Capacity Title: Spill Site Tracking System (SSTS)

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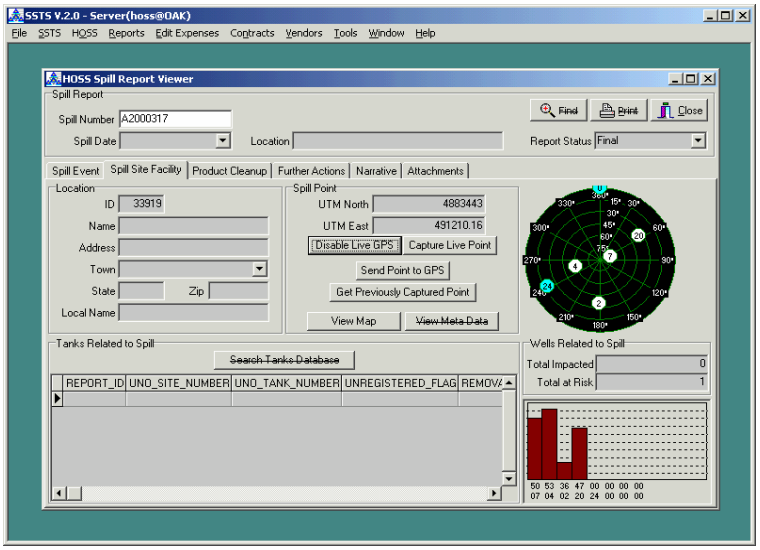
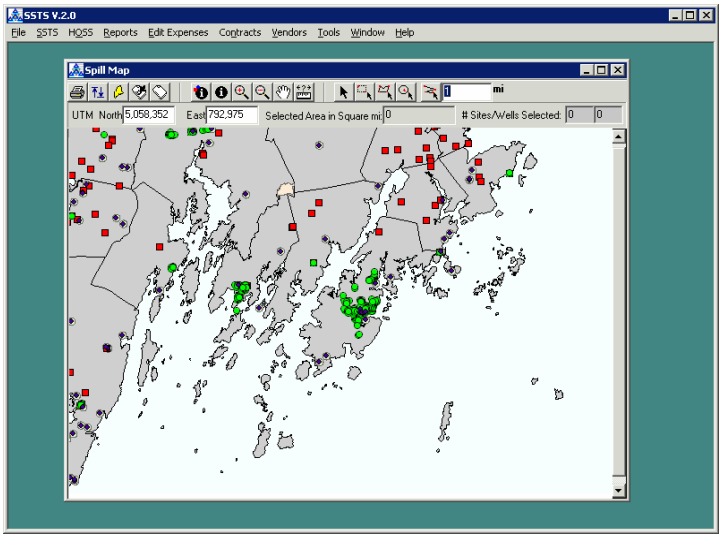
Key Features:

- Integrated ArcObjects Map display
- Automated printing of default layout with ArcObjects
- Import GPS points directly into the Geodatabase
- Collect Feature Level Metadata directly into the Geodatabase
- Synchronization of field edits with the Enterprise Geodatabase



