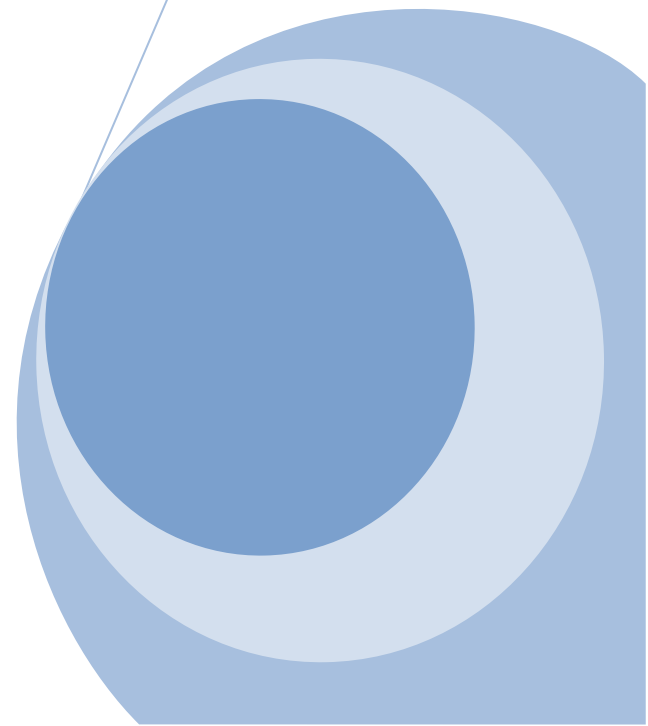


# **EWSolutions Data Warehouse, Metadata Management, Enterprise Data Architecture and Data Modeling Case Study**

*Leveraging Enterprise Data Warehouse Architecture,  
Metadata Management, Data Architecture and Data  
Modeling to Enable Law Enforcement Data Sharing and  
Analysis*

Enterprise data warehouse strategy and implementation, metadata management strategy and MME implementation, and enterprise data architecture and data modeling enabled the ability for federal law enforcement to "connect the dots" through data sharing and more rapid information analysis.

**EWSolutions, Inc.**  
**1/25/2017**



## **Enterprise Data Warehouse Architecture and Implementation, Metadata Management, Data Architecture and Data Modeling: A Case Study in How EWSolutions Enabled Federal Law Enforcement to "Connect the Dots"**

On September 4, 2001, Robert S. Mueller, III became the 6th Director of the Federal Bureau of Investigation (FBI). One week into his term, he became responsible for spearheading the most extensive reorganization the FBI has experienced to date, after the terror attacks of September 11, 2001.

By May 2002, he had articulated several top FBI priorities: protecting the U.S. from terrorist attacks; protecting the U.S. from foreign intelligence operations; securing the nation from cyber-based attacks and high-technology crimes; combating public corruption at all levels; protecting civil rights; combating international and national organized crime; fighting major white-collar crime; reducing significant violent crime; supporting our law enforcement and intelligence partners; and upgrading FBI technology.

"While we remain committed to our other important national security and law enforcement responsibilities, the prevention of terrorism takes precedence in our thinking and planning; in our hiring and staffing; in our training and technologies; and, most importantly, in our investigations," Director Mueller has said. "We need to be able to 'connect the dots' to find and apprehend criminals of every kind, to know who they are, where they are, and what their behavior patterns are, so we can prevent them from acting, or from acting again."



### **Improving FBI data management capabilities**

After the September 11, 2001 terrorist attacks, it was apparent the federal intelligence gathering capabilities and systems needed help. Information gathered by agents was not available readily for analysis, so "connecting the dots" was a manual, laborious task, fraught with difficulties. The FBI had many legacy computer systems that did not communicate with one another, and did not have appropriate levels of security for transferring data between them, if such transfers had been possible. Additionally, agents that used one system may not have had clearance to view data that resided on another system that housed necessary, confirming, or contradicting data.

Finally, the FBI had never addressed the underlying enterprise data and information management challenges of enterprise data warehouse architecture and implementation, enterprise data architecture, metadata management, not knowing that having this unified approach would give them an optimal design and continued capabilities for their decision support and analytical needs.

As described in an article in the [Chicago Tribune](#), the FBI conducted an extensive search for a strategic partner of data management and data warehousing to solve these issues. This was a definite departure from normal behavior for the FBI; usually the Bureau engages consultants from a known pool of firms to perform specific parts of a defined project. On this engagement, the consultants would lead the effort, define the scope, and provide much of the resource talent, since the FBI lacked the skills to deliver the results on its own.

