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Collaborative Web-Enabled Data Distribution – The MetroGIS Experience

Abstract: MetroGIS is a geospatial data sharing collaborative representing over 250 local units of government and other organizations in the seven county Minneapolis/St. Paul Metropolitan Area.

DataFinder (www.datafinder.org), the MetroGIS data sharing web site, provides access to more than 100 metadata records using either the GIS data catalog or the search engine that queries the MetroGIS DataFinder node of the National Geospatial Data Clearinghouse. Many data sets are freely downloadable. The site also features several ESRI ArcIMS map services, with web clients to view data right within the web site.

During 2002, MetroGIS is working on enhancing the data distribution capabilities of DataFinder, with three goals.

1. Provide a more robust method for downloading data. The client for data distribution would have functionality to allow users to subset or clip datasets using an existing feature, such as a city or school district boundary or an ad-hoc user defined area. In addition, users would be able to custom pick attributes to download, as well as selecting among a number of different geospatial data output formats.
2. Implement Web Mapping Service (WMS) that are Open GIS Consortium (OGC) compliant. This is an emerging method of serving and using GIS data and MetroGIS wanted to ensure that the map services available were accessible by clients that adhere to this industry standard.
3. Accomplish these tasks in a truly distributed environment. MetroGIS stakeholders use software from several different vendors. While a goal of MetroGIS is to distribute many organizations' datasets via a centralized web site, we do not want to require 1) centralized data storage or 2) specific vendor software for data storage. The system we are developing allows for either centralized or distributed data storage or serving.

We hope to share through this presentation some real world experiences that other agencies and collaboratives can directly apply to their work in data sharing, application of OGC standards and implementing it all in a distributed and non-vendor specific environment.

1. Introduction

A primary goal of MetroGIS is the efficient and effective distribution of GIS data via the Internet. This paper discusses the context and process for development of a distribution mechanism, the DataFinder Café, which meets the needs of the MetroGIS community. First the MetroGIS organization and the existing MetroGIS DataFinder web site are described, followed by a description of the Café application. Next an evaluation of the Café is provided as well as the future plans for this system. Finally, a few of the lessons learned during this project are also shared.

2. Background on MetroGIS

MetroGIS is an innovative, regional geographic information systems initiative serving the seven-county Minneapolis-St. Paul metropolitan area. This is a 3000 square mile area of 2.6 million inhabitants, which includes 190 cities and townships, 59 school districts and 39 watershed management organizations. MetroGIS is a voluntary collaboration of local and regional governments, with partners in state and federal government, academic institutions, nonprofit organizations and businesses.

The primary purpose of MetroGIS is to promote and facilitate widespread sharing of geospatial data among organizations that serve the Minneapolis-St. Paul Metropolitan Area. More specifically, the goal is to institutionalize sharing of accurate and reliable geospatial data between the data user and producer communities. MetroGIS has focused on meeting business information needs for GIS data defined by the MetroGIS community. The result has been the definition and standardization of several GIS datasets that meet the needs of multiple agencies. The MetroGIS forum provides efficiencies for producers because they can more easily disseminate their data and for the users because they can easily obtain current data. The desired outcomes of MetroGIS are to:

- Improve participant operations;
- Reduce costs; and
- Support cross-jurisdictional decision-making.

A Policy Board directs MetroGIS, providing policy guidance and political reality checks for all actions fundamental to the MetroGIS's success. The Board is comprised of twelve elected officials representing core stakeholders. It has representation from each of the seven metropolitan counties, Association of Metropolitan Municipalities (AMM), Metropolitan Chapter of the Minnesota Association of Watershed Districts (MAWD), Technology Information Educational Services (TIES - school districts), and the Metropolitan Council. The governing body for each organization represented on the MetroGIS Policy Board formally endorsed the MetroGIS mission statement and appointed one of its members to serve on the Board.

