Nebraska*MAP*

Nebraska Geospatial Data-sharing and Web Services Network

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Table of Contents

Appendices

Executive Summary

The Nebraska Geospatial Data-sharing and Web Services Network (now known as NebraskaMAP) is a collaborative project initiated by the Nebraska Information Technology Commission (NITC) GIS Council and endorsed by the Nebraska Information Technology Commission (NITC) as an enterprise "shared services" project. The goal of NebraskaMAP is to develop an enterprise-level geospatial data-sharing network for finding and providing online access to Nebraska-related geospatial (GIS) data available from a wide range of state, local and federal agencies. Another goal of this data-sharing network is to provide a wide range of geospatial data services that could be developed collaboratively at the enterprise-level and then used and/or consumed by a range of public agencies, thereby avoiding unnecessary duplication of effort to develop and maintain these data services in multiple public agencies.

Following an initial examination by an interagency exploratory committee, it was recommended that the Nebraska Office of the Chief Information Officer (OCIO) be the lead agency to undertake the implementation of this collaborative project. The NITC GIS Council endorsed this lead agency recommendation and the OCIO agreed to undertake the implementation lead. A Project Charter was developed (Appendix 1) to define and guide implementation of this collaborative project. As part of that Project Charter, the formation of an interagency NebraskaMAP Partners Committee was recommended to help advise and guide the OCIO in the project development and implementation.

In January of 2009, Dan Pfeffer was hired as the project administrator. During the two years of the project, Dan oversaw the development of an online portal (http://www.nebraskamap.gov/) and the population of that portal with a range of state-wide data. The portal now provides the capability for state and local agencies to distribute common datasets (such as aerial imagery) from a single resource. Resources on the portal include state-wide basemap layers, 2010 FSA imagery and a state-wide Geocoding service (the ability to geocode single or batch addresses for any address in the State of NE based upon Centerline Street.) The portal also provides an environment where GIS users statewide can discover, download, visualize, and publish geographic information. The Metadata Catalog provides users a library of available spatial datasets and web services from all levels of government throughout Nebraska and offers a tool for agencies to create their own metadata in a widely-accepted standard format. The portal delivers state-wide or multi-jurisdictional datasets via easily consumed web service for users to pull into their GIS software on demand without needing to store the data locally.

Near the end of the two-year pilot project, the customized project infrastructure was transferred to the facilities of the OCIO. Overall project coordination is now provided by the OCIO GIS Administrative Manager, with interim technical support for the project provided by Sudhir Ponnappan, Nebraska Game and Parks Commission, and Steve Rathje, Nebraska Department of Natural Resources. This is an interim arrangement while the NebraskaMAP Partners Committee works with the OCIO to arrange for dedicated project support personnel.

To sustain and continue the development of the NebraskaMAP project, it is the recommendation of the NebraskaMAP Partners Committee that, at a minimum, a position of at least one FTE be established. The person hired for this position would be required to have relatively advanced GIS technical skills and experience. It is a further recommendation of the committee that a fully licensed suite of ESRI software be required to provide the foundation to sustain and continue development of this very important collaborative enterprise.

Introduction

A wide variety of state, local, and federal agencies develop and maintain GIS/mapping data. One of the real strengths of GIS tools is the ability to bring together and analyze GIS data on many different themes (natural resources, infrastructure, political boundaries, socio-economics, current events, etc.) to support public policy decisions and implementations. To make optimum use of these tools, it is critical in today's e-gov world to be able to quickly and reliably access and/or share up-to-date data between public agencies (state, local, regional, and federal.) This is particularly true with the wide range of applications using GIS/geospatial technology. So much of the power of GIS lies in its ability to integrate and analyze data from multiple sources, based on location or place. Current GIS technology enables the development of networks and services to provide reliable access to these types of data from multiple sources. A well-developed and supported enterprise-level data-sharing network can provide reliable online data access and services to a wide variety of public agencies at all levels of government. It would minimize the need for multiple agencies to individually invest public resources to develop redundant systems that require expensive software and personnel with high-end, specialized GIS technical expertise. With the support of startup grants from the NITC, the Nebraska State Records Board, and the U.S. Geological Survey, the OCIO and UNL are working with several state and local agencies to develop NebraskaMAP, an online GIS data-sharing and data services network (Appendix 2.)

In the initial phases of developing this collaborative project, the project participants defined a shared vision for a Nebraska enterprise-level, geospatial data-sharing network with related data and mapping services. The vision focused on developing a data-sharing network that would enable agencies to access, in an automated on-demand mode, up-to-date data from multiple participating (state, local, regional, and federal) public agencies. Because some of the data of interest would be sensitive, security and permission protocols were to be integrated into the overall network design. To encourage maximum participation and utility, the data-sharing network was envisioned to have both an open public access/view and a private-secure access/view component. When fully developed, this data-sharing network would support a wide range of GIS/geospatial applications that require regular, dependable access to up-to-date data from multiple sources. The shared vision also included provision of the technical support necessary to maintain these services and assist public entities in accessing and building applications based on these enterprise services. The project participants noted the importance of defining, over the course of the pilot project, the requirements for supporting and sustaining this enterprise service beyond Dec. 2010, when its initial start-up funding ended. As the pilot project progressed, this initial shared vision evolved to adjust to the practical realities of the resources available, limits and challenges related to implementing new technology, and the interests and priorities of the participating partners. Throughout the project, its development was guided by an intergovernmental project committee and the NITC GIS Council.

Advisory Committee

The Nebraska Office of the Chief Information Officer (OCIO) was the lead agency for this collaborative interagency project, and, as such, had the final responsibility and authority for all project implementation decisions. The OCIO entered into a two-year contract with the Center for Advanced Land Management Information Technologies (CALMIT), School of Natural Resources, University of Nebraska-Lincoln (UNL), to provide project management and technical leadership and support for this project. Dr. James Merchant, CALMIT Director jmerchant2@unl.edu, served as the principal investigator.

An interagency NebraskaMAP Partners Committee (Table 1) was formed to provide guidance and recommendations to the CALMIT project management team, the OCIO, and the Nebraska Information Technology Commission (NITC) GIS Council on policy, technical issues and priorities related to the overall project design, implementation and on-going operation. The Partners Committee represented the community of potential users of the network, with membership and voting rights determined by the NITC GIS Council. As additional agencies/entities joined the current partners in supporting and participating in this collaborative effort, their representatives were added to the Partners Committee. This commitment to active participation and support by multiple state, local and federal agencies was critical to the successful launching of this intergovernmental collaborative project.

Table 1. NebraskaMAP Partners

Nebraska GIS Council
Nebraska Office of the Chief Information Officer
City of Lincoln/Lancaster County
City of Omaha/Douglas County
Nebraska Department of Natural Resources
Nebraska Department of Health and Human Services
Nebraska Department of Roads
Nebraska Emergency Management Agency
Nebraska Game and Parks Commission
Sarpy County
University of Nebraska-Lincoln Libraries
University of Nebraska-Lincoln School of Natural Resources
UNL Center for Advanced Land Management Information Technologies (CALMIT)/NebraskaView
U.S. Geological Survey

One of the first tasks of the committee was to develop a position description (Appendix 3) and hire a Project Administrator. Following a national search, Dan Pfeffer, was hired in January 2009 through CALMIT and UNL to provide project management and technical leadership for this project. He and Dr. Merchant, in consultation with the OCIO and the NebraskaMAP Partners Committee, were responsible for the day-to-day management of project implementation.

Scope and Objectives

The development of an intergovernmental geospatial data-sharing network involves a complex matrix of issues (networking, data exchange standards, data transformation, data documentation, data archiving, security, data-sharing agreements, database administration, enterprise administration requirements, operations and maintenance requirements analysis, data viewing and query applications, online data and mapping services, outreach/education, etc.) To address these issues, the overall project was divided into a series of project phases projected to extend over a two-year startup period. Each phase was designed to achieve concrete deliverables and to provide specific advances in interagency data exchange capabilities. Each project phase was also designed to build on the previous phases and to be adjusted based on the lessons learned in the previous phase. For example, sensitive data would not be available through the data exchange network until the later phases of the project, after security and permission protocols had been developed and tested. As part of this learning and building process, it was anticipated that the design of the project phases would evolve over time.

Integral to the design of this project was the concept that much of the data to be shared would not be hosted in a central repository. Much of the data would be hosted on servers operated by the original data-producing agency, but would be accessed through a central GIS portal. This decentralized approach also applies to accessing online GIS mapping and data services provided by remote site project partners. The project design, however, also included a central data repository and mapping server that would enable agencies not currently providing online mapping and GIS data services to participate in the project by hosting their data on the project's data repository and servers. For some agencies this data repository would also act as a data security backup.

The goal of the project design was to be friendly and useful to GIS users with a wide range of GIS experience and sophistication. Although early efforts focusing on putting in place the basic infrastructure and protocols may not be especially user-friendly, the overall design goal of the project was to produce an online GIS interface and tool set that would be easily accessible to unsophisticated GIS users. At the same time, the project would also develop a robust functionality that would serve more sophisticated GIS users. Agencies would be able to develop online applications that could execute and rely on background calls and links to the online GIS mapping and data services provided by the network.

The portal primarily utilizes the ESRI GIS suite of software tools for its project hardware and software architecture. This design decision was based on the fact that the overwhelming majority of GIS users in Nebraska currently rely primarily on ESRI software and that ESRI is the primary GIS software provider nationally. At the same time, there was a commitment to develop the architecture of the system so that it would allow inputting and exporting of geospatial maps and data services in formats compatible with a wide range of GIS, OpenGIS and computer-aided design software packages and standards. The establishment of live links to GIS applications developed and running under other non-ESRI GIS software was also addressed during the design phase of this project.

Issues impacting the project's long-term sustainability and use were researched and proposals developed, as part of the early design and implementation phases of this project. These issues

included training for agency developers and network users; marketing and outreach to increase awareness and use of the network; map and data services needed by the partners, and on-going network maintenance, support and enhancement.

NebraskaMAP Project Plan

The NebraskaMAP Partners Committee developed a draft project plan (Appendix 4) that included broad Phase I objectives related to the selection, acquisition and installation of the project hardware and software. The goal was a functional architecture that allows access to data between a subset of participating agencies. Phase II included the development of data standards and enhanced data access, as well as the identification of requirements for technical staff to maintain the project. The final product would be a functioning repository populated by non-sensitive data. These objectives were subsequently revised by the project administrator into the principle tasks described in the following section.

Implementation

Portal Review

Functions required for the Nebraska geospatial portal were identified by reviewing what other states were doing with their interpretations of metadata portals. Dan reviewed four state portals and presented them at the NebraskaMAP Partners Committee meeting in March of 2009. Four state portals were presented to the NebraskaMAP Partners Committee and each portal was very different from the other. None of the state portals were created with off-the-shelf software.

- Arizona – http://agic.az.gov/portal/dataList.do?sort=theme&dataset=362 Arizona's portal approach is one long list data layers. Each of their data layers has a hyperlink that pops up a short description of the data (Title, Publication Date, Origin, Abstract, Projection, Download Size, and Last Update). It also has a link to the formal metadata record. It's an HTML website with no content management system or underpinning database. Someone is charged with updating HTML files to keep the portal updated.
- Arkansas - http://www.geostor.arkansas.gov/ Glen Rhea (Administrator of the Arkansas GeoStor) glen.rhea@arkansas.gov said that for the Arkansas portal searching is everything, which is probably why it's the only function short of a menu on their home page. When you perform a search the portal actually pops up instructions in the upper right corner for your next steps. The search does yield a list of applications, downloadable data, and consumable services for your desktop software. There are also links to the metadata records and thumbnail pictures of the dataset.
    - GeoStor hosts applications and data on behalf of state government and county government.
    - GeoStor has projected all of the hosted data into one common coordinate system.
    - GeoStor has gone to great lengths to share code. By clicking on "Developers" in the menu there are links to the code that makes the GeoStor work.
    - GeoStor employs three people, an administrator, a technical 'guru', and a technician.
    - Other features provided are an FTP site to download datasets, and a blog.

- Kansas – http://www.kansasgis.org/ The Kansas Data Access and Support Center (DASC) offers a variety of services and perhaps the most important one is their data catalog. Currently there are 174 layers in the catalog. The catalog breaks up the data into ISO Topic Categories, with each category expandable to reveal the layers of data inside of it. This data in the catalog is in Microsoft Access and the portal is written in Cold Fusion.
    - Each data layer has a Data Description, Preview, File Download, Online Service link, and Metadata.
    - If a user would like to download data they can do so but they have to be logged in to perform any downloads. DASC audits the download information for reporting purposes.
    - DASC's recent focus has been to create GIS widgets for government agencies to use on their websites. Ken Nelson nelson@kgs.ku.edu the GIS Section Manager of DASC explained that they are creating widgets that are very simple and meet the demands of ninety percent of the mapping needs. They contain in most cases no more than the following capabilities: search, zoom in, zoom out, identify.
    - I asked Ken Nelson about ESRI's Geospatial Portal Extension and he thought that it was a fine product that they certainly would use if they wanted to go in a different direction, that it basically is accomplishing what they are doing from a metadata standpoint.
    - Ken indicated that they have over 25TB of storage space on their servers and were looking to purchase more storage space. This is expected to exponentially increase as they are hosting county aerial photos.
    - Joe Eckmann, Senior Account Manager at ESRI-Kansas City jeckmann@esri.com was kind enough to arrange a meeting with DASC staff on June 17th, 2010 and prepare a memorandum of his notes which is included in Appendix 5
    - Utah - http://agrc.its.state.ut.us/ Utah's approach to their metadata portal was to use an Open Source Content Management System (CMS) called Joomla. The advantage to this approach is once an article is written it is committed to a database, not a static HTML file. So it can be easily recalled to unpublish it or set to publish at a later date. Joomla also allows users to register and commit their own articles to the website. Their website acts as the one stop shop for all things Utah GIS.
    - They have links to PDF maps, links to other organizations. Basically this portal is set up to point you to GIS resources throughout the state.
- James Langtry (U.S. Geological Survey State Liaison) and Dan Pfeffer attended a Mid America Geographic Information Consortium (MAGIC) planning retreat in Branson, MO and confirmed that Arkansas, Missouri, and Kansas have their data backed up at each other's locations in the event of a disaster. They would provide the same kind of mirrored site organization if this project desired it.

At the January 2009 NebraskaMAP Partners Committee meeting different portal ideas and implementations were reviewed.

- Geospatial Portal Technology – The Geospatial Portal is an extension of ArcGIS Server and is free open source software. The Geospatial Portal has the ability to create a data catalog with sections divided into ISO Topic Categories.
  Administrators can securely create, maintain, and harvest metadata from other portals and REST services sites. The end product is a site that allows users to easily discover metadata that is connected to a data service or linked to a downloadable file.
  Part of this presentation by Joe Eckmann, ESRI Senior Account Manager, included a discussion of Portal Toolkit Training and Implementation. This would include a proposed

scope of work for a week of training and customizations from Dr. Clive Reece, GeoPortal Solutions Manager creece@esri.com (Appendix 6).

- Virtual Alabama – This is a common operating picture for emergency management hosted by Google. It assembles all of the data from city, county, and local governments into the Google data format and allows its users to overlay that data on Google Earth. Discussion of this application was eventually tabled because it was too narrow of a scope. This seems like something that could be potentially leveraged at a later date by an agency that needs this sort of application.

Portal Selection

At the February 2009 NebraskaMAP Partners Committee meeting we selected ESRI's Geospatial Portal extension for ArcGIS Server. This software makes the most sense because of most of the user's familiarity with ESRI software. UNL's licensing agreement with ESRI allows the Portal extension to be installed and beta tested at little or no cost. In the event this isn't what the NebraskaMAP Partners Committee wants, we can select a different path at the end of testing. During demonstrations of the Geospatial Portal it's clear that this allows many ways of discovering data, which is good because we all discover data differently. The key to the portal is the text search but users can also browse a map for data, browse through a catalog, or even subscribe to a Real Simple Syndication (RSS) for a feed which would supply users with an update of metadata changes.

Hardware Installation

The hardware and software specifications were created by researching ESRI's website (http://www.esri.com) and then presented at our February 2009 NebraskaMAP Partners Committee meeting. The document provided a strategy for hardware and software purchase and included specs for ArcGIS Server, ArcGIS Server Image Extension, and GIS Portal Toolkit (Appendix 7).

The following is the hardware purchase made at the University of Nebraska-Lincoln.

- Main Server
  - Dell PowerEdge 2970
  - 2 TB Storage Raid 6
  - Dual quad core AMD Operton 2350 Processor
  - 16 GB Memory
  - Windows Server 2008 R2 Operating System
- Virtual Machine Occupied by NebraskaMAP Project
  - 865 GB Storage – which was eventually expanded to over 1 TB
  - 3071 MB Memory
  - 2 Virtual Processors
  - Windows Server 2003 R2
- OCIO Virtual Machine
  - 95 GB Local Storage
  - 2 GB Memory
  - Windows Server 2008 R2 Standard Operating System
  - Intel Xeon 2.40 GHz Processor

Challenges – Because the project resided on a virtual machine the allocation of disk space, memory, processor resourced and network addresses was challenging. We initially did not allocate enough space on a second drive for the data to reside and should have done so. We created a tiled and cached image service for the Farm Service Agency (FSA) 2006 imagery files and ran out of storage. On a new system we should run software off of the first drive and data off of the second drive. If we had done that we would easily rebuild the operating system and programs without having to touch the data.

Software Installation

At the time of the first installation of the project on University of Nebraska-Lincoln (UNL) servers the available choices for the software list below was limited. If any one piece of software was required, it limited the selection of the next software. Java in particular was required to be a very old installation. Because the GIS Portal Toolkit has matured, software limitations are by far less limiting but there are some and mostly pertain to Java.

- Operating System – We installed Windows 2003 SP2 because of the requirement to use Microsoft SQL Server 2005
- Database – We installed Microsoft SQL Server 2005 SP2
- Java Development Kit – We installed Java JDK 5
- Servlet Container – Apache Tomcat 5.5
- HTTP Server – IIS
- Mail Server – Mail server access is necessary to allow email notifications from feedback, data download, and metadata harvest.
- Servlet Engine – Apache Tomcat
- OpenDS – Is a free open source directory service that allows us to set permissions for the portal Toolkit.
- LDAP Browser – JXplorer 3.2 is the front end to OpenDS and allows us to easily see and grant permissions for the users of the portal.
- ESRI JavaScript API – The gpt.xml file has to be set up to allow the preview map with footprints.
- ESRI - ArcGIS Server
- ESRI – ArcGIS Server Post Installation
- ESRI – ArcGIS Desktop – The only reason this needs to be installed on the server is to publish services.

The software installations actually went fine until you reach the point where you have to edit the gpt.xml file. Page 5-9 of GIS Portal Toolkit Training Workshop Lectures begins to cover the Grid Packaging Tool (gpt.xml) file (Appendix 8) and all other configuration files.

Key file locations for the GIS Portal Toolkit:

- GIS Portal Toolkit Application – Apache Tomcat folder …/webapps/geoportal
- JNDI configuration – Apache Tomcat folder …/conf/Catalina/localhost/gpt.xml
- The gpt.xml file can be found in the Apache Tomcat folder …/geoportal/WEB-INF/classes/gpt/gpt.xml. This is the main configuration file for the entire application.

Portal Metadata Development

Adonna Fleming, UNL GIS Librarian and Dan developed the FGDC-compliant metadata standards that would be used with the NebraskaMAP portal (Appendix 9). The Partners Committee

recommended that a minimum number of fields be required to reduce barriers to metadata input. Dan and Adonna developed a set of required fields that would adequately describe the data, yet not discourage entry of data.

- Recommendations for portal metadata functionality made to ESRI included:
  - Anytime a new user registers for the portal an email should be sent to the designated portal administrator
  - Anytime new metadata is committed to the portal by a user an email should be sent to the designated portal administrator
- Portal Administration Team (as of 1/31/11)
  - Metadata – Adonna Fleming, UNL GIS Librarian afleming@unlnotes.unl.edu
  - Portal Software and ArcServer Support – Sudhir Ponnappan, Nebraska Game & Parks Commission GIS Specialist Sudhir.ponnappan@nebraska.gov
  - OCIO Support – Tyson Searls Tyson.searls@nebraska.gov
  - Website Splash Page – Larry Zink, GIS Coordinator State of Nebraska larry.zink@nebraska.gov

Portal Toolkit Training

ESRI Portal Toolkit Training was delivered by Dr. Clive Reece on June 15-17, 2009 in Hardin Hall on UNL's East Campus. The scope of the training was to learn about metadata standards, the functions of ESRI's portal, and to create and customize our own portal.

Each of the eleven students built their own ESRI Portal Toolkit over the three day period. In the event that the portal at the OCIO needs some tech support, the students should be able to assist or ESRI Tech Support should be able to offer assistance.

One June 18-19 Dan Pfeffer and Clive Reece installed version 9.3.1 and customized the new portal to handle the Nebraska FGDC standard.

Metadata Training

Half day metadata training sessions were held on July 28, July 30, August 3, and August 5, of 2010 in Hardin Hall on UNL's East Campus. The training was developed and implemented by Adonna Fleming (UNL GIS Librarian), Milda Vaitkus (CALMIT Project Manager) and Dan Pfeffer.

Topics addressed included registering for the portal, editing metadata in ArcCatalog for the purpose of importing into the portal, the Nebraska FGDC format, and searching for metadata.

Specific topics were how metadata works, how to construct a search that will get you the information you want, and the importance of standards. Each field in the Nebraska FGDC format was described and explained. The rationale for using this format with fewer fields, rather than other metadata formats, was also discussed.

Administrating the metadata in the portal was explained. Each of the users left the training with enough experience to be able to import a metadata record from ArcCatalog or to create their own, and commit the metadata for approval.

The last part of the training was available for users to import or create their own metadata. Training sessions lasted a total of 2.5 to three hours.

Roughly thirty people attended the training.

Training and technical support documents used in metadata training:

- How to export metadata from ArcCatalog – http://www.nebraskamap.gov/documents/arccatalog.pdf
- *Content Standard for Digital Geospatial Metadata Workbook* – http://www.nebraskamap.gov/documents/csdgm.pdf
- Graphical Representation of *The Federal Geographic Committee's Content Standard for Digital Geospatial Metadata* – http://www.nebraskamap.gov/documents/graphical_csdgm.pdf
- *FGDC Metadata Quick Guide* – http://www.nebraskamap.gov/documents/metadataquickguide.pdf
- NebraskaMAP Metadata Profile – Appendix 9
- Getting Registered – http://www.nebraskamap.gov/documents/portalregistration.pdf
  NebraskaMAP Geospatial Portal Metadata Workshop – http://www.nebraskamap.gov/documents/portalworkshop.pdf

Street Centerline Project

In a separate effort, the OCIO was working with an overlapping group of state and local agencies in pursuing the development of a composite street centerline dataset to be developed by integrating data from multiple sources. This state-wide dataset was designed to support a wide variety of applications, including the Nebraska State Patrol's Computer Aided Dispatch (CAD) system.

After much discussion by the NebraskaMAP Partners Committee, it was decided that the availability of an accurate and current state-wide street centerline/address dataset was needed to support a variety of NebraskaMAP applications and services. Therefore, the committee proposed that Dan, based on his experience with street centerline work prior to this project, would take on this additional task.

The process used for creating one state-wide street centerline shapefile is described below. All of the data were county-based. Ninety county datasets were created using Public Service Commission (PSC) funds for the purpose of supporting E911 Computer-Aided Dispatch software.

Street Centerline Process:

- Street Centerline Shapefile – A state-wide street centerline shapefile would be assembled using the data specifications as laid out in the Street Centerline RFP section titled *Desired Minimum Set of Populated Attributes* (Appendix 10.) Three counties of data are very complete and most of the attribute needs are met for Douglas, Lancaster, and Sarpy Counties. The other ninety counties have limited attribute completion. The reason for this is their needs do not require much more data than calling out an address. The theory is the address is a unique feature in the county, that there are no duplicates. So while the fields are in the source data, much of the data is unpopulated. Population of the missing data which is

mandatory for a geocoding service and for the Nebraska State Patrol's CAD. Those systems simply could not use the data in the provided state.

- A lengthy process occurred to get the centerlines in a useable format (see Appendix 10.) While regular Portal ToolKit work was being conducted, any extra time was committed to creation of the attributes. We conservatively estimated around three months of full time work to successfully assemble this data.
  In the event another update needs to occur, it will take far less time. Most of the counties probably have had little or no changes to their data, and the process has already been defined in the event a county has changed. The editor could run the update process on a needed county and easily replace the source data. The specific process for creating the state-wide street centerline shapefile is provided in Appendix 11.
- Geocoding Service –The shapefile is committed to SDE. Then in ArcCatalog the ArcToolBox dialogue is spawned and the user should click on Geocoding Tools > Create Address Locator. Then the user completes the form by selecting the source of SDE, the source of the centerlines in SDE, and the geocoding format which in this case is US Streets with City, State, and Zip. Finally the attributes are matched from source to destination in the 'fields' dialogue and then start the creation of the geocoder. From start to finish this process takes maybe ten minutes.
- Basemap REST Service – Because the project secured the Image Extension for ArcServer it was pretty easy to set up a consumable service through the project website REST SERVICES. This would allow anyone with ArcMap on their desktop to have an imagery service of the Nebraska street centerlines with the same look and feel as the ESRI Streetmap found at http://server.arcgisonline.com/ArcGIS/rest/services/ESRI_StreetMap_World_2D/MapServer. Data in this format also allows users to build web applications called Application Programming Interface (API) using the basemap REST service. The advantage is you don't need to have the data locally on your computer; you can consume it from an off-site location. To achieve the ESRI StreetMap look and feel the StreetMap Web Kit was downloaded from ESRI's website. The download includes an MXD file (project file for ArcMap) that can be customized with your data. The MXD includes different scale levels that have customized layers and labels showing. As you zoom in on the service, more layers and labels appear, giving it greater definition.
  Once the project is completely customized, it can be exported to a service with the Map Service Publishing Toolbar as a Map Service Definition (MSD) file. According to ESRI this greatly increases the speed of the data.
  Once the MSD file is created make sure it is saved in your ArcGIS Input directory. Then go to that directory in ArcCatalog to publish it. Once the service is published right click on the new service to change the service to a tiled/cached service. This will pop up a new dialogue. You will want to make sure the imagery is set to JPG. JPG are smaller files that draw much quicker. You will also want to set the scales of the tiles. Those scales are the same ones that were set up in the original ArcMap project.
  After that it's simple as starting the build of the tiled/cache. This will take from one day to a week depending on the amount of scales you want to commit.

This process would be very useful for the State of Nebraska if they wanted to create services for all of their years of aerial imagery. The tiled/cache is very quick because the source data is never called upon until the bottom scale.

Nebraska State Patrol (NSP) CAD – The NSP purchased software called Tiburon which is a CAD that provides dispatching and incident control. Upon purchase of the software they had a dataset created on the best available and complete county data and the Nebraska Department of Roads (NDOR) centerlines which ended up being around thirty counties worth of data. Because most of the 93 counties have since been mapped this was an obvious need for NSP and they would provide funding for the completion of the data assembly.

The NSP CAD data requirements are described in Appendix 10, titled *Nebraska State Patrol CAD Database Characteristics*. Most of these data are simply a subset of the Nebraska Street Centerline and were exported from that. However one of the main issues with this process was the attributes were required to be capitalized. Which required exporting the attributes out to an Excel file and set all of the fields to "=UPPER" and then copy and replace the code for values. Then this file would be married to the geometry and recalculated to the appropriate fields.

The biggest issue with completing this work was maintaining the unique ID from the previously completed centerline data of the original thirty counties. The unique ID can be used to extract historic call data from the CAD system. The Tiburon software technicians indicated at a meeting that this unique ID would not be required in future releases of the software.

Another small issue is the alignment of the DOR centerline with the county data. Both datasets are required in the dataset but they do not perfectly lineup.

The complete street centerline and CAD data creation project is available in Appendix 10. In that appendix there is a list of data scrubbing and street naming issues that will need to be addressed.

Data Services

It is recommended that all of these data have a Web Map Service (WMS) included with the ESRI formats. This format is not platform-bigoted and can be consumed by most other desktop GIS software users.

All of the data is in Web Mercator Auxiliary Coordinate System, which is the same coordinate system being used by Google, Yahoo, ESRI, Bing, and other national data providers. Simply put, if you are creating an API on your website, NebraskaMAP data will overlay the very large and very free available dataset. This link is to a blog article rationalizing the use of the coordinate system:

http://blogs.esri.com/Dev/blogs/arcgisserver/archive/2009/11/20/ArcGIS-Online-moving-to-Google-_2F00_-Bing-tiling-scheme_3A00_-What-does-this-mean-for-you_3F00_.aspx.)

The following Nebraska data layers were created during this project and are available on the NebraskaMAP website http://www.nebraskamap.gov/.

- State-wide Geocoding - http://nebraskamap.gov/ArcGIS/rest/services/nebraskageocoder/GeocodeServer
- Basemap - http://nebraskamap.gov/ArcGIS/rest/services/basemap/MapServer
- Airport - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/0
- Bridge - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/1
- Camp - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/2
- Cemetery - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/3
- Child Care - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/4
- Church - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/5
- Citypt (City Points) http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/6
- Golf Course - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/7
- Hospital - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/8
- Hunting Area - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/9
- Library - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/10
- Mall - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/11
- Military - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/12
- Mountain - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/13
- Museum - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/14
- Police Station - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/15
- Post Office - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/16
- Railroad - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/17
- Stream - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/18
- Centerline - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/19
- Citypy (City Polygon) - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/20
- Countypy (County Polygon) - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/21
- Pond - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/22
- River - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/23
- State - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/24
- Hillshade - http://nebraskamap.gov/ArcGIS/rest/services/wma/MapServer/25

Spatial Reference Recommendations

In order for Nebraska geospatial data publishers to mashup (combine data, presentation or functionality from two or more sources to create new services) and overlay data, they need to determine which spatial reference system to use.

