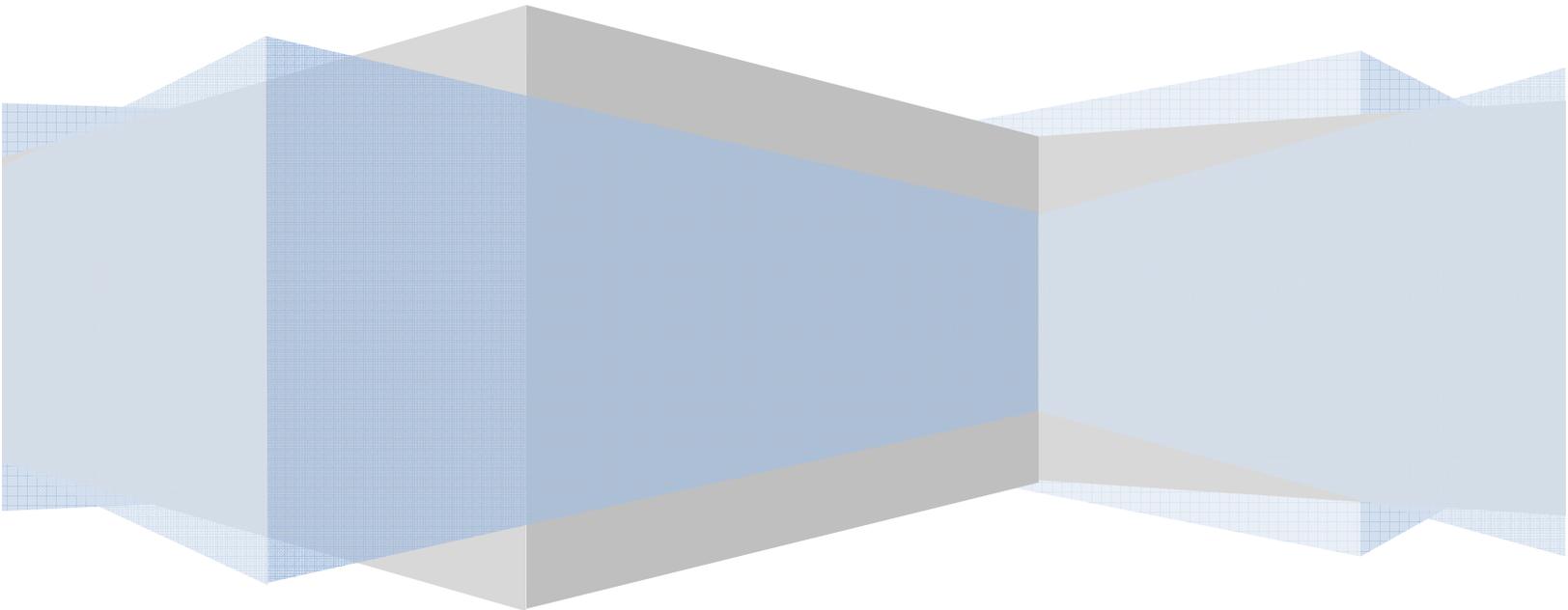




# Outcome-Based Information Management

Delivering the Right Information

Michael C. Daconta, Chief Technology Officer



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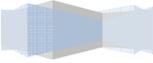
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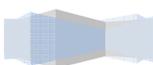
## Introduction

Outcome-Based Information Management (OBIM) is a business-driven methodology designed to accelerate the achievement of tangible results. An outcome-based process begins with business outcomes and works backwards from outcomes to activities to resources. This is a form of backwards-planning that has proven successful in many domains. For example, every military officer is taught that you use backwards planning when preparing for battle. You plan backwards from the kickoff time to account for travel, obstacles, logistics, combat support and anything else needed to achieve a successful outcome. There are always multiple way points and other intermediate milestones that are scheduled backwards from the kickoff at times T-X where T is the kickoff time and X is a conservatively planned duration required for the previous milestone. There, of course, would be multiple X's as there are multiple sub-goals to any non-trivial goal.

