# Information Integration for the Public Sector
## Local, state and federal integration projects

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## 1.0 Introduction

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Today's turbulent global situation has caused the U.S. to rethink its fundamental national security policies and examine how its information is controlled and managed. The traditional centralized system, in which those who control the most information wield the most power, is rapidly shifting to one in which shared information is considerably more powerful. The national security infrastructure that is being recast has, at its core, information decentralization.

In response, public sector agencies are increasingly looking to technology to help them achieve the expanded data integration that will be required to meet new legislative and other directives.

Information sharing among government agencies does exist, and much of it is externally imposed in response to legislative or policy mandates. However, there is an urgent need to not only accelerate information distribution, but also to broaden the scope of organizations that can share data. Local, state and federal agencies nationwide are reevaluating their needs and seeking integration solutions that can be deployed rapidly, efficiently and cost effectively, with minimal disruption.

Historically, the public sector has approached the integration problem with various degrees of enthusiasm; cautious optimism, total apprehension or just plain inertia. Some agencies have embarked on the integration "grand plan" complete with steering committees, multi-million dollar budgets and multi-year schedules. However, evidence suggests that most of these projects fail to deliver the far-reaching transformation that was promised.

Many believe the public sector integration problem is too complex, expensive and time consuming. Most government agencies are frustrated and not sure how to begin. In contrast, MITEM believes that any legacy integration challenge can be solved simply, rapidly and cost effectively. This white paper provides a simple framework for understanding the government data integration problem and breaking through the barriers to change.

## 2.0 Characteristics of Public Sector IT Environments

Let's briefly examine some key characteristics of public sector IT environments. These distinctive traits create a unique set of challenges for government data integration.

### 2.1 Dominated by Legacy Systems

Government systems can be extremely large. Agencies have been collecting massive amounts of critical data for decades, and may have tens of thousands of system users. The U.S. Postal Service has 800,000 employees alone. A state retirement system may have three million members and billions of dollars in assets to manage. Even on a local level, government information management needs can be grand in scale.

Seventy-to-80 percent of government information resides on high-end legacy, or mainframe, data processing systems such as Unisys or IBM. To attain full integration, an enterprise must directly link this legacy data with new applications. Unfortunately, legacy integration is the least understood part of the integration problem and has been poorly addressed by most enterprise application integration (EAI) software vendors.

### 2.2 Diverse Technologies

Government legacy systems typically include many "homegrown" systems and heterogeneous platforms. In the private sector, off-the-shelf, packaged solutions predominate, but the government needs specialized systems that can respond immediately to legislative changes. They can't wait until a software vendor upgrades a packaged solution, so they often create their own. In addition, agency IT decisions are made independently, thus creating a highly diverse environment.

The primary challenge is to integrate not only many disparate systems, but also integrate many systems that could change at any moment. A government application integration infrastructure must plan for and accommodate perpetual change. The high incidence of change often leads to inertia – the feeling that integrating anything is futile since it will change anyway.

### 2.3 Practical, Economical Technology Solutions

The sheer scale of government systems and the high cost of bleeding-edge talent prevent many agencies from rapidly adopting the latest technology fad. The cost of transformative change is too high and return on investment (ROI) is uncertain. Once it's installed and it works, the government maintains its data processing architecture for the long haul.

While some may say that government lags behind the technology curve, one could argue that they have achieved just the right balance to meet their enormous processing demands. They are also in a prime position to learn from others' mistakes. They reap the benefits of deploying technology that has been market-tested and proven to industrial strength before adopting it. Therefore, faddish integration solutions that promise sweeping transformation are highly suspect.

## 2.4 Highly Accountable

The government runs on taxpayer money which is a limited fund. It can be difficult to get government technology projects funded, and there is far greater scrutiny to prove success than in the private sector. If the system works, a compelling case must be made to justify change. Therefore, government agencies need integration solutions with low cost of entry, rapid, demonstrable business value and a stepwise roadmap.

Considering the distinctive character of public sector IT environments, the ideal integration solutions would include:

■ True, direct legacy application integration

■ Minimal, if any, disruption to existing systems

■ Easy accommodation to unforeseen conditions

■ Accountable, proven solutions that deliver on their promises

■ Low-cost entry; show immediate value; build in a stepwise fashion

■ The ability to leverage existing skills and technologies

## 3.0 Integration Track Record – Industry Assessment

For private and public sector organizations in pursuit of 100 percent integration, the track record is woefully dismal. Research on IT integration spending and "success" rates demonstrate that the problem has been, to a large extent, very real, difficult and expensive.

