



Digital Historical Maps

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Enclosures

Appendix 1: Sitemap

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Appendix 2: Production of image files

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1 Summary

In the Digital Historical Maps project a new Internet service has been developed for presenting a wide range of examples of old maps and descriptions from the archives of the National Land Survey of Sweden, the National Survey & Cadastre in Denmark and the University of Greifswald in Germany.

The service is almost complete: the Web-application has been implemented and will be maintained in a stable operating environment, the image files have been stored in a scalable, long term storage and management routines have been established. The service will be completed by the creation of administrative routines for handling orders and billing. These routines will be based on input from the project.

2 Project Results

2.1 User demands

2.1.1 The basis for the development

Before the development of the prototype system was begun an investigation of user demands was carried out in the three countries that are involved in the project. The investigation covered present and foreseeable future use of the materials, requirements regarding the functionality of an Internet service and issues such as price and rights to use the materials.

2.1.1.1 Present and future use of the information

Many authorities in the three countries use historic landscape information for heritage protection and for nature conservation and restoration purposes. Historical landscape information is also used in courses and lectures that are arranged to develop a better understanding of history, continuity and change in the landscape and environment.

The materials offer new and important ways of conveying knowledge. Historical maps make it possible to “read the landscape”, understand relationships and analyse changes in the economic and physical environment. This, in turn, can stimulate a sense of responsibility for one's own landscape/environment and thereby contribute to the development of a sustainable society.

The extent of current and future developments in the use of historic material in the three countries differs due mainly to the varying extent of the map coverage and of difficulties in interpreting the material. In this context it should be pointed out that only a very small part of the German material has been included in this project.

The future use and potential value will of course also depend on the extent to which maps are made available over the Internet. The data collected in the DHM project represents only a very small percentage of the total number of maps. Much more material will have to be made available before the system can be used by planning authorities and others for developing practical and systematic solutions to their specific problems. The standards and the interface that have been developed in the

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project will, however, make distribution of map materials possible for such purposes, which is a service that has not previously been available.

2.1.1.2 User requirements concerning functionality

Potential users have emphasised the need much more efficient search routines than are currently available in the register-based systems. There is a requirement that search should be possible both via a register and a map browser. As the material often lacks co-ordinates, the latter can, in some cases, be problematic.

To facilitate identification and retrieval of maps there must be good quality overview maps. An overview map is needed both for the search process and for obtaining a broad impression of a selected area, for example the general character of the landscape.

This must be supported by zoom possibilities as text and details can be difficult to see on an overview without enlargement. The survey showed that normal use included interpretation of land-use and landscape elements, often represented by very small details and very thin lines, such as the Swedish "laga skifte" enclosures.

As users often need to study several maps at the same time, access must be as rapid as possible. Currently it is possible to order diapositives or CD-ROM files but the routine is slow and it is difficult obtain an overview of the material without visiting the archives. If the DHM project is to replace this system it must provide a better alternative such as a tile-type zoom solution where screen-sized parts of the maps can be downloaded and viewed. This technique already exists. If only smaller parts of the maps are accessed at a time it would be possible to kept down the size of files whilst still allowing detailed viewing. In this way, time-consuming downloading of whole maps, which is not always needed by the user, can be avoided. Full colour resolution is not necessary at this level, although it is often required for professional presentations. For this purpose, and for creating geometrically corrected material, the whole file can be delivered on a CD-ROM containing the full set of information.

An analysis showed that the material should be stored in three *quality levels*:

- As small compressed files: overviews showing whole maps.
- As larger compressed file in which all details can be viewed. This is important for users with PCs on which large files cannot be processed.
- As complete information: mainly for information processing. Normally delivered on CD-ROMs. The complete information can also be reproduced as hard copy.

Finally, there are those who consider that the maps could be more widely and efficiently used if some kind of Help-files could be linked to them. Suggestions that have been made include themes such as:

- General guidelines for using and reading the maps.
- Help files for dialectal words, older types of measurements and other text translations.
- Metadata and links to other sources.

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2.1.1.3 Willingness to pay

The results of the survey showed that users are unwilling to pay for map overviews and are only sometimes willing to pay for viewing parts of a map. On the other hand, there is a total acceptance of paying for CD-ROMs containing map data and for printed copies of maps. No indications of acceptable cost levels were, however, given.

As the user rights that are necessarily associated with transactions of this kind could not be specified by the project, it was, unfortunately, not possible to study this aspect in depth. The scope and type of user rights will, of course, influence willingness to pay.

2.1.1.4 Conclusion

The results of the study supported a functionality with *three information quality levels*: small compressed files with an overview for a whole map, a larger compressed file with zoom possibilities down to the detail level and, finally, complete information on CD-ROMs, mainly for use for information processing.

This is to be interpreted as representing *three access levels*:

- An overview of the whole map with the possibility to zoom to the detail level in screen-sized tiles. This will satisfy the needs of a large number of non-professional users and professional users who only want to obtain a rapid but good overview of a limited area. This service should be free of charge.
- Downloading the larger compressed file to make possible some geometric corrections etc. Charging should correspond to the scope of the rights.
- Complete information on CD-ROMs, mainly for information processing purposes. This will satisfy the needs of professional users and ambitious amateurs. The complete information can also be reproduced on paper. These services can be ordered and a fee is charged.

2.1.2 The first evaluation

The evaluation of the first prototype in April 2000 resulted in a list of desired changes. The main problems concerned the zooming and panning functions, difficulties in obtaining an overview and in interpreting the information in a restricted window in the application (400x400 pixels).

2.1.3 The second and final evaluation

This evaluation which was done in February 2001 indicated that there was a need for better instructions on the homepage.

2.2 Specifications

2.2.1 Image quality

The requirements and specifications that were formulated were for the generation of an almost true digital reproduction of the historical map and text originals in order to facilitate their use in presentations, research, GIS applications, reproductions and other applications where digital

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information of this kind can be used. The maps and act texts delivered from production based on these specifications are in files in the commonly used TIFF format.

The specifications for image production have, with some modifications, been developed at the National Land Survey of Sweden (NLS). The specifications build on experience gained from almost two decades of working with digital raster data.

As the goal for the prototype system is searching and viewing image-files in real-time on the Internet, the files must be highly compressed and/or presented with a technique that radically reduces the information transfer the Internet.

2.2.2 File Format for original files

The original files are the files produced during the data capture process. These files are stored for future use and used for delivery purposes and as source data for converting to other formats for delivery and presentation purposes.

The TIFF format (Tag Image File Format, ISO 12639) is used for coloured maps. TIFF is the most commonly used format for raster data interchange and for safe data acquisition. One of its main strengths is that it is a highly flexible and platform-independent format that is supported by several image processing applications.

Two different formats are used for text originals. German texts are saved in the same format as the coloured maps whereas for the Swedish material, captured from black and white microfilm, the TIFF Group IV format is used. The TIFF file format with Group IV compression has been chosen because other encoding formats generate significantly larger files.

