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INNOVATION THAT MATTERS

Maximo Spatial

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Spatially enabling Maximo

- Enterprise GIS - formerly found only on the desktop
- ESRI ArcGIS Server 9.2 Enterprise available from within Maximo
- Powerful Java ArcObjects & Maximo Business Objects with UI Map & Navigation Controls provide Spatial capabilities within the Maximo UI
- Dynamic – not static – No data duplication
- Leverage GIS Investment by Providing Spatial Data to Maximo Users and Maximo Data to GIS Users

Spatially enabling Maximo

- Visualization of data – a map for Maximo and Business data for GIS
- Support Geoprocessing, Geocoding, nonversion and version editing
- GIS for other Industry Solutions, GIS for Linear in Maximo EAM 7.1
- Maximo Spatial, a GIS enabling framework for customer development

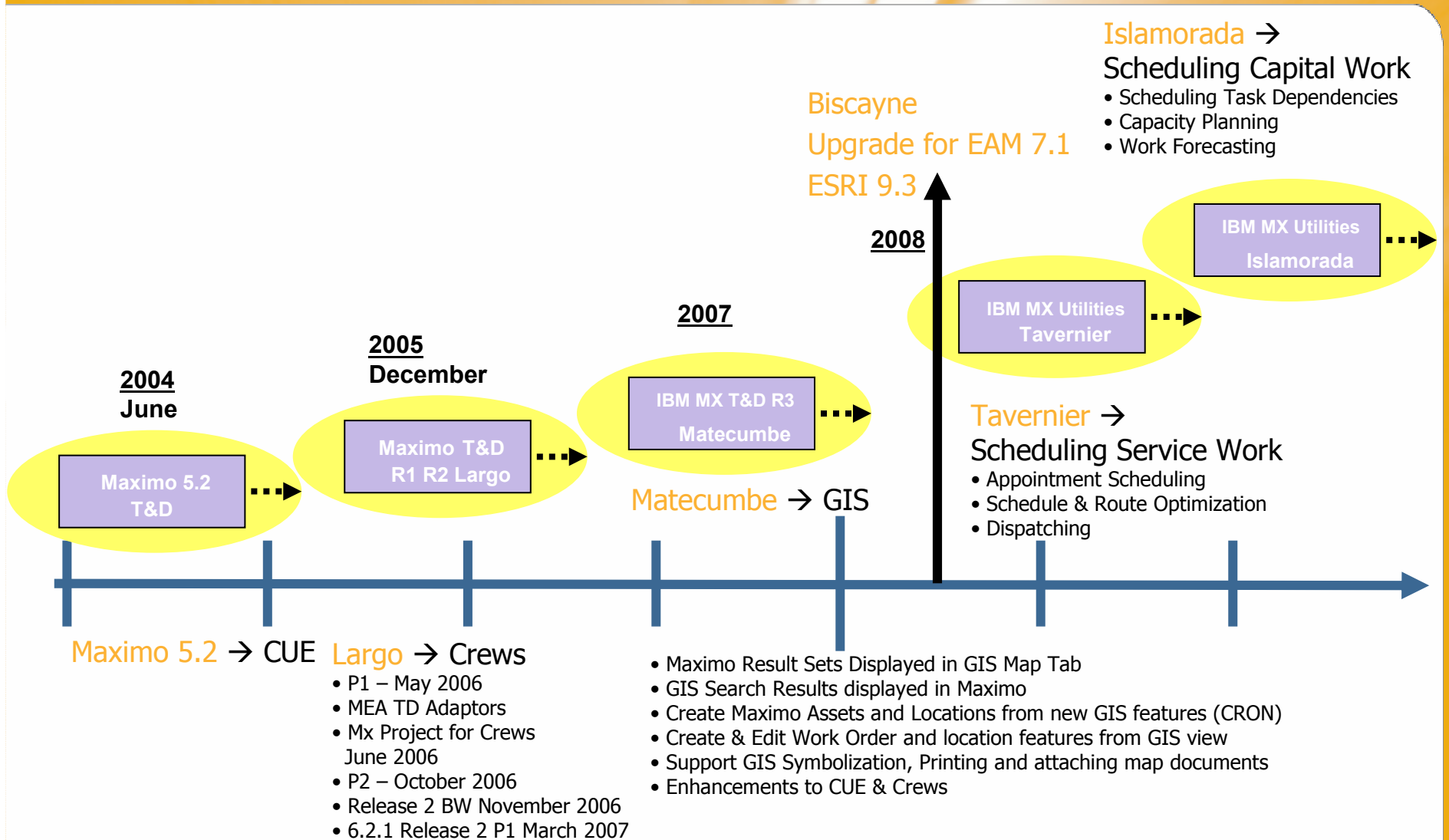
IBM Maximo Spatial allows users to visualize all assets and work in their geospatial context to optimize resources and decisions

Benefits of Spatial Information Sharing



- Assets in GIS not previously Visible to Maximo Users
- Construction and Design Changes NOT previously visible to Maximo Users
- Details of Assets and Maintenance NOT visible to GIS users
- Improve Management and Better Decision Making
- Spatial Business Analysis

Product Direction



Spatial Asset Management Roadmap



Subject to change as required

Islamorada

Maximo

Extend Tracing Functionality
Task Results Links
Interface to Graphics Design data

Dispatching Application
Scheduling Route Optimization
GIS – Crew, Person, Routes, PM,
GIS – Mobile
Multiple Map Document
Organization and Site Access
Improved Editing Tools (ESRI)
Map Tips
Task Results Links
Identify Tool
GPS/AVL Feeds

GIS – Maximo Spatial
Embed Map in Key Apps
Link GIS Feature to Mx Entity
Expose GIS controls thru MBOs
Support Point, Linear, Area
Polygon Processing
Geo-processing
Geometric Networks

Delivery Date: TBD

Tavernier

Maximo 7.1

Dispatching Application
Scheduling Route Optimization
GIS – Routes, PM,
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Multiple Map Document
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GIS – Maximo Spatial
Embed Map in Key Apps
Link GIS Feature to Mx Entity
Expose GIS controls thru MBOs
Support Point, Linear, Area
Editing: Version / Non-Versioned
Crew, Persons
Security Enhancements
Geo-Processing
Geometric Networks
Map Tips, Identify Tool
Polygon Processing

Delivery Date: TBD

Biscayne

Maximo 7.1 & ArcGIS 9.3

Crew, Persons
Security Enhancements
Geo-processing - Modelling
Geometric Networks - Tracing
Polygon Processing
Map Tips
Identify Tool - Enhance

GIS – Maximo Spatial
Embed Map in Key Apps
Link GIS Feature to Mx Entity
Expose GIS controls via MBOs
Support Point, and Linear
Editing: Versioned / Non-versioned

Delivery Date: 2008

Matecumbe

Maximo 6.2.1 & ArcGis 9.2

GIS – Maximo Spatial
Embed Map in Key Apps
Link GIS Feature to Mx Entity
Expose GIS controls via MBOs
Support Point, and Linear
Editing
•Versioned
•Non-versioned