Currently used spatial reference systems and users in Nebraska:
3857 – Web Mercator Auxiliary Sphere (ArcGIS 10)

- Bing, Google, Open StreetMap, and ESRI

102113 – Web Mercator Auxiliary Sphere (ArcGIS 9.3.1)

- Same as above

26852 – Nebraska State Plane, NAD 1983, US Feet

- Nebraska Department of Natural Resources

102704 – Nebraska StatePlane, NAD 1983, Feet, FIPS 2600

- NebraskaMAP
- Douglas County/City of Omaha
- Sarpy County

26914 – UTM Zone 14 North, Meters

- Nebraska Game and Parks

4326 – WGS 84

- Nebraska Department of Environmental Quality

4269 – GRS 1980, NAD 1983, degree

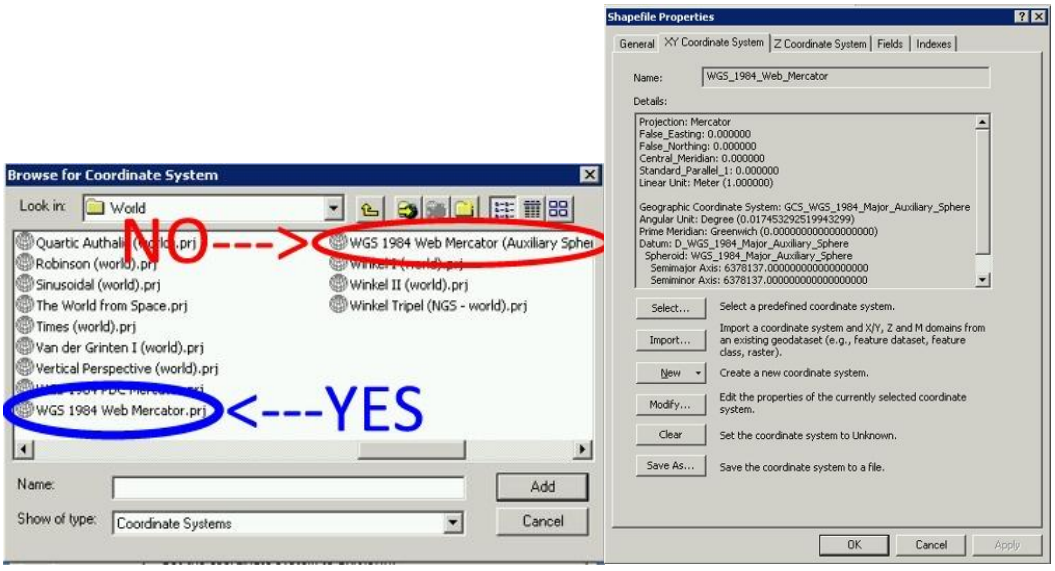
- Nebraska Department of Environmental Quality

Lancaster County Coordinate System

- City of Lincoln/Lancaster County
  PROJCS["GRS_1980_Transverse_Mercator",GEOGCS["GCS_GRS_1980",DATUM["D_GRS_1980",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",164041.6666666666],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-96.68805555555555],PARAMETER["Scale_Factor",1.00005],PARAMETER["Latitude_Of_Origin",40.25],UNIT["Foot_US",0.3048006096012192]]

It is suggested that data publishers create a one-way dataset strictly for using Web Mercator Auxiliary. Its sole purpose would be for use on the web so the organization could leverage their data and overlay it on Google, Bing, and ESRI data in their API.

Because there are different variations of Web Mercator Auxiliary, use the information below when using ESRI products to properly project to the correct coordinate system.

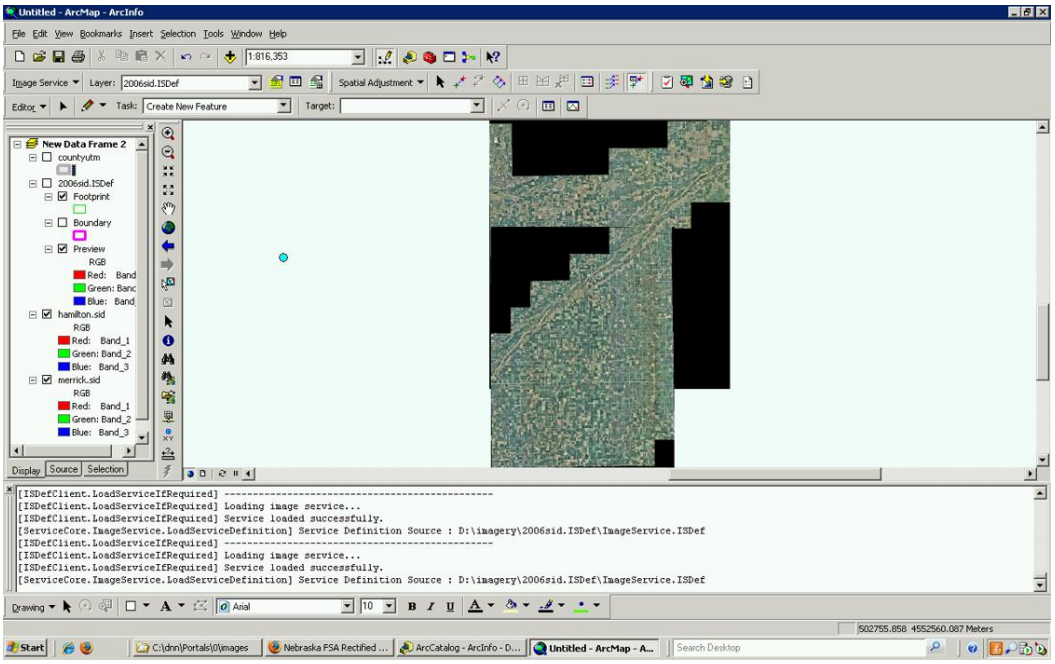


The projection dialogue on the right, which is the correct one, also refers to the Auxiliary Sphere in its details.

Creating an Imagery Service from County Wide Mr. SID Files

When we discovered the power of Image Server Extension for ArcServer we realized we could make an image service that people could consume via rest services that in some cases could be quicker than storing the imagery locally on your computer.

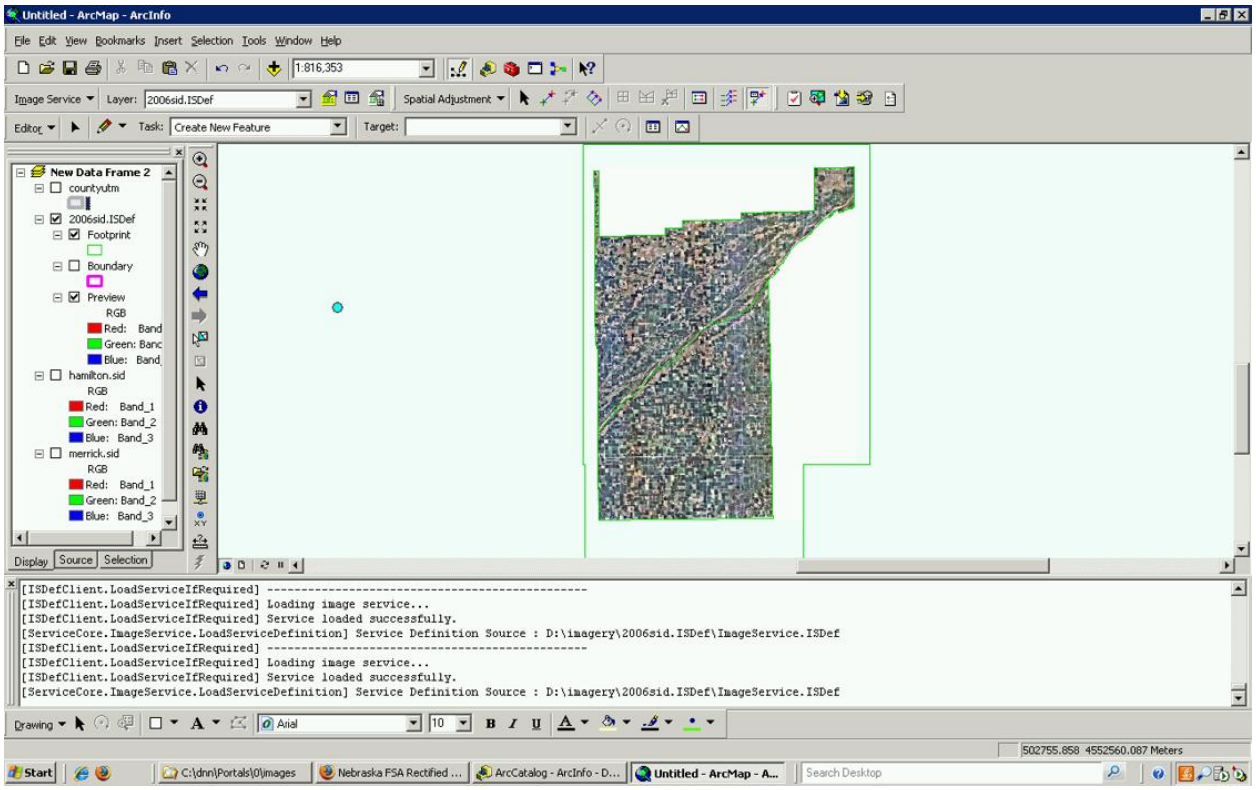
The issue was that we didn't have enough storage space on the project server so we could only use the county wide Mr. SID files found on the DNR Spatial Database Website. Another issue was that the county wide Mr. SID files have black 'no data' collars beyond the county boundary.



Instructions

1. Start ArcMap; add the Image Service toolbar, and the Spatial Adjustment toolbar.
2. Create a new image service.
3. Load the County Boundaries into ArcMap.
4. Start Editing (select the workspace containing the Footprints layer).
5. Turn on the Spatial Adjustment Toolbar.
6. Select "Attribute Transfer Mapping" from the Spatial Adjustment menu on the toolbar.
7. Select "County Boundaries" for the Source (don't add any attributes)
8. Select "Footprints" for the Target.
9. Make sure to check the "Transfer Geometry" box (because you want to transfer the County shape to the Footprint for clipping)
10. Make sure the County Boundaries and the Footprints layers are both Visible and Selectable.
11. Click once to grab the County Boundary polygon, and then click the second time to transfer the shape to the Footprint.
12. Try this first with a few counties, save the edits, and Rebuild the Image Service to verify the results are desirable.

13. If the results are what you expect (mosaic is clipped to county boundaries removing black area) then continue.



The result should be an image service with the black no data collar information removed. At this point you could create a tiled and cached image service and publish it for other users to consume. Also this process is supposed to be automated according to J.D. Overton of ESRI-St. Louis. At ArcGIS Version 10 a new feature was created called Mosaic. The mosaic should help the State GIS users quickly create image services using the file format and projection system they want.

Presentations

During the project numerous presentations were made to many different organizations and committees (Appendices 12 - 15.) Some of these presentations kept the NE GIS Council up-to-date regarding the progress of the project, while others introduced the goals and functions of the project to potential users.

NebraskaMAP Principal Accomplishments

Phase I (Year 1)

- **Conduct systematic review of existing state and federal prototypes (services, navigation, administration, institutional structure, funding)**
  Four state portal/websites were reviewed (Arizona, Arkansas, Kansas, and Utah) and evaluated for characteristics that would be suitable to the needs of the NebraskaMAP project (see Implementation/Portal Review section, page 6.)

- **Conduct detailed user needs assessment**
  User needs were identified during reviews of the state portals (see Implementation/Portal Review section, page 6.) The NebraskaMAP Partners Committee selected features of existing portals that they would like to see implemented. As the project progressed, the list of features was adjusted to reflect the developing focus of the project.

- **Identify datasets currently available from local, state, regional and federal agencies and establish custodians for each**
  Each participating agency in the NebraskaMAP Partners Committee was requested to provide a list of datasets they had and felt should be included in the project, as well as a list of datasets that they did not have but wished to be included.

- **Initial development of standards (e.g. data exchange, network, documentation)**
  A demonstration by ESRI staff of the GeoPortal Extension for ArcGIS Server introduced the NebraskaMAP Partners Committee to a potential architecture for the NebraskaMAP portal. The GeoPortal Extension delivers a searchable metadata database, can be customized to simplify metadata creation, and allows for data downloading. ESRI provided software/hardware specifications based on that being used by the State of Kansas Data and Access Center (DASC, Appendix 5) and provided valuable input regarding what would need to be purchased to host the GeoPortal Extension solution.

- **Initial assessment of security needs**
  Following Committee discussion about data security and how private data could be shared through the portal, it was determined that a private metadata record could be created and shared within a private group. It was also decided to defer further detailed consideration of private data and data security until the project was more mature, keeping in mind future security needs as standards, architecture, and protocols were developed.
- **Identify requirements for hardware and software**
  Hardware and software requirements were provided by Joe Eckmann, ESRI Senior Account Manager (Appendix 7).

- **Acquire hardware and software needed for Phase I**
  Initial hardware and software acquisition at the University of Nebraska-Lincoln was carried out by Bryan Leavitt, UNL CALMIT GIS Specialist bleavitt2@unl.edu. Because it was intended for research and development purposes, the initial software acquisition qualified for educational discounts. New and additional software was acquired as the project evolved from research and development to production, and was moved from the University of Nebraska-Lincoln to the Office of the OCIO.

- **Develop initial proposal for overall Project architecture**
  The initial proposal was based on the ESRI GIS Portal Toolkit On-Site Implementation Services, Support, and Maintenance document (Appendix 6.)

- **Initiate data-sharing agreements process**
  A draft data-sharing agreement was developed and discussed by the NebraskaMAP Partnership Committee. It was determined that most of the project participants felt that they already had the authority to share much of the data of interest. The Committee members also felt that an effort to get consensus on a common data-sharing agreement and to move it through their respective policy-making bodies would likely require a tremendous amount of their time. It was decided to defer this issue until later, to determine the need for such an agreement and, if there was a need, to be in a situation where the project participants could more clearly demonstrate the nature and need for the project to their respective policy-making bodies. Therefore no final data-sharing agreement was adopted.

- **Initiate agreements with USGS (The National Map) and FGDC**
  This objective was deferred until later. At the time of this report, the amount of unique data specifically available through the NebraskaMAP portal did not warrant initiating these agreements. Currently key Nebraska-related datasets utilized by the National Map are served by the Dept. of Natural Resources and data-sharing agreements are in place for those datasets.

- **In consultation with NebraskaMAP Partners Committee, identify one or two initial application demo foci for Phase I**
  Two project ideas were identified based on need for shared data - one regional, the other state-wide. Both needed to be examples of applications that would emphasize the importance of a data-sharing portal to executive-level staff.
  The first (regional) project called for monitoring ice jams along the Platte River. Unfortunately, this project was never developed for lack of time.
  The second (state-wide) project involved the Nebraska Sex Offender Registry http://www.nsp.state.ne.us/sor/find.cfm. The objective was to show how GIS maps and data could be used to help refine police beats and potential surveillance. The address data for the sex offenders was downloaded from the database by county, geocoded and overlaid on the State Base Map. Point locations of daycare and educational facilities were then overlaid on this map to determine the proximity of sex offenders to these locations.
  NebraskaMAP.gov - A Geospatial Data-sharing and Mapping Web Services Network for Nebraska presentation was made to Crime Commission representatives.

- **Identify a minimum subset of (priority) datasets and services to be incorporated into the initial phase**
  A minimum list of desired datasets (Table 2) was identified by the NebraskaMAP Partners Committee. Most of these layers have been implemented in the portal or have been noted otherwise.

Table 2. Priority data, steward, and status (as of 1/31/11.)

Layer Type	Primary Layers	Steward	Contact	Status
Census Data	Census Tracts for Nebraska	Legislative Research Office	Jack Dohrman	Completed
DRG	Topography	CSD	Les Howard	Completed
Elevation Data	Contour	DNR	Steve Rathje	Completed
Elevation Data	NED	DNR	Steve Rathje	Completed
Hydrography	NHD	DNR	Steve Rathje	Completed
Imagery	FSA Imagery	FSA	Dan Pfeffer	Completed
Imagery	Local High Resolution Imagery	Eric Herbert, Mike Schonlau, Jeff McReynolds		Completed
Imagery	NIROC	Mike Schonlau		Completed
Municipal Layers	Floodplain	Eric Herbert, Mike Schonlau, Jeff McReynolds		Not Completed
Municipal Layers	Parcels	GIS Workshop	Dan Pfeffer	Completed
Political Boundaries	City	NDOR	Rose Braun	Completed
Political Boundaries	County	NDOR	Rose Braun	Completed
Political Boundaries	Legislative	Legislative Research Office	Jack Dohrman	Completed
Political Boundaries	NRDs	DNR	Steve Rathje	Completed
Political Boundaries	State	NDOR	Rose Braun	Completed
Structures	Bridges	NDOR	Rose Braun	Completed
Structures	Dams	DNR	Steve Rathje	Completed
Structures	Facilities (hospitals, police stations, schools)	NEMA	Chad Boshart	Hospitals & fire stations only
Structures	Land Cover/ Land Use	DNR/CALMIT	Steve Rathje	Completed

Layer Type	Primary Layers	Steward	Contact	Status
Structures	Public Lands (state & federal)	NGPC	Sudhir Ponnappan	Not Completed
Structures	Railroad Crossings	NDOR	Rose Braun	Completed
Structures	Trails	NGPC	Sudhir Ponnappan	Not Completed
Transportation	Railroads	NDOR	Rose Braun	Completed
Transportation	Roads (highways)	NDOR	Rose Braun	Completed
Transportation	Street centerlines		Dan Pfeffer	Completed
Transportation	Street centerlines by county		Dan Pfeffer	Completed

- **Insure targeted datasets are documented with FGDC-compliant metadata**
  The targeted datasets were documented with the Nebraska FGDC profile and were compliant.

- **Work with OCIO to establish network for data exchange**
  Following a number of discussions dealing with pricing, network connectivity and compatibility between UNL (where the portal was being developed) and the OCIO, it was determined that the project would reside at the OCIO. The OCIO had existing network connectivity with the project partners and the Internet to provide a high level of data exchange capacity. Further discussions dealt with issues of hardware, software, storage, and security at the OCIO.

- **Work with the OCIO to build and populate repository storage as necessary for Phase I implementation**
  The OCIO's technical staff was briefed throughout the portal development process at UNL. The OCIO data storage infrastructure was determined to be sufficiently flexible to grow with expanding needs of the NebraskaMAP project.

- **Build and populate Phase I website for data exchange with goal of ultimately incorporating the following functionality and/or characteristics and ultimately capable of incorporating secure data exchange**
  The Phase I website was built and activated in April of 2009. Beta testing proceeded for over a year. Secure data exchange was not built into this version of the system due to a lack of agreement regarding the dissemination of secure datasets among the agencies involved.

- **Share/distribute data**
  A component of the portal allows datasets to be easily added. Users may then identify an area of interest by drawing a boundary on the layer that they choose, and the portal will 'Clip/Zip/ Ship' the data to the user. The user receives an automated email (almost immediately) informing them that their download is ready. Although this feature is available in the portal (http://www.nebraskamap.gov:8080/geoportal/catalog/download/download.page), it has not been activated.

- **Offering services/applications for those without technical knowledge instead of raw data**
  During the course of this project many different ideas for applications through Web API were presented to the NebraskaMAP Partners committee. At the time of this report, the project focused on providing three specific services to the broader user community. These three services included the provision of the most recent state-wide aerial imagery (1-m resolution, full-color, Farm Services Agency imagery), a state-wide geocoding service, and a base map service to provide a background geospatial reference for a wide variety of applications. These three services were chosen as an initial focus because they demonstrated the potential of the system to provide web-based services to the broader user community and also meet specific priority needs.

- **Ability to download spatial, tabular, & metadata**
  Incorporated into website design and functionality.

- **Share existing & new map services**
  The ArcGIS Server technology allows for data services to be set up on the project website. (These data services currently exist at: http://www.nebraskamap.gov/ArcGIS/rest/services.)

- **Develop methodology for secure registration of new map services**
  Due to a lack of secure datasets, this option was not explored beyond determining that the methodology could be easily developed through the REST (Representational State Transfer) services noted above.

- **Development and provision of common web services**
  The portal has the functionality to allow viewing and accessing data via a map or text/menu interface (http://www.nebraskamap.gov:8080/geoportal/catalog/search/search.page.) Browsing through the metadata by ISO Topic Categories can also be performed http://www.nebraskamap.gov:8080/geoportal/catalog/search/browse/browse.page.

- **Hold workshops for users – training and system assessment**
  Members of the NebraskaMAP Partners committee attended formal training by ESRI on June 15-17, 2009. By the end of the training, the eleven attendees from various state and

local government agencies were qualified to develop and maintain their own metadata portals.

- **Conduct initial requirements analysis for operations and maintenance**
  This task was not formally covered or outlined in Phase I, but was completed in the second year of the project.

- **Prepare a report detailing lessons learned, standards adopted, and needs to be addressed during the next project phases**
  This task was not formally covered or outlined in Phase I, but was completed in the second year of the project.

Phase 2 (Year 2) Principal Tasks

- **Conduct performance analysis of Phase I accomplishments/prototype portal (user's assessment)**
  This task was not formally covered or outlined (not completed.)

- **Enhance automated data access with additional non-sensitive data (e.g., aerial and satellite imagery, dynamic data such as climate and drought data)**
  The Clip/Zip/Ship feature was introduced and tested using vector layers. Imagery and grid data cannot be used without the FME Extension software, which the committee elected not to purchase for the OCIO.

- **Refine requirements for operations and maintenance and acquisition of initial dedicated technical staff resources**
  The technical staff resource information is available in Appendix 3.
  Current portal operation requires that an administrator check weekly for new metadata submissions and post metadata that meets the NE FGDC standards.

- **Refine, implement and document processes for moving data between participating agencies**
  This task was not completed.

- **Refine and document standards development**
  This report will serve as the documentation.

- **Refine, implement and document prototype security processes and protocols**
  Although not implemented because the project committee decided to defer implementing security protocols until later, the portal is capable of supporting secure data services.

- **Refine and document administrative model and needs**
  The NebraskaMAP Partners Committee made the following recommendation to the Nebraska GIS Council and the Office of the CIO (OCIO) relative to the requirements for on-going support of the project.

  It is a recommendation of the NebraskaMAP Partners Committee that to sustain and continue the development of the NebraskaMAP effort, at a minimum one FTE with relative high GIS technical skills and experience, as outlined in the attached draft NebraskaMAP Administrator job description, will be required. It is further recommendation of the committee that the fully licensed software, as outlined in the attachment, will be required to provide the foundation to sustain and continue to develop this collaborative enterprise endeavor. As attached is a draft "bare bones" budget to provide an initial outline of the likely budget that will be required to sustain this effort. All of these recommendations should be considered as interim recommendations designed to help facilitate further discussion and consideration by the multiple parties involved in this effort.

  The Partnership Committee developed a draft job description to outline the desired skills and responsibilities for a NebraskaMAP Administrator (see Appendix 3). Also in response to its charge to define and document an administrative model and needs the Partnership Committee recommended that the on-going project be based in and supported by the OCIO and it defined a Project Charter that outlined a proposed governance model for the project that outlined a structure with the OCIO as the lead agency and the Partnership Committee as an advisory body.

- **Refine, implement and document data-sharing agreement protocols**
  A draft data sharing agreement was developed and discussed by the NebraskaMAP Partnership Committee. The Committee decided to defer this effort until there was a proven need because of the Committee members felt they could currently share most of the data of interest and that developing a consensus around one data sharing agreement and getting it signed by numerous policy-making bodies would likely be very time consuming. Therefore no final data sharing agreement was developed.

- **Refine and document requirements for operations and maintenance**
  This document describes these requirements.

- **Initiate sharing of web-mapping services and base geospatial information from the open public access/View component of the project with GOS and The National Map**
  Although no sharing with GOS and The National Map is occurring, the public is consuming the web mapping services and harvesting NebraskaMAP metadata for use on other portals.

- **Hold workshops for users – training and assessment**
  Portal Metadata training was developed and provided by Adonna Fleming (UNL GIS Librarian), Milda Vaitkus (CALMIT Project Manager), and Dan Pfeffer. The training session lasted roughly two hours with another hour set aside to assist users with introducing their

metadata to the portal. Users were asked to provide assessments of the software, portal, and website.

- **Prepare a report detailing needs to be addressed during the next project phases** Recommendations noted below.

Recommendations

- In 2011 the NebraskaMAP Partners Committee should be committed to keeping the portal project alive. This may require the voluntary services of several individuals to provide some technical assistance to load data and create a service.
- One of the easiest ways to promote the project is to show the state agencies with GIS needs and little expertise how easy it is to add maps to their existing applications. The State of Kansas Data and Access Center (DASC) is a good example; they are creating embeddable mapping widgets for state agencies to be able to put mapping features on their sites simply.
- Another option would be to start using free web applications like the ones available at CyberTech. http://apps.cybertech.com/index.php?option=com_content&view=category&layout=blog&id=2&Itemid=6. All it would require is to add spatial data to REST services and configure them with the free application.
- Free applications that ESRI provides could also be used. (e.g. the Election Results Viewer http://www.arcgis.com/home/item.html?id=1ab8c1af3ca84deba4bf61412ac5d9f2 or free web apps http://resources.arcgis.com/content/web/web-apps.)
- Eventually an ArcServer Administrator will need to be hired. This person could easily handle all data needs for Server and SDE and maintain the portal.
- Support for this project must come from upper-level decision-makers in the organizations represented on the NITC GIS Council http://www.nitc.nebraska.gov/gisc/members/members.html.

Appendix 1

State of Nebraska
Office of the CIO
Shared Services

PROJECT CHARTER

Project Title:	Nebraska*MAP* - A Nebraska Geospatial Data Sharing and Web Services Network
Project Sponsor:	Brenda Decker, Nebraska Chief Information Officer
Project Charter Date:	February 10, 2009
Initial Project Partners:	Nebr. Office of the CIO, Nebr. GIS Council, Nebr. Emergency Management Agency, Nebr. Dept. of Natural Resources, Nebr. Dept. of Environmental Quality, Nebr. Dept. of Roads, Nebr. Dept. of Agriculture, Nebr. Dept. of Health and Human Services, Nebr. Game and Parks Commission, UNL School of Natural Resources, Douglas County, City of Omaha, Sarpy County, City of Bellevue, City of Gretna, City of LaVista, City of Papillion, City of Springfield, Lancaster County, City of Lincoln, US Geological Survey
Project Leader:	Steve Henderson, Information Technology Administrator Office of the CIO
Project Manager:	Dan Pfeffer, UNL School of Natural Resources, Center for Advanced Land Management Information Technologies (CALMIT)
Initial Nebraska*MAP*	NE CIO: Steve Henderson, Information Technology Manager, Office of the CIO
Partners Committee:	NE GIS Council/OCIO: Larry Zink, GIS Coordinator NE Dept. of Natural Resources: Steve Rathje, Senior Analyst NE Dept. of Roads: Rose Braun, GIS Project Manager NE Game and Parks Commission: Sudhir Ponnappan, GIS Specialist NE Health and Human Services System: Karis Bowen, Public Health GIS Analyst NE Emergency Management Agency: Chad Boshart, GIS Specialist UNL School of Natural Resources: Jim Merchant, CALMIT Director UNL Libraries: Adonna Fleming, GIS Librarian Lincoln/Lancaster County: Jeff McReynolds, GIS Program Manager Omaha/Douglas County: Mike Schonlau, GIS Coordinator Sarpy County GIS Coalition: Eric Herbert, GIS Coordinator US Geological Survey, James Langtry, USGS Nebraska Geospatial Liaison

PROJECT CHARTER

Project Vision: The ability to quickly and reliably access and/or share up-to-date data between public agencies (state, local, regional, and federal) is critical in today's e-gov world. This is particularly true with the wide range of applications using GIS/geospatial technology. So much of the power of GIS lies in its ability to integrate and analyze data from multiple sources, based on location or place.

The project participants envision the development of a Nebraska enterprise-level, geospatial data sharing network with related data and mapping services. This data sharing network will enable agencies to access, in an automated on-demand mode, up-to-date data from multiple participating (state, local, regional, and federal) public agencies. Because some of the data of interest will be sensitive, security and permission protocols will be integrated into the overall network design. To encourage maximum participation and utility, this data sharing network will have both an open public access/view and a private-secure access/view component. When fully developed, this data sharing network will support a wide-range of GIS/geospatial applications that require regular, dependable access to up-to-date data from multiple sources. It will additionally provide the technical support to maintain these services and assist public entities to access and build applications based on these enterprise services.

Project Background: This project was initially proposed by the Nebraska GIS Council. The project has also been endorsed by the Nebraska Information Technology Commission as an enterprise "shared services" project. An interagency project exploratory committee recommended that the Office of the CIO become the lead agency to undertake the implementation of this collaborative project and the Nebraska GIS Council endorsed that recommendation. The OCIO agreed to undertake the implementation lead, provided that there was a clear understanding among the project partners that as an agency primarily funded via revolving cash funds, the OCIO would be coming to project partners to provide funding support to assist with the project's initial implementation and on-going support. Initial startup funding for the project has been secured from a mix of funding sources. The development of proposals for sustainable funding will be an objective as project implementation proceeds.

PROJECT CHARTER

Project Governance: The Nebraska Office of the Chief Information Officer (OCIO) is the lead agency for this collaborative, interagency project, and as such has the final responsibility and authority for all project implementation decisions.

The OCIO has entered into a two-year contract with the Center for Advanced Land Management Information Technologies (CALMIT), School of Natural Resources - University of Nebraska-Lincoln, to provide project management and technical leadership and support for this project. James Merchant, CALMIT Director, will serve as the UNL-CALMIT project manager. CALMIT has hired Dan Pfeffer as a GIS Data Portal Manager to provide project management and technical leadership for this project. James Merchant and Dan Pfeffer, in consultation with the OCIO and the Nebraska*MAP* Partners Committee, will be responsible for day-to-day management of project implementation.

To be successful, this project must at its core be both collaborative and innovative in its efforts to meet the business needs of the project partners. To provide an on-going foundation for this collaboration and innovation, an interagency Nebraska*MAP* Partners Committee will provide on-going guidance and recommendations to the CALMIT project management team, the OCIO, and the Nebraska GIS Council on policy and technical issues and priorities related to the overall project design, implementation and on-going operation. To be effective, the Partners Committee must be representative of the community of users of the network. To provide consistency in representation, membership and voting rights on the Partners Committee will be determined by the Nebraska GIS Council. As additional agencies/entities join with the current partners in supporting and participating in this collaborative effort their representatives may be added to the Partners Committee by the GIS Council.

Project Overview: The development of an intergovernmental geospatial data sharing network will involve a complex matrix of issues (networking, data exchange standards, data transformation, data documentation, data archiving, security, data sharing agreements, database administration, enterprise administration requirements, operations and maintenance requirements analysis, data viewing and query applications, online data and mapping services, outreach/education, etc.).

PROJECT CHARTER

To address this complex matrix of issues, the overall project will be divided into a series of project phases currently projected to extend over at least a two-year startup period. Each phase will be designed to achieve concrete deliverables and will, in and of itself, provide specific advances in interagency data exchange capabilities. Each project phase will also be designed to build on the previous phases and to be adjusted based on the lessons learned in the previous phase. For example, sensitive data will not be available through the data exchange network until the later phases of the project, after security and permission protocols have been developed and tested. As part of this learning and building process, it is expected that the design of the project phases will evolve over time.

Integral to the design of this project is the concept that much of the data to be shared will not necessarily be hosted in a central repository. Much of the data will be hosted on servers operated by the original data-producing agency, but will be accessed through a central GIS portal. This decentralized approach also applies to accessing online GIS mapping and data services provided by remote site project partners. The project design will, however, also include a central data repository and mapping server that will enable agencies not currently providing online mapping and GIS data services to participate in the project by hosting their data on the project's data repository and servers. For some agencies this data repository may also act as a data security backup.

The project will be designed to be friendly and useful to GIS users with a wide range of GIS experience and sophistication. Early efforts will need to focus on putting in place the basic infrastructure and protocols, and as such, may not be especially user-friendly. However, a design goal of the project is to produce an online GIS interface and tool set that will be easily accessible to unsophisticated GIS users. At the same time, the project will also develop a robust functionality that will serve more sophisticated GIS users. Agencies will be able to develop online applications that can execute and rely on background calls and links to the online GIS mapping and data services provided by the network.

PROJECT CHARTER

While the final project hardware and software architecture has yet to be determined, current plans call for a primary utilization of ESRI GIS suite of software tools. This design decision is based on the fact that the overwhelming majority of GIS users in Nebraska currently rely primarily on ESRI software and that ESRI is the primary GIS software provider nationally. At the same time, there is a commitment to develop the architecture of the system so that it is open to inputting and exporting geospatial maps and data services in formats compatible with a wide range of GIS, OpenGIS and computer-aided design software packages and standards. The establishment of live links to GIS applications developed and running under other non-ESRI GIS software is also being addressed during the design phase of this project.