Market analysts at Forrester Research and IDC define "interface spaghetti" as a $225 billion problem that accounts for 30 percent of worldwide IT expenditures. META Group estimates the cost of enterprise application interoperability accounts for up to 30 percent of IT budgets. And Gartner estimates that 35-to-40 percent of all programming effort is devoted to application interoperability. Clearly the integration problem is consuming exorbitant IT resources.

According to The Standish Group, most application development projects undertaken have "failed." In this context, failed means 31 percent were cancelled and 51 percent of projects had capabilities that were never delivered. Only 16 percent of new development projects are completed successfully.

In response to such challenges, the enterprise application integration (EAI) software market was born. Vendors unleashed a slew of packaged applications, solutions and infrastructures promising to, once and for all, solve the integration problem. While many of these products offer a vast improvement over hand-coded, integration "spaghetti" and have helped many companies solve pieces of the integration problem, 100 percent integration of key processes and systems still eludes most organizations today.

The EAI industry has made great strides in developing and commercializing enabling technologies for integration. However, in the public sector many packaged solutions or all-encompassing infrastructures are not viable options. And most of these solutions do not adequately address the crucial legacy integration component. MITEM suggests a new pragmatic approach is needed to deliver true 100 percent integration.

## 4.0 A New Approach to an Old Problem

> "Systems that are built to change are more valuable than systems that are built to last."
> Roy Schulte, vice president and research fellow, Gartner - May 2001

### 4.1 The Integration Continuum™

The public sector IT environment we've heretofore described is characterized by diversity, unpredictability and change. Therefore, public sector integration must be approached as a perpetual process, rather than a single event. Integration needs are constantly evolving and changing. The Integration Continuum™ is MITEM's way of describing this perpetual change.

Today's government IT professionals must meet information systems requirements while ensuring the recommended solution also meets unforeseen technology initiatives. The cornerstone of the Integration Continuum™ is the premise that any technology choice that is promised to last is doomed to fail. A "universal adapter" is needed that can link any existing or future system throughout a heterogeneous environment. Therefore, the most valuable integration solutions are those built for adaptability and change over time.

Solutions best suited for the Integration Continuum™ are:

- Non-invasive

- Reusing existing assets

- Infrastructure-ready

### 4.2 Non-Invasive

The non-invasive approach is particularly relevant to the integration challenge in the public sector. Government agencies make their own IT decisions and cannot impose change on one another. Nor can they impose change on the private sector companies they work with. In the public sector technology environment, many heterogeneous systems must be coordinated.

Non-invasive approaches enable real-time legacy application integration without requiring changes or additions to existing applications. In contrast, invasive approaches are disruptive and rigid, requiring technology changes before integration can begin. Non-invasive integration solutions enable government agencies to surmount IT barriers, begin their integration initiatives swiftly and speed full-scale deployment.

## 4.3 Reuse of existing assets

Reusing existing assets is a key aspect of the non-invasive approach. Customers can use what they already have, including any legacy or homegrown systems, to build new applications that optimize and rejuvenate existing data and systems. This approach adds value to what already exists, rather than imposing change. The benefit is that customers can maintain their IT investments, while rapidly implementing new technology initiatives that demonstrate immediate value.

## 4.4 Infrastructure-ready

An integration solution that is infrastructure-ready is compatible and convergent with existing enterprise systems as well as whatever technology requirements the organization may add in the future. The solution sits above and uses the existing infrastructure to provide both forward and backward compatibility with all types of transactions and data. Customers can easily and rapidly build the connections to new or existing systems.

Now that we've described the overarching premise of this integration approach, let's look at a solution based on these attributes and how it can be deployed in a stepwise progression to achieve full-scale integration.

# 5.0 Integration Ladder™

With an integration solution that is non-invasive and built for change, integration becomes a very manageable, stepwise progression. No giant leaps of faith; no "all-or-nothing," multi-year initiatives. You begin with what you have; major changes are not required. You can start with cost-effective, preliminary steps and demonstrate success at each level before moving to the next.

MITEM refers to these basic levels of integration as the Integration Ladder™. This model is built on a foundation of legacy integration since, particularly in the public sector, most data resides on legacy systems. Therefore this is the largest, most critical piece of the integration puzzle.

