Israeli Highways Company (Netivei Israel) Manages Geographic Knowledge with ArcGIS

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"Netivei Israel" is a government-owned company responsible for the planning, development and maintenance of Israel's interurban road network as well as railway development.

The Company manages traffic over more than 7,000 km of roads, 1,200 bridges and tunnels and tens of thousands of traffic lights and lighting points.

The economic value of the transportation infrastructure under the Company's responsibility is estimated at more than 20 billion USD.
Core Components of Geographic Knowledge

- Highways infrastructure
- Maintenance
- Traffic control
- Accidents
- Inventory
- Projects
- Planning
- Cadaster
Geographic Knowledge in Numbers

- 247 feature classes
- 8,513,912 features
- 151,717 attachments
- 359 users
- 1,334,468 transactions in 2015
Approach

- Centralized storage and management
- Knowledge dissemination by organizational GIS portal
- Configurable and metadata driven
- Ease of management
- User Experience
- Personalization
- Extensibility
Implementation

- MS Windows Server 2012 OS
- MS SQL Server 2012 Database
- ArcGIS Server Enterprise Advanced 10.3
- GIS Portal (developed with ArcGIS JavaScript API)
- ArcGIS Server Basic 10.3 Geodatabase
- ArcGIS Desktop
System Architecture

End User

GIS Portal

Presentation Engine
Metadata Engine
Interfaces Engine

ArcGIS Server Enterprise 10.3
ArcGIS Server Basic 10.3
MS SQL Server 2012
Configurable and Metadata Driven System

- Behavior of every object (layer, field, attachment, tool, interface) is defined by its metadata and is highly configurable by changing the metadata only.

- The system supports separation between physical data and user presentation of data. System manager can easily create multiple user-oriented views of physical data by configuring metadata only.

- Extensibility – the knowledge database may be extended endlessly with new objects.
Ease of Management

- The system is managed by user-friendly web-based management application
- System management does not require in-depth knowledge of underlying ESRI software
- System manager can easily adapt the system to changing users requirements, without a need for DBA or programmer and without intervention to underlying ArcGIS infrastructure
- Flexible metadata driven interfaces engine provides painless integration capability. Today the system is integrated with 24 various systems
User Experience

- User interface inspired by Bauhaus "Less is More" principle: it is intuitive and not overloaded
- Familiar UI elements are used – search bars, table filters etc.
- User does not need to know GIS to operate the GIS
- No need for extensive training
GIS Portal

GIS Portal front end

Cluster Accident Presentation
GIS Portal

Tools repository
Database Explorer

Intuitive database exploration
Personalization

- User can save state of application at any given moment (create personal workspace)
- The saved workspace includes: layers, searches, filters, redlining, annotations, open screens etc.
- User can further retrieve a workspace. The application will recreate the saved state, displaying layers, applying searches and filters, redlining etc.
- User can share workspace with other users by email (a workspace is sent as a hyperlink)
- Personal workspaces is a very powerful component of system’s user experience
Extensibility

- Crowdsourcing methodology: user are constantly enriching the content with new information: layers, features, attachments, geotagged images etc.
- Management application lets system manager to quickly add new services to system repository
- User can upload new attachments (unlimited amount)
- User can email geotagged image to the system. The image is added to geotagged images layer by extracting XY information from image EXIF
Extensibility Example – Traffic Lights

- Traffic lights data is updated by GIS users
- Users employ video log module (a stream of geotagged images captured by special vehicle) for virtual travel along the highway
- When a traffic light is spotted, the user either creates new traffic light in the GIS layer or updates the existing one
Extensibility Example – Traffic Lights

- Traffic lights data is updated by GIS users
- Users employ Virtual Trip tool (a stream of geotagged images captured by special vehicle) for virtual travel along the highway
- When a traffic light is spotted, the user either creates new traffic light in the GIS layer or updates the existing one
Traffic Lights Step 1 – Use Database Explorer

Find traffic lights layer
Traffic Lights Step 2 – Engage Virtual Trip
Make a virtual trip along the highway until you spot a traffic light
Traffic Lights Step 3 – Edit Data
Add and edit traffic light feature
Benefits

- Accessible geo-knowledge across organization
- Knowledge preservation – everything is stored in a central database
- Users motivation – GIS portal is both powerful and simple to use. This motivates users to use the system and enrich the context
- Knowledge availability means Efficiency
Thank you!