ESRI India
GIS and Mapping Solutions

ArcIndia News

ESRI India Magazine

January - March 2009 Vol : 3 Issue : 1

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ESRI India @ Map World Forum

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Development of a city and disappearing urban water bodies, a case from Palakkad city of Kerala, India

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Design, Preprint & Production

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From the President's Desk

The World is facing many challenges. The population is rising leading to increase in consumption and depletion of natural resources and biodiversity. It is imposing more demand on the resources of the planet earth creating land use and other conflicts. One of the implications of these changes is migration from rural areas to cities in search of livelihood. As per an estimate 48% of the world's population, about 3 Billion people, lived in urban areas in 2003. This number is expected to grow to 4 Billion by 2020 about 55% of the World's population. In India about 40% of the population is likely to live in cities by 2021.

These developments are leading to unprecedented challenges for city planners as they cope with sharp increase in population in urban areas. They need to provide housing to the citizens; upgrade public utilities and other infrastructure in order to provide basic amenities to the residents. Some of the other areas that need their attention include transportation, healthcare, public safety and environment protection among others. They also need to upgrade emergency response systems in the cities in order to deal with exigencies. And finally they need to raise the capital to finance these investments. As per an estimate urban India needs an investment of US$ 348 Billion over the next 15 years.

Geospatial technology may not have answers to all these problems but it can definitely help. It provides the tools to capture data, analyse it and use it to plan and implement essentially a framework for action. It helps policy planners and administrators in taking more informed decisions. It enables them to collate diverse data sets and build spatial correlation leading to a more integrated view of the situation.

Today urban planners are using geospatial technology to build master plans for cities based on projected population growth, demographics and land use / land cover. They are also using this technology to plan and build multimodal transportation systems to provide the citizens an effective system to commute. Geospatial technology is also being used to plan, monitor and manage traffic in cities including site selection for flyovers and other means to reduce congestion. Public works departments are using geospatial technology to plan new roads, widen existing ones to provide capacity for growth and also plan maintenance of the existing network.

Geospatial technology is also helping city administrators in enhancing the level of citizen services and also strengthening citizen government interface. It is helping them in planning and managing various utilities like water, wastewater, solid waste management, power distribution, street lighting and outage management. Geo-enabled public utilities are better equipped to plan and manage their network and respond to breakdowns more effectively. It is also supporting law enforcement agencies in emergency response and disaster management.

The augmentation of infrastructure and other citizen services will require substantial investment and would necessitate generation of investible funds by municipal corporations. Here also geospatial technology is providing a helping hand. This technology is supporting municipal corporations in building a more accurate data base of properties along with the current usage pattern. This would definitely help them in substantially improving their property tax realisation thereby helping them in creating the required funds to improve citizen services. It will also make the system of filing property tax returns more hassle free for the property owners.

Finally, while urban planners and city administrators are facing unprecedented challenges as they cope with the demands from the growing urban population, help is available from geospatial technology.

This is going to be my last contribution to the "From the President's Desk" column of Arc India News as I pass the baton to Dr. Mukund Rao who has taken over as the President and Chief Operating Officer of ESRI India. I am sure ESRI India will continue to scale new heights under the able leadership of Dr. Rao. I will continue to serve on the board of the company and support Mukund as he spearheads the growth of ESRI India in India and international markets.

I would like to take this opportunity to thank our esteemed users without whose support the company would not have achieved the position it enjoys in the Indian GIS industry.

With best wishes,

Rajesh

Rajesh C Mathur
President, ESRI India

ESRI India to power Singapore Intelligent Map System using ESRI Technology

Application to provide Authoritative map data with Integrated Geospatial information to citizens through collaboration of various Government agencies

Singapore Land Authority recently awarded the contract to develop its Intelligent Map System to NIIT GIS. The system is envisaged to be the next generation mapping portal for various government and private agencies including citizens of Singapore enabling them to share spatial content using internet services, accessible on desktop and mobile platforms. It will be designed to serve a common base map of Singapore for displaying location information along with intelligent search and navigation tools, thus facilitating multiple agencies to mash up spatial content and provide a variety of useful information in an integrated environment. NIIT GIS will develop the system using industry leading ESRI ArcGIS Server technology - the first in the industry to provide mash up capability and implement it on a turnkey basis including state of the art hardware, software and helpdesk support. It will be a first of its kind implementation in Singapore for facilitating spatial data users across the country to deploy map data and GIS processing tasks in lightweight, customized Web mapping applications, thus providing simpler ways to integrate spatial content.

GIS Services for development of an Industrial Freight Corridor

ESRI India as part of a consortium has been commissioned to provide GIS based Urban Planning services for various developmental activities in an Industrial Corridor development Project. At a high level, ESRI India team will carry out GIS and Image Processing activities such as

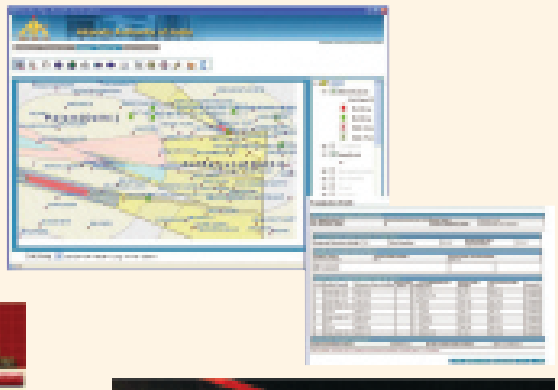
a. GCP collection & satellite image geo-rectification,
b. Base map, land use map and thematic layer creation to support environmental analysis,
c. GIS database creation, integration & spatial analysis to support development planning.

Excellence Awards for ESRI India Projects

Two of our existing projects were honored with Geospatial Excellence Award at the Map World Forum, Hyderabad held in February 2009. Brief details about the awarded projects are provided below: These are Web based Municipal GIS for Property Tax Calculation for Kanpur Nagar Nigam and Web based No Objection Certificate Application System for Airports Authority of India

The Web based Municipal GIS for Property Tax Calculation for Kanpur Nagar Nigam is based on Information portal on Municipal Corporation; Ward level spatial data creation & updation using high resolution satellite image & field survey; Online information of Property Taxes and Online Birth & Death registration.

The Web based No Objection Certificate Application System for Airports Authority of India is based on Portal to obtain statuary clearances for construction from civil aviation ministry; Flight path visualization and intersection analysis and Interfaces with process workflow.



ESRI GIS provides improved support for eTOD implementation

ESRI GIS enables aviation industry to produce, manage, and analyze vast amounts of terrain and obstacle data, making flight safer and operations more efficient. ESRI announces that its Production Line Tool Set (PLTS) for ArcGISAeronautical Solution (Aeronautical Solution) that enables aviation organizations to populate Electronic Terrain and Obstacle databases (eTOD). This enhancement will make it easier for International Civil Aviation Organization (ICAO) participating states to capture and manage obstacle and terrain data necessary for aviation maps and charts, as required by ICAO.

Aeronautical Solution is an extension to ESRI ArcGIS that allows civil and military agencies, commercial airlines, and chart producers to effectively manage aeronautical information and produce high-quality charts. Organizations' ability to integrate eTOD into their GIS workflows means they can provide significant safety benefits for international aviation, because the obstacle and terrain data is accurate and up-to-date.

Aeronautical Solution works as an extension to organizations' Aeronautical Information Systems (AIS), allowing agencies to integrate the software easily into current production workflows. A Task Assistant is provided for defining obstacle and terrain collection surface areas. The Task Assistant workflow consists of step-by-step instructions to create eTOD surface areas and is intended for those not familiar with GIS.

For more information visit **www.esri.com/pltsetod**

Add geocoding, routing, and high-quality cartographic display to ArcGIS with ESRI's StreetMap Premium

The new version of ESRI's StreetMap Premium, an enhanced street dataset that works with ESRI's ArcGIS software to provide geocoding, routing, and high-quality map display, includes expanded coverage and more licensing options. The enhanced dataset now gives users of ArcGIS Server and ArcGIS Desktop access to street data for the United States, Canada, and Europe that is tailored to their specific needs and geographic regions. ArcGIS is an integrated collection of geographic information system (GIS) software products, providing a platform to conduct spatial analysis, manage data, and serve cartographic information.

The commercial street data in StreetMap Premium is optimized, structured, and compressed to ensure ease of use and deployment with ESRI software products. The ready-to-use datasets, based on data from NAVTEQ, include streets and road networks as well as basemap data. The standardized data structure of StreetMap Premium enables users to achieve the highest address geocoding match rates and generate the best routes and driving directions as well as produce superior basemaps. StreetMap Premium works seamlessly with cartographic applications that require address information and scheduling applications that require the most updated streets and addresses

For more information on StreetMap Premium, visit **www.esri.com/streetmap**

ESRI ArcGIS Business Analyst Server 9.3 speeds business intelligence

ESRI's release of ArcGIS Business Analyst Server 9.3 brings an enterprise solution for collaborative business geographics to the marketplace. It enables the creation, sharing, and deployment of workflows and analysis across entire organizations, allowing for more sophisticated business models and intelligence to be developed cooperatively. ArcGIS Business Analyst Server also provides a host of prepackaged processes, data, and functions that allow users to rapidly generate analyses and workflows with less time spent in development and deployment. Because Business Analyst Server is built on core ArcGIS technology, developers can easily build and deploy custom browser-based GIS applications that support specific business functions.

With this recent release, ArcGIS Business Analyst Server has been expanded by adding more reports, data, and flexibility to the application while reducing its resource consumption. Key features of the 9.3 release include the addition of stateless application objects, which support more simultaneous users and decrease CPU and RAM consumption. The release also includes an updated SOAP API as well as a new REST API. New trade area types have been developed for the evaluation and exploration of business operational areas, and new analyses types of the Customer Profiling and Find Similar reports provide additional insight into existing and prospective business locations and customers.

For more information, visit **www.esri.com/baserver**

ESRI's ArcGIS for AutoCAD provides easy GIS and CAD interoperability

The ArcGIS for AutoCAD free download by ESRI has radically improved the ease with which users can share and use geographic information system (GIS) content with AutoCAD files while preserving existing CAD workflows. ArcGIS for AutoCAD Build 200, which was released today, offers simple interoperability; it gives AutoCAD users access to enterprise GIS data and imagery published by ArcGIS Server within the AutoCAD environment. It also gives them a means to prepare data with AutoCAD for use in ArcGIS.

ArcGIS for AutoCAD users can view and query enterprise GIS information from countless public and private sites that use ArcGIS Server to publish map services over the Web. This GIS information can prove invaluable to CAD designers or engineers who need more information about the environment and infrastructure that will affect their design decisions. Moreover, they can access the map services in AutoCAD without translating or converting the underlying GIS data. Map service content is automatically projected into AutoCAD based on the coordinate system of the CAD drawing

In addition, ESRI has developed a data-encoding method called mapping specification for drawings, which has been implemented in ArcGIS for AutoCAD Build 200 and ArcGIS 9.3. This new data-encoding method allows users to create, manipulate, and define how CAD data is organized and attributed as GIS content while remaining true to existing CAD standards. It also offers tools that allow users to create and edit GIS feature classes within standard AutoCAD files and add attributes to any AutoCAD entity. ArcGIS for AutoCAD API tools are also available to build CAD-based, GIS-ready applications. AutoCAD files enhanced with mapping specification for drawings can be used directly as GIS content in applications such as ArcGIS Desktop, ArcGIS for AutoCAD, or custom AutoCAD applications that have implemented the data-encoding method.

For more information visit **www.esri.com/autocadapp**

What's coming in ArcGIS 9.3.1

ArcGIS 9.3.1 improves the performance of dynamic map publishing and increases the sharing of geographic information.

Key Features

High performance Dynamic Map publishing

ArcGIS 9.3.1 is primarily focused on providing ArcGIS Server users fast dynamic web mapping capabilities. This work will benefit all ArcGIS Server users who use dynamic web mapping or who combine dynamic and cached maps on the web. The goal of this work is to exceed display performance to provide a real technical performance. The desktop will provide tools to analyze, optimize, and publish maps to this new fast dynamic web map service.

Build and deploy fast, high-quality map services
ArcGIS 9.3.1 delivers Optimized Map Services

Searching and Sharing of Geographic Information

ArcGIS Desktop will have a new and improved publishing experience allowing users to use ArcGIS Publisher to publish and package data for to ArcGIS Desktop, ArcReader, or ArcGIS Explorer. In addition, these packages will be able to be published to online web services for search and discovery. ArcGIS Online will provide the ability for search and discovery of content available online. This includes content provided by ESRI as well as content contributed by users. Users will be able to control the scope of access to their online information, allowing the system to support intra-organization sharing as well as sharing with the public.

Native Java API extensibility in ArcGIS Desktop, Engine and Server

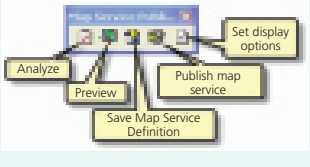
ArcGIS Server and Engine SDKs for Java are improved to support building extensions using native Java code to better support Java Standard Edition (Java SE) and Enterprise Edition (Java EE) developers. Full Eclipse IDE support is provided for Java developers to develop GP Tools, Server Object Extensions, Custom Tools and Commands, Custom renderers, etc.

Product-wise Key Enhancements

ArcGIS Desktop 9.3.1

Map Service Publishing toolbar

The Map Service Publishing toolbar is a new toolbar for ArcMap™ in ArcGIS® 9.3.1. The Map Service Publishing toolbar helps you to analyze the drawing performance of your ArcMap documents. It is used perform all of the steps to publish an optimized map service to ArcGIS Server from ArcMap.



The Analyze command evaluates your map document for publishing as an optimized map service and provides an interactive report for resolving issues. The Preview command allows for viewing the map through the drawing engine used for optimized map services. Services can be published directly to ArcGIS Server via the Publish Map Server command.

Viewer windows

Map Viewer windows now have additional commands available on the local toolbar for easy panning and zooming. These tools could always be used of the standard toolbar but are now in an easy-to-use location.

Accessing online data and services in ArcGIS Desktop

As part of the ArcGIS 9.3.1 release, we are launching a new ArcGIS Online Website which provides a single consolidated location where you can find data and maps that you can add into ArcGIS Desktop. This new Website includes the ability to upload, share, and download layer packages containing feature or raster data, described elsewhere in this document, in addition to Web-based online services. To reflect this change, at 9.3.1 the File > Add Data From Resource Center command in ArcMap and ArcGlobe™ has been renamed to File > Add Data From ArcGIS Online. When you choose this command, it will take you to the new ArcGIS Online Website automatically.

At 9.3.1 the ability to sign in to ArcWeb Services in order to access online data services and additional routing, gaztteer, and address finding services has been removed.

The Find dialog Places tab, Find dialog Addresses tab, Find Route dialog box mentioned above, and the Find Nearby Places dialog box mentioned above all still have free online services built into them, and continue to work as they did in 9.3.

ArcGIS Server

GIS Services

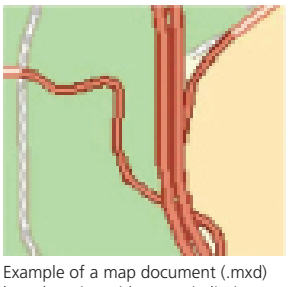
Map Services

ArcGIS 9.3.1 introduces a faster drawing map service for ArcGIS Server. These optimized map services use a new drawing engine to provide faster drawing performance for dynamic map services and faster cache generation for cached services. The optimized map service has high performance on all supported platforms with drawing quality exceeding existing ArcIMS and ArcGIS Server services with native support for anti-aliasing.

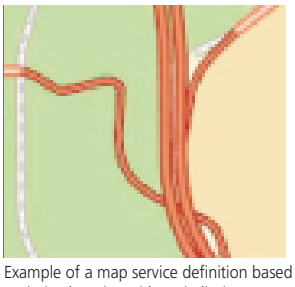
Optimized map services support common vector and raster data sources and 2D symbology. Map documents can be prepared for publishing as optimized map services via the Map Service Publishing toolbar in ArcMap.