## Level 0 - Screen Scraping

To bridge the world of desktop graphical user interface (GUI) and mainframe computer terminal (green screen) environment, screen scraper products were developed. These products are designed to create a mainframe desktop that resembled a GUI. Although it's an alluring concept to think legacy applications could be renovated so easily, these mask-like products really do not provide integration at all. Screen scraper products are only cosmetic – they change the appearance of what is on the screen. They do not provide any capabilities beyond that. MITEM sometimes calls this technique "lipstick on a pig."
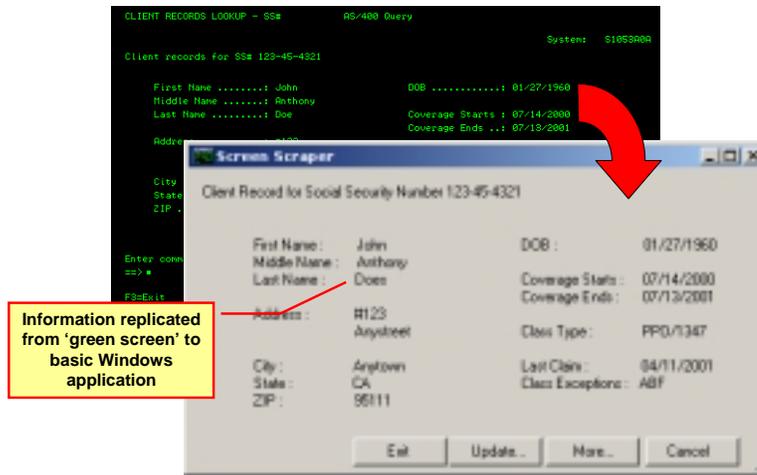
Screen scraper products add little or no value, they create overhead and are actually less efficient for power users since moving a cursor and clicking a mouse adds keystrokes. Screen scrapers make legacy data look like it's in a Windows application, when in fact, it's just a veneer. And, they don't save time. If the user has to pull up ten screens to obtain the necessary data, with the screen scraper it is likely they still have to view ten separate screens.

## Level 1 - User Interface Extension

This preliminary level of integration rises above screen scraping by adding business logic to the new application. At this level, customers can build new applications that add value to existing data. Users achieve new functionality independent of the legacy applications.
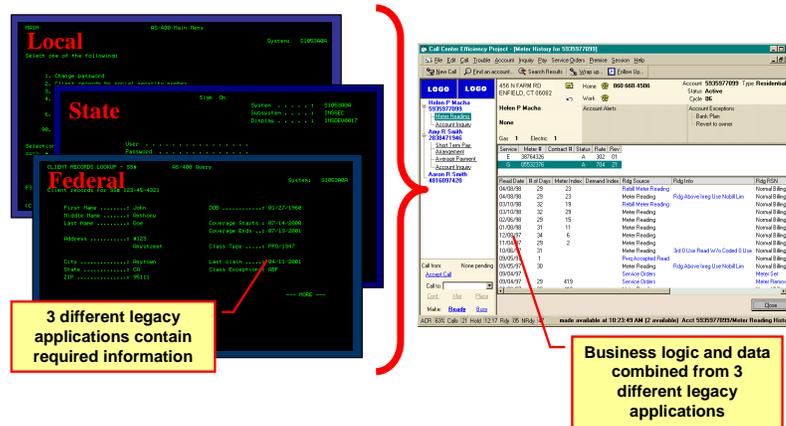
Level 0 only reflects the data as it exists. At Level 1, you can select data points from the mainframe system and create an application that displays something new. For example, instead of displaying date of birth, users can create an application that calculates age. Instead of displaying an insurance policy expiration date, the application calculates how many dates are left in the policy. Call center reps can renew policies over the phone when customers call with other questions. Rather than doing mental arithmetic, Level 1 functionality adds value. This is the first step toward true integration.
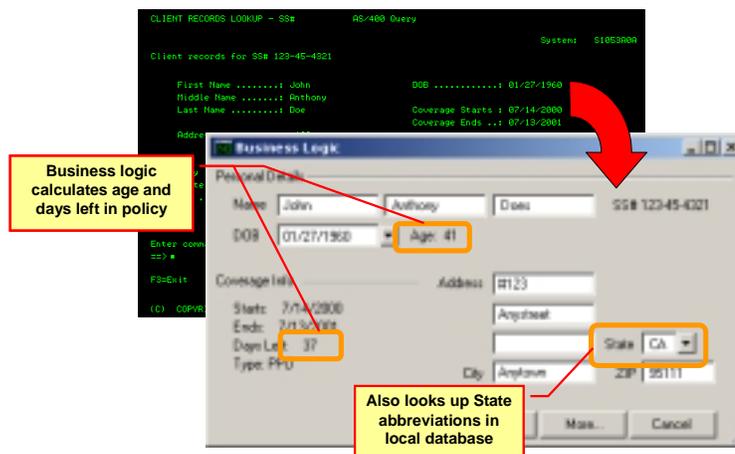
## Level 2 - Composite Applications

Level 2 provides a significant leap in functionality.  At this level, composite applications can be created that simultaneously access multiple systems, and asynchronous processing returns results as they complete.  Users enjoy a highly responsive system that provides a dramatic improvement in compiling data and saves vast amounts of time.  Like magic, everything they need is "instantly" on one screen when they need it, and it eliminates the time-consuming task of accessing multiple screens.

