

CRASH Process Redesign Project

Executive Summary

The CRASH Process Redesign (CPR) project is an IT initiative to redesign and upgrade Michigan's traffic crash data processing system. The CRASH processing system collects traffic crash data from law enforcement agencies throughout the state and then posts the data to a statewide database for use by Michigan Department of Transportation (MDOT), Michigan State Police (MSP), Michigan Department of State (MDOS), and other state and local planning, transportation, and law enforcement agencies.

In addition to the main state users of the crash data, there are many others who have a stake in the CRASH System. Among those users are the same law enforcement agencies generating the crash reports, county road commissions, other municipalities owning roadways outside of MDOT jurisdiction, researchers, insurance companies, transportation consultants, and several federal programs, including those under the auspices of the National Transportation Safety Board and the National Highway Traffic Safety Administration such as the Fatal Analysis Reporting System and the Motor Carrier program.

All of these agencies use the data to support their programs with the expressed goal of improving traffic safety by helping identify potential causes of traffic crashes, deaths, and injuries. Larry Tibbits, MDOT Chief Operations Officer, recently noted: "Traffic crashes carry unacceptable cost in terms of both loss of life and economic impact. Figures for 2001 show 1,328 Michigan fatalities (42,000 nationwide) and a \$9.4 billion loss (\$230 billion nationwide). Every tragic event involves someone's family member!" In 2001 nearly 15 times more people lost their lives in U. S. traffic crashes than died during the terrible events of 9/11.

Jack Benac the CRASH Project Manager says, "Almost every one of us knows someone whose family has been affected by the injury or loss of a loved one through a traffic crash. This project has the potential to touch every family in the state by allowing us to make better and more responsive decisions toward helping prevent such tragedies."

"We want to use data to save lives," agrees John Dullock, EDS IT Project Manager for CRASH.

The mission statement of the CPR project is: "To improve the accuracy and timeliness of crash data to enable stakeholders to make quality traffic safety improvements." Objectives include updating outdated processing and reporting technologies, streamlining business processes, improving data integrity, reducing processing costs and providing traffic safety partners with crash data that is accurate, timely and easily accessible.

Currently the Department of State Police, Criminal Justice Information Center is responsible for maintaining the state central repository for crash records. Nearly 700 Michigan law enforcement agencies submit a paper crash report for each crash that occurs on a public roadway in Michigan. This activity results in more than 400,000 crash reports generating 650,000 documents annually.

Until now, crash data processing has been managed under a system designed in the early 1970's and with few exceptions has remained fundamentally unchanged. With the advent of faster computers, more powerful technical infrastructures, the internet and an increased public need to provide safer roads, the State of Michigan embarked on a project to completely update and redesign the aging and outdated system.

During the course of the project, a major reorganization took place within the state. At the governor's direction, IT functions and personnel from all of the various departments were gathered to form a brand new Department of Information Technology (MDIT). This amalgamation had a direct impact on approval processes and management methodologies. Thus the CPR project is an example of the statewide vision, strategies, leadership and partnered approaches that Michigan is taking with regard to Information Technology. As such, the CRASH initiative embodies both inter-departmental and intergovernmental dimensions. That the project continued so smoothly throughout the transition is a further witness to the determination, foresight and cooperation of all who played a part in bringing the CRASH process redesign to completion.

A. Project Description

Success

On time and on budget, the CRASH Process Redesign project was implemented into the state's production environment on December 18, 2003. A follow-up client survey shows that stakeholders are thrilled. "With the use of our SEI CMMI Level 5 processes, we have achieved almost a 100% approval rating defined through the use of our post-project review survey process," stated John Dullock, adding "this far exceeds our expectation based on the broad range of stakeholders involved in CRASH."

Improvements achieved with the initial implementation include streamlined data processing, improved coordination and sharing of crash data among state agencies, web based reporting capabilities for law enforcement agencies, and a reduction in processing costs along with an improvement in the quality of crash data. Richard Miller, AAA Michigan Community Safety Services Manager, stated, "The quality improvements being implemented will dramatically improve timely access to the Michigan crash reporting system by law enforcement agencies for their traffic safety enforcement initiatives." In addition, leveraging of existing infrastructure enabled a reduction of the number of state crash information databases from three to one, dramatically trimming the amount of actual hardware committed to crash data storage.