The toolbar provides tools to analyze the map document for errors, such as unsupported functionality, performance warnings, and other information that may affect your map service. The interactive analysis experience allows for issues to be found and fixed easily prior to publishing the service directly from ArcMap or by saving a Map Service Definition.

The improved quality of images generated by optimized map services can be seen prior to publishing the service by previewing the service with the Preview command. Below is an example of the improved rendering quality:



Example of a map document (.mxd) based service without anti-aliasing.



Example of a map service definition based optimized service with anti-aliasing

ArcGIS Server Manager for the Microsoft .Net Framework

- **Support for optimized map services**

  ArcGIS 9.3.1 introduces an optimized map service for faster display. The new Map Service Publishing toolbar in ArcMap allows you to save and publish these map services. You can also use ArcGIS Server Manager to publish these map services. The optimized map services can be added to Web Mapping Applications.

- **Display Microsoft Virtual Earth layers and use the Microsoft Virtual Earth locator**

  Microsoft® Virtual Earth® offers high-quality, up-to-date content that you can now add to your ArcGIS Server Web Mapping Applications. There are three map styles that offer global coverage. Use Microsoft Virtual Earth as background maps for

your operational layers. Also available through the Find Address task is the Microsoft Virtual Earth locator for finding addresses and place names as well as reverse geocoding.

- **Add image services to Web Mapping Applications**

  In ArcGIS Server Manager and the Visual Studio® IDE, you can now add image services to your Web Mapping Applications.

- **Access to authenticated WMS services**

  In ArcGIS Server Manager and the Visual Studio IDE, you can specify a username and password when adding an authenticated WMS service to your Web Mapping Application. Click the Access secured services option to enter the username and password.

- **Choose which layers from a WMS service to add to your map**

  When adding a WMS service to your Web Mapping Application, you can now define which layers from the WMS service get added to the map and TOC. Previously, the entire service had to be displayed. To choose which layers are added, edit the markup of the mapresourceItem definition in the Default.aspx.

- **Configure properties for a Server Object extension**

  For developers who have created a server object extension, the properties to configure that server object extension can now be shown in Manager.

ArcGIS Server for the Microsoft .Net Framework REST API

For Java developers

At this release, the ArcGIS framework can now be extended at the ArcObjects level using Java. This capability was not possible at previous releases of ArcGIS, as Java was only able to consume the existing ArcObjects functionalities as they were, out of the box.

This means that the Java programming language can now be used to extend some behaviors and capabilities found in ArcGIS Desktop, Engine and Server, just as extensibility was always possible using COM, C++ and .NET.

This enhancement to the ArcGIS suite of products is yet another milestone in ESRI's continued commitment to the Java platform and its community.

ArcGIS Java developers at 9.3.1 can build custom Java extensions in their native Java environments that support specific functionality and can be deployed and plugged seamlessly into the ArcGIS environment, in typical Java deployment processes.

Also, ArcGIS products, such as ArcGIS Desktop, ArcGIS Engine, and ArcGIS Server, are built on the ArcObjects development platform. Therefore, it is possible to consume custom Java extensions across ArcGIS Desktop, ArcGIS Engine, and ArcGIS Server without modifications.

Below is a high level overview of all the supported extension types and scenarios available to Java developers at 9.3.1:

- Custom Server Object Extensions (SOEs)Java developers can extend the MapServer Server Object type to build customized ArcGIS behavior into the core server itself, without having to build this logic into their Java applications at the Web tier.
- Custom Feature RenderersJava developers can create custom feature renderers to control the way each feature in a map layer is drawn. Also, the custom feature renderers that you create can implement persistence behavior and hence its state can be saved within a layer (.lyr) file or a map document (.mxd) file.
- Custom Geoprocessing Tools- Java developers can create custom geoprocessing function tools to accomplish complex spatial analysis, data management, and batch conversions by integrating the wide spectrum of ArcObjects Platform APIs with other external Java libraries.
- Class ExtensionsJava developers can create class extensions to customize data behavior in a geodatabase.
- Plug-in data sourcesJava developers can create plug-in data sources to integrate and access external data formats with ArcGIS geodatabase (read-only).
- Improved PerformanceJava developers can create custom utility objects to consolidate the recurring fine-grained ArcObjects method calls in an application. Creating custom utility objects heavily reduces the interoperability overhead of fine-grained calls between Java and COM objects improving performance of your application.

The Eclipse plug-ins for the Java Engine and Server SDKs include wizards and tools for generating the code for building these ArcGIS Java extensions. The Java Help System also includes documentation and tutorials for extending ArcGIS Engine and Server, and the SDKs come with Eclipse projects for sample implementations of each of the supported extensibility scenarios.

ArcGIS Server for the Java platform

- **Support for optimized map services**

  ArcGIS 9.3.1 introduces an optimized map service for faster display. The new Map Service Publishing toolbar in ArcMap allows you to save and publish these map services. You can also use ArcGIS Server Manager to publish these map services. The optimized map services can be added to Web Mapping Applications. The Editing task does not support these map services.

- **Support for image services**

  In ArcGIS Server Manager and using the Eclipse™ and Netbeans™ IDE plug-ins, you can now add image services to your Web Mapping Applications.

- **Access to authenticated WMS services**

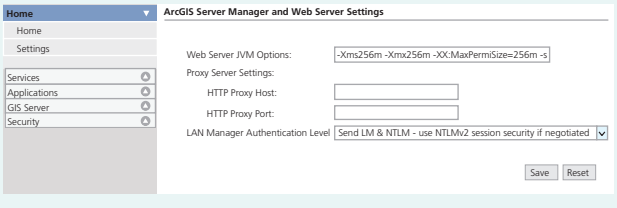
  In ArcGIS Server Manager and using the Eclipse and Netbeans IDE plug-ins, you can specify a username and password when adding an authenticated WMS service to your Web Mapping Application.

- **Configure properties for a server object extension**

  For developers who have created a server object extension, the properties to configure that server object extension can now be shown in Manager.

- **Configure settings for ArcGIS Manager and Web server**

  You can now use the Settings panel to configure settings for the internal Web servers which host the Manager and Web applications. For example, you can specify the Proxy server to use for Internet connections or the Authentication protocol for local connections. You can also specify JVM parameters, like minimum and maximum heap size, for the internal Web server which hosts the deployed Web applications.



- **New ArcGIS Java Web Services Toolkit**

  The WebADF provides a new ArcGIS Java Web Services Toolkit that has better performance and uses memory more efficiently.

- **WMS enhancements**

  The TOC control now reflects scale-dependency of WMS layers and provides a convenient "Zoom To Layer" context-menu. You can also now define which layers from the WMS service get added to the map and TOC when adding a WMS service to your Web Mapping Application. Previously, the entire service had to be displayed. To choose which layers are added, specify the layerSubset property in the WMSMapFunctionality managed-bean declaration

- **ArcGIS extensions in Java**

  Java developers at 9.3.1 can build the ArcGIS extensions in their native Java environments that can be deployed and plugged seamlessly into the ArcGIS environment :

ArcGIS extensions

Data Interoperability - The FME 2009 platform has expanded format support, an enhanced user interface, and has been optimized for processing complex conversions on large volumes of spatial data.

ArcGlobe

Automatic texture management / downscaling for multipatches in ArcGlobe

- Textures are automatically downscaled based on the distance from the camera to the 3D object. This reduces the memory-intensity of displaying textured objects, such as city buildings, inside ArcGlobe.
- Users do not need to configure this; it is automatically enabled.

ArcGIS 9.3.1 License Manager

LINUX based ArcGIS License Manager

An ArcGIS License Manager that is supported on LINUX® platforms is now available. This allows users to install the license manager on supported LINUX servers and serve out licenses to all ArcGIS 9.x Desktop and Workstation software running on either Windows or UNIX® systems.

Please also check out the What's Coming in ArcGIS 9.3.1 information at http://www.esri.com/software/arcgis/whats-new/whats-coming.html

Geospatial Data for Tamil Nadu

The National Remote Sensing Centre, a wing of the ISRO, is likely to do aerial mapping of several cities of Tamil Nadu, to provide geospatial data to the Geographical Information System's (GIS) pilot project for the development of Infrastructure facilities in the state.

The Municipal Administration Department of the Tamil Nadu Government has initiated the pilot project to build a GIS data bank of southern cities including Coimbatore, Madurai and Tiruchy. The digital data bank would also include information on important public service utilities, their infrastructure and facilities, and to improvise and improve the present facilities, besides working out future plans. An important aspect of the GIS data collation is details like the number of buildings, hospitals, and schools in an area, apart from pictures of the cities, their facilities and the topography. Such pictures will be shot aerially from an aircraft using specialized equipment like 'aerial survey metric cameras.'

"For the GIS project in Chennai, the National Remote Sensing Centre has provided 181 kms of aerial pictures of that city," an official said. With regards to other cities of Tamil Nadu, the national agency is expected to execute the same kind of work. "The top priority is for timely completion of the GIS project and any decision should be a tool to facilitate this," the official pointed out.

Letters to the Editors

Dear Readers,

This section of Letters to the Editors is a new inclusion to Arc India News. We would like to have the opinion and feedback of all our readers with respect to the content being published and how it has been useful to them in their day to day GIS advancement. You may also let us know what you expect to see in terms of application & technology in the magazine.

Letters to the Editors may be edited for length and/or clarity and may be published or republished by us in any format or medium and/or licensed to others for publication. If we publish your letter, we may attribute it to you and may include your name and city, unless you expressly request that you remain anonymous. Please share your thoughts with us at info@esriindia.com

Editorial Board

Kumaun University, Uttarakhand Celebrates GIS Day

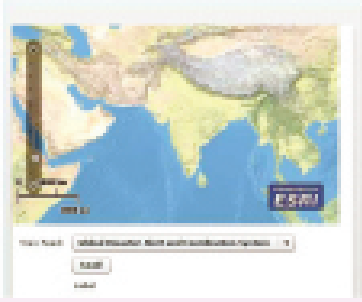
The Association of Geographical Information Science and Technology (AGIST) of the Centre of Excellence for NRDMS (Natural Resources Data Management System) in Uttarakhand, Kumaun University SSJ Campus Almora, India, celebrated the 10th GIS Day at its Centre on 19th November 2008. Post Graduate Students of

Geographic Information Science and Technology (GIST) and Scientists of the NRDMS Centre and Teachers of the Kumaun University participated in the celebration. Welcoming the participant, Prof. J.S.Rawat, Director of the Centre of Excellence for NRDMS in Uttarakhand introduced about the significance of GIS at different scales ranging from global to the local government, planning, administration and research. The students of MGIST discussed on the - Current Status of GI Science Education in America and UK; Application of GI Science in Defence, Village Resources Planning and Disaster Management.

The Chief Guest of the Ceremony Mr. S.C. Napalchiyal Chief Development Officer and Nodal Officer, GIS Cell, District Almora highlighted on the importance of GI Science in local level planning, i.e., district and below, and underlined the need to develop human resource through education to adopt this technology for quick and efficient administration and planning. The Chief Guest also distributed the first, second, third prizes to the winners of Essay and Poster competitions on GI Science. At the end of the Ceremony, Prof. S.K. Singh, Head of the Department Geography gave vote of thanks to all the participants.

GIS Portal Toolkit 9.3

The ESRI GIS Portal Toolkit is a technology and services solution for implementing local, regional, national, and global spatial data infrastructure (SDI) portals. It enables implementation of one-stop Web sites for the discovery, transmission, and use of geographic data and mapping services maintained anywhere on the Interne and supports all relevant OGC and ISO standards. The toolkit is deployed as an extension to ArcGIS Server and offers a fully supported, stable platform to build geospatial portals, spatial data infrastructures (SDIs), and metadata catalogs, thus providing organizations with diverse and changing geospatial resources located throughout their enterprise a means to provide quick access to those resources regardless of the resource location or type.



Key Features

Support recognized international standards for technology & data

GIS Portal Toolkit supports recognized international standards for technology and data and can be used to support the development and deployment of authorized data sets. As an extension to ArcGIS Server, GIS Portal Toolkit complements the standards support provided by core ESRI products by supporting Open Geospatial Consortium, Inc. (OGC) Web Catalog Service (CS-W) services and discovery clients for third-party CS-W services, as well as supporting state-of-the-art ISO metadata support.

Catalog your existing GIS resources regardless of location or type

The GIS Portal Toolkit extension includes a Catalog Service that supports inventorying of all of your existing geospatial resources, storing and managing the metadata information in one repository. The service integrates with existing metadata management business processes and supports Lightweight Directory Access Protocol (LDAP) and simple authentication security.

Discover GIS resources with the GIS Portal Site Starter

The included GIS Portal Site Starter lets you publish and share geospatial resources by creating a GIS portal site quickly. Developers can customize the site's look and feel to integrate with their existing Web design.

Consume GIS resources in a ready-to-go Map Viewer

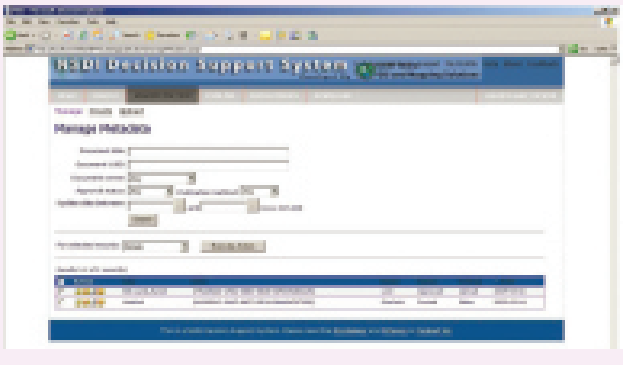
The GIS Portal Toolkit extension includes a ready-to-go Map Viewer that provides users with quick access to geospatial data and services. Using the Java Application Development Framework, implementers may customize the Map Viewer to satisfy specific requirements.

Discover & use GIS resources from within Desktop

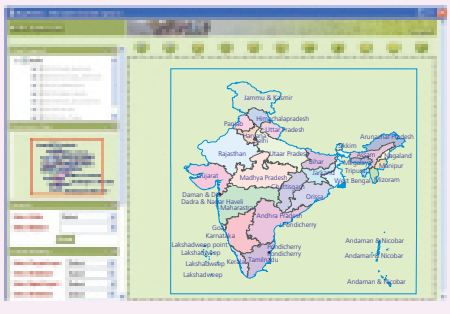
The free CS-W Clients for ArcGIS Desktop & ArcGIS Explorer enable discovering and using GIS resources available at a GIS Portal directly from ArcGIS Desktop & ArcGIS Explorer.

Harvest content from other GIS Portals and Catalog Services

Catalog existing geodata resources with a harvesting tool and service, which can automatically retrieve metadata from distributed catalogs and register them with the catalog service. This makes it much easier for you to add, manage, and update large amounts of data.



Allow users to find relevant geospatial resources regardless of their GIS platform



Expose content from the catalog service to external clients using the REST API, which makes it simple to query the Catalog Service from third-party applications including those that utilize KML. It also adds GeoRSS functionality to the GIS Portal to support dynamic feeds of search results and to notify users of updates to the Catalog Service.

Integrate with third-party content management systems, portal frameworks, or authentication systems

The GIS Portal can integrate with third-party content management systems by using the REST API to render HTML snippets. This would expose content maintained in the GIS Portal catalog to those external content management systems. Alternatively, GIS Portal functionality may be embedded in Portal frameworks as part of a larger solution. Finally, to ensure integration in enterprise architectures, the GIS Portal may authenticate users using available authentication mechanisms through LDAP support.

What You Can Do:

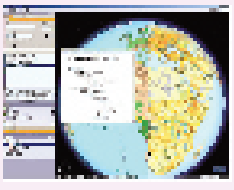
The GIS Portal Toolkit extension provides all the components that are required to create a comprehensive and robust GIS Portal by providing:

- Support collaboration and cooperation among and across departments and organizations, regardless of GIS platform.
- Gain an enterprise-level awareness of disparate geospatial data, Web services, and activities.
- Leverage existing geospatial resources rather than duplicate those resources or the effort involved in creating them.
- Ensure use of approved, high-quality data sets.
- Reduce the time it takes to find relevant, usable geospatial resources.