This is how it works.  From one end-user, the integration application simultaneously queries legacy applications, extracts the required information from each data stream, and places the data into a composite application seen on the desktop.  Results come back fast because it queries in an asynchronous fashion – it doesn't wait until one result is complete before moving to the next.  Therefore, the entire task only takes as long as the longest query and users get a "real time" response.



3 different legacy applications contain required information

Business logic and data combined from 3 different legacy applications

For example, a call center rep may have to access four separate green screens to check, and in many cases, manually copy data from one and enter into the other.  This process may take two minutes.  With a Level 2 composite application, they view one GUI screen and it takes only a few seconds – an enormous gain in productivity, accuracy, reliability and overall value.

Truly astounding is that best-in-class systems today have an unlimited number of applications that can be accessed.  Mitem*View*®, the integration software from MITEM Corporation, can process 40 screens of information per second, whether it's being used by one or 100 users.  That's up to 4,000 screens per second of integration processing power that links directly to existing systems!

## Level 3 - Web Enablement

At this level, we can now bring today's Web-based technology into the fray.  The two previous integration approaches are used within the organization.  Level 3 goes outside the organization and enables a direct link from the legacy systems to Web-based applications.

Web self-service applications are being widely deployed to better serve employees or a growing customer base, without having to increase labor costs.  Let's say you want to provide Web access to information regarding retirement benefits.  When pension fund members go to the Web site, they are walked through an identification and security process, and then they click on a button that is directly linked to the mainframe data.  In the background, the integration application queries the mainframe applications and the member's information pops up.  The Web application goes straight back to the actual data and members receive the most accurate information, easily and rapidly.
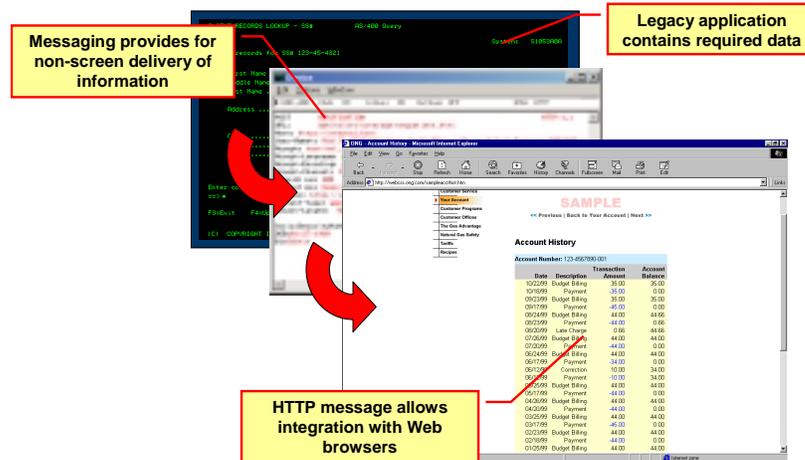


Behind the scenes in this process, the message coming into the Web application is an HTTP transaction.  The HTTP messaging protocol is behind most everything that appears on the Web – it's the primary transport method for all information.  In Level 3, we can add these formal messaging interfaces to "modernize" legacy data.  In essence, linking the old world with the new.

Today's best Level 3 systems allow organizations to build these new applications fast. They reuse legacy assets as they exist, without modification.  In linking the old world with the new, fast-paced Internet world, saving development time is crucial.

## Level 4 - Full Integration Infrastructure

At this stage, we achieve integration nirvana.  A Level 4 integration system is the backbone, an intermediary transport layer, which connects any application or system that exists, or any that may be added in the future.  This architecture brokers all messages and speaks all languages. The most popular technologies for integration infrastructures today include IBM's WebSphere MQ (previously MQSeries), TIBCO's ActiveEnterprise and numerous XML-based solutions.