The current release is only the first step in improving this system. Work is well underway on future enhancements which will further refine crash data processing by providing additional quality control check points, upgrading outdated hardware systems, increasing inter-departmental data flows and developing a certification process for the electronic submittal of crash forms by law enforcement agencies.

Ultimately, the project success has hinged on two fundamental guidelines instituted from the very start of the project. First, it was imperative to set "realistic expectations". "We didn't want anyone to think this project was going to solve all the state's issues in regard to this important activity", says Mr. Benac. "This was just one step in a long, continuous journey that is far from over". Second, it was equally imperative that all state and local agencies involved in the project were fully committed, engaged and willing to work as a team.

Electronic Data Systems (EDS) was the contractor chosen to design and implement the technical software updates. John Dullock, EDS Crash Project Manager stated, "This project has been an excellent example of a partnership between the State of Michigan, local communities, and EDS. The teamwork and commitment between all the groups has been extremely professional. This project would not have been successful without this team approach."

Fred Bueter, Chair of the Traffic Records Coordinating Committee which provides oversight to the project stated, "We knew from the start that if all the groups agreed to work together and were willing to foster a 'give and take' mentality, this project would go well. It's a testament to our local and state partners for having the mind set to move this project forward and ultimately provide a safer transportation system for our citizens."

System

The CRASH system shows a high level of innovation in its design, which is apparent in its ability to provide strong user satisfaction to a diverse non-technical user base, while providing exceptional levels of automated functionality that fully fit the business processes.

The development tools of Sybase PowerBuilder version 9.0 were used to construct an extremely intuitive user interface that closely adheres to statewide business practices, while maintaining the dynamic capabilities needed to allow the system to adapt to the specific business requirements of many state departments, local government agencies, public and private institutions/firms, or anyone needing to use crash data for planning, decision-making, or research. These dynamic properties, enabled by using this particular technology, include the ability to turn functionality on and off at an agency level. The system's client/server capability utilizes ODBC to provide connection to the Oracle database, which allows for advanced user support through the ability to connect to the various offices' databases.

The entire system was designed and developed with user requirements first, followed by the design of the technical solution to meet these requirements. The quality assurance process for the CRASH system has always included heavy user involvement, from early concepts to beta testing to frequent user surveys. The resulting continuous improvement has reinforced for users the importance of their input to the final technical solution. The CRASH system licensing structure with MDOT and other agencies ensures that adequate funding exists to support this continuous improvement of the applications over time.

Diane Sherman, Director of the Michigan State Police Criminal Justice Information Center and CPR Project sponsor emphasizes, "Quality is no accident. Since many groups rely on the integrity of the data for their own analysis and planning, it is important to ensure the integrity of data is not compromised. This data is directly related to traffic safety, so the completeness and accuracy of the data can ultimately play a part in saving lives."

B. Significance to Improved Government Operation

Governance Structure and CMMI Level 5

In a narrower sense, this project is changing the way crash data is collected, stored, and analyzed across the entire state and across a wide spectrum of users of the information. Through a spirit of teamwork, the means were developed to improve the system and deliver data to a diverse customer base, resulting in a win/win outcome for all.

In the broader context of future ventures, the CPR initiative has changed the way such cooperative information technology projects are managed and carried out. This project is unique in its use of top-level IT project management methodologies to facilitate synergy among so many widely diverse business entities with overlapping interests. It paves the way for future collaborations across the boundaries that exist within and among both public and private constituents having disparate business cultures, agendas, and programs.

C. Douglass Couto, Information Officer for MDOT who was recently quoted in a special edition of CIO magazine says, "Some people have told me I can put a dollar value on everything, but I haven't found the model yet that does that. On the other hand, the systematic application of new strategic management disciplines *has* allowed us to make great strides in repeatability, standardization, risk reduction, and user satisfaction."

This groundbreaking cross-agency effort spanned *multiple* state agencies, local governmental and law enforcement units, and public and private user groups, while employing SEI-CMMI Level 5 procedures. As the first project in the state to do so, it proved the value of these methods to broad-based initiatives of this type.