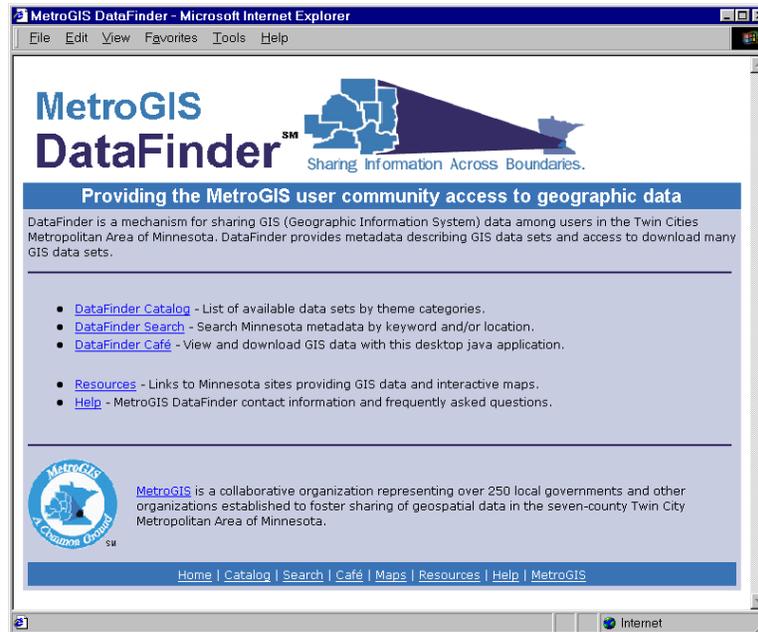
A Coordinating Committee and a Technical Advisory Team support the Policy Board. The Coordinating Committee, comprised of 20+ managers and administrators from a cross section of interests and organizations, recommends courses of action to the Policy Board concerning design, implementation, and operation of MetroGIS. Both groups are composed of persons with broad expertise and perspective, including GIS and other relevant organizational policy, data access, data content, and data standards. MetroGIS operating guidelines govern the responsibilities and composition of the Board and the supporting structure.

The Metropolitan Council, a regional planning agency, is primary sponsor of the MetroGIS initiative and provides the primary staff support. This commitment has varied from one to three FTEs throughout the life of MetroGIS, as well as significant, but sporadic contributions from additional Metropolitan Council staff.

3. DataFinder

The DataFinder web site implements MetroGIS's data sharing mission. This site (www.datafinder.org), launched in 1998, has changed significantly over time as the organization and technology have grown. It now has three functional pieces for data sharing – the DataFinder Catalog, the DataFinder Search and the DataFinder Café. Central to these functions are geospatial metadata records.

DataFinder was primarily created to distribute datasets defined by the business information needs process, but MetroGIS also encourages the web site to be used for distribution of other datasets relevant to the Twin Cities area. Any organization in MetroGIS may contribute metadata and/or datasets to be included on the DataFinder web site. Currently 14 different organizations contribute towards a total of over 120 metadata records on the DataFinder site. Over 80 of the datasets described by metadata are available for download. The numbers of organizations, metadata records and downloadable datasets are expected to increase over time, especially with the addition of the Café tool.



3.1 DataFinder Catalog

The theme based data catalog was the first functional piece of DataFinder to be built. It is essentially a list of available metadata records covering GIS datasets in the Twin Cities metropolitan area. The catalog initially used theme categories developed by MetroGIS, but has since changed to use spatial data categories being promoted by the Federal Geographic Data Committee, which evolved from the ISO metadata standard work (ISO/Technical Committee (TC) 211 Draft International Standard 19115). MetroGIS includes some subcategories developed within the Minnesota GIS community.

Users of the catalog can scroll or link down to a theme of interest (e.g. administrative and political boundaries) and view a list of available metadata records (e.g. county boundaries and school districts). Users can then click to view a complete metadata record. From this metadata record, the user may be able to directly download the dataset, or may be directed to the source organization, depending upon the distribution policy for that particular dataset.

The DataFinder Catalog is still the most frequently used DataFinder tool, being a particularly attractive option to those who know what they are looking for and where to find it. As the number of metadata records on DataFinder has increased, however, the ease with which a particular metadata record can be

found in the catalog has been diminished somewhat. For this and other reasons, in January 2001 MetroGIS included a metadata search mechanism in the DataFinder site.

3.2 DataFinder Search

The DataFinder Search functionality allows users to search metadata records via keywords and geographic extents of datasets. DataFinder actually functions as a node of the National Spatial Data Clearinghouse, however, the search interface on the DataFinder site is geared specifically to search for metadata hosted on the MetroGIS node, as well as a few other state wide nodes in Minnesota.

