A Field Server Approach to Managing Utility Field Crews

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Agenda

- The business case for field crew automation
- A field server approach for deploying ArcGIS and other enterprise data in the field
- The TruckMap* Field Information System
Mobile Computing Can Have Impact

- 40% to 60% of utility company staff perform most or part of their daily work tasks away from the office

- Significant organizational resources are expended in support of field operations
Field Crew Overhead Legacy

Cox Cable Survey:

- 57% on the job time - *installing and servicing*

- 31% job-related overhead - *driving to site, communicating with dispatch, awaiting assignments, completing paperwork*

- 7% management related overhead - *meetings, training, reporting*

- 5% downtime – *meals, etc.*
Field Users of Utility Data

- Maintenance Crews
- Outage Repair Crews
- Linemen
- Inspectors
- Engineering
- Facilities Designers
- Meter Readers
- Construction and Stake Out
- Surveyors
- Field Supervisors
- Sales Reps
- One Call Services
GIS in the Field

ArcGIS

Mobile GIS
But…GIS is only part of the story

Load up the truck, guys -- our GIS found a section of road that has never been dug up!
Mobilization of Vertical Applications

Enterprise Systems

Field Work

Enterprise View

Construction Tasks

Inspection Orders

Maintenance Orders

Work Orders

Trouble Orders

Service Orders

Meter Orders

ArcGIS

CAD

Assets

SCADA

CIS

WMS

OMS

ENG DES

Mobilization of Vertical Applications
But...field crews are different
Field View of Enterprise Data

Enterprise Systems

Extract, Amalgamate, Translate, Compress, Synchronize

Field Work
A field crew view of data
Field Information System

- Focused on field information & field crew work processes
- Mobilizes large amounts of spatial and tabular data
- Provides enterprise data extracts needed in the field
- Common architecture for all field applications (client/server)
- Supports mobile and field management applications (dispatch)
- Centralized security, system administration, software updates
- Utilizes low-cost handheld computers and PDAs
Why not wireless Internet in the field?

- Reliance on multiple network administrators makes it slow and unstable
- Minimum use of ‘gloves on’ field interfaces
- Not optimized for complex user interactions frequently needed for GIS in the field
- Slow response for real-time navigation
- Best for casual field users
Client/Server ‘Load & Go’ Approach

- Data loaded via docking and/or Wi-Fi
- Short bursts of data for updates and messaging
- Do not need to rely on availability of wireless (durable connections)
- Application speed and user interface tailored to field users
- Accommodates multiple wireless network services
- Best for dedicated field applications
Wi-Fi Hot Zones

- Hot spot in fleet yard
- Passive transfer of data and work assignments
- Automatic software upgrades
- Fast “Load and Go” approach
Enterprise Mobile Access

Mobile Computer

Casual Field User

Web Server

Corp DB

Enterprise Applications

Field Server

GIS Applications

GIS DB

Web-enabled

Field-enabled

Dedicated Field User

Mobile Computer

Web-Browser

Casual Office User
TruckMap™ Field Information System
TruckMap* Architecture

**Tier 1:**
- **Enterprise**
  - Relational Databases
  - Geographic Information Systems
    - Engineering Design
    - CAD Systems
  - Customer Information System
    - Trouble Call/Outage Management
    - Work Management System

**Tier 2:**
- **Field Server**
  - Dispatcher:
    - TruckMap* Office PC
      - (GeoMessenger)
  - Durable Wireless

**Tier 3:**
- **Field Clients**
  - Service Crew: TruckMap* Recon
  - Contractor Crew: TruckMap* PC
  - Trouble/Outage: TruckMap* Recon
  - Inspector/Survey: TruckMap* GeoXT
  - Durable Wireless
TruckMap* Key Features Summary

- A SINGLE, OPEN ENVIRONMENT supports full range of field and dispatch applications across the enterprise
- IN THE FIELD sketches, notes, incident reports, query, map rendering and routing provide full compliment of capabilities
- Office-to-field and peer-to-peer MESSAGING and TRACKING keeps dispatchers and field supervisors in touch with field staff
- Integrated GPS, wireless and moving map display, provides a VEHICLE TRACKING solution
- Field Crew locations displayed on the map both at the dispatch center and IN EACH CREW UNIT
Available Mobile Hardware

- **HP iPAQ 5550**
  - PocketPC

- **TDS Recon**
  - Rugged PocketPC

- **Fujitsu PenCentra**
  - HandheldPC

- **Advantech MobiPanel**
  - Rugged HandheldPC

- **Mentor Engineering Stryder AVL**
  - HandheldPC

- **Itronix GoBook**
  - Rugged XP Tablet PC

- **Panasonic Toughbook**
  - Rugged XP Tablet PC

- **Fujitsu Stylistic**
  - XP Tablet PC

- **Trimble GeoXT**
  - Rugged GPS

- **Trimble Pocket Pathfinder GPS**

- **GPS Cards**

- **---- Wireless Modems ----**
  - GSM/ GPRS
  - CDMA
  - 1XRTT
  - CDPD
  - NexTel®
  - Ricochet®
  - WiFi
  - 802.11x
ArcGIS and TruckMap*

- TruckMap* compatible with ArcSDE, Geodatabase, Oracle and other databases
- GIS feature attributes and network connectivity available in the field
- Redlines captured on georeferenced background map image files
- Combines ArcGIS data with other enterprise system data for use in a single, coherent field application
TruckMap* Office – Crew Tracking
Jim, the parts for step transformer 3467-ASR just arrived at the warehouse. Swing by and pick them up at lunch today. Bill
TruckMap* Field – Service Locate
TruckMap* Field – Customer Locate
TruckMap* Field – In-vehicle Routing

Path distance: 26.4 miles (42.4 km).
Path travel time 0.6 hours (33 minutes).

Starting on HAVANA ST head South (Straight) and travel for 0.03 miles (0.05 km).

Turn West (Right) onto CO-44\E 104TH AVE and travel for 6.23 miles (10.02 km).
TruckMap* Field – Notes, Photos, Incidents
TruckMap* Field – Redlines & Sketches
Mobile Work Force Management
Two Landbases and a Facilities Layer
Maps and Forms on PDAs
Modular to Meet Every Mobile Need

- Sending work orders to field crews and sending work status back to the dispatcher: GeoMessenger™, GeoForms™

- Support both unplanned and planned work tasks in the field: GeoRouter™, GeoTracker™

- Display GIS maps in the field with update of network components and maps: GeoIllustrator™, GeoNotes™

- Field units easily customizing for unique business processes: GeoConfigure™, GeoForms™

- Download & upload of spatial and tabular information from multiple GIS and enterprise applications: GIS Interfaces, GeoUpdater™, GeoQuery™
TruckMap* Value Summary

- Scalable solution that integrates with GIS and ERP
- Compatibility with ODBC, ADO, SQL, Oracle, XML, SOAP
- Powerful data compression and compaction
- Work connected or disconnected without interruption
- Field-friendly query and locate of enterprise data
- Customizable forms, map sketches, field notes, & documents
- Quickly deployed and modified out-of-the-box
A Field Server Approach

Questions and Answers

“That’s right, stick up for the utility company!”