Delivery Date: Sept. 2007



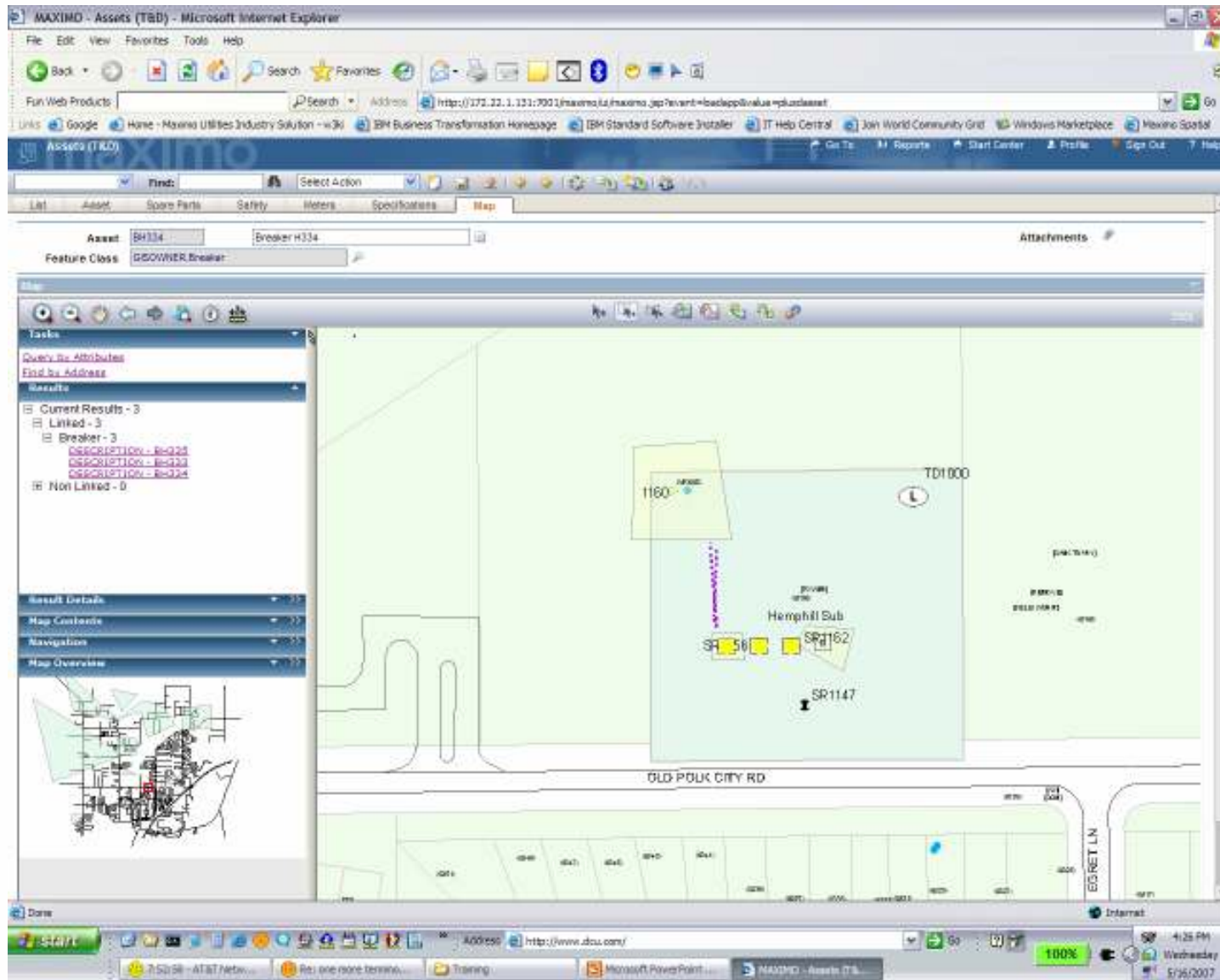
Search for Assets – Breakers -



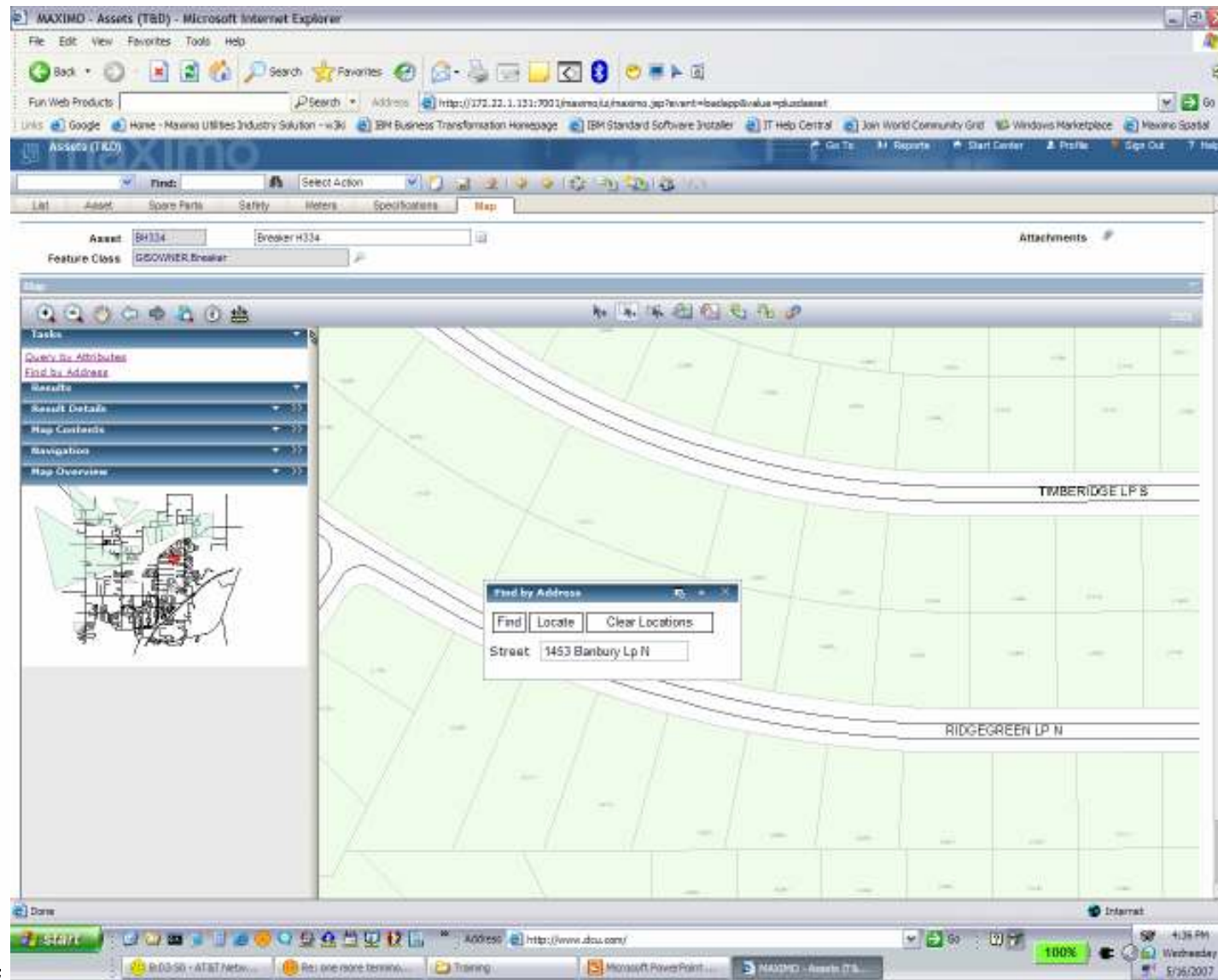
| Asset | Description | Location | Parent | Relating Item | Site |
|-------|--------------|----------|--------|---------------|---------|
| H333 | Breaker H333 | TD1000 | | | BEDFORD |
| H334 | Breaker H334 | TD1000 | | | BEDFORD |
| H335 | Breaker H335 | TD1000 | | | BEDFORD |
| H336 | Breaker H336 | TD1000 | | | BEDFORD |



