

“Gas Utility Management - Made Easy”

Presented By:

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“Gas Utility Management – Made Easy” by Mahesh Deshpande - Paper Submitted to the Proceedings of Map Middle East 2007, Dubai.

Experience certainty. IT Services
Business Solutions
Outsourcing

Presentation Outline :

- TCS Geospatial Technology Practice - Glimpse
- Introduction
- Understanding the Business Requirements
- GIS in Gas Utilities
- Bespoke Tools
- Dataset Configuration
- Summary
- Discussions

Geospatial Technology Practice - Glimpse

Experience

- 500+ person years of services
- 50+ customer relationships
- 90% customer satisfaction index
- Consistent YOY growth of > 40%
- 20+ active GST Projects

Alliances & Partnerships



- Joint go-to-market strategy
- Participation in beta Programs
- Bundled offerings of Solutions & Services

TATA CONSULTANCY SERVICES

Technology



- GE SmallWorld
- ESRI
- MapInfo
- Oracle Spatial
- Autodesk
- Open Source

Dedicated COEs to focus on key

technology areas

Consultants and Offerings

- 500+ experienced consultants
- Integrated Geospatial IT and Data Services
- End-to-End Offerings
- Strong Industry Practices Collaboration
- Rigorous internal competency development and evaluation program

Turnkey Services

Consulting

- Needs Study
- Implementation Roadmap and Transition Strategy
- Solution Optioneering
- System Architecture Review and Upgrade Consultancy
- Data Migration Strategy

Design, Development and Implementation

- Customised Data Models
- Benchmark and Prototyping
- Custom Application Development
- Deployment and User Training
- Integration with Scientific Models
- Integration with Business Systems

Spatial Data Services

- Digital Database Creation
- Field/GPS Survey
- Data Conversion & Migration
- QA/QC
- Aerial Photogrammetry
- Ortho Image Rectification
- LIDAR Data Processing
- Digital Elevation Modeling

Operation & Maintenance Support

- Application Maintenance and System Support
- Application Enhancement
- 24x7 Global Helpdesk
- Remote Management Services

Introduction:

Managing the network with less maintenance and ease to gain more monetary profit.

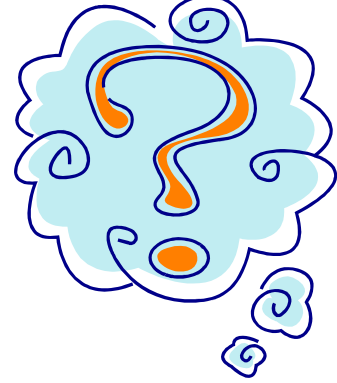
The distribution network consists of many interconnected features that convey gas from the point of generation to the customer.

Following are some of the primary tasks, which are carried out using the GIS:

- ▶ Digitizing Pipe and Plant Features
- ▶ Updating Landbase and Customer Location
- ▶ Workflow Management
- ▶ Data Validation
- ▶ Planning of New Distribution Network
- ▶ Managing Non-spatial Data
- ▶ Emergency Response Planning
- ▶ Network Maintenance and Management



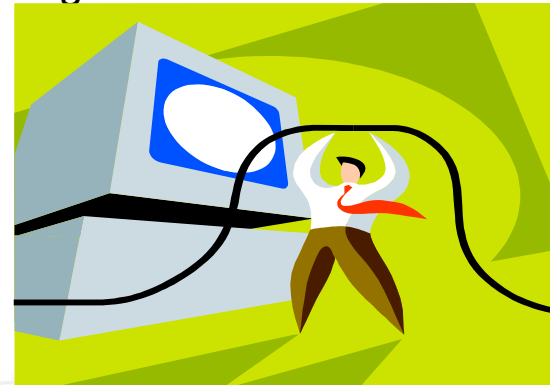
Understanding the Business Requirements



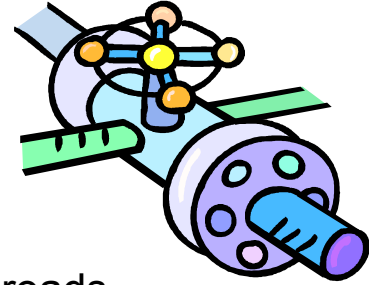
- Many operational units that play a crucial role in the gas distribution.
- Different operational units adopt different methodologies and technologies.
- Thorough understanding of the inter-organizational divisions, which depend on the GIS.
- Understanding of not only the core technologies, relationships between business rules, various data formats and interfaces with other systems.

