

Better Decisions, Better Government: Effective Data Management Through a Coordinated Approach



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So Data is Important - What Now?

Part 1 of the NASCIO Data Management Series, *Data the Lifeblood of State Government*¹, highlighted the importance of managing data and information as strategic assets. Public expectation of transparency and accountability in government programs; effective prevention of fraud, waste and abuse; improved safety and well-being of the public; strong education and workforce programs; and more engaged interaction with citizens requires that government uses its data and information assets to continually drive efficiencies and effectiveness in business operations, and create value. Given the explosive growth of data, the lack of data governance and consistent standards, and the historical development of government data systems in silos, government is challenged to be able to have access to and confidence in its own data resources, and to exploit it properly to make more effective, strategic and proactive decisions.

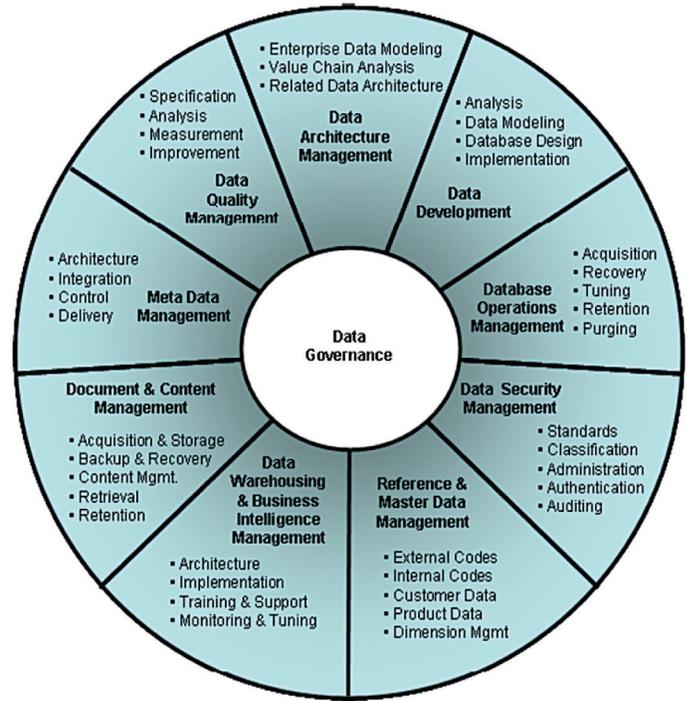
So we all agree that data management is important, and that with better data management, government can have a more coherent, trusted and comprehensive view of data - data that can drive insights and help make better business decisions. But how does data management (DM) work and how does government get started in developing and employing DM operating discipline?



**Key
Question**

Will the data management organization be centralized or decentralized?

One of the first keys is understanding that data management is not just an IT function. Successful implementation will only result from a joint engagement with both IT and business. DM is comprised of discipline, process, and procedure - data architecture, data inventories, data standards, metadata, security and controls - all functions that require strong technical and data management skillsets. But a discipline that works in that technical vacuum is just that - only a discipline.



DAMA Data Management Functional Framework

Data management brings true value when business organizations understand how better data and better management of that data can help create insight to make better decisions every day. To ensure prudent investment and support of a comprehensive and impactful data management program, business owners must understand that data management is critical for:

- Resolving the question of which system has the best information when we have multiple, possibly conflicting, information
- Helping business users find such basic information as the best name, address, date of birth, services and programs, and consolidating all of that “best” data into a master record or a single view of an individual
- Increasing confidence in the accuracy and quality of data by cleansing and standardizing data, ensuring that business rules are applied consistently



**Key
 Question**

What is the role of the chief data officer (CDO)? What is the reporting structure for the CDO?

- Improving the reliability and availability of data to make timely, proactive and better informed business decisions

When IT and business stakeholders work together to implement a data management program, government benefits by having comprehensive, reliable, quality data to:

- Reduce costs and increase revenue by improving operations and reducing fraud, waste and abuse
- Reduce risk and crime by improving the analytics employed by social services and public safety
- Streamline interactions with citizens by consolidating citizen information and touchpoints with government
- Increase the security, control and privacy of data by implementing appropriate data governance policies and procedures
- Make better decisions because they are informed decisions

Many phrases convey the idea of two groups working (or not working) together. “On the same page,” “singing from the same sheet music” or asking the question “are we even in the same ballpark?” When both the business and IT stakeholders are working together on a data management initiative, it’s important both parties are in agreement. Think of this process like a sporting event. The overall goal, along with the rule book that the players must follow is something everyone must agree to and understand. The rulebook (process) is defined by the governance organization while the players (people) must follow those rules. You can think of the equipment (technology) being there to help the players follow the rules and play the game to the best of their ability. Imagine a baseball game where there are no rules, no consistent way to keep score or any way to anticipate what is going to happen. The resulting game would be chaos.