A contractor created the MetroGIS search interface for the Minnesota Land Management Information Center (LMIC), a state government entity. LMIC then leveraged their investment by sharing the interface with the Metropolitan Council for use with the MetroGIS DataFinder site. The search tool on DataFinder averages over 50 searches a week resulting in 70 metadata records being examined.

3.3 DataFinder Café

The DataFinder Café is the latest tool to be added to the DataFinder web site, and its development is the focus of the remainder of this paper. It is an application by which users may browse geographic datasets and then download them.

4 Development of DataFinder Café

4.1 Background

In July 2001, the seven metro counties and the Metropolitan Council began working on an agreement in accordance with a MetroGIS effort to allow the distribution of the counties' parcel datasets online to public sector and academic interests in the metro area. These users would be required to complete license agreements with the counties, but the data would then be available free of charge. This was an enormously positive step for MetroGIS because county parcel GIS data are the most sought after by MetroGIS stakeholders. However, it also raised some technical and functional problems with the MetroGIS DataFinder web site. The large size of the parcel datasets, and the fact that the downloading rights needed to be restricted to certain licensed users, didn't fit with DataFinder's existing methods of online data acquisition.

Until this point, the general practice had been to make any free datasets downloadable directly from the metadata via an FTP link. Users would download entire datasets at a time. However, many parcel data users did not want the entire seven county metro area, instead desiring only the portion for their area of interest. Furthermore, no mechanism existed to restrict downloading to just licensed users.

Based on the new functionality needed to distribute parcel data and on other feedback regarding DataFinder, a project scope was defined for the creation of a new tool.

4.2 Project Definition

In order to ensure that the scope of the project was adequately specified and would result in the creation of a new tool for DataFinder that would meet the needs, a team of 15 MetroGIS participants from 6 organizations was assembled. Members of this ad-hoc team helped during different stages of the project.

Using feedback from the parcel data forum and other sources, the team defined a reasonable set of requirements for the project. The definition of a scope stated that the application should satisfy the following objectives:

- Automate processes involved in distributing geospatial data via the Internet to the MetroGIS data user community, including a security module that provides the ability to distinguish between data requests that require licensing and/or fees and data requests that require neither.
- Provide the user with the ability to obtain data for self-defined geographic areas of interest (i.e., clip).
 - Allow users to select among available geographic datasets and attributes.
 - Provide users with multiple geospatial data format choices.
- Identify the possibility of integrating Open Geographic Consortium's proposed Internet Map Services standard into the solution.
- Provide a method for data providers to share their data via an application, but keep the data on their servers (i.e., create a distributed environment for data sharing).

In July 2001, MetroGIS published a Request for Proposals (RFP) for the development of an Internet enabled data distribution mechanism that encompassed and expanded upon the requirements listed above. The full "scope" section of the RFP can be viewed at http://www.metrogis.org/data/datafinder/data_distribution_rfp_scope.pdf. Seven proposals were received and two companies were interviewed. Syncline, Inc. of Boston, Massachusetts, was selected for the project. Syncline is a company that specializes in products and solutions that allow for the visualization, analysis, management and sharing of spatial data via the Internet.

Over several months, Syncline and MetroGIS further refined the project requirements, including two meetings between Syncline and the MetroGIS ad-hoc group. This refinement process was extremely important because it identified as many potential problems as possible in advance of actual application development starting. Two documents resulted: 1) a Functional Requirements Document (FRD) and 2) a System Design Document (SDD). The FRD can be viewed at: http://www.metrogis.org/data/datafinder/ieddm_func_req.pdf.

4.3 Café Application

4.3.1 Overview

The FRD and the SDD provided the blueprint for implementing the DataFinder Café. The Café can be logically separated into two parts – the server-side piece and the client piece. The client piece is the user application that allows for data browsing and data download. The server-side piece consists of modules that process requests from the client. These processes include providing graphics of GIS layers to the client, compiling data requested for download and changing format of the data as necessary. Both the server and client pieces of the Café are described below.

4.3.2 Café Client Application

To achieve the functionality requested by MetroGIS, Syncline recommended using a more sophisticated client than would be possible in a web browser. The decision was made to use Java Web Start for client application development. Java Web Start provides the ability to develop an application that is as flexible and robust as a desktop application, but yet also has the capabilities of web-based applications. For example, Java Web Start allows for the user to drag and drop data layers into the map, to draw an ad-hoc polygons and include "right-click" mouse functions. While such functionality could be provided through a web-based client with Java applets, it would take a lot longer to load each time – a factor that the MetroGIS team defining this project saw as a problem.

