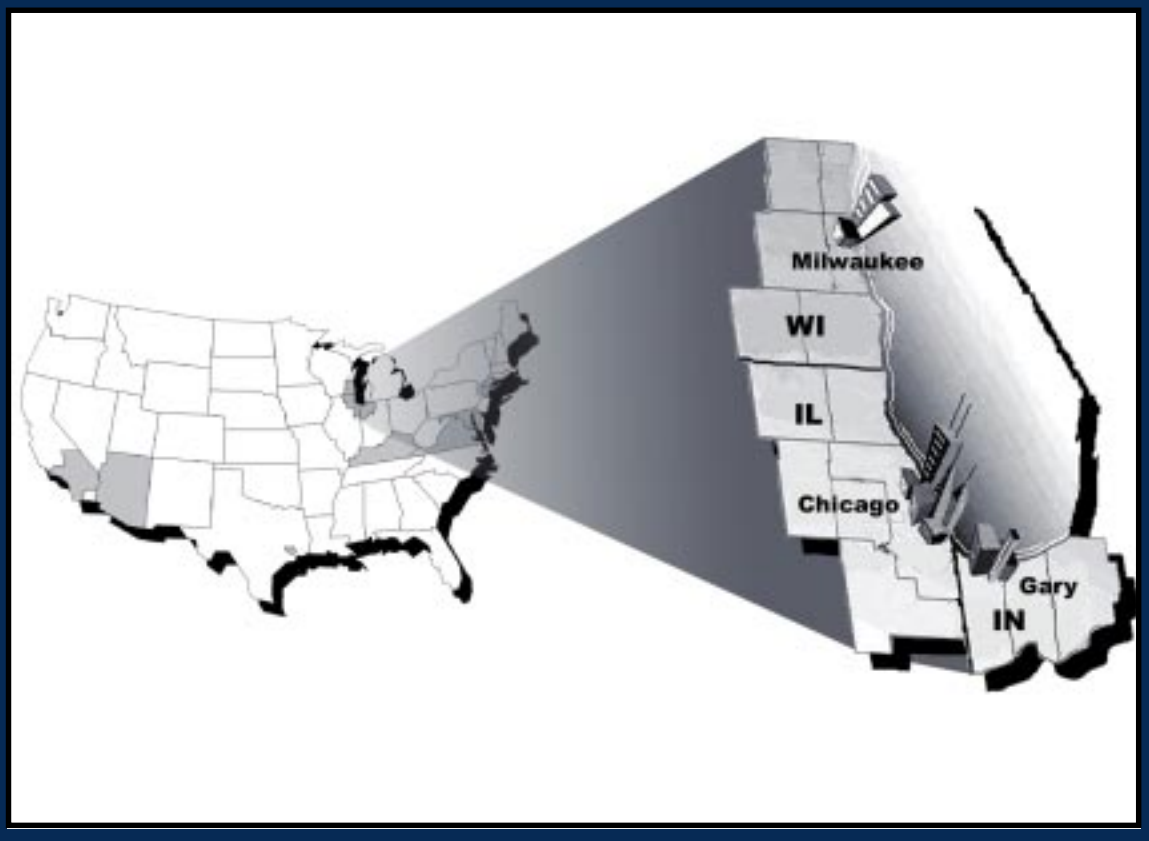
Regional ITS Architecture Development

A Case Study

Gary–Chicago–Milwaukee ITS Priority Corridor



Building a Framework for Tri-State ITS Corridor Integration

September 1999

Foreword

Dear Reader,

We have scanned the country and brought together the collective wisdom and expertise of transportation professionals implementing Intelligent Transportation Systems (ITS) projects across the United States. This information will prove helpful as you set out to plan, design, and deploy ITS in your communities.

This document is one in a series of products designed to help you provide ITS solutions that meet your local and regional transportation needs. We have developed a variety of formats to communicate with people at various levels within your organization and among your community stakeholders:

- **Benefits Brochures** let experienced community leaders explain in their own words how specific ITS technologies have benefited their areas;
- **Cross-Cutting Studies** examine various ITS approaches that can be taken to meet your community's goals;
- **Case Studies** provide in-depth coverage of specific approaches taken in real-life communities across the United States; and
- **Implementation Guides** serve as "how to" manuals to assist your project staff in the technical details of implementing ITS.

ITS has matured to the point that you don't have to go it alone. We have gained experience and are committed to providing our state and local partners with the knowledge they need to lead their communities into the next century.

The inside back cover contains details on the documents in this series, as well as sources to obtain additional information. We hope you find these documents useful tools for making important transportation infrastructure decisions.

Christine M. Johnson
Program Manager, Operations
Director, ITS Joint Program Office
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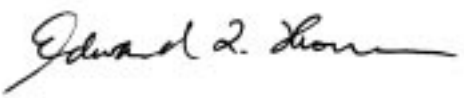

Edward L. Thomas
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This is one of seven studies exploring processes for developing ITS architectures for regional, statewide, or commercial vehicle applications. Four case studies examine metropolitan corridor sites: the New York, New Jersey, and Connecticut region; the Gary-Chicago-Milwaukee Corridor; Southern California; and Houston. The fifth case study details Arizona's process for developing a rural/ statewide ITS architecture. A cross-cutting study highlights the findings and perspectives of the five case studies. The seventh study is a cross-cutting examination of electronic credentialing for commercial vehicle operations in Kentucky, Maryland, and Virginia.

