databázi. Vybírat obrázky budou moci jen ti, kteří budou mít celosvětová prohlížecí práva.

NETWORK WAGENINGEN

The network Wageningen (fig.1) connects some 100 departments of the Agricultural University which are widely spread over the town, by 20 km glass-fibre cable. About 3000 pc's within the university and 50 servers, Unix-workstations, Dec Alpha workstations and a Vax-cluster, are connected in the network. Students can be connected via coaxial televisioncable from their studenthomes. Provided services are Campus-wide software licenses for wordprocessors, spreadsheets, databases, programming languages, etc., a Campus Wide Information System, an archiving system for digitized images, etc.

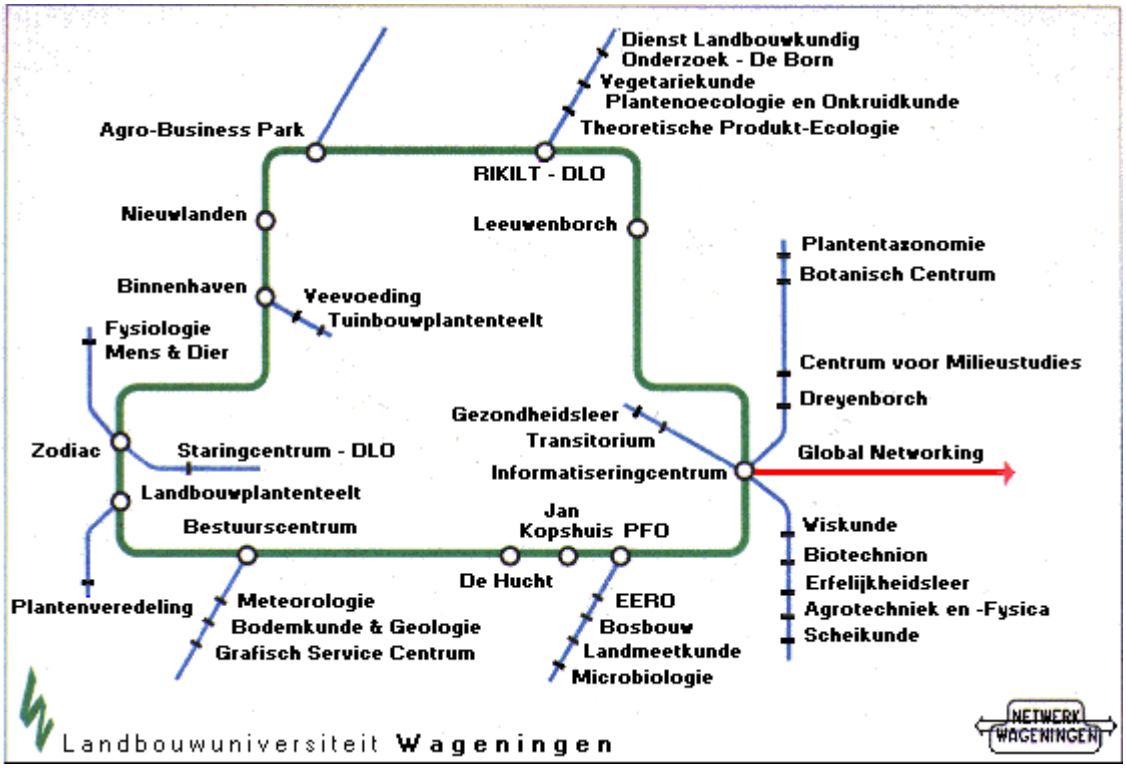

Figure A

DIAS

Slides are a very important tool for teaching. Archiving them can be done by merging a set of slides to a collection based on a common characteristic e.g. title or date of the lecture. A more fine-tuned archiving system is necessary to distinguish between different slides. This can be achieved by using keywords. To obtain a flexible keyword system all over the university, a set of keywords is fixed for a collection. But a keyword can be used in more than one collection. Retrieval will use the categorisation of the collection first and furthermore the keywords for that specific collection. A keyword set can be predefined for a collection . If not, the defined keyword set can grow on use.

A Paradox for Windows application was build to support the archiving function. To discharge the user of struggling with picture formats, the JPEG-format was choosen for storing the digitized images. Slides have to be digitized in one of the supported formats, e.g. TIFF, GIF, BMP, PCX, WMF, EPS, WPG, TGA, DCX, PICT, PCD, JPG,... The application will convert the digitized image to a suitable JPEG and thumbnail, both to be stored in the database. The conversion was tuned to screen display. To retain high quality prints or slides the original material should be used or the original high resolution scan. The Accusoft Image Format

Library is used for conversion of the images. Displaying images is provided by a DLL based on VT-Express.

First a Paradox database was used as backend for the Paradox client in a Banyan Vines network. The central part of the database which contains the description and the keywords is stored in a central file-service. The images (the JPEG and thumbnail data) are stored at a file-service of the department owning the image data. For all other users of the network read acces is set by the local system administrator to allow them to view the stored images. The image itself is only transferred if the user double clicks the thumbnail. Figure 2 shows the diagram for this implementation. Local view rights are defined using the Banyan Vines streettalknames including lists and wildcards.