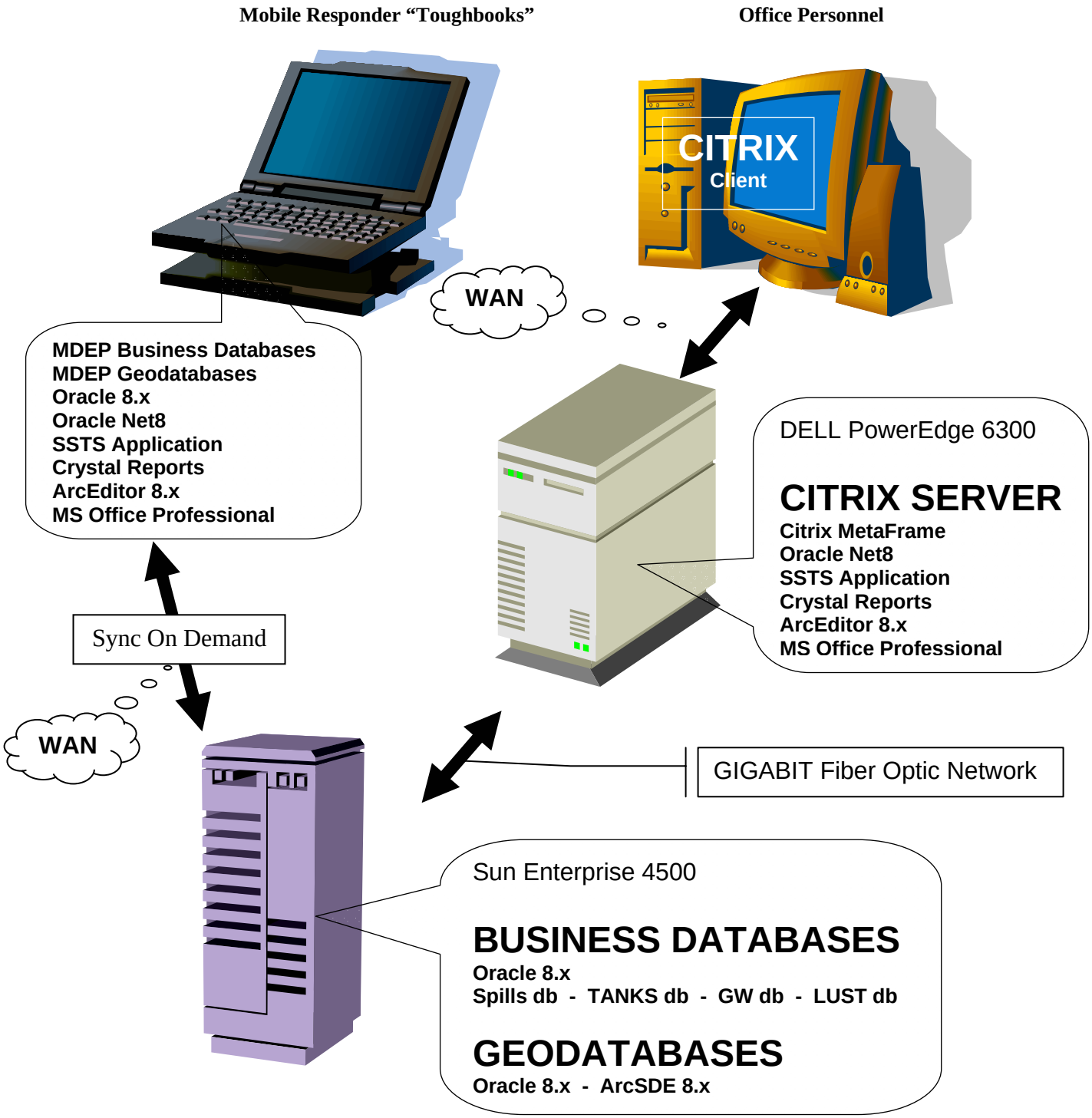
System Overview: The Bureau of Remediation, Recovery and Waste Management (BRWM) includes the Division of Response Services, whose statewide staff of approximately 25 are known as "responders." On a round-the-clock basis, they are the first official representatives on the scene of an oil, hazardous waste or hazardous materials spill, interacting with up to 2,700 spill events every year.

We built an ArcObjects embedded application that integrates spatial and operational data from a variety of departmental systems and their enterprise GIS that is used by all personnel whether in the office or in the field. Field response hardened laptops run ArcGIS, and Personal Oracle with ArcSDE. Several custom utilities we developed manage disconnected editing, synchronization and versioning, as all 25 responders have concurrent disconnected editing privileges and must re-sync upon return to the office without corrupting the geospatial database.



SGCi Penobscot Bay Media (SGCi), an ESRI Business Partner working closely with BRWM, developed The Spill Site Tracking System (SSTS), an enterprise-wide database and GIS system. This application gives responders access to a wide range of hitherto unavailable data, whether in the office or at a spill site. Responders can now take laptops to the field with current copies of all relevant MDEP databases and spatial data. SSTS references existing MDEP data sets and provides more complete and accurate reports, now available to concerned parties throughout the system.

Image of System Concept: SSTS is a custom application using embedded ArcObjects supporting office users as well as 25 mobile responders and disconnected editing.



Operational Capability: The Spill Site Tracking System (SSTS) provides the capability for oil and hazardous material spill responders to access critical GIS data that directly impacts the effectiveness of their spill cleanup activities and the accuracy of their spill reports. SSTS provides extensive historical data about other spills and helps responders pinpoint the public health and environmental risks that might otherwise be ignored or underestimated. With SSTS, responders now have seamless, integrated access to both spatial and business relational databases. SSTS has been designed for use both in the office (while connected to shared enterprise databases) and in the field with built in synchronization mechanisms for the business and spatial databases. SSTS includes the following features:

Integrated access to business and spatial data: SSTS is currently used to access information across multiple Oracle business databases and a single enterprise spatial database engine (SDE). It could be customized to access any number and type of business databases and/or multiple spatial databases. When viewing or editing a spill report within SSTS, users can click on a "view map" button to display a map along with the spill point that had been previously saved for that spill report. While looking at the map, users can view different spatial layers within the geodatabase including tank locations, streams, wells and other environmentally relevant spatial data.