A complete understanding of the business requirements helps in knowing the:

- ✓ Number of bespoke tools to be developed
- ✓ Data models required
- ✓ Interfaces to be developed



GIS in Gas Utility



- ✓ Allows the user to view the location of pipes and plant items in relation to roads, buildings and other geographic features.
- ✓ Allows the user to view, manage, and update information through a graphical view.
- ✓ Provides a view of the relationship between pipes and plant.

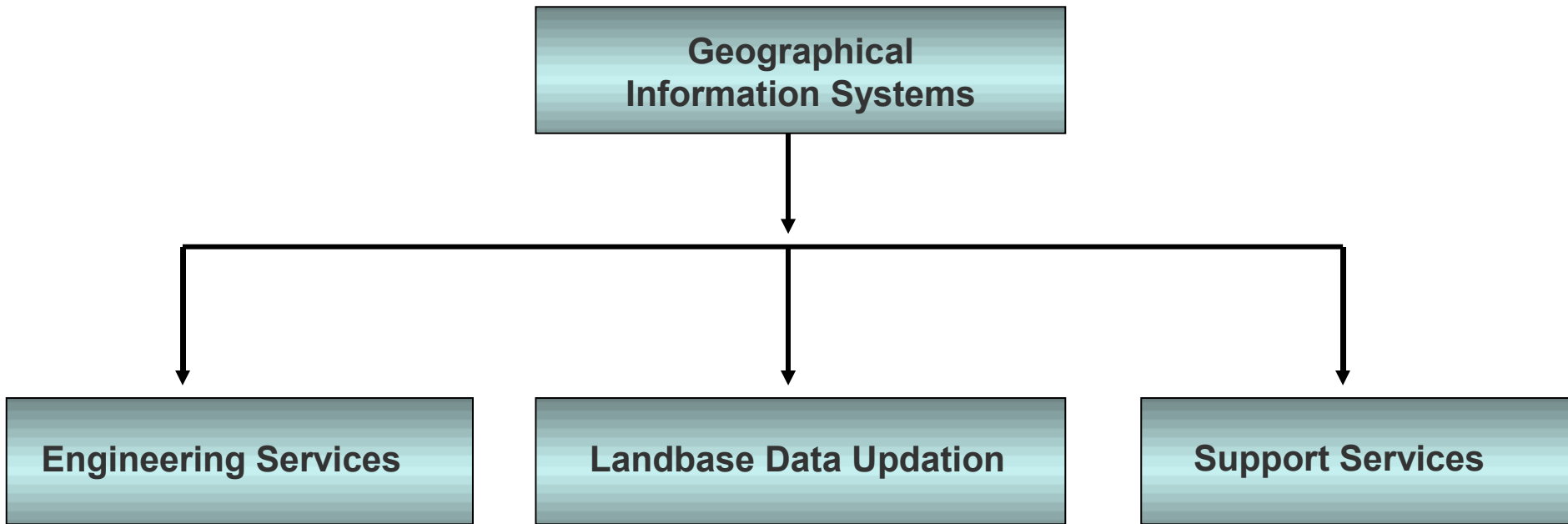
GIS has many applications , some of which include:

- Update of graphical records .
- Network planning.
- Location of gas network and other areas of interest data.
- Assist in the decision making process on gas escapes, excavating and on emergency by field staff.
- Network Analysis.