TEXAS PARKS AND WILDLIFE

WE ARE THE PUBLIC’S FIDUCIARY OF [TEXAS] NATURAL RESOURCES, WHICH IS A DEEP, LONG-TERM RESPONSIBILITY. KNOWING OUR AUDIENCE AS MUCH AS POSSIBLE AND SERVING THEM EFFICIENTLY GOES TO THE CORE OF OUR MISSION.

~ CARTER SMITH
 EXECUTIVE DIRECTOR





Key Question

What authority should
the CDO have?

Get in the Game

When initiating a data management program, government needs to consider these three key areas - process, people, and technology. Each of the three legs of the data management stool plays an important role in ensuring a program that brings value to the business and structure and management to the data.

The Rulebook

The rulebook provides the process and policy to implement a data management program. It sets the structure under which the players are going to perform activities to design, implement and manage the program. Without the rulebook, agencies across state government may take varying approaches to how data is collected, handled, valued, protected and used.

What is in the Rulebook?

1. Governance Approach - provides clear direction about who has data management decision-rights. These decision makers determine the policy for how data is captured, standardized, integrated and used. Policy may address issues like determination of and adherence to data standards; resolution of data sharing issues and management of data sharing agreements; determination of security and privacy concerns; and management of enterprise data for specific business uses.
2. Program Management - provides process for defining scope of effort; managing participation of organizations across government agencies and jurisdictions; and determining priorities for the data management activities.
3. Business Case - there will be challenges coming from a variety of sources requesting or even demanding justification for investment in data management operating discipline, personnel and tools. There must be clear economic justification for embarking on a data management capability; near-term, medium-term, and long term outcomes; integration of the data management function and strategies in supporting / enabling state government business strategies and technology strategies. Examples include big data and analytics, the internet of things (IoT), unmanned aerial vehicles (UAV), sensor data, video and other types of unstructured data that could be exploited for better decisions.



Key Question

Will the CDO have the power to act? What real political support does the role have?

The Players

There are key people needed to fill the roles and responsibilities of a data management program. With any government program, understanding the mission, objectives, and scope of the data management effort will determine the best personnel and roles to include in any particular approach. It's important to note that a single individual can, and often times does, play multiple roles.

1. Executive leadership - ensures the success of a data management program by setting strategic direction, evangelizing the value of data management, and serving as a diplomat to help remove inhibitors to organizations buying into the program and sharing information.
2. Enterprise Architecture - NASCIO has made the case in the past regarding the overall scope of enterprise architecture and the necessary component domains of enterprise architecture. One of the key domains is the data and information domain. The ultimate placement of data management should be within enterprise architecture.
3. Program Management - the lead role may be a Chief Data Officer or a Chief Analytics Officer, or perhaps a director of a data management and analytics initiative. These roles provide leadership in implementing the strategy including setting mission, scope, and key objectives.
4. Data Stewards - generally business owners of the data, who provide both business knowledge and technical understanding of data. They help remediate data quality and standards issues, establish the most accurate sources of data to populate the “golden record” or authoritative source, and ensure management of data on an on-going basis.
5. Business Stakeholders - subject matter experts who justify the business value of better access to high quality, reliable, and easy to use data, and demonstrate the results of operational efficiencies, proactive decisions and improved citizen interaction. Business stakeholders need to have “skin in the game,” participating during all project phases from defining business requirements to testing and deployment of data management solutions.
6. IT Stakeholders - technical personnel who help implement the data management technology, enforce the governance policies to ensure data standards, quality, security and access.



Key Question

What legal counsel should exist for data and information management?

7. Legal Stakeholders - legal advisors in place to ensure proper roles and procedures are in compliance with applicable laws and regulations.
8. Enterprise Portfolio Management (EPM) - the EPM will help to put in place the state government portfolio of data and information assets, and will help manage that portfolio over time.
9. Security - working with the EPM and the data management team, security specialists will help guide the classification and valuation of data and information assets. This will help determine the level of investment in protecting these assets. Not all data and information requires the same level of protection.