Six of the studies were conducted by U.S. DOT's Volpe National Transportation Systems Center under the sponsorship of U.S. DOT's ITS Joint Program Office, with guidance from the Federal Highway Administration and Federal Transit Administration. The Houston case study was conducted by Mitretek Systems, with support from the Volpe Center.

This study was prepared for a broad-based, non-technical audience. Readership is anticipated to include mid-level managers of transportation planning and operations organizations who have an interest in learning from the experiences of others currently working through ITS architecture development issues.

Purpose

Case Study Overview

"The need for a framework or architecture helped to unify the Corridor—to link our data together."

— **John Corbin, Freeway Operations Engineer, WISDOT**

The Gary-Chicago-Milwaukee (GCM) ITS Priority Corridor is a real-world study in intergovernmental cooperation to develop integrated, intelligent transportation services that serve a diverse constituency. This GCM Corridor case study reveals:

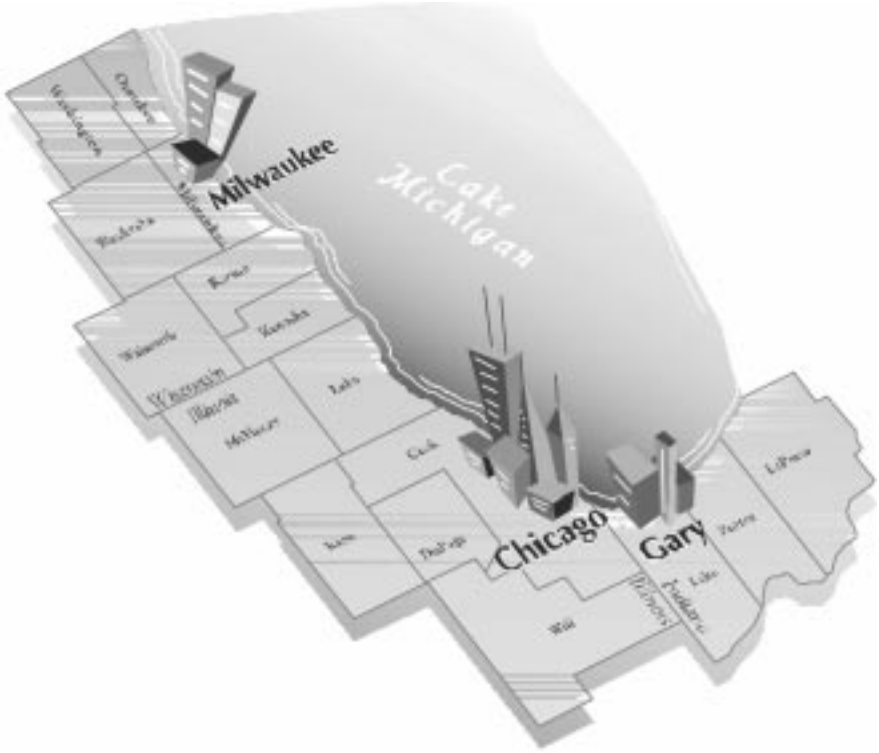
- An extraordinary partnership among three state departments of transportation: Wisconsin (WISDOT), Illinois (IDOT), and Indiana (INDOT)
- Cooperative efforts that transcend multiple metropolitan, county, and state jurisdictional boundaries to address major traffic demands, weather conditions, and infrastructure limitations
- Bringing together existing ("legacy") and planned systems and services into an integrated framework of corridor ITS services
- Effective use of an unconventional chronology of ITS planning and deployment.

This case study presents the circumstances found in the Gary-Chicago-Milwaukee (GCM) Priority Corridor. It begins with an insight into the circumstances found in the GCM Corridor and then discusses the basic approach employed by the Corridor to develop an ITS corridor architecture. The study examines the challenges and achievements of the Corridor's interagency partnership from its inception, and it offers a series of "lessons learned" to help others seeking to integrate ITS services across a region or corridor.

The methodology used in the preparation of this study included a review of the GCM Corridor (and related) literature, as well as a series of interviews with individuals from the numerous organizations that plan, implement, and monitor transportation services and operations along the corridor.

The GCM Corridor benefited from the special ITS priority corridor funding authorized in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. However, many of the institutional hurdles it has cleared—or is attempting to clear—are nearly universal and relevant to other regions or corridors not selected as part of the Priority Corridors Program.

Background



Traffic Congestion Prompts Agency Collaboration

While formal collaboration along the GCM Corridor did not begin until the 1990s, there is a history of traffic management and traveler information services dating back almost 40 years. Most of these efforts were ad hoc arrangements, based on informal working relationships. Public organizations and individuals worked under differing operational and policy constraints. Growing congestion and limited resources in the 1970s and 1980s were harbingers of the need for inter-jurisdictional, cross-agency coordination, particularly with respect to traffic data.