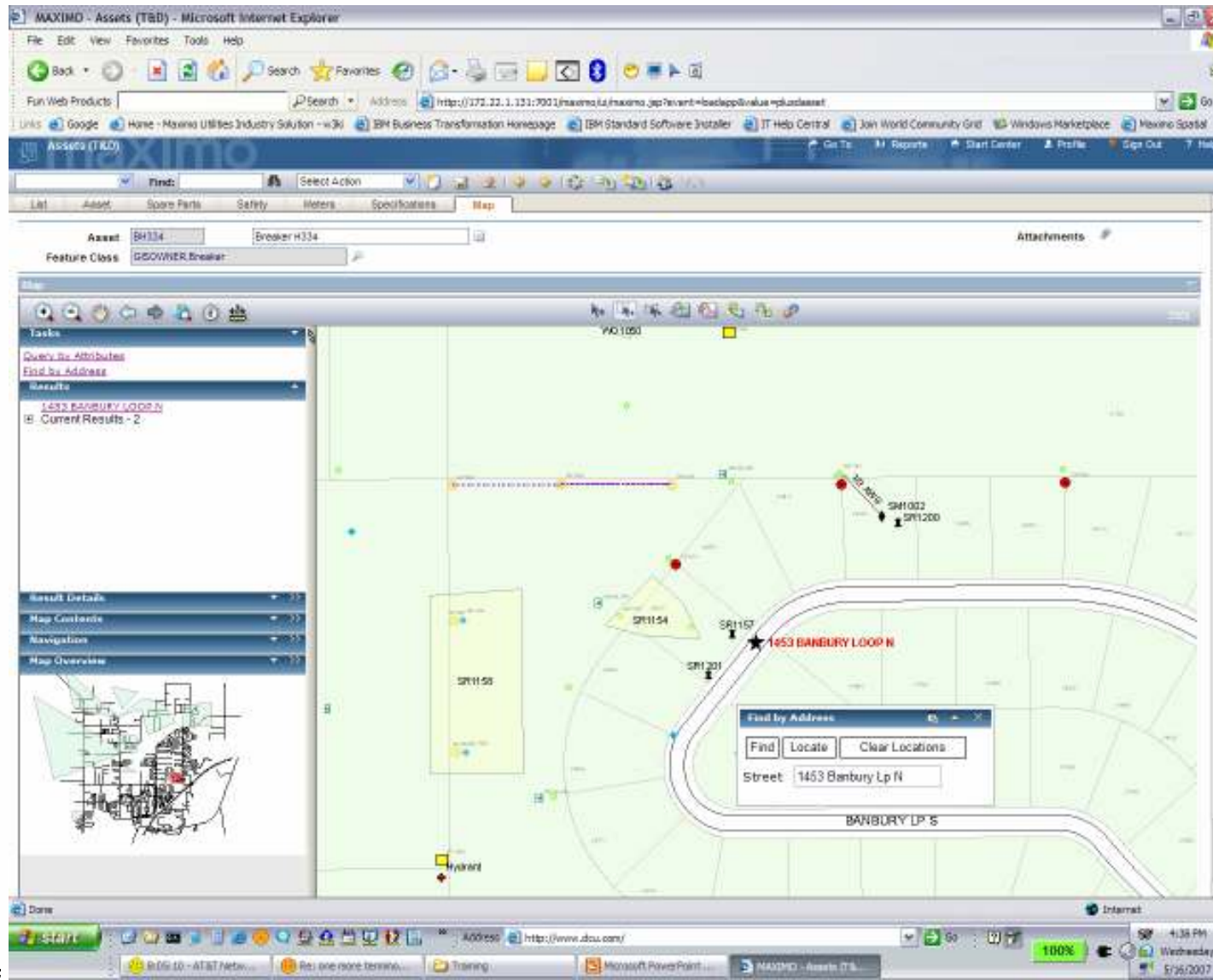
Display Assets on a Map – Breakers at the SubStation



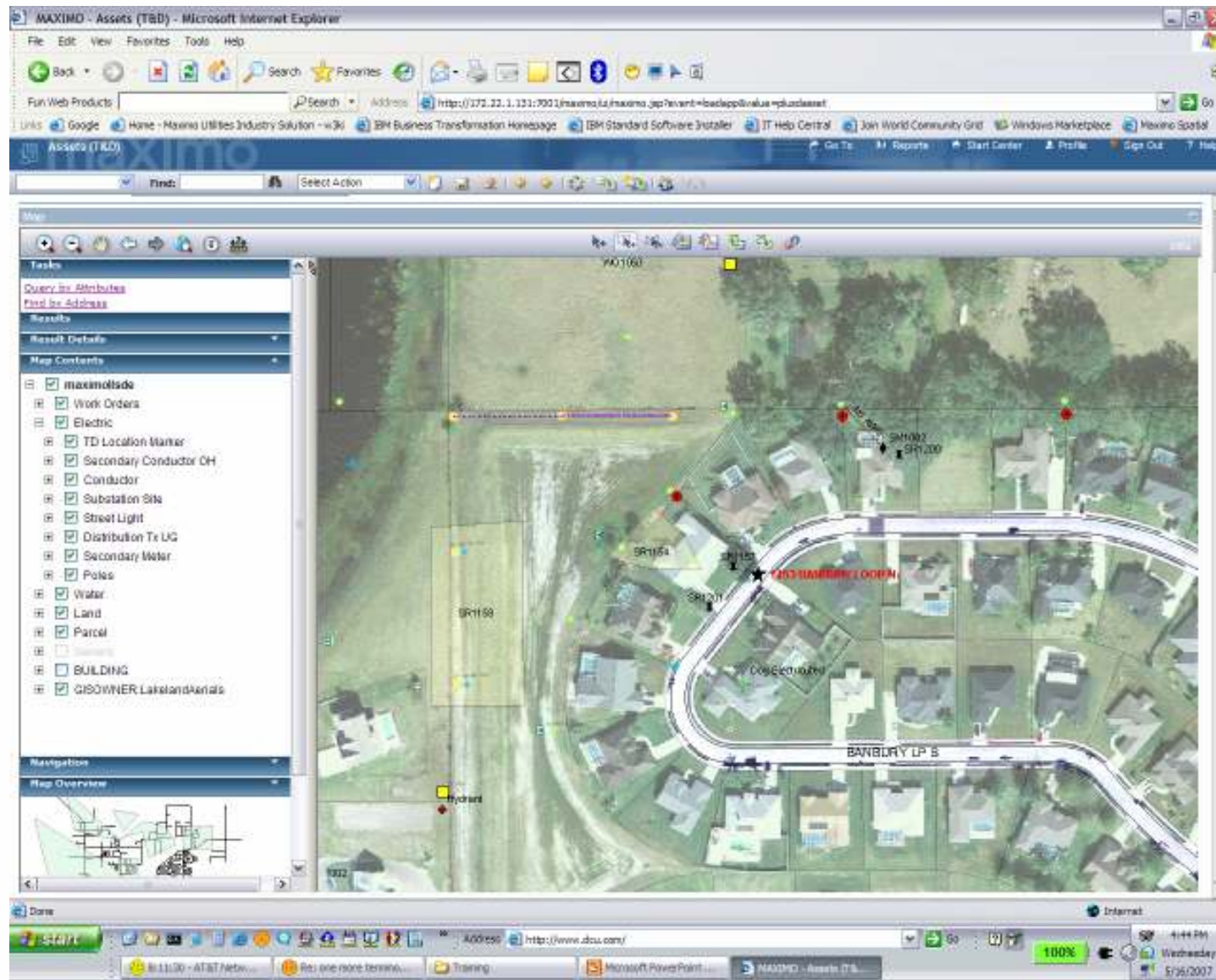
Search for Address

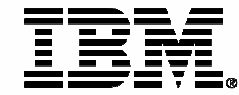


Address Locator Search – Locate on a Map



Add Aerials





Spatially Enabling Enterprise Applications

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Gary Freeman
Advanced Technologies & Architecture
IBM Tivoli

Characteristics

- **Server Based – J2EE**
 - Integrate using ESRI ArcGIS Server 9.2
- **AJAX HTML/JavaScript Client**
 - Embed GIS Web Controls
 - Map, Search, Query, Geo-coding, Identify, Editing, Selection
- **No Data Replication**
 - Extend GIS & Maximo Schema
 - Linkage between Feature Class and Maximo entity