The Equipment

Finally, certain key technologies are essential for implementing an enterprise data management program. This doesn't mean technical tools drive the initiative. A portfolio of tools will be necessary over time for assisting in managing data and information assets, in modeling data, in assisting with the analysis of data, and helping programs and projects accomplish their intent. The technology provides the mechanism to interact with data; to perform quality, standardization and integration activities; as well as access and analysis of data in order to gain insights from the data to make business decisions.

1. Data Quality tools - help assess data content, consistency, and value. Where possible, data quality cleanses and standardizes data content to meet the agreed upon data formats. These tools provide insight to data stewards to help them resolve quality issues as close to the source of data as possible. New business policies, transaction system modifications, and even education and training of personnel that create the data can improve the quality of the data.
2. Entity Resolution tools - helps data management match data across multiple data sources, agencies and jurisdictions. Entity resolution uses techniques like direct, "fuzzy" or even probabilistic matching of key identifying fields to build master records for key entities - such as people, businesses, facilities, or even equipment. Matching data provides more comprehensive information about a particular entity and contributes to enterprise and inter-enterprise data sharing and analysis.



Key Question

What budget should be established initially and when will that budget be reviewed?

3. Data Search tools - high quality, standardized and integrated data can only provide value to the business if users can access the data. Data mining and search tools allow business users to access information to answer business questions as needed.
4. Reporting and Analysis tools - when the business user needs greater insight into key information, reporting and analytic tools provide the ability to generate reports, dashboards, charts and graphs. More advanced analytic tools can assess trends and patterns in data, predict future outcomes based on historical information, identify key linkages in data, and much more.
5. Data modeling tools - used to clearly and precisely describe the semantics, business rules, integrity constraints, data relationships, and data attributes at various levels of abstraction and detail - conceptual, logical and physical data models. With more and more unstructured data coming into the purview of decision makers, there are new approaches and supporting tools for managing unstructured data.

So moving forward

1. Build Your Business Case - be sure data management is not an academic exercise. Identify tangible, measurable benefits that can demonstrate the business value and future return on investment. Help the business and other key stakeholders see the answer to “what’s in it for me?”
2. Establish Executive Support - identify key executives who will advocate for the program, establish leadership councils to help drive strategy and vision, and enlist key stakeholders who have a vested interest in the success of the program. Ideally this will include cabinet level support for a data management initiative and state-wide data governance.
3. Define Vision and Scope - set clear expectations for breadth of work and anticipated outcomes. Create key milestones that can demonstrate progress and create support for the long-range plan.
4. Recognize Your Challenges - data management is a complex process. Anticipate key issues like inhibitors to data sharing, poor data quality, lack of key skill sets, or funding. Taking time to address and manage these issues early in the process can establish a strong foundation to help facilitate data management activities.



**Key
 Question**

What are target first initiatives that are strategic to state government and to an early data management function? What are the current issues facing state government and how can data management help?

5. Identify Supporting Technologies - tools and technology are needed for data quality, integration, security, storage, access, and assessment. Identifying these key resources will help build expertise and skill sets to support the program.
6. Identify and Define the necessary roles and responsibilities - to ensure the necessary organization is in place with the appropriate authority to create and sustain the data management initiative. These roles include both the core data management function and the data stewards network.
7. Develop a Training Strategy. This will include ongoing professional development for the core data management function and the data stewards network. It also addresses the necessary training and awareness-building that must include all employees. For state government to make progress and sustain that progress, every employee must embrace the value of data and understand their role in establishing and maintaining data quality and security.
8. Establish Policy - document key governance and program management policies and provide them to program participants. Ensure stakeholders understand the policies and how they facilitate data management efforts. Periodically revisit policy to ensure revisions are incorporated as the program matures.
9. Employ Enterprise Portfolio Management (EPM) - establish the necessary partnering with the EPM function to help build the data portfolio.
10. Start Small and Grow - finally recognize that data management is a significant undertaking, something that can't be accomplished in a big bang approach. With all the challenges, it can be daunting to embark on this journey. So start small but start somewhere!

Just like in the movie *Field of Dreams* - "If you build it, they will come." After seeing success with small, but properly planned data management projects, additional groups will see the benefit and want to play the game as well!





Key Question

What is the collaborative relationship and reporting structure essential to bringing analytics, big data and data management together?