During this period, traffic volume and corresponding congestion continued to grow in this highly industrialized corridor. Increased congestion impacted negatively on the area's infrastructure, as well as its accident rate, and the environment. The greater Chicago area, which includes major intermodal freight facilities, hosts the third largest volume of truck traffic in the nation. And, like many major metropolitan areas, the GCM Corridor is a severe ozone/air quality non-attainment area (as defined by the Clean Air Act Amendments of 1990), a condition that is exacerbated by stop-and-go traffic congestion. In addition to the Clean Air Act, other environmental laws slowed highway expansion and modifications. In addition, more media attention and public scrutiny resulted in greater public awareness of surface transportation issues. Ever-increasing construction costs and funding constraints prompted the search for alternatives to traditional remedies. It became apparent that traditional highway and transit system expansion solutions would not be sufficient to meet ever-growing transportation demands in a resource-limited environment.

GCM Corridor Vision Statement:

This vision is one of enhanced transportation productivity, mobility, efficiency, and safety within the corridor with a reduction in energy use and negative environmental impact through the use of ITS technologies and systems.

Background

GCM Corridor: By the Numbers . . .
(March 1999)

- Population: 10 million
- Employees: 5 million
- Geographic Area: 16 counties, 2,500 sq. miles
- The greater Chicago area has the 3rd largest volume of truck traffic in the nation.
- Milwaukee County Transit was second in the nation to deploy Automated Vehicle Location (AVL) technology on its bus fleet. Of its 602 vehicles, 558 are being equipped with AVL.
- Half of Chicago Transit Authority's 1,400 buses are equipped with AVL and GPS for emergency tracking.

As the region's transportation professionals began to broaden their thinking from construction and maintenance to transportation system operations, management, and coordination, change did not always come smoothly. Agency missions and resources were not structured to support interagency data sharing and coordination. In some instances, transportation agency officials were forced into a new high-profile visibility. Public interest groups made new demands to either limit or terminate growth. In some instances, there were no market forces to support needed changes, so the responsibility was left to public agencies.

In the 1980s, before interagency collaboration and data sharing were in vogue in many other areas, the IDOT-sponsored Traffic Systems Center was initiated as a way to start sharing information. A conceptual plan looked at which entities should be involved, and provided the basic framework of what was to be accomplished. The regional system evolved into a core of active members, complimented by another less active group that was kept informed of activities. This allowed each player to determine his or her own role and level of participation. Generally, the commitment started with each state's DOT, first at the ranks of middle management and gradually ascending to more senior-level decision-makers.

ITS Before the Priority Corridor

By the early 1990s, several of the initial ITS projects within the GCM Corridor were either operational or under development, including:

- IDOT's Freeway Management Program in the greater Chicago area
- WISDOT's Milwaukee area Freeway Management Program (MONITOR)
- Automated Vehicle Location systems with Milwaukee Transit, Chicago Transit Authority and Pace (suburban Chicago area) bus fleets
- IDOT's operational test, which involved in-vehicle navigation technology and communication with the traffic management center (ADVANCE)
- INDOT's Borman Expressway Management Project
- Incident response programs by INDOT ("Hoosier Helpers"), IDOT ("Minutemen")
- WISDOT's Traffic Incident Management Enhancement, or "TIME" Program, which is a freeway operations and incident management program for Southeastern Wisconsin.

While informal interagency coordination was part of the planning and development of these early ITS services, these were largely stand alone, "stove-piped" projects. In 1992, with IDOT as a major proponent, representatives from the three states came together to evaluate their common transportation problems and examine potential corridor-wide initiatives and coordination that might benefit all three states. Since the three state DOTs had a history of informal coordination along the GCM Corridor, some helpful groundwork had already been laid for establishing an institutional GCM Corridor Coalition.

Priority Corridor Designation

In 1993, U.S. DOT designated the GCM Corridor as one of the four ITS Priority Corridors. With this designation came dedicated funding; the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 authorized over $500 million for ITS corridors, roughly half of which was to be divided among the four designated priority corridor sites over the six-year authorization. Through fiscal year 1997, priority corridor program funding for the GCM Corridor (including state contributions) totaled nearly $25 million. This funding has supported the following corridor priorities:

- expanding the coverage of existing ITS services
- enhancing ITS service capabilities
- connecting the ITS services and functions to support compatibility among information databases and operational procedures.

In addition to the special funding, the priority corridor designation was a major impetus for institutionalizing interagency data sharing, in large part through the establishment of the Corridor Transportation Information Center. This project, which is the "information hub" of the GCM Corridor, is the logical evolution of the Traffic Information Center associated with the ADVANCE operational test program.

As the GCM Priority Corridor began to take shape, the Corridor Transportation Information Center became an important "test bed" for corridor integration efforts. This project involved the immediate reuse of an existing system to serve the needs of the GCM Corridor until a corridor-wide system could be developed from the ground up. It was funded by IDOT, outside of the GCM Corridor funding. The current "Gateway" project, which includes "Datapipe" and "Information Clearinghouse" projects, was determined by the GCM Corridor Coalition to be both its top priority and the focus of its near term efforts at developing a GCM Corridor regional ITS architecture.