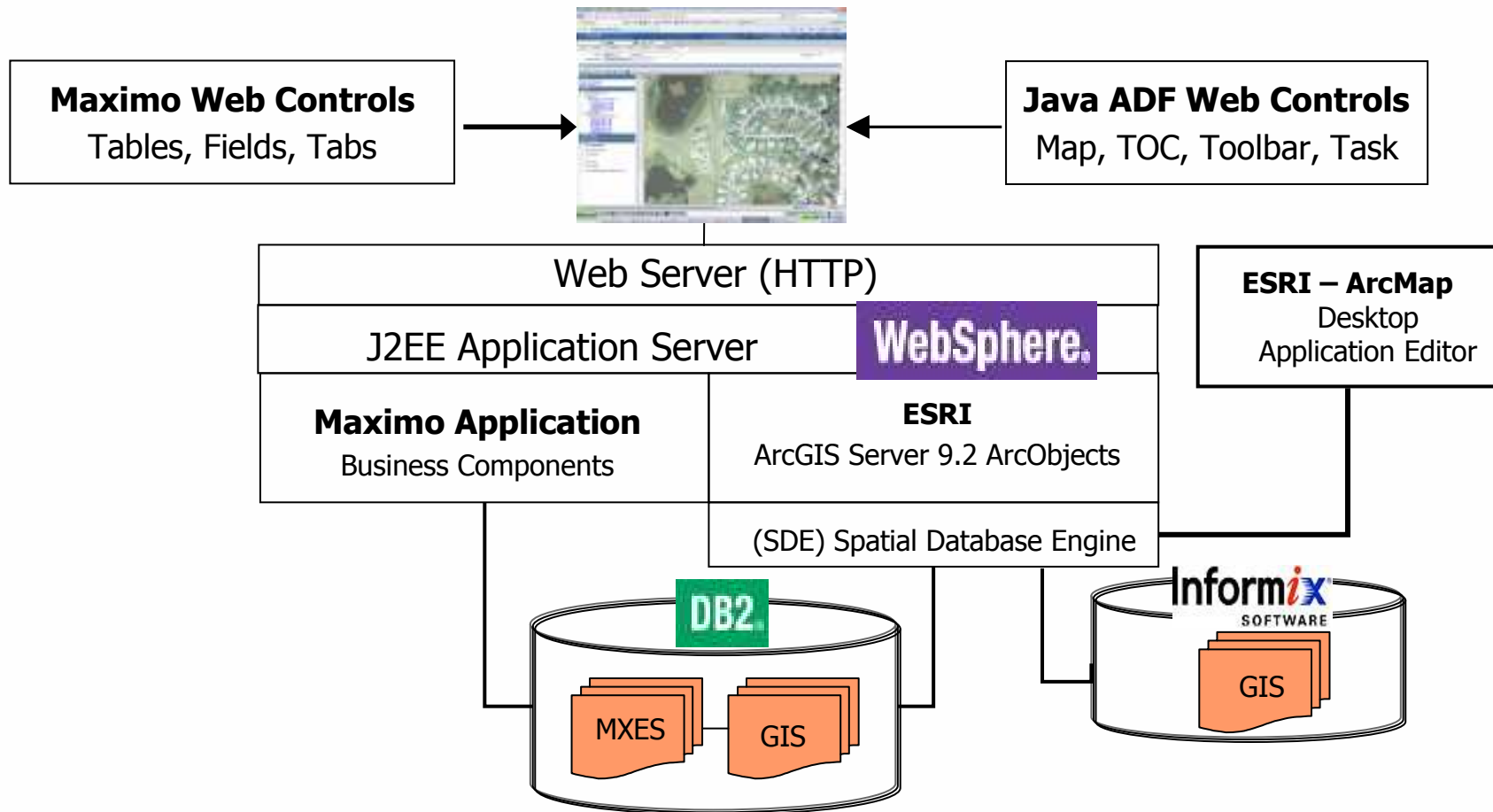
Characteristics

- **Single and Multiple Database Design**
 - Model customer environment
 - GIS data open to the Enterprise as a service
- **Any Maximo entity can be spatially enabled**
 - Service Request, Assets, Locations, Work Orders, Tools, Materials, Labor
- **Support Linear (Geometric Networks)**
 - Roads, Rail, Pipelines, Power lines, Waterways
- **Support Points**
 - Fire Hydrants, Gate Valves, Transformers

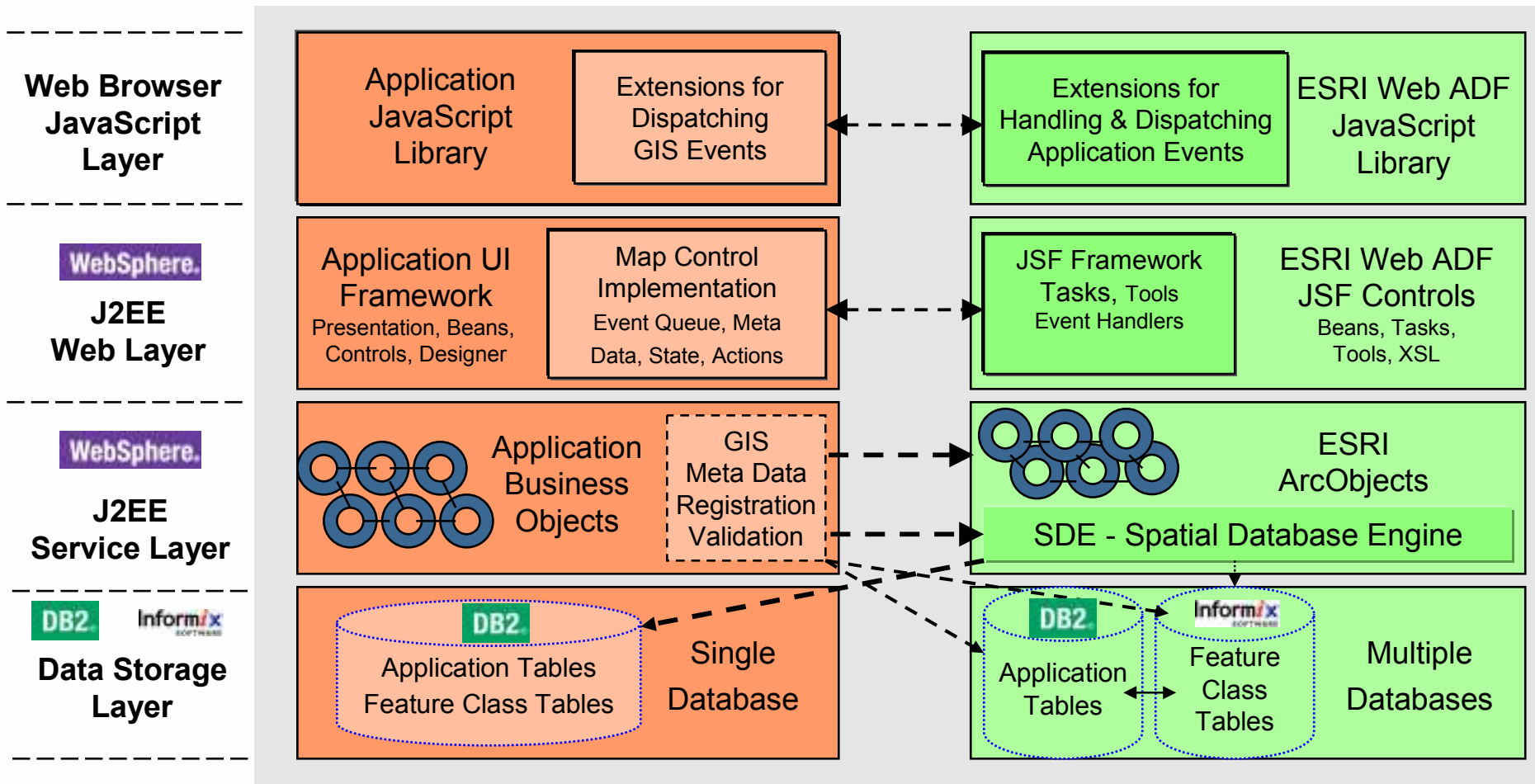
Characteristics

- **Support Area (Polygon)**
 - Forestry, Buildings, Roofs, Service Areas, Campus, Office
- **Support Stored Queries, User Preferences**
- **Expose GIS Functionality Through Application Framework**
 - Highlighting, Selection, Record & Feature Positioning, Result sets
- **Support LBS (Location Based Services)**
 - Directions, Geo Coding & Reverse Geo Coding, Proximity