GIS Portal Toolkit Clients for ArcGIS

GIS Portal Toolkit clients add new levels of interoperability between GIS portal catalogs and ArcGIS Desktop or ArcGIS Explorer. They are available for both the publishers and end users.

Clients for End Users	CS-W Clients for ArcGISEnables discovering and using GIS resources available at a GIS portal directly from ArcGIS Desktop and ArcGIS Explorer. Use the clients to: • Search metadata catalogs directly from ArcMap or ArcGIS Explorer. • View the title and abstract of search results, and download the metadata xml. Add referenced live map services to an ArcMap document or ArcGIS Explorer globe.
WMC Opener Client for ArcGIS Desktop	Enables opening a saved map from a GIS Portal Toolkit Map Viewer for viewing and further analysis in ArcGIS ArcMap. It can also open other OGC WMC files, as defined by the OpenGIS Web Map Context Implementation Specification
Clients for Metadata Publishers	The GPT Publish Client is a tool for ArcCatalog that lets you easily publish metadata from your local desktop to the GIS Portal. The metadata can come from shapefiles, personal geodatabases, enterprise geodatabases, or any other local data formats for which you can create metadata in ArcCatalog. For publishing metadata from ArcIMS Metadata Services we recommend setting up a harvesting schedule using the GIS Portal Toolkit harvesting capabilities.



The free CS-W Clients for ArcGIS enable discovering and using GIS resources available at a GIS Portal directly from ArcGIS Desktop and ArcGIS Explorer.

What's New in GIS Portal Toolkit 9.3

New for All Users

- An updated user interface for the GIS Portal that is fully localizable.
- ArcIMS is no longer used; a metadata service is included out-of-the-box.
- Authentication through LDAP.
- Use of ArcGIS Server REST API for search map, place finder, and data download features.
- A new Java ADF map viewer that supports OGC service types as well as GeoRSS feeds and comes with expanded query and markup functionality.
- Searching occurs through a OGC catalog service interface.
- Provides a REST API for searching that supports GeoRSS, KML, and OpenSearch.
- Data extraction service is included for downloading data for a resource, with the ability to specify an extent, projection, and download format.
- Extended profile support for CS-W clients
- Context-sensitive online help is available for all pages in the portal applications.
- GPT is more tightly integrated into the ESRI core software environment, providing a fully supported, stable platform for building geospatial portals, SDIs, and metadata catalogs.

With the introduction of GIS Portal Toolkit 9.3, the software has matured from a software and services solution to a fully supported extension to ArcGIS Server.

ESRI now offers a standard maintenance program to licensed users consisting of technical support as well as updates during the maintenance period.

New Functions for Publishers

Extensible framework for metadata standard supportimplementers can define support for their preferred metadata standards, profiles, and validation rules.

- Expanded list of metadata profiles supported out-of-the-box

Federal Geographic Data Committee (FGDC) Best Practice

Dublin Core

ESRI Encoding of ISO metadata

ISO 19139 encoding of ISO 19115/19119 metadata for Datasets, Dataset Series, and Web Services

New Functions for Portal Administrators

- Harvesting enhancements include expanded profile support, a harvesting scheduler, and improved repository registration.

New for Developers and Implementers

In addition to the principal user functionality enhancements listed above, other major changes provided by GIS Portal Toolkit 9.3 include the following:

- There is more efficient custom configuration of each implementation of the portal. (This includes the movement of all text from code to resource files for easier translation of the portal interface and associated search functions.)
- An internationalization kit is included; its default language is English
- Channel content for focused user communities can now be supported by integrating with a third-party content management system
- A vastly expanded set of documentation in the areas of installation, customization, and usage are included.

Few Successful Implementations Worldwide

The following are some examples of large SDI projects that leverage the ESRI GIS Portal Toolkit to share information on a global scale.

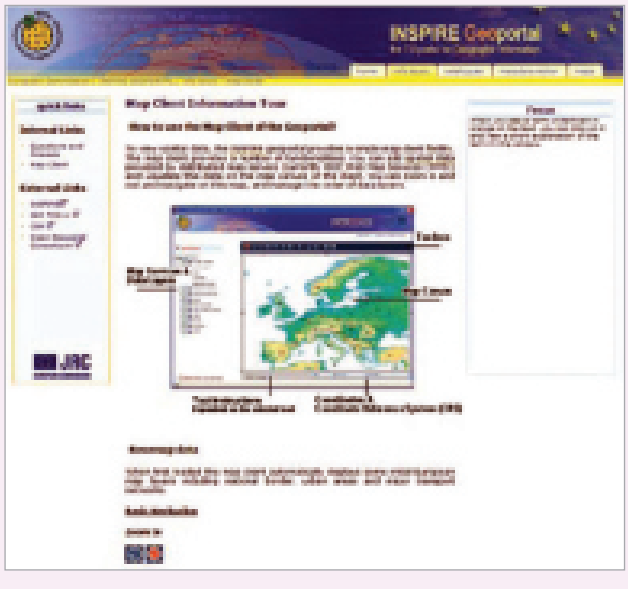
- **Geospatial One-Stop Operational Portal (www.geodata.gov)**

In 2005, ESRI was selected by the U.S. Department of the Interior to develop the Geospatial One-Stop (GOS) Operational Portal version 2, the U.S. National Spatial Data Infrastructure (NSDI) that would serve to encourage greater

collaboration and coordination in the use of geospatial technologies across all levels of government. GOS 2 provides a one-stop way to search for geospatial data from local, state, and federal sources; Web mapping services; data collection activities; and geospatial best practices and standards. The portal is open and interoperable and incorporates industry-approved standards.

- **INSPIRE GeoportalEuropean Spatial Data Infrastructure (www.inspire-geoportal.eu)**

This site represents a prototype ESRI built as part of the research the European Union is doing to help define the



requirements for INSPIRE. The goals are to trigger the creation of a European spatial data infrastructure; deliver to users integrated spatial information services linked by common standards and protocols; and support established standards and specifications from European, international, and industry consensus-building processes including the International Organization for Standardization (ISO), the European Committee for Standardization, the Open Geospatial Consortium, and the World Wide Web Consortium (W3C®).

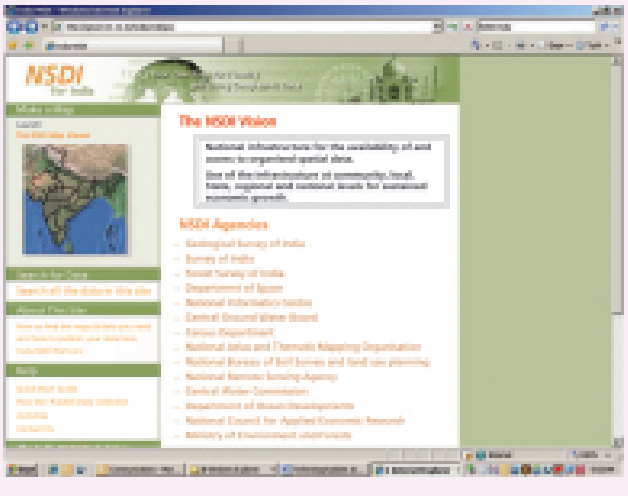
- **GeoNorgeNorwegian Mapping Agency (www.geonorge.no)**

This project was a collaborative effort headed by the Norwegian Mapping Agency to provide Web-based map and geographic services on the Internet. It involved cooperation of

public agencies that have geographic responsibilities or are large users of geographic information. Publication is open to data providers for both public and private users.

- **Indian Experience**

For more information, please visit www.esri.com or www.esriindia.com



For more information,

please visit

www.esri.com or www.esriindia.com

Designing and Mapping the Future of Your Community with GIS

Every day, planners use geographic information system (GIS) technology to research, develop, implement, and monitor the progress of their plans. GIS provides planners, surveyors, and engineers with the tools they need to design and map their neighborhoods and cities. Planners have the technical expertise, political savvy, and fiscal understanding to transform a vision of tomorrow into a strategic action plan for today, and they use GIS to facilitate the decision-making process.

Planners have always been involved in developing communities everyone would want to call home. Originally, this meant designing and maintaining cities and counties through land use regulation and infrastructure support. Agencies have had to balance the needs of residential neighborhoods, agricultural areas, and business concerns. Now, in addition to that complex challenge, local governments must factor into these decisions the requirements of a growing list of regional, state, and federal agencies as well as special interest groups.

Rapidly changing economic conditions have further complicated the process by threatening the funding needed to carry out these functions. To date, local governments have been rightsized and downsized and have had budgets drastically cut while trying to maintain service levels. Information technology, especially GIS, has proven crucial in helping local governments cope in this environment.

ESRI® software solutions help planning, building and safety, public works, and engineering professionals meet or exceed these demands. ESRI software is the number one choice of local governments for mapping and analysis. Using GIS software from ESRI, planning agencies have discovered how traditional tasks can be performed more efficiently and tasks previously impractical or impossible can be easily accomplished. Benefits of using GIS in local government include the following:

- Increase efficiency
- Save time
- Generate revenue
- Provide decision support
- Improve accuracy
- Manage resources
- Automate tasks
- Save money
- Increase access to government
- Enhance public participation
- Promote greater collaboration among public agencies

Urban and Regional Planning

Helping Design Tomorrow's Cities Today

Planning seems simple enough: design the ideal community and ensure regulations support design goals. Reality is far more complex. Today, city, community, and regional planning means dealing with constant change. Planning professionals have the technical expertise, political savvy, and fiscal understanding to translate a vision of tomorrow into a strategic action plan for today. Requirements handed down from federal and state regulatory agencies, regional boards, and an increasingly active public have made this job even more challenging. Literally thousands of local government organizations, and planning agencies in particular, have embraced GIS tools from ESRI as a means of meeting these demands while dealing with limited funding and staffing.

Front Counter Service and Current Planning

GIS promotes a good public image of a planning department. Equipped with GIS tools from ESRI, staff members can quickly access information on parcel maps, such as environmentally sensitive areas, and all matters concerning the implementation of zoning, permit status, and other planning information.

Comprehensive Planning

Planners use GIS to prepare plans, which set the standard for policy decisions regarding long-range changes to a community's physical environment. Planners make use of GIS to smooth the progress of citizen participation and community input as they develop a vision for the community that enhances the quality of life for all citizens. ESRI GIS tools help planners analyze problems more quickly and thoroughly, formulate solutions, and monitor progress toward long-term goals for the community.

Planning Agencies

GIS is also used at planning agencies to conduct environmental review of projects; development review, analysis, and compliance; historic preservation; and redevelopment, as well as regional planning, as more planning agencies seek to coordinate planning efforts to minimize negative impacts on neighboring communities. In many cases, planning agencies are also using GIS Web services to coordinate planning and economic development initiatives.

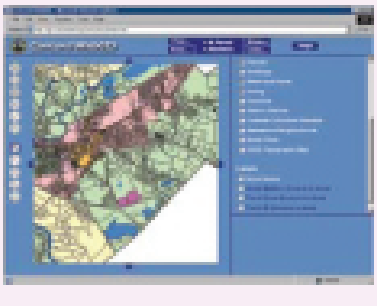
It is no wonder that ESRI's software solutions have been adopted by more planning agencies than any other GIS software. By integrating and organizing information spatially, planners can get a broad view of the current situation and more accurately assess the future. GIS software can analyze more scenarios more quickly, giving decision makers more choices.

Integrated Web Services and GIS for E-Government

E-government is using the Internet and GIS to create more effective government. The combination of readily available Internet access and maps lets governments provide a new level of service to both businesses and the public. It is making collaboration between government agencies possible in new and powerful ways. The strong data integration abilities of GIS let governments truly capitalize on data existing in legacy systems.

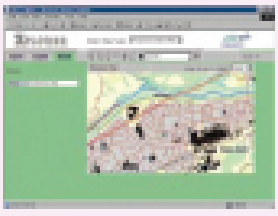
GIS-enabled Web sites can provide services, such as online mapping, fee payment, and application submission that were not previously available. Three categories of e-government applications have developed: government to business, government to citizens, and government to government.

- Government-to-business applications typically relate to economic development, land development, licensing, or permitting.
- Government-to-citizen applications provide information on government service, such as trash pickup, or streamline the public's interaction with government agencies by allowing online payment of fees or providing feedback on land use plans to officials.
- Government-to-government applications improve the amount, quality, and speed of information exchange among various levels of government and/or agencies and departments within governments. Better communication helps governments use resources more wisely by avoiding duplication of effort and allows agencies to work together to tackle large-scale planning problems or respond to emergencies.



Concord's WebGIS Internet mapping solution allowsusers to search for any property in town by address, owner name, or parcel ID. Information, such as parcel size, zoning, owner name and address, and assessed value, is available.

Xplorer is designed as a simple but functional application that places special emphasis on the provision of public access to council and property information for the benefit of the citizens of Upper Hutt City, New Zealand



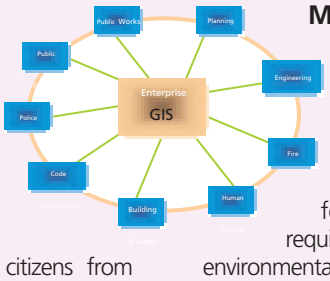
Using GIS to enhance business workflow across the Enterprise

GIS has expanded from a niche technology used by specialists to an integrated information technology used throughout an organization. While the demand for staff who specializes in GIS persists, numerous planning and economic development, community development, and public works professionals are embracing GIS as a basic tool for conducting their daily business. ESRI supports both approaches with an array of tools for GIS professionals performing georeferenced tasks and those who use GIS in many disciplines to improve efficiency and productivity and centralize information.

Furthermore, many urban, community, and regional planning efforts are so complex that they involve federal, state, and local governments. In this case, GIS is used to facilitate this process across many agencies and departments and thus help prevent traditional problems of data redundancy and data currency.

GIS provides the framework for an integrated workflow across the enterprise for creating, enhancing, and updating GIS databases that can be easily shared both within and between organizations. Although GIS applications have been used to manage individual planning projects for decades, the real benefits of GIS use can only be fully realized by applying GIS across the entire organization's business workflow.

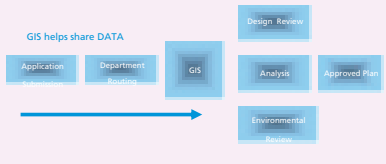
The ESRI family of software works together to handle the entire workflow from data creation to information distribution in an environment that supports information technology standards and interoperability with existing systems. Enterprise GIS, with the geodatabase, data models, and an array of applications, is revolutionizing the planning process.



Managing the development review process

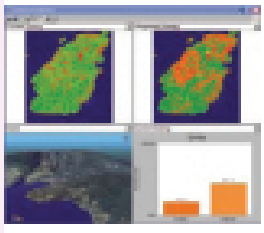
The development review process ensures that plans for development adhere to federal, state, and regional requirements as well as protect citizens from environmental or public safety hazards and support progressive economic development. Planning agencies are integrating ESRI® software solutions as a central component in the development review process. The functionality of ESRI's GIS software streamlines design review activities such as mapping, site review, notification, analysis, and environmental review. GIS integrates and streamlines processes among different departments.

ESRI's GIS software, the next step in the evolution of information technology, streamlines the development review process by sharing data. Using a central information base eliminates problems caused by conflicting data.



GIS Supports Planning and the Public Participation Process with Planning Support Systems

Advances in GIS and supporting technologies have led to the development of decision support systems that facilitate the community planning process. There are several planning support systems (PSS) available on the market today to ESRI users. PSS use indicators and alternative development scenarios to measure the attributes and performance of communities and their plans. Planning support systems are instrumental to successful community planning and public participation processes because they focus on the needs and the know-how of users as opposed to focusing on or requiring a high degree of GIS expertise.



British Columbia: Like many other small rural communities across North America,Bowen Island in British Columbia, Canada, is feeling the pressures of urban growth, and it is actively exploring new smart growth strategies and integrated planning frameworks for navigating a path forward. A key element of this planning framework is the capacity to envision and assess viable pathways toward community sustainability. Bowen Island is using CommunityVizTM to support this process of planning and "what if" analysis through a powerful suite of integrated GIS modeling and landscape visualization tools that provide both context and focus for community-based decision making.