2.2.3 Naming files

The file name convention has been designed to facilitate the management of files from different types of data capture and with different formats. File names are therefore related to and contain information about the contents of the file.

The file name is thus a tool for sorting and building up a common database for material in different formats and from different data capture and storage systems.

A file name can reflect factors such as geographic identity, the number of maps and pages in a document, information as to whether or not the file has been converted (i.e. rectified) or if the image file only covers a part of the original map.

2.2.4 Geo-coding

As almost all of the material from the involved archives is, in some way, spatially related it can be geo-coded. In a full-scale solution, a complete geo-coding of all of the documents in the archives done by digitising would be a huge and unrealistic task. To reduce the workload to an acceptable level, whilst retaining the advantages of geo-coding for creating rapid and user-friendly functionality in search procedures, a compromise solution is necessary.

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For more detailed studies, such as comparing historic maps with actual map data, this must be done with GIS software.

In the project, three levels of geo-coding have been defined all of which have been tested in the project.

Level A

Level A is used for overview maps with administrative divisions combined with a searchable register and a link to the corresponding file. All files produced in the project have been geo-coded at least at this level.

Level B

The files are given one pair of co-ordinates.

Level C

Level C entails a complete geo-coding of the entire file. Geo-coding at this level is only done for limited areas in connection with use for demonstration of applications on the homepage.

2.2.5 Technique for presentation of images on the Internet

The **individual** TIFF-files are rather large and vary in size between 100 and 200 MB. For it to be possible to present image files in real-time on the Internet, the TIFF files must be compressed. There are several methods for compressing image files available on the market. Furthermore, new methods and tools are continuously being developed specifically for presenting information on the Internet. The materials in this project, historical maps, are a special and uncommon case. The original maps can be large and the information on them may be very detailed. A system for presentation of this type of material must, therefore, be developed in a way that makes it possible to take maximum advantage of the latest technical developments

The basic goals for the system development have, therefore, been, firstly to make it possible to store high quality TIFF-files and secondly, to create a storage system for compressed files for presentation purpose. It is intended that the contents of the files can be replaced as new formats for presentation become available.

When choosing tools and format for compressed files, the following criteria were considered:

- The volume of information transferred over the Net for viewing. The functionality in the web browser must be rapid even on slow Internet connections (28K and 56K modems). This means that the amount of data transferred must be limited.
- The image quality of the compressed file must (visibly) correspond to that of the original file (TIFF) when presented for the viewer at a scale of 1:1.
- It must be possible both to have an overview over the entire image and to be able to read details within a limited image area (zoom functions).
- It must be possible to move around in the image at a chosen zoom level (panning).
- It must be possible to save and/or print the visible image.

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- It must be possible to change the image frame size or to restrict the size of the image window.
- It must be possible to restrict acquisition to only that part of the image that is visible.

To find a solution that satisfied these requirements several compressing programs were tested for the use with the prototype.

Formats that were studied in the project include:

LZW	<p>Advantages:</p> <p>Compression with no data loss is possible.</p> <p>Disadvantages:</p> <p>Rather low compression and, therefore, not a realistic alternative for Internet use. Zoom functionality will necessitate production of images of several enlargement levels and a system for handling them. Special viewers are needed.</p>
GIF	<p>Advantages:</p> <p>Commonly used on the Internet. No plug-in or specialised viewer is needed. High compression is possible.</p> <p>Disadvantages:</p> <p>A large amount of information will be corrupted. Zoom functionality will necessitate production of images of several enlargement levels and a system for handling them. Restricted colour presentations: a maximum of 256 colours.</p>
JPEG	<p>Advantages:</p> <p>Commonly used on the Internet. No plug-in or specialised viewer is needed. High compression is possible</p> <p>Disadvantages:</p> <p>A large amount of information will be destroyed. Zoom functionality will necessitate production of images of several enlargement levels and a system for handling them.</p>
Flashpix	Similar to JPEG, but the viewer must be able to handle the Flashpix format
MrSid	<p>Advantages:</p> <ul style="list-style-type: none">– Wavelet compression gives good image viewing quality. Well suited for originals that have several colour tones. Compression is x20 and the quality is almost equal to that of the original at a scale of 1:1.– The format is viewable and easy to print out in standard Internet browsers (the transferred information is in jpeg format).– Several layers are created in the conversion and they can be viewed, which makes zooming and panning possible. An image server installed on the Web-server manages the converted file.

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	<ul style="list-style-type: none">- Only information required by the user is transmitted over the Internet.- The information can be viewed with or without plug-in or by using Java functions in the browser.- Colour images of all sizes can be compressed in MrSid.- MrSid can handle co-ordinates and be used in standard GIS software such as ArcView and MapInfo.- The format can be used in Photoshop. <p>Disadvantages:</p> <ul style="list-style-type: none">- Is on the slow side, particularly compared to DjVu.- Needs adaptation for presentation of cadastral documents that comprise several separate pages.
DjVu	<p>Advantages:</p> <ul style="list-style-type: none">- A high compression rate.- The quality is generally good enough for the presentation maps and documents.- Cadastral documents that comprise several pages are easy to handle (the software contains a tool for bundling documents).- Zooming and panning is fast.- Better quality and compressing ratio than MrSid when converting the Swedish B/W files. <p>Disadvantages:</p> <ul style="list-style-type: none">- The format can only be viewed with plug-in.- No extensions for other software are available.- In the current version of the software the entire file is transmitted over the Net which means that it is not possible to restrict acquisition to only part of the compressed image file.- Limited size of original file before conversion: it must be less than about 380 MB.- The high compression ratio lowers the quality of images that have many colour tones.- Printing of images from the Internet browser requires large system resources.

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From our tests and experience we concluded that MrSid was the most suitable tool currently available. The prototype system has therefore been based on the MrSid format. With this format it is possible to meet the demands defined above at the same time as it is possible to use it in standard imaging software (PhotoShop) and GIS software (ArcView, MapInfo). The software also includes functionality for viewing, printing, zooming and panning and also supports enhanced functionality in a free downloadable stand-alone viewer provided there is a MrSid-file in the local environment.

To maintain image quality, the compression ratio for coloured maps and document texts has been set to close to x20.

As development in the field of image processing is both dynamic and continuous, particularly regarding presentation of images on the Internet, the project group's recommendation that MrSid should be used in the prototype can be changed should a better system be identified in the future. As the original files are to be stored in TIFF-format, they will, most likely, be usable in future data compression tools.

2.2.6 Storage

The most expensive process in a digitising project is the actual data capture. Storing the huge volume of data that is generated for the future use is almost equally expensive. It is, therefore, crucial to save the data in such a way that it will not be necessary to recapture the same data at some future date. The choice of file format and storage techniques must, therefore, be given special and careful attention. The possibility to change storage techniques over time must also be considered in the storage strategy. Rapid development is taking place in this field and the historic trend of costs decreasing by half halves every eighteen months is still valid.