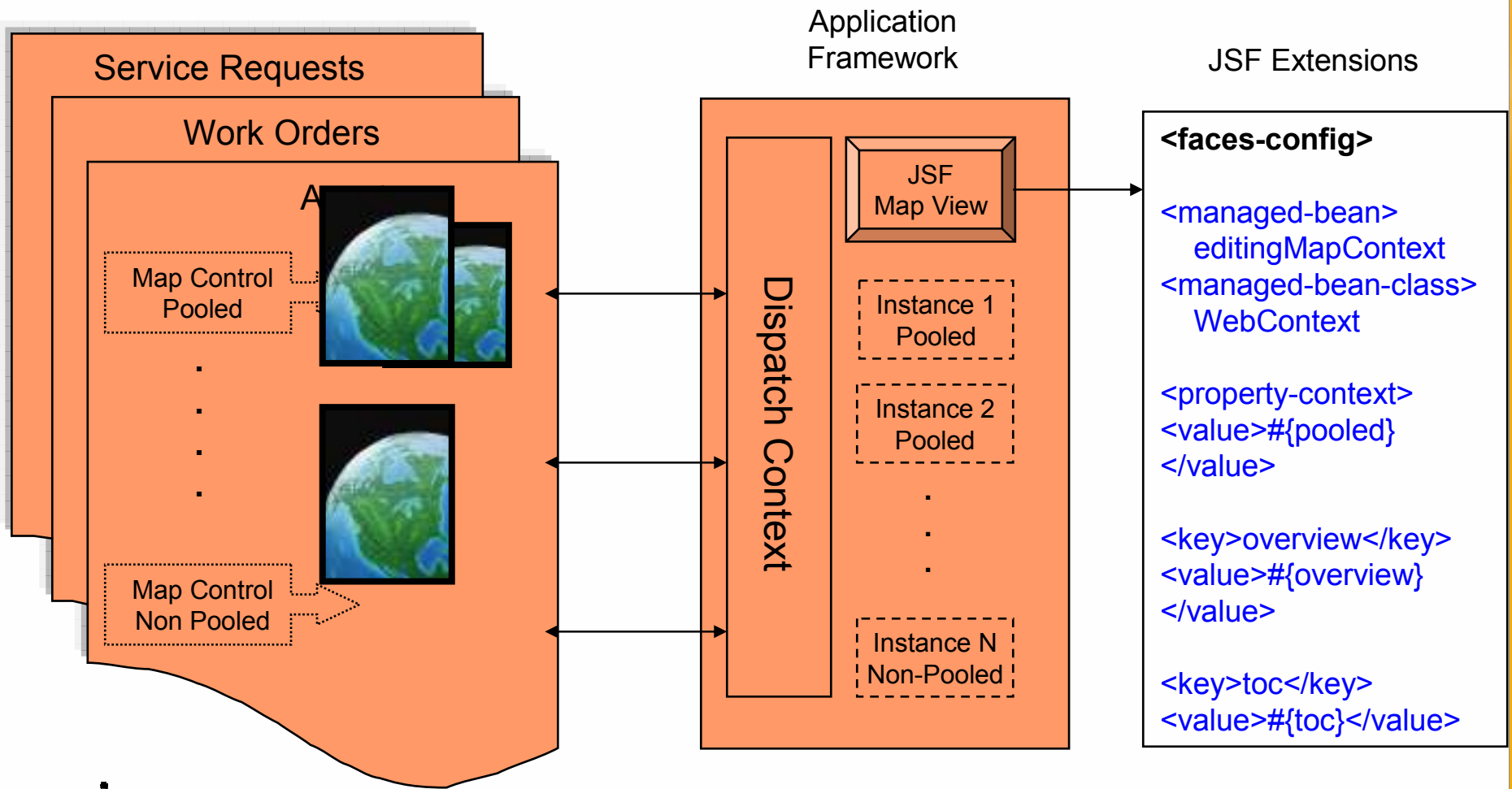
Architecture Design



Architecture Design Tiers



Multiple Map Views 1...N



Extend Schema & Linkage

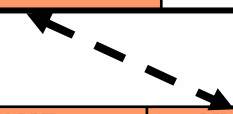
ASSETS

ROADS – GIS Feature Class Business Table

| SHAPE | OBJECTID | NAME | CREATEINMAXIMO | MXASSETUID | ... |
|-------|----------|----------|----------------|------------|-----|
| 133 | 4321 | Main St. | YES | 12345678 | |

ASSET – MXES

| ASSETNUM | LOCATION | DESCRIPTION | FEATURECLASSNAME | MXASSETUID | ... |
|----------|----------|-------------|------------------|------------|-----|
| 1001 | | Main St. | ROADS | 12345678 | |



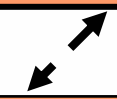
LOCATIONS

PARK – GIS Feature Class Business Table

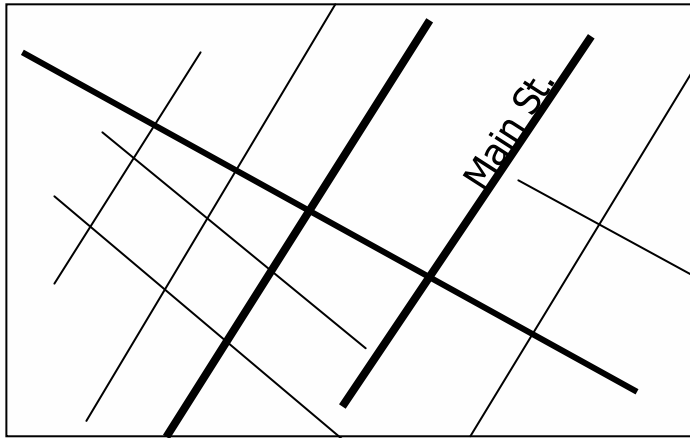
| SHAPE | OBJECTID | NAME | CREATEINMAXIMO | MXLOCATIONSID | ... |
|-------|----------|------------|----------------|---------------|-----|
| 245 | 1234 | Playground | YES | 09922334456 | |

LOCATION - MXES

| LOCNUM | DESCRIPTION | FEATURECLASSNAME | MXLOCATIONSID | ... |
|--------|-------------|------------------|---------------|-----|
| L2003 | Playground | PARK | 09922334456 | |



GIS Feature Class Schema - Foundation



ROADS

| SHAPE | OBJECTID | NAME | ... |
|-------|----------|----------|-----|
| 1 | 1 | Main St. | |

Feature ID

F

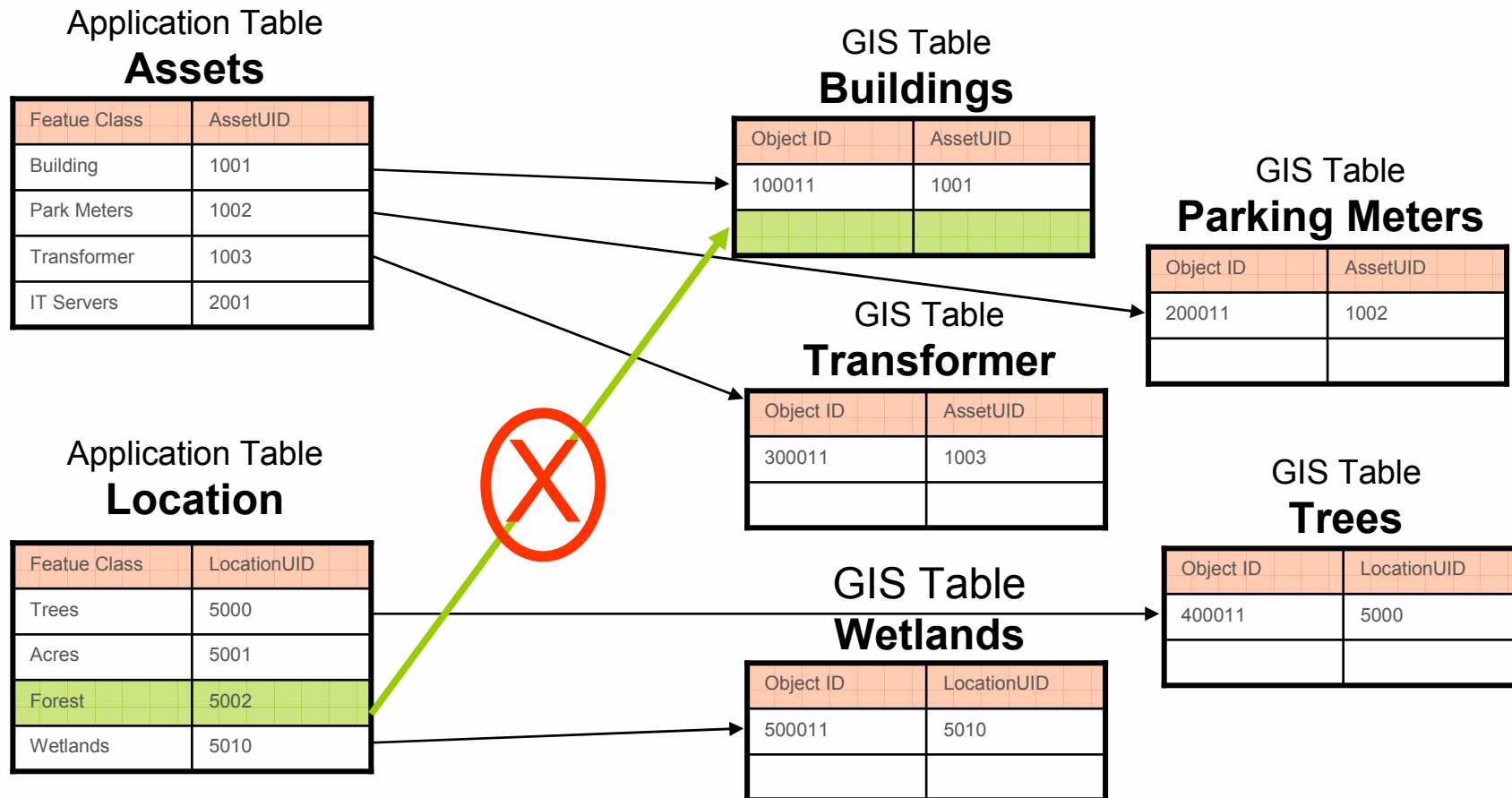
| FID | ... | AREA | LEN | POINTS |
|-----|-----|------|--------|--------|
| 1 | ... | 0 | 926.45 | |