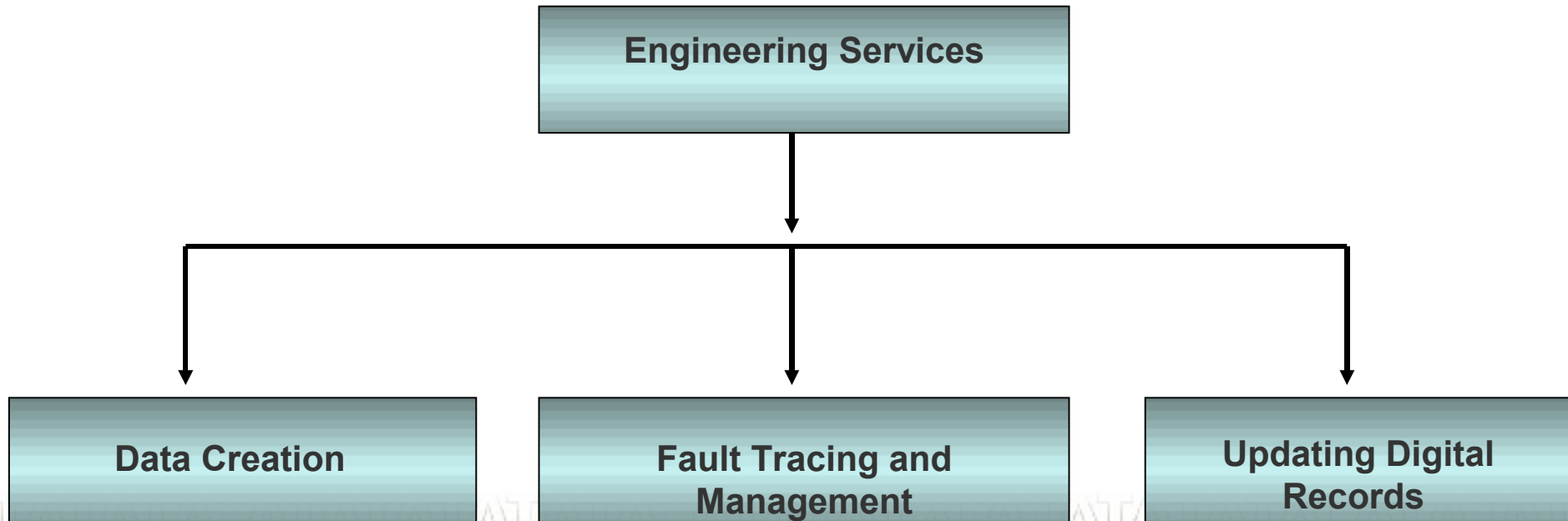
GIS in Gas Utility

The GIS in gas distribution can be divided as illustrated in the diagram below.



GIS in Gas Utility

The primary tasks which are looked after by Engineering services are illustrated in the diagram below.



Bespoke Tools

Need of bespoke tools :

- ✓ The COTS software will not have all the functionalities inbuilt.
- ✓ Authorization to access the data
- ✓ To Increase accuracy
- ✓ To Improve efficiency
- ✓ More Productivity
- ✓ Integration with other systems
- ✓ Reports, prints and plots
- ✓ Maximise profits

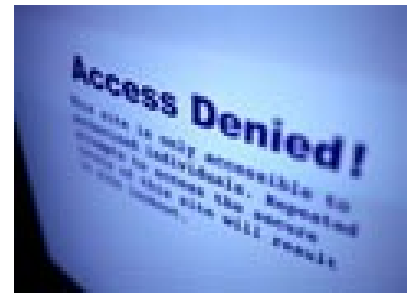
Many bespoke tools needs to be developed to meet the specific requirements of any Gas industry.

The tools are developed using ArcObjects and VB.Net.

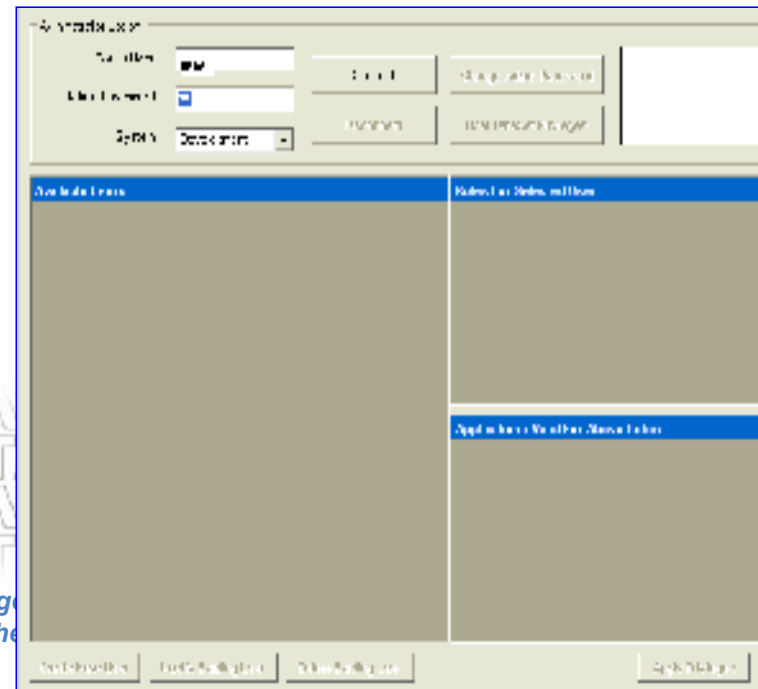
Following bespoke tools are discussed in detail.