Planning support systems can measure and compare performances of different planning scenarios according to planner- or citizen-defined indicators for land use, transportation, natural resources, and employment, to name a few. The ultimate goal is to bring together all potential players to work collaboratively on a common vision for their community.

Broadway Corridor: San Antonio's Broadway Corridor was modeled three ways in Smart Growth INDEX®: existing conditions, current build-out plan, and stakeholders' alternative build-out plan. The latter emphasizes mixed live/work/shop land uses. The final INDEX "report card" for the corridor revealed that the stakeholders' new proposed plan would create much better conditions than the current plan. In this way, the GIS tool gave participants rapid, critical feedback on the validity of their work to date and the promise of their future efforts. The catalyst for bringing these stakeholders together was an offer from the U.S. Environmental Protection Agency (EPA) to apply Smart Growth INDEX, a GIS-based planning support tool that EPA is distributing nationally to selected communities.

GIS-based planning support systems allow planners and citizens to quickly and efficiently create and test alternative development scenarios and determine their likely impacts on future land use patterns and associated population and employment trends, thus allowing public officials to make informed planning decisions.

Three-Dimensional Visualization Tools

Community planners, architects, urban designers, and land use planners are increasingly using three-dimensional visualization tools to give citizens and public officials the ability to visualize the impact or probable result of urban design projects and proposed land use and zoning changes or envision the results of smart growth initiatives. Three-dimensional GIS tools facilitate public participation by communicating both complex and simple geographic and man-made phenomena. Three-dimensional visualization tools combined with planning support systems allow the public and decision makers to interactively change or simulate existing and proposed modeled environments or scenarios.

ESRI India @ Map World Forum

ESRI India participated at the global congregation of geospatial professionals, experts and leaders held in Hyderabad from 10th to 13th February 2009, that discussed the applications of geospatial technologies to create a Sustainable Planet Earth.

The conference was formally opened by the Hon'ble Vice President of India, Mohd Hamid Ansari on February 10, 2009. A host of other governmental agencies, like Indian Space Research Organisation (ISRO), National Remote Sensing Centre (NRSC), Department of Information Technology (DIT), who are providers of geospatial data as well as users of the data participated in the four-day event. The Honorable Minister for Science and Technology & Earth Sciences, Government of India, Kapil Sibal stated, "Government of India stands committed to create, update, manage and disseminate geospatial information and use it to the best possible manner to improve the quality of the life of its citizens and development of the nation.

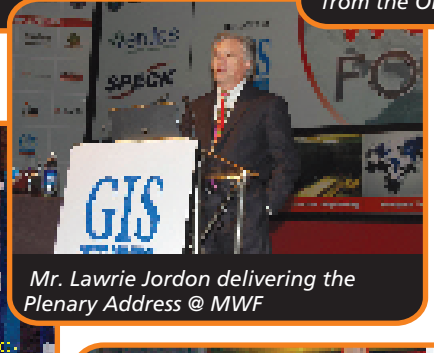
Addressing the august gathering Mr. Rajesh Mathur, President ESRI India focused on application of GIS in Agriculture and Food Security. He also emphasized that today Geospatial technology enables community planners, economists, agronomists, and farmers to research and devise practices that will enable the sustainability of food production to meet the growing needs of the mankind. Mr. Mathur during his presentation recommended a frame work strategy **"development of GEOKISAN, a web based Farmers Information System (FIS)"** for the benefit of the Indian farmers who can make use of the system to improve farm yield. Mr. Lawrie Jordon, Director Enterprise Imaging Solutions, ESRI Inc, also addressed the conference giving an insight into new GIS computing environment in a services-oriented, open architecture that delivers global "Geography-on-Demand" in near real time.

ESRI India also participated in the state-of-art Geospatial Exhibition, showcasing ESRI technology and solutions. The Honorable Vice President of India, Mohd Hamid Ansari and Honorable Minister for Science and Technology & Earth Sciences, Government of India, Kapil Sibal visited our ESRI Zone at the Exhibition where they took keen interest in knowing the wonderful projects implemented by ESRI India. Special interest was shown by Mr. Kapil Sibal where he threw light on the GIS implementation by Reliance to the government delegation. ESRI India overall had a wonderful experience discussing the various GIS solutions in different verticals with the delegates of the Map World Conference.

ESRI India also conducted half day seminar giving an insight to the latest developments in ESRI Technology and its implementation in various applications. Map World Forum also honored two of our prime clients Airports Authority of India and Kanpur Nagar Nigam for GIS implementation done under the supervision of ESRI India using ESRI technology.

ESRI India @ Map World Forum Exhibition

ESRI India receiving the Memento from the Organisers



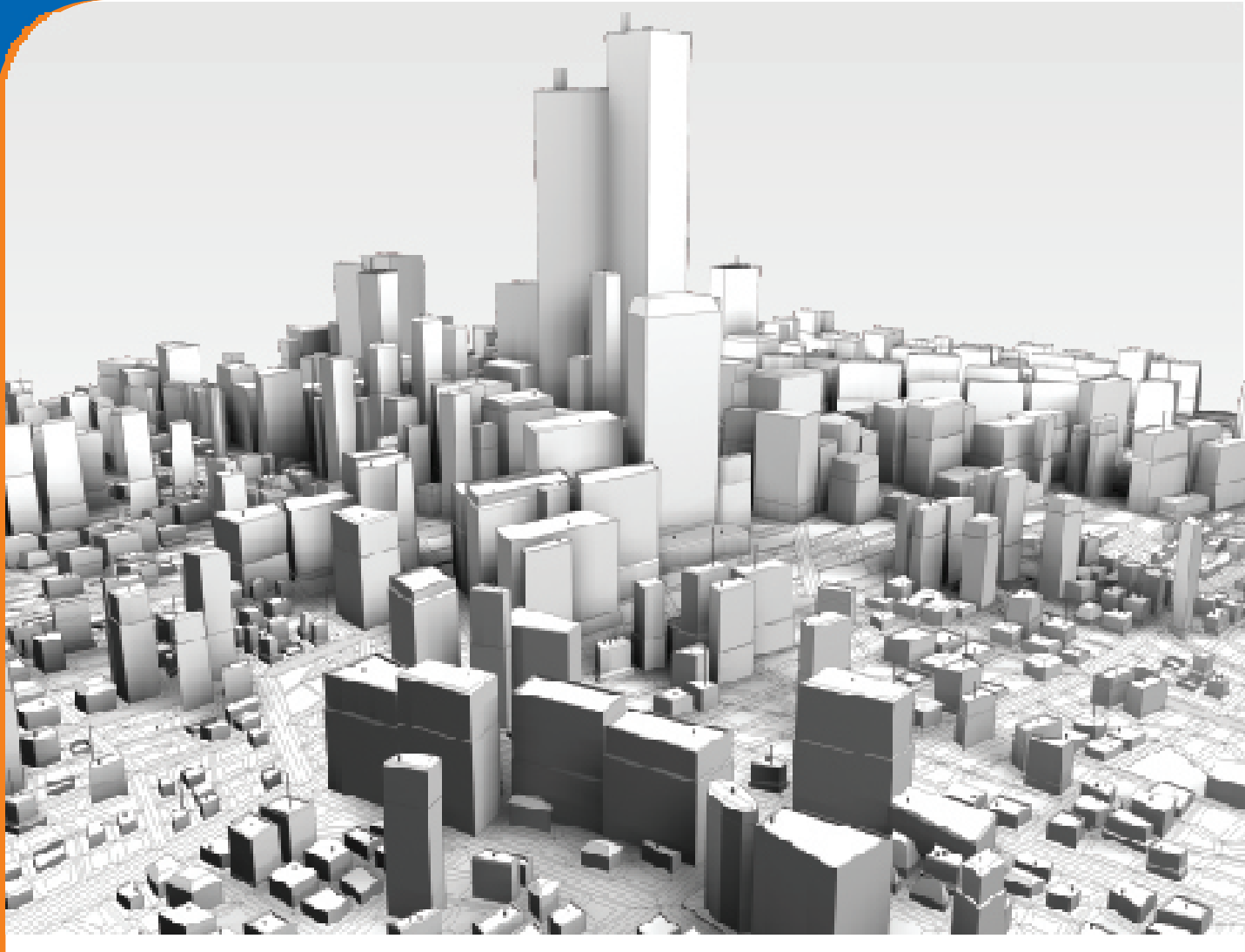
Mr. Lawrie Jordon delivering the Plenary Address @ MWF

Rajesh Mathur delivering the Plenary Address @ MWF

Mr. Rajesh Mathur & Mr. Lawrie Jordon @ ESRI India Booth

The Vice President of India Mohd Hamid Ansari and Mr. Kapil Sibal, Minister for Science & Technology & Earth Sciences @ Exhibition.

ESRI India Team @ Map World Exhibition



KANPUR NAGAR NIGAM MUNICIPAL GIS PROPERTY TAXATION FOCUS

Case Study

Introduction

Kanpur Nagar Nigam (KNN), the municipal body is one of the largest commercial and industrial cities in Uttar Pradesh, India extending to a total area of about 260 Sq. km with a population of about 2.5 Million people. Its local body is very active and open to adapting modern governance methodologies for both good governance and enhance the revenues for efficient implementation of development works in the municipality.

As part of the modernization of the property tax system in Kanpur Nagam Nigam, KNN had conducted a Total Station survey way back in the year of 2002 to develop a GIS based map to integrate with property details for better property taxation system, subsequent to that in the year of 2006 KNN initiated a project to update the existing GIS maps with the help of satellite images and development of enterprise GIS based application along with a web GIS based interactive website and online property tax payment system.

An Over View of the Project

As a part of the e-governce initiatives, Under the Urban Reforms Incentive Funds (URIF) scheme of Govt. of Uttar Pradesh; KNN envisaged development of an online web GIS based property tax calculation system as a pioneering effort in the country. The job was formally tendered and the work was awarded to ESRI India on basis of best technical cum financial performance. The scope of this work covered the follwing are the major activities associated with the project:

- Creation of a GIS based spatial property database involving:
  - o Procurement and supply of Quickbird Image (0.6m resolution) for the entire area under the municipality's jurisdiction.
  - o Georectification of the satellite image form the GCPs collected from DGPS survey.
  - o Updation of digital GIS maps of KNN with the help of geocorrected Quickbird data and preparation of data for assessment list.
- Conduct a property level survey for every property unit
- Development of Informative and Interactive web GIS system for online property tax calculation and payment
- Development of desktop application for property database repository management and tax assessment.
- Supply and Installation of software's, hardware and networking with server and additional peripherals

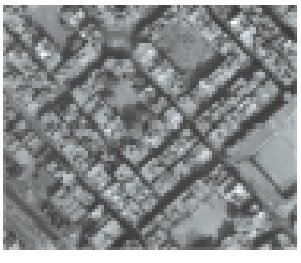
- Training of KNN Personnel
- Renumbering of properties with unique premises no. and fixing of house number plates.

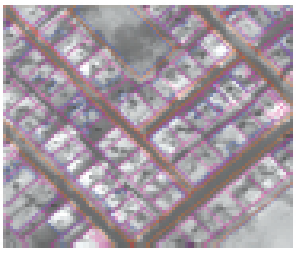
The Scope of GIS based work mentioned above could be categorized into two broad components based on requirements of the KNN project as –

- Property Survey & GIS database Creation
- Application Development and Website Development

Property Survey & GIS database Creation

Quickbird satellite data was procured and georeferenced based on the Ground survey conducted to collect the GCP's through DGPS. Base data of 1:1000 scale was created through digitization of satellite imagery and supplemented with secondary ground survey to capture information on covered / carpet area, land use, occupant's details, condition of structure, etc. The mapping done using the Quickbird Satellite data was used for conducting the primary contact property survey. A sample of the Quickbird image procured and its use in feature extraction /mapping is given below:





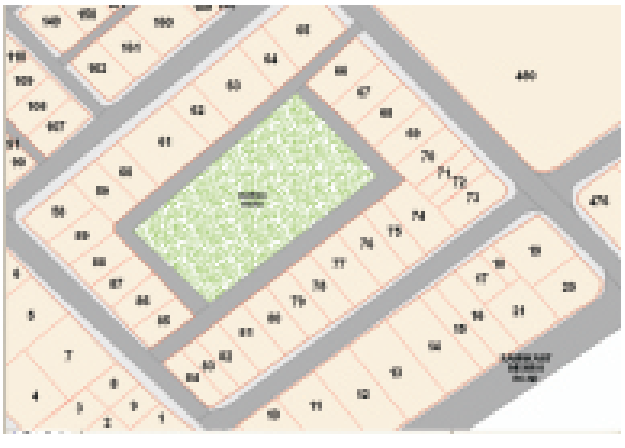
One of the challenges in mapping was to register and integrate the plot wise map created from the Total Station Survey (TSS) in 2002 with the image based map. The importance of this map available with KNN was that the plot layer could be created only on the basis of ground survey and could not have been derived from satellite image. The KNN map from TSS however had quiet a few inaccuracies which had to be verified from the ground and corrected.

Three types of field survey were involved covering the 110 wards distributed in 6 municipal Zones ie. A) DGPS survey for collection of 200 GCPs for image registration, B) The contact (house / property lever) survey involved collection of about 12 parameters relating to the property and assessment criteria for taxation and C) Spatial survey for collection of the spatial features as manholes, land marks and verification of the properties in relation to the map

A major task and a difficult one is to identify the existing assesses or the taxpayers in the old records while the properties on the ground have undergone vast changes. Issues as one property/owner number with hundreds of individual units in clusters termed as "Hatas" and their survey have been a great challenge including threats from the communities to the surveyors as well as the KNN. Post survey integration into GIS database has also been demanding; resulting in several resurvey visits. After the survey the number of proprieties increased to 53%, the chart given below shows the number of properties before and after the contact survey.

Sl.No.	Description	Property Count
1.	Number of properties in the old assessment list (Pre-Survey)	241946
2.	Number of properties in the new assessment list. (Post Survey)	493966

Other mapping and spatial solutions included resolving and correctly marking the ward boundaries based on the textual description including the subward units as Chaks, Mohallas and Blocks. Consequent to these administrative boundary resolution a major task that was undertaken was to rationalize the house numbering with reference to the new ward and chak boundaries. Thus a system for identification of the properties a unique number was developed. This involved assigning to each properties, a 17 digit unique property numbering system as part of the project, that comprise, details of different administrative units, house number and floor/part information. The following diagram however shows only the last three digits of the 17 digit system so as to not to clutter the map.



Plot Boundaries with new plot/house number

Application Development and Website Development

The software development effort for the Kanpur Nagar Nigam included development of KNN portal and desktop application.

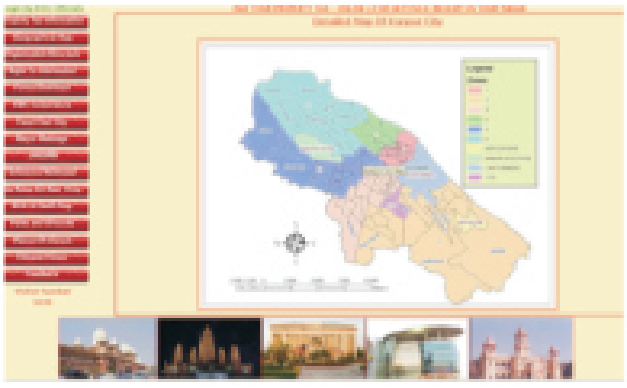
KNN Website

An interactive GIS based website was developed for KNN to provide on-line information to citizens on i) Property Tax Details ii) Property Tax liabilities iii) Existing status of paid taxes iv) Taxes due to be paid, v) On-line Property tax calculation based on the Unit Area Method and On-line tax payment and vi) online tax payment.

A facility to access maps based on Zones, Wards, Blocks and Chaks will be provided. In case an individual or an organization wishes to buy relevant maps, the site also provides for visualization of maps and placing an on-line purchase request by the individual or organization.