The storage will contain large volumes of data, which will continue to increase over time. The storage facilities must, therefore, be expandable. Today, the most economic way of storing large amounts of data is on tape. It is recommended that the DLT tapes that have been used in the project should be used for the next decade during which time it is realistic to assume that new, more cost-effective and better techniques will be developed.

Storage based on the use of DLT-tapes does not, however, meet the demands for presentation in real-time on the Internet. Currently, the only usable method for this purpose is storage on hard disks. This is, however, an expensive method. From both a cost point of view and to reduce the information flow over the Internet, data compression is needed. The solution adopted for the project was therefore based on a scalable long-term storage of the original TIFF files managed by a DBMS. In this way it will be relatively simple to carry out a new conversion or change the conversion tool when needed. The converted information on the hard disks for presentation is also managed by the database.

Back up routines comprising application, databases and information are used in the system.

As can be seen from the figures below, the storage system used in the prototype, which contains data from University of Greifswald, the National Survey and Cadastre of Denmark and the National Land Survey of Sweden, does not fully conform with the description above.

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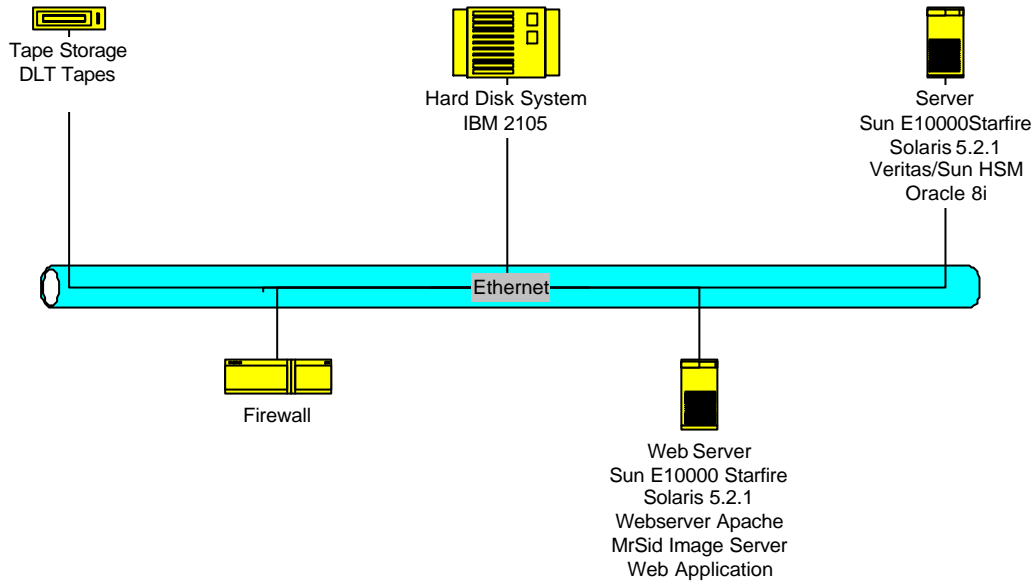
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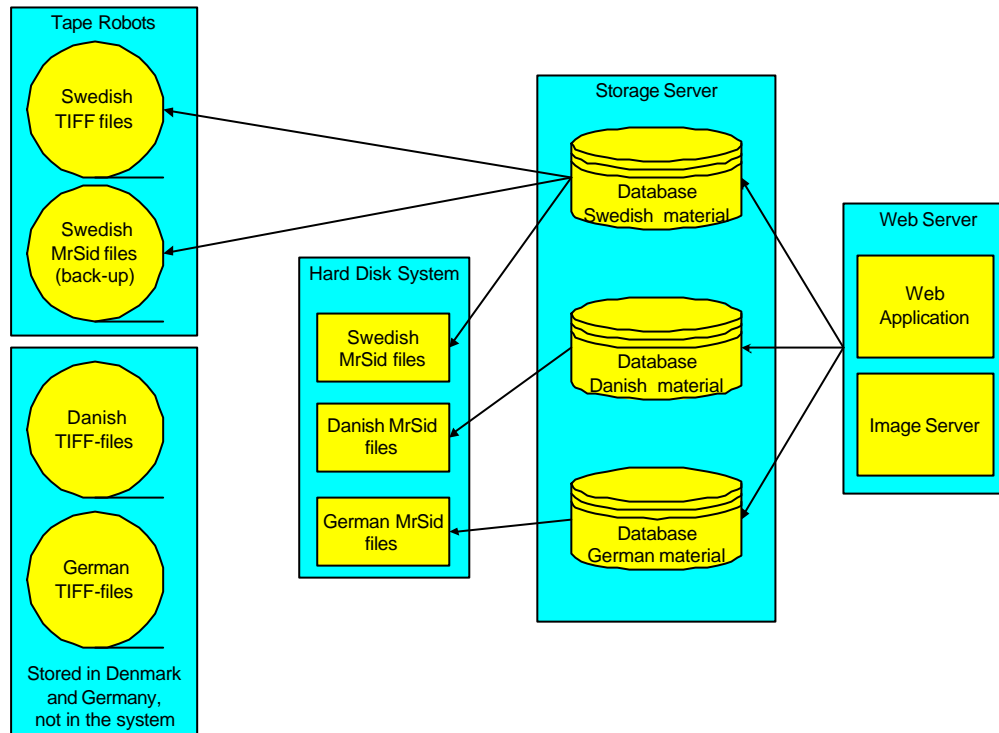
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Technical solution (hardware and software)



Information Structure:



2.3 The DHM Homepage and prototype system

Based on the specifications, the homepage and the prototype system have been implemented on www.dhm.lm.se. In addition to the prototype system, the homepage contains a public discussion board, certain project information and general information about the organisations and archives that are involved in the project.

The discussion board has been open for users within the project (project members and reference groups) since the beginning of 2000. From 2001 it has also been open to the general public. The board has been implemented using a freeware, the Discus discussion board program, that has been developed by DiscusWare, LLC of Holland, Michigan, USA.

2.3.1 Multilingual functions

The homepage is available in four different languages, English, Danish, German and Swedish. To make it possible to choose between the different versions, there is a link to the start page on all pages.

The contents of the different language versions differ to some extent. This is for two reasons: firstly an assessment of what can be of interest for people in the different language areas - information that is deemed to be mainly of local interest may, in some cases, only be available in a specific language; secondly there are sometimes problem finding concise, equivalent translations of special expressions without the need for long explanations. Naturally this can be developed and increased in a future production system.