- Managing Users
- Managing Workflow
- Managing Non-Spatial Data

Managing Users : Security and Access Control



- The authorization of the user level security.
- Security and Access Control (SAC) is the tool, which can be used to create, modify, delete user, and grant or revoke the user roles and privileges.
- SAC tool allows to create and manage users at database level.
- SAC tool assigns application role and privileges on different dataset and SDE tables to the users created.
- Maintains the role and the application mapping.



Managing Users : Security and Access Control

Advantages of Security and Access Control:

- Ensure that only a valid user can access the GIS application.
- Restrict the user's access to data.
- Restrict the user's access to functionality of the applications and modules.

Privilege	RoleID	Role Name
<input checked="" type="checkbox"/>	2002	Editor

The screenshot shows a 'New User Details' dialog box with the following fields and values:

- User Name: Bimal
- Description: Editor
- Password: *****
- Confirm Password: *****

Buttons: Create, Cancel

- Allow new user to be granted access to GIS and have appropriate privileges.

Managing Workflow: Session Manager

- A session is a set of transactions performed by a user or a host while interacting with a server.
- Before editing in ArcMap a session needs to be created and open.
- The session can be created using Gatekeeper tool.
- The GateKeeper tool can be accessed by the user who is having GateKeeper rights.
- The session can be opened using a tool called Session Manager.



Managing Workflow:

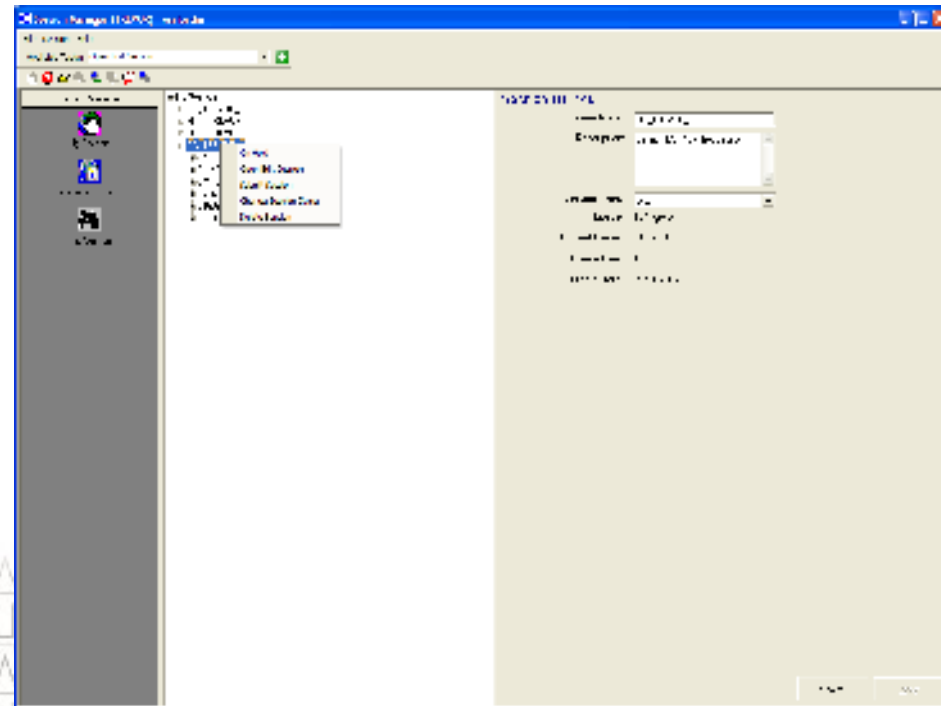
- The work is carried out within a session/version.
- Before any editor starts editing, a session needs to be created.
- Session Manager present in the ArcFM helps to manage sessions.
- Session Manager enables an editor to find, claim, open, edit, save and submit work.
- The Session Manager interface includes Toolbar, Filters and user controls.