With Level 4 integration, potentially any application can be added to the mix -- legacy applications, Web-based applications, custom applications or packaged applications such as CRM, ERP and Financial Accounting. Customers can quickly build "pipes" to integrate other systems, easily connecting them to the main integration highway.
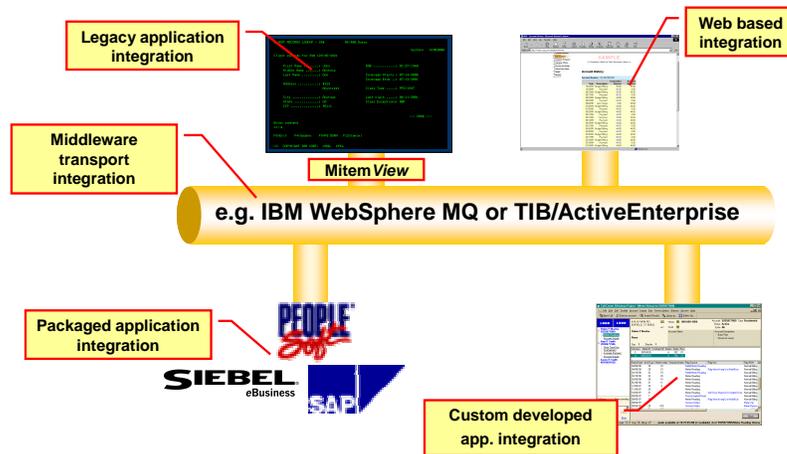
Mitem *View* is the Universal Adapter™ that connects the "last mile" from the integration infrastructure to legacy applications. While many vendors boast of having a dozen adapters to the most popular CRM, ERP and Financial Accounting applications, Mitem *View* addresses the remaining 300,000 plus custom and "no-name" applications that still power many vital government systems and functions.

Our Integration Ladder™ shows how organizations can build individual solutions with Level 1, 2, or 3 over time, and it won't hinder their ability to move to Level 4.  These solutions are simply embraced within the Level 4 infrastructure.  While Level 4 is the ultimate goal for some customers, integration needn't turn into an all-or-nothing predicament for everybody.

## 6.0 Public Sector Integration in Action

The following MITEM case studies illustrate how e-Government transformation can be successfully achieved through our incremental approach to integration.

## Integration of Law Enforcement, Detention and Court Services Systems

**Case-in-Point:** Minnesota's Ramsey County Criminal Justice System

**Summary:** Criminal justice system integrates data from disparate county, state and federal systems. New front-end streamlines administration of warrants, criminal history, court dispositions and jail management. The accuracy of maintaining criminal history has increased from 65 to 100 percent.

### Integration Challenge

Ramsey County is the second largest county in Minnesota, with a population of 500,000. Like many of its local government counterparts, Ramsey County was facing ever-tightening criminal justice budgets while criminal activity was increasing. The County's objective was to increase the effectiveness of law enforcement, detention and court services by consolidating the diverse criminal information systems at the county and state levels.
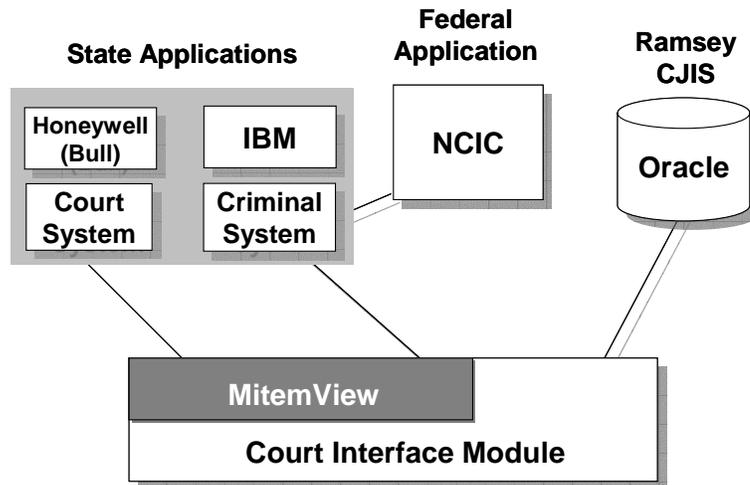


All Minnesota warrants are entered into the Honeywell Bull-based TCIS (Total Court Information System) application and the IBM-based MINCIS (Minnesota Criminal Information System). The process of issuing and managing warrants, bookings, court dispositions and criminal history was handled by different information systems on disparate platforms, each containing duplicate and inconsistent data.

"Looking up individuals with outstanding warrants on a local or state system and their criminal history was very labor intensive and error prone," said Dave Fenner, Lieutenant, Sheriff's department.