In this paper, we will use the OBIM methodology to explore the methodology by working backwards through the key concepts starting with outcomes, then moving backwards to the activities required to achieve those outcomes and finally working backwards to the resources required to perform those activities. We will begin with understanding and defining some key information management outcomes. It is these outcomes that provide business value to the organization. In fact, not understanding and not focusing on the outcomes of the information management discipline is the key factor in the failure of most Enterprise Information Management initiatives.

## Information Management Outcomes

Figure 1 depicts AIM's Outcome-Based Information Management approach. It should be read backwards from normal reading (of the English language) in that it should be read from Right-to-Left. It should be read from outcomes to activities. The primary focus must be first on the outcomes, on the results that you wish to achieve. Then from the particular outcome or outcomes you move to the left to find the corresponding set of activities and artifacts required to produce that outcome. Regarding the activities you should notice that the activities are stacked upon each other in layers with the lower layers supporting the upper layers. Thus the particular activity group that achieves a particular outcome has a set of dependencies via the activities below it that support it. Thus, you must not only go from outcomes to activities but then from activities downward to determine the dependent activities. Of course, the layers do not need to be fully implemented before an upper layer is implemented. In the diagram, this is indicated by the slices of layers connected via the spiral implementation arrow that connects them. The key idea here indicated by that spiral is that an outcome is created by threading through the information management architecture stack by implementing the appropriate slices of each layer. That approach insures both that outcomes are the top priority and that the activities required to deliver those outcomes can be implemented in a timely manner.



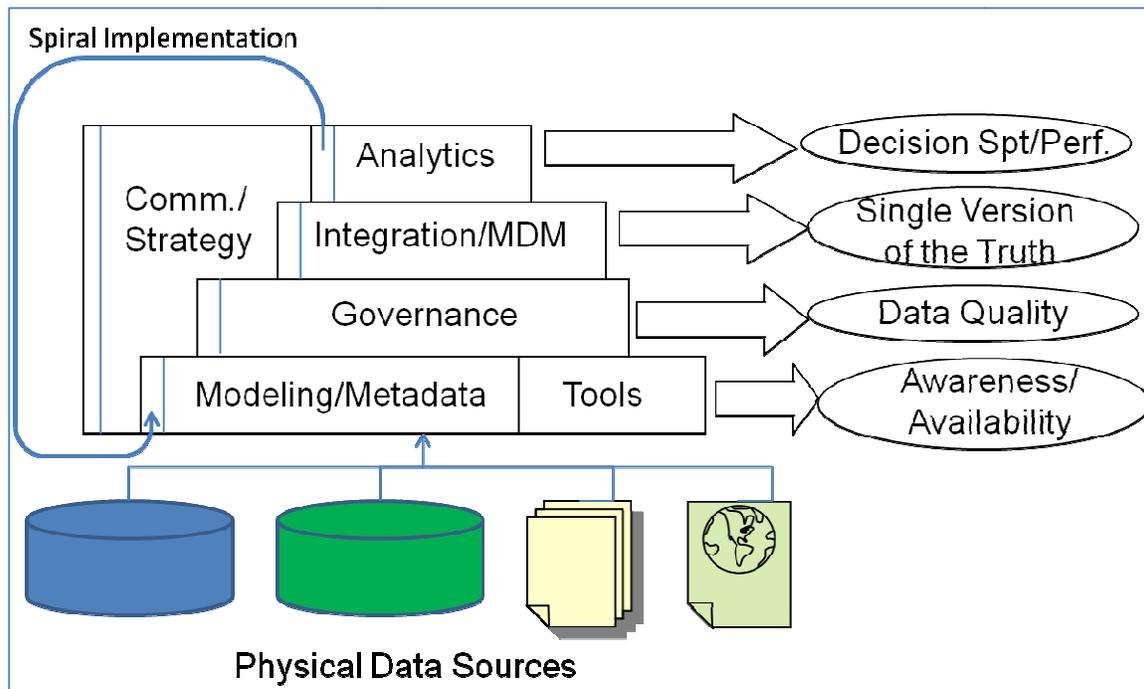
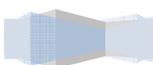