Barriers and Challenges You Must Prepare For

One of the most significant challenges you must be prepared for is the resistance to information sharing. You may also encounter resistance to being an early - or first-adopter - of any new software or technology solutions.

Developing data management discipline will appear to slow down project progress. It will take more time to maintain and build up the data and information asset portfolio, to determine data classifications, to train personnel on data standards, and to see actual agreement and reuse of data and information assets.

With the advent of big data and big data analytics, there will be resistance to developing standards that will impact fast paced, immediate results based initiatives. These initiatives include project employing change-driven development approaches such as Agile. Data management discipline must take into account the particular nature of unstructured data and the necessary access to such data demanded by advanced analytics. Part of the issue is related to advanced analytics experimentation and learning approaches. State government data will be sought to inform various types of decisions, both tactical and strategic. The expectation is that analytics will eventually reach a level of sophistication that it enables most jobs and most personnel. The velocity and variability intrinsic in big data analytics efforts are necessary considerations for any burgeoning or evolving data management initiative.

Change-driven approaches such as Agile techniques are by their very nature fast with short sprints that may fit into an overall epic. Traditional data management approaches were developed with the waterfall methodology in mind. Such plan-driven approaches still have their place for certain types of projects. Data management operating discipline must now encompass change-driven approaches. A project must move ahead, and move quickly, but the enterprise data architecture must also be informed and updated with any new data and information. It may be that an application developed using a change-driven approach is eventually scaled up and becomes an authoritative data source - a system of record (SOR) - for certain data and information.

Advanced data talent is expensive. Many states, possibly most states, cannot afford to have their own dedicated data scientists, or a chief data officer, or a staff of data architects. At some point states may need to consider cross-jurisdictional approaches for acquiring and sustaining human talent in data management.



Key Question

What data management discipline is relevant and supportive to change-driven approaches?

Key questions that impact your data-sharing approach

- Will the data management organization be centralized or decentralized?
- What is the role of the chief data officer (CDO)? What is the reporting structure for the CDO?
- What authority should the CDO have?
- Will the CDO have the power to act? What real political support does the role have?
- What legal counsel should exist for data and information management?
- What budget should be established initially and when will that budget be reviewed?
- What are target first initiatives that are strategic to state government and to an early data management function? What are the current issues facing state government and how can data management help?
- What is the collaborative relationship and reporting structure essential to bringing analytics, big data and data management together?
- What data management discipline is relevant and supportive to change-driven approaches?
- Who in industry and government are making progress in successful data management?
- What influence should data management have in the procurement process? In the managed services process?

Recommendations

- Develop a SMART plan for data management that includes: Strategy, Metrics, Analyze, Report, Transform, but start with a strategy.
- Begin with an inventory and assessment of current data assets.
- Develop a first cut meta data model to identify the meta data, data about data, that must be captured for each data asset.
- Anticipate that the meta data is necessary for classifying data assets and will eventually be used to determine what can be shared, who can have access to data, who can change it, and what security measures are appropriate for protecting it. This will require assigning some form of valuation to data.

- Integrate data management and a data architecture review on every project. On each project, program and management initiative, demonstrate the economic value of good data management. Over time understanding the value of data management and individual commitment to good data management will become imbedded in the DNA of the organization.
- Incorporate data management discipline within the purchasing process for systems and cloud services. Require a data management review and signoff prior to approval of any purchase of applications or systems. Begin working on this shared discipline once governance is put in place.

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Resources

See NASCIO reports under the category “Enterprise Architecture.”
www.nascio.org/Publications

What to look for:

- Data Governance Series
- Data Transparency
- Open Data
- Cloud Computing - Capitals in the Clouds: The Case for Cloud Computing in State Government Part II, Challenges and Opportunities to Get Your Data Right.
- NASCIO Enterprise Architecture Toolkit Version 3.0
- Unmanned Aerial Systems

DAMA International

www.dama.org

The DAMA (Data Management Association) is a not-for-profit, vendor-independent, international association of technical and business professionals dedicated to advancing the concepts and practices of data management.

What to look for:

- The DAMA Guide to the Data Management Body of Knowledge” (DAMA-DMBOK Guide)

EndNotes

¹ *Data the Lifeblood of State Government*, NASCIO, October 2015,
<http://www.nascio.org/Publications/ArtMID/485/ArticleID/287/Data-Management-Brief-I>