In addition to the above the portal also provides for accessing, registration and follow up of routing municipal services as i) Complaint / Grievance Redressal, ii) Death / Birth Registration iii) License / Renewal of License to manufacture for Sale / Distribution of Wholesale / Retail iv) Tender Notice, v) Right to Information etc.

The website also contains information about Kanpur City, its geographic location, history, connectivity, important tourist



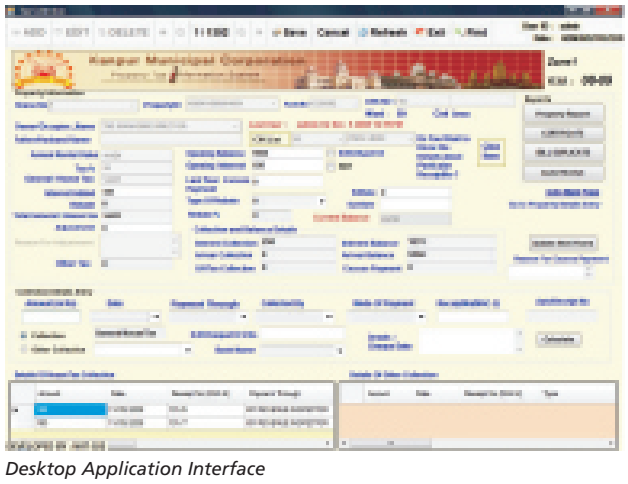
GIS data representation on WEB

Customized WEB-GIS interface

places, etc. Details of Kanpur Nagar Nigam will also be available on the website with KNN History, Organizational Structure, Contact Details, etc.

Desktop Application

A desktop application also was developed as part of the project, providing a GIS interface to perform conditional queries on database such as 'Tax collected by Zone' or 'Tax collected in a financial year for a selected ward', etc. The database is linked to spatial layers to display results of analysis and queries on GIS maps. The application also enables the KNN staff to calculate tax based on digitized areas taking into account the Unit Area Method and generate various kinds of reports required in the day to day operations of KNN. Primary focus of the application was to provide a server based Geographical Information System with key spatial layers and links to the relevant textual / Graphical information available in the database.



Desktop Application Interface

System Architecture

KNN application uses the three-tier architecture based on ESRI technology. An ArcSDE service conveys spatial data between Geographic Information System (GIS) applications and a database. The system architecture uses database management systems (RDBMSs) SQL Server with ArcSDE. It will be a registered collection of ArcGIS feature classes. The application that can connect to and access spatial data from an ArcSDE service will be automatically designed in the application. The solution component for KNN application development and deployment follows three-tiered system architecture as given below:

Presentation Tier or Client Tier where the users access the KNN application through internet browser

Application Tier where the KNN application business logic resides

Data Tier where the KNN application databases reside

Lessons Learnt

The KNN Municipal GIS is currently in operation and has been a success story for the first time where the e-governance is GIS enabled and the forms a Spatial decision support system in a local government. The system has resulted in enhancing the property based tax revenues drastically as compared to the system that existed prior to the introduction of the GIS based application. The other positive fallouts of this endeavour have been:

1. *Transparency in governance*
2. *Reduction in delays in government processing of grievances*
3. *Online tax payment and status verification facility removes intermediary agents facilitating the same.*
4. *Better revenues for investments into civic facilities*

KNN project was an eye opener for some of the key aspects to be considered while doing a property mapping project.

- Importance of finalization of different administrative boundaries and overlaying the same on top the geo-referenced data sets.
- Importance of Cleaning / standardization / normalization of existing property details (assessment list).
- Importance of standardization of locality / Mohalla name etc for better electronic implementation.

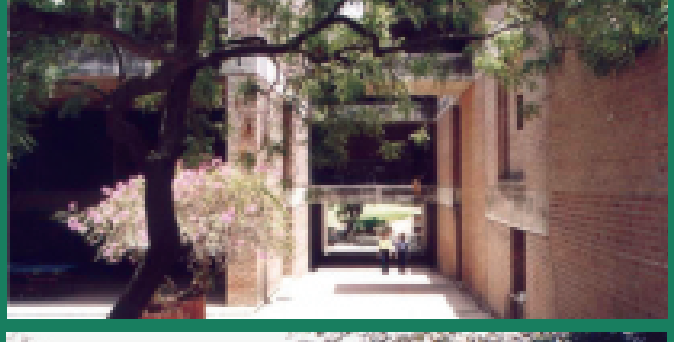
About CEPT University

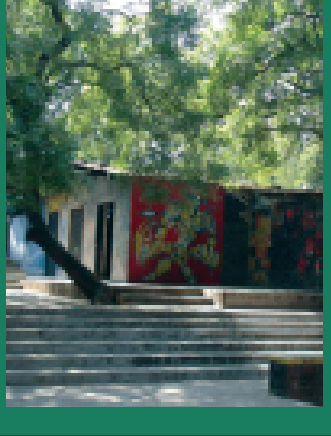
CEPT University is a leading institution offering undergraduate, postgraduate and Doctoral programme in the areas of developed and natural environment for the human society and related disciplines.

The Graduate School was established to further CEPT University's emphasis on a wholistic approach to built environment. It aims to facilitate interdisciplinary collaboration by working towards a lateral integration. Presently sixteen programmes are being offered and they share, common resources including faculty, electives, collaborative studios and joint research and consultancy.

Masters in Geomatics at CEPT University, Ahmedabad

Prof. Anjana Vyas, Course Director





Introduction

Remote Sensing was introduced as a subject in the School of Planning in the year 1988.During the year 1998, 'Remote Sensing and GIS' subject was introduced in various Schools of the CEPT University, namely, Landscape Architecture, Urban Design, Construction, Planning and Management at Post-graduate level and School of Architecture, School of Building Science and Technology at under-graduate level. The feedback from students is highly encouraging and rewarding. The students are able to apply this knowledge in their projects and dissertation work.

CEPT has established laboratories for the analysis of Remote Sensing data using GIS, GPS and digital image processing technology. The facilities are used by the students for training, hands on exercises and project work. In addition to the above, these facilities are being utilized by Government Departments, Private Organizations, Corporate Sectors, NGOs, individuals and researchers.

Masters of Geomatics

CEPT University is pioneer in introducing a Masters level course in Geomatics in the State of Gujarat in the year 2006. The course is intended to produce professionals who are capable of using the geomatics technology for the economic, social and physical development of the country at micro and macro level and to fulfill the need for a continuing education in line with the CEPT University's philosophy of 'Knowledge and Science together'.

The students are from the various parts of the country. They are from Madhya Pradesh, Manipur, Tamil Nadu, Maharashtra, Gujarat and other states.

Aim

The purpose of this course in Geomatics is building capacity through educating and training to the students and professionals in the field of remote sensing, geographical information system, data base management system, global positioning system, computer programming languages, operating system, and quantitative research methods.

Mission

To create a Centre for Excellence in Geomatics through education, training and research.

Programme

Masters Programmes can be carried out either on a full time or on a part time basis with a duration of two years and three years respectively.

Eligibility

Minimum qualification with minimum 50% (SC/ST 45%) required for the admission in Master of Geomatics is a Bachelor Degree (or equivalent) in Science, Geography, Geology, and Computer Applications from a recognized University/ Institution. However, Bachelor of Architecture, Engineering, Planning and Information Technology may also apply.

Sponsored Candidates

A provision is made to admit a limited number of candidates in this programme who are sponsored by organizations/ industries.

Graduate Placement

The CEPT University has an excellent track record to place its graduates in government, non-government, and private organizations.

Admissions

Details of admission and application form can be downloaded from the websites www.cept.ac.in, www.geomaticsindia.com or CEPT University office at Ahmedabad from 6th April 2009. Completed application form along with requisite D. D. should be submitted on or before 30th June 2009. The date for admission test is scheduled on Monday, 6th July, 2009 at CEPT University, Ahmedabad.

Development of a city and disappearing urban water bodies: A case from Palakkad city of Kerala, India

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Technical Case Study

Introduction

Geographic information system (GIS) and Remote Sensing (RS) are serving as the best tools to study Spatio temporal changes in a landscape. Due to the population explosion coupled with the globalization, rising purchase power of the public most of the Indian cities are emerging in to complex physical and socio-economic system moving in the path intricate development and spread that can be an attribute of the 'urban sprawl'. The city insidiously gnaws into its vicinity subsuming the rural and natural landscape in the process. The growth in infrastructure development triggered by global exchanges of various natures played crucial role in the hasty growth of Indian cities. In the population a 3% annual urban growth is reported from in Indian cities (Sudhira and Ramachandran 2003). In India the unprecedented population growth coupled with unplanned developmental activities has led to urbanization devastating many natural areas especially wetlands. Given that wetlands and river courses were the pioneer sites of human settlements and cradles of civilization all over the world, they were among the foremost natural systems that faced the ensuing pressures of development.

Among the various ecosystems of the world, wetlands are the most threatened ones (Turner1991). Urban wetlands of the world are under going constant degradation due to different levels of anthropogenic activities like encroachment and so called 'reclamation' that in fact is the destruction and depletion of several invaluable ecosystem services that we derive from those systems. The hydrological realms of the wetlands are vulnerably affected by inflow of domestic sewage, pesticides, fertilizers and industrial effluents. Over fishing, boating, aquatic weeds and eutrophication, disturbances from excessive recreational activities and tourism, diversion of water for irrigation, domestic use or industrial uses are also among the major threats to these natural ecosystems (Verma 2001). Over all, social prejudice, perhaps for the ignorance about their values, of wetlands as 'wastelands' apparently accelerate the pace of transformation either in to built up area or diversion to other uses of short term economic returns.

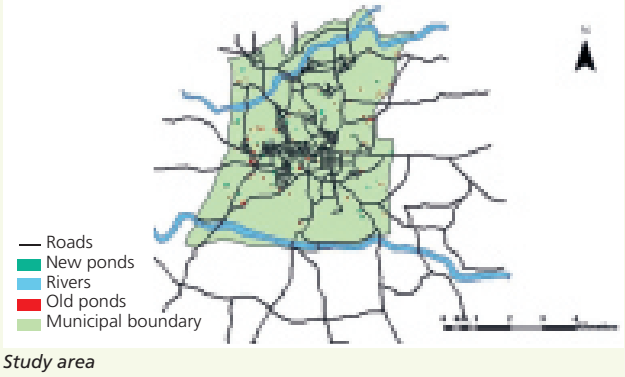
Compared to other Indian states, the state of Kerala is bestowed with huge proportion of wetland area. Its geography, the unique location in the lap of Western Ghats, and the topography with undulating terrain with a wide range of altitude (from below mean sea level to 2,694 meters above mean sea level) provides the state this unique setup. Both the monsoons providing more than six months extended rainy season also ensure a vast wetland stretch in the state. From time immemorial, the state was provided with numerous water bodies and artisan ponds which played a crucial role in the culture and traditions of the state and in the traditional system of agriculture especially in the drier months. These water bodies, although originally held under private ownerships by the feudal lords, were regarded as community based water storage tanks and served the community very well round the year, particularly during the summer months. These water storages or wetlands also served in sustaining the natural biota of the area, of course offering several other ecological goods and services unwittingly utilized by humankind.

Human settlement in Kerala is distributed in a very unique manner. There are no clear cut demarcated villages, except in later year's revenue records and documents, in the state. The habitations are more or less randomly and uniformly distributed through out the state especially in the coastal low lands. The consequent city development also has the reflection of the pattern to a large extend. The urbanization in a large part of the state during the 19th and 20th centauries was a result of confluence of several micro urban centers; points of traditional meetings and trades. Subsequently the earlier urban centers of the state Kochi, Thiruvananthapuram and Kozhikode have gained well-defined characteristics of cities and manifest distinctive urban features. The urban growth in the recent years is being in other locations in the state, such as Kollam, Trissur, Alappuzha and Palakkad. Presumably, the state's unique infrastructure and demographic features would have a direct influence on these developments. The demography of the state, especially in death rate and birth rate, apparently follow a trend similar to some developed countries (www.planningcommission.nic.in). The state occupies first position in Human development index, literacy rate (90.9%) and sex ratio (1058 female: 1000 male, www.ibef.org). The population density of the state is 819 persons per Km^2. The road density is 374.9 km/ 100 Km2, far ahead of the national average of 74.9 Km/100 Km^2. Length of road per one lakh population is also much higher than the national average (462.6 km against 259.2 km, www.planningboardkerala.nic). 25% of the total population of the state is urban. Above all Kerala is one of the states in India having very high remittance rate (about Rs. 24000 crore / year) from abroad (Zachariah et al., 2000; Kannan & Hari, 2002).

The urban development of the Palakkad city is highly manifested by consumption of rice paddies and ponds. Earlier the area was known for its huge paddy fields and bumper yields. Even during the dry months of a year using artisan ponds the agriculture was in full swing. During the last couple of years Palakkad region is facing severe drought and dearth water (CWRDM, 2004). The decrement in the annual rain fall, and the total rainy days in the region may be a prime reason for the prevailing drought (Raj and Azeez 2008a, Raj and Azeez, 2009a). Disappearing traditional water harvesting methods such as Artisan ponds by the physical pressures from development also worsen the dearth in water in Palakkad region. In this context, the present study attempts to explore the temporal changes that have happened in the traditional artisan ponds in the Palakkad city.

Study area

The Palakkad city, located between76° 37'-76° 40'E and 10° 44'-10° 48'N, is one among the 53 municipal areas of Kerala state and its municipal limits spreads to an area of 26.60 Km^2 (see map). Being a first grade municipality it is the biggest among the 4 municipal cities of Palakkad administrative district. The city is located in the plains (84 m above sea level) at the western opening of the Palakkad gap in Western Ghats. The city is well connected by road net works and railways. The total length of the road falling in the municipal



Study area

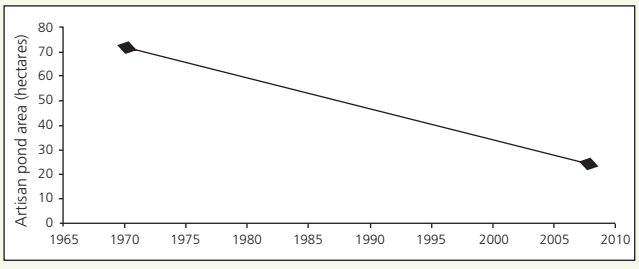


Fig.1. Temporal variation in artisan pond area Palakkad city

area is 268Km. According to national level of classification based on population, the Palakkad municipality fall under class 1 city (Census of India, 1991). The area has more or less pleasant weather through out the year; the temperature ranging from 20˚C to 45˚ C. The summer season extends from March till June. Average annual rainfall of the area is approximately 2159 mm. The southwest monsoon commences here in June and continues up to September, while northeast monsoon reaches here towards November (Government of Kerala, 2006). However, the Palakkad area is experiencing notable changes in the annual rainfall pattern (Raj and Azeez 2009a).

Methodology

We examined the distribution of artisan ponds / wetlands in Palakkad municipality (10°46'2.43"N, 76°38'54.49"E) using ESRI software ArcGis 9.3. The Survey of India Toposheets (1:50,000 scale, 58 B/9 and 58 B/10, 1970) and cadastral maps from concerned government departments were used to delineate the municipal boundaries. The wetlands /ponds present inside the municipal area were digitized and compared with the respective Google earth imagery (GoogleEarth2008). Ground truth data collection and field verification was carried out randomly in the area to strengthen the location accuracy.. The results thus obtained were inspected in view of built up area expansion as well as the decadal population data of the city.

Result and Discussion

The analysis shows a gradual decrease in the total area of water bodies in the city (Fig.1). 9A significant trend was observed between the area under water bodies in the city with the decadal population as well as the building density (Fig 2. & Fig.3). This decrements may highly associate with the urban development of the city as well as the demographical changes (Boarnet & Haughwout, 2000; Yu, 2002).