Issues that will impact the project's long-term sustainability and use will be researched and proposals developed, as part of the early design and implementation phases of this project. These issues include training for agency developers and network users; marketing and outreach to increase awareness and use of the network; map and data services needed by the partners, and on-going network maintenance, support and enhancement.

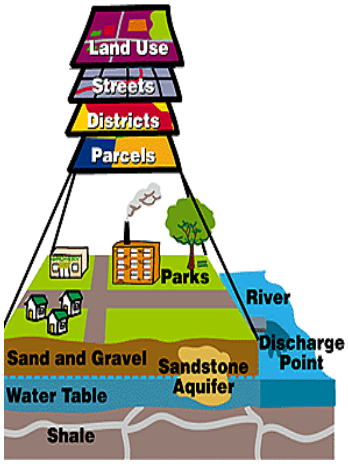
Appendix 2

NebraskaMAP

http://www.NebraskaMAP.gov

Improving Access to Geospatial Data for Nebraskans

Enhancing the Benefits of Geospatial Data



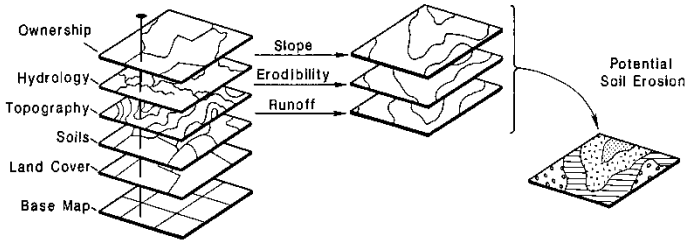
Geospatial data are "digital maps" that represent features such as property parcels, soils, elevation, land use, water resources, roads and railroads, utilities and administrative boundaries

More than 80% of the decisions made in government and the private sector are based on analyses of geospatial data. Such decisions involve property valuation, political redistricting, agriculture, schools, protection of water and soils, wildlife management, emergency response, homeland security, law enforcement, public health and many others. Hundreds of geospatial datasets have been developed for Nebraska; however, there is currently no centralized repository or clearinghouse where one may find, view and access geospatial data for Nebraska. Datasets are scattered among various developers and custodians, and often exhibit differences in format, spatial resolution and other attributes. Moreover, each year data volume increases as new datasets are created and existing datasets are updated. The goal of **NebraskaMAP** is to ensure that Nebraskans make full use of geospatial data and technologies such as geographic information systems (GIS) that are increasingly critical tools for mapping, monitoring and managing our cities and rural lands, and protecting our natural resources. Working in collaboration with the Nebraska GIS Council and many partners, we are establishing a geospatial data-sharing and web services network to support and enhance the ability of Nebraska agencies at all levels of government to better address their respective missions, respond to emergencies and provide for the public good.

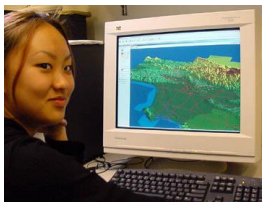
A Sample of Nebraska GIS Users

Nebraska Department of Environmental Quality
Nebraska Department of Health and Human Services
Nebraska Department of Natural Resources
Nebraska Department of Roads
Nebraska Emergency Management Agency
Nebraska Game & Parks Commission
Nebraska National Guard
Nebraska Natural Resources Districts
Nebraska State Surveyor's Office
Rainwater Basin Joint Venture
Omaha Public Power District
Lincoln Electric System
Lincoln/Lancaster County
Omaha/Douglas County
Grand Island/Hall County
Scottsbluff/Scotts Bluff County
Sarpy County
U.S. Army Corps of Engineers, Omaha District
U.S. Geological Survey, Nebraska Science Center
U.S. Environmental Protection Agency
U.S. Department of Agriculture Farm Services Agency
U.S. Department of Agriculture Natural Resources Conservation Service

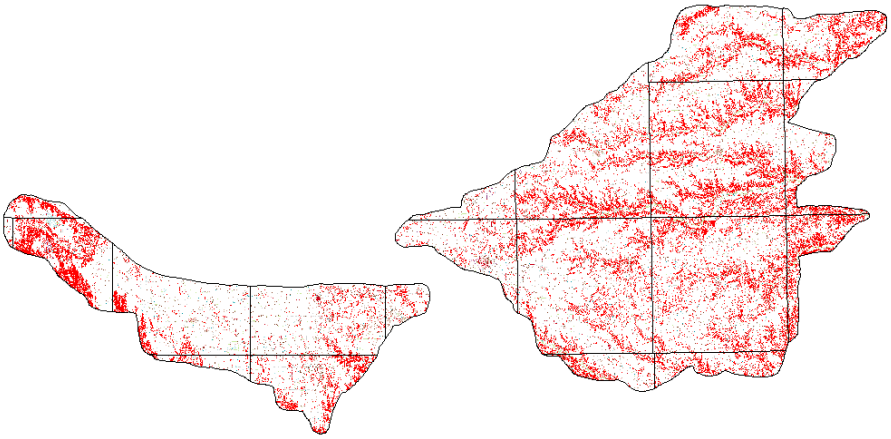
Geographic Information Systems (GIS)



A ***Geographic Information System*** (**GIS**) is a decision-support tool comprised of specialized software, integrated with computing and networking hardware, designed to facilitate management, manipulation and analysis of geospatial data. As the use of GIS has expanded across Nebraska, the need for agencies to quickly and reliably identify, access and share geospatial data across institutional and jurisdictional boundaries has become increasingly acute.



Sharing Geospatial Data will Benefit all Nebraskans



A GIS was used to model soil erosion in Nebraska's Rainwater Basin, an important wetlands ecosystem critical to waterfowl (above). Red areas represent predicted soil loss greater than 5 tons/acre/year. Geospatial data used in this analysis were obtained from six different agencies. Project partners included the University of Nebraska-Lincoln School of Natural Resources, the Nebraska Game & Parks Commission, the Rainwater Basin Joint Venture and the U.S. Fish & Wildlife Service.

NebraskaMAP Status (April 2009)

Development of **NebraskaMAP** commenced in January 2009. A working prototype is expected to be completed by December 2009. The prototype will be expanded and enhanced during 2010.

The NebraskaMAP project is managed by Dan Pfeffer (University of Nebraska-Lincoln) in collaboration with an advisory team comprised of representatives from state, local and federal agencies. Others interested in participating

NebraskaMAP Partners (April 2009)

- Nebraska GIS Council
- Nebraska Office of the Chief Information Officer
- City of Lincoln/Lancaster County
- City of Omaha/Douglas County
- Nebraska Department of Natural Resources
- Nebraska Department of Health and Human Services
- Nebraska Department of Roads
- Nebraska Emergency Management Agency
- Nebraska Game and Parks Commission
- Sarpy County
- University of Nebraska-Lincoln Libraries
- University of Nebraska-Lincoln School of Natural Resources
- UNL Center for Advanced Land Management Information Technologies (CALMIT)/NebraskaView
- U.S. Geological Survey

Dan Pfeffer
NebraskaMAP Project Manager
CALMIT/School of Natural Resources
University of Nebraska-Lincoln
305 Hardin Hall
Lincoln, NE 68583-0973

Phone: 402/472-7066
Fax: 402/472-2946
E-mail: dpfeffer2@unl.edu
Web site:
http://www.nitc.state.ne.us/gisc/wrkgrps/DataExch/index.html

Appendix 3

Nebraska**MAP** Administrator Position Description

Responsibilities
Provide leadership to develop the NebraskaMAP geospatial portal. The geospatial data portal will facilitate interactive data access and exchange between NU, state, local, federal agencies, the private sector and the general public. The project utilizes the latest online GIS mapping technologies to provide a foundation upon which Nebraska public agencies can build their own agency-specific online geospatial analysis/mapping applications.

Education or Experience Requirements
Master's degree in geography or related area, including technical training in GIS, plus one year experience with the ArcGIS family of software and familiarity with Nebraska and Nebraska agencies preferred.

Minimum Qualifications

- 3+ years of experience designing web-based GIS data portals or clearinghouses.
- 3+ years of experience, managing the full lifecycle of medium to large scale GIS projects, performing tasks across all nine project management knowledge areas - project integration, scope, time, cost, quality, human resources, communications, procurement and risk.
- 3+ years of experience determining user information and functional requirements for web-based GIS data clearinghouses or portals.
- 3+ years of experience in business workflow analysis for GIS searching, discover, access and loading.
- 3+ years of experience defining roles, business functions, and processes associated with maintaining web-based data clearinghouses or portals.
- 3+ years of experience programming utilizing client-side and server-side languages including HTML, JavaScript, ASP and JSP
- Demonstrated experience creating and maintaining records compliant with the Federal Geographic Data Committee's minimum content standard for geospatial metadata
- Demonstrated experience with deploying web applications using a servlet engine such as Apache Tomcat
- Demonstrated experience interacting with web and ftp server management software such as Microsoft IIS
- Demonstrated experience administering Microsoft 2003 Server
- Ability to communicate technical information effectively both written and verbal
- Demonstrated experience managing an enterprise GIS system for many users serving multiple functions, departments and objectives

Preferred Qualifications

- Understanding of ArcGIS for the development of topologically correct GIS databases
- Understanding of ArcGIS GeoPortal Extension for development of metadata and dispersal of data
- Understanding of SQL Server databases or other enterprise database software

Job Duties

This position is responsible for the day to day oversight and the ongoing operation and administration of the NebraskaMAP project (http://www.nebraskamap.gov) the State's enterprise class geographic information system metadata and data clearinghouse. Support activity includes assisting state and local government with web application and technical support on interactive web mapping applications that run through the NebraskaMAP portal. The position also supports other programs administered by the Nebraska Office of the CIO.

1. Develops spatial data overlays and comparisons, performs geostatistical analyses, generates and analyzes grids and surfaces, geocoding, network and route analysis, and displays and communicates results using GIS on a monthly basis.
2. Works closely with Office of the CIO staff to review data processing procedures and applications to ensure data integrity, compatibility and compliance with existing systems, standards, policies and other guidelines on a daily basis.
3. Develops, tests, documents and performs data capturing, analysis and quality control procedures on a weekly basis.
4. Enhances and promotes the utilization of GIS through technical support and training of end users on a daily basis.
5. Identifies needs and analyzes GIS data, data processing procedures and applications to ensure that operational, project and user needs are addressed on a weekly basis.
6. Develops and utilizes queries and other GIS tools to analyze spatial data, assist in decision-making, and generate reports and map products on a daily basis.
7. Reviews and evaluates new software applications to determine ease of use, functionality and potential problems on a quarterly basis.
8. Makes recommendations regarding standards, policies, procedures, guidelines and technical manuals, and participates in geodatabase design activities every few months.
9. Responds to complex questions from GIS users and resolves basic problems on an hourly basis.
10. Participates in meetings, training seminars and GIS user groups on a monthly basis.

Appendix 4

Draft Project Plan – Detail

PHASE 1.

Define Project Architecture (*proposed additional objective for Phase I)*

- Establish a subgroup to develop draft medium-term (3-5 year) scenario for overall project architecture
  - Security/authorization, data exchange format/protocols, software, network needs, administration and technical support, data sharing agreements, standards
- Solicit review and feedback from working group members on draft architecture plan
- Develop final architecture plan, revising draft plan based on working group feedback, as necessary.
- Collect and record "lessons learned" and "requirements for operations and maintenance" during the course of project implementation.

Acquire hardware and software

- **Hardware**

  Define specific hardware needs
  - Develop draft definition of overall hardware needs and areas of flexibility (i.e. further phasing in of project components)
  - Identify existing hardware availability
  - Evaluate suitability of existing hardware for project
  - Develop draft outline of specific hardware utilization plans (new and existing), including anticipated costs
    - Draft hardware proposal
      - Two servers initially (1- data repository, 1- combined front-end web services and ArcGIS Server)(ultimate plan to have 4 servers, with 2 data repository servers and 1 - web services and 1 –ArcGIS Server)
      - Two (2) HP ProLiant DL385 G2 Servers
      - Dual core-single processor
      - 4 GB memory
      - 4 yr warranty @ $4,261 = **$8,522**
      - 1 - 4 TB of storage array = **$13,341**
      - Hardware Total = **$21,863**
  - Solicit review and feedback by working group members
  - Develop final hardware plan, revising draft plan based on working group feedback, as necessary

  Acquisition of hardware
  - Secure permission (outlining any related understandings and/or limitations) for use of existing hardware
  - Determine what agency will do actual acquisition of new hardware
  - Develop detailed procurement plan for new hardware (costs, vendors, etc.)
  - Secure necessary funding commitment/availability for new hardware purchase
  - Purchase hardware
- **Software**

  Define specific software needs
  - Develop draft definition of overall software needs and areas of flexibility (i.e. further phasing in of project components)
  - Identify existing software availability

- Evaluate suitability of existing software for project
- Develop draft outline of specific software utilization plans (new and existing), including anticipated costs
  - Draft software proposal:
    - 1 – 2005 SQL Server, 64-bit, standard license - **$3,710** *(possible price reduction by upgrading existing 2003 license)*
    - 2 – Windows 2003 Server OS standard (1-32 bit, 1-64-bit) @ $465 = **$930**
    - 1 - ArcGIS Server 9.2 @ **$32,000** *(another alternative to explore is a $1,500 fee for an annual ESRI Developer Network subscription that would need to be replaced when we go into "production".)*
    - 2 - XMLSpy @ $200 = **$400**
    - **Software Total = $37,040**
- Solicit review and feedback by working group members
- Develop final software plan, revising draft plan based on working group feedback, as necessary

Acquisition of software

- Secure permission (outlining any related understandings and/or limitations) for use of existing software, if desired.
- Determine what agency will do actual acquisition of new software
  - Proposal: Office of the CIO??
- Develop detailed procurement plan for new software (costs, vendors, etc.)
- Secure necessary funding commitment for new software purchase
  - **Proposed Estimated Hardware/Software Total = $58,903**
- Purchase software

- **New Hardware/Software Acquisition Funding**

Identify funding possibilities

- USGS end-of-year grant funds
- HHSS GIS earmarked funds
- Omaha-area UASI funding
- Others

Secure funding commitments

- USGS end-of-year grant funds – completed $43,000
- HHSS GIS earmarked funds
  - Outline specific plan, related needs, timeline, responsibility
  - Execute plan and secure funding commitment
- Omaha-area UASI funding
  - Outline specific plan, related needs, timeline, responsibility
  - Execute plan and secure funding commitment
- Others
  - Outline specific plan, related needs, timeline, responsibility
  - Execute plan and secure funding commitment

Define initial information to populate repository *(and data exchange network)*

- Develop draft listing of desired datasets and data owner/steward for each
- Determine metadata status of desired datasets
- Identify which datasets should be on data repository and which accessed via data exchange network
- Work with data owners or stewards to develop necessary metadata

Create data repository(ies) (*and ArcGIS Server)*

- One data repository server and initially one server for combined web services and ArcGIS Server
  - Office of CIO proposed for initial location???
- Working Group agrees on overall architecture design
- Working Group agrees on hardware/software proposals
- Purchase hardware/software
- Install hardware/software for data repository
- Install hardware/software for web services and ArcGIS Server
- Test hardware/software
- Collect and store data (see identified data repository datasets)
- Develop and test web applications pulling data from repository and external servers
- Determine and implement backup requirements for Phases I and II

Establish network for data exchange

- Working Group agrees on overall architecture design
- Working Group agrees on hardware/software proposals
- Purchase hardware/software
- Install / place servers in data center
- Connect to server Demilitarized Zone
- Give IP Address and DNS
- Develop access to designed external geospatial servers and data
- Develop access to designed external geospatial web services

Phase I Deliverables:

- Ability to share/access data between limited subset of participating agencies
- An initial requirements analysis for operations and maintenance
- A report detailing lessons learned and what needs to be addressed during the next project phase
- A "Go – No-go" recommendation for next phase

PHASE II.

Refinement of Phase I processes for moving data between participating agencies

- Automated synchronization
- Map services
- Editing
- Integration of similar datasets
- Develop pilot agency apps based on data sharing network

Review and develop timeline and plans for implementation of second data repository
Initial development of standards (data exchange, network, documentation)

- Convene Standards Working Group
- Define list of needed standards
- Prioritize standards development
- Look to borrow from existing standards
- Establish standards review and ratification process

Initial assessment of security needs

- Look at other "states" models and approaches

- Application based security versus credential versus token-based???
- Look at security maintenance/overhead needs
- Centralized versus decentralized approach
- External editing???

Initial assessment of administrative model and needs

- Data base administration
- Application administration
- Security administration

Initiate data sharing agreements process

- Develop template for standard data sharing agreement for Geospatial Data Sharing Network
- Secure permission and data sharing agreement from dataset owner/steward outlining specific understandings related to sharing data access and use of specific datasets.

Phase II Deliverables:

- Enhanced automated data access and population of repositories with non-sensitive data
- Refinement of requirements for operations and maintenance and acquisition of initial dedicated technical staff resources
- A report detailing lessons learned and what needs to be addressed during the next project phase
- A "Go – No-go" recommendation for next phase

Appendix 5

Environmental Systems Research Institute, Inc.
8700 State Line Road Suite 315 Leawood, Kansas 66206
(913) 383-8235 Fax (913) 941-3410

MEMORANDUM

DATE: June 18, 2010
SUBJECT: Kansas Data Access and Support Center meeting
TO: Dan Pfeffer
FROM: Joe Eckmann

I had a little time this afternoon so I thought I'd type up my notes from our meeting with DASC yesterday. I hope you find it useful.

DASC Staff:

- Ken Nelson – Manager (also GIS Manager for Kansas Geological Survey)
- Lisa Hallberg – Web Administrator (responsible for web administration and development, database management and portal maintenance
- Eilene Battles – GIS Specialist (responsible for outreach)
- Brent and Nick – Titles? (responsible for customer support, data integration and data requests)

Funding:

DASC is primarily funded by Ivan Weichert's budget (State Director of GIS, under the Kansas Information Technology Office). Supplemental funding from service fees, but most of the tasks that are performed by DASC staff are done at no charge. Ken (in Lawrence) and Ivan (in Topeka) meet/talk once a week.

Focus:

DASC has moved away from application development and now focuses on serving as a data repository (http://www.kansasgis.org/) for state and local government agencies. They have built their portal from scratch using Cold Fusion, but would not recommend that approach to everyone. They create and maintain many public map and image services including state-wide base maps and aerial imagery. They provide data for download but do not offer a Clip/Zip/Ship service. Users must have an account and be logged in to request and download data. This allows DASC to track who downloaded what and when. They refer back to this information when updates are made to the data and notify the recent users of the available update by email.

DASC REST Mapper:

Lisa Hallberg has made it easier for state web developers (or anyone, really) to add maps to their web applications by creating the REST Mapper. This basically leverages the ArcGIS API for Javascript that allows developers a method for embedding a URL in an HTML iFrame. It provides simple pan, zoom and

identify tools and gives the developer access to entire catalog of map services hosted by DASC. Typically, the agency will provide to DASC a dataset (such as addresses and attributes) to geocode and serve in an ArcGIS Server map service. Then the agency would use the REST Mapper, a DASC base map and the agency's own data to create their web map application. Besides the ease of use for the developer, this allows the state to create a standard for all basic web mapping applications.
Here are a few helpful links Lisa provided us:
The URL to access the "under construction" web site is:
http://www.kansasmaps.org/?password=test

And the "REST Mapper" help is here:
http://www.kansasmaps.org/services/rest/map.cfm?help

Here's a "REST Mapper" map with 3 layers (Kansas basemap, 2008 NAIP, water bodies):
http://www.kansasmaps.org/services/rest/map.cfm?layers=24,245,62

Hardware and Software:
One 4-core Dell server with 32 GB RAM (standalone, not virtual)

- ArcGIS Server Standard Enterprise

One Sun Solaris Unix server with 32 GB RAM

- Oracle (version?)
- ArcSDE

One 4-core Dell PowerEdge server with 16 GB RAM

- ArcGIS Image Server

One HP Storage Area Network (Raid 5) with three-9 TB shelves

- Imagery
- Map caches
- Local government data backup

Ken said they are about to add another 4-core ArcGIS Server Standard Enterprise license and go to a virtual server environment. He also said they have been running ArcSDE services on their Oracle server for years but would likely use ESRI recommended direct connection method if starting over today. Ken said they have a second Image Server license on a 4-core Dell PowerEdge server that is utilized when their primary Image Server box is experiencing heavy user requests for imagery.

Summary and Recommendations:

Based on what we learned from Ken and Lisa, it seems the approach to separate the raster data from the vector data is the recommended way to go. Therefore, whether or not UNL servers are used to host the imagery, a second server should be purchased to handle the requests for raster data. Therefore, I recommend the purchase of the items listed on ESRI quotation # 20360624. These items include:

- 1 ArcInfo Upgrade from ArcView Single Use
- 1 ArcGIS Data Interoperability Desktop Concurrent Use License
- 1 ArcGIS Server Standard Enterprise for Windows up to 4 Cores License
- 1 ArcGIS Server Data Interoperability Extension Standard Enterprise for Windows up to 4 Cores License
- 1 ArcGIS Server Geoportal Extension Standard Enterprise up to 4 Cores License
- 1 ArcGIS Server Standard Workgroup up to 2 Cores License

- 2 ArcGIS Server Standard Workgroup One Core Additional License
- 1 ArcGIS Server Image Extension Standard Workgroup up to 4 Cores License
- 1 ESRI Developer Network (EDN) Subscription Bundle

Appendix 6

January 29, 2009

Dr. James W. Merchant
Center for Advanced Land Management Information Technologies
School of Natural Resources
3310 Holdrege, 306 Hardin Hall
University of Nebraska - Lincoln
Lincoln, NE 68583-0973
Telephone: (402) 472-7531
E-mail: jmerchant1@unl.edu

RE: ESRI GIS Portal Toolkit On-Site Implementation Services, Support, and Maintenance

Dear Dr. Merchant,

As a follow up to your recent request for a quote, Environmental Systems Research Institute, Inc. (ESRI) appreciates the opportunity to present this letter proposal identifying the scope of services to the University of Nebraska-Lincoln (UNL) for training and implementation services pertaining to the ESRI GIS Portal Toolkit (http://www.esri.com/software/arcgis/gisportal-toolkit/index.html) and for follow-on support and maintenance services to UNL in Lincoln, Nebraska.

If UNL desires further support from ESRI, beyond the scope of this proposal, we will be happy to provide a proposal for any additional work upon request. Some additional services that our group is uniquely positioned to provide are: Spatial Data Infrastructure (SDI) consulting on best practices, consulting on standards, interoperability, metadata development, and custom project development and implementation.

Scope of Work

Task 1 - Five-day On-Site GIS Portal Toolkit Implementation Services Package

ESRI's GIS Portal Toolkit Implementation Services Package includes a three (3) consecutive day on-site workshop followed by two (2) consecutive days of on-site implementation services to assist with the installation and configuration of the GIS Portal Toolkit on hardware and software provided by UNL. The proposed on-site implementation service package is based on one ESRI staff person working at the client's site for five (5) consecutive, eight-hour days, during normal business hours.

During the three (3) day onsite workshop, ESRI will introduce UNL staff to the technology and industry standards that are used in the GIS Portal Toolkit, and acquaint the staff on how to install, configure, and customize a geospatial portal using the GIS Portal Toolkit. These UNL staff will be given the opportunity to actively learn how to manage metadata using ArcCatalog, what components constitute the GIS Portal Toolkit, and explore how these components work together to provide a geospatial portal solution. In addition, ESRI will provide background information on the architecture and context of GIS Portal

Toolkit.

During the two (2) day on-site implementation services, ESRI will assist the UNL staff with installation, configuration and customization of the user interface of the GIS Portal Toolkit on UNL production servers. ESRI will provide implementation services to UNL staff who will be involved in the support of the ESRI GIS Portal Toolkit. During this activity, ESRI will assist the staff with system preparation to host the GIS Portal Toolkit.

ESRI Deliverables

- Three (3) days of on-site workshop at UNL facilities in Lincoln, Nebraska
- Two (2) days of on-site implementation services in Lincoln, Nebraska to assist with installation and configuration of the GIS Portal Toolkit interface with UNL's production servers.
- ESRI GIS Portal Toolkit software, installation files and source code for selected modules
- Instructional Materials (lectures, documentation, exercises)

UNL Responsibilities:

- UNL will provide a facility for demonstration purposes that includes computers with software that meets the GIS Portal Toolkit 9.3 Supported Environment (Attachment A), a projection screen, an overhead projector that supports laptop slide presentations, Internet access, table, and chairs for the instructor and all participants.
- UNL will provide access to the hardware environment and software necessary for ESRI staff to assist with the installation and configuration of the GIS Portal Toolkit during the on-site visit (see Attachment A).
- UNL will ensure that all appropriate personnel participate in the Workshop and suitably qualified technical staff (with the experience and qualifications referenced in the following Assumptions) work with ESRI per ESRI requirements during the follow-on installation and configuration phase.

Assumptions:

- The GIS Portal Toolkit does not itself supply the metadata and data services it acts upon, and the ultimate utility and success of your solution that is built using the GIS Portal Toolkit will depend on the quality and availability of metadata and associated geospatial data services provided by yourself and/or others.
- The on-site activities targeted require UNL's technical staff to collectively have the minimum, prerequisite experience and qualifications outlined in Attachment A—ESRI GIS Portal Toolkit Implementation Prerequisites
- The installed Portal will be based on the ESRI GIS Portal Toolkit version 9.3.
- Implementation services, instructional materials, workshop, and any other communication or documents will be provided in the English language.
- The exact dates for the workshop and the final schedule for the on-site activities will be mutually agreed upon, after receipt of the signed purchase order and enclosed ESRI license agreements.

Task 2 - Remote GIS Portal Toolkit Developer Support

This GIS Portal Toolkit Developer Support consists of forty (40) hours of remote telephone, email and/or webcast support by an ESRI GIS Portal Product Specialist for the purpose of obtaining information and advice on technical issues pertaining to customization of the GIS Portal Toolkit. UNL may use the support hours at their discretion. This support is offered independently from Annual Maintenance.

ESRI Deliverables

- Forty (40) hours of prepaid remote support regarding customization of the ESRI GIS Portal Toolkit.
- ESRI will provide this remote support by an ESRI GIS Portal Toolkit Product Specialist via email, telephone, and/or webcast during Monday to Friday between the hours of 8 a.m. to 5 p.m. Pacific Time, excluding public holidays.
- ESRI will provide a monthly accounting of remaining support hours to UNL until the support hours are exhausted.

UNL Responsibilities:

- UNL must pay for Remote GIS Portal Toolkit Developer Support in advance.
- UNL will assign a single point of contact for technical communication with ESRI

Task 3 - GIS Portal Toolkit Annual Maintenance for Two Years

This Annual Maintenance Program for the GIS Portal Toolkit provides UNL with the following benefits for up to two years for one server with up to 4 cores.

ESRI Deliverables:

- Remote telephone and e-mail support for the ESRI GIS Portal Toolkit in accordance with ESRI's standard technical support guidelines (http://support.esri.com/index.cfm?fa=homepage.policies.arcGISOverview)
- Updates to GIS Portal Toolkit software versions, patches, and/or documentation

UNL Responsibilities:

- UNL must pay for GIS Portal Toolkit Annual Maintenance in advance
- UNL will assign one authorized caller as a point of contact for technical support requests made to ESRI

Assumptions:

- Maintenance Program benefits will be in effect for up to one year from the time of purchase of the GIS Portal Toolkit Annual Maintenance Program
- Maintenance will be renewable and offered for an annual fee following the two years of GPT Annual Maintenance described in this Task

Firm-Fixed Price Proposal

ESRI proposes a firm fixed price of thirty-one thousand, three hundred and ten dollars ($31,310) US Dollars to complete and deliver all of the deliverables defined in this proposal. The price breakdown for the Five-day On-Site GIS Portal Toolkit Support package plus Remote Developer Support and Annual Maintenance Program is presented in the table below.

Price Summary Table

Task 1 - Five-day On-Site GIS Portal Toolkit Implementation Services Package	$17,510
Task 2 - Remote GIS Portal Toolkit Developer Support (40 Hours)	$8,800
Task 3 - GIS Portal Toolkit Maintenance Program (Two years)	$5,000
Total Firm Fixed Price (U.S. Dollars)	**$31,310**

Our proposed price and required staff, computer, and travel expenses for the deliverables has been estimated based on our experience in performing previous GIS Portal Toolkit implementations. Work will be performed in accordance with the Implementation Service Terms and Conditions Agreement (G363) attached hereto at Attachment C.

UNL will be invoiced on a monthly basis according to the percentage of work completed in the previous thirty-day period. This proposal is valid for sixty (60) days and is exclusive of any applicable country, state and local taxes including any foreign taxes, value-added tax, customs, or duties for which UNL shall remain liable. Invoices are to be paid within thirty (30) days of receipt of invoice. ESRI assumes the proposed scope of services will be performed during calendar year 2009.

To order services please fax (followed up with two originals of the same via mail) the following documentation attention: Miranda Carberry, Contracts Administrator at (909) 307-3034:

1. Fully Executed Portal Toolkit License Agreement – Attachment B
2. Fully Executed Implementation Services Terms and Conditions Agreement - Attachment C
3. A copy of this Proposal (P09-1771) for ESRI's GIS Portal Toolkit On-Site Implementation Services Package
4. A Purchase Order referencing items 1-3 above

Items 1 and 2 must be executed by an authorized UNL signatory with authority to bind UNL.
We look forward to working with UNL on this project. Please feel free to contact me at (651) 454- 0600 ext. 8376, if you have any questions or comments regarding our proposal.

Sincerely,
Clive Reece
Project Manager – ESRI

Enclosure: Attachment A – ESRI GIS Portal Toolkit Workshop Prerequisites
Attachment B – ESRI GIS Portal Toolkit License Agreement (intentionally removed from report)
Attachment C – ESRI Implementation Services Terms and Conditions Agreement (intentionally removed from report)
Attachment D – ESRI GIS Portal Toolkit 9.3 Pre-Installation Requirements

Attachment A
ESRI GIS Portal Toolkit Workshop Prerequisites

Staff Experience and Qualifications

- Strong command of the English language
- Creating and troubleshooting ArcIMS services
- Authoring and designing ArcIMS Web sites
- Administering a Windows (or UNIX) operating system
- Managing site administration
- Managing database storage
- Creating server users and assigning their privileges
- Using spatial and tabular data from a GIS application
- Experience with XML and XSLT
- Understand how SDE software interacts with the RDBMS
- Understand SDE and ArcIMS architectures

The table below identifies which users should attend what lectures that are part of the GIS Portal Toolkit Instructor-led class or onsite workshop.