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Information areas that are common to all language versions

- **The Archives** (Om Arkivet, Die Archive and Om Arkiven respectively), contains information about the archives from each organisation. The most important information about the individual national archives has, as a rule, been highlighted, at the expense of descriptions of archives from other countries. This means that more detailed information is available for interested domestic visitors. The English version covers all materials, but a visitor can get more detailed information by linking to the part of the homepage specifically for the Danish, German or Swedish language. For example, the Danish material is described in greater detail in the English and Danish parts of the Web than in the German and Swedish.
- **The Project** - information about the project. The most detailed description of this part is in the English version and there are only overview descriptions in Danish, German and Swedish. For interested visitors there is a reference to the English version in the other language versions.
- **Forum** – contains links to the discussion board and the project reports. The information is reachable from all parts of the homepage. Reports are only in English.
- **Historical Maps Prototype System** – Moves the visitor to the map search prototype.
- **DHM Home** – Links to the Web site start page.

Included in the prototype

- **How to search** – a Help pages introduces visitors to using the search system. The Help pages are opened in a new window and can, therefore, be accessed and read at the same time as a search is being made.
- **Download sample** – A sample from each country can be downloaded, free of charge.
- **Home DHM Prototype** – Links the visitor to the prototype start page to make a new search.
- **DHM Home** – Links to the Web site start page.

Unique for different language versions

- **Om Sognekort – (Danish)** - Provides Danish visitors with more detailed information about the Danish material. In Danish only.
- **Legende der schwedischen Matrikelkarten - (German)** - Gives help for interpretation and understanding of the Swedish geometric maps of Germany, explaining the meaning of colours, symbols etc. used in the maps. In German language only.
- **Historien visar sig – (Swedish)** – A collection of examples showing interesting areas where historical maps have contributed to an understanding of settlement, changes in the environment and archaeological sites. This part is in only in Swedish and has been written for Swedish visitors.

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- **Understanding the material – (English and Swedish)** - Provides assistance in interpreting the historical material. This part is available in English and Swedish in the prototype. The Swedish part is more detailed and also contains a glossary explaining older Swedish expressions and measures.

For a comprehensive view of the structure in the different parts of the Web site, see the site map in Appendix 1.

2.3.2 Search functions

The search system comprises two integrated parts, a geographic search function and a register-based search function.

The geographic search function is built up of linked pictures made from raster data provided by the participating organisations. A software developed in the project, together with ArcInfo, was used to generate the pictures. There is more information about the construction of map images in Appendix 4 and on the enclosed CD-ROM-ROM.

As the images are not geo-referred, the geographic search is restricted to the most detailed level that exists in both the register and in the original geographic data. In Denmark and Sweden this is the parish level, whilst in Germany it is possible to reach the village level.

To make searching as easy as possible for a visitor not familiar with the archives structure, register search is based on national administrative divisions. The list boxes only present areas where it is possible to find images to view.

The integration between geographic and register search requires that the map and the contents in the list box correspond.

The search result is presented in a list with linked file names.

The functionality has mainly been solved using HTML on the page, combined with communication with the database via PHP scripts. For more information about the techniques used, see Appendix 6.

2.3.3 Presentation of maps and text documents – the prototype system

After a link to desired image has been chosen, the image is presented in a window together with its metadata. The MrSid Image Server is used to present the image. By default the Java functionality is used, but it is possible to change between Java, Plugin or neither of them. No adjustments have been made to the original functionality in this prototype.

Technically, MrSid is built on Pearl-scripts. Depending on the variant that the user checks, the desired functionality calls up the corresponding scripts. For example, a Pearl-script calls for the Java functionality when the Java link is checked. The Pearl scripts interact with HTML code for design of the page.

2.3.4 Order functions

In the prototype the order form is activated by pressing the order button in the image presentation window. After the presumptive customer has filled in the required information, and actively accepted

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the licence agreement, an e-mail is sent to a simulated customer desk for further handling. The functionality has been solved using a standard system, WebMail, from BitShop. In future production systems this will, of course, be implemented in the environment of the individual organisation.

(Using WebMail the user only needs to be connected to the Internet and not to an E-mail system).

The E-mail produced in the prototype system is to illustrate the functionality. The visitor only receives a return message saying that nothing will be delivered and that no information will be saved.

Depending on the source of the “ordered” information, E-mails are sent to the customer desks of the respective organisations.

2.3.5 Delivery functions

It is proposed that the delivery of copies of original files should be made on CD-ROM. The copies will be made directly from the storage system as part of the standard delivery routine of the respective organisation.

In the future it may be possible to download converted files direct from the application.

The prototype system only has functionality for download one example file from each country. This functionality can easily be increased to comprise all compressed files.

The application allows visitors to download one map from Denmark, Germany and Sweden respectively, free of charge.

Before downloading can be started the order form must be filled in. Submitting the order form trigger the download process and the sending of an e-mail to Infomaster.

The download functionality is only available for users of Internet Explorer . Depending on the browser used, the following should be noted:

For Internet Explorer users:

- By right-clicking with the mouse on the image and selecting “Save goal as” the user is prompted with the “Save as” window. The user can then choose where to save the file.
- If the user has installed the MrSid Browser Plug-in or the MrSid Stand Alone Viewer, the image will be automatically loaded in the IE window. The file can then be saved using the Save- options in the menu that appeared when right-clicking with the mouse on the image.
- If the user does not have the MrSid Browser Plug-in or the MrSid Stand Alone Viewer installed, he/she will be prompted in the Save as window to choose where to save the file.

For Netscape users:

In the current system the download functionality does not function reliably. Netscape does not recognise the MrSid format and downloads it directly to the browser, which results in garbled text. The file cannot be saved.

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2.3.6 Statistics on Use of the Homepage

Since the beginning of 2001 about 2 400 visitors per month have visited the project homepage of whom 50% visited the Swedish version, 35% the Danish, 8% the German version and 7% the English version. No special marketing activities have been carried out during this period, but will be started after the end of the project.

2.4 Copyright, Policy for dissemination and pricing

2.4.1 Copyright issues

2.4.1.1 The Bern Convention and the national copyright laws

The national copyright laws in Denmark, Germany and Sweden are all based on the Bern Convention. The Convention can be described as a model law for copyright. The countries that are members of the Bern Union have an obligation to create a national copyright law within the frameworks laid down in the Convention. The Convention contains mechanisms and rules which the respective countries are obliged to follow. Thus the national copyright laws for countries in the Bern Union have a common structure and terminology.

In the Bern Convention, it is stipulated that the law of the country in which a conflict arises (the Principle of National Treatment) shall govern matters concerning copyright. If, for example, material produced in Denmark is misused in Sweden, the Swedish Copyright Act shall govern the process against the offender. The Convention gives a minimum level of protection to every right holder in the Bern Union.

2.4.1.2 Work in the public sector

The central 'object' for the copyright protection is 'the work'. This term is common in the three copyright laws (Denmark: "værk", Germany "geschützte Werke", and Sweden "verk"). A 'work' is a result of a creative action. This criterion places demands on the performance of the "author". In some countries, uniqueness is proof that a work is a work in the sense of the copyright law. In Germany, the law describes a work as a "Geistige Schöpfung", in Denmark as a literary or artistic product.