Figure 1 Outcome-Based Information Management Stack

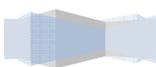
Now let's examine the details of Figure 1 by defining each part of the diagram starting with the outcomes and then working backwards. The outcomes in Figure 1 are as follows:

- **Awareness/Availability** – this enterprise outcome is achieved when key data sources of the enterprise are exposed to the entire enterprise beyond the business units that produce them. This outcome contains two parts: awareness and availability. Awareness is when the information consumers of an enterprise know that key data sources exist regardless of who produces those data sources. The awareness of data sources outside of those that produce them increase productivity and enhance organizational and cross-organization information sharing. Those are two key business benefits of the awareness outcome – increased productivity and increased information sharing. You cannot have availability without awareness but once you have awareness, then availability is possible. Availability is for the data in a discovered data source to be accessible by another system or an end-user. This can be via a portal or via a standard web service interface. Key business benefits of the availability outcome are increased transparency and reuse. Another important benefit that comes from awareness and availability is awareness of redundant or duplicative data sources that are being maintained. Elimination of those redundant data stores decreases costs.
- **Data Quality** – this enterprise outcome is achieved when key data sources can be trusted. Trust is the business benefit received by the outcome of data quality. Trust is achieved when the lineage from source to consuming application is known. When metadata on the security and privacy of the data source is published. When regular profiling and monitoring of the data source catches errors. When available data is interoperable by conforming to enterprise



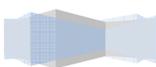
standards. Available data of high quality can be relied upon to make decisions. And that is another business benefit of trusted data – better and more reliable decisions.

- Single Version of the Truth – this enterprise outcome is achieved when the organization can get a single correct answer to questions that cross business units. When businesses and governments attempt to make key business decisions, they need trusted information to do so. However, since there are often multiple transactional systems that process common data, it is often difficult to get a single answer for information that crosses systems. For example, when the Department of Defense wants to know the number of active duty soldiers, in all branches of service, that are serving in Iraq or when a business wants to know all the customers of 1 division that were marketed to by another division. Information about customers and employees is often spread across multiple transactional systems when it needs to be carefully integrated to support these types of enterprise questions. Thus, instead of getting multiple versions of what the truth is, executives seek a single answer to a cross-cutting question. It is this holistic, integrated view of common enterprise data that is a desired outcome of all midsize and large organizations. The business benefit of this outcome is the ability to get complete and consistent answers across multiple perspectives and thus to be able to better understand and monitor business activity.
- Decision Support/Performance Management – this enterprise outcome is achieved when an organization has the ability to perform detailed analysis, including trend analysis, on its business activities to improve performance. For commercial business, a common type of analysis would be to understand sales activity and performance over time and categorized by division, geographic region and customer segment. For government organizations, that lack the simpler profit measurement, historical insight into performance effectiveness and efficiency can lead to improved mission results like arresting more criminals, screening more passengers or inspecting more planes. This outcome is broad and encompasses everything the industry labels “business intelligence”. A critical thing to remember when we discuss the activities required to implement this popular and common outcome is that there are considerable dependencies in the activity-chain. Without the complete activity-chain implemented, this outcome becomes brittle and untrustworthy.
- Other outcomes and sub-outcomes – while the outcomes described above are the key ones, there are many other outcomes that are either combinations of the above outcomes or subordinate outcomes to the ones listed. For example, “Reducing Data Calls” is a combination of all of the four outcomes because there are often data calls involved for each outcome. Another example is eDiscovery which is a combination of the first three outcomes (excluding decision support). An example of a subordinate outcome would be “Authoritative Data Sources” as it would be subordinate to the Awareness outcome of understanding all your data sources and then selecting those that were authoritative on a particular subject. Finally, there are outcomes that are not listed on the diagram; for example, the technical outcome of preventing stove-piped applications.