Lecture	Title	End-User	Database Administrator	GIS Portal Administrator	Technical User
1	Introduction	X	X	X	X
2	Working with Metadata	X		X	X
3	GIS Portal Toolkit	X	X	X	X
4	GIS Portal Database		X	X	X
5	GIS Portal			X	X
6	Map Viewer			X	X
7	Working with the GIS Portal Toolkit	X		X	X
8	Harvesting Tool			X	X
9	Portal Toolbar for ArcMap	X		X	X
10	Customizing the GIS Portal			X	X
11	Customizing the Map Viewer			X	X

GIS Portal Toolkit 9.3 Supported Environment

The GIS Portal Toolkit 9.3 has been tested, verified, and is fully supported on the following software environment, which is the base support level:

ESRI Software

- ArcGIS Server 9.3 Standard Enterprise edition
- The Java Web Application Developer Framework is required for the GIS Portal Toolkit Map Viewer
- ArcGIS Desktop 9.3 (optional but highly recommended)

Third Party Software

Operating System	Microsoft Windows Server
HTTP Server	ISS (5.0, 5.1, 6.0 – version depends on Windows version) Apache 2.058
Servlet Engine	Tomcat 5.0.28, 5.5.17, 5.5.26
Database (1)	SQL Server 2000 or 2005 Oracle 9i or 10g PostgreSQL 8.3
User Authentication/Authorization	LDAP-enabled Directory Server (2) **or** Simple Authentication)3+
Javatm 2 Platform (4)	Standard Edition (J2SE) 1.5.0_06 or higher

(1) *A JDBC driver for the database is required.*

(2) *For full functionality of user-based roles in GIS Portal Toolkit 9.3, an LDAP-enabled **Directory Server** is required for the authentication mechanism. You may use an existing Directory Server if you already have one in your organization. If you currently do not have a Directory Server and wish to have user-based roles, you will need to install a Directory Server. Examples include Microsoft Active Directory, IBM Tivoli Access Manager, Sun OpenDS, and Apache Directory Server. Instructions on installing either Apache Directory Server of Sun OpenDS are available in the GIS Portal Toolkit 9.3 distribution documentation package.*

(3) *"Simple Authentication", where the GIS Portal Toolkit has just **one** administrative user account, is available as an alternative to LDAP when setting up the GIS Portal Toolkit 9.3. It is a quick option for an introductory setup but is not recommended for Production environments. Users wishing to use simple authentication need not install additional LDAP software. Setting up simple authentication can be achieved solely via the GPT configuration file and is described in detail in the installation guide.*

(4) *Java 6 is **not** supported.*

GPT 9.3: Pre-Installation Requirements

Contents

1. INTRODUCTION

GIS Portal Toolkit (GPT) 9.3 requires certain software to be setup and present on the environment in which GPT 9.3 will be installed. Please refer to each section below to verify that your environment meets the particular system requirement before proceeding with a GPT 9.3 installation.

2. OPERATING SYSTEM

Although we have only officially tested GPT 9.3 in a Windows 2003 SP2 Server and a Windows XP SP2 Professional Edition environment, the following operating systems are all supported for GPT 9.3. If you are using one of these other operating systems, we would be happy to hear from you with any issues you encounter.

- Red Hat Enterprise Linux AS/ES 4.0 Update 2
- SUSE Linux Enterprise Server 10
- Sun Solaris 9, 10 (SPARC)
- Windows 2000 SP4 Server
- Windows 2003 SP2 Server
- Windows Vista SP1 Ultimate, Enterprise, Business
- Windows XP SP2 Professional Edition

3. DATABASE

GPT 9.3 supports the following databases:

- Oracle 9i 9.2.0.7
- Oracle 10g 10.2.0.2
- Microsoft SQL Server 2000 SP4
- Microsoft SQL Server 2005 SP2
- PostgreSQL

4. JAVA

The full Java 1.5 SDK is required. Either version 1.5.0_06 or 1.5.0_14 may be used. GPT 9.3 will not work with Java 1.6.

5. ESRI SOFTWARE

The following ESRI software is required before installing GPT 9.3:

- ArcGIS Server 9.3 Standard Enterprise – Java Edition
- ArcGIS Desktop 9.3 (optional, but highly recommended)
- ArcSDE 9.3

In addition, GPT 9.3 requires the following:

a) An ArcGIS Server Map Service, with a REST URL endpoint
b) An ArcGIS Server Locator service. If you do not have the means to create a locator service, you may use the publicly available one at:
http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Locators/ESRI_Geocode_USA/GeocodeServer

NOTE: If you have ArcIMS installed on the machine onto which you will be installing GPT 9.3, you must uninstall ArcIMS before installing GPT 9.3. After uninstalling ArcIMS, please verify that the "servlet" web application is no longer present in <Tomcat>\webapps. GPT 9.3 installs its own servlet application. Any other ArcIMS web applications, such as esriadmin or aimscsw, will not conflict with GPT 9.3 and can remain present if needed.

6. WEB SERVER AND SERVLET ENGINE

Web Server
Either Apache 2.0.58 or IIS (version dependent on operating system).

Servlet Engine
Tomcat is the only supported servlet engine. Tomcat 5.5.17 or 5.5.26 may be used. GPT 9.3 will not work with Tomcat 6.

7. DIRECTORY SERVER

For full functionality of user-based roles in GPT9.3, an LDAP-enabled Directory Server is required for the authentication mechanism. You may use an existing Directory Server if you already have one in your organization. If you currently do not have a Directory Server, and you wish to have user-based roles, you will need to install a Directory Server. Instructions on installing either Apache Directory Server or Sun OpenDS are available in the GPT 9.3 distribution documentation package.

Simple authentication – where the GPT has just one user account, an administrative account – is available as an alternative when setting up GPT 9.3. It is a quick option for an introductory setup, but is not recommended for production environments. Users wishing to use simple authentication need not install additional software. Setting up simple authentication can be achieved solely via the GPT configuration file and is described in detail in the installation guide.

8. THIRD PARTY JAVA PACKAGES

GPT 9.3 exposes Sun and Apache technology via third-party Java library files for some of its functionality. With GPT 9.3, the third-party library files are included in the distribution package. The following is a list of the libraries that are distributed and used by GPT 9.3.

	Vendor	Ver.	Filename	Source	Location
1.	JSF Framework	1.1.01	commons-beanutils.jar commons-collections.jar commons-digester.jar commons-logging.jar jsf-api.jar jsf-impl.jar	Sun	http://java.sun.com/javaee/javaserverfaces/download.html Notes: The downloaded file will be jsf_1_1_01.zip. Expand the archive. All files will be found in the lib directory.
2.	Java Mail	1.4	Mail.jar	Sun	http://java.sun.com/products/javamail/javamail-1_4.html Notes: The downloaded file will be javamail-1_4.zip. Expand the archive. The mail.jar will be in the root directory.
3.	JavaBeans Activation Framework	1.1	Activation.jar	Sun	Sun http://java.sun.com/products/archive/javabeans/jaf11.html Notes: The downloaded file will be jaf-1_1-fr.zip. Expand the archive. The activation.jar will be in the root directory.
4.	Struts Tiles	1.3.8	commons-digester-1.8.jar struts-core-1.3.8.jar struts-tiles-1.3.8.jar	Apache	http://struts.apache.org/download.cgi#struts138 Notes: The downloaded file will be tructs-1.3.8-lib.zip. Expand the archive. All files will be found in the lib directory
5.	JSP Standard Tag Library	1.1.2	jstl.jar standard.jar	Apache	http://jakarta.apache.org/site/downloads/downloads_taglibs-standard.cgi Notes: The downloaded file will be jakarta-taglibsstandard-1.1.2.zip. Expand the archive. All files will be found in the lib directory.

6.	File Upload	1.2	commons-fileupload-1.2.jar	Apache	http://archive.apache.org/dist/commons/fileupload/binaries/ Notes: The downloaded file will be commons-fileupload-1.2-bin.zip. Expand the archive. The commons-fileupload-1.2.jar will be in the lib directory
7.	IO	1.3.2	commons-io-1.3.2.jar	Apache	http://archive.apache.org/dist/commons/io/binaries/ Notes: The downloaded file will be commons-io-1.3.2-bin.zip. Expand the archive. The commons-io-1.3.2.jar will be in the root directory.
8.	CSW Client		CSWClient.jar	ESRI	Bundled in the GPT9.3 Beta application

If you have verified all system components, you are ready to install GPT 9.3. Please refer to the GPT 9.3 Installation Guide for Guidance.

Appendix 7

GIS Server System Requirements

ArcGIS Server System Requirements

URL = http://wikis.esri.com/wiki/display/ag93bsr/ArcSDE+Microsoft+SQL+Server+Database+Requirements

Supported Database Versions

- Microsoft SQL Server 2000 SP4 (32-bit)
- Microsoft SQL Server 2005 SP2 (32-bit)
- Microsoft SQL Server 2005 SP2 (64-bit)
- Microsoft SQL Server 2008 (32-bit)
- Microsoft SQL Server 2008 (64-bit)

Supported Operating Systems

Database	Supported Operating System(s)
Microsoft SQL Server 2000 SP4 (32-bit)	▪ Windows 2000 SP4 (32-bit) Server, Advanced Server & Datacenter ▪ Windows 2003 SP2 (32-bit) Server Standard, Enterprise & Datacenter ▪ Windows XP SP2 (32-bit) Professional Edition
Microsoft SQL Server 2005 SP2 (32-bit)	▪ Windows 2000 SP4 (32-bit) Server, Advanced Server & Datacenter ▪ Windows 2003 SP2 (32 bit) Server Standard, Enterprise & Datacenter ▪ Windows 2008 (32 bit) Server Standard, Enterprise & Datacenter ▪ Windows XP SP2 (32 bit) Professional Edition ▪ Windows Vista (32 bit) Ultimate, Enterprise, Business
Microsoft SQL Server 2005 SP2 (64-bit)	▪ Windows 2003 SP2 (64-bit - EM64T) Server Standard, Enterprise & Datacenter ▪ Windows 2008 (64-bit - EM64T) Server Standard, Enterprise & Datacenter
Microsoft SQL Server 2008 (32-bit) *	▪ Windows 2003 SP2 (32 bit) Server Standard, Enterprise & Datacenter

	▪ Windows 2008 (32 bit) Server Standard, Enterprise & Datacenter
Microsoft SQL Server 2008 (64-bit) *	▪ Windows 2003 SP2 (64-bit - EM64T) Server Standard, Enterprise & Datacenter ▪ Windows 2008 (64-bit - EM64T) Server Standard, Enterprise & Datacenter

ArcGIS Server System Requirements Limitations

SQL Server 2008

* SQL Server 2008 Spatial Types (Geography and Geometry) are supported with 9.3 SP1, binary supported at 9.3 Final.

Windows Vista and XP

Windows Vista and XP Service Pack 2 is supported for basic testing and application development use only. It is not recommended for deployment in a production environment.

Windows XP Service Pack 2 is only supported with the Developer Edition of SQL Server.

Windows 64-bit servers

ArcSDE 9.3 is currently a 32-bit application, which can run on Windows 64-bit servers.

ArcGIS Server Image Extension

URL = http://www.esri.com/software/arcgis/serverimage/about/sys-reqs.html

The ArcGIS Server Image extension works on the following Microsoft operating systems.

Service Editor (for Authoring a Service)

- Requires ArcGIS Desktop 9.2 (ArcView, ArcEditor, or ArcInfo).
- .NET support for ArcGIS Desktop is required (an optional component of the desktop install).

Server

- Microsoft Windows XP or Windows Server 2003.
- Hardware requirements
  - Intel Pentium or Intel Xeon 2.0 GHz or higher
  - 1 GB RAM
  - 36 GB disk space
  - Fast access to disk storage where images are stored

More system requirements are available and should be reviewed because they are platform related.
http://support.esri.com/index.cfm?fa=knowledgebase.systemRequirements.matrix&pName=ArcGIS+Image+Server&productID=103&pvName=9.2&versionID=115&PID=103&PVID=366

GIS Portal Toolkit

URL = http://www.esri.com/software/arcgis/gisportal-toolkit/about/sys-reqs.html

ESRI Software

- ArcGIS Server 9.3 Standard Enterprise edition
- The Java Web Application Developer Framework (required for the GIS Portal Toolkit Map Viewer)
- ArcGIS Desktop 9.3 (optional but highly recommended)

Third-Party Software

HTTP Server	▪ IIS (5.0, 5.1, or 6.0, depending on Windows version) ▪ Apache 2.058
Servlet Engine	▪ Tomcat 5.0.28, 5.5.17, 5.5.26
Database (1)	▪ SQL Server 2000 or 2005 ▪ Oracle 9i or 10g ▪ PostgreSQL
User Authentication/ Authorization	▪ LDAP-enabled directory server (2) Or ▪ simple authentication (3)
Java 2 Platform (4)	▪ Standard Edition (J2SE) 1.5.0_06 or higher

(1) A Java Database Connectivity (JDBC) driver for the database is required.
(2) For full functionality of user-based roles in GIS Portal Toolkit 9.3, an LDAP-enabled directory server is required for the authentication mechanism. You may use an existing directory server if you already have one in your organization. If you currently do not have a directory server and wish to have user-based roles, you will need to install a directory server. Examples include Microsoft Active Directory, IBM Tivoli Access Manager, Sun OpenDS, and Apache Directory Server. Instructions on installing either Apache Directory Server or Sun OpenDS are available in the GIS Portal Toolkit 9.3 distribution documentation package.
(3) Simple authentication, where the GIS Portal Toolkit has just one administrative user account, is available as an alternative to LDAP when setting up the GIS Portal Toolkit 9.3. It is a quick option for an introductory setup but is not recommended for production environments. Users wishing to use simple authentication need not install additional LDAP software. Setting up simple authentication can be achieved solely via the GPT configuration file and is described in detail in the installation guide.
(4) Java 6 is not supported.

Another really good resource to browse would be the ESRI System Design Strategies found at http://www.esri.com/library/whitepapers/pdfs/sysdesig.pdf. That might have more to do with an enterprise solution but that might come into play down the line.

Appendix 8

Grid Packaging Tool (GPT) XML - gpt.xml

The Grid Packaging Tool (GPT) uses XML to describe all the information that is needed for an installation. These XML files hold all of the information on that the GPT will need in order to create a Grid instance on a particular system.

```
<?xml version="1.0" encoding="UTF-8"?>
<gptConfig version="10.0.0.200">

   <databaseReference name="gpt" jndiName="jdbc/gpt"/>

   <!-- Mail server configuration.
      - smtpHost: mail server SMTP host
      - smtpPort: mail server SMPT port (optional)
      - siteEmailAddress: portal contact E-Mail address
      - emailAddressRegexp: a regular expression for validating input E-Mail addresses
      - smptAuth: configuration for a mail server requiring authentication credentials
      - username: the username credential
      - password: the password credential
      - encrypted: "true" or "false" (indicates if this password is encrypted) -->
   <mail
      smtpHost="mxout.ne.gov"
      smtpPort="24"
      siteEmailAddress="ocio.gis.admin@nebraska.gov"
      emailAddressRegexp="^[a-zA-Z0-9,!#\$%&amp;'\*\+/=\?\^_`\{\|}~-]+(\.[a-zA-Z0-
9,!#\$%&amp;'\*\+/=\?\^_`\{\|}~-]+)*@[a-zA-Z0-9-]+(\.[a-zA-Z0-9-]+)*$">
      <smtpAuth
         username=""
         password=""
         encrypted="false"/>
   </mail>

   <!-- ========================================================================== -->
  <!-- Search page map configuration.
                  - jsapiUrl: url to the JavaScript API
                  - mapServiceUrl: REST URL to an ArcGIS Server MapServer service
                  - mapServiceType: type of map service, dynamic or tiled.
                  - geometryServiceUrl: REST URL to an ArcGIS Server GeometryServer service
                  - locatorUrl: REST URL to an ArcGIS Server GeocodeServer service
                  - locatorSingleFieldParameter: field for the GeocodeServer service upon which
locations can be searched -->

   <interactiveMap
      jsapiUrl="http://serverapi.arcgisonline.com/jsapi/arcgis/?v=2.0"

mapServiceUrl="http://server.arcgisonline.com/ArcGIS/rest/services/World_Street_Map/MapSer
ver"
```

```
        mapServiceType="dynamic"

geometryServiceUrl="http://sampleserver3.arcgisonline.com/ArcGIS/rest/services/Geometry/GeometryServer"

locatorUrl="http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Locators/ESRI_Geocode_USA/GeocodeServer"
        locatorSingleFieldParameter = "city"/>

    <catalog gptTablePrefix="GPT_">

                <!-- Lucene configuration.
                - indexLocation: path to the folder that will hold indexed documents
                        (e.g. c:/geoportal/lucene-index/catalog1)
                - writeLockTimeout: the wait time in milli-seconds for acquiring a
write lock
                - useNativeFSLockFactory: if true a NativeFSLockFactory is used
otherwise use a SimpleFSLockFactory
                - analyzerClassName: the class name for the Lucene analyzer
                - adaptor: parameters that define the optional OntologyService
configuration, as per geoportal webhelp at

    http://help.arcgis.com/en/geoportal_extension/10.0/help/index.html#/Enable_Search_Using_an_Ontology_Service/00t00000003v000000/ -->

            <lucene
                indexLocation="D:/ESRI/Geoportal Extension 10/Lucene"
                writeLockTimeout="60000"
                useNativeFSLockFactory="true"

    analyzerClassName="org.apache.lucene.analysis.standard.StandardAnalyzer">
                <!--
                        <adaptor name="like"
className="com.esri.gpt.catalog.lucene.StandardNetworkParserAdaptor">
                                <attribute key="baseUrl"
value="http://serverName/OntologyService/query?threshold=0.25&amp;term="/>
                        </adaptor>
                -->
            </lucene>

            <!--  Lucene index based assertions (resource ratings and comments).
              - assertion.index.enabled: indicates if ratings and comments should be
enabled.
              - assertion.index.location: path to the folder that will hold the indexed
comments and ratings. NOTE: This assertion.index.location should
          not be the same location as the lucene\indexLocation value. These indexes
should not be deleted and should be on a file backup/restore
          plan.
              - assertion.index.allowNonLocalResourceIds: if true, comments and ratings
can be made about resources that do not exist in the local
```

catalog.
- assertion.rating.enabled: allow users to rate resources.
- assertion.comment.enabled: allow users to leave comments for resources.
- assertion.comment.maxLength: maximum characters allowed for one comment. -->

<parameter key="assertion.index.enabled" value="true"/>
<parameter key="assertion.index.location" value="D:/ESRI/Geoportal Extension 10/assertion_index"/>
<parameter key="assertion.index.allowNonLocalResourceIds" value="false"/>
<parameter key="assertion.rating.enabled" value="true"/>
<parameter key="assertion.comment.enabled" value="true"/>
<parameter key="assertion.comment.maxLength" value="2048"/>

<!-- Map Viewer configuration. Optional. You can use the following section to integrate a map viewer with your geoportal, according to the Integrate Map Viewer webhelp documentation at http://help.arcgis.com/en/geoportal_extension/10.0/help/index.html#/Integrate_a_Map_Viewer/00t00000000s000000/. Below is the flex map viewer configuration.
- url = Url of the Flex viewer
- className: class name of the map viewer instance, e.g., for Flex example is com.esri.gpt.catalog.search.MapViewerFlex. NOTE: The
MapViewerFlex must be in the same domain and port in order for layering of resources to work -->
<!--
<mapViewer>
<instance
url=""
className="com.esri.gpt.catalog.search.MapViewerFlex">
<parameter key="width" value="1000"/>
<parameter key="height" value="700"/>
<parameter key="regexCanConsumeUrl" value=""/>
</instance>
</mapViewer>
-->

<!-- Search settings.
- searchTimeoutMillisecs: length of time allotted to a search attempt before a timeout error occurs
- distributedSearchTimeoutMillisecs: length of time allotted to a federated search attempt before a timeout error occurs
- distributedSearchMaxSelectedSites: maximum number of sites allowed to be searched in one federated search attempt
- searchResultsPerPage: number of results to show on a page. If more results are returned than this value, page navigation will be visible
- searchResultsReviewsShown: How should the reviews be shown on the results page. Options are "none", "only-reviewed" or "all"
- maxSavedSearches: maximum number of allowed searches in storage, per user.

```
                        -allowExternalSiteSearch: Flag enabling federated search-->

                        <search
                                searchTimeoutMillisecs="10000"
                                distributedSearchTimeoutMillisecs="5000"
                                distributedSearchMaxSelectedSites="5"
                                searchResultsPerPage="10"
                                searchResultsReviewsShown="only-reviewed"
                                maxSavedSearches="10"
                                allowExternalSiteSearch="false">

                                <!-- Settings for repositories available in federated search
                                - key: regular expression, can be used to identify the rid for the
repository.
                                - class: search engine instance, a Java class that will process the
search request.
                                - labelResourceKey: text that appears in the federated search list. If
no key is given, the repository will not be visible in the federated search list.
                                - abstractResourceKey: text that appears on the REST distributed
search, describing the repository. -->

        <repositories>

         <repository key="local"
          class="com.esri.gpt.catalog.search.SearchEngineLocal"
          labelResourceKey="catalog.search.searchSite.defaultsite"
           abstractResourceKey="catalog.search.searchSite.defaultsite.abstract"/>

                                 <!--  Default search engine that catches blank rids -->
                                <repository key="^$"
                                   class="com.esri.gpt.catalog.search.SearchEngineLocal"
                                   labelResourceKey=""
                                   abstractResourceKey=""/>

                                <!-- arcgis.com rid. Optional. -->
                                <repository key="arcgis.com"
                                   class="com.esri.gpt.catalog.search.SearchEngineRest"
                                   labelResourceKey="catalog.search.searchSite.agsonline"
                                   abstractResourceKey="catalog.search.searchSite.agsonline.abstract">
                                   <parameter key="endPointSearchUrl"

value="http://www.arcgis.com/sharing/search?q={searchTerms}&amp;amp;start={startIndex}&amp;amp;n
um={count}&amp;amp;f=json"/>
                                   <parameter key="defaultParamValues"
                                      value="q&amp;#x2714;access:shared || access:public || access:private "/>
                                   <parameter key="profileId"
                                      value="urn:esri:gpt:HTTP:JSON:ESRI:AGSONLINE" />
                                </repository>

        <!-- For the registered CS-W repositories flagged for viewing in federated search -->
```

```
        <repository key="*"
           class="com.esri.gpt.catalog.search.SearchEngineExternalCsw"/>

      </repositories>
   </search>

   <!-- Metadata Access Policy Configuration
      For Ldap identity adapter, single group restriction policy configure as below,
      if not configured then publisher selects from all ldap groups
      type="unrestricted"
      or
      type="public-protected" protectedGroupDN="distinguishedName(E.g.
cn=gpt_administrators,ou=groups,ou=system)"
      or
      type="restricted" -->

   <metadataAccessPolicy type="public-protected"/>

   <!-- Sitemap parameters
    - sitemap.baseUrl: the base URL for sitemap files
       default = auto-generated, e.g. http://host:port/[contextPath]/sitemap
    - sitemap.documentUrlPattern: the default URL pattern referencing documents within a
sitemap,
       {0} will be replaced with the document's UUID,
       default = /sitemap/document/{0}?f=html
    - sitemap.documentUrlPattern.[format]: response format specific document URL patterns,
       {0} will be replaced with the document's UUID,
       e.g.
         http://host:port/[contextPath]/sitemap?f=xml
         will produce specific document references with the following pattern
         http://host:port/[contextPath]/sitemap/document/{0}?f=xml
    - sitemap.urlsPerIndexFile: the maximum number of sitemap files to be referenced within
       the sitemap index file (should not exceed 1000),
       default = 1000
    - sitemap.urlsPerSitemapFile: the maximum number of documents to be referenced within
       an individual sitemap file (should not exceed 50000),
       default = 1000
    - sitemap.namespaceUri: the sitemap namespace URI,
       default = http://www.sitemaps.org/schemas/sitemap/0.9
    - sitemap.changefreg: the change frequency to be listed per document reference,
       hourly daily weekly monthly yearly ,
       default = weekly
    - sitemap.priority: the priority to be listed per document reference, 0.0 -> 1.0,
       default = none   -->

   <parameter key="sitemap.baseUrl" value=""/>
   <parameter key="sitemap.documentUrlPattern" value="/sitemap/document/{0}?f=html"/>
   <parameter key="sitemap.documentUrlPattern.html"
value="/sitemap/document/{0}?f=html"/>
   <parameter key="sitemap.documentUrlPattern.htmlfragment"
```

```
value="/sitemap/document/{0}?f=htmlfragment"/>
    <parameter key="sitemap.documentUrlPattern.xml" value="/sitemap/document/{0}?f=xml"/>
    <parameter key="sitemap.documentUrlPattern.kml" value="/sitemap/document/{0}?f=kml"/>
    <parameter key="sitemap.urlsPerIndexFile" value="1000"/>
    <parameter key="sitemap.urlsPerSitemapFile" value="1000"/>
    <parameter key="sitemap.namespaceUri"
value="http://www.sitemaps.org/schemas/sitemap/0.9"/>
    <parameter key="sitemap.changefreq" value="weekly"/>
    <parameter key="sitemap.priority" value=""/>

                <!-- Synchronizer parameters.
                        - webharvester.active: flag for if synchronization is active at startup. Default:
true
          - webharvester.queueEnabled: flag to enable task queue. Default: current
webharvester.active value. Note! it is not possible to set this flag to false if webharvester.active is
true
                        - webharvester.poolsize: pool size of the Threads. Default: 4
                        - webharvester.autoSelectFrequency: Resources auto-selection frequency.
Default: 1[HOUR]
                        - webharvester.watchDogFrequency: Watch-dog activation frequency.
Default: 1[MINUTE]
                        - webharvester.baseContextPath: Base context path used inside email
notifications. Default: none (no report link in the notification)
                        - webharvester.maxRepRecords: Maximum number of records to report.
Default: 10000. -1 to remove limit.
                        - webharvester.maxRepErrors: Maximum number of errors to report.
Default: 5000. -1 to remove limit
                        - webharvester.resource.autoApprove: Autoapprove newly registered
resources. Default: false -->

            <parameter key="webharvester.active" value="true"/>
            <parameter key="webharvester.queueEnabled" value="true"/>
            <parameter key="webharvester.poolsize" value="4"/>
            <parameter key="webharvester.autoSelectFrequency" value="2"/>
            <parameter key="webharvester.watchDogFrequency" value="1"/>
            <parameter key="webharvester.baseContextPath" value=""/>
    <parameter key="webharvester.maxRepRecords" value="70"/>
    <parameter key="webharvester.maxRepErrors" value="7"/>
    <parameter key="webharvester.resource.autoApprove" value="false"/>

          </catalog>

   <!-- Download data configuration.
      - taskUrl: geoprocessing task URL
      - mapServiceUrl: map service URL used by geoprocessing task
      - mapServiceType: The caching scheme for the map service. The value can be "dynamic" or
"tiled"  -->

   <downloadData
```

```
taskUrl="http://www.nebraskamap.gov/ArcGIS/rest/services/ExtractData/GPServer/ExtractDataTool"

mapServiceUrl="http://www.nebraskamap.gov/ArcGIS/rest/services/ExtractableData/Mapserver"
    mapServiceType="dynamic">

    <features>
      <feature key="File Geodatabase - GDB - .gdb" alias="gdb" resKey="catalog.download.feature.gdb"/>
      <feature key="Shapefile - SHP - .shp" alias="shp" resKey="catalog.download.feature.shp"/>
      <feature key="Autodesk AutoCAD - ACAD - .dxf" alias="dxf" resKey="catalog.download.feature.dxf"/>
      <feature key="Autodesk AutoCAD - ACAD - .dwg" alias="dwg" resKey="catalog.download.feature.dwg"/>
      <feature key="Bentley Microstation Design (V8) - DGN_V8 - .dgn" alias="dgn" resKey="catalog.download.feature.dgn"/>
    </features>

    <rasters>
      <raster key="ESRI GRID - GRID" alias="grd" resKey="catalog.download.raster.grd"/>
      <raster key="File Geodatabase - GDB - .gdb" alias="gdb" resKey="catalog.download.raster.gdb"/>
      <raster key="ERDAS IMAGINE - IMG - .img" alias="img" resKey="catalog.download.raster.img"/>
      <raster key="Tagged Image File Format - TIFF - .tif" alias="tif" resKey="catalog.download.raster.tif"/>
      <raster key="Graphic Interchange Format - GIF - .gif" alias="gif" resKey="catalog.download.raster.gif"/>
      <raster key="Joint Photographics Experts Group - JPEG - .jpg" alias="jpg" resKey="catalog.download.raster.jpg"/>
      <raster key="Joint Photographics Experts Group - JPEG 2000 - .jp2" alias="jp2" resKey="catalog.download.raster.jp2"/>
      <raster key="Bitmap - BMP - .bmp" alias="bmp"  resKey="catalog.download.raster.bmp"/>
      <raster key="Portable Network Graphics - PNG - .png" alias="png" resKey="catalog.download.raster.png"/>
    </rasters>

    <!-- To support backward compatibility for the Geoportal 9.3.x data download customizations, these projections and format sections are provided. These are not used in the Geoportal 10 data download customization -->
                        <!--<projections>
      <projection key="Mercator (world)" alias="54004" resKey="catalog.download.projection.54004"/>
      <projection key="WGS 1984 UTM Zone 10N" alias="32610" resKey="catalog.download.projection.32610"/>
      <projection key="WGS 1984 Web Mercator" alias="102113" resKey="catalog.download.projection.102113"/>
      <projection key="WGS 1984" alias="4326" resKey="catalog.download.projection.4326"/>
    </projections>
```

```
    <formats>
      <format key="GML - (.gml)" alias="gml" resKey="catalog.download.outputFormat.gml"/>
      <format key="GMLSF - (.gmlsf)" alias="gmlsf"
resKey="catalog.download.outputFormat.gmlsf"/>
      <format key="MIF - (.mif)" alias="mif" resKey="catalog.download.outputFormat.mif"/>
      <format key="ACAD - (.dwg)" alias="dwg" resKey="catalog.download.outputFormat.acad"/>
      <format key="IGDS - (.dgn)" alias="dgn" resKey="catalog.download.outputFormat.igds"/>
    </formats> -->
  </downloadData>

  <!-- ========================================================================== -->
                <!-- User Management configuration. simpleAdapter OR ldapAdapter.
                        - simpleAdapter: configures geoportal with one administrative user
                        - ldapAdapter: configures geoportal to connect to LDAP user directory store.
-->

  <identity encKey="PtkESRI" realm="Geoportal">
    <!--
     <simpleAdapter>
       <account username="gptaccount" password="gpt.account" encrypted="false"/>
       <roles>
         <role key="gptRegisteredUser"/>
         <role key="gptPublisher"/>
         <role key="gptAdministrator"/>
       </roles>
     </simpleAdapter>
    -->

    <ldapAdapter>

      <ldapConnectionProperties
        providerURL="ldap://stnegisweb01:10389"
        initialContextFactoryName="com.sun.jndi.ldap.LdapCtxFactory"
        securityAuthentication="simple"
        securityProtocol="">
        <ldapServiceAccount
          securityPrincipal="uid=admin,ou=system"
          securityCredentials="Huskers"
          encrypted="false"
          catalogAdminDN="cn=gptadmin,ou=users,ou=system"/>
      </ldapConnectionProperties>

      <singleSignOn
        active="false"
        credentialLocation="userPrincipal"
        anonymousValue=""
        logoutOutcome=""/>

      <selfCareSupport
```

```
   supportsLogin="true"
   supportsLogout="true"
   supportsUserRegistration="true"
   supportsUserProfileManagement="true"
   supportsPasswordChange="true"
   supportsPasswordRecovery="true"/>

<roles authenticatedUserRequiresRole="true">
   <role
      key="gptRegisteredUser"
      groupDN="cn=gpt_registeredUsers,ou=groups,ou=system"/>
   <role
      key="gptPublisher"
      inherits="gptRegisteredUser"
      groupDN="cn=gpt_publishers,ou=groups,ou=system"/>
   <role
      key="gptAdministrator"
      inherits="gptPublisher"
      groupDN="cn=gpt_administrators,ou=groups,ou=system"/>
</roles>

<users
   displayNameAttribute="cn"
   passwordEncryptionAlgorithm="SHA"
   newUserDNPattern="cn={0},ou=users,ou=system"
   usernameSearchPattern="(&amp;(objectclass=person)(cn={0}))"
   searchDIT="ou=users,ou=system">
   <requiredObjectClasses>
      <objectClass name="top"/>
      <objectClass name="person"/>
      <objectClass name="organizationalPerson"/>
      <objectClass name="inetOrgPerson"/>
   </requiredObjectClasses>
   <userAttributeMap>
      <attribute key="username"    ldapName="uid"/>
      <attribute key="password"    ldapName="userPassword"/>
      <attribute key="email"       ldapName="mail"/>
      <attribute key="firstName"   ldapName="givenName"/>
      <attribute key="lastName"    ldapName="sn"/>
      <attribute key="organization" ldapName="o"/>
      <attribute key="affiliation"  ldapName="businessCategory"/>
      <attribute key="street"      ldapName="street"/>
      <attribute key="city"        ldapName="l"/>
      <attribute key="stateOrProv"  ldapName="st"/>
      <attribute key="postalCode"   ldapName="postalCode"/>
      <attribute key="country"     ldapName=""/>
      <attribute key="phone"       ldapName="telephoneNumber"/>
   </userAttributeMap>
</users>
```

```
      <groups
        displayNameAttribute="cn"
        dynamicMemberOfGroupsAttribute=""
        dynamicMembersAttribute=""
        memberAttribute="uniquemember"
        memberSearchPattern="(&amp;(objectclass=groupOfUniqueNames)(uniquemember={0}))"
        searchDIT="ou=groups,ou=system">

      <!--
      <metadataManagementGroup
        name="Region 1"
        groupDN="group_distinguished_name"/>
      <metadataManagementGroup
        name="Region 2"
        groupDN="group_distinguished_name"/>
      -->
      </groups>
    </ldapAdapter>
  </identity>

  <!-- Scheduled Background Threads
================================================== -->

  <scheduler active="true" corePoolSize="0" harvestThreadsNumber="4"
jobInactivityPeriod="2[HOUR]">

    <!-- Catalog synchronization -->
    <thread class="com.esri.gpt.catalog.context.CatalogSynchronizer" period='1[HOUR]'
delay="30[SECOND]"/>

    <!-- Index optimixation -->
    <thread class="com.esri.gpt.catalog.lucene.LuceneIndexOptimizer" at="02:30"/>

  </scheduler>

</gptConfig>
```

Appendix 9

NebraskaMAP Metadata Profile -- (Nebraska FGDC)
Adonna Fleming and Dan Pfeffer

Based on:
Content Standard for Digital Geospatial Metadata (CSDGM)
Essential Metadata Elements

The following is a set of recommended metadata elements that can be used to as a *boilerplate* for the development of organizational metadata and templates. Users are strongly encouraged to consider the following as a starting place for template development and not a solution to minimizing the standard. The set represents an expansion to the purely mandatory elements specified by the CSDGM. The set is best applied to GIS data and imagery maintained in standard horizontal coordinate systems. For more specialized data and data maintained in vertical and local horizontal coordinate systems, additional metadata elements become essential. For more information about CSDGM element definitions and domains see the following documents located at the FGDC Metadata Publication website,
http://www.fgdc.gov/metadata/metadata-publications-list

- *Content Standard for Digital Geospatial Metadata Workbook, Vers. 2.0*
- *Metadata Quick Guide*

FGDC Minimum

Section One: Identification

Originator

It is recommended that you indicate the party responsible for the data set. While that is most commonly the organization that developed the data set, in some cases, it is not. For example, if a county planning department hires a contractor to build a street centerline road file, the planning department, not the contractor should be identified as the Originator. The contractor should be fully cited using the
Data_Set_Credit (1.11) element, e.g. *'this data set was developed for the Wayne County Planning Department by Smith Engineering, Inc'*.