For the user, the use of Java Web Start means that to run the DataFinder Café, they are first required to perform a one-time install of Java Web Start and then install the Café application. While the initial setup of the Café may take the user a few minutes the first time, the load time and performance of the application is better than a web-based client because the application is actually on the users computer, and therefore loads

and runs faster. The next time the user starts the Café application, Java Web Start checks to see if a later version of Café is available at the server. If there is, then the newer components are automatically installed. This ensures that the user always has the most up-to-date functionality in their client and also allows for MetroGIS to make periodic updates to the Café and deliver them seamlessly to their users. A description of the Café client functionality follows.

4.3.2.1 Starting the Café

When starting the Café application, users are given the option of entering a user name and password, or running as an anonymous user. Anonymous users have access to all unlicensed data. Licensed users of the parcel data enter their user name and password to be able to view and download parcel data and any other datasets they may be licensed for in the future.

4.3.2.2 Viewing Data with the Café

When entering the Café, the user is first presented with a blank map on the left side of the window. On the right side, the user is shown a list of geospatial theme categories, the same ISO derived categories used in the DataFinder Catalog. The user may then click any theme category to see the available datasets within that theme. Individual datasets can be added to the map for viewing. With over 60 datasets already in the Café, the user can browse many combinations of datasets together that suite their individual needs. Each of the datasets has predefined symbology that is appropriate for that dataset.

The screenshot shows the MetroGIS Data Distribution application window. The main map area displays a map of several counties (Anoka, Hennepin, Ramsey, Scott, Dakota, Carver) with various colored points representing data layers. The right-hand side features a 'Catalog' pane with a tree view of geospatial theme categories. Below the catalog is a list of selected layers: Shopping Centers, Municipal Boundaries, and County Boundaries. At the bottom right, there is an 'Update Map' button. The status bar at the bottom shows a scale of 15.89 km (1:625755) and coordinates X: 529669 m, Y: 4916672 m.

Map will be empty when the application opens - you can add any datasets you want to view & extract

Open folders to view available datasets

Double click or Right-click & select Add to add data layer to map

If you have a license for parcel data you will have access to another folder that includes the parcel datasets

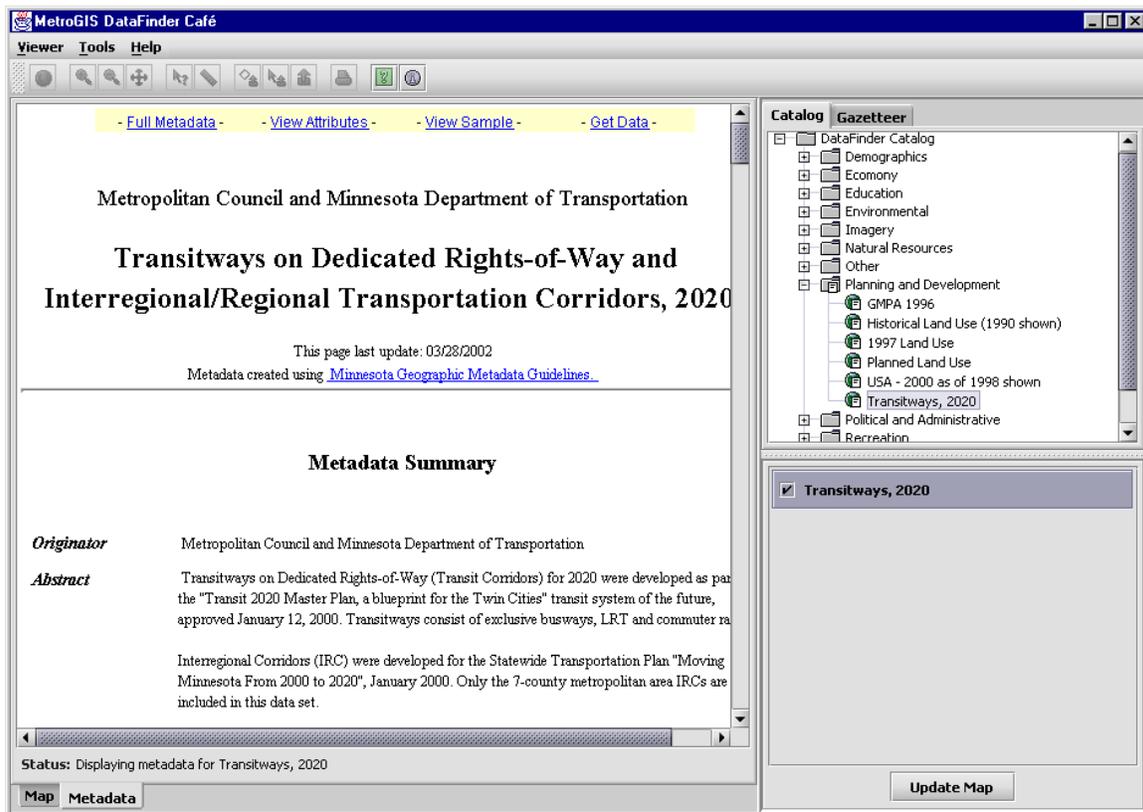
You can reorder data layers by dragging them to a new position.