U.S. DOT ITS Priority Corridor Goals

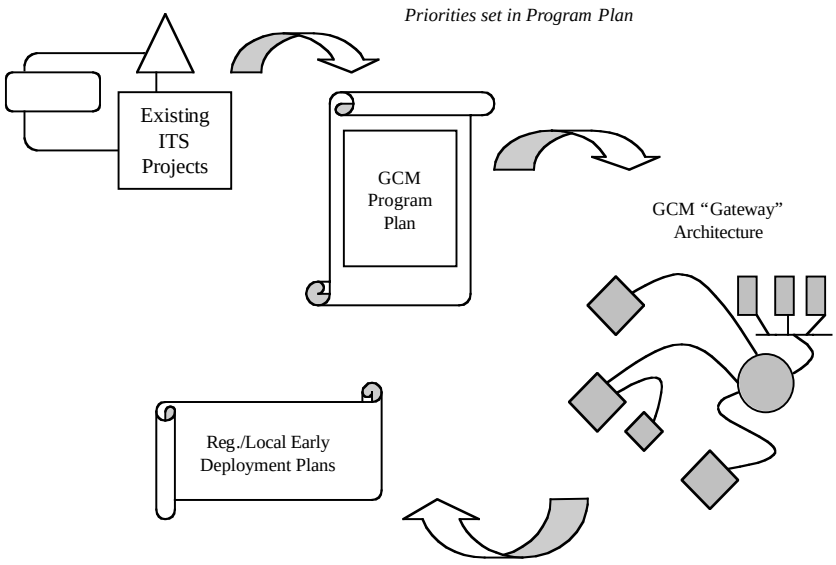
- Advance ITS strategic planning
- Serve as national ITS test beds
- Demonstrate the benefits of ITS
- Showcase ITS to the public
- Evaluate ITS concepts and technologies

ITS Architecture Development Process

In order to achieve integrated transportation systems and coordinated traveler information, public and private agencies and organizations throughout the corridor are working together to jointly develop solutions and link systems.
— GCM Corridor Communications Plan

The development process for the GCM Corridor ITS architecture includes a number of important elements, the remainder of which are introduced below. This section lays out a chronology of these elements, and suggests relationships between major process elements.

Highlights of GCM ITS Corridor Architecture Development Process



EDPs developed to be consistent with GCM Corridor ITS Architecture

GCM ITS Priority Corridor Program Plan

In 1995, the *GCM ITS Priority Corridor Program Plan* was developed by BRW, Inc., under the guidance of corridor coalition technical and coordinating committees. It was formally approved by an executive committee comprised of the three state DOT executives and the acting Regional Administrator of the Federal Highway Administration. The program plan, which was updated in a formal planning process in 1997, offers a 20-year horizon for implementing some 100 corridor projects categorized in 10 major program areas:

- Multimodal Traveler Information
- Integrated Transit
- Incident Management
- Technical/Planning
- Traffic Management Systems
- Commercial Vehicle Operations
- Traffic Signal Integration
- Vehicle Transponder Systems
- Advanced Incident Reporting/Mayday Security
- Public/Private Partnerships

To determine these priority program areas, public outreach and agency coordination was obtained through coalition meetings, a series of workshops, and periodic newsletters to a wide circulation of public, private, and community organizations.

Stakeholders Set Corridor Priorities

Through the course of preparing the program plan, the GCM Corridor Coalition grew to over 700 members, representing some 70 public, private, and community organizations. With such a large pool of stakeholders, virtually every constituency interested in participating is represented in the coalition, from suburban municipal traffic engineers to urban transit operators to statewide emergency service agencies.

A few entities were conspicuous by their absence. Some stakeholders questioned the apparent lack of participation by the world's busiest airport, O'Hare International Airport, which is centrally located in the GCM Corridor and has the potential to significantly impact traffic conditions across a wide area. However, O'Hare and Midway airports are represented by Chicago's Department of Aviation, and as the corridor evolves, the airports are anticipated to play more active roles.

Participation among the coalition varies widely, but a core group exists that includes representatives from the three state DOTs, major city transportation and transit agencies, planning agencies, Federal Highway Administration and Federal Transit Administration, and private sector consultants.

With few exceptions, what drives most organizations' involvement in corridor committee activities and decision-making is the particular interest of individuals. This is due in large part to an individual's background or special interest in ITS, and a belief in the potential of an integrated system of ITS services.

Like an Early Deployment Plan (EDP), the Corridor Program Plan is serving an important and similar purpose by helping to further stimulate interagency coordination and data sharing considerations. And, perhaps most importantly, it has "codified" the corridor coalition's aim of building corridor integration by establishing project funding priorities.

The GCM Corridor Coalition is comprised of 700 members representing state, regional, local governments, transportation providers, industry, and non-profit organizations.