← Tools



← Filters



Managing Workflow: Gatekeeper Tool

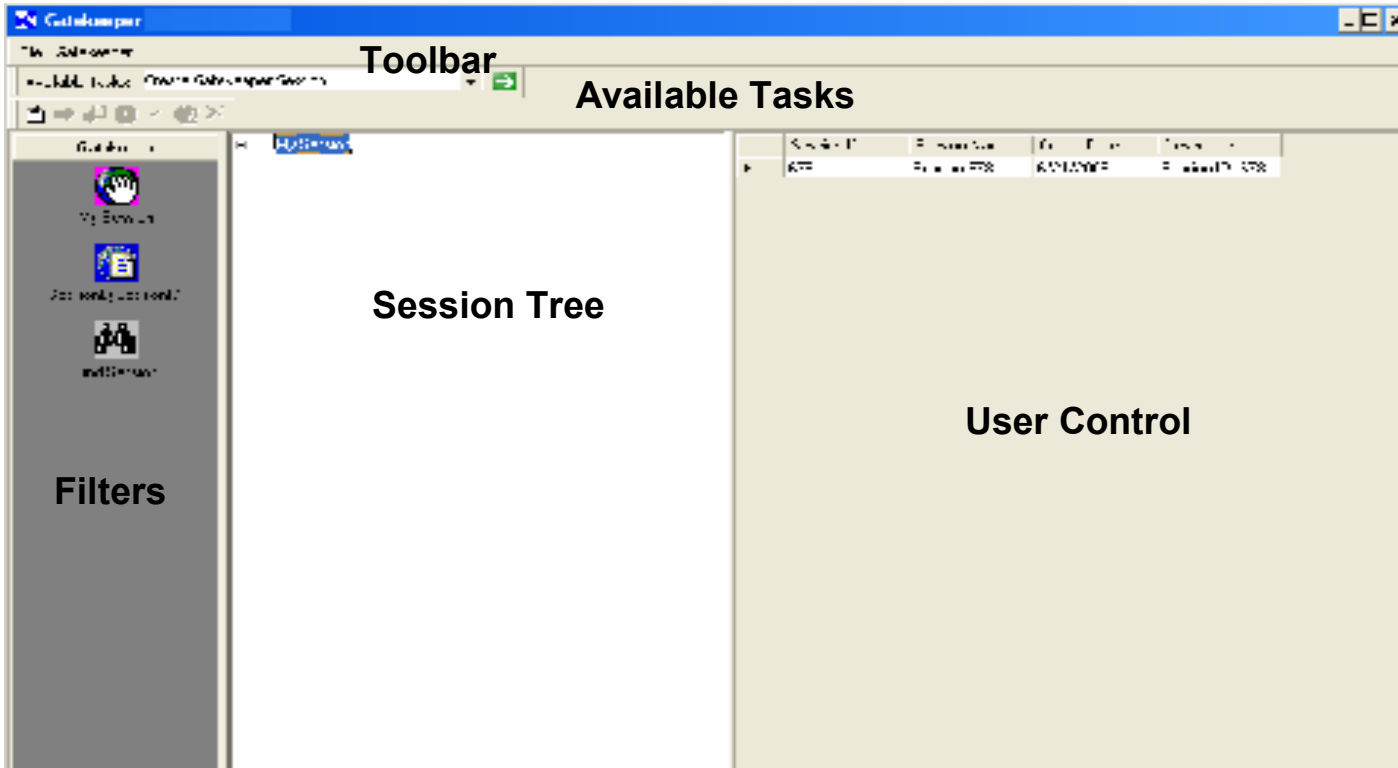
Gatekeeper Tool helps in creating and assigning a session.