The interpretation of the term work is, in the first place, made in case law. There are differences between case law in the three countries. In general terms a comparison shows that the demands upon a 'work' are higher in Germany than in Denmark and Sweden.

In some fields, in accordance of the Bern Convention, national legislator is free to prescribe that certain types of work are not be protected by copyright. One such field is works produced by or on behalf of the public sector.

Maps and other works that contain geographical data are often produced by or on behalf of the public sector. The national legislators in the three countries have all, in line with the Bern Convention, stated that maps shall, if they meet the basic requirements in the national law, be regarded as 'works'. If a map is produced within a public authority different national regimes apply. In Danish law maps produced by public authorities are protected in the same way as other maps.

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2.4.1.3 Time- restricted protection

Denmark

In Denmark, as in other countries that are members of the European Union, copyright is valid for 70 years from the year of the author's death. If the work is published without mention of the name of the author, copyright applies 70 years from the end of the year in which the work was first published. In addition to these standard rules there are special rules for a certain kinds of Danish maps. According to the Order of 1816, nautical charts produced by "Søkortarkivet" have permanent copyright protection; and according to the Order of 1831 topographical maps produced by "Generalkvartermesterstaben" are similarly permanently protected by copyright. These orders are still valid according to the Danish copyright law (Ophavsretslovens §92). Both Søkortarkivet and Generalkvartermesterstaben are now parts of Denmark's National Survey and Cadastre (Kort & Matrikelstyrelsen). The maps included in this project are only protected by the standard rules of 70 years of copyright.

Germany

In German law, official maps are protected in the same way as other maps such as those produced in the private sector. The copyright law also protects maps produced by public institutions if they are official, such as, for example, land survey maps. Other maps made by public institutions may be excluded from copyright according to §5 of the copyright law, if they are made and published specially as information to the public, and if there is a specific official interest in informing the public. The decision as to whether or not §5 applies is made by case law.

Sweden

In Sweden, maps produced by public authorities are protected if they meet the basic requirements for a work. A work by an individual author is protected during a period of 70 years reckoned from the year after the author's death. Works, which have been published or made public without mention of the name of the author, are protected for seventy years reckoned from the year after it was first made public. For a work, which is made public in separate parts, such as: the topographic map of Sweden, the time of is set from the day the last part of the work is made public. This has still not occurred for the topographic map.

The Swedish land use map production of which started in 1942, and which is still being produced, is thus protected by copyright.

This rule must, at least in Sweden, be referred to the constitutional framework, in the first place the Freedom of the Press Act, which defines what is 'a public document'. In this act, every map in the archives of a Swedish authority is considered to be a 'public document'. Once a document has been put in such an archive it has also, in the sense of the Swedish Copyright Act, been published or made public. If the period for protection has ended, the work is, in this respect, in the public domain.

2.4.1.4 Protection of databases

The directive on the legal protection of databases (Directive 96/9EC Directive of the European Parliament and of the Council of 11 March 1996) is the basis for the legal aspects of database protection. The Directive has been implemented in Danish, German and Swedish law.

Database protection is made up of two parts. One part is based on traditional copyright. In this case, if data in a database is structured in such a way that the traditional requirements in the copyright law are fulfilled, the database shall have the same protection as other works. In other words, the database is considered to be a 'work'. The second part is the 'sui generis protection'. This protection does not fall within the copyright system but is protection in its own right. Technically, the mechanisms are implemented in the national copyright laws (Denmark §71, Germany §§ 55 and 87 and Sweden §49).

The sui generis protection is related to the producer's financial input, and the investments must be substantial. The producer has, with some exemptions, the exclusive right to exploit - 'extract' and 're-utilise' the whole or a substantial part of - the database under a period of fifteen years from the year following the date of completion. The sui generis protection is only valid within the European Union and therefore it has limited importance for activities on the Internet.

2.4.1.5 Conclusion

Based on the above, it can be concluded that there is no copyright on maps that are more than 70 years old. However, as a consequence of the creative works involved in their creation, the copyright law protects databases. Databases are also a result of substantial investments and are, therefore, also protected by the sui generis protection in national legislation. It is a legal question whether or not a single file is protected through the database protection law. Thus, as the legal situation is not clear, the conditions will be governed by agreements based on national legislation and case law.

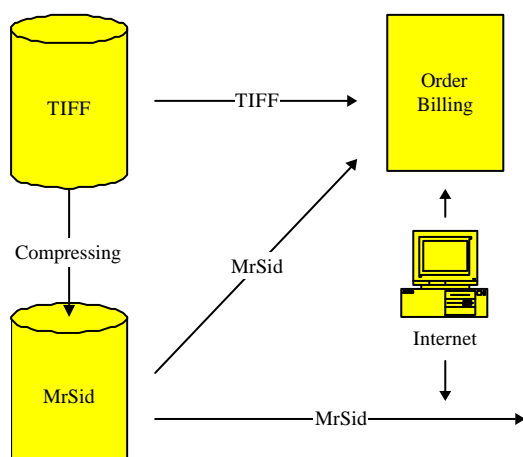
2.4.2 Restrictions due to Protection of Privacy

Because of legislation concerning protection of privacy it is necessary to place restrictions on the dissemination of person-related data on the Internet. As modern documents in the archives mainly consist of title documents from property formation activities, there is an abundance of private information. This information must be protected and it can only be made accessible by applying special solutions.

2.4.3 Policy for dissemination

Based on the rules of copyright and the financial model a dissemination policy has been established at the National Land Survey. This policy incorporates two storage levels and two access levels as

Two Storage Levels



Two Access Levels

Charged

Entire file (delivered on CD)
-TIFF
-Mr Sid

Free

Browser

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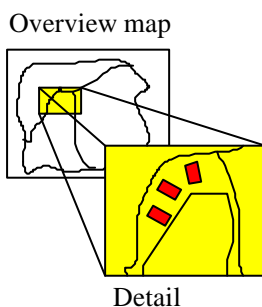
follows:

The free browser permits

- Overview of an entire converted file.
- Zoom to details in a limited area with the possibility to evaluate quality and make interpretations of the material.
- Ordering TIFF or converted files.

2.4.4 Pricing policy

Two different approaches can be followed when pricing products. One is to set a price that is as high as the market can accept; the second is to set a price as low as possible when taking into account production and financing costs. In the project, the involved parties agreed to adopt the latter approach. This has been based on a policy that considers archives to be a part of the basic national information infrastructure. The price for information will, therefore, depend on the costs for building up, maintaining and disseminating the information and how this is financed.



In Sweden, for example, financing the production, maintenance and access to information about the landscape and property is based on a combination of grants and fees. The model is an expression of a governmental commitment as a guarantor for the systems at the same time as the users, by steering demand and through contributing to production costs by paying fees can influence the development of the systems. The model implies:

1. That the initial build-up of systems and databases is financed by grants.
2. That management is financed through a combination of grants and fees. Management activities include updating, development and adaptation of information and systems to meet demands from users and associated systems in the user world.
3. The extraction and distribution of information, such as access to information, is financed by fees.