Publication_Date

The date that the data was published or otherwise made available.
Remember format: YYYYMMDD.

Title

Minimum – where, what, when,
Best practice – who, why, resolution, filename, source
e.g. Aquifer Systems and Recharge Potential in
Louisiana from LDEQ source data. Geographic NAD83,
LOSCO (1999) [aqrgeog3dpdeq]

Abstract

Be sure to include
general content and features
data set form (GIS, CAD, image, Dbase)
geographic coverage (county/city name)
time period of content (begin and end date or single date)
special data characteristics or limitations

Purpose

Why was this dataset created?

Time_Period_of_Content

The relevant date of the data content. Can be a single date, multiple dates, or a range of dates.

Currentness_Reference

The context for the Time_Period_of_Content. For example: an orthophotograph may have been compiled and delivered in June (publication date) but flown in February (ground condition).

Progress

The status of the data set, this field has a fixed domain of: “Complete”, “In Work”, and “Planned.

Maintenance_and_Update_Frequency

How often will the data be updated?

West_Bounding_Coordinates
East_Bounding_Coordinate
North_Bounding_Coordinate
South_Bounding_Coordinates

Coordinates in decimal degree form

Theme_Thesaurus

ISO 19115 Topic Category

Theme_Keywords

Select from drop down box

Access_Constraints

Default is 'none' – follow your agencies policy

Use_Constraints

Default is 'none' – follow your agencies policy

Section Two: Metadata Reference Information

Contact_Organization *(preferred)*

Contact_Person

Address_Type
Address
City
State_or_Province
Postal_Code
Contact_Voice_Telephone

Metadata_Standard_Name
Metadata_Standard_Version

Appendix 10
Street Centerline RFP

Desired Minimum Set of Populated Attributes

Points ** field values selected from domain list*

ITEM NAME	*TYPE*	*WIDTH*	*Description*
UNIQUE_ID_PT	Number	9	Framework unique sequential identifier (generated by data integrator???)
AGREE_PT_IND	*String	1	Indicator if point is or is not an agreement point.
CREATE_DT_PT	Date	8	Date that point geometry/attribution first created (MMDDYYYY)
UPDATE_DT_PT	Date	8	Date that point geometry/attribution last modified (MMDDYYYY)
STATUS_CD_PT	*String	1	Code indicating operational condition of road segment point (including if it is now in a "retired" status)

Lines ** field values selected from domain list*

ITEM NAME	*TYPE*	*WIDTH*	*Description*
UNIQUE_ID_SEG	String	9	Framework unique identifier (generated by data integrator???)
LENGTH	Number	16	Calculated length in US Survey Feet (to 3 decimal places)
DATMAINTENANCE	*String	25	Entity responsible for maintenance of road segment data
DIRPREFIX	*String	15	Prefix directional component of segment name
PREFIXTYPE	*String	10	Road type component of segment name that appears before RDNAME (e.g. ST, AVE, LP, CT etc.)
RDNAME	String	50	Road name component of segment name
RDTYPE (SUFFIXTYPE?)	*String	15	Road type component of segment name (e.g. ST, AVE, LP, CT etc.)
DIRSUFFIX	*String	15	Suffix directional component of segment name
LFROM	Number	10	Left low address range
LTO	Number	10	Left high address range
RFROM	Number	10	Right low address range
RTO	Number	10	Right high address range
LCITYPOSTAL	String	30	Left city name of postal address (not necessarily legal location)
RCITYPOSTAL	String	30	Right city name of postal address (not necessarily legal location)
CREATE_DT	Date	8	Date that segment geometry/attribution first created (MMDDYYYY)
UPDATE_DT	Date	8	Date that segment geometry/attribution last modified (MMDDYYYY)
STATUS_CD	*String	1	Code indicating operational condition of road segment (including if it is now in a "retired" status)

Attributes Included in Data Model to be Populated If Available

Points

ITEM NAME	*TYPE*	*WIDTH*	*Description*
LOCAL_ID_PT	Number	9	Local road centerline segment feature identifier, unique and permanent to the segment at the local level (generated by road authority/data custodian)

Lines * field values selected from domain list

ITEM NAME	TYPE	WIDTH	Description
LOCAL_ID_SEG	String	9	Local road centerline segment feature identifier, unique and permanent to the segment at the local level (generated by road authority/data custodian)
RDAUTHORITY	*String	25	Entity responsible for policy decisions related to physical road segment
RDMAINTENANCE	*String	25	Entity responsible for maintenance of physical road segment
DATAUTHORITY	*String	25	Entity responsible for policy decisions related to road segment data
RDNUMBER	String	15	Number assigned to a collection of segments
INTERSTATE_NUM	Number	2	Interstate Highway number of road segment, if appropriate
US_HWY_NUM	Number	2	US Highway number of road segment, if appropriate

STATE_HWY_NUM	Number	2	State Highway number of road segment, if appropriate
LOCAL_RD_NUM	Number	2	Local Road number of road segment, if appropriate
ALIAS1	String	50	Alias name for road segment
ALIAS2	String	50	Alias name for road segment
ALIAS3	String	50	Alias name for road segment
LZIP	String	10	Area descriptor to aid geocoding, left side of centerline (could be ZIP)
RZIP	String	10	Area descriptor to aid geocoding, right side of centerline (could be ZIP)
BEGMP	Decimal	5.3	Beginning RDAUTHORITY mile measure (to 3 decimal places)
ENDMP	Decimal	5.3	Ending RDAUTHORITY mile measure (to 3 decimal places)
LCITY	String	25	Name of city jurisdiction on left side of road segment
RCITY	String	25	Name of City jurisdiction on right side of road segment
LCOUNTY	String	25	Name of County jurisdiction on left side of road segment
RCOUNTY	String	25	Name of County jurisdiction on right side of road segment
LSTATE	String	2	Abbreviation of state with jurisdiction on left side of segment
RSTATE	String	2	Abbreviation of state with jurisdiction on right side of segment
LOCAL_FUNC_CLASS	*String	30	Functional Class assigned by road owner with possible suggestions guidelines for possible local classification schema
STATE_FUNC_CLASS	*String	30	Functional Class with classification schema define by standards TWG
FED_FUNC_CLASS???	*String	30	Functional Class with classification schema define by standards TWG

Nebraska State Patrol CAD Database Characteristics

A. Derived from Master State-wide Road Centerline-Address Database. The road centerline-address data for the Nebraska State Patrol (NSP) CAD will be derived and updated from converting and reformatting the road centerline and related attributes from the master, state-wide road centerline-address database outlined in the Deliverables Section E.3. All of the road centerline vectors in that master database will be incorporated in the NSP CAD Database.

B. ESRI Shapefile Format. To be integrated into and support the NSP CAD system the road centerline-address database must be delivered and maintained in an ESRI shapefile format.

C. Nebraska State Plane Coordinate System. The NSP road centerline-address database must be provided in Nebraska State Plane Coordinate System (FIPS Zone 2600), NAD 83, coordinates in feet.

D. Road Centerline Definition. The road centerlines in the NSP database will be based on and derived from the data maintained in the Nebraska master road centerline-address database and positional adjustments of these centerlines will not be required.

E. Attributes.

<u>Roads Attributes</u>

FID

Shape (derived)

PREDIR (from master database DIRPREFIX)

STR_NAME (from master database RDNAME)

STR_TYPE (from master database RDTYPE (SUFFIXTYPE) or PREFIXTYPE)

SUF_DIR (from master database DIRSUFFIX)

LADD_FROM (from master database LFROM)

LADD_TO (from master database LTO)

RADD_FROM (from master database RFROM)

RADD_TO (from master database RTO)

L_CITY (from master database ??? LCITYPOSTAL or city boundary files??)

R_CITY (from master database ??? RCITYPOSTAL or city boundary files??))
L_ESN (from master database ??proposed to be removed from PSC data)
R_ESN (from master database ??proposed to be removed from PSC data)
UNIQUE_ 9-digits (from master database UNIQUE_ID_SEG)
Shape_Leng (derived)
County-bound-trp_area attributes
FID
Shape
NAME SIOUX, DAWES
CODE (e.g. Sioux County – CSIO, Dawes County – CDAW)
STATUS (e.g. OPTION 1, OPTION 2, NDOR HWY M) (status of cty road data when compiled)
SERVICE (seems to all be "P")(don't know the meaning)
RD_AREA (e.g. Lancaster – H002; Seward – H016; Hall – C008)
DISPATCH_G (e.g. Lancaster – TPH; Seward – TPH; Hall – TPC)
AGENCY (e.g. Lancaster – TPRH; Seward – TPRH; Hall – TPRC)
Cities Shapefile
FID
Shape
NAME (e.g. DAYKIN – DAYK; FAIRBURY – FARB; ELK CREEK – ELKC)
CODE (e.g. DAYKIN – DAYK; FAIRBURY – FARB; ELK CREEK – ELKC)
Counties Shapefile
FID
Shape
NAME (e.g. SIOUX, DAWES)
CODE (e.g. Sioux County – CSIO, Dawes County – CDAW)
STATUS (e.g. OPTION 1, OPTION 2, NDOR HWY M)(status of cty road data when compiled)
Outstanding Issues and/or Questions Related to NSP Data Needs
Confirm the ability of NSP Triburon CAD software to work with coincident vectors

- All street centerline vectors that cross the county (or other) jurisdictional lines will be edge matched to join with the vector representing the connecting street/road from the adjacent jurisdiction(s). If there is significant spatial displacement between these two connecting segments of streets/roads where they cross a jurisdictional line, 2003 Nebraska NAIP imagery will be used as a reference to determine the most appropriate location of the two vectors and their connection point. An exception to this requirement for edge matching of vectors crossing jurisdictional lines is in instances where the different jurisdictions have different street names and/or street numbering schemes for the street/road that lies on the jurisdiction boundary. In those instances, …
- In instances where adjacent counties have different street names and/or street numbering schemes for the same physical street/road that falls on or near the county boundary, two parallel (or coincident) vectors will be created to represent the same segment of this boundary street/road. These parallel vectors representing the same street segment will be mapping no more than 25 feet apart. One vector will be attributed with the street name and numbering scheme (on both sides of the street) of one jurisdiction and the other parallel vector will attributed with the name and numbering scheme (for both sides of the street) for the adjacent county. The RESN, LESN, RCITY, and LCITY attributes for both parallel

vectors will be populated in a manner to best reflect the actual ESN and city/county jurisdictional reality on the right and left sides of the physical street/road represented by these two parallel vectors. In these instances where adjacent counties have different names and/or street numbering schema for the boundary streets and roads, it will not be possible to do edge matching and joining/snapping of street segments that cross the county boundary.

- Where feasible and practical transfer existing NSP Line Segment IDs to line segments in new state-wide enterprise dataset that have not had a geometry change. NSP CAD system depends upon stable line segment IDs, but in the new state-wide enterprise dataset the line segment IDs will change whenever there is a geometry change in the line segment. The IDs will not change if there is only an attribute change. Therefore it will be important to create a report each time the state-wide enterprise database is updated that will report out on the changes to the Line Segment IDs.
- Translate attribute names to NSP format

Appendix 11

Instructions for Assembling Nebraska Street Centerline Shapefiles

90 Counties

1. Add the following fields to the shapefile:
    a. DataMaint – calculated the county name
    b. LeftFrom – inherited from FROMLEFT
    c. LeftTo – inherited from TOLEFT
    d. RightFrom – inherited from FROMRIGHT
    e. RightTo – inherited from TORIGHT
    f. PreDir – inherited from STPRE
    g. StreetName – inherited from STNAME
    h. StreetType – inherited from STTYPE
    i. SufDir – inherited from STSUF
    j. LeftCity – Step A below
    k. RightCity – Step A below
    l. LeftPostal – Step B below
    m. RightPostal – Step B below
    n. LeftZip – Step B below
    o. RightZip – Step B below
    p. LeftCounty – Step C below
    q. RightCounty – Step C below
    r. State – calculated as Nebraska
    s. FIPS – inherited from FIPS
    t. LeftESN – inherited from L_ESN
    u. RightESN – inherited from R_ESN

Douglas County

2. Add the following fields to the shapefile:
    a. DataMaint – calculated the county name
    b. LeftFrom – inherited from FROM_LEFT
    c. LeftTo – inherited from TO_LEFT
    d. RightFrom – inherited from FROM_RIGHT
    e. RightTo – inherited from TO_RIGHT
    f. PreDir – inherited from DIRPREFIX
    g. StreetName – inherited from STREETNAME
    h. StreetType – inherited from STREETTYPE
    i. SufDir – inherited from DIRSUFFIX
    j. LeftCity – Step A below
    k. RightCity – Step A below
    l. LeftPostal – inherited from ZIPLEFT and translated (numeric to string)
    m. RightPostal – inherited from ZIPRIGHT and translated (numeric to string)
    n. LeftZip – inherited from ZIPLEFT
    o. RightZip – inherited from ZIPRIGHT

p. LeftCounty – Step C below
q. RightCounty – Step C below
r. State – calculated as Nebraska
s. FIPS – no FIPS data
t. LeftESN – no ESN data
u. RightESN – no ESN data

Lancaster County

3. Add the following fields to the shapefile:
    a. DataMaint – calculated the county name
    b. LeftFrom – inherited from ADDLL
    c. LeftTo – inherited from ADDLH
    d. RightFrom – inherited from ADDRL
    e. RightTo – inherited from ADDRH
    f. PreDir – inherited from STPRE
    g. StreetName – inherited from STNAME
    h. StreetType – inherited from STTYPE
    i. SufDir – inherited from STSUF
    j. LeftCity – Step A below
    k. RightCity – Step A below
    l. LeftPostal – inherited from ZIP5L and translated (numeric to string)
    m. RightPostal – inherited from ZIP5R and translated (numeric to string)
    n. LeftZip – inherited from ZIP5L
    o. RightZip – inherited from ZIP5R
    p. LeftCounty – Step C below
    q. RightCounty – Step C below
    r. State – calculated as Nebraska
    s. FIPS – no FIPS data
    t. LeftESN – no ESN data
    u. RightESN – no ESN data

Sarpy County

4. Add the following fields to the shapefile:
    a. DataMaint – calculated the county name
    b. LeftFrom – inherited from Left From Address
    c. LeftTo – inherited from Left To Address
    d. RightFrom – inherited from Right From Address
    e. RightTo – inherited from Right To Address
    f. PreDir – inherited from Direction
    g. StreetName – inherited from Name
    h. StreetType – inherited from Type
    i. SufDir – no SufDir data
    j. LeftCity – Step A below
    k. RightCity – Step A below

l. LeftPostal – inherited from Zip_Left and translated (numeric to string)
m. RightPostal – inherited from Zip_Right and translated (numeric to string)
n. LeftZip – inherited from Zip_Left
o. RightZip – inherited from Zip_Right
p. LeftCounty – Step C below
q. RightCounty – Step C below
r. State – calculated as Nebraska
s. FIPS – no FIPS data
t. LeftESN – no ESN data
u. RightESN – no ESN data

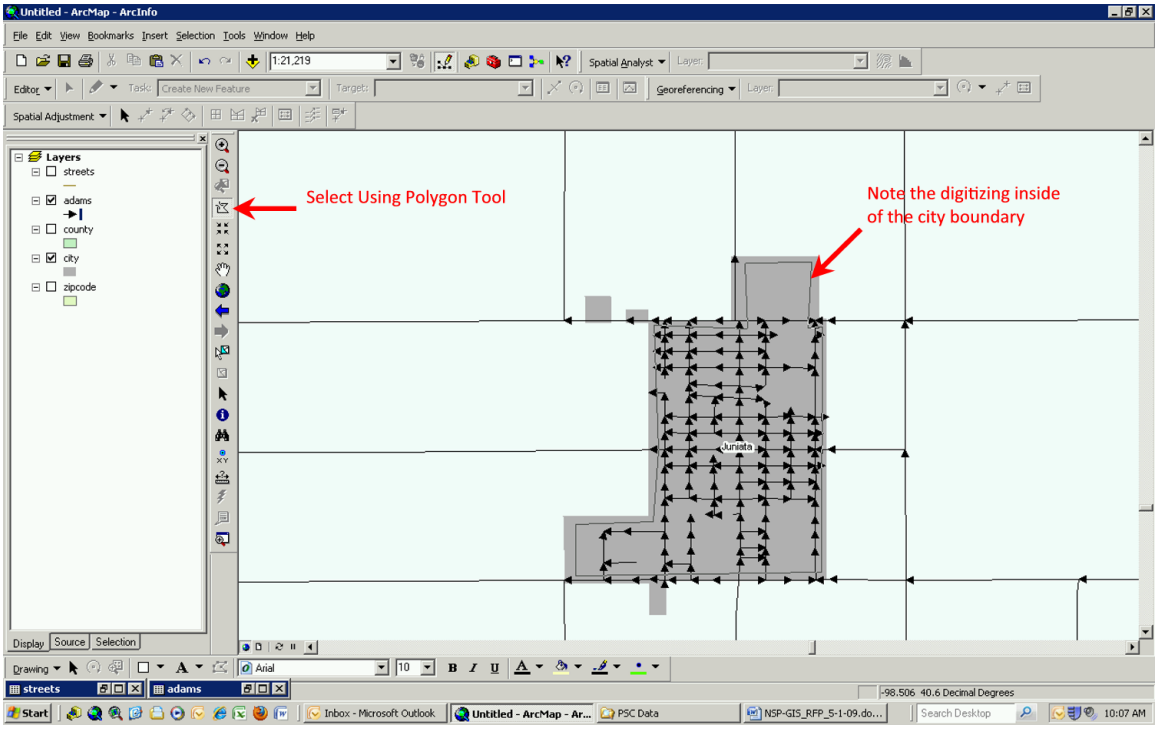
5. Merge all 93 street centerline shapefiles
6. Project new merged shapefile to desired projection system, the source is in WGS84 (aka Lat/Long).

For Nebraska State Patrol (NSP)

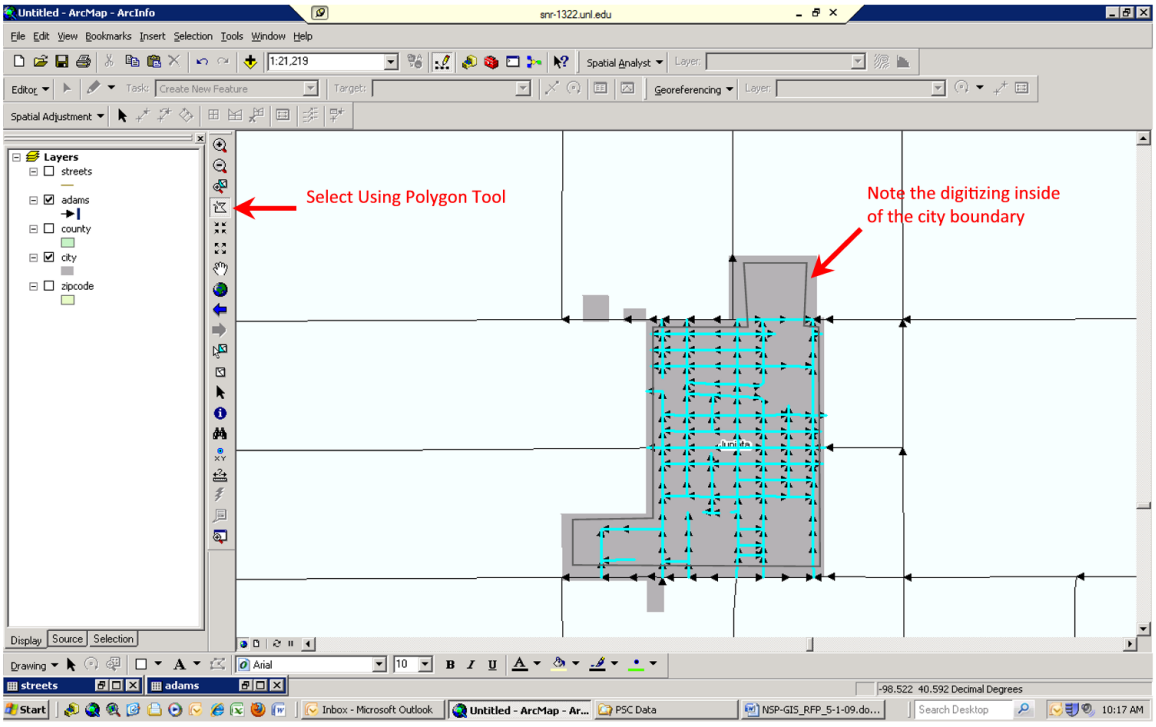
1. Make a copy of the centerline shapefile
2. Add the following fields to the shapefile
    a. PRE_DIR – inherited from PreDir
    b. STR_NAME – inherited from StreetName
    c. STR_TYPE – inherited from StreetType
    d. SUF_DIR – inherited from SufDir
    e. LADD_FROM – inherited from LeftFrom
    f. LADD_TO – inherited from LeftTo
    g. RADD_FROM – inherited from RightFrom
    h. RADD_TO – inherited from Right To
    i. LCITY – inherited from LeftCity
    j. RCITY – inherited from RightCity
    k. L_ESN – inherited from LeftESN
    l. R_ESN – inherited from RightESN
    m. UNIQUE_ - describe next
3. Spatially join the former CAD file for NSP to the new one you are creating.
4. Calculate UNIQUE_ from the former CAD file attributes. The UNIQUE_ field is required for use in NSP's current CAD software but will not be in the next release (statement made by Tiburon).

Step A

7. Set Selectable Layers – select only county centerlines you are working on.
8. Use "Select Using Polygon" tool.



9. Last click is a double click to close the digitized polygon.



10. The result is all centerlines inside of this city boundary are selected.
11. Next open the centerline table.
12. Calculate LeftCity to the name of the city.
13. Calculate Right City to the name of the city.
14. Next the centerlines that are left side only have to be selected and calculated like above.

15. Then the centerlines that are right side only.
16. Repeat for all cities in the county.
17. NEXT STEP

Step B & C

1. Repeat steps in Step A only for Zip Code Boundaries. The difference here is you will need to calculate twice for Zip Code Number and Zip Code City.

Notable Problems:

1. Banner, Cheyenne, Clay, Colfax, Dundy, Fillmore, Frontier, Nemaha, Perkins, Red Willow, Sherman, Sioux, Thayer, Morrill, County streets for the most part have no Street Type. They are typically called RD 53 or HWY 53 instead of 53rd Road or 53rd Hwy with a formal Street Name and Street Type.
2. Many of the counties do not have all of their data in "ALL CAPS" which is a requirement of the CAD software at Nebraska State Patrol.
3. Counties differ on the way they handle numeric streets. Some call them FIRST ST others call them 1ST St. There is no way a Nebraska State Patrol Dispatcher can know the difference. It seems like there needs to be street naming standards. Colfax County calls it 1 ST (in separate fields). This should probably all be part of a massive data normalization project the next time the data is assembled.
4. Dawes, Garfield, Greeley, Hayes, Hitchcock, Kearney, Kimball, Loup, Merrick, Valley, Washington, Wheeler County STNAME field has to be parsed and normalized. Most of the address data is in that field.
5. Hall, Hitchcock, Thomas, County street name data is parsed, but the type and suffix remnants are in the Street Name field.
6. York County many of the roads have no Street Type.
7. Richardson County has no attributes.
8. Other street naming issues
    a. State Highway
    b. State Hwy
    c. Highway
    d. Hwy
    e. County Road
    f. Co Rd

Appendix 12

Presentations

- Nebraska GIS Council - These meetings occur on the first Wednesday of every month.
    - Wednesday, March 3, 2010 – At this meeting we briefed the GIS Council on the status of metadata training and the state-wide street centerline project. (Minutes - http://www.nitc.nebraska.gov/gisc/mtgs/minutes/min3-3-10.pdf)
    - Wednesday, January 13, 2010 – We gave a demonstration of the GIS Portal Toolkit and an update on the state-wide street centerline project. (Minutes - http://www.nitc.nebraska.gov/gisc/mtgs/minutes/min1-13-10.pdf)
    - Wednesday, September 2, 2009 – We provided a brief update on the GIS Portal Toolkit and updated the Council on the state-wide street centerline project five-county pilot project. (Minutes - http://www.nitc.nebraska.gov/gisc/mtgs/minutes/min9-2-09.pdf)
- 2009 Nebraska GIS/LIS Consortium – April 21-22, 2009 at the Holiday Inn Convention Center, Kearney, NE – Jeff McReynolds, GIS Manager City of Lincoln/Lancaster County jmcreynolds@lincoln.ne.gov, Larry Zink, and Dan Pfeffer presented NebraskaMAP.gov, Building a geospatial data-sharing and mapping web services network for Nebraska. There were roughly forty people in attendance for this ninety minute presentation. The focus was to demonstrate the GIS Portal Toolkit and then to have an open house discussion on the benefits of the GIS Portal Toolkit to Nebraska GIS users. The presentation is part of Appendix 12.
- 2010 GIS Day – November 17th, 2010 at Northeast Community College in Norfolk, NE – Dan Pfeffer presented the GIS/LIS presentation and demonstrated the Sample Flex API Viewer with some Nebraska specific modifications including live weather.
- ArcGIS Server User's Group Meeting at Embassy Suites in Lincoln, NE on Tuesday, May 12, 2009 we presented the GIS Portal Toolkit. This was a completely online presentation. These meetings are always worth attending as they blend viewing technology with some medium to highly technical discussions on how the features are accomplished.
- 2009 MAGIC Clearinghouse Summit – September 16, 2009 at the State Office Building. This was another completely online presentation. Most states from MAGIC were present and a few of them made presentations (Appendix 13.)
- Presentation to Agency heads at OCIO (Appendix 14) – February 2, 2010 at the Executive Building– Larry Zink, Steve Henderson, Jeff McReynolds, and Dan Pfeffer presented the GIS Toolkit Portal and State Portal Demonstration to NDOR – NDOR has had licensing for IMS which translated into getting ArcServer. The demonstration included the advantages to migrating to ArcServer. In a discussion with Joe Eckmann prior to the meeting he offered up some tech support to get the Roads staff working with ArcServer. Much of the discussion surrounded the difficulties sharing data amongst departments and separate buildings.
- 2009 ESRI User Conference – July 12-17, 2009 - San Diego Convention Center, San Diego, CA – The ESRI User Conference is always a great educational and networking experience. There were many useful demonstrations on ArcSDE, ArcServer, and API.

Appendix 13

NebraskaMAP.gov

Building a geospatial data sharing and mapping web services network for Nebraska

Project Stake Holders

- Nebraska Office of the CIO
- Nebraska GIS Council
- Nebraska Emergency Management
- Nebraska Department of Natural Resources
- Nebraska Department of Environmental Quality
- Nebraska Department of Roads
- Nebraska Department of Agriculture
- Nebraska Department of Health and Human Services
- Nebraska Game and Parks Commission
- University of Nebraska-Lincoln School of Natural Resources
- Douglas County/City of Omaha
- Sarpy County
- Lancaster County/City of Lincoln
- USGS

Project Vision

- Quick and reliable access and/or share up-to-date data between public agencies (state, local, regional, and federal) is critical in today's e-government world. This is particularly true with the wide range of applications using GIS/geospatial technology. So much of the power of GIS lies in its ability to integrate and analyze data from multiple sources, based on location or place.

Project Vision

- Quick and reliable access
- Updated data and metadata
- Integration of data sources

Project Background

- An interagency project exploratory committee recommended that the Office of the CIO (OCIO) become the lead agency to undertake the implementation of this collaborative project and the Nebraska GIS Council endorsed that recommendation. The OCIO agreed to undertake the implementation lead, provided that there was a clear understanding among the project partners that as an agency primarily funded via revolving cash funds,

Project Background (cont.)

- the OCIO would be coming to project partners to provide funding support to assist with the project's initial implementation and on-going support. Initial startup funding for the project has been secured from a mix of funding sources. The development of proposals for sustainable funding will be an objective as project implementation proceeds.