ITS Architecture Development Process

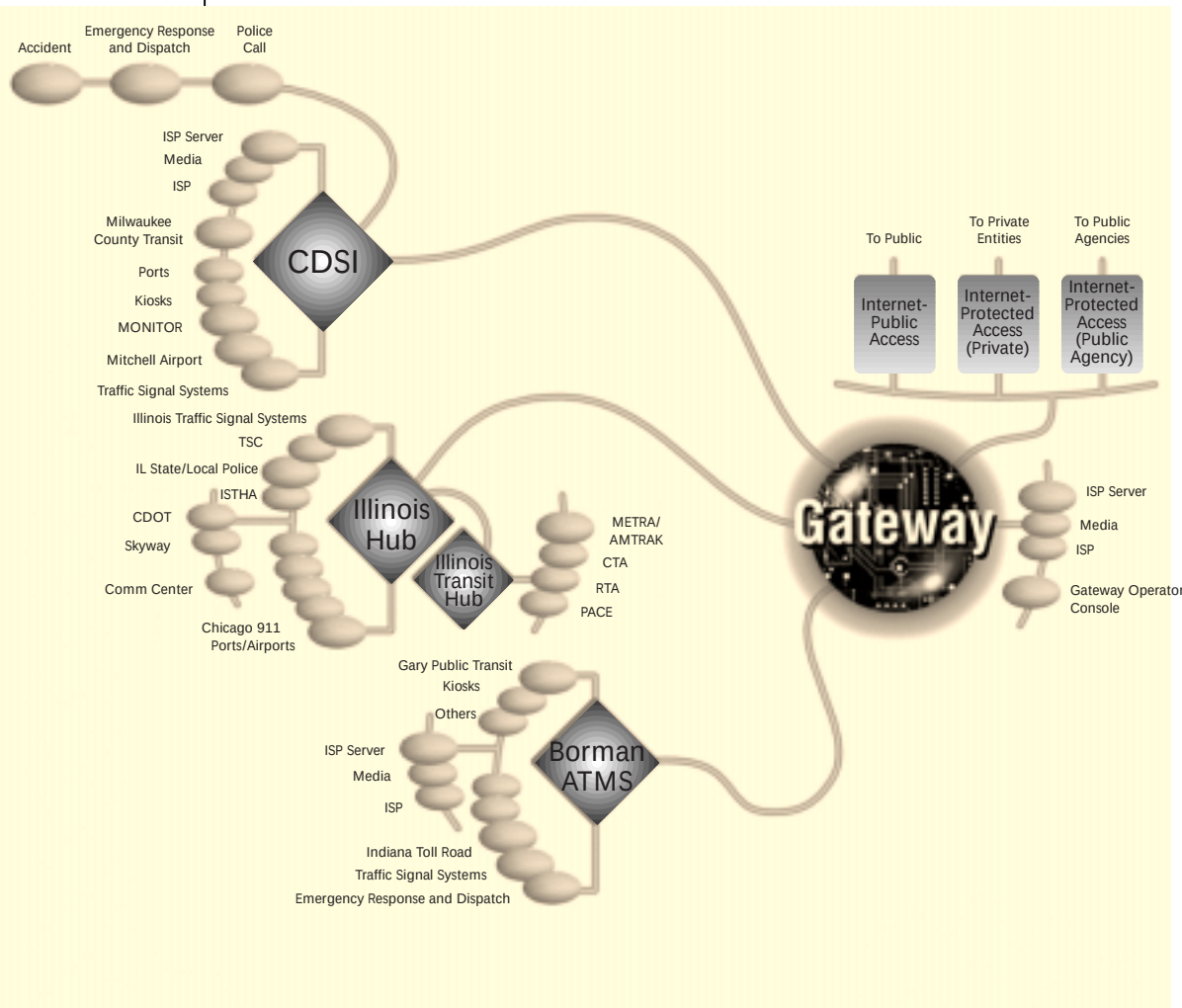
"It's hard to imagine diverse communication coordination and electronic data exchange without the GCM (Corridor) or National Architecture."
— **Ken Glassman, Coordinator of Engineering Services, Illinois State Toll Highway Authority**

The Gateway Program and the GCM Corridor ITS Architecture

The next step in the development process involved the creation of the Multimodal Traveler Information System, of which the Gateway Program is a crucial subset. As noted, the Gateway Program is the flagship of the GCM regional ITS architecture. It is an integrated information system that provides data to operating agencies and the traveling public throughout the GCM Corridor.

The Gateway Program was designed as a "distributed system," with regional hubs in each of the three states that collect transportation data and then pass it on to a main Gateway server. The server then distributes corridor-wide data back to each of the three state hubs. A fourth hub is dedicated for Illinois transit and stems from the Illinois hub. The Gateway server is the focal point for distributing such data as travel times, construction and maintenance, traffic incidents, and weather information to operating agencies, information service providers, planners and researchers, and to the public via the internet.

Diagram of the GCM Corridor Gateway



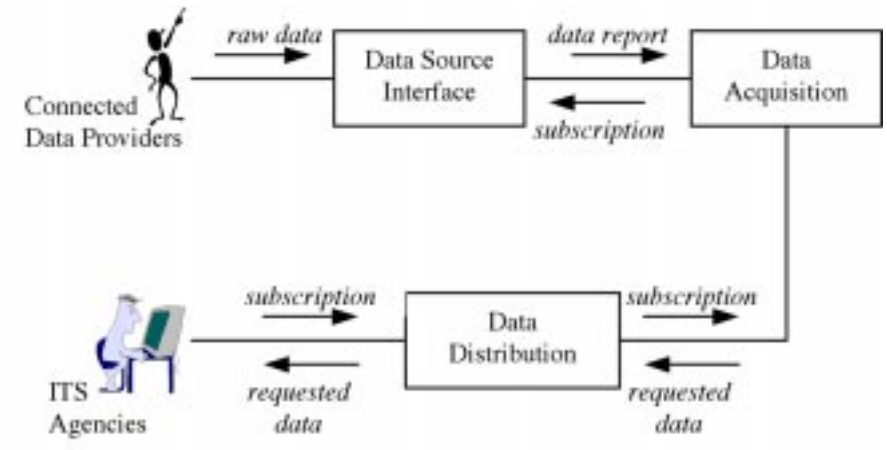
ITS Architecture Development Process

The GCM Corridor Coalition took advantage of a confluence of events in 1994-1996. As the ADVANCE operational test program was reaching completion and phasing down, the GCM Priority Corridor Program gathered additional momentum from the already-deployed communications infrastructure and other resources of the ADVANCE project.