Sharing data with the state and nationwide criminal justice systems was a manual process with inconsistent results. When final court dispositions were issued, a batch printout was forwarded to the county where individuals had to manually look-up past bookings to update criminal history with court judgments. Only about 65 percent of the cases were correctly matched.

Ramsey County wanted to provide comprehensive and timelier information to the State of Minnesota. Key objectives included: giving users a logical view of information regardless of where the information resides; improved accuracy; reducing the time and effort County employees spent entering redundant data across several systems; and eliminating subjective judgments.

Solution

Ramsey County appointed Computer Task Group (CTG), a systems integrator, to design and develop an integrated criminal justice system. A full life cycle approach using CTG's C/S Method and "best practices" provided the foundation and infrastructure. Existing Ramsey County systems were replaced with an Oracle/PowerBuilder application called the Court Interface Module, which was modified to meet Ramsey County's law enforcement requirements.
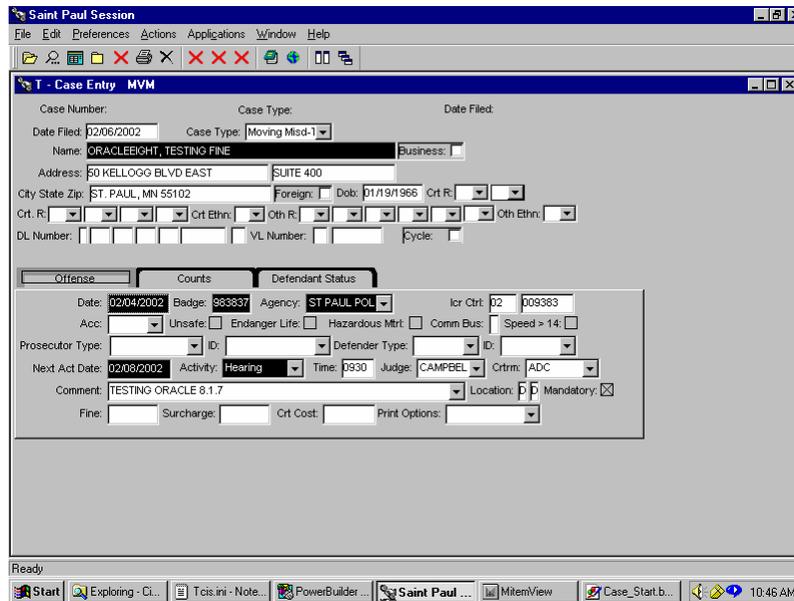


The new system now integrates data from multiple systems and eliminates redundant data entry. It supports: warrants, criminal history, civil process and jail management.

"Integration in the criminal justice industry is complex. There are multiple integration points that are required to facilitate a comprehensive criminal justice information system," said Mike Engel, engagement manager, Computer Task Group.

To integrate the new county criminal information system with MINCIS and TCIS, Mitem *View* was recommended as a non-invasive approach.

> "Mitem *View* is the only tool of its kind in the industry that could be counted on to bridge the gap between legacy and new systems, while meeting the service-level requirements for performance, availability and reliability," said Engel.

### Results

Court employees now enter warrant information into the Court Interface Module, which automatically updates TCIS, MINCIS and federal NCIC (if applicable).  The court case and warrant number is returned and updated automatically in the Court Interface Module application.

As final sentencing and court judgments are issued, the new system automatically captures and updates the new Ramsey County Criminal Justice System.  By connecting the warrant and booking data with the court case number, Ramsey County has increased the completeness and accuracy of maintaining criminal history from 65 percent to 100 percent.

## Enhancements to Streamline Payroll Operations and Comply with Section 508 Federal Regulation

**Case-in-Point**:  United States Postal Service (USPS)

**Summary**:  In 2000, the USPS launched its cost reduction/containment "Shared Services" initiative.  This reengineering effort includes technology upgrades of approximately 53 inter-facility processes to provide enhanced service to USPS employees, without adding more staff.  With more than 800,000 employees, the USPS is the third largest employer in the U.S.

### Integration Challenge

USPS has a single data processing center for all payroll and human resources systems. Its Accounting Services Center (ASC) processes various types of payroll adjustments for all employees.  This operation uses multiple mainframe systems with a variety of payroll and human resources applications.

Two new payroll adjustment processing applications were needed to upgrade older technology and streamline payroll business processes.

USPS needed to renovate its Involuntary Deduction Unit (IDU) application used by 25 specialized data entry staff to process IDU requests.  Its traditional 16-bit screen scraper. that accessed mainframe data needed for IDUs, could no longer accommodate the usability features USPS wanted to provide.