Project Background (cont.)

- OCIO is the lead agency
- The Nebraska GIS Council endorsed the project and the OCIO's role
- Project partners provide financial assistance
- Stake holders will be working on sustainable funding

Stake Holder Meetings

- Stake holder meetings occur every first Thursday of the month at Hardin Hall.
- The project manager brings the stake holders project updates and seeks to get agreed upon direction as to the next set of tasks.
- Subcommittees report their meeting notes to the stake holders at the monthly meeting.

Timeline

- Project manager hired – December 2008
- Software vendor agreed upon – January 2009
- Core software install – February 2009
- Present the project at the Nebraska GIS/LIS Symposium – April 2009
- ESRI Portal Tool Kit Training – May 2009
- Portal beta testing begins – June 2009
- Fully operational portal – December 2009
- Demonstrations and Training - 2010

Timeline/Funding

- The initial scope of the project expires after two years (December 2010.)
- The intent is secure funding beyond 2010.
- Future goal is to create a GIS service bureau at the OCIO to support statewide activities

Centralized GIS Approach

- What does it mean?
  - Data Sharing/Licensing
  - Software Training
  - ELA – Software Purchases
  - Application Development
  - Technical Support
  - Enterprise Solution

Potential Benefits

- Existing GIS Users
  - Data
  - Services
- Future GIS Users
  - Data – centralized repository of GIS data
  - GIS applications that leverage the statewide data repository
  - Develop one application – share with all

What will the Portal do?

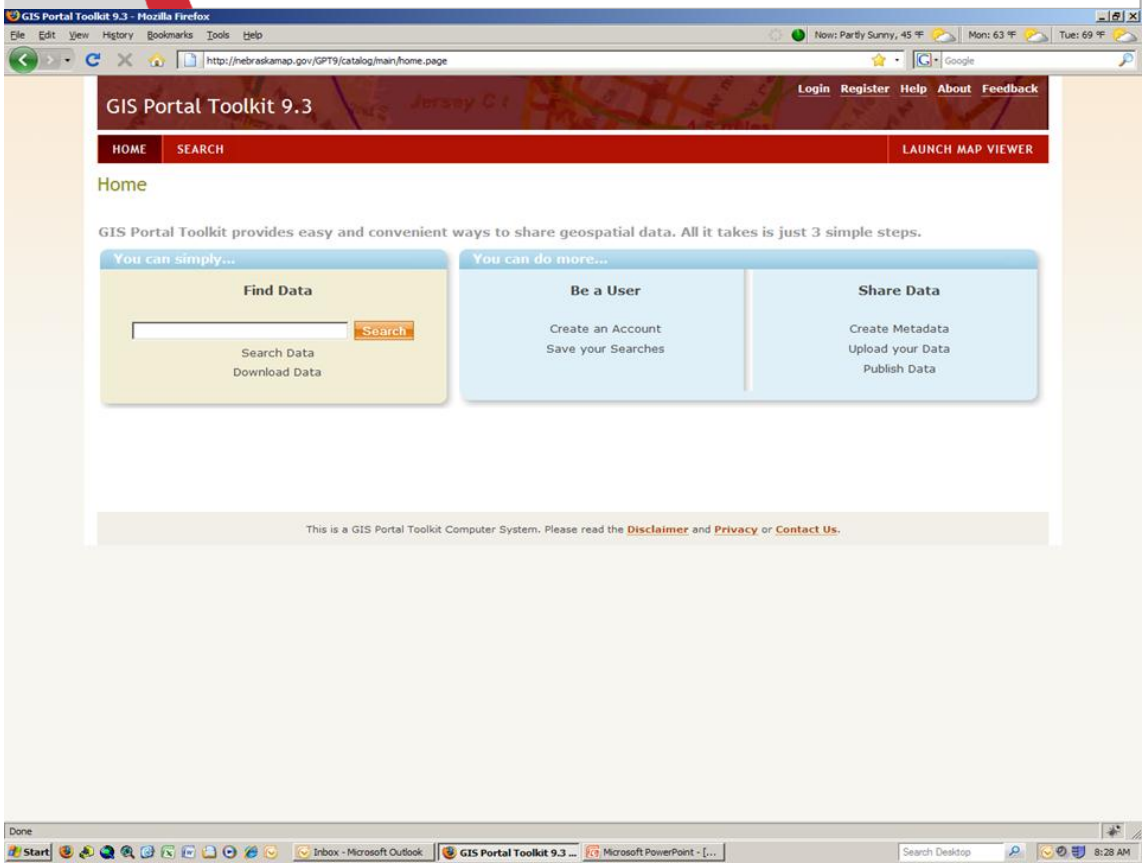
- Search
- View, publish, and contribute metadata
- Publish/Contribute Data
- View data

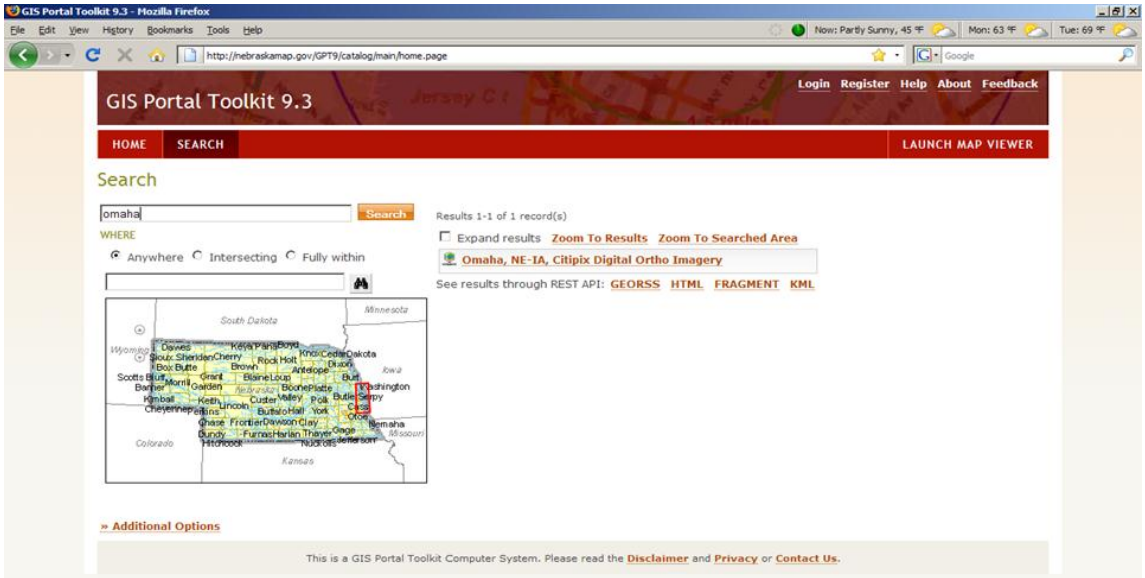
What will the Portal do?

- Data
  - Public
  - Secure
- Access
  - Consume mapping services
  - Clip, Zip, Ship

What will the Portal do?

DEMO

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Omaha, NE-IA, Citipix Digital Ortho Imagery
See results through REST API: GEORSS HTML FRAGMENT KML
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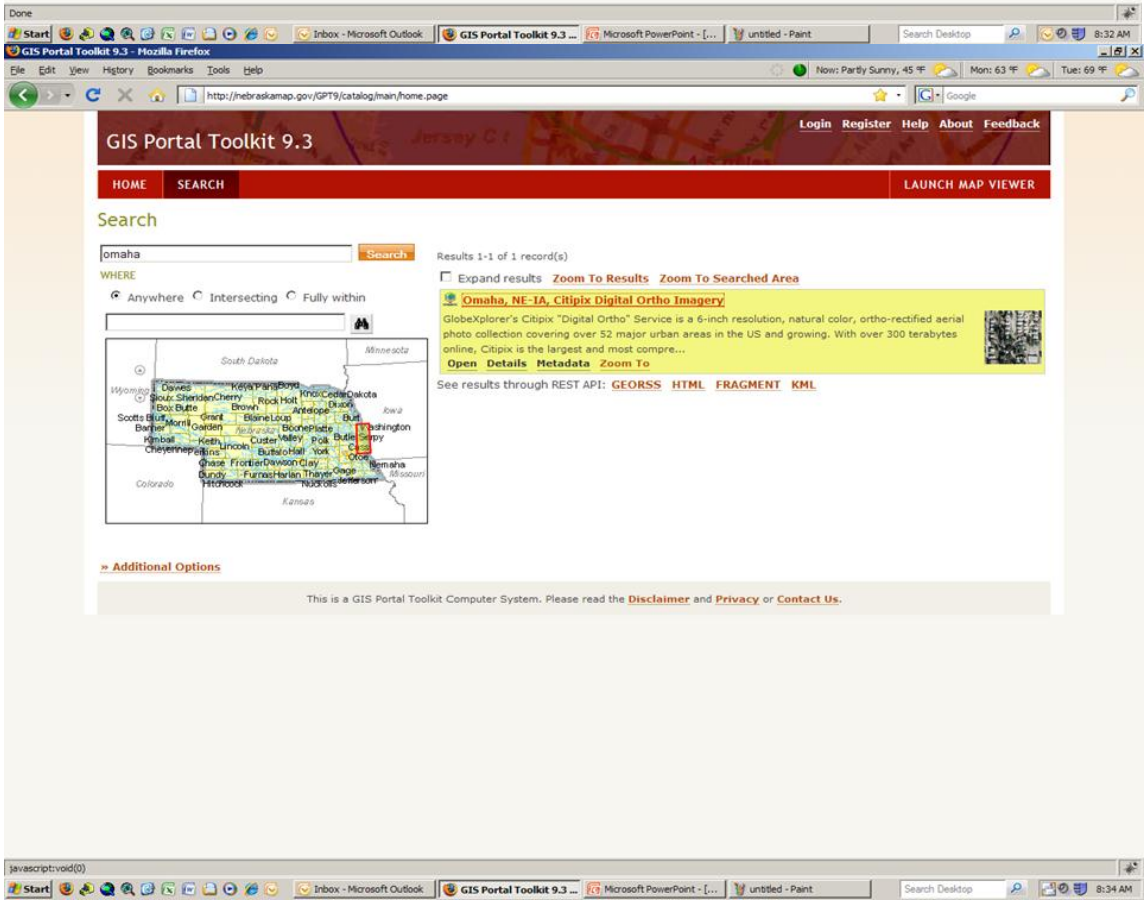
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Omaha, NE-IA, Citipix Digital Ortho Imagery
GlobeXplorer's Citipix "Digital Ortho" Service is a 6-inch resolution, natural color, ortho-rectified aerial photo collection covering over 52 major urban areas in the US and growing. With over 300 terabytes online, Citipix is the largest and most compre...
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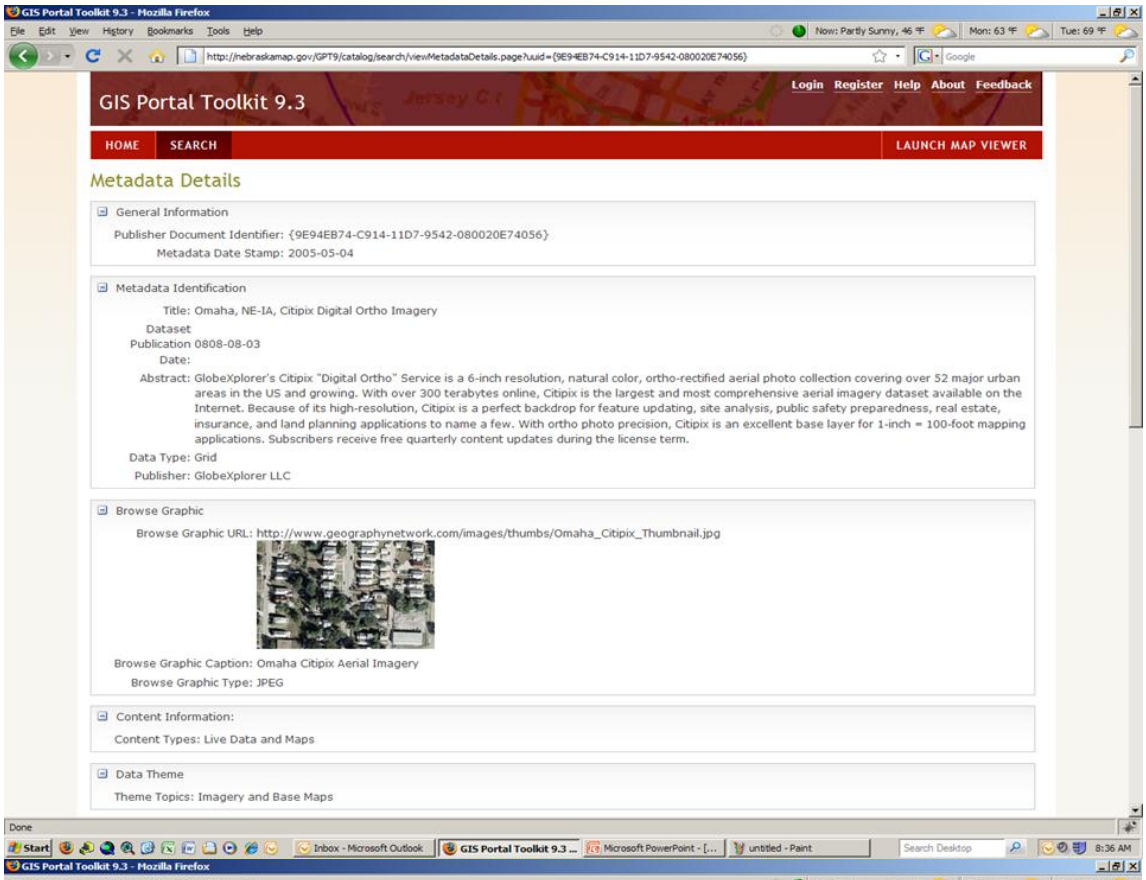
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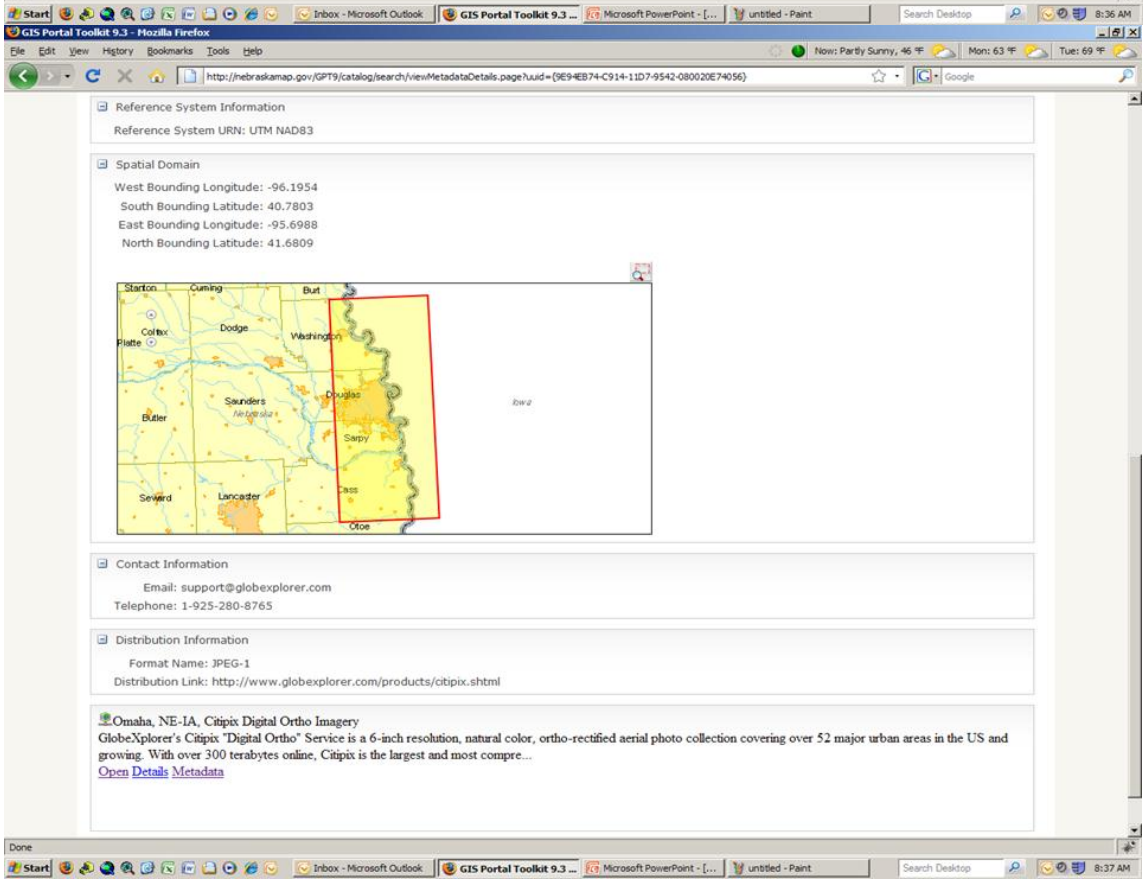
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Dodge
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Platte
Douglas
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Telephone: 1-925-280-8765
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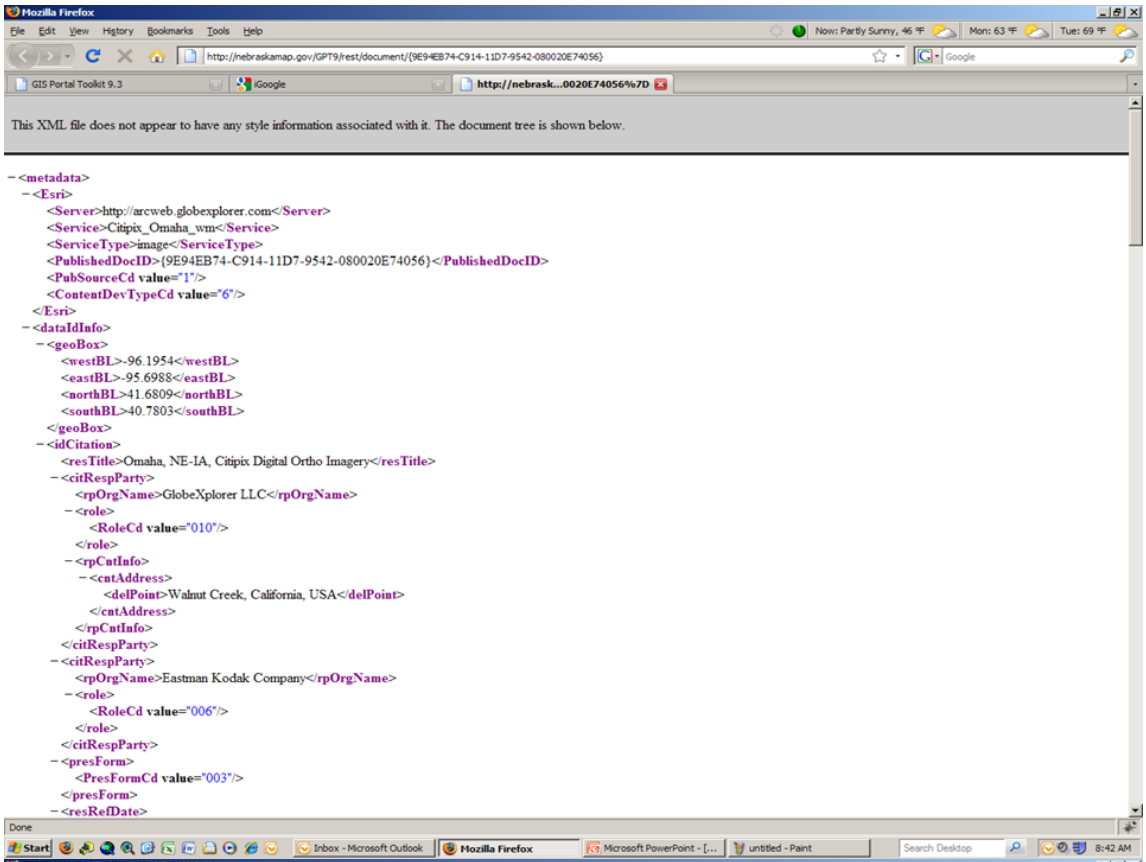
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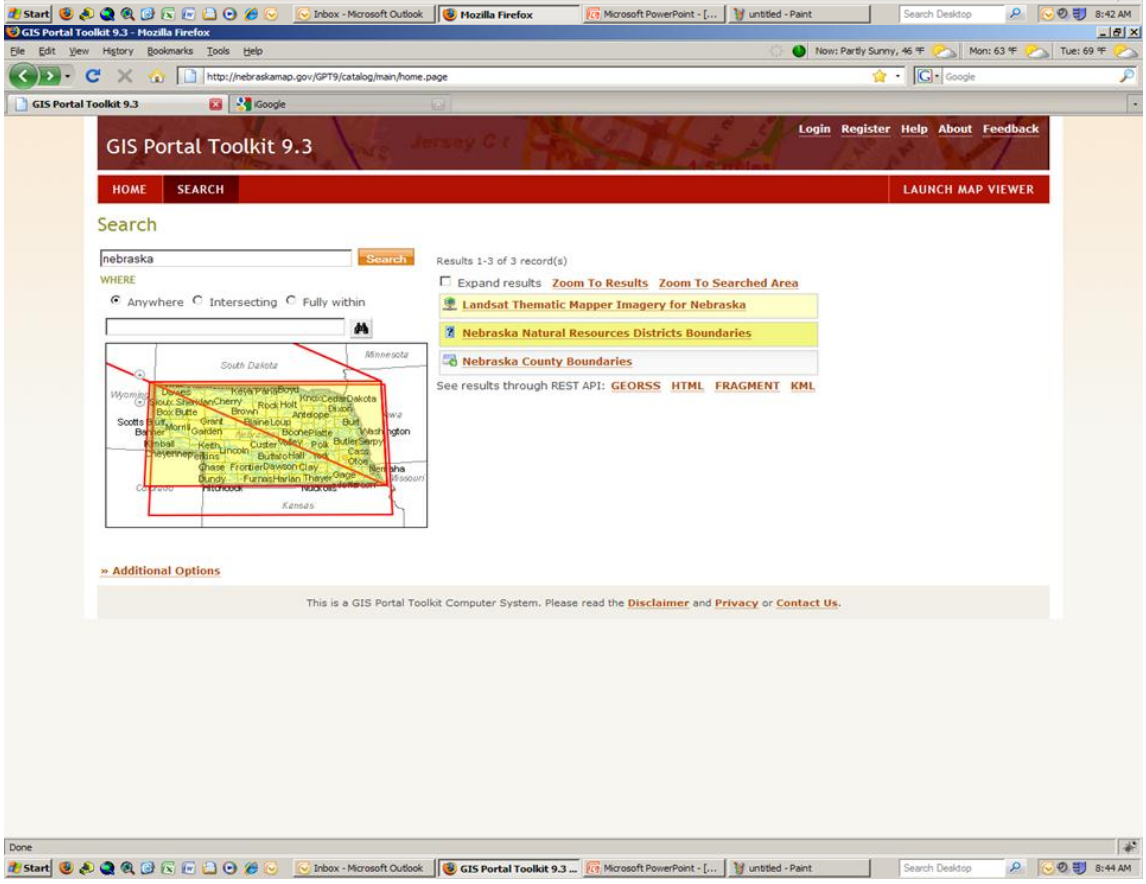
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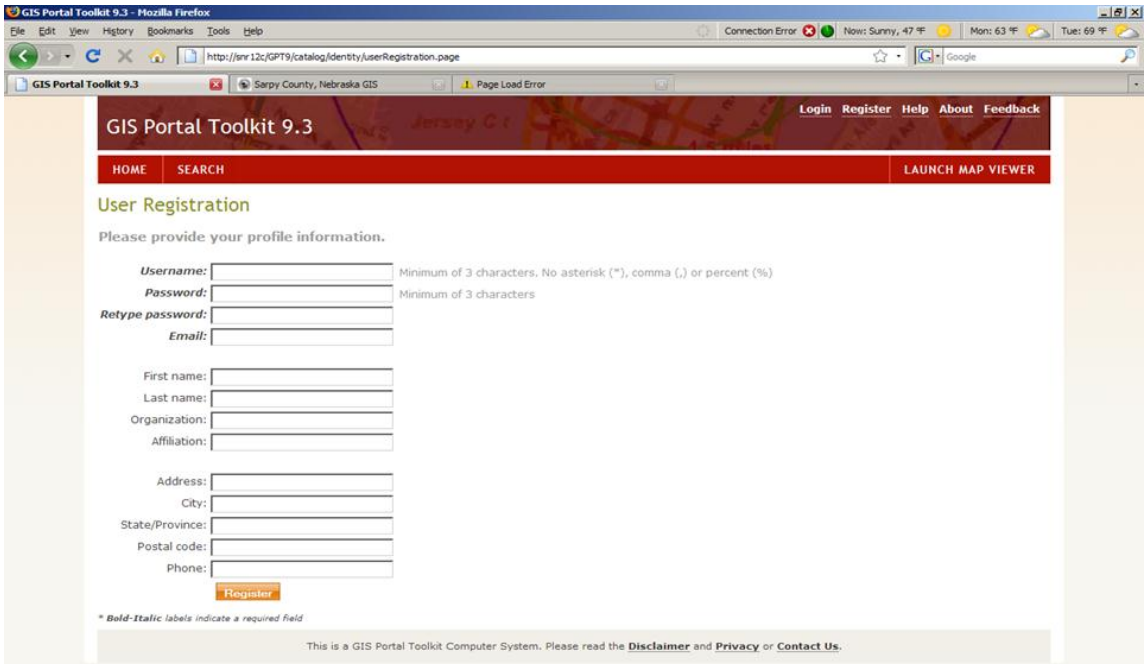
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Password:
Retype password:
Email:
Minimum of 3 characters. No asterisk (*), comma (,) or percent (%)
Minimum of 3 characters
First name:
Last name:
Organization:
Affiliation:
Address:
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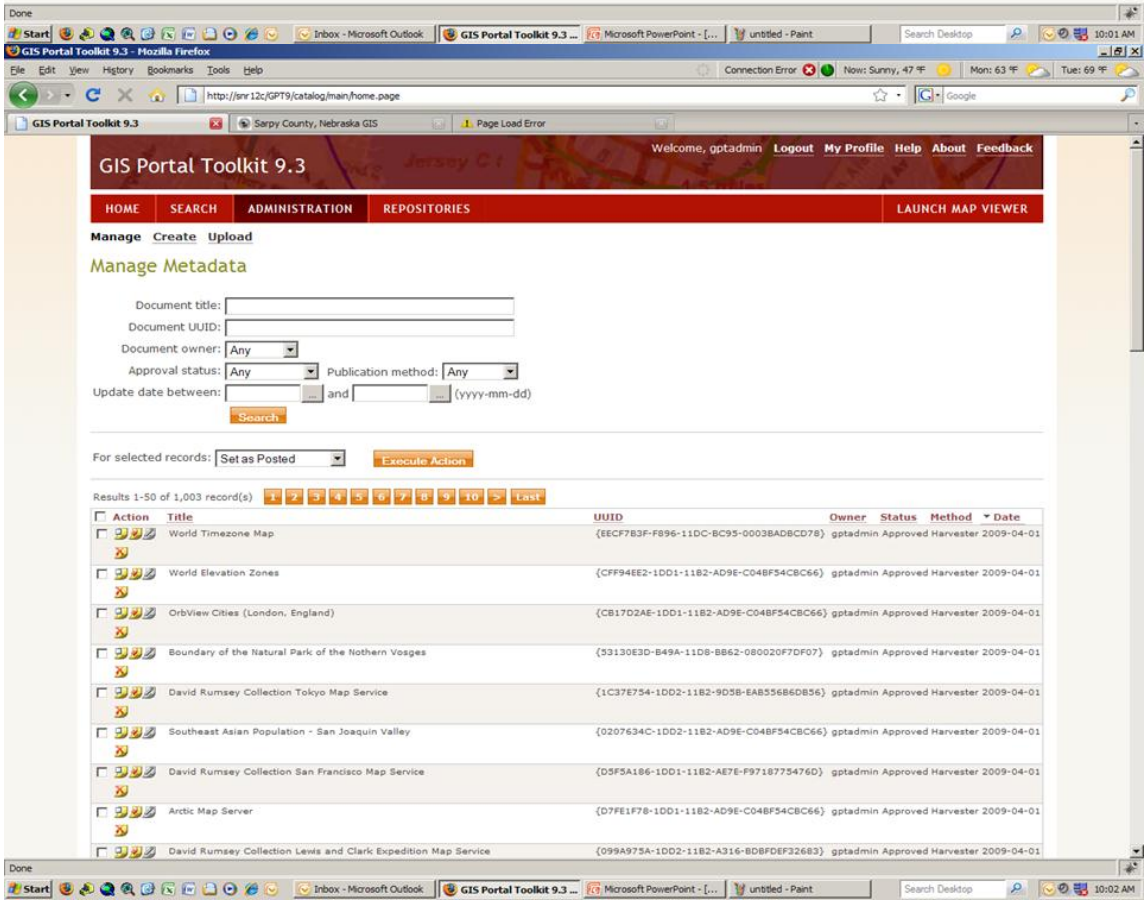
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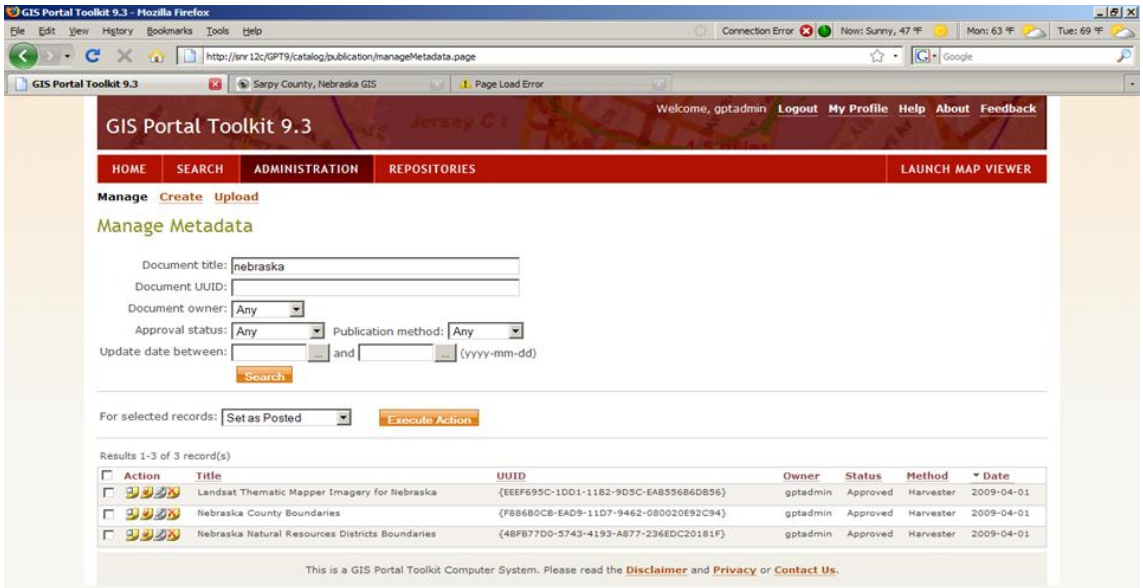
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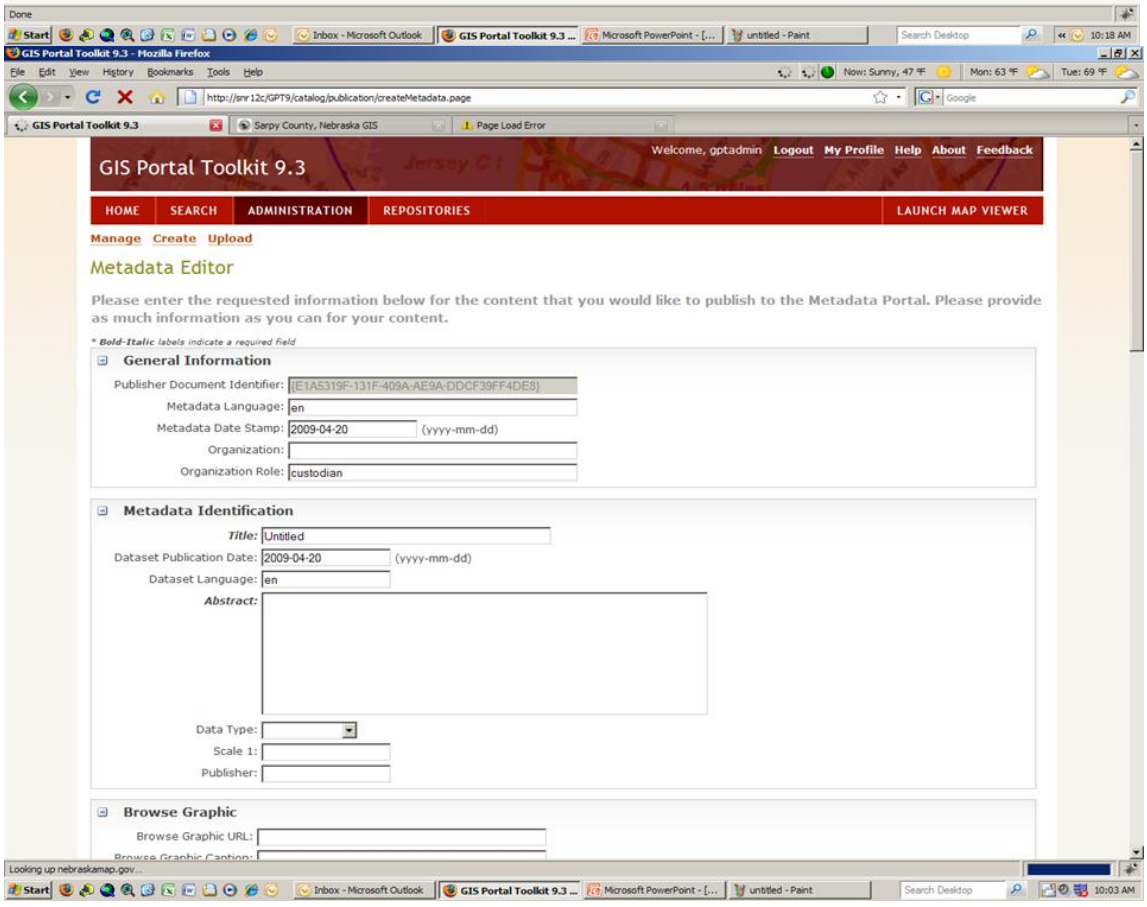
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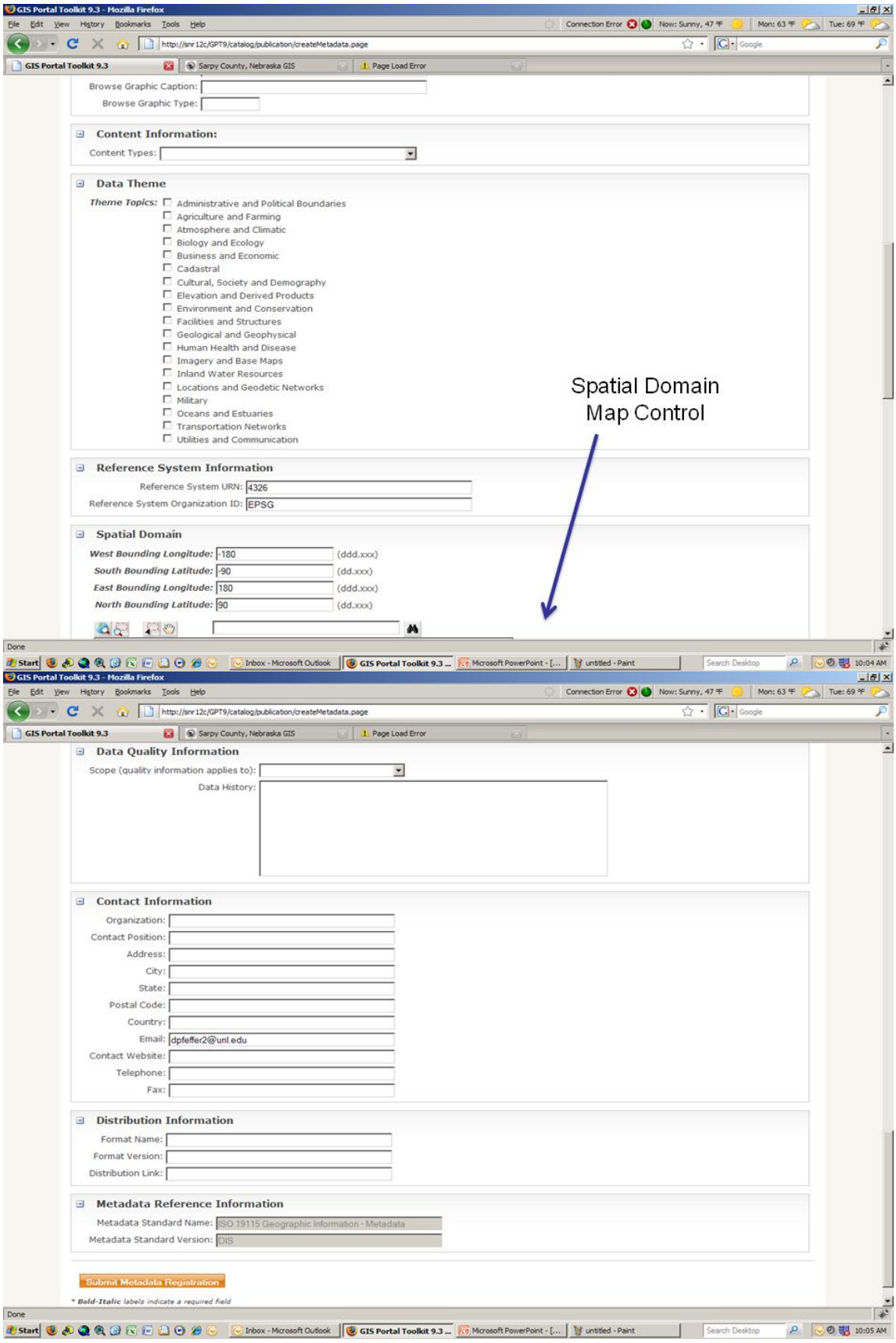
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Facilities and Structures
Geological and Geophysical
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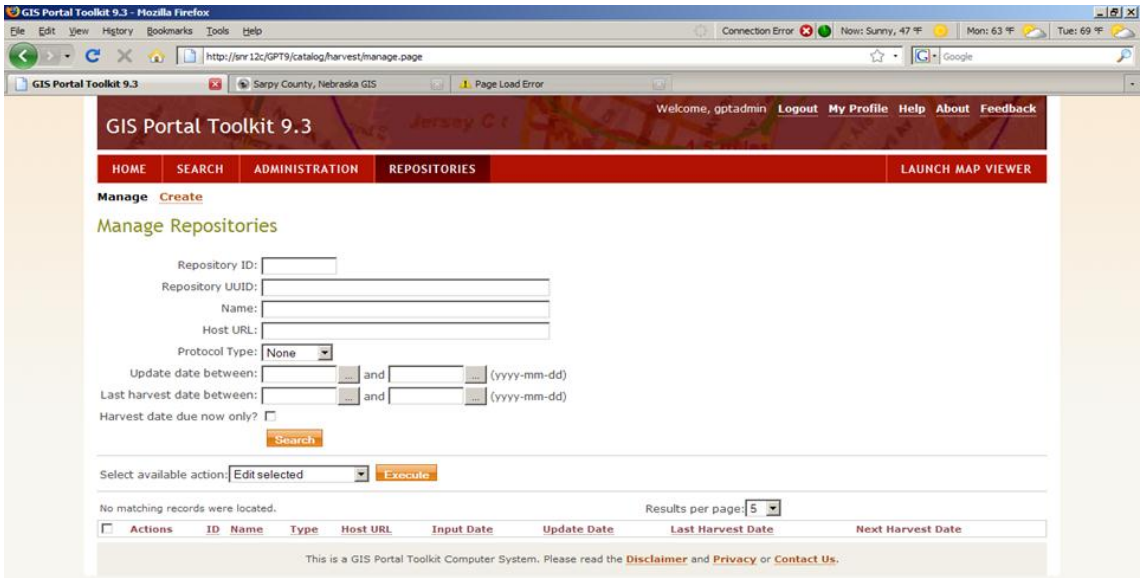
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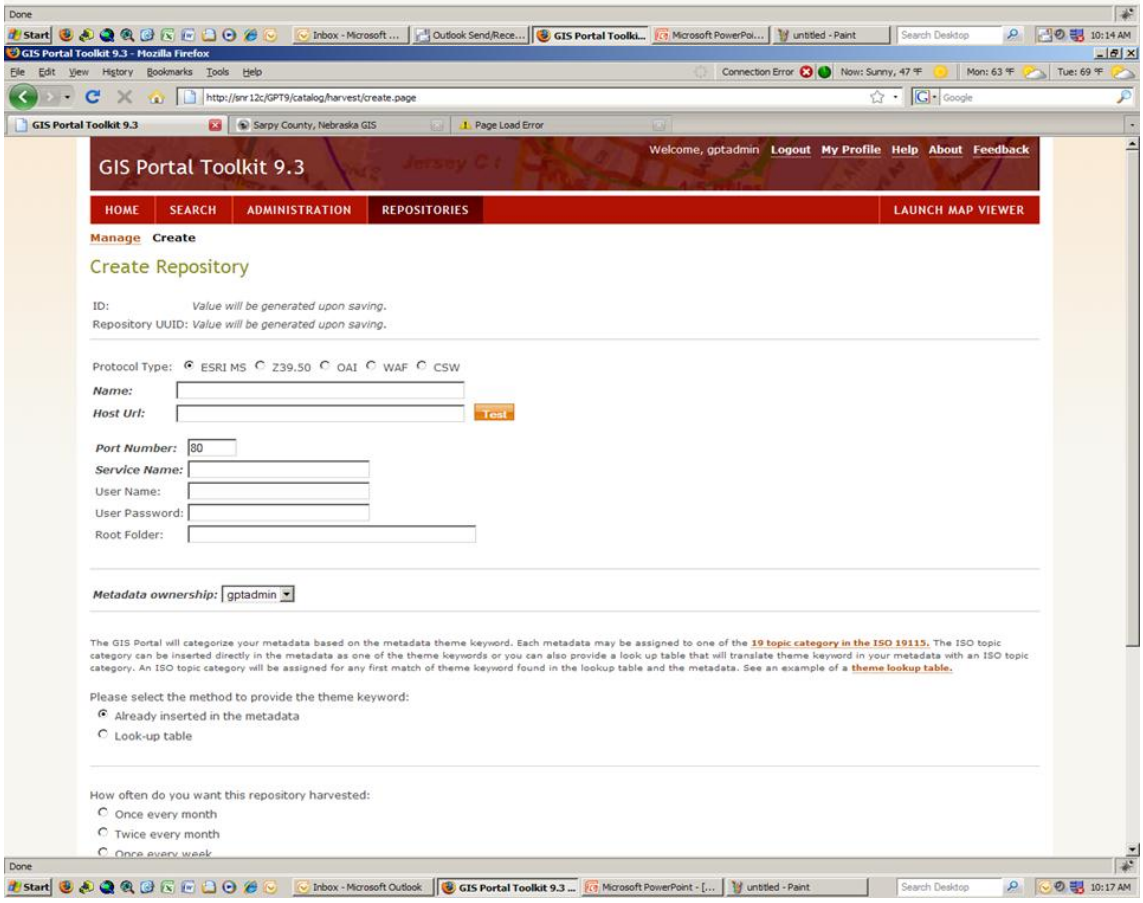
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Manage Create
Create Repository
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Repository UUID: Value will be generated upon saving.
Protocol Type: ESRI MS Z39.50 OAI WAF CSW
Name:
Host Url:
Test
Port Number: 80
Service Name:
User Name:
User Password:
Root Folder:
Metadata ownership: gptadmin
The GIS Portal will categorize your metadata based on the metadata theme keyword. Each metadata may be assigned to one of the 19 topic category in the ISO 19115. The ISO topic category can be inserted directly in the metadata as one of the theme keywords or you can also provide a look up table that will translate theme keyword in your metadata with an ISO topic category. An ISO topic category will be assigned for any first match of theme keyword found in the lookup table and the metadata. See an example of a theme lookup table.
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Look-up table
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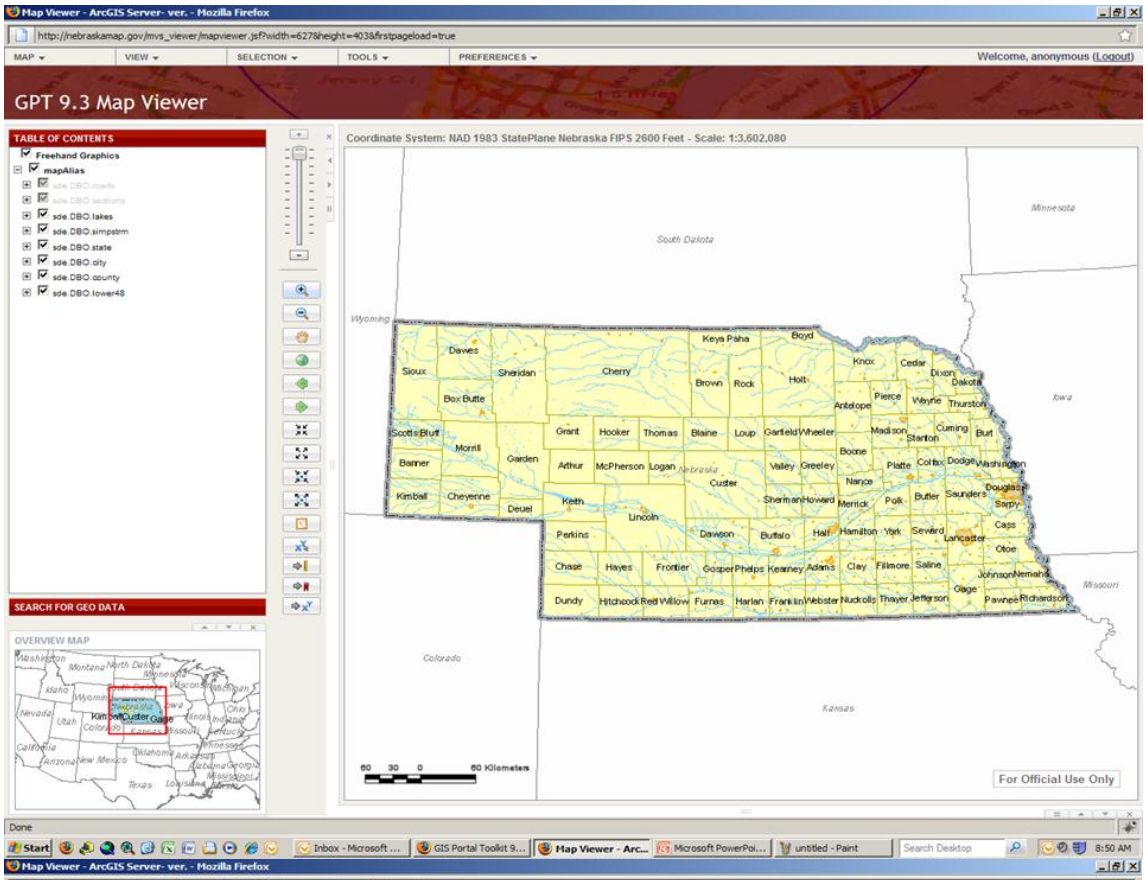
Once every month
Twice every month
Once every week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For Official Use Only
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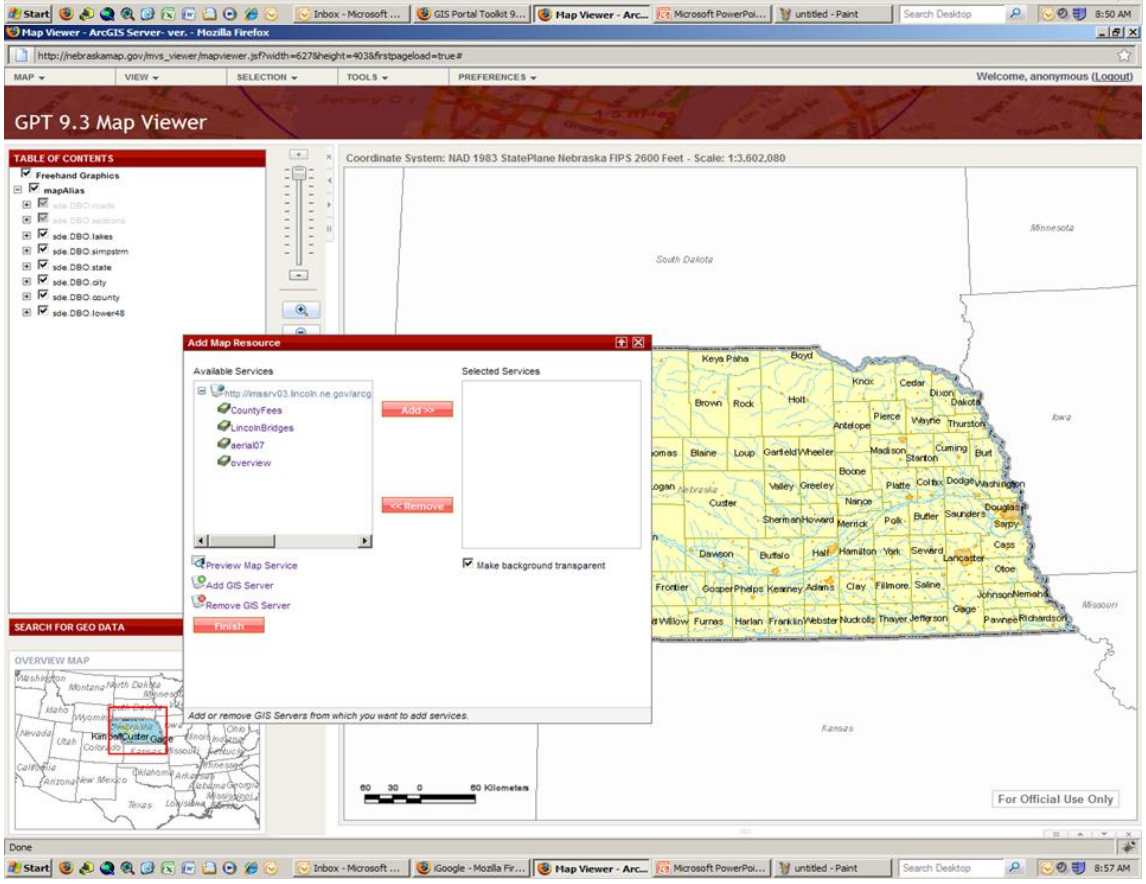
Map Viewer - ArcGIS Server- ver. - Mozilla Firefox
http://nebraskamap.gov/mvs_viewer/mapviewer.jsf?width=627&height=403&firstpageload=true#
MAP
VIEW
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TOOLS
PREFERENCES
Welcome, anonymous (Logout)
GPT 9.3 Map Viewer
TABLE OF CONTENTS
Freehand Graphics
mapAlias
sde.DBO.lakes
sde.DBO.simpstrm
sde.DBO.state
sde.DBO.city
sde.DBO.county
sde.DBO.lower48
Add Map Resource
Available Services
http://imssrv03.lincoln.ne.gov/arcg
CountyFees
LincolnBridges
aerial07
overview
Add >>
<< Remove
Selected Services
Preview Map Service
Add GIS Server
Remove GIS Server
Finish
Make background transparent
Add or remove GIS Servers from which you want to add services.
SEARCH FOR GEO DATA
OVERVIEW MAP
Coordinate System: NAD 1983 StatePlane Nebraska FIPS 2600 Feet - Scale: 1:3,602,080
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Missouri
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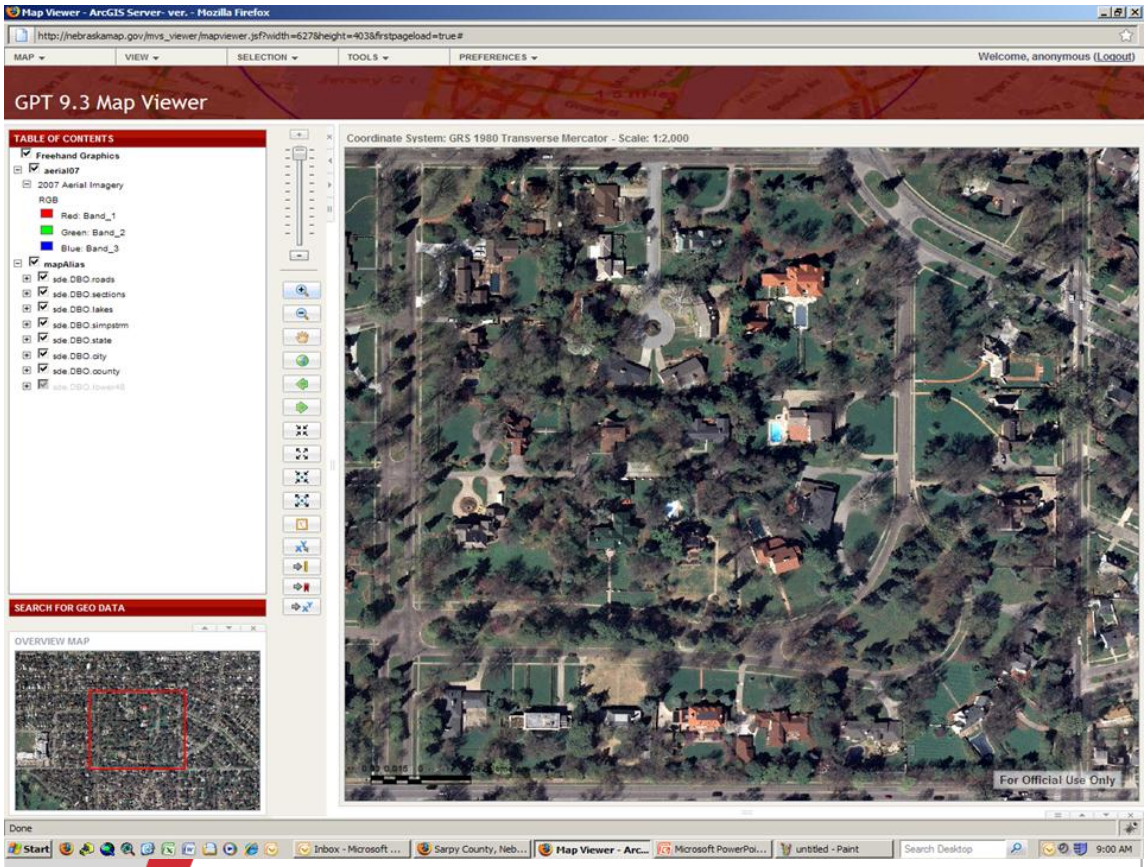