Click Update Map button to refresh Map so layers draw

It is important to note that the focus of the Café is data distribution and not data viewing. Thus, from the start of the project, it was agreed that the viewing capabilities would be limited to those necessary for data acquisition purposes only. Therefore, no changes to symbology are permitted by the user. This decision has allowed MetroGIS to put some clear boundaries on the scope of the Café project, preventing what could be significant scope creep into the myriad of functionality associated with map symbology and rendering.

The DataFinder Café includes a Gazetteer function. This allows its users to zoom to predefined areas of interest such as counties, municipalities, school districts or watershed management areas. Standard zoom and pan map navigation functions are also available, as are a feature identification tool and a measurement tool.

In addition to data, metadata are also viewable in the Café. Users can click the metadata tab to view complete metadata for each dataset. Of importance here is a MetroGIS policy that requires any dataset available through DataFinder to be accompanied by complete metadata. MetroGIS has adopted as a metadata standard the Minnesota Geographic Metadata Guidelines, which are essentially a subset of the FGDC standard. Once the ISO standard is formally approved, the state of Minnesota will revise their metadata guidelines (with MetroGIS involvement) and MetroGIS will adopt the new standard.



4.3.2.3 Downloading Data from the Café

Three methods exist for defining the geographic extent of when downloading data from the Café. Users can draw their own ad hoc polygon, they can extract based upon the extent of a feature in an existing dataset (e.g. a city boundary), or they can extract based upon the current viewing extent in the application. Additionally, when users choose the option to extract based on an existing feature, they will also be able to

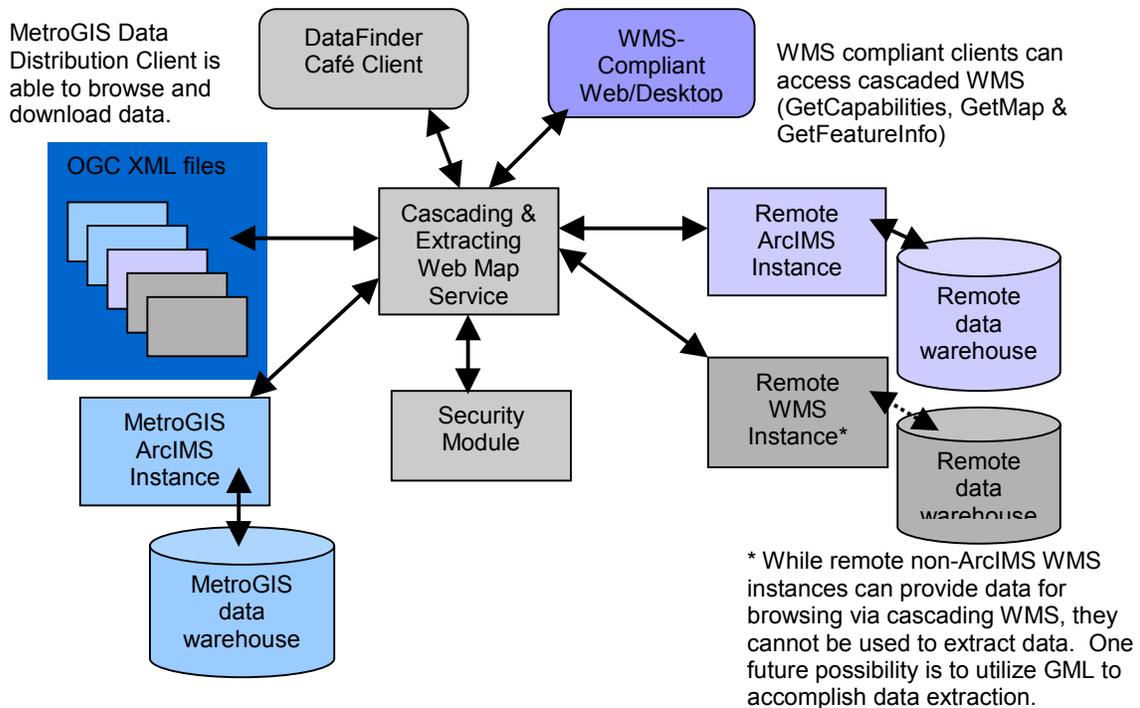
buffer this area by typing in a distance and selecting units, or by selecting from a pre-defined list of buffer distances. The other two extract options do not include buffer function.