The second project involved a Web application to handle USPS' payroll adjustment processing. With the traditional method, each of the thousands of USPS supervisors manually filled out a form, sent them via postal mail to a specialized payroll department, and they were keyed in and processed. If the form had an error, it bounced back, by postal mail, causing significant delays in employees' pay adjustments. The department handles 30,000 requests every two weeks and USPS wanted to leverage Internet technology to automate and streamline this process.

In addition, both applications had to be in compliance with Section 508 of the Rehabilitation Act, federal guidelines that help ensure the universal accessibility of applications for people with disabilities. MITEM is one of a handful of integration software vendors with expertise in developing 508-compliant applications.

Solution

USPS selected Mitem*View* as a key component in developing and deploying both applications. It easily provides a seamless interface with the USPS mainframe payroll system, an IBM OS/390 mainframe.

For the IDU application, MITEM rewrote the GUI in Visual Basic, to provide a more adaptable, flexible programming environment for future growth. MITEM also added advanced usability features to enhance USPS' business processes such as a cleaner, more intuitive user interface and edit checks.

With MITEM's Web-based payroll adjustment application, supervisors fill out the complex forms in a secure browser, submit them, and maintain a feedback loop with the processing department to ensure timeliness and accuracy. MITEM not only duplicated, online, the complex process of accurately completing the form, but also built in an advanced communications layer so that if supervisors need assistance they can communicate with the payroll department to get the issue resolved before an inaccurate paycheck is issued.
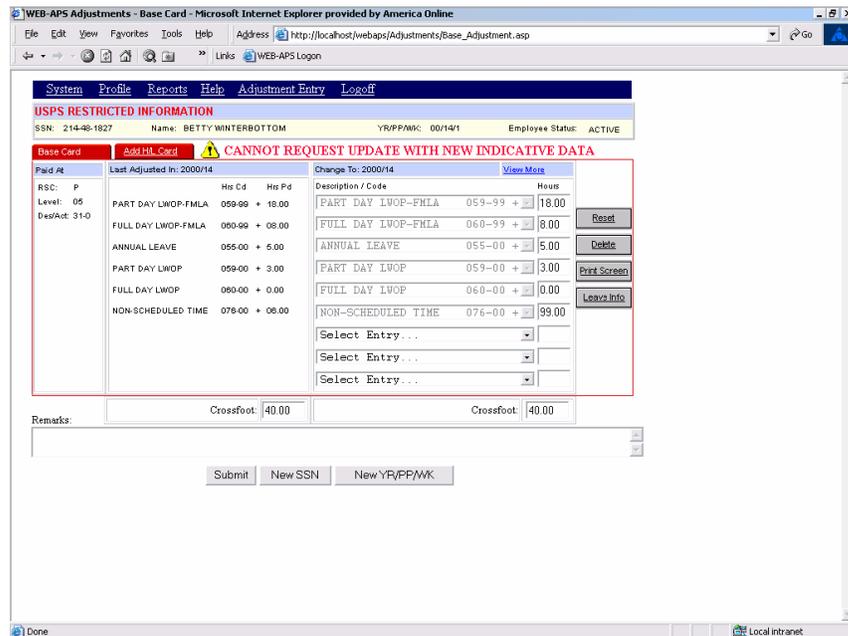
## Results

The USPS' IDU application has been live since mid-October 2001 and users report tremendous gains in processing speed. Tasks that used to take 30 seconds, now take less than one second.

> "Our previous IDU GUI project was on a development timeline of almost two years with a team of 4 developers. MITEM completed the project, and even went above and beyond the required functionality, in four months with only two people," said Rick Beyer, USPS project manager. "With MITEM we saw it was possible to get advanced, fully integrated business solutions without a lengthy development time or tremendous cost."

The payroll adjustment application is going live at the end of February 2002. The USPS expects it will greatly diminish the need for extensive manpower to manually process 30,000 forms every two weeks. USPS expects cost savings as well as greater efficiency in the payroll adjustment process.

# Moving up the Integration Ladder from Composite Applications to a Full Integration Infrastructure

**Case-in-Point**: CalPERS (California Public Employees' Retirement System)

**Summary**: CalPERS needed to prepare for the approaching "wave" of baby boomer retirees and support its expanded services offering. In 1998, they began a series of technology initiatives to enhance quality of service without hiring additional staff.

