

Arc Hydro: GIS for Water Resources

Three days training class

Overview

Arc Hydro is a geodatabase design and a set of accompanying tools geared for support of water resources applications in ArcGIS environment. This three-day course presents the Arc Hydro data model and tools and shows how to implement them through a series of real world examples. The first day presents an overview of the geodatabase principles and the Arc Hydro data model, while the second and third days go into the details of Arc Hydro implementation and hands-on operations. The participants will learn the basic principles of Arc Hydro data model, how to extend it, and how the Arc Hydro tools manage and use the data model. Moving beyond the basics, the course will in its second and third day, provide hands-on, real-world exercises through which the participants will be able to apply the new knowledge. Advanced topics on customization of Arc Hydro and external model integration will be covered as well.

Audience

The first day of the course is targeted towards general audience interested in water resources applications of ArcGIS. The second and third days are targeted towards existing ArcGIS users who want to get a quick, hands-on training in Arc Hydro implementation.

Goals

- Understand Arc Hydro data model
- Extending Arc Hydro data model
- Core Arc Hydro tools functionality
- Advanced Arc Hydro tools functionality
- Combine Arc Hydro data structure and tools for solution of real water resource problems
- Extending Arc Hydro tools (development of custom functionality)
- Integration of external models into Arc Hydro

Topics Covered

Arc Hydro data model: Core feature classes, properties, and relationships; HydroID as the unique identifier and primary key in all relationships; managing HydroID; time series storage

Extending Arc Hydro data model: Adding properties to existing Arc Hydro feature classes; adding additional feature classes to Arc Hydro projects and data model; managing HydroID for new feature classes; using existing relationships with new data model elements; adding GRIDs and TINs to the Arc Hydro model and project

Core Arc Hydro tools: tools for management of Arc Hydro core properties; HydroID editor extension and management tools; creation of Arc Hydro feature classes through tools; terrain processing and basic network tracing; combining raster, vector, and network datasets into an integrated data environment

Advanced Arc Hydro functionality: local and global watershed delineation; watershed characteristics extraction; time series management tools; advanced network/attribute tracing; controlling tool's operations through XML; controlling data structures through XML

Arc Hydro in action: loading time series data via WEB into Arc Hydro; manipulating NEXRAD data; mass-balance analyses; watershed delineation and characterization

Extending Arc Hydro tools: developing custom functionality within Arc Hydro tools; developing custom functionality on top of Arc Hydro tools; Arc Hydro tools programming framework; Arc Hydro tools control XML

Integration of external models into Arc Hydro: principles of generic data exchange; XML as vehicle for data exchange and exchange control; building custom exporter; building custom importer

Prerequisites and recommendations

General GIS and/or water resources background. Familiarity with ArcGIS (three months of experience using ArcGIS software with focus on ArcMap component) desirable but not required.

Instructor

The class will be presented by Dr. Dean Djokic of ESRI, lead developer of Arc Hydro tools.

Price

See class schedule.

Outline of Topics

Introduction

- Logistics
- Course overview
- Introduction of participants
- Student feedback

Overview of Geodatabase Principles and ArcGIS

- What is a geodatabase?
- Advantages over other spatial data storage formats
- Relationships, networks, raster and vector data formats
- Spatial reference
- ArcCatalog, ArcMap, and ArcTools environments
- Template data models
- Tips and tricks

Arc Hydro data model

- Arc Hydro – template data model for water resources
- Principles of Arc Hydro data model
- Arc Hydro feature classes, object classes, properties, and relationships
- Arc Hydro framework
- HydroID as the unique feature identifier
- Managing HydroID
- Global HydroID – planning HydroID implementation
- HydroID - primary key in Arc Hydro relationships
- Building Arc Hydro databases – repository, tools, data import

Extending Arc Hydro data model

- Adding properties to existing Arc Hydro feature classes
- Adding additional feature classes to Arc Hydro projects and data model
- Managing HydroID for new feature classes
- Using existing relationships with new data model elements
- Adding GRIDs and TINs to the Arc Hydro model and projects
- Example of Arc Hydro data model extension: HEC-GeoRAS
- Do's and don'ts of Arc Hydro data model extension

Core Arc Hydro tools

- Tools for management of Arc Hydro core properties
- HydroID editor extension and management tools
- Creation of Arc Hydro feature classes through tools
- Terrain processing and basic network tracing
- Combining raster, vector, and network datasets into an integrated data environment
- Combining Arc Hydro and standard ArcMap functionality

Advanced Arc Hydro functionality

- Local and global watershed delineation
- Watershed characteristics extraction
- Time series management tools
- Advanced network/attribute tracing
- Controlling tool's operations through XML
- Controlling data structures through XML

Arc Hydro in action

- Planning an Arc Hydro implementation
- Loading time series data via WEB into Arc Hydro
- Manipulating NEXRAD data
- Mass-balance analyses; watershed delineation and characterization

Extending Arc Hydro tools

- Developing custom functionality within Arc Hydro tools
- Developing custom functionality on top of Arc Hydro tools
- Arc Hydro tools programming framework
- Arc Hydro tools control XML

Integration of external models into Arc Hydro

- Integration with external applications – Excel, Access, custom dlls
- Principles of generic data exchange
- XML as vehicle for data exchange and exchange control
- Building custom exporter
- Building custom importer