The WisTransPortal Project

Project Overview

The Wisconsin Department of Transportation (WisDOT) has a long history of collecting transportation operations related data to support long-range planning and improvement project justifications. WisDOT has also collected a significant amount of traffic data that supports metropolitan Milwaukee and Madison freeway management systems. To better support infrastructure-based and operations-oriented investment decisions, there is a need to provide tools that effectively manage, aggregate, archive and analyze multiple data sources and allow transportation professionals to practice methods for accessing and manipulating the information. Another emerging need relates to the use of aggregated data to provide real-time information to motorists, e.g., 511 traveler information.

To help meet those needs, the Wisconsin Traffic Operations and Safety (TOPS) Laboratory has started development of a data management system (WisTransPortal) to facilitate continuous collection and archiving of Intelligent Transportation Systems (ITS) data in Wisconsin. The basic mission of the WisTransPortal project is to develop capabilities for a statewide ITS data hub to support multiple applications in traffic operations and safety. Those capabilities include integration, management, analysis, and dissemination of real-time and historical ITS / traffic operations data through a centralized database and communications infrastructure.

The WisTransPortal is being developed through a phased deployment process by TOPS Lab at the UW-Madison Department of Civil and Environmental Engineering. Phase I, which began in mid-2003, is focused primarily on hardware and system software deployment and preliminary data archiving capabilities. Phase II is scheduled to begin in late 2005 and will focus on expanded data archiving capabilities and applications development.

System Architecture

The WisTransPortal system architecture is based on a distributed model that separates logical software components such as the high-level Web presentation, the mid-level application logic, and the low-level data management. The benefit of this design is to support the development of a wide range of user applications and to allow, at the same time, for gradual improvements to the underlying database model. Highlights of the WisTransPortal hardware and software configuration include:

- A direct link from WisTransPortal to the WisDOT fiber network.
- Oracle 10g Enterprise Database with one terabyte of hardware RAID disk storage.
- Off-site data backup services through the UW Division of Information Technology.
- J2EE web-application development based on Apache/Tomcat and Open Source Java.
- ESRI ArcIMS for publishing GIS based-tools to the web.
Data Collection and Archiving

The data archiving component of WisTransPortal consists of automated services that connect to various WisDOT and other ITS data sources and prepare the data for archiving in a common Oracle database. Phase I development is focused primarily on replicating existing WisDOT data sources in the WisTransPortal. Five main data elements are covered in the Phase I scope:

- Traffic detector data from the WisDOT Traffic Operations Centers (TOC) in Madison and Milwaukee.
- Lane and ramp closure data from Milwaukee TOC.
- Milwaukee County CAD/911 traffic incident data from Milwaukee TOC.
- Historical crash data from the WisDOT MV4000 crash database.
- Road weather information from WisDOT R/WIS system.

Phase II will focus on improvements to the underlying database model to support data integration and national ITS standards. Additional development goals include migrating existing data acquisition services to the WisDOT fiber link and improving the data archiving component design through the use of J2EE data persistence frameworks.

Applications Development

A core business function of the WisTransPortal is to support ITS data clearinghouse activities through the use of high-level interfaces to the data. This includes the development of web-based query tools, GIS mapping tools, and web services. In addition, there are several WisDOT applications that are currently being developed or investigated for development through the WisTransPortal:

- Enhancements to the Milwaukee TOC Data Extractor software.
- Development of a statewide web-based Lane Closure System.
- Support for Wisconsin 511 traveler information.
- Local roads crash data mapping and tools.
- WisDOT inconvenience map automation.

The WisTransPortal website, http://transportal.cee.wisc.edu, is the primary vehicle for accessing data, applications and documentation related to the WisTransPortal project.

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