S

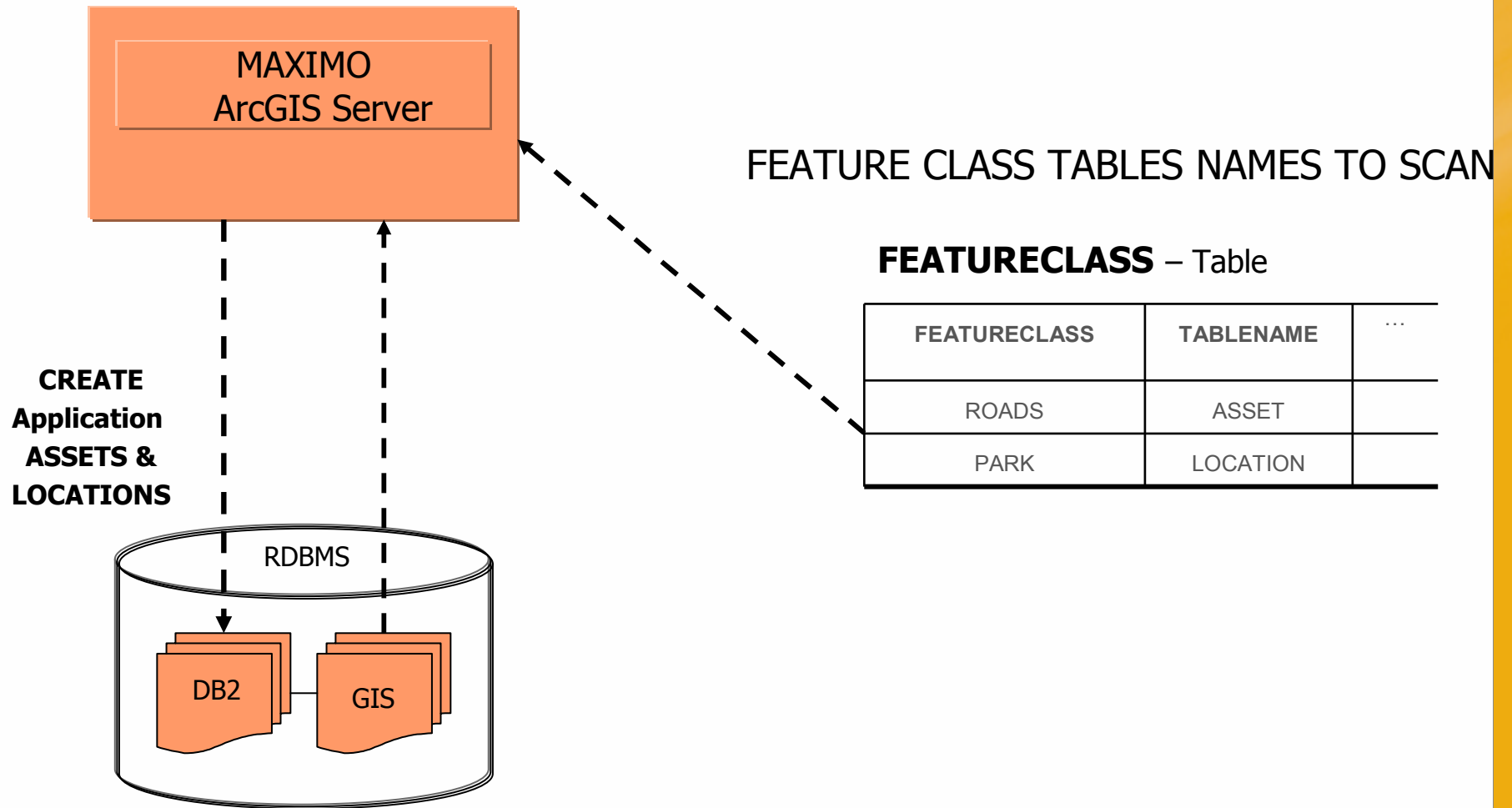
| SP_FID | GX | GY | ... |
|--------|----|----|-----|
| 1 | 7 | 12 | ... |
| 1 | 8 | 12 | |

- **Three Tables**
 - **Attributes:** Business table
 - **Geometry:** Feature table
 - **Spatial index entries:** Spatial index table
- **Joined on** feature identifier **value**
- **F and S-tables include** layer identifier in name

DBMS Mapping



REGISTERED CRON PROCESS TO IMPORT GIS ASSETS, LOCATIONS, ETC





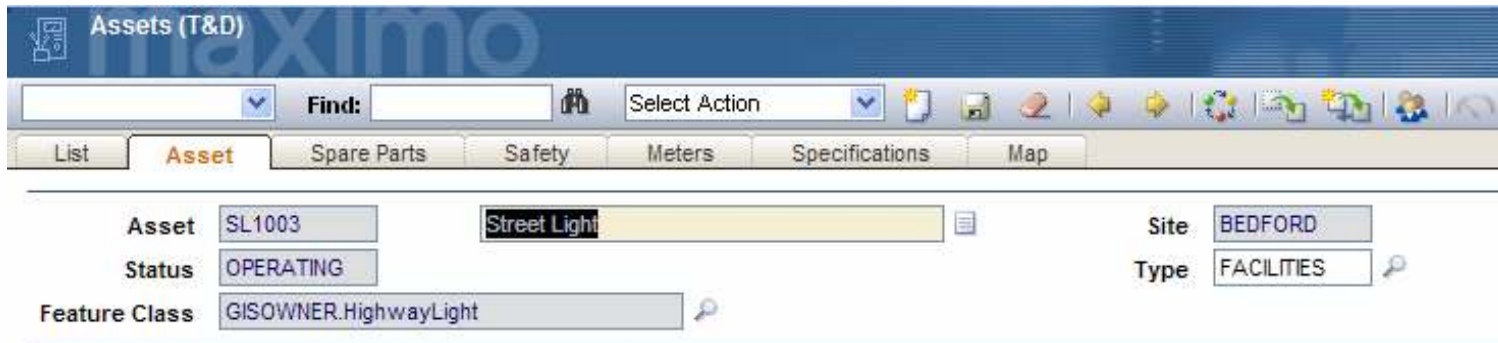
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Spatial Product Review