Similarly, while early design work on the GCM (Gateway) corridor architecture preceded the 1996 release of the National ITS Architecture, a synergistic benefit resulted from the GCM system design consultants also being participants in the National ITS Architecture development process. Therefore, a corridor architecture design emerged that was influenced by the National ITS Architecture. Attention to the National ITS Architecture also eased concerns about an emerging issue: how to balance the demands for a flexible and open architecture that also ensures a sufficiently integrated system of compatible components.

Under an existing contract with IDOT, De Leuw, Cather and Company is finalizing the development and implementation of the *Gateway Traveler Information System, System Architecture Design*. This design document details a corridor-wide ITS architecture—including functions and specific information flows—for a fully deployed Gateway Traveler Information System, which is slated for implementation by the spring of 2000. System functions, subsystems, data flow diagrams, interfaces, and information flows are all reflected in the GCM Corridor's Gateway architecture design.

Example of GCM Gateway Architecture Data Flow Diagram



GCM Corridor ITS Architecture Timeline

1992 Tri-state DOT coordination of GCM corridor ITS activities

1993 GCM Priority Corridor est.

1995 GCM Corridor Plan approved

"TIME" Program initiated in SE Wisconsin

1996 National ITS Architecture Released

1998 Multimodal Traveler Info. System Completed by IDOT

1999 Anticipated completion of *Strategic Early Deployment Plan*

Anticipated Completion of *Gateway Trav. Info. System, System Architecture Design*

2000 Anticipated completion of Gateway system

ITS Architecture Development Process

"While efforts must be made to hear as many views as possible in the architecture development process, it is also important to allow room for imagination, to take a broader view of potential capabilities."
— **David Zavattero, Deputy for Operations, Chicago Area Transportation Study (Chicago MPO)**

Other Regional Planning Activities

Transportation planning efforts in Wisconsin, Indiana, and Illinois have in varying ways acknowledged, supported, or even affirmed the GCM Corridor architecture development efforts. One planning effort in particular is noteworthy. In 1996, a year after completion of the GCM Corridor Program Plan, the Chicago Area Transportation Study initiated the development of a Strategic Early Deployment Plan (SEDP) for northeastern Illinois. While the SEDP does not cover the entire GCM Corridor, major steps have been taken to link the SEDP to the Corridor Program Plan, as well as the 2020 Regional Transportation Plan.

Given its timing—the SEDP is scheduled for completion in 1999, the SEDP is playing a different role in supporting regional ITS architecture development. Instead of the foundation or "spring-board" role that some EDPs have played in other metropolitan areas, the SEDP will support the corridor ITS architecture by way of endorsement and affirmation. The task force that oversees coordination of the SEDP with the GCM Corridor has recommended that the SEDP formally adopt as its foundation the GCM Corridor architecture, based on the following rationale:

- The corridor ITS architecture will likely meet current and future corridor transportation data demands
- The National ITS Architecture was used to help define the corridor architecture
- Because it is an "open architecture," integration with additional corridor subsystems will be possible
- It has been developed to be compatible with legacy systems, as well as systems that are planned and currently being implemented
- Rather than replace or supercede (existing ITS), the corridor ITS architecture is a means to better disseminate and collect information of corridor-wide importance.

Architecture Applications and Evolution

Maintaining the Corridor Architecture

As the GCM Corridor ITS architecture moves from planning and design to deployment and implementation, working-level committees will continue to guide, evaluate, and resolve issues associated with corridor–wide integration. The Gateway Regional Integration Coordinating Committee is part of an institutional infrastructure that will aid in architecture maintenance and updating necessary to ensure that the corridor ITS architecture is sufficiently flexible to accommodate changing priorities and demands.

In addition to being an integral part of long-term corridor planning, the GCM Corridor ITS architecture supports the vision of allowing agencies to deploy ITS services they deem necessary, while still being consistent with the corridor ITS architecture. Like the National ITS Architecture, the corridor ITS architecture is not technology-specific. However, one recurring issue involves using standardized vs. specialized technology, such as buses using radios versus computers. As new technologies emerge, the possible impact on corridor compatibility is an issue that will require revisiting.

Architecture and Jurisdictional Barriers

There is often little jurisdictional flexibility to provide or share data, facilities, or services with other agencies, especially in different states. In this instance, a regional ITS architecture can bring interagency coordination and information sharing to a higher level because the functions and technologies involved can help to break down jurisdictional and other institutional barriers.

For example, Illinois and Indiana attempted to establish an agreement by which variable message signs (VMS) along an Illinois portion of I-94 would be operated by INDOT and maintained by the Illinois Tollway. The opposite arrangement was proposed in northwestern Indiana. This would enable motorists to receive up-to-date information about conditions ahead—in another state, while still preserving INDOT and Illinois Tollway Authority control over freeway access for maintenance purposes. Unfortunately, the arrangement could not be reached due to liability concerns.