The average building density of Palakkad city was 0.50 hectare per hectare during 1970 to 2008 (Raj and Azeez 2008b). The decadal population growth of Palakkad municipality shows a trend of increase with an average annual increment of 833 persons. Compared to the average annual urban growth rate of the whole district (4.81%), the growth rate in the city is almost double of that (9.63 %). During the study period the number of artisan ponds fell from 65 to 32 during the same period. This reduction in number as well as in area may possibly due to draining, filling and conversion. In the recent few couple of years Palakkad city has become a salubrious destination for NRIs and NRKs to building residences.

Conversion of wetlands and other low lying lands for real estate venture is common all over Kerala. The neo-rich utilitarian attitude of the people, reallocated most of the state's wetlands in to dry built up areas. Most of the wetlands in the state were rice-cultivating areas as is the case of Kole, Pokkali or Kuttanad. Nevertheless, due to low economic returns from agriculture fueled with the pressure from booming real estate business ventures most of wetlands rapidly disappear (Raj and Azeez 2009b).

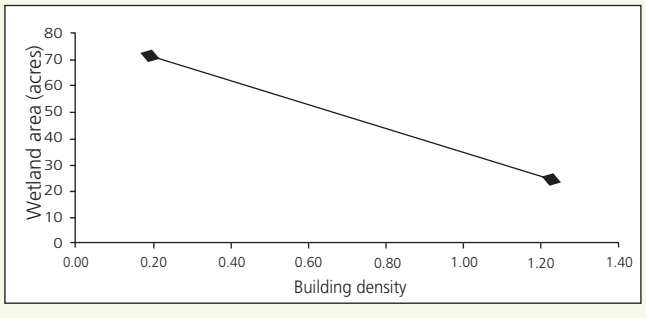


Fig.2. Variation in pond areas and building density

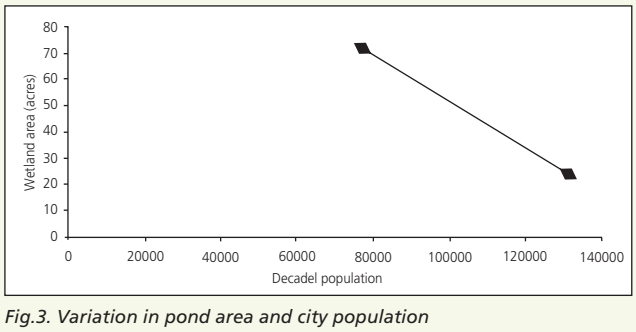


Fig.3. Variation in pond area and city population

Conclusion

The present study documents the fall in ponds in a developing city. Artisan ponds and water bodies have crucial importance in Kerala's socio-economy, culture and traditions. However the values and services of these ancient structures are largely neglected and most of them are being filled and converted to dry lands and built up areas. In Palakkad city the number and size of the water bodies are found decreasing rapidly during the last few decades. Conservation of these structures may prevent to an extend the frequent droughts and water scarcity in the area, as they help as effective water harvesting structure in the context of changing rainfall pattern in the area.

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ArcGIS 9.3: Useful Functionalities & Handy Tips

Whether you have developed a .NET Web ADF application from Manager or built it from scratch in Visual Studio, there are several options for improving the performance.

Cache your map services

By caching your map services, you will reduce the time that it takes for your map to draw. When ever possible, try to cache all of the services in your application and not combine cached and un-cached services. At 9.3, the display of maps where dynamic and cached services are combined together has been optimized dramatically.

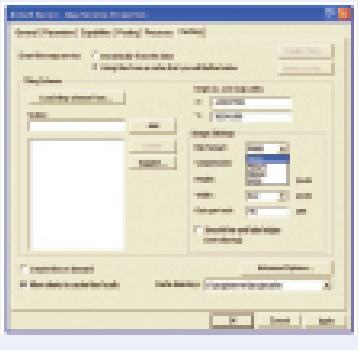
Evaluate the image format of your map cache

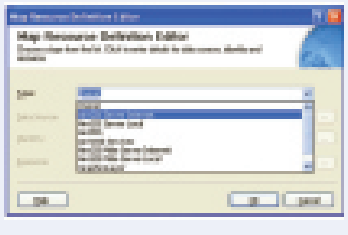
The default image format for the caching tools at 9.2 is PNG24. Using a different image format, such as PNG8 or JPEG, can result in smaller image file sizes and will result in a faster display of images in the Map control. Note that at version 9.3, the default cache format is now PNG8.

Avoid using Internet Explorer 6 when the web application contains multiple cached services in PNG24 format Internet Explorer 6 has limitations in its ability to display transparency for PNG24 images. The Web ADF includes code that works around this limitation, but there is a performance penalty incurred when this scenario is encountered. Avoid this scenario by:

A) Using Internet Explorer 7 or Firefox 2 when viewing blended map services cached in PNG24 format.

B) Caching your map services in PNG8, PNG32 or JPEG format if Internet Explorer 6 must be used



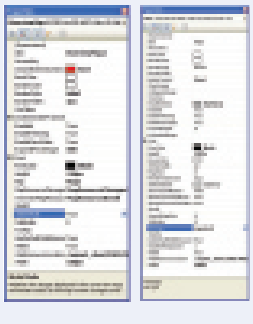


Use ArcGIS Server Internet connections when possible

Connect to your server using ArcGIS Server Internet connections to make more efficient use of server context requests. ArcGIS Server Local connections should be used only when the application requires working with ArcObjects on the server. This includes making stateful changes to the service and utilizing functionality that is only available in ArcObjects.

Use the new StaticMode property on the OverviewMap

The OverviewMap was enhanced at 9.2 Service Pack 5 to include a new StaticMode property. By setting StaticMode to True, the image in the OverviewMap will not change when the Map extent changes. Previously, a new image was generated for the OverviewMap every time the Map extent changed.



Optimize the TOC control

9.2 Service Pack 3 resolved a significant performance problem with the TOC control. This problem was particularly noticeable when using map services with a significant number of layers, group layers and layers with scale dependency applied.

The TOC control has several options that will allow the application developer to reduce the amount of information requested from the server.

TOCType

The default setting of 'SwatchList' will generate a TOC listing both the layer names and the symbology within each layer. Changing this setting to 'LayerList' will reduce the amount of information requested from the sever by only displaying the layer names and not the symbology.

RenderOnDemand

When a TOC is configure to display symbology, setting this property to True will delay the requesting of swatch information until a layer is expanded. This will help improve the initial startup time of the application.

ExpandDepth

Use an ExpandDepth value of 0 or 1 to minimize the number of nested layers visible when the TOC is displayed at initial application startup. Consider setting the Visible property on some of your MapResourceItems to False. This will result in the application will load quicker but the web page user will need to turn on the layers manually.

Eliminate web controls from your application that are not absolutely necessary

The default Web Mapping Application that comes with Manager and Visual Studio includes web controls such as the Table of Contents (TOC), OverviewMap and Scalebar. As you interact with your application, these controls request new images and updated status information. Eliminating controls from the application that are rarely used will help improve the application performance and scalability of the system.

Deploy production applications without debug

Web ADF controls emit JavaScript require for use by ADF controls. When deploying an application in a production environment, remove the debug option (from the web.config) to ensure the compressed version of the Web ADF JavaScript files are streamed to the client. This will reduce the amount of time upon initial load of the application.

Use HTTP Compression

IIS provides the ability to compress resources (ie. JavaScript) streamed to the client browser at runtime. Compression will reduce the amount of information that needs to be provided to the client (usually upon initial load).

Disable mime data

By default, non-cached map resources in the Web ADF generate mime images which are streamed to the browser for blending. To reduce the amount of information which must be processed directly by the ADF, disable use of mime data on the resource ("Request MIME data" in the map resource display settings editor dialog). The url to the map image generated by a map service must be available in a public virtual directory. During a map draw operation at runtime, the browser will be provided with the url to the map image instead of the image mime data. The browser will retrieve the image via the url instead reading and rendering the mime stream. Note, variable transparency applied to the map resource will not be applied in this scenario. Background transparency will be respected if the image type generated by the map service supports it (e.g. png).

Define the data frame name for ArcGIS Server services

The resource definition for an ArcGIS Server resource includes the data frame and map service name. If the data frame name is "(default)", the ADF application must request the default data frame name from the map service when the resource is initialized (possibly every request). Explicitly set the data frame name to avoid this extra request.

Use the ArcGIS Server LayerDescription to improve query response time

Each ArcGIS Server map resource in the ADF has a MapDescription which maintains a list of layer descriptions as a LayerDescription array, MapDescription and LayerDescription are types defined by ArcGIS Server SOAP API.

A LayerDescription describes the contents of a layer in a map service. When querying layers in an ArcGIS Server map service using ADF types (e.g. IQueryFunctionality) the ArcGIS Server SOAP API is used. As a result, modifications to the SOAP types associated with an ArcGIS Server map resource can modify query results. In many cases, returning geometry from a query is necessary to render features in a map as a selection or subset. The level of detail in geometry returned (i.e. number of vertices) will directly affect the amount of time it takes to return a result. By default, geometry as stored in full detail will be returned. If full detail is not necessary, you can generalize geometry returned from a query using GeometryResultOptions object associated with a LayerDescription. Generalizing geometry will reduce the amount of time it takes for a query to return a result.

GeometryResultOptions defines two properties of interest in this case: GeneralizeGeometry and MaximumAllowableOffset. Set Generalize Geometry to true and define a Maximum Allowable Offset in map units. The MaximumAllowableOffset defines the limit of how far the output geometry can be from the input geometry. The greater the value, the more generalized the geometry. Note, since the MapDescription for an ArcGIS Server map resource is stored in state, when you change this value it is maintained for the duration of the session. To reset or disable, manually modify the properties or set GeneralizeGeometry to false. The following code block provides an example of how to set these properties using an ArcGIS Server MapFunctionality and SOAP API LayerDescription in the Web ADF. After setting these values for a LayerDescription, return geometry from a call to the ADF QueryFunctionality.Query method. The ADF geometries in the results (ADF FeatureGraphicsLayer) will be generalized.

[C#]

```
ESRI.ArcGIS.ADF.Web.DataSources.ArcGISServer.MapFunctionality agsMapFunctionality =
        (ESRI.ArcGIS.ADF.Web.DataSources.ArcGISServer.MapFunctionality)mapFunctionality;
ESRI.ArcGIS.ADF.ArcGISServer. LayerDescription[] layerDescriptions =
        AgsMapFunctionality.MapDescription.LayerDescriptions;
        ESRI.ArcGIS.ADF.ArcGISServer. LayerDescription activeLayerDescription =
        ESRI.ArcGIS.ADF.Web.DataSources.ArcGISServer.MapFunctionality.GetLayerDescription(
        activeLayerIDInt, layerDescriptions);
        ActiveLayerDescription.LayerResultOptions.GeometryResultOptions.GeneralizeGeometries = true;
        ActiveLayerDescription.LayerResultOptions.GeometryResultOptions.MaximumAllowableOffset = 10000;
```

Skip creating child controls in a custom control

When creating custom server controls for use with the Web ADF, such as Web tasks, the control often contains a collection of child controls, such as buttons, textboxes, tables, etc. Each request to the page iterates through page and control lifecycle which includes creating every control and it's child controls. If a request is not processed by your custom server control, you can skip creating child controls. The easiest way to do this is add some conditional logic to the custom server control's CreateChildControls method (usually the location where child controls are created and added to the parent's control collection). Two scenarios are presented below. Both use a utility class, AsyncOptimizer, to determine the caller in an async request and determine if CreateChildControls in the custom control should continue. The AsyncOptimizer class is included in an SDK sample Common CustomTasks, in the OptimizeTask control.

Scenario 1: Simple custom task with no child controls that generate async calls

[C#]

```
protected override void CreateChildControls()
{
 base.CreateChildControls();
 #region Do not create child controls in an async call if this control is not participating in the call
  AsyncOptimizer asyncOptimizer = new AsyncOptimizer(this);
 if (!asyncOptimizer.RequiresChildControls)
        return;
  #endregion
```

Scenario 2: Full-featured custom task with child controls and tools that generate async calls

[C#]

```
protected override void CreateChildControls()
{
 base.CreateChildControls();
  #region Do not create child controls in an asyn call if this control is not participating in the call
 AsyncOptimizer asyncOptimizer = new AsyncOptimizer(this);
 if (!asyncOptimizer.RequiresChildControls)
        Return;
 #endregion
 #region Create Child Controls
```

ArcGIS 9.3: Useful Functionalities & Handy Tips

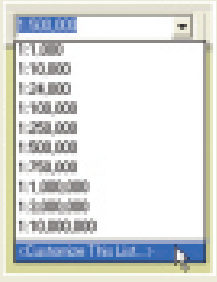
Tips and best practices for map caches

The tips below can help you achieve the best appearance and performance for your map caches. The tips are arranged in the following categories:

- Preparing the map document
- Creating the cache
- Maintaining the cache

Preparing the map document

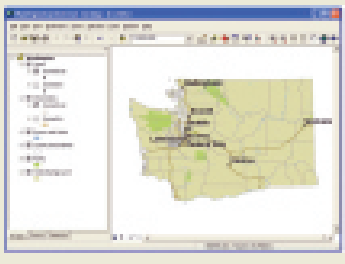
- Do not include spaces or non-alphanumeric characters in data frame names. When the data frame names are included in URLs, some Web servers may have difficulty interpreting spaces or special characters.
- If possible, choose the scales you want to cache before you start designing the map. Work at those scales as you create the map in ArcMap. For quick reference, you can manually load those scales into the drop-down list of scales in ArcMap.
- Before caching your map, do a visual check of the source map document at each scale that you plan to cache. Make sure that the appropriate layers appear with effective symbology and labeling at each scale. If you need to change the symbology of a layer based on scale, you can copy the layer and paste it back into the ArcMap table of contents. Set a scale range on each copy of the layer and symbolize appropriately for that scale range.



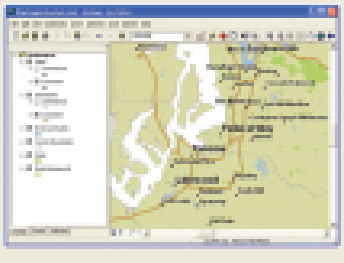
The images below show an ArcMap document that has been symbolized for viewing at two scales. The author of this map copied and pasted the Interstates and Cities layers back into the data frame, then symbolized a "Zoomed in" and "Zoomed out" version for each layer.

In the zoomed out map, the author set a definition query to limit the visible cities to those with a population of more than 50,000. Also, the author symbolized the Interstates layer with a thin line.

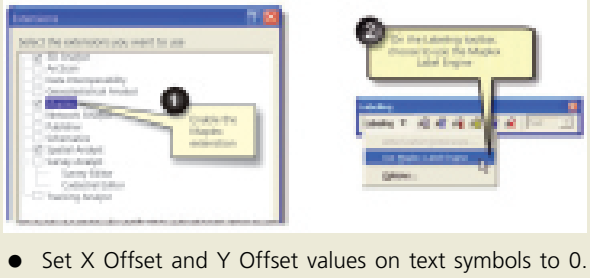
In the zoomed in map, the author removed the definition query so that all cities are visible. However, the author added label rules that symbolize larger cities with a larger font. The author also changed the Interstate symbolization to use a thicker cartographic line symbol.



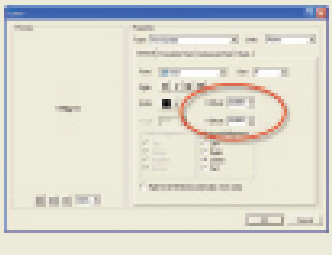
The author set scale ranges on both the "Zoomed in" and "Zoomed out" layers to ensure that only one of the layers is visible at any given scale. The Rivers and Lakes, County Boundaries, Parks, and State Background layers use the same symbol whether zoomed in or out, so the author did not create copies of these layers.



- If you're creating a map that you intend to cache at many scale levels, you will need to repeat this process, potentially creating many copies of layers in your map document. Use group layers to keep them organized.
- Use the Maplex labeling engine in your map document. This will give you the best possible label placement while caching.