The FBI chose to retain industry leader [EWSolutions](#) to design its enterprise data warehouse strategy. The Bureau requested that [EWSolutions](#) and its expert consultants lead the design and development of an assessment of their current state of data collection and storage, evaluate their data integration and enterprise data architecture approaches, and develop a strategy and implementation plan for metadata management that would support improved understanding of the vast amount of data and information the FBI collects and maintains. [EWSolutions](#)' team of experienced strategists and practitioners, led by President David Marco, was able to provide the Bureau with exemplary advice, guidance, planning and execution strategies and recommendations for improvement in all the identified data management areas.

[EWSolutions](#) and the FBI determined that success would be defined by achieving selected business and technical goals. Specific goals included:

- The necessity to “Connect the Dots” – to find links between seemingly disparate pieces of data over broad dimensions of time and geography.
- The primary technical goal was to combine data from almost any source, of any type (structured, unstructured, semi-structured), into one large cohesive database, enhance it with additional information such as latitude/longitude or zip+four, index it in a variety of ways, and make it all available to agents and analysts in real-time
- Faster, easier, more seamless data integration, data access (securely), and data queries, executed by agents and other authorized law enforcement professionals using current technologies

Key accomplishments included:

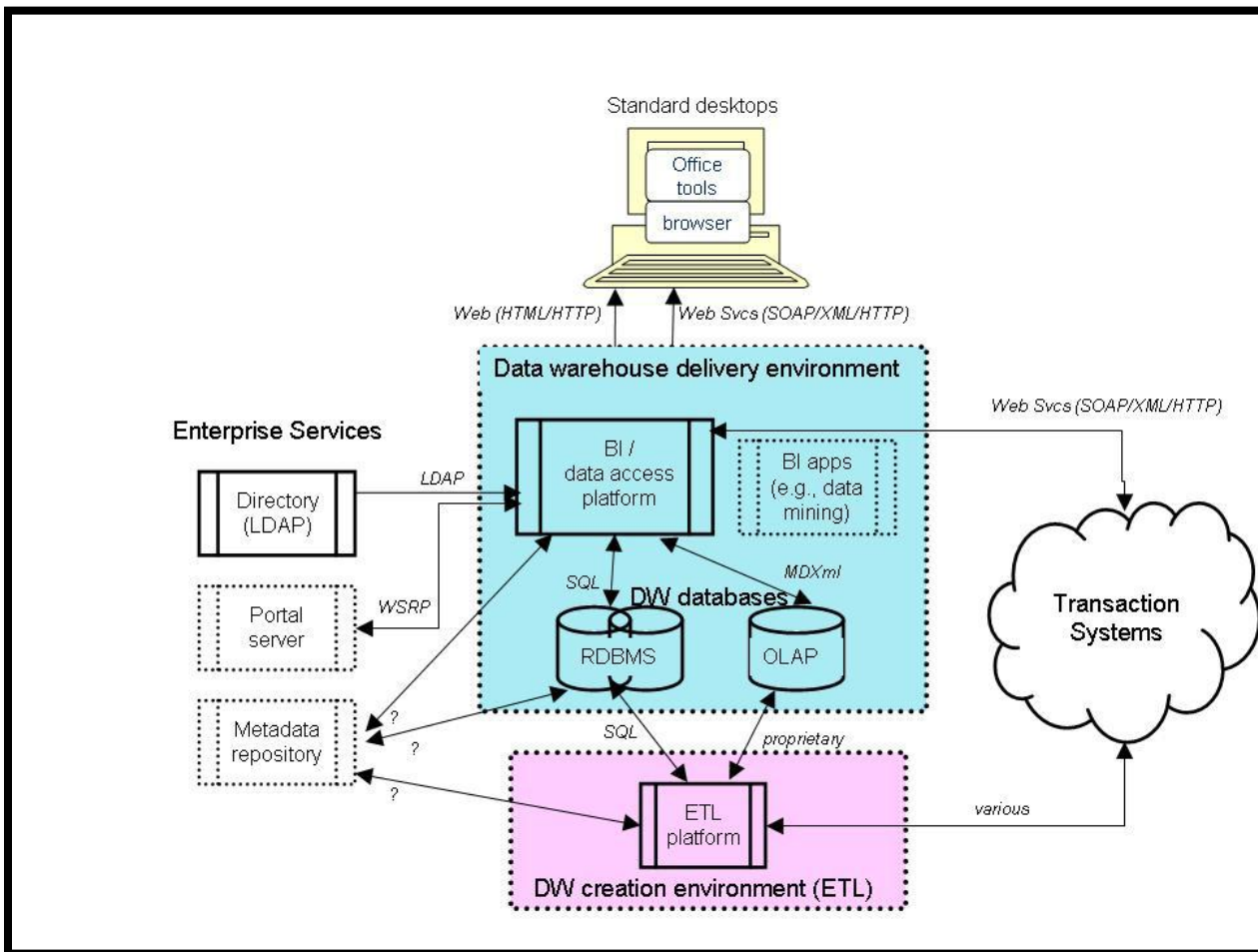
- Leading design, architecture, and implementation of the Investigative Data Warehouse (IDW 2.0), developing the capability to integrate massive amounts of structured and unstructured data - over 400 terabytes at completion
- Assessing the existing architecture and requirements (automate, improve, and expedite the method of handling investigative data, developing future architectures (Data Warehouse, ETL, Metadata, Data) and their requirements (enable ready access to and sharing of information across the FBI, with other federal agencies, and with state and local law enforcement).
- Establishing processes for ETL, Data Quality, Technology Evaluation
- Designing and populating metadata repository using Informatica.
- Participating in developing governance policies at the FBI and the U.S. Intelligence Community
- Incorporating leading edge, commercial-off-the-shelf (COTS) technologies for data warehousing / business intelligence and data mining to support the FBI's counter-terrorism, counter-intelligence, cyber crimes, and serial crimes investigations.
- Data model accepted as enterprise standard for the bureau

