



Whitemarsh
Information Systems Corporation

**Data Interoperability
Community of Interest
Handbook**

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Preface

Why was this book necessary? That is a good question and is answered here. Data Interoperability within enterprises almost always involves databases. Databases are almost always multi functional. Hence, database, as an IT discipline which started in the middle 1960s, has always been a cross-functional or community effort. The work products of these Communities of Interest are the specifications (i.e., metadata) of the databases, the missions, organizations, functions within which the databases operate, and are the specifications of the information systems from these communities that feed data into or employ data from these databases.

Communities of Interest are not just the right approach for these efforts. They have been the only approach for the past 50+ years. Highly efficient, and broadly successful Communities of Interest are work-product centric, author anonymous organizations. Individual contributions are subservient to the produced data interoperability standard.

The cost for a Community of Interest approach over the Stove Pipe approach is 50% less. Additionally, it is almost 10 times less when adding an additional system/member than the Stove Pipe approach. That alone should be sufficient justification for the Community of Interest approach.

This book is a handbook for successful Data Interoperability Communities of Interest. That is, those that are work-product centric, author-anonymous. To be successful, Communities of Interest operate under a formal set of rules and produce highly engineered, thoroughly integrated work products.

The Congress of the United States (a Community of Interest for America) operates under an elaborate set of rules. These rules were adapted for members of ordinary societies by GEN Henry M. Robert in 1915. These are now commonly called *Robert's Rules*. Notwithstanding they also require a "Sergeant of Arms." For sure not to shoot members, but to enforce good order. From the United States Senate website¹, "The Sergeant at Arms and Doorkeeper, elected by the members, serves as the protocol and chief law enforcement officer and is the principal administrative manager for most support services in the United States Senate." Even with such an individual,

¹ The website address is:
<http://www.senate.gov/reference/office/sergeant_at_arms.htm>

some sessions in both houses of the U.S. Congress seem not to be in good order.

Over the years, I have participated in a number of Communities of Interest. These range from committees to develop programs for Boy Scout Troops, to informal groups within various employments, and a number of times during Whitemarsh consulting assignments. As the years have passed, the financial impacts of decisions made by Communities of Interest have become greater. For example, it is common for the decisions made by the ANSI INCITS H2 Technical Committee on Database, a Community of Interest especially focused on the ANSI standard database language, SQL, to have tens-of-millions of dollars implications. Such decisions should be made not only with the utmost technical precision but also with the utmost bureaucratic care. Proper formulation, notice, discussion, voting, and on some occasions, appeals are all absolutely essential.

Some Communities of Interest seem like “professional” hockey games: Three 20 minute periods of continuous fighting interrupted by short intervals of skating around the rink. When serious Community of Interest discussions and decisions need to take place, consuming 50% of the time settling who votes, how votes are taken, what determines success or failure, if or when you can abstain, when papers are produced, and how minutes are is clearly a waste of time and effort. All of that should be predetermined by the rules and procedures of good order.

This book sets down a set of bureaucratic and procedural rules for accomplishing the scope and program of work of Communities of Interest. This book also provides clear procedures for accomplishing its technical work. While it was clear to me that the bureaucratic policies and procedures were needed, it was however a complete surprise that the technical policies, procedures and product specifications were also needed. They are provided in this book and are very much further detailed with materials from the Whitemarsh website².

I hope this book brings value to your Community of Interest efforts. Suggestions for revision are always welcome. Send me email.³

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November 2007

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Acknowledgments

There were four main sources for the material in this book. First is the Multi-Lateral Interoperability Program⁴. This is a military Command and Control (C2) community of interest exclusively focused on data interoperability that was founded within NATO (North Atlantic Treaty Organization). The MIP organization has been operational for more than 10 years across 26 nations. Simply stated, this organization has created a first class Information Exchange Data Model for Command and Control. Not surprisingly, it is called C2IEDM. The scope and the purpose of the MIP organization are set down in the opening section of Chapter 1 of this book. Only very minor edits were performed on their text. If the text is compelling as to the mission and goals of data interoperability, then it is because the need for and concepts surrounding data interoperability transcend organizations and nations. The most significant contribution of these materials has been the engineering of this style of community of interest. While the MIP material has been edited for use in this book, the intention was to remain true to their data interoperability Community of Interest engineering.