Attempts are now underway, however, to achieve the same result via the Gateway system. Each state would be the operator of its own signs, and the information would be provided as a service to the motorist without regard to the state border. In the long run, this may be a better arrangement because it is simpler and poses less risk.

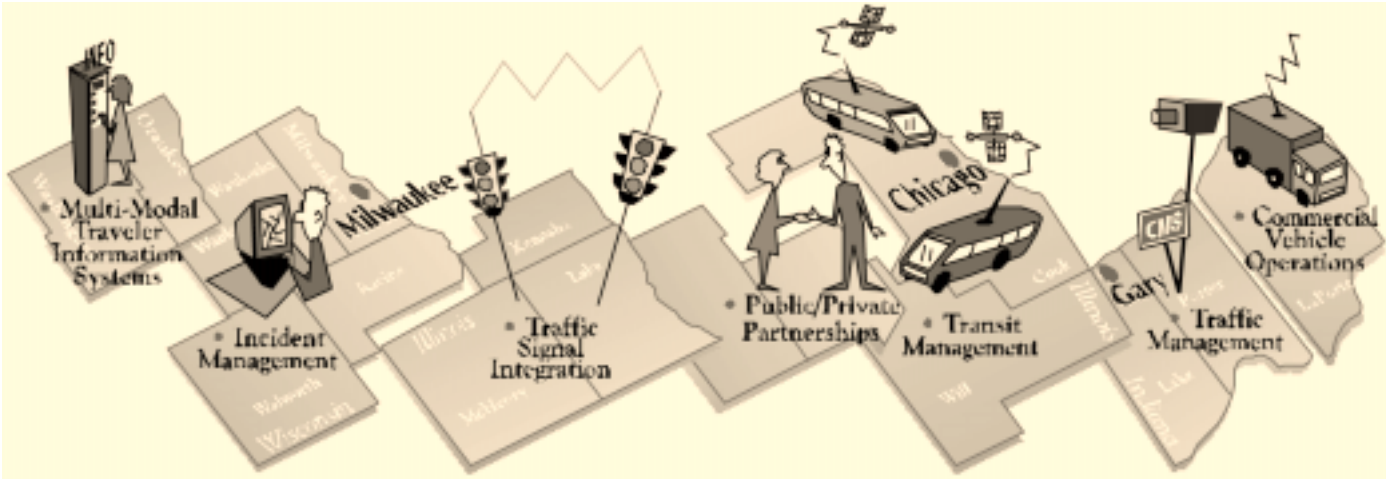
"The GCM (ITS) architecture is great, but it's not yet in practice, and vendors need time to catch up. You can only go as far as vendors are (able to support you)."
— Troy Boyd, Hoosier Helper Patrol Program, INDOT

"The (GCM) architecture is taking interagency coordination to another level. The technology is helping to break down jurisdictional obstacles."
— Jeff Hochmuth, ITS Program Manager, IDOT

Architecture Applications and Evolution

The resolution of other jurisdictional/institutional issues can be more elusive. For example, in Illinois the issue of interagency communications at the field operations level sometimes entails opposing viewpoints. For some state troopers and highway maintenance operators, having compatible radio communication capabilities ("radio interoperability") seems logical and long overdue. Such direct connection to other agencies' field units would empower personnel to redirect limited resources to meet the most immediate needs, in real time. Conversely, without coordinated deployment of field resources through centrally-dispatched communications and standardized procedures, the advantage of strategically deploying resources may be lost to hap-hazard, insufficient response. The GCM Corridor architecture effort may lend more support to the latter side of this argument. However, by linking field resources (such as state police, incident response, transit, highway maintenance, etc.) together via the Gateway architecture, the field unit role for incident response and data input becomes even greater. Ultimately, this issue is apt to be resolved at the operations management level within each agency.

GCM Corridor ITS Services



Courtesy of BRW, Inc.

Lessons Learned

As with any such endeavor, several topics, issues, and "lessons learned" have emerged from the GCM Corridor ITS architecture development process. In general, it is clear that the process itself yielded much more than a draft system architecture for the GCM Corridor. Bringing parties together through formal committee meetings and informal peer-to-peer contact stimulated its own institutional integration, while also establishing a cadre of public and private "champions," supportive of implementing the corridor ITS architecture. Below is a series of additional findings and comments, grouped in general categories.

"The GCM architecture effort stimulated interagency coordination between transit and Wisconsin DOT, as well as with incident management."

— Ronald Rutkowski, Manager of Program Development, Milwaukee County Department of Public Works (an FTA transit property)

Getting Started

- *Learn From Incident Response Teams:* Before developing an ITS architecture, find out what incident response teams are learning in the field. This will help reveal the true causes of traffic congestion, highway incidents, and travelers' information needs.

- *Use the National ITS Architecture:* Deployment would have been much faster had the National ITS Architecture (or GCM corridor architecture) been available when many early corridor ITS services were implemented. The National ITS Architecture helped to identify important and unanticipated linkages.

- *Let the Process Help Define the Region/Corridor:* Initiating the development process for the corridor ITS architecture helped to further define the Corridor—geographically, politically, and organizationally, thereby providing a stronger foundation from which to respond to federal requirements, requests for information, and funding opportunities.

