INTEGRATION AND INTEROPERABILITY OF SERVICES USING ArcGIS® SERVER 9.2

SOLUTION FOR HYDROMETRIC GAUGING STATION NETWORK

Power Builder Query
This tool is quite similar to standard query builder tool of ArcGIS®, where the users can build queries using logical operators as required.

The following parameters can be used to query the Hydrometric and Climatic stations.

- Latitude
- Longitude
- Station ID
- Other Id (ARMY Corps station ID, etc.)
- Station Name
- Operating Season
- Station Type (e.g. Active, discontinued, etc.)
- Real Time or Not
- Parameter (s)
- Recording Interval
- Data Availability (e.g. Published, on request, proprietary)
- Data Quality
- Agency
- Contact Person
- Contact Details
- From_Date
- To_Date
- Gross DA (Hydrometric Stations only)
- Effective DA (Hydrometric Stations only)
- Regulation (Hydrometric Stations only)
- Period of Record
- Parameter (s)
- Recording Interval
- Data Availability (e.g. Published, on request, proprietary)
- Data Quality
- Agency

Map Viewer
The Map viewer handles the map display and navigational requirements in the application. The user can perform tasks such as zoom in, zoom out, pan, zoom to full extent, left and right navigation, and identify a specific feature in the displayed map using the query tools.

CONCLUSION
The development of this solution for the province of Alberta, Canada was a challenge and the solution was of its own kind. The development process began with understanding the specific needs of the client and the complexity of existing system was analyzed during the system study. A deliberate design document which lived up to the expectations of the client was a great support in building this solution. The integration and interoperability of various services over web-based GIS is evolving rapidly with ArcGIS® Server 9.2. The need to bridge the data across the services is essential in the verticals such as oil/gas, utility and land administration and Magnasoft can provide unparalleled solutions using the power of ArcGIS® Server 9.2. GIS is sure to add value by giving geographic insight to those who need to make tough decisions in real-time.
EXECUTIVE OVERVIEW

The ArcGIS® Server 9.2 is on the horizon and it is conceived to be a major step forward in the evolution of GIS software serving the government and private enterprises. Organizations can now resolve issues pertaining to integration of applications and data sharing across the enterprise and have truly real-time decision-making applications that are location independent. The ArcGIS® Server introduces a complete and integrated Web-based GIS that comes with out-of-the-box end user applications and services for spatial data management, visualization, and spatial analysis. All this is without having to purchase the expensive hardware, software, and training courses.

With the above advantages in mind, the province of Alberta, Canada was seeking a solution that could help them resolve problems involving determination of rainfall probabilities, the space and time distribution of rainfall and evaporation, the water budget, the recurrence interval of major storms, snow melt and runoff, and probable wind tides and waves in reservoirs. Adding to the problem was the data relativity with the climatologist, the hydrologist, the cloud physicist, and the weather forecaster. The challenge was taken by Magraskit along with its strategic partner MGIS in Canada and the team used the power of ArcGIS® Server 9.2 to develop and implement the Hydromet Solution.

HYDROMET SOLUTION

Hydromet is a multifunctional solution that provides the user to query and view information pertaining to the hydrometric and climatic stations. It is designed keeping in mind the needs of hydro meteorologist, climatologist, the hydrologist, the cloud physicist and the weather forecaster.

The easy-to-use map viewer with navigational tools allows the users to load non spatial-data of the stations remotely, via the internet or the customer’s internet. The application also provides powerful reporting functionalities including features such as export to PDF, XLS, word document and web based email.

The application consists of the following three key tools that are available on the toolbar:

**Simple Query for Basic Station Search**

These queries enable the user to query the stations based on station name, number, station category, station attribute and other station related fields. The user can also query individual fields within a station. The report can be generated based on the search criteria in HTML format and user can also export it into CSV/XLS format.

**Generic Interactive Queries**

These tools allow the users to query on different aspects of the hydrology and climatic data. User is able to customize the query by picking the appropriate items from the set criteria. Each query has its own query form. The tools are built such that if no criteria is selected all the stations in the database will be queried.

**Category of Station**

User can select the station as needed. In this case it would be either climate or hydrometric station.

**Station Type**

This tool allows the user to select three different station types such as Active, Discontinued & All Stations. Active Station will further allow the user to search the Real Time and Non Real Time stations.

**Measured Parameters**

This tool allows the user to select pre-defined parameters for each station type. In this case the climatic station type has 16 parameters defined.

**Spatial Search Location**

This tool queries the spatial location of stations. There are four different approaches to query the database. The user can either use Lat-Long or draw a polygon giving buffer to the area or by selecting Township/Range/Meridian or by major watershed. The tool also supports the user to query all the stations in the database.

**Period of Record**

The stations can be queried either by giving a specific number of past years or between two dates. If both are not specified the tool will query the entire database.

**Search by Monitoring Agency**

The stations are monitored by agencies. Therefore this tool helps the user to query agency wise. However, if no agency is given the tool will search all the stations.

**Search by Operating Season Year-Round Stations**

The database can be queried for stations operating round the year or seasonal ones.

**Search by Data Quality**

The data is segregated as Equivalent, Satisfactory & Unknown data. This helps to standardize the existing database as needed.

**Search by Drainage Area**

This tool is built for Hydrometric purpose only. The tool queries over a specific drainage area, either gross or effective area.

**Search by Type of Regulation**

This tool is built for Hydrometric purpose only. The tool can query the Unknown, Regulated and Un-regulated stations.

INTEGRATION AND INTEROPERABILITY OF SERVICES USING ARCGIS® SERVER 9.2

**Business Value**

- Helps in reducing the damage level caused by natural calamities
- Reduced Management time & hardware acquisition costs
- Provides real-time decision-making applications across the enterprise
- Provides a data bridge between incompatible Technologies
- Authentication and authorization support at every level

**Category of Station**

User can select the station as needed. In this case it would be either climate or hydrometric station.

**Station Type**

This tool allows the user to select three different station types such as Active, Discontinued & All Stations. Active Station will further allow the user to search the Real Time and Non Real Time stations.

**Measured Parameters**

This tool allows the user to select pre-defined parameters for each station type. In this case the climatic station type has 16 parameters defined.

**Temporal Search Location**

This tool queries the temporal location of stations. There are four different approaches to query the database. The user can either use Lat-Long or draw a polygon giving buffer to the area or by selecting Township/Range/Meridian or by major watershed. The tool also supports the user to query all the stations in the database.

**Period of Record**

The stations can be queried either by giving a specific number of past years or between two dates. If both are not specified the tool will query the entire database.

**Search by Monitoring Agency**

The stations are monitored by agencies. Therefore this tool helps the user to query agency wise. However, if no agency is given the tool will search all the stations.

**Search by Operating Season Year-Round Stations**

The database can be queried for stations operating round the year or seasonal ones.

**Search by Data Quality**

The data is segregated as Equivalent, Satisfactory & Unknown data. This helps to standardize the existing database as needed.

**Search by Drainage Area**

This tool is built for Hydrometric purpose only. The tool queries over a specific drainage area, either gross or effective area.

**Search by Type of Regulation**

This tool is built for Hydrometric purpose only. The tool can query the Unknown, Regulated and Un-regulated stations.