The second source for material is an even older community of interest: The International Committee of Information Technology Standards (INCITS, www.incits.org). This organization is at least 40 years old and operates under the auspices of the American National Standards Institute (ANSI). This uniquely American, volunteer-based, organization is responsible for developing IT standards for SQL, COBOL, FORTRAN, Optical Digital Data Disks, C, C++, Metadata, Radio Frequency Identification (RAID), and the like. The INCITS organization operates almost exclusively through Communities of Interest. The author of this book has been the Secretary of the Database Languages Committee, H2, since its very first meeting in April 1978. The organizational and operational materials from INCITS have been invaluable in the construction of the “bureaucratic” component of this book. Similarly, while the INCITS material has been edited for use in this book, the intention was to remain true to its information technology standard’s Communities of Interest engineering. Thus, similarity to the original text is no accident.

⁴ The MIP website is located at: www.mip-site.org.

Just having a complete policies and procedures manual to govern meetings, documents, decisions and appeals to decisions does not automatically bring peace, order, and harmony. That is achieved by a chair who understands that his role is to progress the standard and doing that requires peace, order and harmony. For 26 of the 28 years, the chair of H2 has been Dr. Donald Deutsch. That SQL is clearly one of the most accepted IT standards in the world is due to his firm hand and calm demeanor. Don, my “ANSI boss,” and close friend for more than 40 years is therefore great fully acknowledged. Because the engineering and operations of H2 are excellent, a number of H2 documents have been employed to construct key content in several chapters.

The ANSI and ISO organizations have developed two key standards that greatly assist in the development of data interoperability standards. These are the SQL standard that is managed by the ANSI INCITS H2 Technical Committee on Database Languages, and the ISO 11179 Standard for Data Element Registries. The U.S. Committee for the ISO 11179 Standard is ANSI INCITS L8 Technical Committee on Metadata. Information about both these standards and organizations can be obtained from INCITS⁵.

The third source of material has been the Office of the CIO of the United States Army. During the time, September 2003 through December 2004, this author, and two other individuals, Bruce Haberkamp and Jim Blalock worked almost continuously on building an enterprise⁶-wide Data Management Program that could achieve data interoperability across the U.S. Army. A workshop based on a prototype of these efforts was conducted in December

⁵. The INCITS website is: www.incits.org.

⁶. As defined within this book, an enterprise is merely a term to relate to a collection of organization units that have common collections of data, processes, activities within a business or a company and sometimes beyond corporate affiliations as in the case of data interchanges. Ideally, there is also a common governance of these items. An enterprise is therefore not just a synonym for business or a company. Rather, it is intended to convey a common data, process, and activity view across the organizational units sharing that view. A Data Interoperability Program is presumed to work across enterprises. Specific Communities of Interest work within enterprises and with respect to data interoperability, represent a shared governance. Some Communities of Interest work across corporate boundaries as in the case of the ANSI committee of the U.S. State Motor Vehicle Departments. Maryland drivers who speed in Nebraska see notations on their Maryland driving record.

Acknowledgments

2003. It was very successful. Dr. Edward Siomacco (COL, U.S. Army Ret) authorized and encouraged the workshop. These efforts resulted in sections within two Army documents. The data management paragraphs of Army Regulation 25-1, and an entire data management chapter in the Department of Army Pamphlet (DA PAM 25-1-1). These materials provided the three distinct levels to the Data Interoperability Program: Program, Project, and Community of Interest.

The fourth sets of materials have been from the Whitemarsh Corporation's extensive development of data management related methodologies, metadata engineering, and a metadata repository that can accomplish the program and scope of work for a Community of Interest. These materials have been in constant use and refinement since the middle 1970s. Organizations that have employed these materials are listed under Clients on the Whitemarsh website. During 2005 and 2006 Whitemarsh constructed the materials necessary for a Community of Interest. These materials contributed to the technical processes of constructing the data interoperability products.