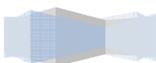
Now that we have discussed the outcomes, we can trace backwards to understand how those outcomes are implemented. Moving backwards we encounter the activity set (depicted as a layer) that is required to achieve the outcome. These activity sets are layered to show the dependencies. Thus, when tracing from an outcome to the required activities you move to the left (in the diagram) and then down to the dependencies. The activity layers in Figure 1 are as follows:

- Modeling/Metadata and Tools – the awareness and availability outcomes trace back to this activity set. That means that in order for the entire enterprise to be aware of the available data sources, those data sources must be catalogued, modeled and described in an enterprise registry. This set of sub-activities for cataloging your data assets is often labeled as “content discovery”. Of course, awareness is only half of the outcome, the others are accessibility and reuse. For accessibility, you need tools and processes that expose the data. This is often the data services layer of an overall Service Oriented Architecture (SOA) Strategy. Thirdly, in order to reuse the data, robust metadata on usage, composition and modularity must be built into the information production system (if one exists). Additionally, a key part of reuse is that a consumer trusts that the data is accurate so that their reuse benefits them. Thus, the enterprise needs data quality and master data management tools. In general, this activity set spans a wide array of description processes and the implementation of data management tools like metadata registries, Extract Transform and Load (ETL) tools, data profiling, data cleansing, data modeling, enterprise content management, enterprise search, data integration and master data management.
- Governance – the data quality outcome traces back to this activity set. That means that in order to achieve trusted data, you need a set of activities as part of a process to actively manage the state of your data’s quality – sometimes referred to as “data health”. In fact, a good way to look at governance processes is to use an analogy to health management processes because biological health, including biological disease, is an appropriate metaphor for data health and poor data quality. The key part of a governance process is the building of a business-based (meaning it is populated with folks from the business units and not dominated by IT folks) data governance council and working groups. The data governance council should be formally chartered and have multiple components to include a steering committee (strategic buy-in), a voting council and one or more technical working groups. The first order of business for the governance process is threefold: first the ability to create a quality baseline of the current state, secondly, devise a process to monitor and report on the state of quality in a recurring basis and third, devise the cleansing and standardization process to correct quality errors as close to their root cause as possible. Furthermore, as stated before, the way to trace through the diagram is to the left (including a communication strategy component) and then down to the dependencies. In this case, the governance process is dependent on a set of data quality tools in order to create the baseline, perform the data profiling, monitoring and cleansing of the data. Closely related to data governance is the governance of the Software Development Lifecycle (SDLC) and specifically, the inclusion of data governance within the SDLC process. This is extremely important in order for data governance activities to penetrate deep within the



organization. For example, all applications store and process data and therefore data governance and design must be a part of all application development.

- Integration/Master Data Management – the “single version of the truth” outcome traces back to this activity set. That means that in order to achieve a single version of the truth, you need a set of activities and tools that can access, analyze and intelligently combine data from multiple sources. Each of those activity subsets (access, analyze and intelligently combine) are dependent upon the lower layers of the activity stack discussed above. You cannot intelligently combine what you are not aware of (via data asset discovery) or able to access. You cannot intelligently combine what you do not understand (via modeling and definitions). You should not combine what you do not trust (via governance). There are various methods to integrate (or combine) data from multiple sources; however, the two most common are either a data warehouse type approach (via Extract, Transform and Load (ETL)) or a Service-Oriented Architecture type approach (via an Enterprise Service Bus (ESB)). Master Data Management (MDM) uses data integration to centralize a set of “master” records and “master” reference data. These master records are of various enterprise-wide types of data that are needed in many applications in each of the business units. MDM has evolved out of the Customer Data Integration space and the Product Integration space. Since that time, MDM has evolved to cover many different types of enterprise data that cut-across business units like Asset, Account, etc. Like Data Warehousing, Master Data Management is rapidly gaining adoption as it proves an effective solution to a serious enterprise problem. MDM enables executives to get a single, reliable answer to their cross-cutting questions instead of multiple different answers from each business unit. A recent experience AIM had assisting a customer was to design an MDM solution for Asset management so that the customer could ask a cross-cutting question like “how much are we spending on maintenance for all of our Assets”. Because each business unit had a different definition of “asset” hard-coded into their IT systems, an MDM solution was devised to create master records for Asset. We will discuss this in more detail in the OBIM Process section below.
- Analytics – the “decision support” outcome traces back to this activity set. That means that in order to achieve improved enterprise decisions, you need a set of activities and tools that can aggregate key facts, categorize them in multiple dimensions and present the trends in various graphical views. The most common example of this is for a business to create a data warehouse to aggregate its sales data and then report on it by country, state, year, salesperson, etc. This mature area is well-known as data warehousing and business intelligence (BI). The opportunity exists to integrate multi layered BI including “data analytics”, “content analytics”, “event analytics” and “entity analytics” to achieve organizational transformation and situational awareness. As seen in the diagram, these set of activities depend upon all the lower layers otherwise you will encounter a common data warehousing problem whereby an executive questions an inaccurate number in a BI report and it is found that it is derived from a non-authoritative source. There are many mature vendors in this space and the modeling,