Long Term Vision

- Why have a state wide portal?
- Data discovery
- Appropriate data use – read the metadata!
- Data sharing
  - Why have a copy of statewide aerials when you can consume a service?

Long Term Vision

- Collaboration
  - Are we creating/collecting like data?
  - Should we create/collect together?
  - What standards should we use?
- Statewide geocoding service
- Statewide shared applications
  - Like a flex viewer?

Other Portal Examples

- Other Portal Tool Kit Examples
  - Group on Earth Observations http://geoss.esri.com
  - Geodata.gov http://gos2.geodata.gov
  - Mississippi http://www.gis.ms.gov/Portal/
  - Conservation Geoportal http://www.conservationmaps.org/index.jsp
- Other Portal Example
  - Arkansas http://www.geostor.arkansas.gov

Appendix 14

2009 MidAmerica GIS Consortium (MAGIC) State GIS Clearinghouse Retreat

The 4th annual MAGIC State GIS Clearinghouse Retreat was held in Lincoln, Nebraska on September 15th and 16th, 2009. The retreat provides an opportunity for representatives from the state GIS programs across the MAGIC region to gather to discuss issues related to clearinghouse operations. Historically, the retreat is hosted by a different state each year, with the goal of holding the event in all of the MAGIC region states before repeating a meeting location. MAGIC provides travel assistance for two representatives from each state to attend the meeting. The total funding provided by MAGIC for the 2009 retreat was $1,500. This year's event drew 22 attendees from 9 states, including USGS Geospatial Liaisons from Nebraska, Iowa, Missouri, Arkansas, Oklahoma, South Dakota, and Minnesota.

This year's retreat was a day and a half event. The first day's agenda items included a 30-minute program summary from each state including an overview of major initiatives, a WebEx presentation on the USGS National Map Viewer given by Rob Dollison of USGS, a discussion impacts of Light Detection and Ranging (LiDAR) data on the state clearinghouses, and an open discussion on the International Charter. The second day of the event featured a technical discussion of ESRI server-based technologies including ArcGIS Server, ArcGIS Server Image Extension, and ESRI's web mapping Automated Programming Interfaces (API). Lloyd Heberlie, from ESRI's St. Louis regional office, attended the second day of the retreat and helped to facilitate the technical discussion.

The MAGIC Clearinghouse Retreat is a unique event and provides a great opportunity for clearinghouse staff to meet, exchange ideas, and learn from respective state programs. The financial support from MAGIC helps to ensure that key personal can make it to the event each year. The feedback from this year's attendees was extremely positive. One attendee even mentioned that the clearinghouse retreat is the most useful event they attend each year. Special recognition should be given to Jim Langtry and Steve Shivers from Nebraska for taking care of the local arrangements including meeting space and hotel reservations. Additionally, special thanks goes out to the Nebraska GIS/LIS Association for providing funds for breakfast and refreshment items for both days of the event.

Below is the agenda for this year's event and a list of attendees. Additionally, the PowerPoint presentations given by each state, as well as the results from the 2009 MAGIC Clearinghouse Survey, are available on the MAGIC web site at http://www.magicgis.org.

2009 MAGIC State GIS Clearinghouse Retreat Agenda
September 15-17, 2009
Lincoln, NE

Tuesday, September 15, 2009

Unofficial social – meet in the hotel lobby at 6:00 PM if you're interested in going to dinner

Wednesday, September 16, 2008 (8:00 AM – 5:00 PM)

Introductions (8:00 – 8:15)

State Clearinghouse Status Report (8:15 – 11:15)

- **Review of MAGIC Clearinghouse Survey results (8:15 – 8:45)**
- **State Presentations (8:45 – 12:00) -** 15-20 minutes from each state to cover current events, hot topics, and/or significant project(s). We can allocate more time to individual state presentations. Please request additional time on the agenda in advance of the meeting.
  - Arkansas
  - Iowa
  - Kansas
  - Missouri

  BREAK - 10:00 – 10:15
  - Nebraska
  - North Dakota
  - Oklahoma (state activities update & demo of new state portal)
  - South Dakota

INTERNATIONAL CHARTER OVERVIEW (11:30 – 12:00)

- What is it? How does it work? Who is involved?
- State organization and activities
- Resources

LUNCH – on-site (12:00 – 1:00)

USGS UPDATE (1:00 – 3:00PM)

- Part 1 – National Map update – Rob Dollison
- Part 2 – USGS Partnership Update

BREAK (3:00 – 3:15)

LiDAR – Impacts on the state clearinghouse (3:15 – 4:15)

- OK…so…you got the money and collected the data…now what?
- Storing and serving very big, large, or even huge amounts of data
- LiDAR file formats, derivative products, etc.
- Project highlight – Iowa's state-wide LiDAR project?

Wednesday evening – official social event – details will be shared at the meeting

THURSDAY, September 17, 2008 (8:30 AM – 12:00 PM)

ESRI SERVER TECHNOLOGY ROUNDTABLE DISCUSSION

- ArcGIS Server, Image Server, ArcGIS Online
- ArcGIS Server Online SDK's – JavaScript, Flex, Silverlight, .NET, Java
- Technical direction for ArcGIS Server and web-based GIS applications
- Application demonstrations
- Discussion, Q&A session, etc.

LOGISTICS:

Lodging: **Marriott Cornhusker Hotel**
333 South 13th Street
Lincoln, NE 68508
(402) 474-7474
Parking is available in the parking garage on the west side of the hotel. There is a $1 hourly charge with a maximum daily rate of $6. I think this is per parking session, not per day, so you may want to leave you vehicle parked if possible. For those non-federal attendees, bring your parking ticket to the meeting and we will validate it, **MAGIC** will cover the parking fees.

Meeting: Blue Cross Blue Shield of Nebraska Conference Room at 1233 Lincoln Mall. This is 2 blocks south of the hotel.