Collectively then, the organizational engineering from the MIP program, the bureaucratic structures and processes from INCITS, the firm and guiding hand of a "Don Deutsch," the programmatic levels from the U.S. Army, and the technical materials from Whitemarsh have been brought together to create this book. All during the engineering and construction of his book, Hank Lavender, a retired USAF Colonel and graduate of the Air Force Academy, and also a senior database management consultant to the U.S. Department of Logistics's Defense Logistics Standards Management Office, and a long time friend and a professional colleague, has been ever ready to read a chapter, and even whole manuscripts and provide back immediate and very constructive comments.

Within the MIP program thanks goes to Gene Simaitis and Francisco Loaiza of the Institute for Defense Analysis, to COL Stuart Whitehead, and to Mike Morris. These four along with countless others have made the MIP data model, the C2IEDM, the premiere Command and Control data model throughout the world.

A common thread to all of these Army data interoperability initiatives has been the Office of the CIO under the command of LTG Stephen Boutelle. It was his program actions that funded the development of the data interoperability materials within the Army regulations, and that funded the workshop that demonstrated that the guidance in this book works efficiently and effectively.

A review and very valuable guidance have been received from David Allen of the Office of the Assistant Secretary of Defense, National Information Infrastructure, Office of the CIO.

A critical review and encouragement have been received from Andreas Tolk of the Old Dominion University. These individuals and many others in the data communities such as Robert Seiner of The Data Administration Newsletter, Terry Moriarty, Kevin light, and Karen Lopez of the ever responsive Data Management Discussion Group, Ron Ross for the material on Resource Life Cycle Analysis, and the DAMA community at large have all impacted the quality and validity of this book. Once a year all the “data folks” get together at the DAMA-Metadata International Conference. Tony Shaw and his great staff from Wilshire Conferences are responsible for making every year the best yet.

It is largely because of the hundreds of staff years from all these four acknowledged organizations and all the individuals cited above that this book represents an integration, editing, and publication effort rather than an original creation effort. In short because of all these efforts, this book is equivalent to a book you would read after it has been continuously revised over many years.

1

The Demand for Data Interoperability

The application of data in the early 21st century is demanding. It covers a wide spectrum of scenarios that range from conventional to crises responses, and to asymmetric operations. Unilateral capability is important but most planning is made on the assumption of alliance and coalition operations in scenarios that are difficult to predict and which often arise at short notice. Thus, the nature and composition of data to meet requirements may be quite specific but should be based upon general and flexible capabilities.

To achieve this, an assured capability for the interoperability of data is essential. The successful executions of fast-moving operations need an accelerated decision-action cycle, increased tempos of operations, and the ability to conduct joint operations. Executives require timely and accurate information. Also, supporting business information systems⁷ need to pass information within and across language boundaries. Moreover, tactical information must be provided to the operational and strategic levels of command.

The aim of a Data Interoperability Community of Interest, hereafter referred to just by Community of Interest, is to achieve data interoperability at all levels in support of combined and joint operations. Because data interoperability is almost always cross-functional, and cross-organizational, achievement of the highest level of data interoperability requires institutionalized, cross-functional, and cross-organizational semantics.

⁷. In the context of this book, a Business Information System is generic term for an information system that most commonly employs a database management system and a database. Simply put, a business information system is an application of IT technology in support of a collection of end users. The term is thus distinguished for example, from a computer's Operating System such as Windows or Unix, or a Database Management System such as Oracle, or "office" systems like Microsoft's Word, Power Point or Excel.

The catch phrase for this within the U.S. DoD is *factory to foxhole*. Specialized, parochial semantics are direct inhibitors to data interoperability.

The concept for the overall end state is to have multiple and disparate organizations operate as a single, synchronized team in accomplishing its assigned mission. In order to achieve that synergy, a common understanding is required. The interoperability contribution to this end state is to facilitate the timely flow of accurate and relevant information.