Even more innovative, was the forging of a joint governance structure that will form the framework and model for subsequent generations of similar state-sponsored IT partnerships. This structure included a core team and decision-making body to provide daily input and oversight as well as an ongoing approval mechanism for scoping, budgeting, and scheduling. "In the end we were able to quickly resolve issues, make good decisions, and keep the project moving," says Mr. Couto.

Hundreds of customers were represented on the project by nearly 50 entities from at least 6 State Departments and several private firms and educational institutions. Some examples include numerous groups from Michigan State Police, Michigan Department of State, and Michigan Department of Transportation, along with others from the Departments of Community Health, Family Independence Agency and Natural Resources, together with the Federal Hwy. Administration, National Hwy. Traffic Safety Administration, the Southeast MI Council of Governments, the (private) Traffic Improvement Agency, Michigan Technological Institute, the Univ. of MI Transportation Research Institute, and local law enforcement agencies.

The project evolved because in the past few years it had become apparent to the operators and users of the CRASH System that improvements to the system were necessary. To that end, a weeklong visioning session was held in August of 2001 in order to determine the

future direction of the system. This process was called Transtip and is a process that MDOT uses to improve products. At the visioning session, long and short term recommendations were made, including the migration of the CRASH Repository from a mainframe environment to a client server based system.

It was determined that the Crash System Redesign should provide law enforcement offices, traffic safety and highway engineers, researchers and other users of crash data with a system that is both flexible and efficient in meeting their needs while taking into account the business needs of the primary funding agencies.

Cross-Agency Guideposts

Such a pathfinding collaborative effort was naturally not without difficulty. In addition to the *technical* complexities of a system with so many users, so many purposes, and involving so many processes, the nature of this *cross agency* effort required careful planning and special measures to implement. The experience will prove valuable to future projects.

Keys to Successfully Implementing a Cross-Agency Project:
Lessons Learned and Best Practices to Emulate

1. Establish common business goals among all participants

The project was designed to reap benefits for all participants, so that project successes are a win/win for everyone.

2. Reach agreement up front on high-level issues

- Independent, facilitated discussions were held between representatives from state and local government and from private industry to provide a system of checks and balances.
- Sponsors came to agreement on the scope of the project early in the process (including agency Information Officers Gary Blair from the Michigan State Police, Dave Borzenski from Michigan Department of State, and Doug Couto from the Michigan Department of Transportation).
- Memos of Understanding were created early that clearly described the project's goals, the roles and responsibilities of all participants, and funding issues. These memos were then agreed upon and signed by the respective agency directors to become the basis for operating together.
- Separate estimates were created for different solutions to allow a buffet-style decision-making process where objectives could be prioritized and better decisions could be made about how best to spend money and resources.

3. Maintain open and forthright communication

- One business Project Manager (Jack Benac) and one technical Project Manager (John Dullock) were designated as primary project managers for the project and all communication was funneled to them to avoid confusing cross-talk.
- Changes were openly discussed and handled equitably to prevent future disagreements.

4. Strong leadership inspires confidence and trust among all participants

- Leaders were selected for this project who embraced the change in business culture that accompanies cross-agency projects and time was allowed for that cultural change to take effect.
- Leaders were selected with past experience and success (EDS had previously delivered two traffic safety projects on time and within budget) to instill confidence.
- Leaders fairly and diplomatically dealt with differences and held participants to their agreed- upon roles and responsibilities.

5. Employ sound project management methods

- Regular status updates created a loop comparing what was originally intended with what was actually accomplished. Discussion of any discrepancies built trust and kept all participants in harmony.
- The best formal project management techniques were used, including SEI CMMI level 5 practices that result in repeatable processes, reduction of risk, and quality review cycles at multiple levels.
- Various project management technology tools were used (including PVCS, NIKU, Microsoft Project, and Transportations' MAX methodology) to maximize the three key tenets of formal project management: time, cost, and quality.
- Contingency was built into the project to mitigate risks associated with early retirements, changes of personnel, and resource reductions.