When defining the geographic extract functionality, the design team decided that these extraction methods should not "clip" the features to the exact boundary specified. Instead, every feature that intersects the boundary should be included in its entirety. This method may deliver features that extend beyond the extraction boundary, but it also preserves attribute integrity. For example, an attribute that shows total population for a polygon feature would effectively be inaccurate if that polygon were to be cut in half by a clipping operation.

Once a user has defined their geographic extent of interest, the Café download wizard allows users to select the attributes (data columns) they wish to download. This is particularly useful for datasets with very large attribute tables, in which the user has need of only a few attributes. Next the user is able to select from a variety of spatial data downloading formats. The Café employs FME's Spatial Direct product to perform the data conversion functionality. Currently four spatial data output formats are available from the Café, ESRI Shape format (.shp), MapInfo format (.tab), Intergraph IGDS format (.dgn), and FME transfer format (.ffs). All datasets are downloaded in a compressed (.zip) file format. In addition to the actual datasets, the user is provided with an HTML metadata file for each dataset. Also each dataset can be accompanied by an addition file that may be a disclaimer, or a reminder of use and care of the dataset, or another type of document pertinent to the dataset.

4.3.3 Café Server Application

The server side of the Café application is what drives much of the Café client's functionality. The server side system is shown in the diagram below.



4.3.3.1 Cascading & Extracting Web Map Service

The main part of the system on the server-side is the Cascading & Extracting Web Map Service. This service is what accesses map services from potentially a number of different sources and combines them together (cascades them) to send them to the Café client. For example, if a user via the Café client wants to draw shopping centers and rivers layers in their map, the client sends a request to the server. The cascading map services then finds those datasets, which may come in one or more map services, and requests a graphic of those map layers. Next, the service combines those graphics into one graphic, which is why it is considered a cascading service. That single graphic is then sent back to the requesting client – showing the user their requested datasets in the map. This series of transactions occurs each time the user refreshes the map by panning, zooming or adding new data layers. The cascading map server knows which map layer comes from which map service because of a series of XML files. The XML capability files that adhere to the OGC WMS standard expose this information.

The Café system is compliant to the OGC web mapping service (WMS) standards. When cascading web service combines graphics together, it also sends the graphics and any other requests, such as tabular information, back to the client in WMS-compliant XML. The benefit of using this standard is that not only the DataFinder Café can understand this protocol, but any WMS-compliant client can. As this standard becomes more widely used, DataFinder map services will be available via many more software packages. For example the DataFinder map services may be viewed via the WMS viewer at www.wmsviewer.com.

A similar series of events to the cascading map service occurs when the user requests a specific extent of data to be downloaded. The Café map client sends the request. The extracting map service module in turn, using the XML files, finds which map service contains the data and then requests the data to be extracted by the user extent. The zipped files are then returned to the extracting service. If there are zip files gathered from more than one source, then the service unzips them all and re-zips them into one file to return to the user for download to their computer. If the user has requested a different data format than the ESRI shapefile format, as each zip file is unzipped for assembly into one zip file, the format of the data is also changed by running a side request to the SpatialDirect software. The ability to extract data is not included in the OGC WMS standard, so the XML files were extended by Syncline to include custom vendor tags specific to this function. Additional custom tags also indicate the location of the “notice” file that is included with the data bundle in addition to the metadata HTML file.