The perspective of this book is that there is a collection of operational Communities of Interest within an enterprise's Data Interoperability Program, and this book is a component of day-to-day operations of all the subgroups⁸ within the Data Interoperability Program. If it is the case that there is only one community of interest, then the entire organizational structure could consist solely of that community of interest and its contained technical committees. Consequentially, there would be no need for the Data Interoperability Program Committee and any of its contained subgroups. Other areas of this book could be similarly organizationally collapsed and/or streamlined in such a case.

1.1 Formal Interpretation of this Book

Formal interpretation of this book may be obtained upon request to the Data Interoperability Program Committee⁹. It is their responsibility to determine the meaning of any content and to render decisions about the effect of such interpretation. Any request for interpretation will be addressed by Procedures Board Committee at the first meeting following receipt of the request. The Data Interoperability Program Committee will maintain a record of all

⁸. Within the context of this document, *subgroup* is a generic term that refers to any constituted data interoperability program organizational entity including the Data Interoperability Program committee, its contained boards, Communities of Interest, its contained technical committees. This term is employed within the context in question, and applies universally to all data interoperability program organizational entities.

⁹. From the publishing perspective of this book, if a reader of this book finds that content is missing, misstated, or could be stated or described differently, suggestions are always welcome. Send them to Whitemarsh@Wiscorp.com. The ultimate goal of this book is to assist in the engineering of Communities of Interest that operate efficiently and effectively. Feedback will enhance future editions.

requests including the substance of the request and the interpretation provided. This record of interpretation will be periodically distributed to all members of the Data Interoperability Program Committee as well as all subgroup officers, and will serve as a basis for future revisions of this document.

Appeals to any interpretation made under this procedure may be made directly to the Community of Interest by requesting in writing that the issue be reviewed at its next scheduled meeting of the Data Interoperability Program Committee.

1.2 Objective of this Book

The objective of this book is to facilitate the identification, development, and evolution of data interoperability standards. These standards are produced within Communities of Interest that, in turn, operate within an enterprise's Data Interoperability Program. Data interoperability standards from one Community of Interest are themselves almost always semantically interrelated with other data interoperability standards from other Communities of Interest. A key function of certain subgroups within the overall Data Interoperability Program is semantic harmonization across data interoperability standards. Without harmonization data interoperability standards ultimately become the specifications of just another "stovepipe" database. The centerpiece product in a Data Interoperability standard is the Information Exchange Data Model. Surrounding this product is the multiple classes of metadata. Throughout this book, the word, standard, is used as a shorthand for the complete specification of a Data Interoperability standard. If a Community of Interest just creates a file of SQL DDL for the Information Exchange Data Model and calls it a Data Interoperability standard, they greatly short change the effort, and will likely fail to achieve the goal of data interoperability.

1.3 Communities of Interest

From the Wikipedia, "a Community of interest is a community of people who share a common interest or passion, such as rugby fans on Rugby365.com, or music lovers on MP3.com. These people exchange ideas and thoughts about the given passion, but may know (or care) little about each other outside of

this area. Participation in a community of interest can be compelling, entertaining and create a 'sticky' community where people return frequently and remain for extended periods."

Within the context of this book, a Community of Interest is the organizational implementing mechanism through which data interoperability is achieved across collections of data. In almost all organizations, data is cross functional. Consequently, data interoperability communities of interest under whatever names they have been called have existed for 30 or more years.

Within information technology, Communities of Interest is really a new name for an old concept. Charles Betz indicates that these groups have been called Communities of Practice, Consortia, Steering Committees, Advisory Committees/Councils, Coordinating Committees, or Interest Groups.

Communities of Interest exist within the context of an organization's data interoperability program. Each community of interest is likely focused on a particular functional area or a collection of functional areas. For example, if there is a data interoperability community of interest for Order Processing, then while functionally narrow, it may embrace a collection of organizations and individuals that deal with creating interoperable order processing data. Such a community might exist because each participating organization has a different order processing system.