The initial project went live in 1999. "SmartDesk" is a composite application that integrates a number of separate applications into a single system, and greatly simplifies the work process. Service reps can access multiple systems through one application rather than toggling through many screens. MITEM provides the legacy integration capability in SmartDesk that connects directly to the mainframe data that the reps frequently need.

CalPERS is the largest public pension fund in the U.S., with $170 billion in assets and more than three million active and retired members.

## Integration Challenge

As CalPERS' services and membership continued to expand, it became more complex to provide efficient customer service. Service representatives often manually hopped around as many as ten different applications in response to one telephone inquiry. In addition, many new applications had been added to CalPERS' mainframe core benefits system to support new processes and record-keeping, resulting in duplicate data entry. And, the learning curve for agents to master all these systems was growing.

SmartDesk was designed to create a user intuitive application that would integrate and consolidate multiple applications. The integration of the mainframe-based core benefits system into SmartDesk posed a difficult challenge, however Mitem *View* solved this problem seamlessly.

Each SmartDesk client had a Mitem*View* client that enabled mainframe access. When CalPERS decided to extend their integration infrastructure, they also needed to extend this vital legacy integration component.
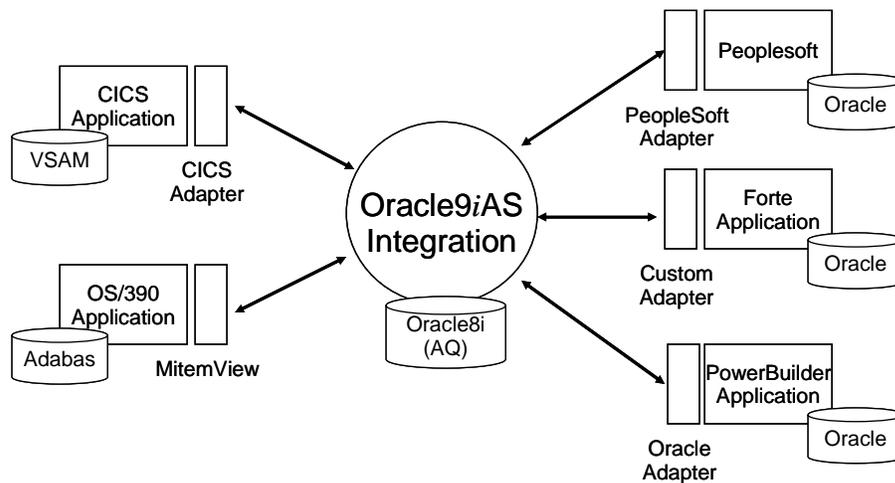


## Solution

CalPERS expanded the SmartDesk client integration by incorporating the new features of Oracle's 9iAS integration infrastructure and elevating Mitem*View* from the client to the server level.

> "We decided to expand our integration initiatives with the leading-edge Oracle 9iAS, however, Oracle couldn't talk directly to the mainframe. Therefore, we extended our use of Mitem*View*, moving it to a server level application, so that everyone connected to Oracle could easily access vital mainframe data through Mitem*View*," said Tim Garza, chief, Enterprise Modeling and Management.

With this new system, CalPERS has achieved two key objectives. They provided users with one integrated view of all the organization's disparate systems and applications, and secondly, everyone on the new enhanced Oracle 9iAS system has direct mainframe access to tap into legacy data.

> "Nearly every member's request involves looking up some piece of legacy data. Having this crucial Mitem*View* link available to many more employees will help us realize enormous gains in productivity at less cost," said Garza. "Mitem*View* is also highly adaptive to new infrastructure requirements as we grow, and gives us the ability to quickly deploy additional composite applications that are user friendly and can further reduce costs."

CalPERS estimates that MITEM's rapidly deployed, non-invasive solution reduced average application development time by 25 percent.

Currently, 400 CalPERS users are fully deployed on the new system. Ultimately this will be expanded to CalPERS' entire user community of 1200 people.

Results

The SmartDesk application reduced CalPERS' total cost of ownership for systems, improved customer service capabilities, increased overall effectiveness of operational processes by 20 percent and created a more robust customer relationship management environment.

SmartDesk reduced average call duration time from six and one-half minutes to four minutes, and it reduced system navigation time for end-users by 30 percent. The application also reduced customer service representative training time by 30 percent.

> "Mitem *View* was the ideal solution to solve CalPERS legacy integration challenge. It was very easy and quick to deploy and its performance capabilities and reliability far exceeded our expectations. Mitem *View* dramatically extended and perfectly complemented the integration capabilities of the Oracle 9iAS infrastructure." said Garza.

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