[EWSolutions](#) expertly guided the FBI in the use of its industry leading **M3<sup>sm</sup>** methodology for metadata management. The results of this methodology implementation included:

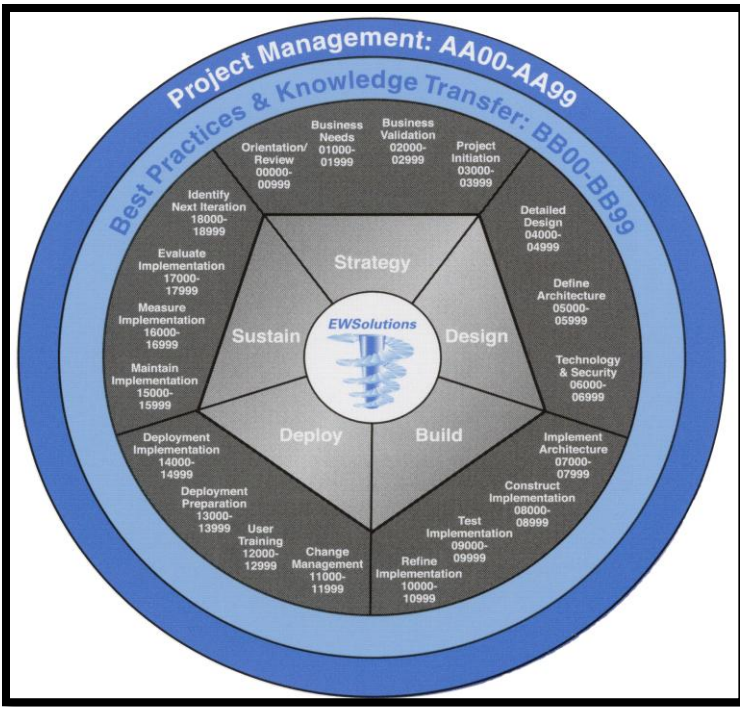
- Analysis of **M3<sup>sm</sup>** against current FBI metadata management activities and practices
- Assessment of gaps between the Bureau's metadata management practices and industry proven practices in **M3<sup>sm</sup>**
- Incorporation of **M3<sup>sm</sup>** stages, phases, activities, templates into an enterprise approach for managing metadata
- Incorporation of new method into selected metadata management implementation projects, starting with the development of a managed metadata environment

Additionally, [EWSolutions](#) used its industry leading **I3<sup>sm</sup>** methodology for data warehousing and business intelligence on this engagement. The results of this methodology implementation included:

- Analysis of **I3<sup>sm</sup>** against current FBI data warehousing / business intelligence practices
- Assessment of gaps between the Bureau's DW/BI practices and industry proven practices in **I3<sup>sm</sup>**
- Incorporation of **I3<sup>sm</sup>** stages, phases, activities, templates into FBI's DW / BI approach
- Expert guidance for blending **I3<sup>sm</sup>** and FBI's approaches into a unified method
- Incorporation of new method into selected DW/BI implementation projects



**Methodologies enable more rapid assessment, development and implementation through best practices**



**EWSolutions’ M3<sup>sm</sup>** methodology for Metadata Management is a highly customizable, iterative, and workflow-oriented methodology designed to help your organization achieve enterprise metadata management success effectively. With hundreds of fine-grained tasks with clear objectives, success factors, and responsible parties identified, **M3<sup>sm</sup>** enables the development of a managed metadata environment with the proper processes, people, and technologies.