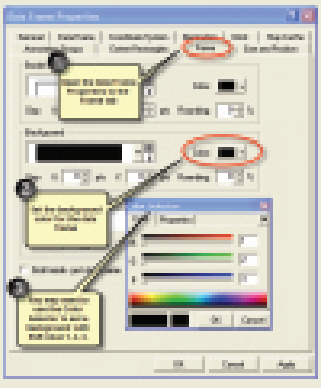


- Set X Offset and Y Offset values on text symbols to 0. Using text symbol offsets may result in periodic inadvertent label truncation. Use the label engine's offset ability instead.

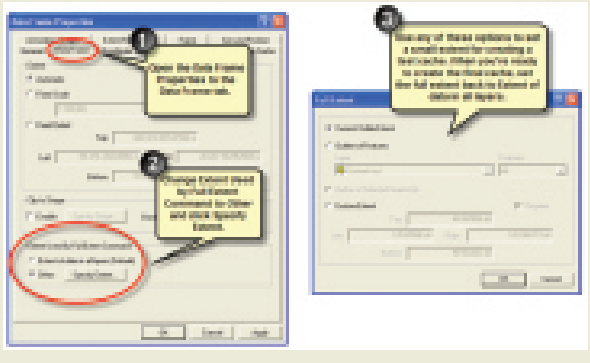


- Explicitly define a data frame background color not used elsewhere in your map (RGB 254,255,255 is a good choice). Otherwise, any symbols and text that happen to be the same as the background color may be rendered improperly when the background is interpreted as transparent in certain browsers.

  You can explicitly set the background color in ArcMap. The background will render as transparent in environments that support PNG 24 transparency.



- Before starting a large caching job, make a test cache of a small area at all scale levels. You can do this by setting a custom full extent on the source map document that covers a small geographic area. When you've created the cache for this small area, examine the tiles to make sure they look and perform the way you expect. One way to do this is to create a simple Web Mapping Application in Manager that uses the service.

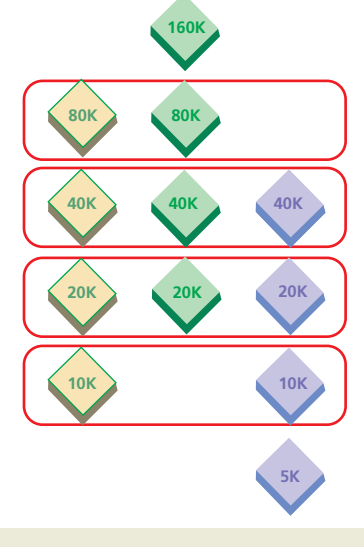


When you're satisfied with the test cache, delete it, reset the full extent to the original extent, and cache the whole map.

Creating the cache

- Use fused caches or combinations of fused caches whenever possible. If you use multilayer caches, ArcMap is the recommended client application.
- Make sure you've created enough scales. Web application users can only see the map at the scales you cache.

  ArcMap users see resampled cache tiles when they are in between scales. Caching too few scales causes more resampling and possible distortion of features.
- Choose your closest scale level carefully. Your closest (largest) scale is the one that will take the longest time to cache and the most storage space. It should be zoomed in just as far as you need without getting any closer.
- Try to use the same tiling scheme for all caches created in your organization. If you'll be bringing cached services



into your Web applications from another organization or department, you may want to match their tiling scheme, or agree on one that you can both share.

- When creating caches that will overlay each other in a Web application, use the same tiling scheme if possible. It's not required that you create all the caches at all the same scale levels. However, you should match as many scales as possible.

  In the image below, three caches with different scale ranges share the same scales where possible. Shared scales are circled in red:

- When creating cache tiles, use the "Update specific areas using a feature class" option to avoid creating tiles for areas that you don't need. It may be useful to create a new feature class that specifically outlines the areas that you want to precreate. You can use this feature class whenever you create or update your cache.
- Avoid using on-demand caching to build your entire cache. A good practice is to precreate tiles for areas that you anticipate will be frequently visited and use on-demand caching only for areas that will be visited rarely.

Image format

Although you should try to match tiling schemes when building your caches, you do not need to match image format. After importing a tiling scheme file, you can change the image format before you create the cache. Use these guidelines to choose the appropriate image type for each individual cache:

- Use JPEG format for raster-based basemaps with a lot of color variation, such as imagery.
- Use JPEG or PNG formats for vector-based basemaps such as street maps. Maps with just a few simple colors should use PNG.
- Use PNG for overlay services, such as boundaries, road networks, or any features that require background transparency.
- Avoid using PNG 8 if your map has more than 256 colors.
- Avoid using PNG 24 if your tiles will be viewed in Internet Explorer 6.

Maintaining the cache

- If your source data tends to change, you can use a Python script to automatically run the Manage Map Server Cache Tiles geoprocessing tool on a regular basis. This tool can update all or selected areas of your cache.
- If you have very large caches and you need to run the GIS Server Post Install, be aware that it may take the postinstall a long time to apply the necessary permissions to every file in the cache. See ESRI Knowledge Base Article 32766 for a way to work around this. Applying a service pack is an example of a situation where you would need to run the GIS Server Post Install.
- After the cache is created, if you don't want to continue storing all of the source data on your server, you can remove some of the layers from the source map document. Leave at least one layer in the map document (a suggestion is a simple feature class with one feature covering the map extent), and leave the map document in the coordinate system used to create the cache. After you restart the service, you can safely remove the source data off the server for any layers you removed. As long as the service name and the cache name stay the same, users will continue to see the cache when they view the service.

Keep in mind that if you use this technique, users will not get any meaningful results when they query the service. If you want to maintain some queryable layers, you should leave them in the map document and leave the source data for those layers on the server

Creating Hyperlinks in ArcMap

Providing immediate access to information held in other types of files

In ArcMap, you can provide immediate access to additional information contained in other types of files -Web pages, images, or documents in Adobe PDF or other formats - that relate to a map feature simply by creating hyperlinks.

Hyperlinks come in two flavours: field based and dynamic. The number of hyperlinks in the document and what they will do determine which method you choose.

Field-based hyperlinks are familiar to longtime users of ESRI GIS software:

- Create a text field in the attribute table of the features to be hyperlinked
- Enter the target for the hyperlink in that field. A target can be the path to a file, a URL, or a macro that creates customised hyperlink behaviour
- The path to the target can be relative or absolute. See the topic "Adding hyperlinks to features" in ArcGIS Desktop 9.3 Help for information on setting relative paths
- Access field-based hyperlinks using the Hyperlink tool

Dynamic hyperlinks do not support macro targets and shouldn't be used if a map will have many hyperlinks, as that adversely affects performance. However, dynamic hyperlinks are very easy to implement and can manage multiple hyperlinks for the same feature.

To set a dynamic hyperlink for a feature:

- Click on that feature with the Identify tool
- Right-click the feature name in the Identify dialog box and choose Add hyperlink from the context menu
- Specify the desired type of hyperlink target. To hyperlink to a Web page, click Link to a URL and type the URL. To link to a PDF, Microsoft Word, or other document, click Link to a Document and type a path to the document or browse to its location. For dynamic hyperlinks, relative paths are supported for map layers but not for .lyr files.
- Access dynamic hyperlinks by clicking the feature with the Identify tool, right-clicking to access the context menu, and choosing Hyperlinks.

With ArcGIS 9.3, a parameter can be set to control how a hyperlinked document is opened by specifying the page that will be opened. For example, c:\temp\PopulationData.pdf ?/A "Page=5=OpenActions" would open the PopulationData.pdf document at page 5. ArcGIS uses a question mark (?) as a special delimiter to separate the file path from the parameter. In this case, c:\Program Files\Adobe Reader 8.0\Reader\AcroRd32.3exe. is the location of the software, /A "Page=5=OpenActions" is the open parameter, and c:\temp\PopulationData.pdf is the location of the file.

Note that the parameters are specific to the software for each type of document (e.g., Adobe Reader, Microsoft Word), so documentation for that software should be consulted for the syntax for opening a document.

Function Name: CreateTextAnnotation
Environment: Windows
Version: ASP.NET, ArcIMS 9.2 (Web ADF)
Description:
This function shows creation of graphic layer and text annotation of Ground Water Wells. Selecting and Highlighting Wells and showing its Water Level in a specified color range (From Light Blue to Dark Red) as a Text Element on the Map.
The Water Level Information is shown from the non spatial data.

```
Imports ESRI.ArcGIS.ADF.Web
Imports ESRI.ArcGIS.ADF.Web.UI.WebControls
Imports ESRI.ArcGIS.ADF.Web.DataSources
Imports ESRI.ArcGIS.ADF.Web.DataSources.IMS
Imports ESRI.ArcGIS.ADF.IMS.Carto
Imports ESRI.ArcGIS.ADF.IMS.Carto.Layer
Imports ESRI.ArcGIS.ADF.IMS.Display
Imports ESRI.ArcGIS.ADF.IMS.Display.Symbol
Imports ESRI.ArcGIS.ADF.IMS.Display.Renderer
Imports
ESRI.ArcGIS.ADF.IMS.Display.AcetateElement
```

Code Snippet:

```
Public Sub CreateTextAnnotation(ByVal layerName As
String, ByVal tableName As String, ByVal GEMSInfo
As String, ByVal FromDate As String, ByVal ToDate
As String)
' Declare variables
Dim dbConnection As New Connection
Dim sqlQuery As String = ""
Dim ConnectionString As String
Dim tableAreaWells As DataTable
tableAreaWells = Session("tableArea")
Dim txtFromDate As String = FromDate
Dim txtToDate As String = ToDate
Dim wellsCount As Integer = 0
Dim DBDataSet As Data.DataSet = New
Data.DataSet()
Dim FinalDBDataSet As Data.DataSet = New
Data.DataSet()
Dim wellSiteID As String = ""
Dim resourceIndex As Integer =
GetResourceIndex()
Dim IMapFunctionality As
ESRI.ArcGIS.ADF.Web.DataSources.IMapFunctionalit
y = CType(Map1.GetFunctionality(resourceIndex),
ESRI.ArcGIS.ADF.Web.DataSources.IMapFunctionalit
y)
Dim MapFunctionality As
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapFunctiona
lity = CType(IMapFunctionality,
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapFunctiona
lity)
Dim MapResource As
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapResource
= CType(MapFunctionality.Resource,
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapResource)
Dim mapResourceLocal As
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapResource
= CType(MapFunctionality.Resource,
ESRI.ArcGIS.ADF.Web.DataSources.IMS.MapResource)
Dim mapDescription As
ESRI.ArcGIS.ADF.IMS.Carto.MapView
Dim layerIndex As Integer = 0
Dim lNames As String() = Nothing
Dim lIds As String() = Nothing
Dim Count, lyrCount As Integer
Dim varInt As Integer = 0
Dim varString As String = Nothing
Dim layerCnt, totalNoofLyr, selectedlyrCount,
rowCount, ColumnId, welllidcount As Integer
Dim lyrNameGEMS, listofSelectionLyrname(),
tempLyrName, newsqlQuery As String
Dim FeatureLayer As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.FeatureLayer =
mapDescription.Layers.FindByName(layerName)
Dim filter As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.Filter = New
ESRI.ArcGIS.ADF.IMS.Carto.Layer.Filter
Dim mapView As ESRI.ArcGIS.ADF.IMS.Carto.MapView
= MapFunctionality.MapView
Dim envelop As New
ESRI.ArcGIS.ADF.IMS.Geometry.Envelope
Dim wellid As String = ""
Dim waterlevel As Double = 0
Dim highlightLayer As
ESRI.ArcGIS.ADF.IMS.Display.Renderer.SimpleRende
rer = New
ESRI.ArcGIS.ADF.IMS.Display.Renderer.SimpleRende
rer()
Dim FeatureSymbol As
ESRI.ArcGIS.ADF.IMS.Display.Symbol.FeatureSymbol
= Nothing
Dim wellidnonspatial As String = ""
Dim filternew As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.Filter = New
ESRI.ArcGIS.ADF.IMS.Carto.Layer.Filter
Dim selection As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.FeatureLayer
Try
' Pass the query for retrieving the resultant
GEMS Wells (Water Level Info) table
For wellsCount = 0 To tableAreaWells.Rows.Count
- 1
If sqlQuery = "" Then
sqlQuery = "SELECT Distinct WLS_WELL_ID,
WLS_DATE, WLS_WTR_LEVEL FROM " & tableName & "
where WLS_WELL_ID='" &
tableAreaWells.Rows(wellsCount).Item("CGWB.GWDAT
ABASE.ID_SITE_ID") & "' and (WLS_DATE between
to_date('" & txtFromDate & "','mm/dd/yyyy') and
to_date('" & txtToDate & "','mm/dd/yyyy'))"
Else
sqlQuery = sqlQuery & " OR " & "WLS_WELL_ID='" &
tableAreaWells.Rows(wellsCount).Item("CGWB.GWDAT
ABASE.ID_SITE_ID") & "' and (WLS_DATE between
to_date('" & txtFromDate & "','mm/dd/yyyy') and
to_date('" & txtToDate & "','mm/dd/yyyy'))"
End If
Next
ConnectionString =
System.Configuration.ConfigurationManager.AppSet
tings("oracleconnection")
If dbConnection.GetConnection(ConnectionString)
= True Then
Dim DBAdapter As Data.OleDb.OleDbDataAdapter =
New Data.OleDb.OleDbDataAdapter(sqlQuery,
ConnectionString)
DBAdapter.Fill(DBDataSet, tableName)
dbConnection.CloseConnection()
End If
If DBDataSet.Tables(0).Rows.Count = 0 Then
Map1.CallbackResults.Add(New
CallbackResult(m_map, "JavaScript", "alert('No
Records Found.');"))
Else
For rowCount = 0 To
DBDataSet.Tables(0).Rows.Count - 1
If wellSiteID = "" Then
wellSiteID = "CGWB.GWDATABASE.ID_SITE_ID='" &
DBDataSet.Tables(0).Rows(rowCount).Item(0) & "'"
Else
wellSiteID = wellSiteID & " OR " &
"CGWB.GWDATABASE.ID_SITE_ID='" &
DBDataSet.Tables(0).Rows(rowCount).Item(0) & "'"
End If
Next
mapDescription = MapFunctionality.MapView
Dim layerDescs As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.LayerCollection
= mapDescription.Layers
' Getting the GEMS Wells Layer and making it
visible
IMapFunctionality.GetLayers(lIds, lNames)
For lyrCount = 0 To lNames.Length - 1
If lNames(lyrCount) = layerName Then
varInt = lyrCount
varString = lNames(lyrCount)
Count = lyrCount
Exit For
End If
Next
layerDescs.FindByName(layerName).Visible = True
mapDescription.Layers.FindByName(layerName).Visi
ble = True
totalNoofLyr = mapDescription.Layers.Count
tempLyrName = ""
For layerCnt = 0 To totalNoofLyr - 1
lyrNameGEMS =
mapDescription.Layers(layerCnt).Name
```

```
If lyrNameGEMS.StartsWith("selection for ") Then
tempLyrName = tempLyrName & lyrNameGEMS
If Not layerCnt = totalNoofLyr - 1 Then
tempLyrName = tempLyrName & ","
End If
End If
Next
listofSelectionLyrname = tempLyrName.Split(",")
For selectedlyrCount = 0 To
listofSelectionLyrname.Length - 1
Dim ActeateLayer As AcetateLayer =
CType(mapDescription.Layers.FindByName(""),
AcetateLayer)
If Not ActeateLayer Is Nothing Then
mapDescription.Layers.Remove(ActeateLayer)
End If
Dim selectionLayer As FeatureLayer =
CType(mapDescription.Layers.FindByName(listofSel
ectionLyrname(selectedlyrCount)), FeatureLayer)
If Not selectionLayer Is Nothing Then
mapDescription.Layers.Remove(selectionLayer)
End If
Next
filter.WhereExpression = wellSiteID
Dim queryParams As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.QueryParameters
= New
ESRI.ArcGIS.ADF.IMS.Carto.Layer.QueryParameters(
filter)
queryParams.FeatureLimit = "100000"
queryParams.ReturnGlobalEnvelope = True
Dim resultstable As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.FeatureTable =
FeatureLayer.Query(queryParams)
For ColumnId = 0 To resultstable.Columns.Count - 1
If resultstable.Columns(ColumnId).ColumnName =
"CGWB.GWDATABASE.ID_SITE_ID" Then
For welllidcount = 0 To resultstable.Rows.Count - 1
If newsqlQuery = "" Then
newsqlQuery = "SELECT Distinct
WLS_WELL_ID,WLS_WTR_LEVEL FROM " & tableName & "
where WLS_WELL_ID='" &
resultstable.Rows(welllidcount).Item(resultstabl
e.Columns(ColumnId).ColumnName) & "' and
(WLS_DATE between to_date('" & txtFromDate &
"','mm/dd/yyyy') and to_date('" & txtToDate &
"','mm/dd/yyyy'))"
Else
newsqlQuery = newsqlQuery & " OR " &
"WLS_WELL_ID ='" &
resultstable.Rows(welllidcount).Item(resultstabl
e.Columns(ColumnId).ColumnName) & "' and
(WLS_DATE between to_date('" & txtFromDate &
"','mm/dd/yyyy') and to_date('" & txtToDate &
"','mm/dd/yyyy'))"
End If
Next
End If
Next
ConnectionString =
System.Configuration.ConfigurationManager.AppSet
tings("oracleconnection")
If dbConnection.GetConnection(ConnectionString)
= True Then
Dim DBAdapter As Data.OleDb.OleDbDataAdapter =
New Data.OleDb.OleDbDataAdapter(newsqlQuery,
ConnectionString)
DBAdapter.Fill(FinalDBDataSet, tableName)
dbConnection.CloseConnection()
End If
For Count = 0 To
FinalDBDataSet.Tables(0).Rows.Count - 1
If
IsDBNull(FinalDBDataSet.Tables(0).Rows(Count).It
em("WLS_WTR_LEVEL")) Then
Else
waterlevel =
FinalDBDataSet.Tables(0).Rows(Count).Item("WLS_W
TR_LEVEL")
If waterlevel <= 10.0 Then
Dim FeatureType As
ESRI.ArcGIS.ADF.IMS.FeatureType =
FeatureLayer.Type
wellidnonspatial =
FinalDBDataSet.Tables(0).Rows(Count).Item("WLS_W
ELL_ID")
filternew.WhereExpression =
"CGWB.GWDATABASE.ID_SITE_ID=" & "'" &
wellidnonspatial & "'"
Dim queryParam As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.QueryParameters
= New
ESRI.ArcGIS.ADF.IMS.Carto.Layer.QueryParameters(
filternew)
queryParam.FeatureLimit = 100000
queryParam.ReturnGlobalEnvelope = True
Dim resultstable1 As
ESRI.ArcGIS.ADF.IMS.Carto.Layer.FeatureTable =
FeatureLayer.Query(queryParam)
' Set the property for highlight layer
If FeatureType =
ESRI.ArcGIS.ADF.IMS.FeatureType.Point Then
Dim SimpleMarkerSymbol As
ESRI.ArcGIS.ADF.IMS.Display.Symbol.SimpleMarkerS
ymbol = New
ESRI.ArcGIS.ADF.IMS.Display.Symbol.SimpleMarkerS
ymbol()
SimpleMarkerSymbol.Color = Drawing.Color.Cyan
SimpleMarkerSymbol.OutlineColor =
Drawing.Color.Cyan
SimpleMarkerSymbol.ShadowColor =
Drawing.Color.Cyan
SimpleMarkerSymbol.Width = 6
SimpleMarkerSymbol.Antialiasing = True
FeatureSymbol = SimpleMarkerSymbol
envelop = resultstable1.GlobalEnvelope
End If
If Not FeatureSymbol Is Nothing Then
FeatureSymbol.Transparency = 100.0
End If
highlightLayer.Symbol = FeatureSymbol
' Create a graphic layer for the text element
Dim lyrName As String
lyrName = "selection " & "for " &
wellidnonspatial
selection =
CType(mapView.Layers.FindByName(lyrName),
ESRI.ArcGIS.ADF.IMS.Carto.Layer.FeatureLayer)
selection =
FeatureLayer.CreateSelectionLayer(filternew,
highlightLayer, lyrName)
selection.Name = lyrName
mapView.Layers.Add(selection)
Dim AcetateLyr As New AcetateLayer
mapView.Layers.Add(AcetateLyr)
'Create a point to locate the text
Dim txtLocation As New
ESRI.ArcGIS.ADF.IMS.Geometry.Point(envelop.XMax
- 3000, envelop.YMax - 2500)
' Create the TextElement and set its properties
Dim txtLabel As String = waterlevel
Dim TextElement As New TextElement(txtLabel,
AcetateUnits.Database)
TextElement.Location = txtLocation
TextElement.Antialiasing = True
TextElement.AllowLabelOverlap = False
TextElement.Angle = 0
TextElement.BackColor = Drawing.Color.Beige
TextElement.Font = New
ESRI.ArcGIS.ADF.IMS.FontInfo("Verdana", 10,
Drawing.Color.Cyan, FontStyle.BoldItalic)
TextElement.GlowColor = Drawing.Color.WhiteSmoke
TextElement.HorizontalAlignment =
HorizontalAlignment.Center
TextElement.Interval = 2
TextElement.TextCasing = TextCasing.AllUpper
TextElement.Transparency = 0.4
TextElement.VerticalAlignment =
VerticalAlignment.Center
AcetateLyr.AcetateElements.Add(TextElement)
Dim Selectionlyr As FeatureLayer =
CType(mapView.Layers.FindByName("selectionlayer
for GWDatabase"), FeatureLayer)
If Not Selectionlyr Is Nothing Then
mapView.Layers.Remove(Selectionlyr)
End If
End If
End If
Next
End If
```

```
Map1.CallbackResults.Add(New
CallbackResult(Map1, "JavaScript",
"window.setTimeout(HideLoadingLocal, 500);"))
Map1.CallbackResults.AddRange(Toc1.CallbackResul
ts)
Map1.Refresh()
Toc1.Refresh()
returnString = Map1.CallbackResults.ToString &
"^^^" & Toc1.CallbackResults.ToString()
Catch ex As Exception
Call ErrorHandler.WriteError(ex,
"Default.aspx.vb", "CreateTextAnnotation")
End Try
End Sub
```