4.3.3.2 Remote Nodes

As the diagram shows, the system can have inputs from multiple map services. This meets one of MetroGIS requirements in defining this project – that the system be truly distributable. The datasets that are show in the DataFinder Café client may come from many different organizations and many different servers, but this is not evident to the user. This achieves an important goal of centralized data distribution through a one-stop shop, without the need to centralize data, which ultimately reduces data redundancy and also ensures more current datasets. Currently, the remote nodes in the Café system can serve either ArcIMS map services or OGC-compliant WMS map services to have data be viewable in the Café client. However, for data to be downloadable, the map service *must* be an ArcIMS map service. So, while remote non-ArcIMS WMS instances can provide data for browsing via cascading WMS, they cannot be used to extract data. One future possibility is to utilize GML to accomplish data extraction, but at the time of development, MetroGIS felt that the GML standard and the related Web Feature Service (WFS) were not stable enough to integrate into the solution. This is one of the enhancements that MetroGIS hopes to implement in the future.

4.3.3.3 Security Module

The security module of the system is what regulates which users have access to which datasets. The users and their permissions are stored in an Oracle database and each time a user logs into the Café client, the database checks which datasets they have access to and then only includes those datasets in the Café catalog list. A web-based administrative console allows for easy updates and edits to this security system.

4.4 Project Costs

The project to develop the DataFinder Café has several direct and indirect costs. The direct costs to develop the Café are as follows: SpatialDirect software - \$22,050 and Syncline application development - \$55,895.

Indirect costs include items that have a definite cost, but were already accounted for by the GIS department at the Metropolitan Council. If this system were to be replicated elsewhere, such items would need to also be factored into the overall cost of the project. These items include a web-server class computer, ESRI ArcIMS software and the staff to support them.

Ongoing costs anticipated to support this system are maintenance fees on ArcIMS, Spatial Direct and support as needed from Syncline to troubleshoot any problems that may occur. In addition, staff will be needed on an ongoing basis to maintain the Café and the supporting software and hardware.

5 DataFinder Café Evaluation

5.1 Café Status

Currently, the DataFinder Café has 60+ datasets available for download via the Café client. In addition those datasets can be accessed as a WMS simply for browsing using the Café client or other WMS-compliant clients. Data producers can provide their datasets to MetroGIS for hosting on the MetroGIS server, or can be a remote node to the Café if they are running ArcIMS. When this functionality was put in place, in April 2002, MetroGIS conducted a feedback survey to ask users for their input on the DataFinder Café.

5.2 User Feedback

In order to obtain feedback on the DataFinder Café, over 80 individuals were encouraged to test the application, and each tester was encouraged to fill out an online survey to comment on and rate several aspects of the application. A summary report was created of the test process, objectives, participants, comments and rating results, and actions taken to address issues identified by the beta testers and can be viewed online (http://www.metrogis.org/data/datafinder/beta_summary_final.pdf). The comments submitted by users together with comments that have been received since the testing period expired indicate the new application is generally being well received. A selection of these positive” comments is as follows:

- "Very easy to download & install."
- "Very intuitive design; pays off if you are an ArcView user, but could figure it out without difficulty."
- "I like the fact that when you download the parcel data you receive metadata as well as use and care information. Gives people a second reminder."
- "This site is incredible, what a fantastic application, great job. We will be setting the link on our site for our customers to use it to get data."
- "Overall, this is what I envisioned MetroGIS would become when first involved back in 1995-6 – GREAT WORK!"

In addition to these comments, several good ideas were provided for ways to enhance the Café. These suggestions form the basis for the next steps will be taking to improve and enhance the DataFinder Café.

5.3 Additional Success Measures

In addition to the feedback received via the feedback survey, MetroGIS has received significant interest in this project from both MetroGIS data producers and the State of Minnesota, which we acknowledge as a strong endorsement that the Café is successfully meeting data distribution needs.

