Enterprise GIS in a Commuter Rail Environment: State-of-Practice at a Major Northeastern Carrier

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Abstract

Triggered by both Superstorm Sandy’s aftermath and a minor operational incident—where accurate and rapid mapping would have been tremendously helpful—Metro-North Commuter Railroad deployed its first Enterprise Geographic Information System (GIS) in 2012 by federating existing departmental systems, creating a companywide Office of GIS Coordination, promulgating GIS policies and standards, and developing and marketing a uniform set of web mapping viewers designed for all employees. This paper describes the state-of-practice and a checklist of strategies utilized to promote a new technology that, by its very nature, requires interdisciplinary collaboration and coordination within a proud organization steeped in a rich tradition of craft and developing and marketing a uniform set of web mapping viewers designed for all employees. This case study offers a glimpse of how incrementalism and a web-based rapid deployment strategy can overcome institutional inertia, culminating in an ongoing culture transformation where GIS became a common acronym understood by many functional groups and managerial levels within the organization. While there will always be different degrees of GIS readiness across departments, many employees at Metro-North now see the value of GIS and proactively seek it out as a resource to improve their daily work where circumstances warrant.

Early Strategy

• Hire GIS Specialist
• Sizing Enterprise GIS Infrastructure
  - Small-Scale but Expandable Infrastructure
  - Leverage Enterprise Virtual Servers
• Federated Approach—Sharing of Responsibilities

Enterprise GIS Web Viewers

• Enterprise GIS Viewer
  • Track Department Automated Sensor Data
  • Census Demographics
  • Environmental Features
  • Superstorm Sandy Cable Job
  • Quasi-Public Facilities
  • West-of-Hudson Signal Project As-Built
  • Integrated Google/ Bing Street View
  • Topographical Contours
  • Grand Central Terminal Floorplan
  • New Haven Railroad Val Maps
  • Westchester County GIS

GIS Data Layers

• Map infrastructural features, on web applications
• Publicly available GIS layers overlaid with railroad locations
• Link existing PDF maps into viewer as repository of drawings
  - Signal block plans, Power sectionalizing diagrams, Val maps, etc.
• Avoids labor intensive Gofering of maps
  • Google Maps and Street View integration at critical points

GIS Policies and Standards

• Software
  - Open Source
  - Data Security
  - Data Hygiene Procedures
  - Human Capital
• Establish Data Ownership and Update Responsibilities

Internal GIS Marketing

• Portal: “At a glance” GIS resources wilderness
• Open REST Services Directory
• Ask Project Manager to Approve: when receiving data, always circle back to PM (more for education than for review)
• Early Products: use 3D visualization, heat maps, infographics, etc.
• Circulate example map to generate interest
• “Infor-mercial” Videos: like home shopping
• Email Blasts: exec. level “This is what GIS can do”
• Roadshows: visit regular departmental meetings or set up special targeted sessions
• Employee Newsletter Article: provided needed buzz to encourage conversation and prompt folks to try the web applications.
• Software Training
• Monitor Enterprise GIS Usage

Concluding Observations

As Metro-North’s Enterprise GIS program enters its third year, GIS is becoming a common acronym on the railroad. Software was purchased and installed, staffing is in place, policy and procedures were promulgated, and employees were trained. Data was acquired and for the most part, web strategy was successful so more departments are requesting features they need and contributing GIS data to the crowd-sourced and federated companywide effort.

Trigger Events

• Westport 1532 (2011-07-12)
  - Real-time train location
  - Emergency access to PDW
  - Fire/EMS jurisdictions
• Hurricane Sandy (2012-10-29)
  - Real-time train tracking
  - Element of key rail
  - Post-event insurance claims
  - Mapping recovery efforts
  - Flood proofing future design

Three states, twelve county service areas, and 2,701 square miles.

Five lines, three branches, 384 route miles, and 775 track miles.

1,072 bridges, 119 grade crossings, and 77 illustrations.

124 stations, 1,258 railcars, and 711 weekday departures carrying 246K customers.

Full service commuter railroad with engineering responsibilities for track, signals, power, structures, stations, and railcars.

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