Function Name: MapServerBindingApplet.java
Environment: Windows
Version: JDK 1.5_08, Java WebServices, ArcGIS Server 9.3
Description:
The function describes about the Java Applet code that calls a map server object from ArcGIS Server using Web Services and displays the map in the application. The application displays the latitude Longitude values and Military Grid Reference System (MGRS) values on the mouse movement on the map. The following packages ned to get imported to run the application.

```
import com.esri.arcgisws.MapServerIdentifyResult;
import com.esri.arcgisws.EsriImageFormat;
import com.esri.arcgisws.EsriImageReturnType;
import com.esri.arcgisws.GraphicElement;
import com.esri.arcgisws.ImageDescription;
import com.esri.arcgisws.ImageDisplay;
import com.esri.arcgisws.ImageResult;
import com.esri.arcgisws.ImageType;
import com.esri.arcgisws.LayerDescription;
import com.esri.arcgisws.Line;
import com.esri.arcgisws.MapDescription;
import com.esri.arcgisws.MapExtent;
import com.esri.arcgisws.MapImage;
import com.esri.arcgisws.MapLayerInfo;
import com.esri.arcgisws.MapServerBindingStub;
import com.esri.arcgisws.MapServerInfo;
```

Code Snippet:

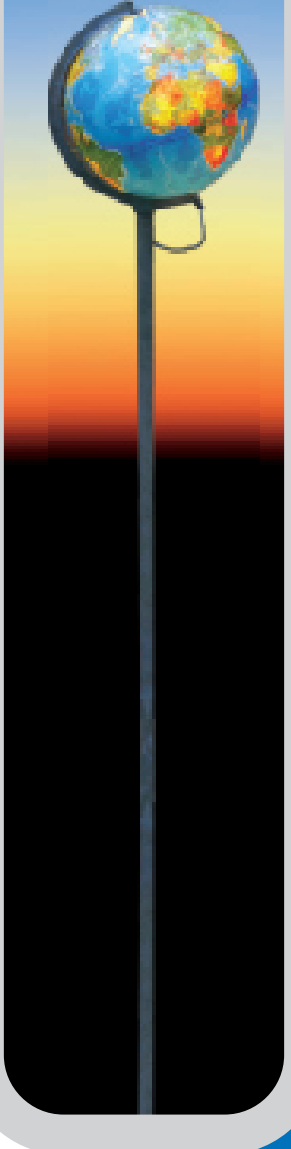
```
public class MapServerBindingApplet extends
JApplet {
        Image mapimage = null;
        MapDescription pMD = null;
        ImageDisplay idisp1 = null;
                private static String
         wsservice = "http://2196-a43-
        gis:8399/arcgis/services/ISSA1/MapServer";
        public void init() {
                try {
Javax.swing.SwingUtilities.invokeAndWait
(new Runnable() {
        public void run() {
                try {
        createGUI();
getMapServer();
}catch (MalformedURLException e) {
e.printStackTrace();
                                        }catch
(RemoteException e) {
e.printStackTrace();
                                        }catch
(UnknownHostException e) {
e.printStackTrace();
                                        }catch
(IOException e) {
e.printStackTrace();
                                        }
                                }
                        });
                }catch (Exception e) {
                        System.err.println
("createGUI didn't successfully complete");
                }
        }
        private ImageDisplay getImageDisplay() {
                ImageDisplay idisp = new
ImageDisplay();
                Idisp.setImageDPI(96);
idisp.setImageHeight(map.getHeight());
idisp.setImageWidth(map.getWidth());
                return idisp;
        }
        private void drawMap(MapDescription
mapDesc) {
                try {
                        this.setCursor(new
Cursor(Cursor.WAIT_CURSOR));
System.out.println("**************************
********");
                        MapServerBindingStub
mapservice = new MapServerBindingStub(
                                                new
java.net.URL(wsservice), null);
System.out.println("**********************mapse
rvice is "
+ mapservice);
                        ImageType imgtype = new
ImageType();
imgtype.setImageFormat(EsriImageFormat.esriImage
PNG);
                        imgtype
.setImageReturnType(EsriImageReturnType.esriImag
eReturnMimeData);
                        ImageDisplay imgdisp =
new ImageDisplay();
imgdisp.setImageHeight(map.getHeight());
//pixels
        imgdisp.setImageWidth(map.getWidth());
//pixels
                        imgdisp.setImageDPI(96);
                        ImageDescription imgdesc
= new ImageDescription();
        imgdesc.setImageDisplay(imgdisp);
        imgdesc.setImageType(imgtype);
                        GraphicElement[]
gelement = mapDesc.getCustomGraphics();
                        if (gelement != null) {
System.out.println("customgraphics length in
drawmap is"
        + mapDesc.getCustomGraphics().length);
                        }
                        mapimg =
mapservice.exportMapImage(mapDesc, imgdesc);
                        byte[] data =
mapimg.getImageData();
                        mapimage
=java.awt.Toolkit.getDefaultToolkit().createImag
e(data);
                        //wait for the image to
load
                        MediaTracker tracker =
new MediaTracker(this);

tracker.addImage(mapimage, 1);
                        tracker.waitForID(1);
                        // draw the image
                        map.drawMap(mapimage);

                }catch (Exception ex) {
                        ex.printStackTrace();
                }finally {
                        this.setCursor(new
Cursor(Cursor.DEFAULT_CURSOR));
                }
        }
```

ESRI

Global Page



National Governors Association Honors ESRI with Public-Private Partnership Award

ESRI was honored for Groundbreaking GIS-Based Performance Accountability Applications Improve Transparency in Maryland Government. During the closing session of the 2009 National Governors Association (NGA) Winter Meeting in Washington, D.C., yesterday, geographic information system (GIS) software leader ESRI received a Public-Private Partnership Award for its work with the State of Maryland Office of the Governor. ESRI was acknowledged for its role in developing the innovative, GIS-based performance measurement applications **MD iMap**, **GreenPrint**, and **BayStat**.

"We are honored to receive this award for our work with the governor's office in Maryland," says ESRI president Jack Dangermond. "For the first time, a state has developed an online reporting system that uses geography and statistics to show citizens and government stakeholders hard data about government goals, activities, and progress. It was a privilege to work closely with Governor Martin O'Malley and his staff on these groundbreaking accountability tools."

MD iMap is a Web portal that provides an authoritative basemap of Maryland and allows government and citizens to assess information about state, local, and municipal performance. GreenPrint is a planning tool designed to help government staff, conservation organizations, and individual citizens make good decisions about land conservation and growth. GreenPrint is accessible via MD iMap.

Both MD iMap and GreenPrint build upon other GIS-based accountability programs O'Malley has initiated in the state including BayStat and StateStat. Those Web mapping applications allow government staff and citizens to assess Chesapeake Bay restoration projects and evaluate the effectiveness of state government projects. All these applications are based on the pioneering concepts of CitiStat, which O'Malley spearheaded when he was mayor of Baltimore.

"MD iMap and GreenPrint were possible because of our partnership with ESRI," says Governor O'Malley. "These tools have the potential to revolutionize the way citizens learn about government operations and how state and local governments share information. They encourage fact-based decision making and result-oriented policy development in addition to transparency in government. I hope other states will create similar initiatives based on these examples."

The Public-Private Partnership Awards recognize NGA Corporate Fellow companies for noteworthy partnerships with governors and states. The awards honor companies that have partnered with governors' offices to implement programs or projects that positively affect the citizens of those states.

ESRI Expands Virtual Earth Access in GIS by Teaming with Microsoft

A new agreement with Microsoft Corporation gives ArcGIS users fast access to Microsoft Virtual Earth for their geographic information system (GIS) projects. As part of ArcGIS Online at the ArcGIS 9.3.1 release, ArcGIS Desktop and ArcGIS Server users will be able to connect directly to Virtual Earth and quickly start their GIS projects with ready-to-use content.

"Our agreement with Microsoft defines a pattern of sharing geospatial data on the Web that promises to grow the GIS community," says ESRI President Jack Dangermond. "By bringing Virtual Earth into their GIS projects, people will have a greater opportunity to perform spatial analysis based on dynamic data."

ArcGIS Desktop users who are current on maintenance and have an Internet connection will have access to Virtual Earth for a variety of up-to-date mapping content including aerial imagery, roads, and hybrid (aerial with labels) imagery. With a familiar look, imagery access will appear as another data layer in GIS. The imagery will provide excellent background maps on which users can overlay their operational data. This means users will be able to focus more on their business data than on its context.

For example, an electric utility can layer its distribution line data over a Virtual Earth aerial view of a neighborhood to create a map of its lines and customer connections. This Virtual Earth background layer is useful for editing the company's data and can be easily shared online with other company users.

ArcGIS users can build Web applications that support geospatial services through ArcGIS Server and ArcGIS Web software developer kits (SDKs), including APIs for JavaScript, Flex, and Microsoft Silverlight. This enables them to provide their clients with access to Virtual Earth content from their applications.

"ESRI and Microsoft share a long history of building geographic information systems solutions that combine both of our companies' strengths," says Chris Sampson, director of Virtual Earth at Microsoft. "By integrating Microsoft Virtual Earth across all ESRI ArcGIS products, we can provide our mutual customers with spatial analysis software that has instant access to comprehensive geographic data that can only be found in a software plus services solution."

The agreement provides no-cost access to Virtual Earth content for ArcGIS Desktop 9.3.1 users on maintenance and a free 90-day Virtual Earth evaluation to ArcGIS Server users. After the 90-day evaluation, deployment for ArcGIS Server can be purchased through ESRI. In addition to the Virtual Earth map services, ArcGIS Server users will also be able to leverage Virtual Earth geocoding and place-finding capabilities.

ArcGIS users can preview Virtual Earth street maps, imagery, and hybrid map layers at **http://resources.esri.com/arcgisonlineservices**. Read more about using ArcGIS and Virtual Earth at **www.esri.com/agolwhatsnew**.