There has been a strong interest from MetroGIS data producers to become remote nodes to the Café from the producers. They understand how this will eliminate many of their needs for day-to-day data fulfillment. In addition, other data producers have become more interested in posting their data on the MetroGIS server and on DataFinder because they see that this new Café tool can meet many of their customer needs for data. MetroGIS feels that the Café offers a flexible solution for participants and has encouraged increased participation from MetroGIS organizations.

In addition to interest from data producers, some of the most encouraging support for DataFinder Café has come from the Land Management Information Center (LMIC). This state entity has submitted for a grant to extend the Café model to State level. The grant envisions that Café would allow Minnesota State agencies to share data via a one-stop location without much of the data redundancy that occurs now.

5.4 Next steps

5.4.1 Café enhancements

While the current version of the DataFinder Café is well received and fills an important role, some important next steps are already planned. The enhancements given below result from feedback provided during the beta test.

One of the problems with the current Café is created by two conflicting functions of the application. One function allows users to download only datasets that they have drawn on the screen. The other function sets scale dependencies for drawing datasets, so that a user would not be able to draw, for example, an entire county of parcel data. The purpose of this latter feature is to prevent users from getting stuck with enormously long draw times. Because of these two features, users have no way to download an entire county parcel dataset, because they can't draw it. Since downloading a full county is expected to be a common task, one of the most important near term enhancements will be to implement separate viewable and extractable extents for datasets.

Another important enhancement will be a projection/coordinate system conversion utility. Currently, the seven counties in the metro area, as well as most local government units, use 5 different state sanctioned county coordinate systems. State and regional users typically use the UTM zone 15 coordinate system. While the Café uses UTM coordinates, the ability to re-project remote map services as well as re-projecting data for download will increase the efficiency with which the MetroGIS community can use the GIS data resources available on DataFinder.

An additional technical next step involves providing additional output data formats. ArcInfo export (e00) file format, AutoCAD DWG, and DXF are being considered.

Another enhancement that will extend data download from remote nodes would be to integrate the use of the Open GIS Consortium's GML data format into Café. This would allow the DataFinder client to extract data from non-ArcIMS map servers such as Minnesota MapServer or Intergraph's GeoMedia Web. This would significantly help MetroGIS reach its goal of being vendor neutral. While the funds for this enhancement are not yet available, MetroGIS hopes to pursue this functionality in the near future.

5.4.2 Café Extensibility

On an administrative and policy level, MetroGIS is working closely with the State of Minnesota as it begins to assess the benefit of expanding the Café model on a statewide basis. MetroGIS is extremely motivated to leverage its investment in this technology by sharing it with partner organizations. The

contract with Syncline permits MetroGIS to share the complete application with any government unit in Minnesota provided MetroGIS believes sharing it would further its goals and objectives.

6 What have we learned?

MetroGIS considers the DataFinder Café project to be a success. During this project, we learned several things that may be of interest to others undertaking similar projects.

- The use of standards is very important for creating a scalable and long-lasting product. For example, the Café outputs Web Map Services (WMS) and we are confident that as clients for WMS become more widely available, those clients will be able to leverage Café's services. In addition, the use of standardized metadata as a requirement for data to be hosted by Café means that users are assured that they can find out about each dataset to see if it meets their needs. This can be achieved quickly because all the metadata adheres to the same standard – ensuring that information is easy to find and easily comparable between records.
- While standards are important to follow, data users and providers needs must also be considered if the project is to be a success. For example, adhering to the WMS standard for map services will prove to be valuable in the long run, most of the data producers in MetroGIS who had map service capabilities used ArcIMS. To make it easy for these producers to be involved in the project and to include their data remotely, it was advantageous to have the system use ArcIMS services directly. This allows more organization to contribute their data from a remote node with less up-front work on their part – which is a definite incentive to participate
- Paramount to the success of this project was a strong effort at good documentation. The creation of a functional requirements document and a system design document was the key to maintaining an understanding of the project objectives and scope. This documentation was essentially written through a mutual effort between Syncline and MetroGIS staff. It sets the stage for expectation for both Syncline and MetroGIS. For example, when beta testers requested that changing symbology would be a nice enhancement, we had already addressed this issue within the documentation phase and knew it would be out of scope for this project. Closely tied to documentation, it was also beneficial to see this project a simply Phase 1 of a long-term vision of data distribution. Symbology and other enhancements could be implemented in a later phase.