The Gatekeeper Tool can also be used to perform the following tasks:

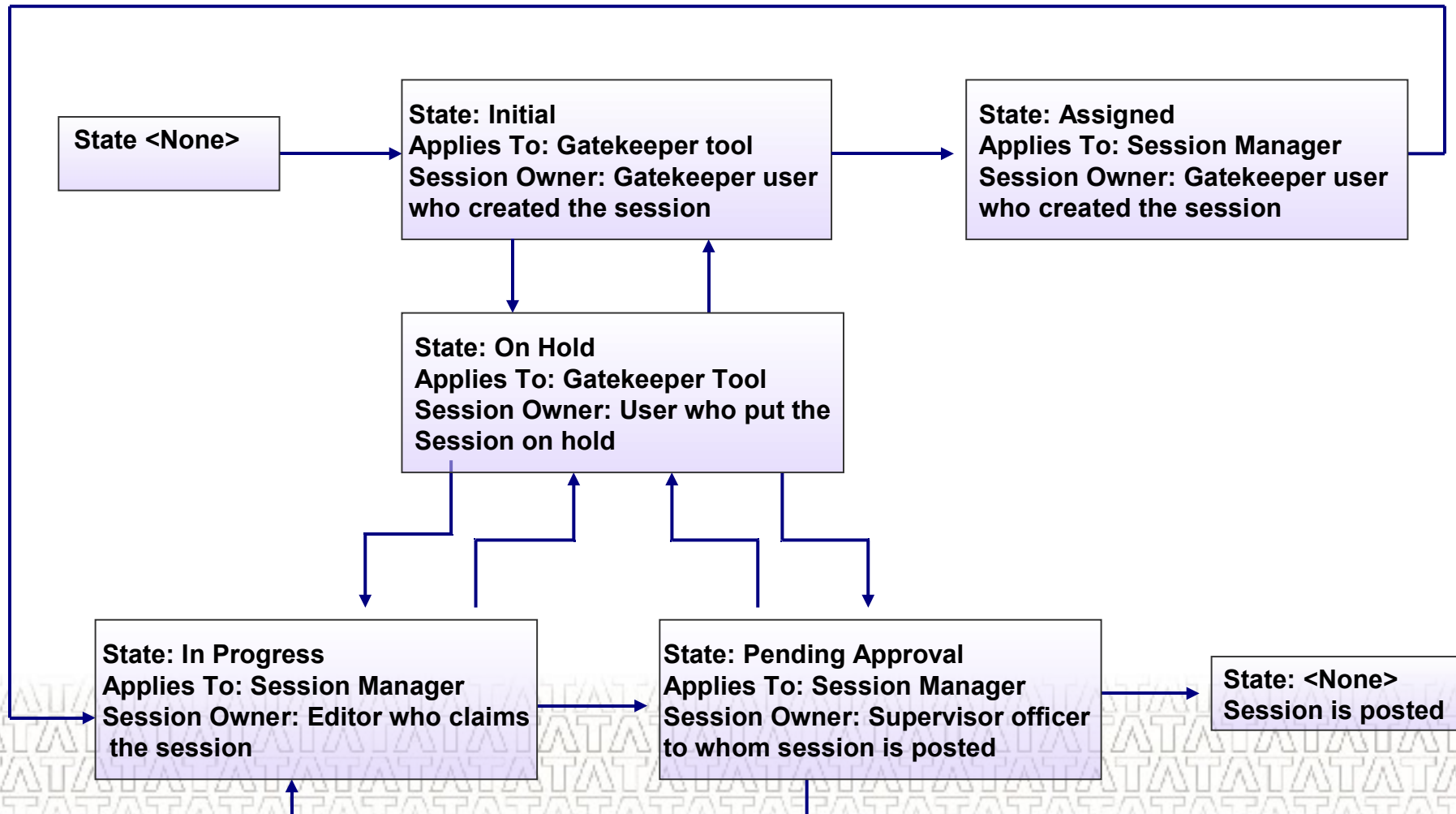
- ❖ Assign transactions to the session.
- ❖ Delete transactions assigned to the session.
- ❖ Assign session to the editors.
- ❖ Put the session on hold.
- ❖ Submit the session.
- ❖ Change the session owner.
- ❖ Delete the session.