6. Use the Phased approach: breaking projects into small chunks

- This project was designed to be completed in phases to help maintain team focus.
- This approach allows progress to be seen and demonstrated more easily, building

- momentum among participants and other stakeholders.
- Functionality was built into each phase to deliver usable products to the customers with each completed phase.

The Crash Redesign Project demonstrates how successful cross-agency projects can be when sound project management methodology is employed, when sponsors and team members remain involved, and when strong leaders are chosen whose past experience and successes inspire confidence and trust among all participants.

C. State and Stakeholder Benefits

Rewards

The CPR (Crash Process Redesign) project is helping users save time, money...and ultimately lives by:

- Streamlining the business process in order to improve data integrity
- Expediting processing and reducing the process cycle time
- Making the data more accessible
- Reducing the error rate of the process
- Achieving an overall cost savings on the processing of the crashes
- Increasing the accuracy of the data
- Assuring that the business needs of CRASH system users are met
- Exploiting newer technologies to increase flexibility, speed, and ease of use and maintenance.

The efficiencies gained do provide real economic savings. However, benefits to participating state and law enforcement agencies, motorists, taxpayers, research groups and consultants are not only monetary, but also include "soft" benefits such as error reduction, agency image improvement, legal compliance, data confidence, and employee morale.

Of course, the ultimate payoff is better decision-making for safer highways. Project Manager Jack Benac explains, "We make million-dollar decisions based on data—if the data is bad we make bad decisions." Good data that is easily delivered in timely fashion enables those in charge to make more responsive informed choices regarding the three main focal points for improving traffic safety: infrastructure, vehicles, and programs.

Even if the integrity of the data is excellent and it can be easily accessed, that means very little if the data is months old before it is available. Previously, there was a wait of up to a year from the time a crash occurred until the associated data was complete and available on the CRASH database. The heavily manual processes were a major contributor to this problem. Today, the lag between the crash event and its data availability has been slashed to 60 days and is expected to drop even more as users gain confidence using the system.

Improving efficiency, accuracy and timeliness of crash data analysis is intended to save lives, prevent injuries, minimize traffic delays, and decrease medical/insurance expenses for the motoring public.

D. Return on Investment

Costs vs. Gains

The estimated savings for the anticipated efficiencies gained over a 3-year period total nearly 4.6 million dollars. These savings include cost savings, cost avoidance, revenue recovery, time savings and more efficient use of assets.

One specific example of economic return involves the ability for the state to identify crashes in which there was evidence of state property damage. Notes Mr. Benac, "The State of Michigan lost over \$1.5 million last year due to the inability to accurately identify these crashes. The upgrades to the system will allow us to perform this check and ensure the state is reimbursed these costs."

The following is a summary of the project finances:

Project Cost Summary as of 12/14/2003:

Actual Contractor Costs	\$2,256,043
State Agency Personnel Costs	\$415,666
Total	\$2,671,709

Note: State Agency Personnel Costs are funded through state government wages and salaries and are not supported by the Project Available Funding. Project Available Funding is used to fund only hardware, software, and contractor resources.

Project Return Summary:

Keying Process Improvements:	\$82,128
Client/Server Application to Replace Mainframe:	\$267,264
Scanning Process:	\$45,936
Imaging Process:	\$133,632
Motor Carrier File Extract Process:	\$41,760
MDOS Process:	\$150,336
User Extract File Process:	\$27,144
Web/Client Server Real Time Reporting:	\$66,816
Log Maintenance:	\$58,464
State Property Damage Process:	\$2,500,224
Eliminating the ActionData Entry Contract**:	\$500,338
Keying Process Improvements:	\$50,880
Auditing Action Data Entry Work:	\$116,928
Imaging Process:	\$151,344
Corrected Copy Processing:	\$8,352
General Error Correction Processing:	\$204,624
Electronic UD-10 Data:	\$174,000
Motor Carrier File Extract Process:	\$15,000
Total	\$4,595,170

** Note: In reference to the 'Eliminating the ActionData Entry Contract' line item, the MSP DCO rate calculation includes salary, benefits and some indirect costs for data coding operators but does not include all costs. Otherwise, these figures have been calculated for 3 years following implementation using the current \$58 MDOT rate.