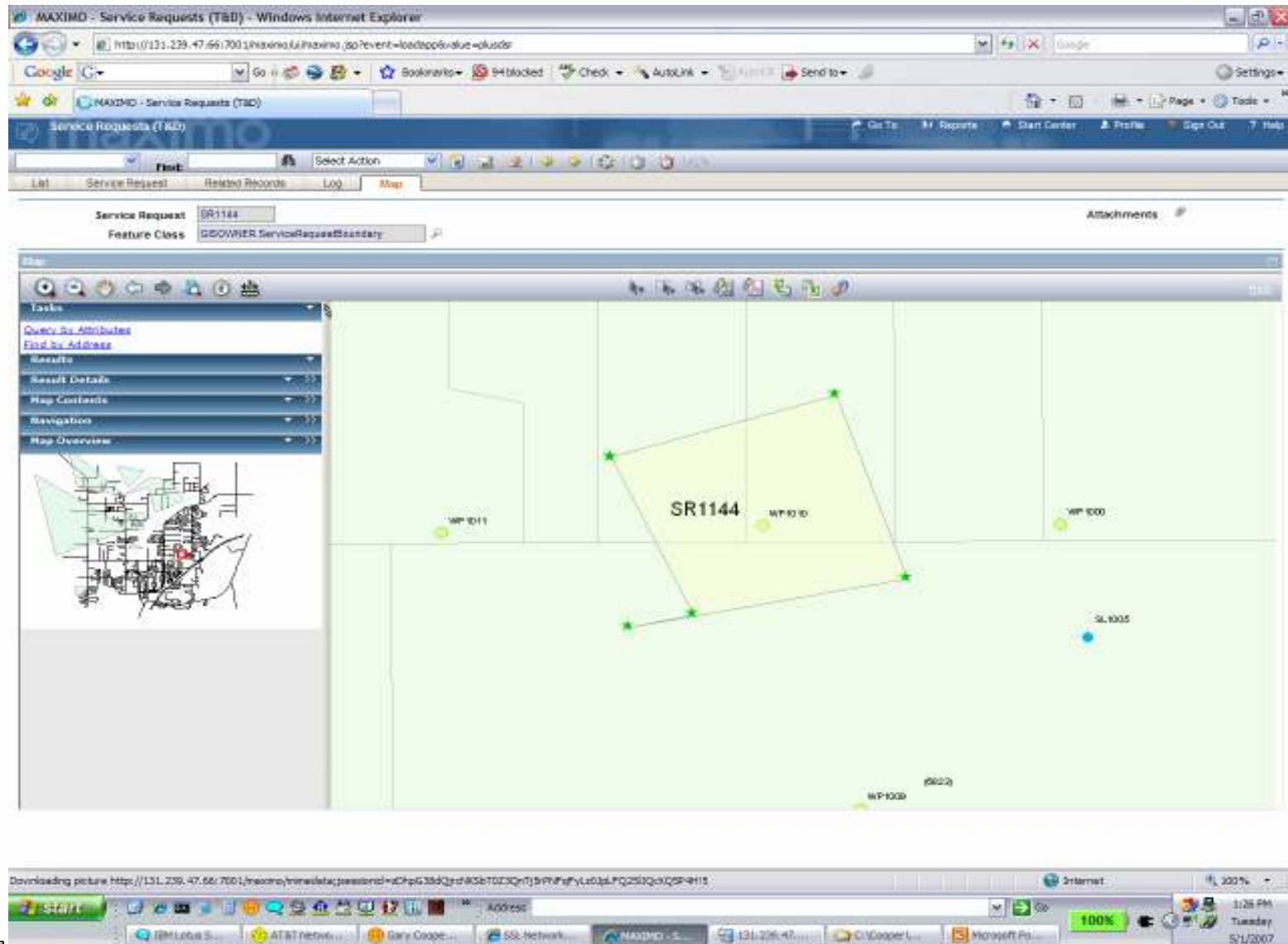
Gary Cooper
Design Architect
IBM Tivoli

Feature Class Name



- Feature Class name has been added to display with record providing visual confirmation that the Maximo record has a GIS feature.
- When map tab is selected the related GIS feature will be in the center of the map view with a star/highlighting to differentiate.

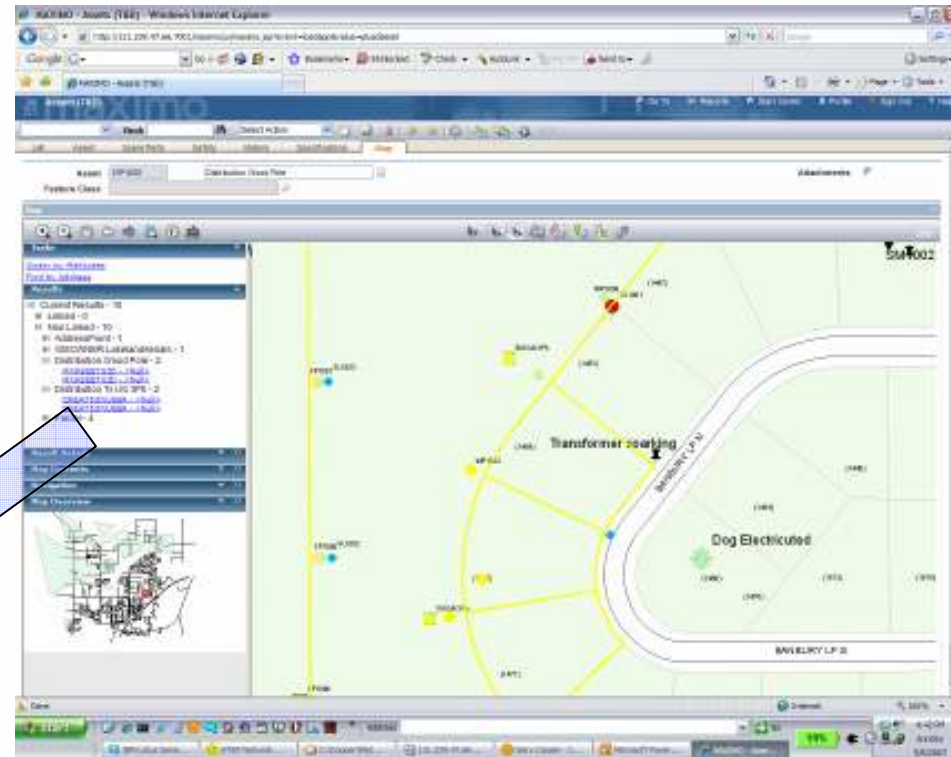
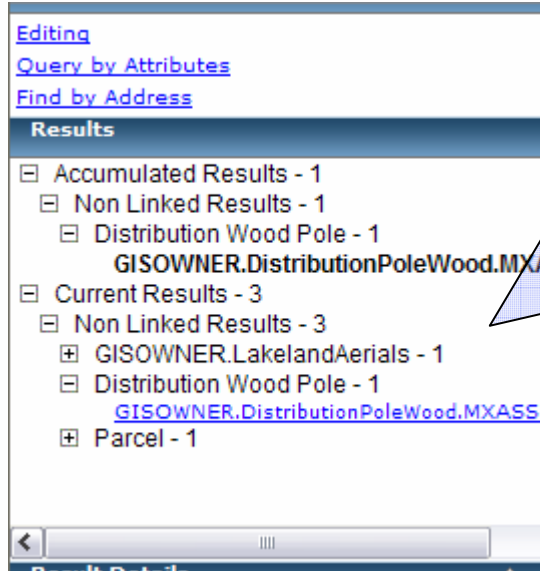
Search for Service Request or Work Order



Task Results



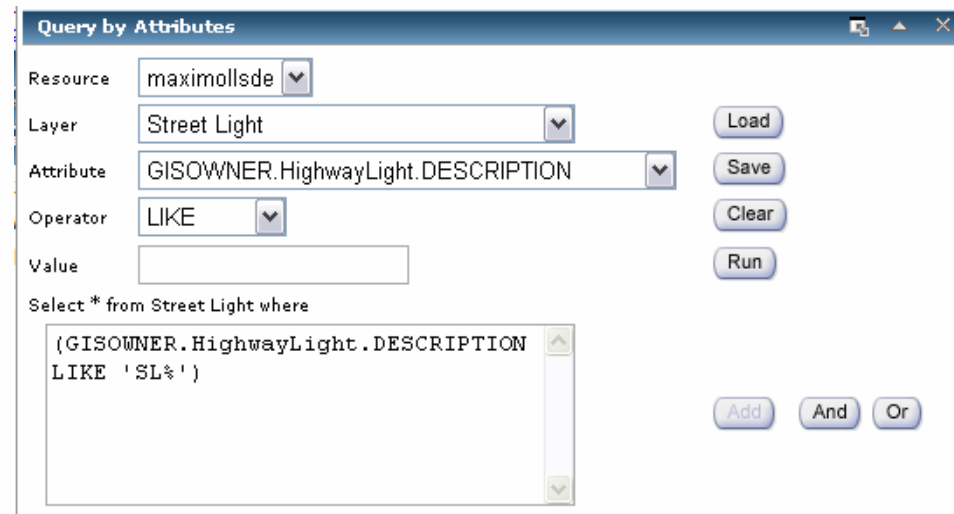
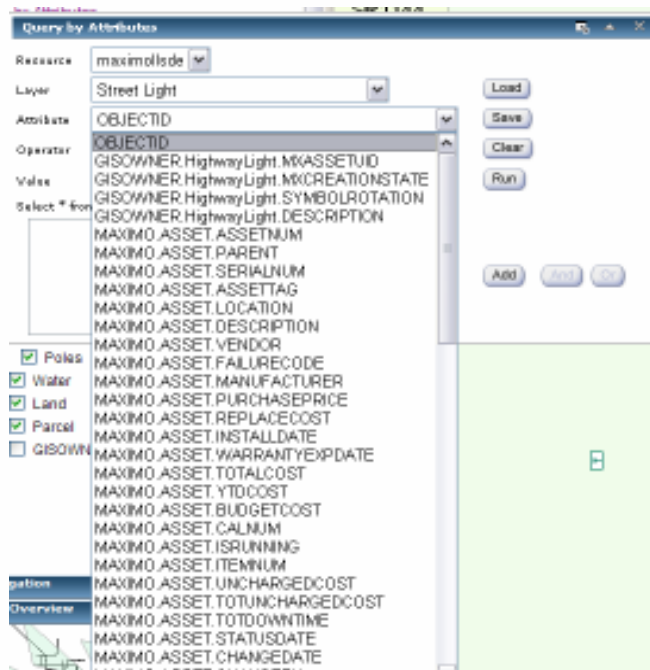
- Task Results Tree
 - Maintains list of features (AR Node)
 - List can define record set in GIS or Maximo
 - Input deck for Geoprocessing (future)
 - Feature Counts
 - Current query results in CR Node