The charged price will, consequently, cover the costs for extraction and distribution of the information and part of the management costs, the size depending on governmental input.

2.5 Production of image files

2.5.1 Methods for data capture

In project, different methods for data capture have been used:

- Denmark: flat bed scanning og map originals.

Digital Historical Maps

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- Germany: Photo scanning of map originals with Line scanning photographic digital camera Leica S 1 pro; Triple linear colour CCD line with 5140 pixels; 36 bit technology.
- Sweden: flat bed scanning of color diapositives from map originals and from B/W microfilm from text documents.

2.5.2 Production contents

2.5.2.1 Denmark

The chosen maps are a combined version of the first cadastral maps in Denmark, dating back to the early nineteenth century. The maps have been reduced in scale to 1:20.000, leaving out some of the topographical elements. Normally, each map covers a parish. The maps have been chosen to give an overview over almost the entire country and also because of their clarity and manageability. In total, 2925 maps are available on the homepage.

2.5.2.2 Germany

The German material in the project are the Swedish Matrikel Maps kept in the university of Greifswald, Institute of Geography and in the University Archive. The maps have been produced on the basis of a landsurvey in Swedish Pomerania between 1692 and 1698. The historical information consists of the maps themselves, associated text volumes with data on the location of the village, conditions of ownership and administration, land use and quality, taxation and services to be contributed to manorial farms. The maps mainly cover the area of the former counties of Barth, Franzburg and parts of the former district of Stralsund (131 maps). All maps are drawn at a scale of appr. 1:8000.

2.5.2.3 Sweden

Various maps from different époques are presented on the homepage including geometric land books and other geometric maps from about 1650 and onwards, combined with land re-allotment maps from the eighteenth and nineteenth centuries. These maps are representative for the typical hand drawn maps in the archives of the National Land Survey. Also printed maps from the nineteenth and twentieth century are included. Both maps and text files are available on the homepage.

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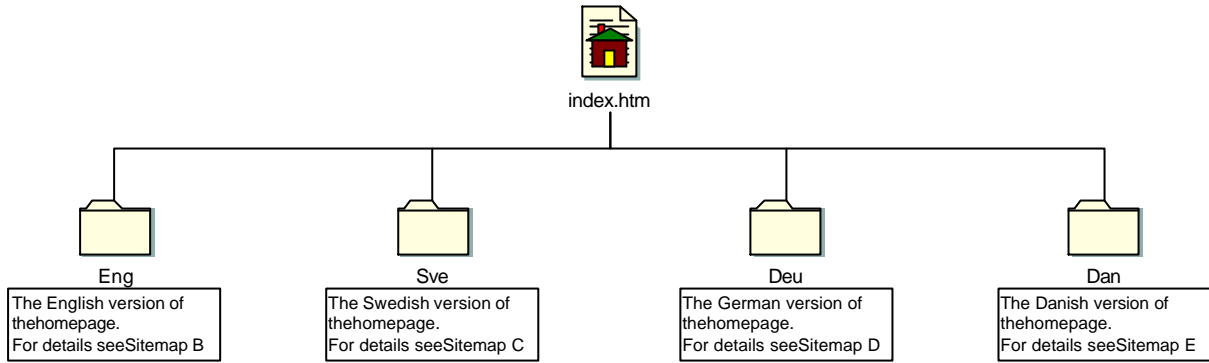
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Site Map