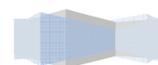
governance, integration, warehousing and presentation activities (including dashboards) are well-known, popular and still growing.

- Communication/Strategy – all of the activities described in this section cannot exist on their own without a parallel set of communication and strategy activities. The strategy activities are formal planning documents like a Concept Of Operations (CONOPS) and formal policy documents like a Management Directive that states data is an enterprise asset. These strategy documents are critical to setting the management foundation to implement and maintain the stack of activities, tools and resources to execute information management. Without top executive buy-in, the business units may not support enterprise-wide information management. This is critical because if the data is operated and maintained by the business units and if the enterprise is not given access to the data, the entire information management stack is rendered useless. So, whereas the strategy elements of information management provide top-cover, the communication strategies are just as important to motivate and engage the business units. Communication activities include status briefings, educational sessions, training and a newsletter. Communication and strategy complement each other and act as a lubricant to all the other activities in the stack. When the AIM Chief Technology Officer, Michael Daconta, was in the Department of Homeland Security, he did extensive educational briefings to many of the DHS components to explain metadata, the Federal Enterprise Architecture (FEA) Data Reference Model (DRM) and the National Information Exchange Model (NIEM, available at [www.niem.gov](http://www.niem.gov)). Currently, DHS has continued emphasizing data management and requires a data management plan to be created for each major development project as part of the Department's SDLC and Enterprise Architecture (EA) process.

At this point we have covered all the key elements in our innovative model for information management. One question we often get when presenting this in briefings is “do we have to fully implement each layer before moving up the stack?” The answer is no! In fact, if you look at the blue line that circles the stack and connects a slice of each layer you will begin to see how you implement this methodology in a small, stepwise manner. That brings us to our OBIM implementation process that we will discuss next.

## Outcome-Based Implementation Process

To implement this methodology requires selecting the required activities and skill-sets, scoping the activities to the smallest increments, and properly sequencing the activities to demonstrate rapid results. In general, the OBIM process follows the iterative, spiral development model as depicted in Figure 2. The core of the spiral model is to break the overall task into a series of iterative steps where you define, design, implement, test and deploy each iteration.