Stakeholders: Cast a Wide Net

- *Link Stakeholder Participation to Specific ITS Services:* The state police (and others) may be more likely to get involved if you have a metropolitan-based traffic incident management system, in part because the relevance to their operational mission may be more apparent.
- *Look to Include the Media:* Getting the media involved in the architecture development process may yield benefits. There may be opportunities to complement regional ITS efforts with radio and television stations' traffic systems, services, and monitoring capabilities.
- *Note that Agency Participation Reflects its Representative's Interest:* While securing the support of organizations is important to set and implement the future corridor agenda, an organization's participation in the development process is largely determined by its individual representative's interest in ITS.

Lessons Learned

"The greatest value of the GCM Corridor lies in the fact that we now have a mechanism for pursuing regional projects. These projects … need to function as though there were no state or local boundaries—the Gateway Program is a classic example. Without the GCM Corridor, funding and managing these projects is extremely difficult, if not impossible."

— Dan Shamo,
ITS Program Manager,
INDOT

Agency and Public Education

- *Conduct "Inreach" as well as Outreach:* As the regional ITS architecture is developed, start educating a broader pool of staff and managers within the agency ("inreach") who need to understand what the effort seeks to accomplish. For example, state government procurement or capital budget personnel who do not understand basic ITS concepts and benefits may significantly hamper development and implementation schedules.
- *Understand that Terminology is Still Unfamiliar:* "Architecture" (and related terminology) is a term that can sometimes inhibit its very goal of broad agency participation from those who are not system architects.
- *Build Support Through Awareness:* Do not underestimate the importance of public relations and communications as tools to build public awareness and support. Highlight accomplishments if the value of the project is not clearly perceived by public and private interests.

Intergovernmental Cooperation

- *Focus on Region-wide Coalition Building:* The strong tri-state coalition has been crucial for ensuring regional participation in the corridor ITS architecture development process. The process can change attitudes among different levels of operations—as well as throughout the coalition, resulting in a "spirit of cooperation."
- *Capitalize on Partnership Opportunities:* The process builds vertical partnerships between public sector partners at various levels (i.e., federal, state, regional, and local), while incorporating horizontal partnerships among parties with similar program responsibilities, but different geographic turf.
- *Take Advantage of Organization Benefits:* The organization that emerges through the development process serves as an important clearinghouse for the partners, interested parties, and the general public. Just as important as the regional ITS architecture is the interagency coordination and cooperation fostered by the architecture development process.
- *Identify and Promote New Professional Capabilities:* The process in general highlights the needs of the transportation professional for the future, which includes a mix of computer, analytical, technical, communication, public policy, and human resource skills beyond traditional engineering backgrounds.

Available Resources

- *Bridge the Resource Gap with Interagency Coordination:* The ITS architecture development process is an effective way of identifying needs, but it does not ensure coordination—in large part because most agency resources for such activities are scarce.
- *Recognize the Value Consultants Can Offer:* Capable consultants can be crucial when working through detailed architecture design and development stages of the process. While integration consultants represent an additional cost, their support may yield valuable dividends in time-savings and other efficiencies.

Institutional Considerations

- *Consider Liability Issues:* Liability continues to be an obstacle for corridor-wide integration and interagency sharing of resources. While some public agencies have liability waivers and exemptions, others do not. (Some stakeholders suggested that this is a role the federal government could play, to provide corridor-wide liability protection.)
- *Weigh Staffing Options:* When expanding agency operations in ITS, consider the potential impacts on internal hiring, training, and promotion practices, as well as use of consultants versus permanent staff.
- *Build a Long-Term Vision:* Continue to build a long-term vision so that immediate results turn into long term benefits.
- *Focus on Deployment:* Strategic planning is essential, but deploying ITS—to address specific local or regional needs—is the ultimate goal.

Additional Thoughts

These "lessons learned" convey the beneficial clarity of hindsight in a number of areas. From this case study another conclusion may be obvious, but still worth noting explicitly. It is very difficult to develop a regional or corridor ITS architecture without first going through the process of developing a program plan or an Early Deployment Plan.

In the case of GCM, these processes are where the priorities were identified and agreed to, and where public involvement is most likely. Because the SEDP followed the GCM Corridor architecture design, it will serve to confirm and affirm the priorities set by the corridor program plan, as well as the framework established by the Gateway architecture design effort.

Without such publicly-endorsed priority setting, it would be difficult to get wide public agency buy-in and participation in the development and deployment of a regional or corridor ITS architecture.

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www.gcm.travelinfo.org/

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www.dot.state.il.us

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Intelligent Transportation Society of America:
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Association of Metropolitan Planning Organizations:
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Individuals Interviewed

The authors wish to thank the following individuals who were interviewed and/or provided other support in the preparation of this case study report:

Illinois Department of Transportation:
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John Mitchell, Emergency Traffic Patrol Manager
Marty Anderson, Bureau Chief of Electrical Operations
Don Schmidt, Expressway Traffic Operations Engineer

Wisconsin Department of Transportation:
Phil DeCabooter, ITS Program Manager
John Corbin, Freeway Operations Engineer, MONITOR Traffic Operations Center
Curtis Pulford, Application Support Specialist, Bureau of Automation Services

Indiana Department of Transportation:
Dan Shamo, ITS Program Manager
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