Query Builder



- Queries can be created using the Query Builder
- GIS and Maximo table can be joined so MX columns can be used in queries.



Display Results

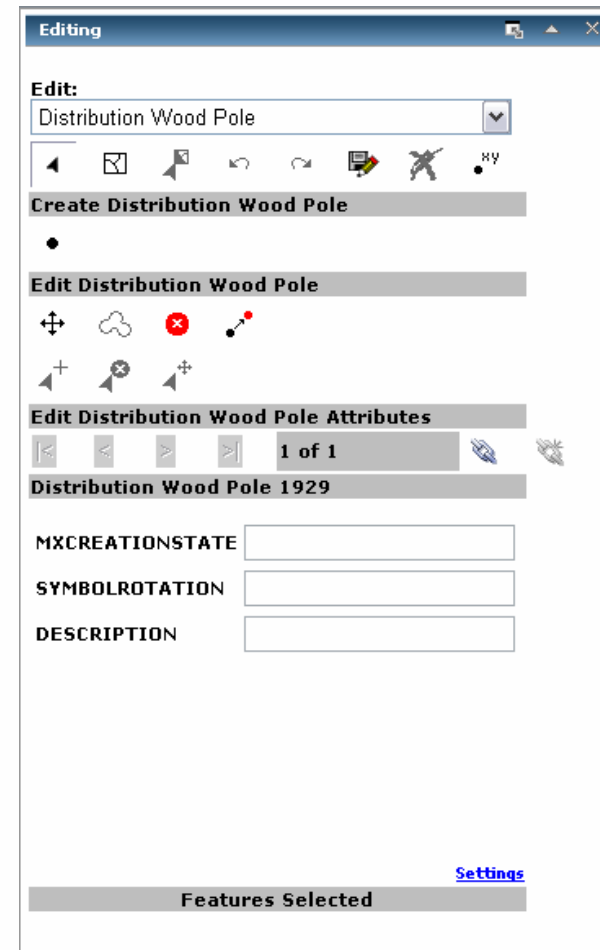


The screenshot displays the MAXIMO web application interface within a Windows Internet Explorer browser. The browser's address bar shows the URL: `http://131.239.47.66:7001/maximo/!maximo.js?event=loadapp&value=plussdasset`. The application header includes navigation options like 'Go To', 'Reports', 'Start Center', 'Profile', and 'Sign Out'. Below the header, there are tabs for 'List', 'Asset', 'Score Parts', 'Safety', 'Meters', 'Specifications', and 'Map'. The 'Map' tab is active, showing a map of a utility area with various assets. A search bar at the top left of the map area contains 'Asset: BL1002' and 'Feature Class: GROWER.HighwayLight'. A 'Query by Attributes' dialog box is open in the foreground, showing the following configuration:

- Resource: maximolode
- Layer: Distribution Wood Pole
- Attribute: DESCRIPTION
- Operator: LIKE
- Value: (DESCRIPTION LIKE 'MPN')

The dialog box also includes buttons for 'Load', 'Save', 'Clear', 'Run', 'And', and 'Or'. The map displays several assets, including a 'Transformer sparking' and a 'Lap'. A red arrow points to an asset labeled '10 Add SM1002'. The map also shows roads labeled 'BANBURY LP N' and 'BANBURY LP S'. The Windows taskbar at the bottom shows the system tray with the date 'Tuesday 5/1/2007' and time '9:32 PM'.

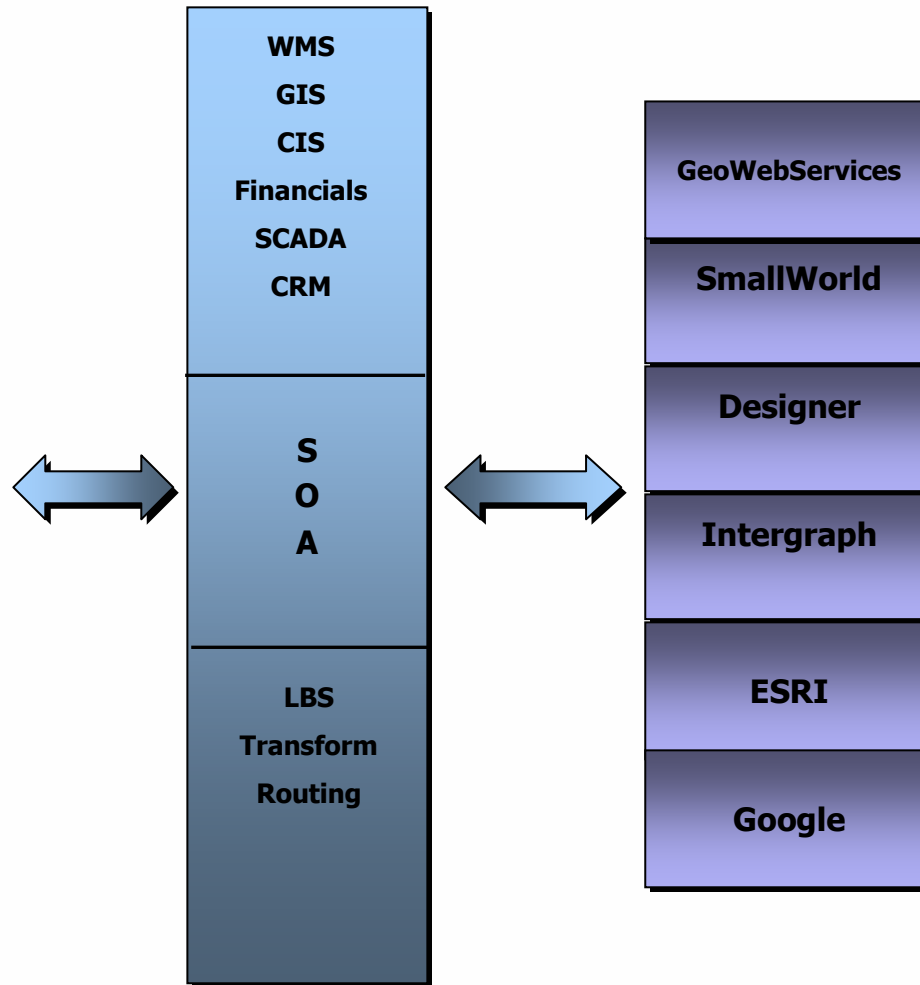
- Create, Modify, Link GIS features
 - Create any feature. Only features related to the current Maximo application can be linked
 - Must create a Maximo record first
 - Create link and save the GIS and Maximo records.
 - Feature Class in Maximo record.
 - Maximo unique ID in GIS feature record.
 - Maximo attributes are edited in Maximo
 - GIS Attributes are edited from the Edit Task dialog



Remote Data Sources

- External Data Sources
 - Remote Spatial Databases – connect in ArcCatalog
 - External data sources can provide themes that overlay the production layers.
 - GPS(AVL) feeds from provider to track resources, assets, tools.
 - Any spatial data not maintained internally is a potential source.
 - FEMA flood planes, evacuation routes, census data
 - Easily integrated to map document simply by creating a connection. (demo add FEMA Flood Plane data)
 - Any web services compatible with ESRI data formats

Interoperability



•Questions?