dhm.lm.se Site map A



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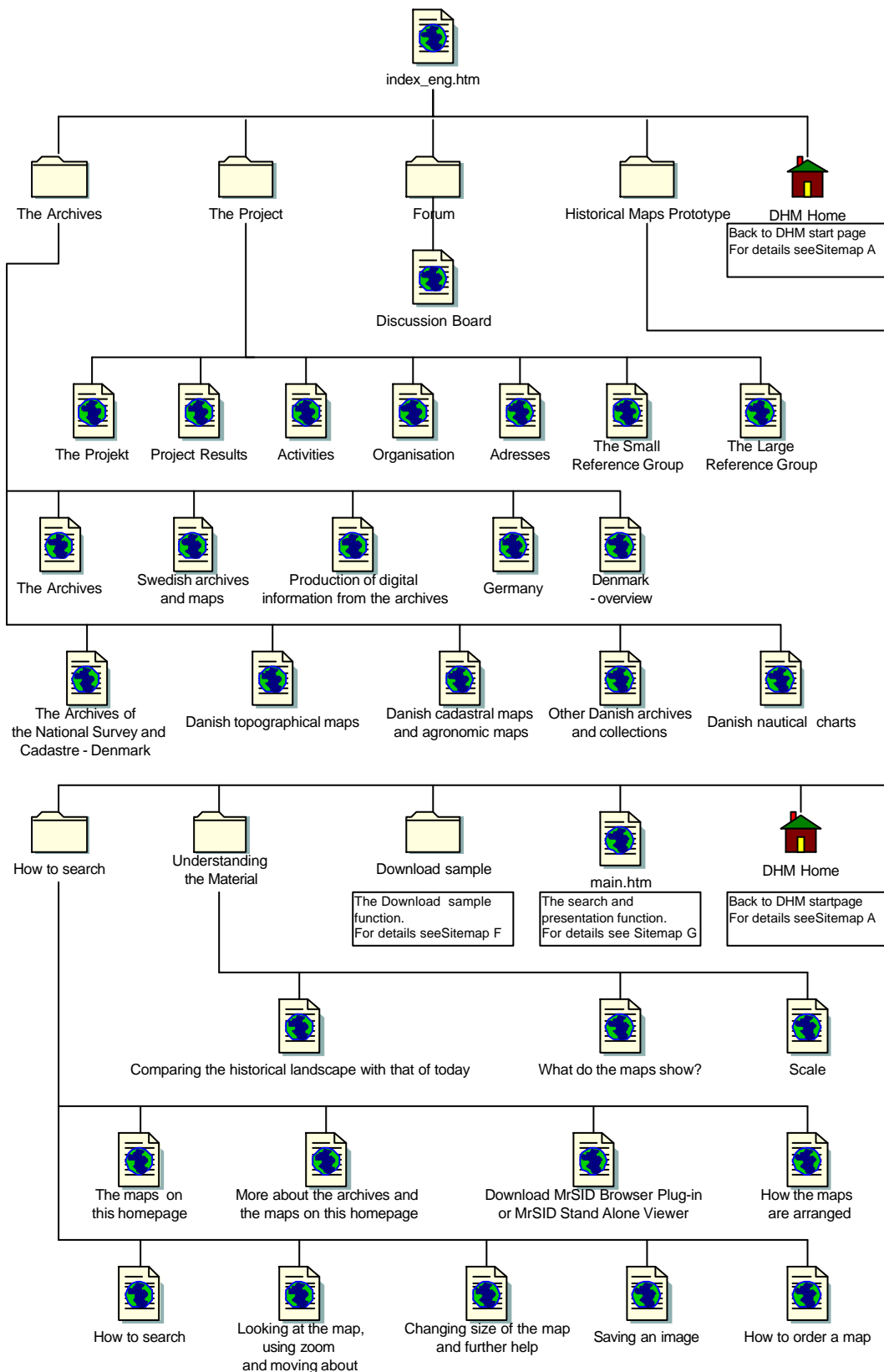
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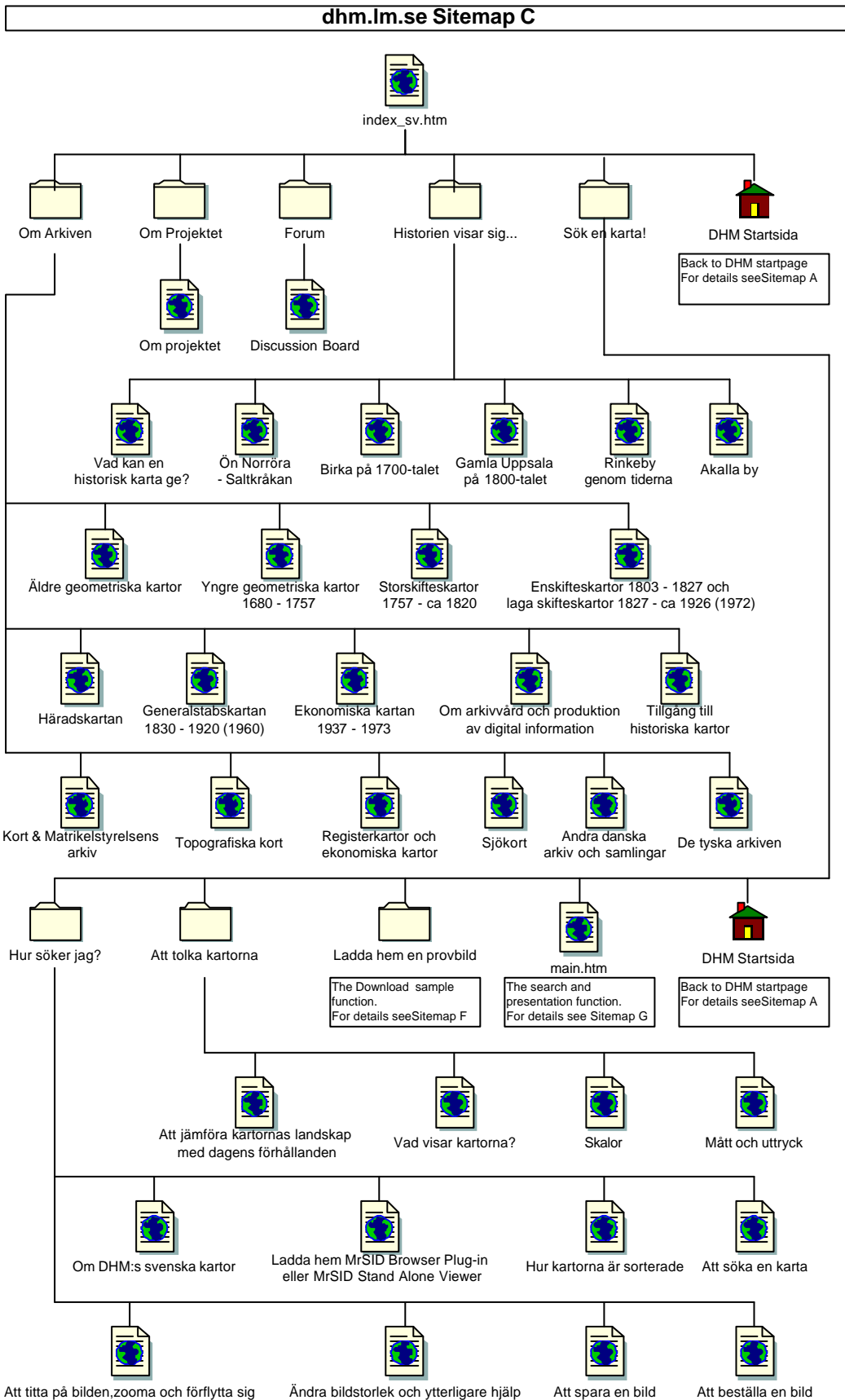
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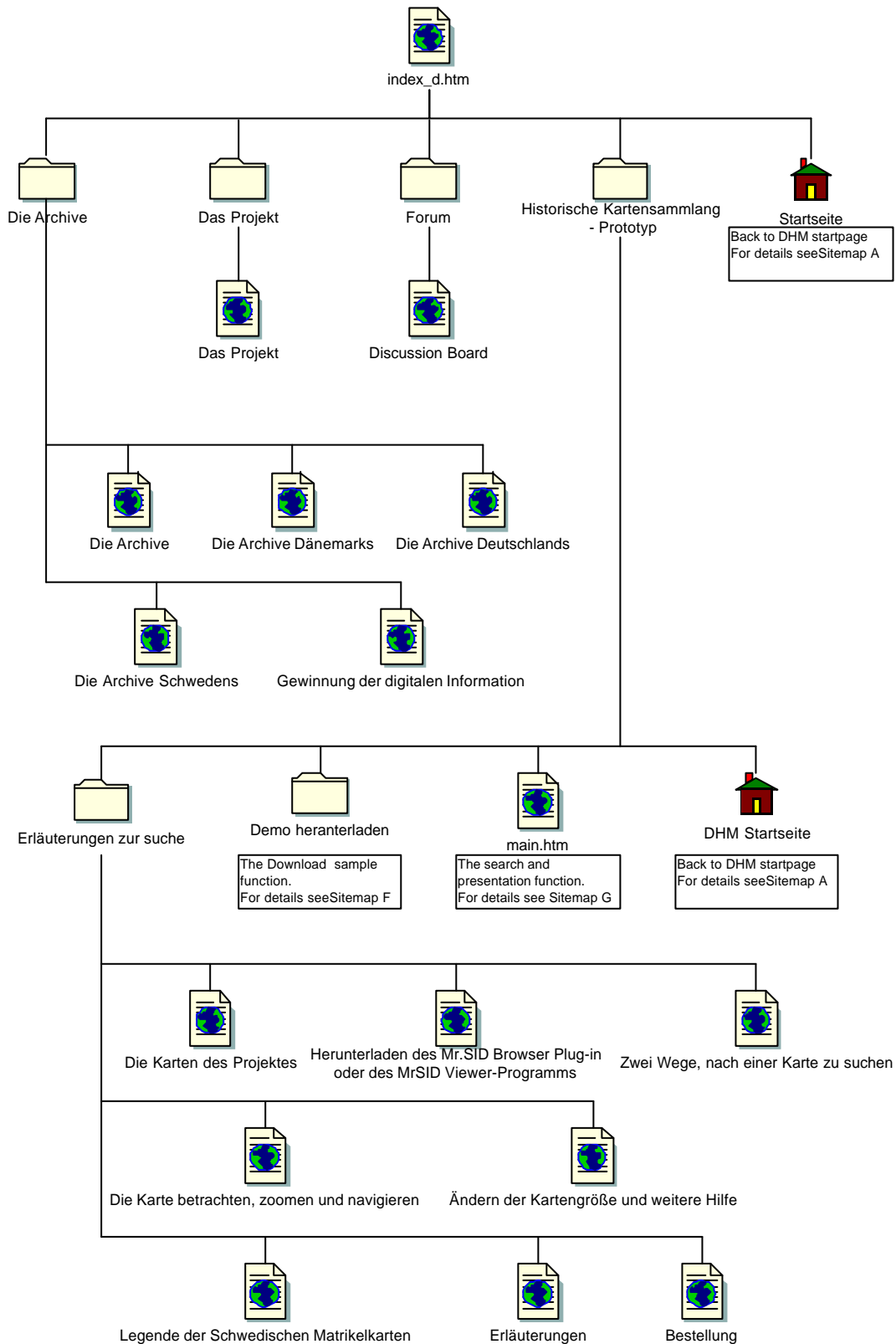
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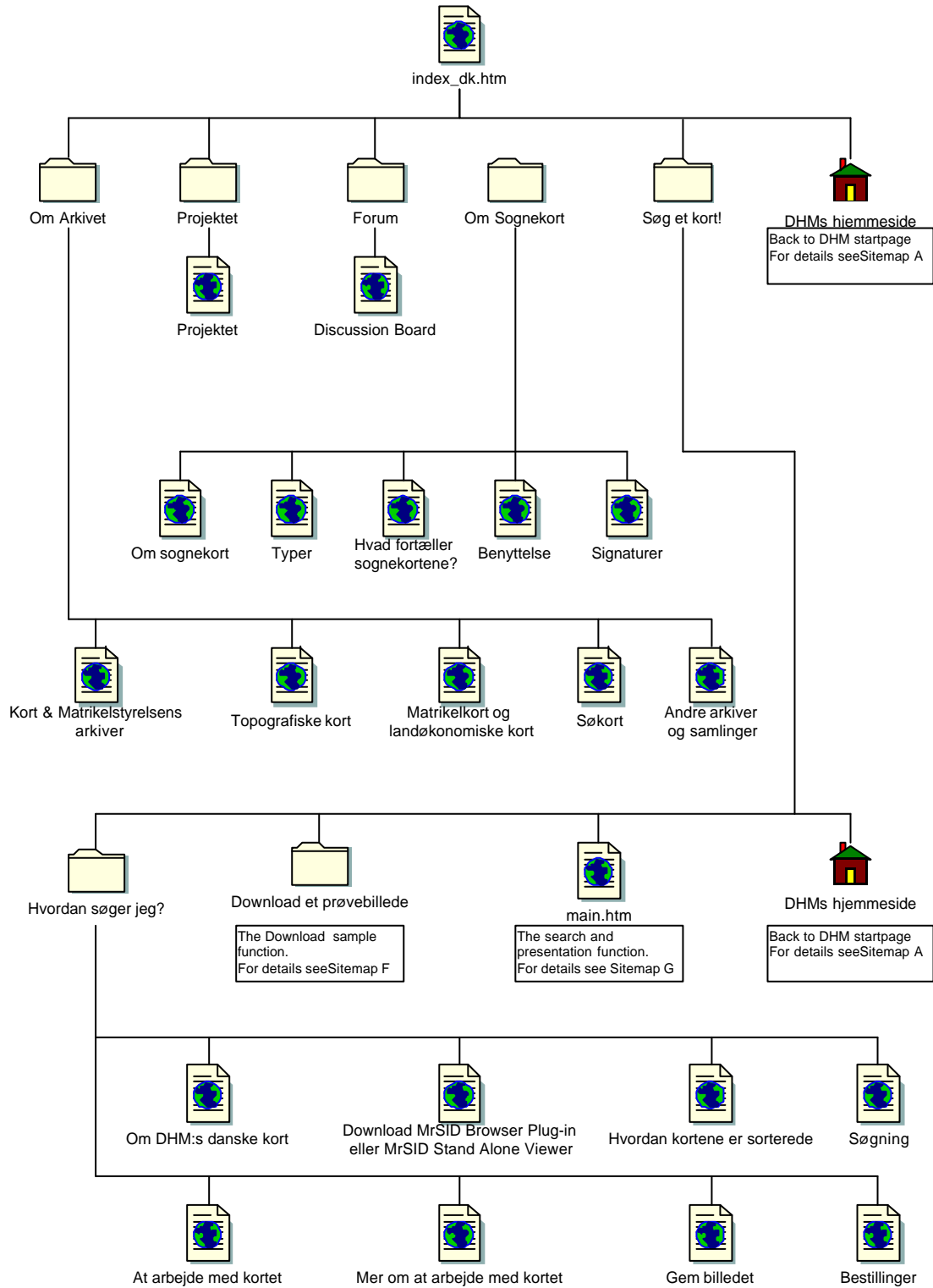
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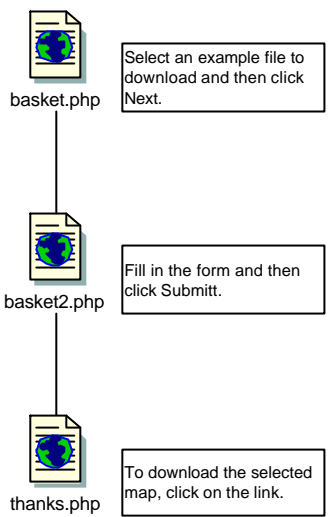
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Appendix 2:

WP7	Activity	Time schedule		
		Completed 2000-08-28	Completed 2001-03-31	Planned 2000-12-31
Sweden				
Map files				
	Transfer of data	2750	4259	~ 3000
	Scanning	2342	2342	~ 3000
	Compression	5092	6601	6000
	Name Conversion	5092	6601	6000
	Geo-coding (A-level)	4576	5188	6000
	Geo-coding (C-level)	0	15	< 100
	Rectifying	0	15	< 100
Text files				
	Scanning	4000	4115	4000
	Transfer of data	4000	4115	4000
	Compression	265	4115	4000
	Name Conversion	265	4115	4000
	Geo-coding (Level A)	265	2281	4000
In the application		4841	7469	10000
Denmark				
Map files				
	Scanning	1950	2925	1800
	Compression	1700	2925	1800
	Geo-coding (Level A)	1550	2925	1800
In the application		1454	2925	1 800
Germany				
Map files				
	Scanning	103	131	127
	Compressing	103	131	127
	Geo-coding (Level A)	103	131	127
Text files				
	Scanning		333	
	Compression		333	
	Geo-coding (Level A)		147	
In the application		103	278	127

Total	Completed	Planned
In the application	10672	11 927