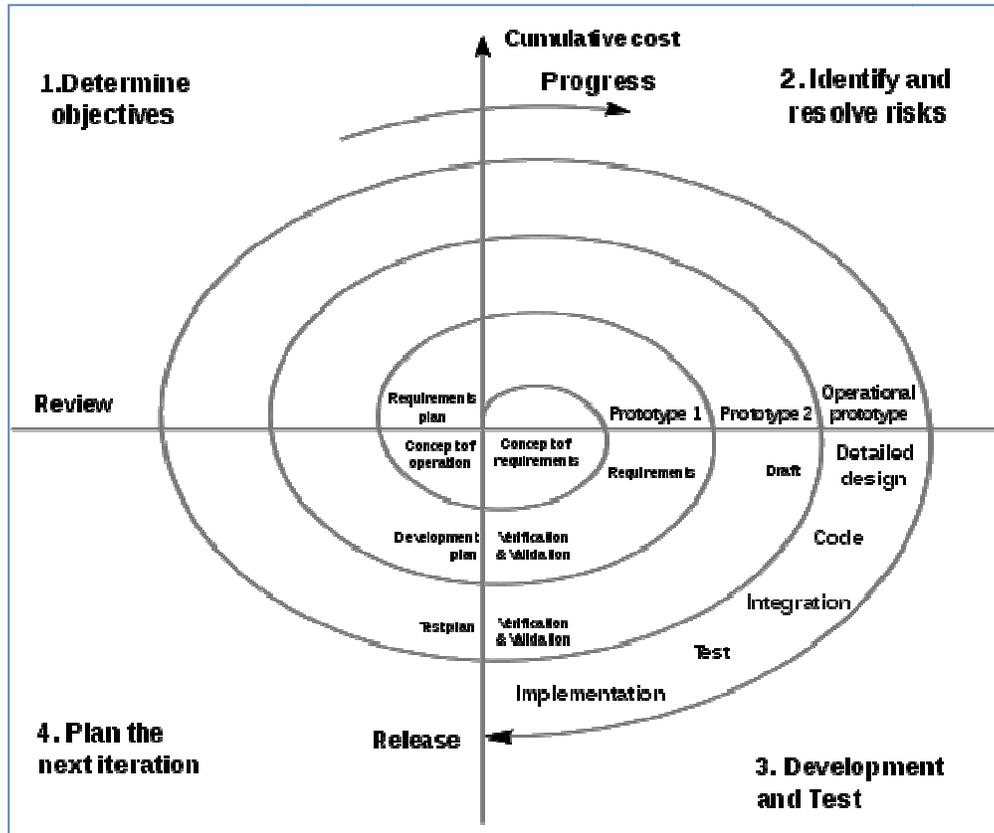
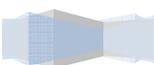


Figure 2 Boehm Spiral Development Model

Within each iteration, as discussed above, we perform the following OBIM-unique tasks:

- Selecting the Information Management Activities – the way to select the required activities is to perform detailed traceability backwards from the outcome to the activity layer and then downward to the dependencies. Specifically, this type of traceability begins with understanding the outcome in detail. For example, the outcome of a “single version of the truth” needs to be further specified to determine precise types of data that need to be integrated/consolidated across the organization. For example, for the U.S. Army Corps of Engineers (USACE) there is a need to integrate Asset data from across multiple physical systems. Thus a single version of “Asset” information becomes the key driver for this outcome. Furthermore, we can refine the outcome to elicit specific reports that the end-users want to see that requires integrated views from multiple systems. Thus, after refining the outcome, we then can select specific information management activities from each of the layers in our stack. For example, for the USACE MDM effort we will need to perform master data modeling, data standardization (for conformed dimensions) via governance, report generation, targeted data profiling and cleansing of the source systems, data access and transformation, and numerous communication/harmonization sessions with the business units that operate the source systems. It is critical to understand that in the OBIM method all of these tasks must be pared



down to their bare essentials to achieve our outcome. This avoids one of the most serious criticisms of information management which is that “it takes too long”.

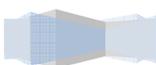
- Scoping the Information Management Activities – as stated previously, each layer is not implemented entirely to support the layers above it but only a small slice of the layer is implemented to support the desired outcome. A simple example of this is in the modeling task – many organizations make the mistake of thinking that a comprehensive enterprise data model must be completed before the higher layers can be started. These types of “kitchen-sink” activities often fail because the process gets bogged down and the senior executives never see any tangible results. To avoid this, the OBIM process, scopes each information management task selected to its bare minimum to achieve the desired outcome. The way to do this is to enforce direct traceability from the activity to either a dependency or a resultant outcome. For example, in the MDM tasks we can see how the tasks create a chain from data sources, to integrated model, to standardized dimensions, to resulting reports. It is the formal creation and briefing of these activity chains that scopes the effort. Both business and technical management should be able to clearly see the line-of-sight from the resources to activities to outcomes by tracing the chain.
- Sequencing the Information Management Activities – Besides, scoping or narrowing the activities, they also need to be sequenced properly. In following with our overall approach, we again recommend that sequencing proceeds backwards from the outcomes through activities to resources to physical data sources. The only exception to this backwards sequencing is when dependencies force the tasks to be reversed. For example, to create an integrated data model you must collect the data models from the physical data sources so that they can be harmonized and integrated. The other key to proper sequencing is to prioritize efforts with tangible and visible results first.