GPS point capture capability with feature-level metadata: The primary area of SSTS used by responders is the spill report window. This window allows users to edit the relational data that is stored in the business database. This window also includes the ability to capture a GPS point directly from a GPS unit connected to the computer's serial port and it includes the ability to capture saved GPS points from some GPS models. Feature level, FGDC compliant metadata is automatically created for each spill point.

Spill map viewing and printing capabilities: Another spatial feature accessible to responders directly from the spill report window is the spill map functionality. This feature can be used to either visually depict the location of the currently viewed spill report or to browse a particular geographic area for other spills. Maps viewed on the screen can then be printed to paper for future reference.

Extensive searching capabilities: SSTS includes extensive search capabilities that allow users to enter search criteria and receive a list of matching search results from 20 plus years of historical data. These spill reports can then be viewed and printed from the spill report window. This feature is particularly useful when a user is looking for similar spill reports, for example reports within a given time period or reports that share a common piece of information like product spilled or cause of spill.

Customizable reporting capabilities: In addition to the many reports deployed with the system, SSTS also includes the capability for application administrators to modify existing reports and to add new reports to the system. Once reports have been added to the system, all users can access them. All report layouts are created in Crystal Reports 8.5, a feature rich report development environment.

Distributed access to business and spatial data: SSTS is also designed for field deployment on a laptop, in particular a rugged laptop like the Panasonic Toughbook. In this configuration the laptop includes a local copy of the geodatabase and a local copy of the businesses databases used by SSTS. The spill report editing functionality within SSTS allows responders to create and edit spill reports locally; the spill report includes a spill point which is stored in the personal geodatabase on the laptop. In this configuration SSTS also includes a synchronization mechanism that allows responders to send and receive updates to and from the enterprise spatial and relational databases.

Technical Approach: The Unified Software Development Process (USDP) will be used to manage all phases of the software development life cycle and the Unified Modeling Language (UML) will be used to document the system's deliverables (artifacts) through a series of UML diagrams. This methodology uses an iterative approach to systems design and implementation and includes a strong emphasis on stakeholder and end user requirements as will as delivery architecture. Each phase of the methodology includes a review of the system deliverables.

Project Phases and Deliverables:
The USDP phases and the deliverables that will be completed in each phase are as follows:

Phase 1: Inception
- Requirements identification and analysis (user interviews, group meetings, legacy system review)
- Functional design (documents the system requirements of users and other stakeholders)
- Architectural design (documents the system components to be developed and/or delivered)

Phase 2: Elaboration
- Design sessions (system design discussions between systems development staff and end users)
- Updated functional design (update functional design documents as per design sessions)
- Updated architectural design (update architectural design documents as per design sessions)
- Construction design (documents how the system will be built)
- Initial prototype and interface design evaluation (proof of concept prototype to validate the design)

Phase 3: Construction
- Implement and test the system components as per design (database, user interface, SDE, etc.)
- Install system components within the designated test environment

Phase 4: Transition
- User acceptance testing (based upon end-user interaction with the system in the test environment)
- Deploy system into the production environment
- Incorporate user feedback into planned maintenance updates

Estimated Schedule
- Project is expected to last between nine and twelve months depending on the needs and the complexity of the specific installation.
- Estimated time per project phase is as follows:
    - Inception: two to three months
    - Elaboration: two to three months
    - Construction: three to four months
    - Transition: one to two months

Hardware and Software Requirements

Servers

- Citrix Server (Dell PowerEdge 6300 with Citrix Server, ArcEditor and Crystal Reports 8.5)
- Business Data Server (Sun Enterpise 4500 with Oracle 8.1*)
- Spatial Data Server (Sun Enterprise 4500 with ArcSDE 8.2*, Oracle 8.1* and supporting software)

Clients

- Any PC, Macintosh or Unix computer capable of running the Citrix Client (Version 6.01 or higher) and with connectivity to the Citrix Server (Note: direct connections to the Business and Spatial Data Servers are not required as this is handled through the Citrix server)

Other Applications: SSTS is a custom application built with embedded ArcObjects for spatial queries and map display for the Oracle RDBMS, but could be made to work with other RDBMS such as DB2, SQL Server or Informix.

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**SSTS is currently undergoing a substantial upgrade to incorporate ESRI's ArcGIS 9 technology, improved functionality and newer database systems (June 2004).*

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