The methodology is based on **EWSolutions’** consultants many years of helping clients successfully realize outstanding benefit from their metadata management efforts. **M3<sup>sm</sup>** underscores **EWSolutions’** numerous award-winning efforts and thought-leading practices and supports integration with Enterprise Information Management (EIM), data governance, and data warehouse / business intelligence (DW/BI) efforts. **M3<sup>sm</sup>** is a self-sustaining, iterative, and customizable methodology that helps organizations to realize continuous return on investment (ROI) by identifying new business opportunities, improving efficiencies, and increased data quality through a metadata management program.

**Methodology Critical Points:**

With highly customizable task narratives, templates, and examples, **M3<sup>sm</sup>** allows any organization to fit the methodology to its efforts, not the other way around. The methodology adds value to a metadata program without adding unnecessary complexity or unjustified efforts.

An iterative methodology with overlapping phases and activities, **M3<sup>sm</sup>** helps an organization anticipate and reduce risks within and across phases, providing strong validation of scope and results, while efficiently utilizing all resources, including time, personnel, funds, and effort.

The **M3<sup>sm</sup>** workflow provides discipline and manageability to any metadata management program. Developing a managed metadata environment can be very complex – using the **M3<sup>sm</sup>** methodology breaks the effort into manageable, measurable tasks to know the current state, target state, and next steps. With its clear success criteria and best-practice estimates, the methodology helps an organization achieve discipline and increase visibility to assess progress and identify needed adjustments efficiently and effectively.

**EWSolutions’ I3<sup>sm</sup>** methodology for Business Intelligence/Data Warehousing (BI/DW) is a highly customizable, iterative, and workflow-oriented methodology designed to help your organization achieve enterprise BI/DW success effectively. With hundreds of fine-grained tasks with clear objectives, success factors, and



responsible parties identified, **I3<sup>sm</sup>** enables the development of a BI/DW environment with the proper processes, people, and technologies.

The methodology is based on **EWSolutions'** consultants many years of helping clients successfully realize outstanding benefit from their BI /DW efforts. **I3<sup>sm</sup>** underscores **EWSolutions'** numerous award-winning efforts and thought-leading practices and supports integration with Enterprise Information Management (EIM), data governance, and managed metadata environment (MME) efforts. **I3<sup>sm</sup>** is a self-sustaining, iterative, and customizable methodology that helps organizations to realize continuous return on investment (ROI) by identifying new business opportunities, improving efficiencies, and increased data quality through a BI/DW program.

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### **Significant Accomplishments Provide Continuing Progress**

The FBI continued to implement its enterprise data warehouse and business intelligence strategy with the continued support of [EWSolutions](#), including expansion of its managed metadata environment (MME), enterprise data architecture and modeling, and by starting a focus on enterprise data governance. Enterprise data management and unstructured data management capabilities were sponsored by senior leadership across the Bureau, and the organization continues its enterprise data management efforts.

[EWSolutions](#) provided sustained guidance and advice informed by industry standards and proven practices, and led / directed several foundational projects during a critical period for the FBI. The program received a service award from FBI Director Mueller, and [EWSolutions](#) was nominated for several awards for this engagement, including the Wilshire Metadata Management Best Practices Award for 2006.

#### **EWSolutions Overview**

[EWSolutions](#) is comprised of superior strategic and tactical planning analysts who offer government and commercial clients innovative and authoritative solutions to assist with assessments / strategies in all areas of enterprise data / information management, technology implementation in metadata management, data warehousing (ETL, BI, data and text mining, etc.), business intelligence implementation, data governance program development and implementation, enterprise data management framework development and implementation, data migration planning, disaster and contingency planning, and strategic solutions for business/technology issues. The company's extensive client base spans the government and the health, life sciences, insurance, financial services, consumer products, retail, manufacturing, and high-tech industries. For more information on our strategic consulting services, high-value implementation services, methodologies, or world-class training call (630) 920-0005 or email us at [Info@EWSolutions.com](mailto:Info@EWSolutions.com)