Social: Dinner at Lazlo's (local brewpub) the evening of the 16th – more details to come

Meeting Attendees:

State	Name	Email address	MAGIC Sponsored
Nebraska			
	Jim Langtry	jlangtry@usgs.gov	
	Steve Rathje	steve.rathje@nebraska.gov	
	Dan Pfeffer	dpfeffer2@unlnotes.unl.edu	
	Larry Zink	larry.zink@nebraska.gov	
Iowa			
	Bob Lemen	rlemen@usgs.gov	
	Patrick Wilke-Brown	Patrick.Wilke-Brown@dnr.iowa.gov	Y
Missouri			
	Ray Fox	rfox@usgs.gov	
	Mark Duewell	duewellm@missouri.edu	Y
Kansas			
	Ken Nelson	nelson@kgs.ku.edu	Y
	Eileen Battles	battles@kgs.ku.edu	Y
	Lisa Hallberg	hallberg@kgs.ku.edu	
	Nick Callaghan	nick@kgs.ku.edu	
Arkansas			
	Bill Sneed	wsneed@usgs.gov	
	Glen Rhea	glen.rhea@arkansas.gov	Y
Oklahoma			
	Darryl Williams	dwilliams@usgs.gov	
	Kathryn Hines	kehines@ou.edu	Y
	Scott March	scmarch@ou.edu	
	Mike Sharp	mike.sharp@conservation.ok.gov	Y
South Dakota			
	Steve Shivers	sshivers@usgs.gov	
	Erik Nelson	Erik.Nelson@state.sd.us	
North Dakota			
	Bob Nutsch	bnutsch@nd.gov	Y
Minnesota			
	Ron Wencl	rwencl@usgs.gov	
Other Attendees			
	Rob Dollison (WebEx)	rdollison@usgs.gov	
	Lloyd Heberlie	lheberlie@esri.com	

Appendix 15

Intergovernmental Collaboration

Nebraska*MAP* Vision

Shared Infrastructure and Support

Quickly Find Existing Nebraska-related GIS Data

Reliable Access "Current" Data Remotely

Display Remote Data on Desktop or the Web

Combine Data from Multiple Sources

Analyze Data

Nebraska*MAP* Benefits

Shared Services

- *Combining Resources*
- *Cutting Duplicative Expenses*
- *Enhancing Available Services*

Nebraska*MAP* Benefits

Shared Services

- *Combining Resources*
- *Cutting Duplicative Expenses*
- *Enhancing Available Services*

Specialized Professional GIS/IT Expertise and Resources

– Sharing the Costs

Storing and Serving Enterprise Datasets

- *Aerial Imagery*
- *Street Centerlines-Addresses*

Infrastructure Platform to Support Agencies' Future Web Applications

- *State Patrol's Fusion Center*
- *Public Service Commission's E911 Street Centerline - Address*

Support for Common Enterprise-level Projects

(street centerline-addresses)

Institutionalize Data Sharing Arrangements

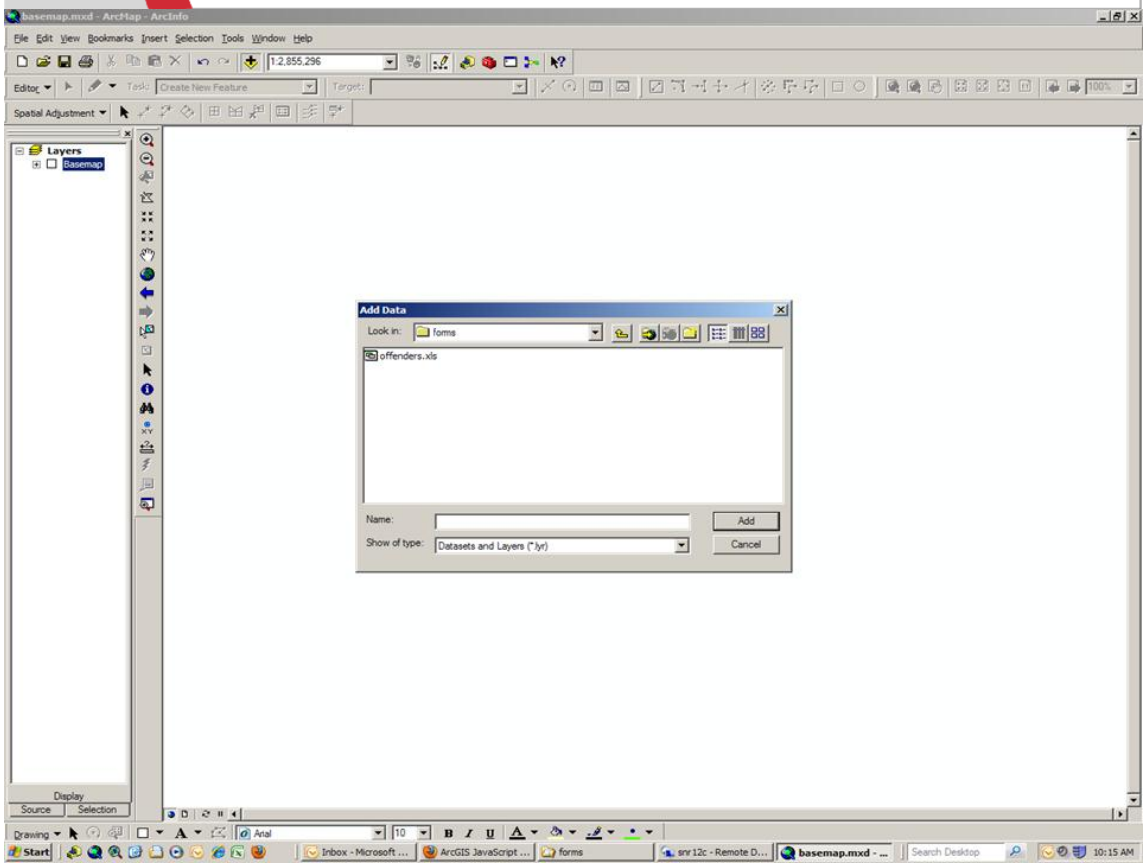
(no longer based on individual relationships)

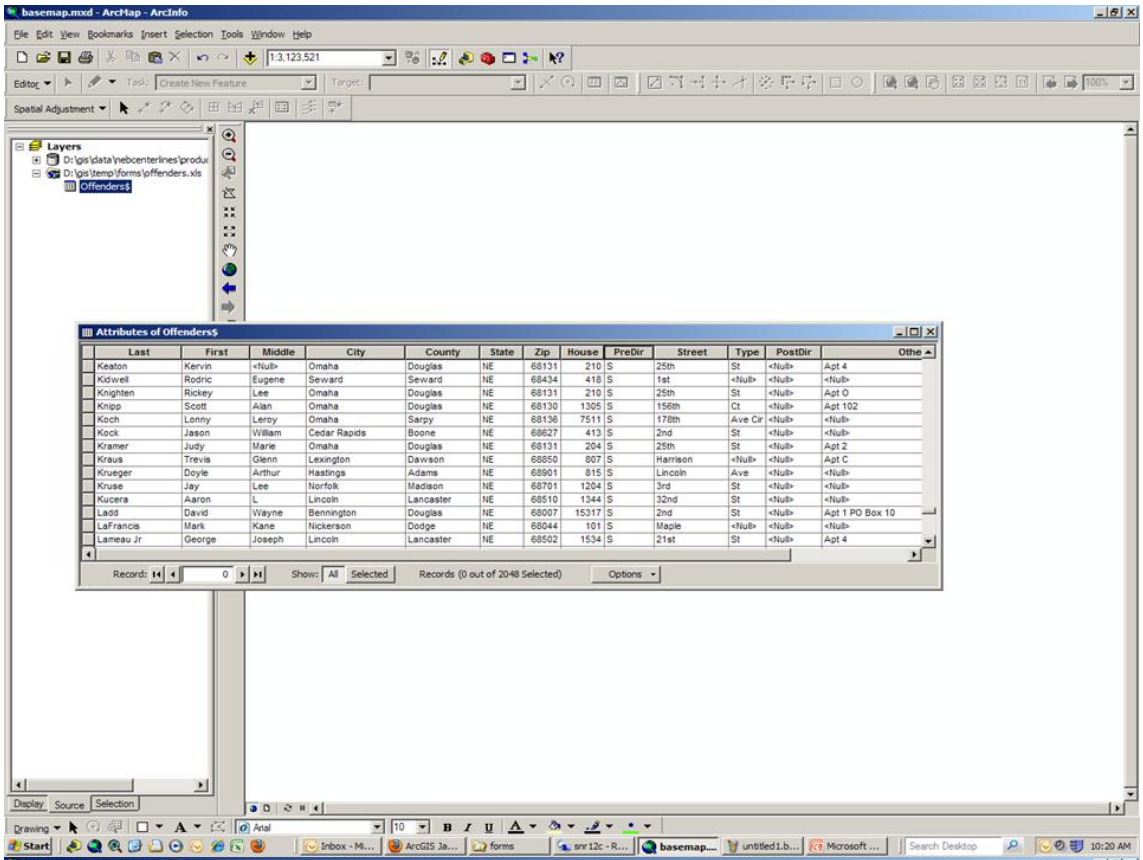
Professional Resources

to Support Geo-enabling Existing and New Web Services

Demonstration Examples

(Ice Jams on Platte
Geocoding Sex Offenders Registry and Schools)

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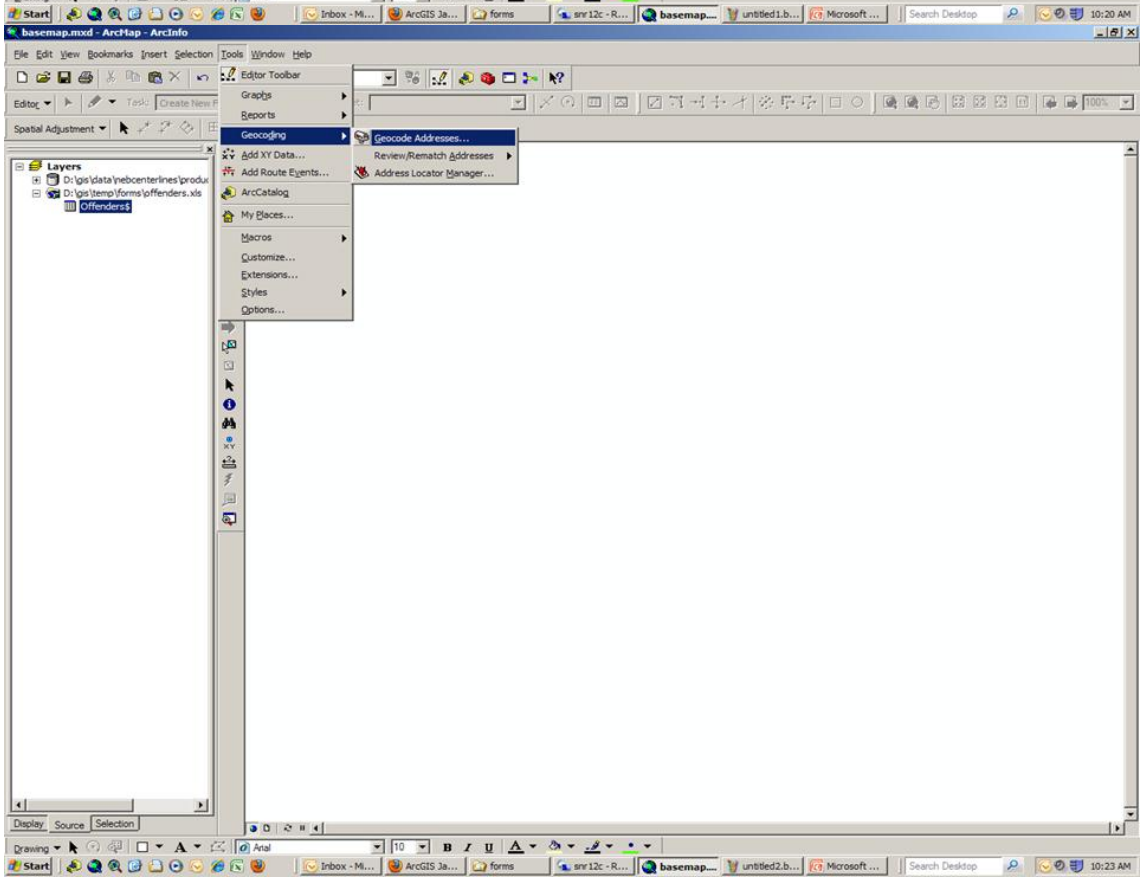
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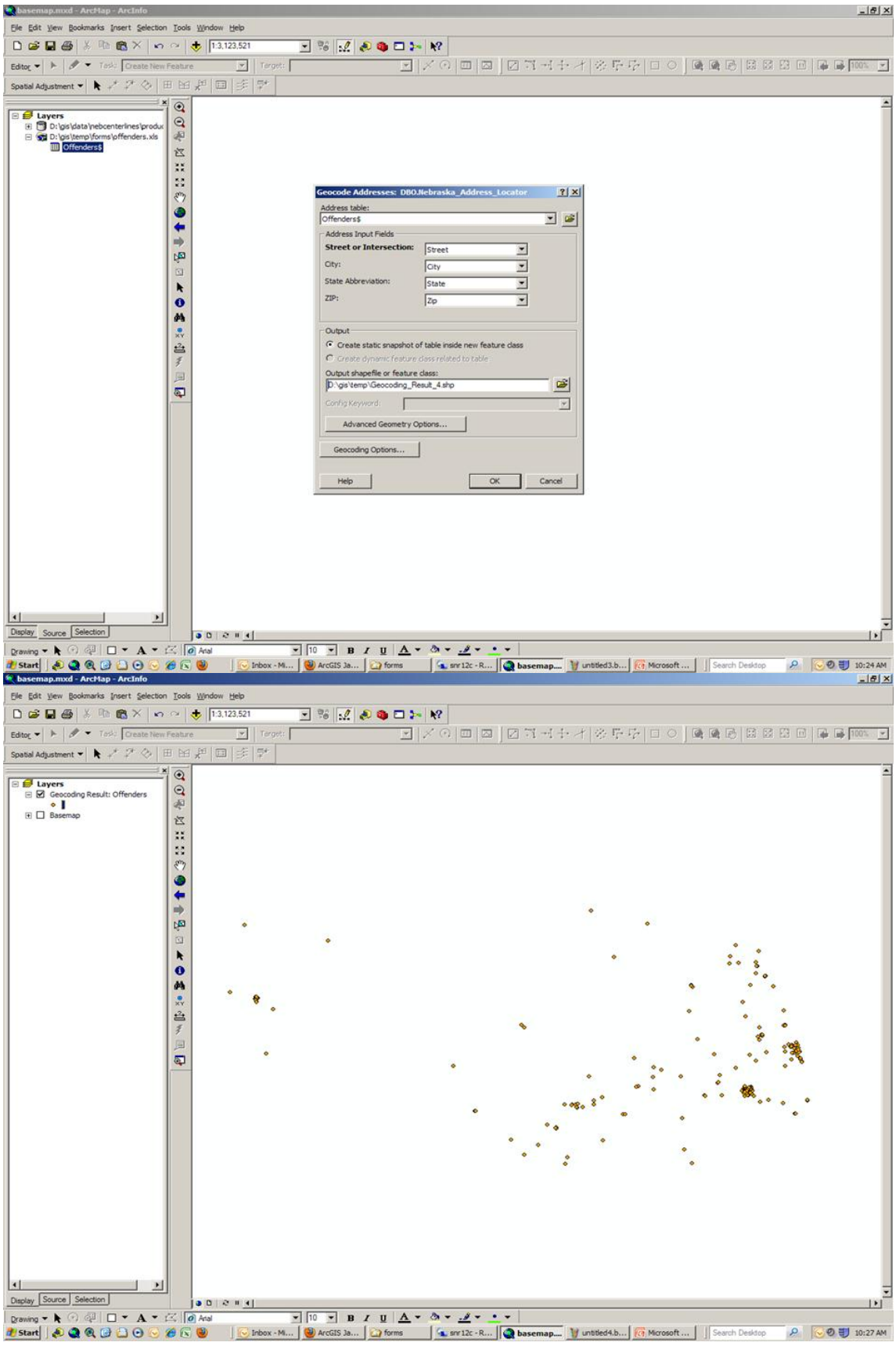
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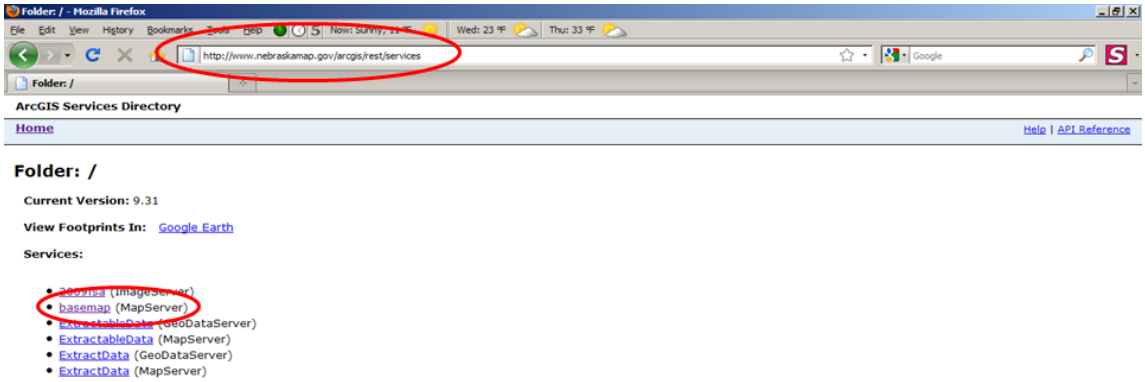
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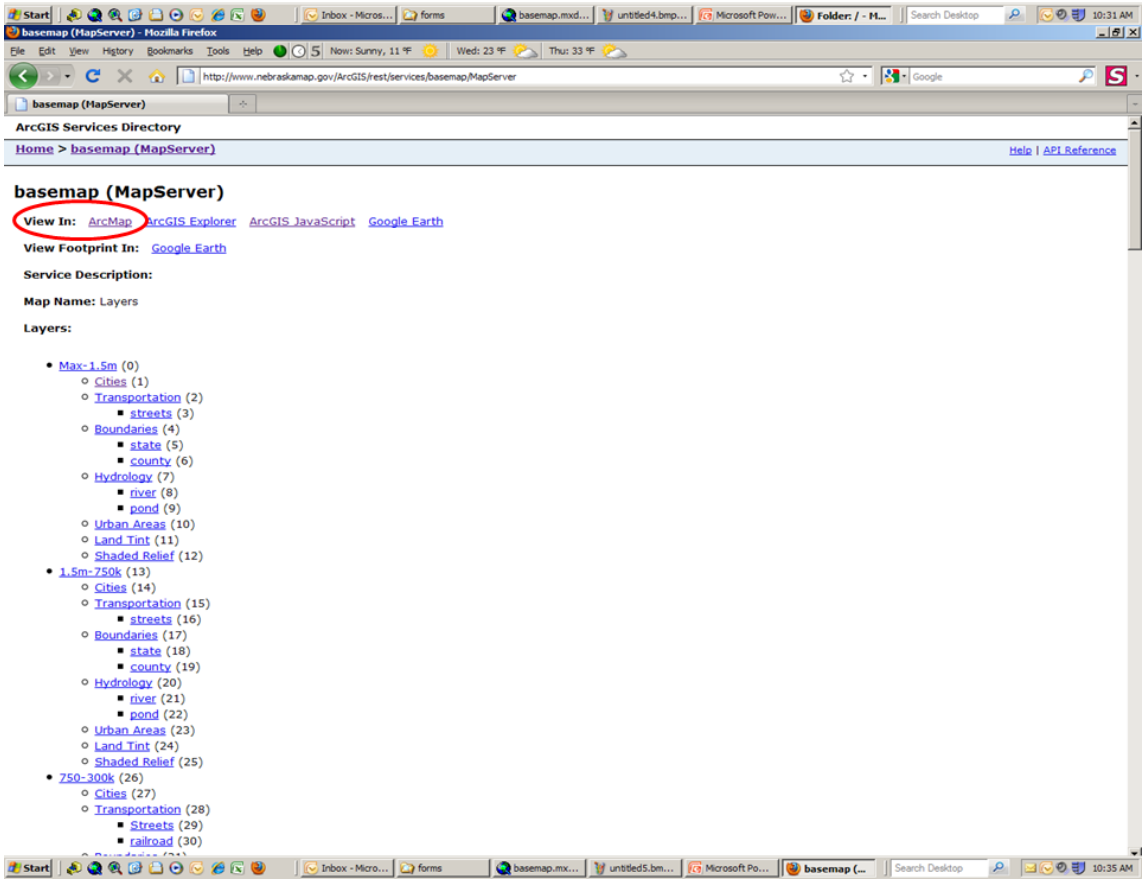
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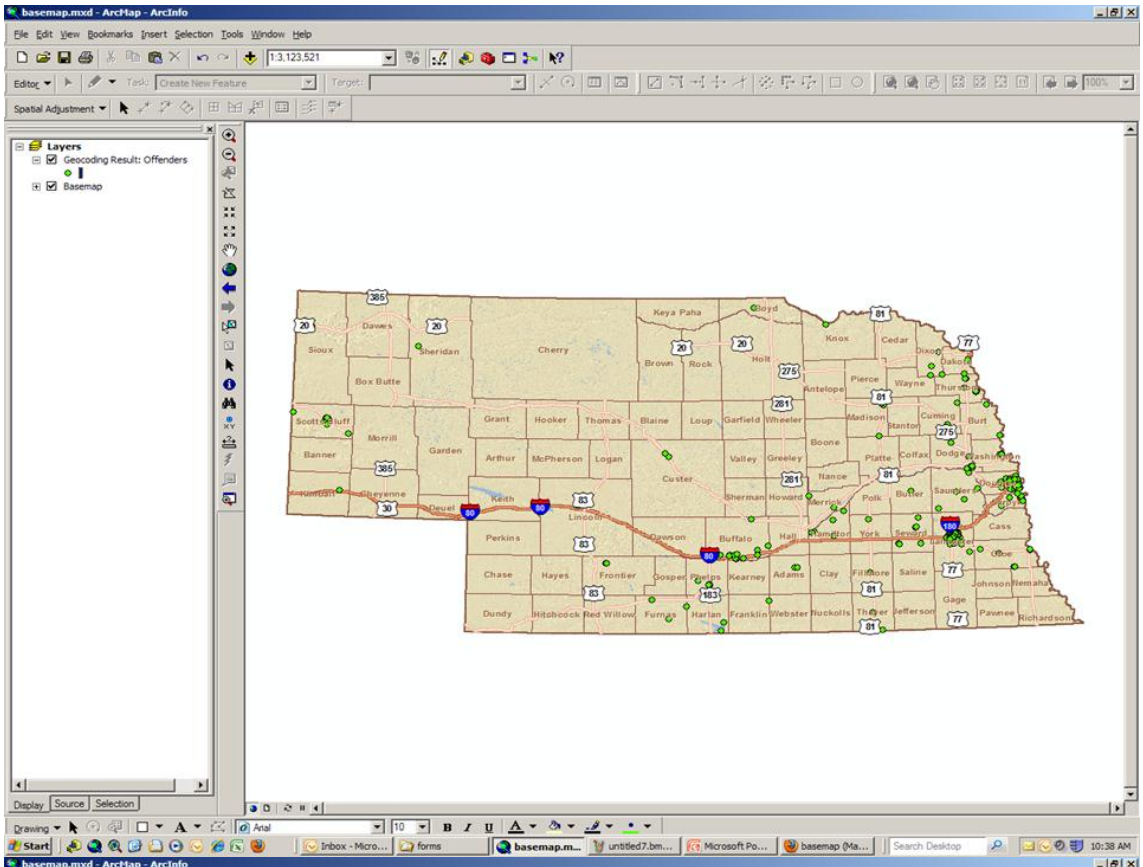
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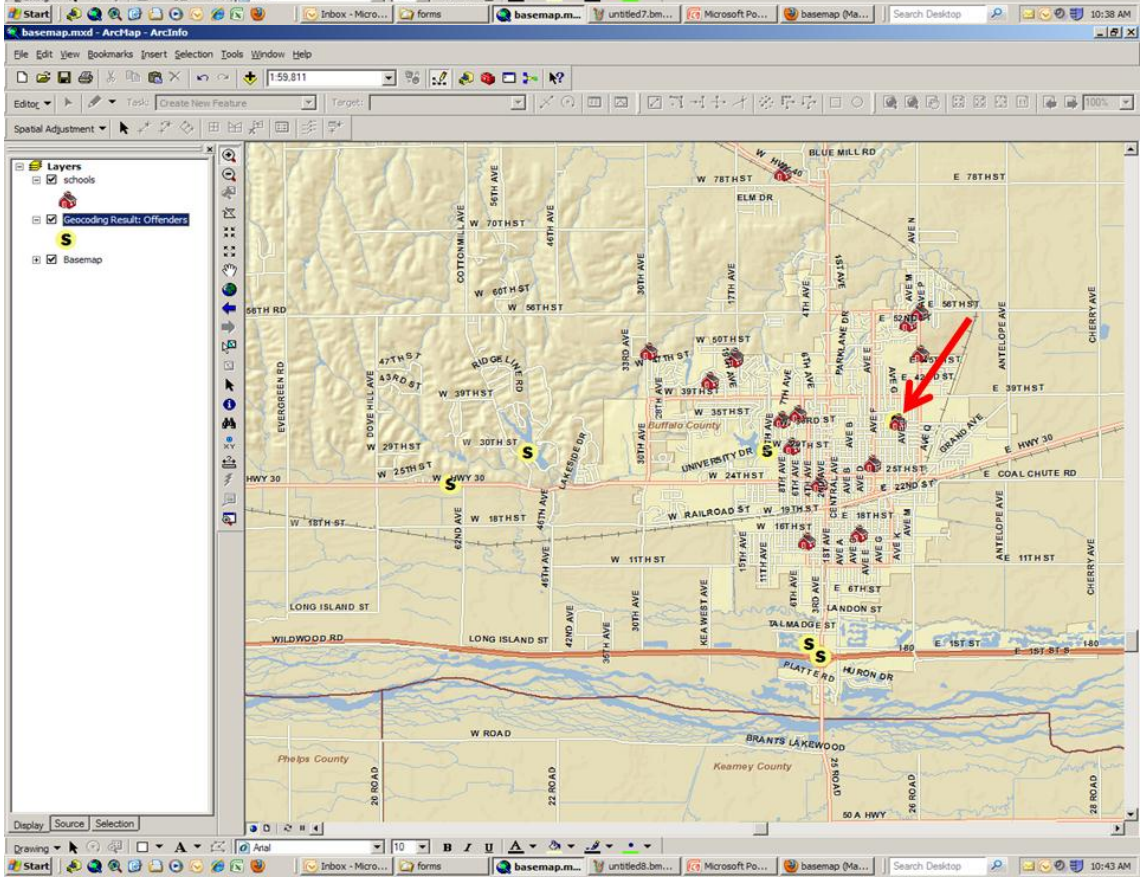
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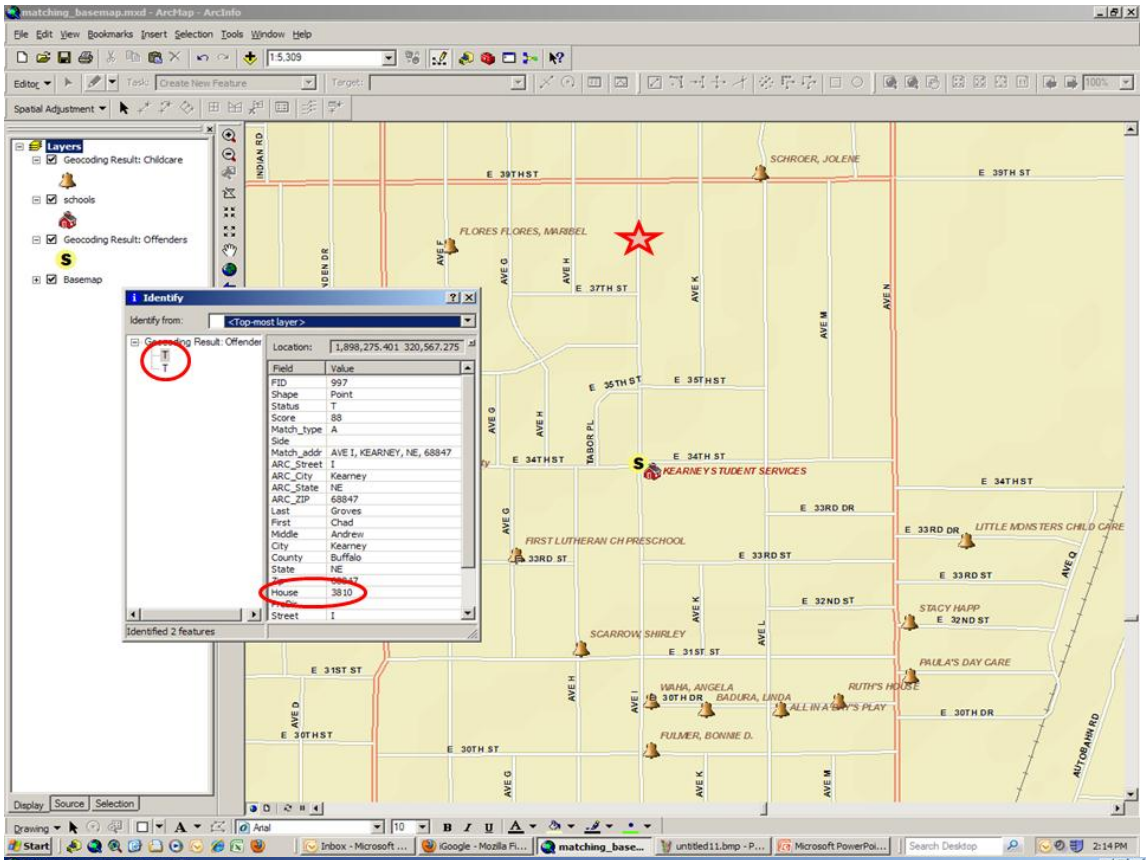
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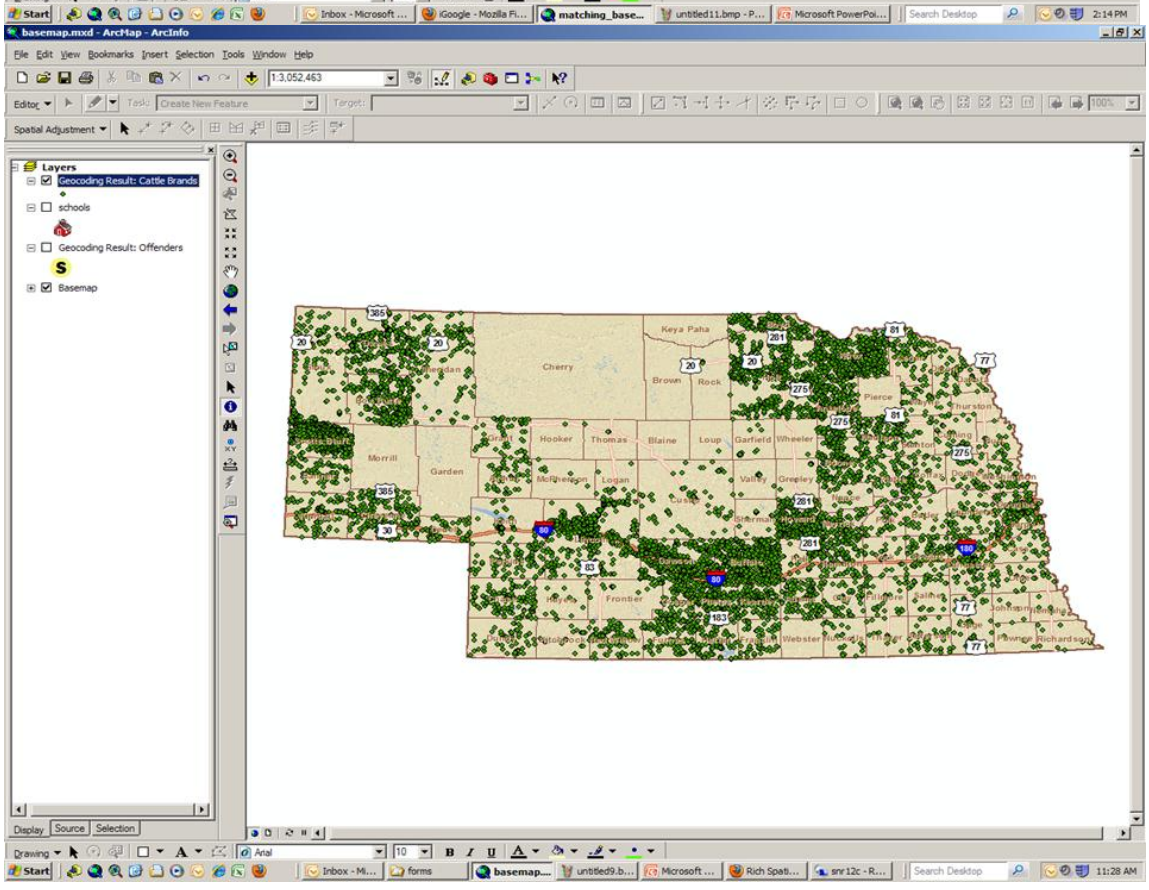
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Blaine
Loup
Garfield
Wheeler
Morrill
Garden
Logan
Valley
Greeley
Frontier
Webster

Developing a Model for Long-term Sustainability

(Steve Henderson)