Managing Workflow: Gatekeeper Tool User Interface

Following diagram shows the user interface of the Gatekeeper Tool

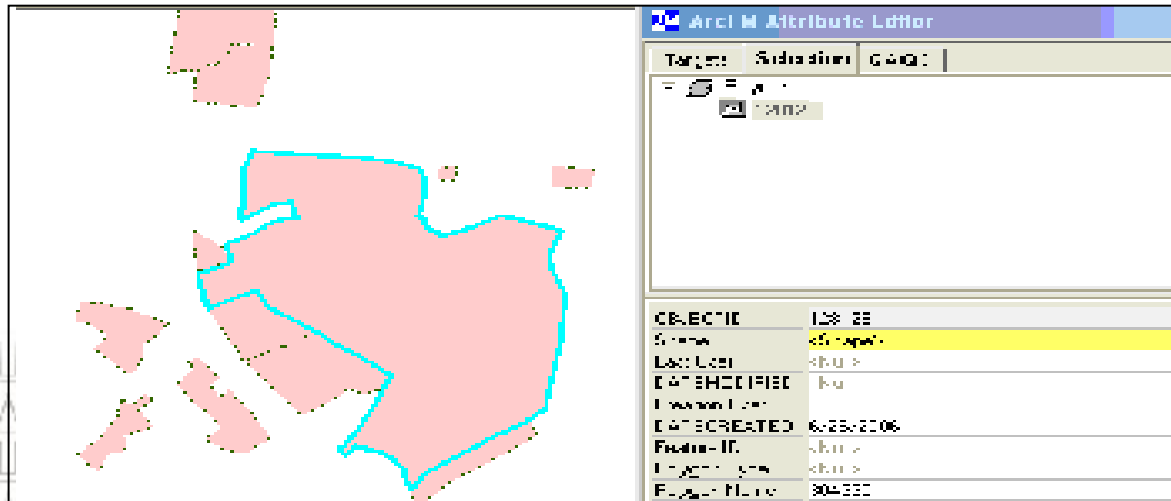


Managing Workflow: Life Cycle of the Session



Managing Non-Spatial Data

- In an enterprise wide organization the non-spatial data usually comes from Asset Management System (AMS).
- By customizing the ArcFM attribute editor all non-spatial data can be brought in the GIS database.
- This can be achieved using primary fields / unique identifiers.
- The Attribute Editor has also tool to create features.
- The pipe and plant features can be digitized using the attribute editor.
- Once the feature is created, the corresponding attributes can be assigned.



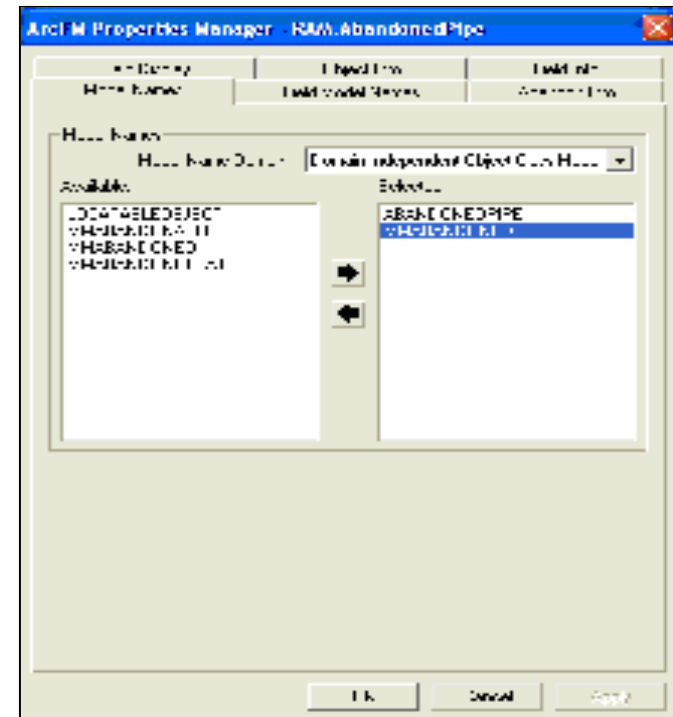
Configuring the Dataset

Configuring the dataset includes:

- ✓ Assigning Model Names
- ✓ Setting Field Model Names
- ✓ Field Display
- ✓ Abandon Information Settings
- ✓ Object Information Settings
- ✓ Field Information Settings

The model names needs to be configured against respective feature classes for managing the various operations like abandoning, deleting, moving etc.