WWW connections will be made to an Interbase database which is a copy of the Paradox database (fig. 1 part 3,4,5,6). The images are not spread in this database on different cpu's like the pc-version.

WWW-users are allowed to view images and their corresponding data if the specific image is assigned world-wide view right.

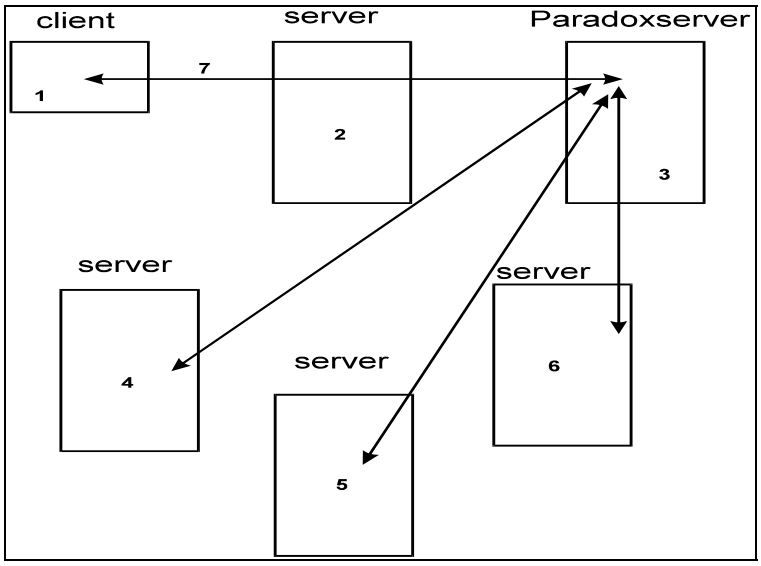

Figure B

1.	client PC	2,3,4,5,6,	pc server (Vines fileserver)
3.	DIAS main server, common tables	4,5,6.	DIAS image server
7.	Vines network connection to DIAS software and main data		

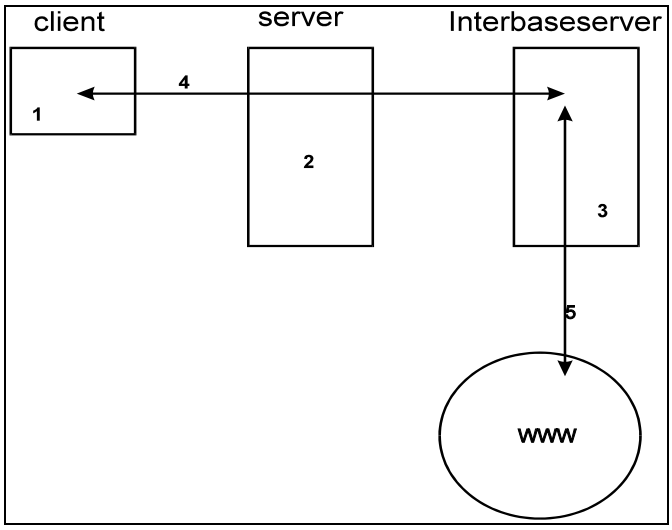

Figure C

1. client PC
2. Vines Fileserver
3. Database server (Interbase)
4. Vines network connection to DIAS software (2) and data (3)
5. WWW connection to Dias

Figure 3 shows the near future configuration. By changing the route from the Paradox application to the Interbase database instead of the Paradox database the Image server will be filled immediately on use. At the moment no distribution of the images data is used but should not be considered impossible in the future. The rights mechanism will act the same. Local clients are allowed to view images labelled with local rights, WWW clients can retrieve images with world wide view rights. To be able to handle copyright the view rights for images must be proper defined. In future information can be sold via WWW. To use the available information for making money the view rights can be used.

WWW and money[(1)]

Some ways of digital payment are just coming in use. They are based on the traditional paying systems based on debet and credit where the digital equivalent of money, checks, vouchers and so on is used. The biggest problem faced is security. The vendor sometimes can view all customer information on e.g. creditcards and purchasing behaviour. But even in an encrypted environment specialists are able to pick up numbers of creditcards or passwords

because of the similar place where this information shows up in different transactions during transfer. Two big consortia, Visa/Microsoft and MasterCard/Netscape announced both working on a payment system, but not available until late 1995. No definition of the announced systems is revealed yet. Lot of WWW-sites are discussing electronic payment systems and related problems.[2,3,4,5]

(1) Singleton, A. Cash on the Wirehead, BYTE, june 1995, 71-78

(2) Janson, P, Waidner, M,.Electronic Payment over Open Networks, http://www.zurich.ibm.ch/Technology/Security/publications/1995/JaWa95.dir/JaWa95e.html

(3) Solinsky, J. An Introduction to Electronic Commerce, http://nearnet.gnn.com/gnn/meta/finance/feat/sol.html

(4) Chaum, D. Achieving Electronic Privacy, http://ganges.cs.tcd.ie/mepeirce/Project/Chaum/sciam.html

(5) htttp://www.base.com/gordoni/web/security.html