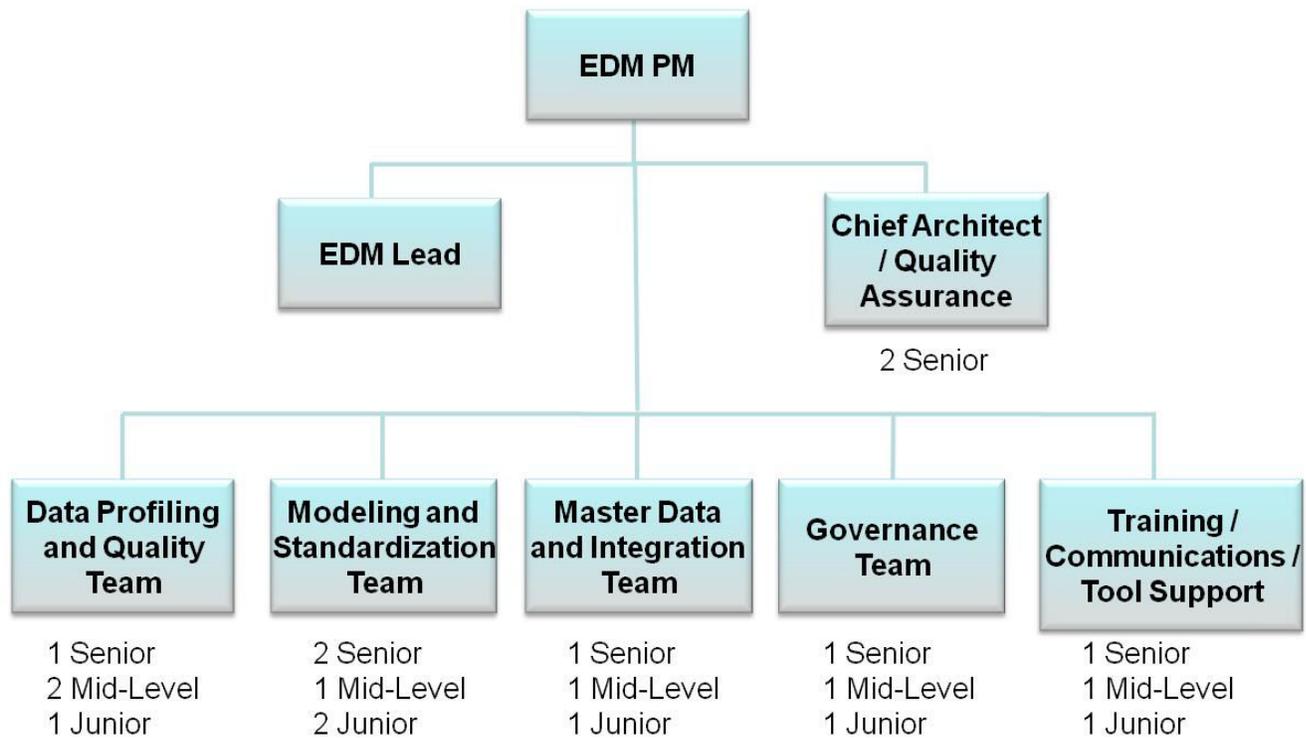
After selecting, scoping and sequencing the activities you calculate and acquire the resources required, in terms of human resources and tooling, to execute those activities. In the final section of this whitepaper we will discuss the OBIM approach to resourcing.