ArcFM Properties Manager is used for configuration of the respective feature classes.



Configuring the Dataset: Autoupdaters :

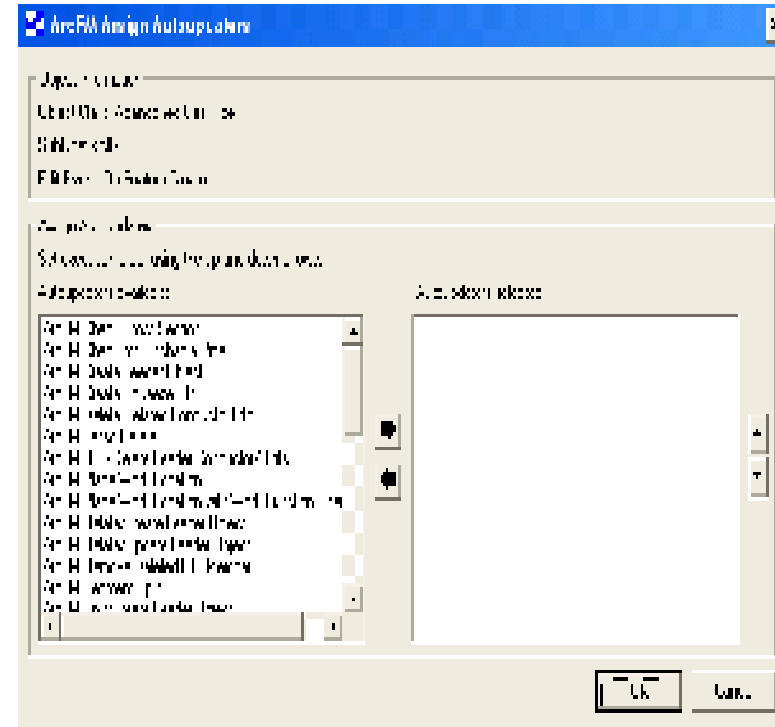
- ❖ ArcFM Autoupdaters automatically generate an attribute value at the onset of a specific event such as adding or deleting a feature.
- ❖ We can set specific behaviours at certain events such as when a feature is added, updated, or deleted.
- ❖ Multiple Autoupdaters objects can also be attached to a single event.
- ❖ The use of multiple autoupdaters eliminates the need to programmatically create combo autoupdaters.



Configuring the Dataset: Autoupdaters:

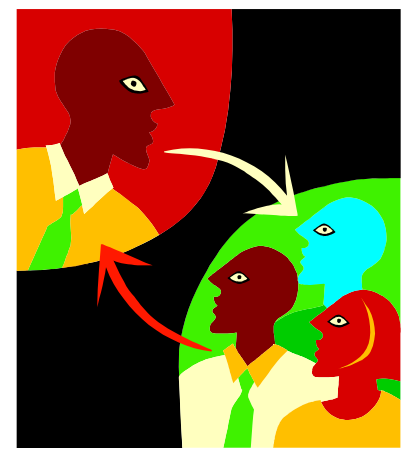
Following are the some of the examples of Autoupdaters that are Used in Gas Utility:

- Place Terminator
- Creation User
- Digitized Length
- Date Created
- Delete Feature
- Date Modified
- Last User
- Network ID insertion
- Check Pipe Pressure
- Auto Angle Setter
- Linking documents
- Symbol Rotation



Summary and Discussions

- GIS in gas utilities
- Understanding the business requirements
- Advantages of GIS in gas utilities
- Various processes of GIS involved in gas utilities
- Bespoke tools
 - Managing Users
 - Managing Workflow
 - Managing Non-spatial data
- Configuring the Dataset
 - Creating the data models
 - Assigning the data models to feature classes
 - Autoupdaters



Thank You