## Outcome-Based Resourcing

In walking backwards from our outcomes we have selected the required activities and are now ready to execute those activities. To successfully execute the required activities will require personnel with the right skill sets and the right tools to process the data.

For resourcing personnel you must create an effective structure mirrored around the major activity sets and attract the people with the right skill sets. The key skill sets to find are : Functional Data Stewards, Data Architects, Data Quality Analysts, Data Modelers, Business Intelligence Analysts, Data Warehouse Architects, Database Administrators, Web Service Specialists, and Reporting Analysts. Figure 3 presents an actual structure for a client based on their desire to achieve seven specific outcomes.





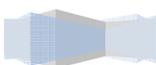
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Figure 3 Notional Enterprise Data Management Team Structure

It is important to stress that the notional number of personnel listed in Figure 3 is for a robust enterprise information management team to achieve a large number of information management outcomes. Of course, the number and scope of outcomes dictates the size of the team required.

In addition to personnel, the team needs information management tools to carry out its required activities. For example, in order to create data models, the modeling team requires a software modeling tool like Computer Associate’s Erwin product. Each activity set has its own corresponding set of tools to support it. Examples of these tools are a metadata registry/repository, extract-transform and load tools, data quality profiling and cleansing tools, business glossary tools, data warehouse tools, MDM tools, business intelligence tools, predictive intelligence tools and many, many more. Again, these should be carefully scoped as some tools can be costly.

After you have all of the above you are ready to construct a detailed 120-day action plan that will launch your efforts aggressively with immediately visible tangible benefits. Having developed this OBIM methodology over the last five years by participating in and witnessing what has worked and what has not worked, we have confirmed that this pragmatic approach works!



## Conclusion

In this whitepaper we have proposed a new methodology to tackle your information management challenges in a manner that rapidly achieves tangible results. Outcome-Based Information Management is a practical approach to Enterprise Information Management (EIM) specifically designed to overcome the traditional EIM pitfalls. Specifically, most EIM efforts take too long and focus on a laborious layered approach of attempting to catalog and model all data in order to harmonize an enterprise data model that covered all data in the enterprise. These types of overly ambitious, model-everything approaches rarely work and have even given some EIM efforts a bad reputation. The OBIM methodology changes that with a business-driven, outcome first approach.

In this paper we have examined the details of the OBIM approach by first examining a set of desired information management outcomes. Specifically we examined information sharing, information quality, information integration and decision support. We then examined the stack of activity-sets required to achieve those outcomes. Specifically we examined modeling/metadata development, governance, integration/master data management, analytic activities and communication/strategy development. After understanding the required activity-sets we discussed a spiral implementation approach and guidelines for successfully resourcing the implementation. Implementing Outcome-Based Information Management puts the focus back where it belongs – on the mission. At AIM, we understand that Information Technology and Information Management play a supporting role to mission objectives. We understand that IT/IM is not the mission - IT/IM is a mission multiplier. In that context, Outcome-Based Information Management can deliver better mission decisions, trusted information, a single version of the truth and improved information sharing! In short, OBIM delivers mission success!

## About AIM

Accelerated Information Management, LLC is a woman and veteran-owned small business that specializes in information management services. Founded in 2009 by Harold Klink, Michael C. Daconta and Craig Tanner, AIM has supported federal customers to include the Federal Aviation Administration (FAA), the Department of Homeland Security (DHS), the United States Army, The Army Corps of Engineers, the National Marine Fisheries Service and many others in achieving their Information Management objectives. AIM's CTO, Michael C. Daconta, is the former Metadata Program Manager for the Department of Homeland Security. Mr. Daconta led the interagency working group to create the Federal Enterprise Architecture (FEA) Data Reference Model (DRM) and launched the National Information Exchange Model (NIEM) with the Department of Justice (DOJ). In 2009, Mr. Daconta was selected as an IBM Information Champion. For more information on AIM's capabilities and to contact us, please visit <http://www.acceleratedim.com> or call Mr. Harold Klink, Chief Marketing Officer at (703)403-2315.