Other more naturally existing data interoperability communities of interest exist with data operational data store (ODS) database, data warehouse (both wholesale and retail) projects, or master data projects (including reference data). These classes of projects have always been cross functional, and thus, the groups of individuals from the different participating organizations have always functioned as communities of interest.

This book then is really a new book about an old concept. The objective is to provide a formalization to these cross-functional data interoperability groups so that when these groups come into existence they can operate more smoothly, efficiently, and effectively. Less smoke and mirrors: more real work.

1.4 Organization of this Book

The book begins with this chapter and then proceeds to Chapter 2 which explains the need of data interoperability environments. There is then an overall architecture for the book: The Knowledge Worker Framework. Frameworks are merely mechanisms for depicting, understanding, and

explaining a complex subject. Some frameworks are durable and persistent while others are temporal. The Knowledge Worker Framework, which was described in the early 1980s by Matthew Flavin is thoroughly explained in materials from the Whitemarsh website, is for the knowledge worker rather than for the process worker. The key columns for the framework are:

- Mission (Chapter 4)
- Database Object (Chapter 5)
- Business Information System (Chapter 6)
- Business Event (Chapter 7)
- Business Function (Chapter 8)
- Business Organization (Chapter 9)

Figure 1 depicts the Knowledge Worker Framework. Explained in a left-to-right fashion, every enterprise has a mission, and without a mission there is no reason for the enterprise. Database object classes and the resulting database objects represent the “data proof” that the mission is accomplished. Business information systems are the “IT mechanisms” through which the mission-based data is collected and stored in databases. Business events are the business information system triggering mechanisms that are set within calendar and business cycles. Functions, often called in this book, Business Functions, are the human-centric processes that are performed and that on occasion trigger the business events. Finally, organization, also called Business Organization in this book, are the bureaucratic constructs of collections of persons who perform business functions.

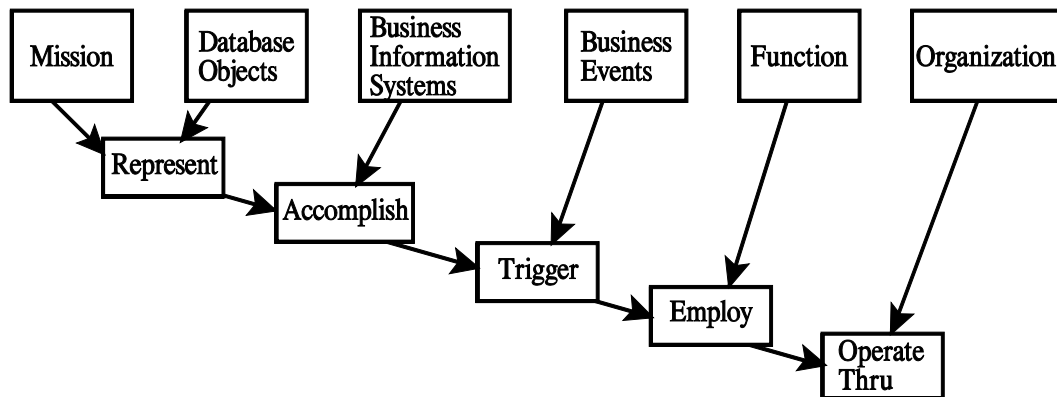


Figure 1. Interrelationships among Knowledge Worker Framework components.

The order, left to right, represents the least political to the most political. Where, that is, place is not in the framework because in today's network environments, "where" can be anywhere and often is virtual. In the case of this book, the mission is to build interoperable data environments. As this mission is accomplished, products are constructed. In this case the products are database objects but are not real-data-based products. Rather, they are metadata-based products. To construct these metadata-based products, business information systems are executed. In this case, the building of data interoperability specifications, the business information systems are metadata-based information systems. These metadata-based information systems are activated during the accomplishment of the functions associated with the creation of data interoperability specifications. Finally, functions are accomplished by persons operating within positions of the organizations participating in the communities of interest.

Stated from right to left, organizations operate through functions which, when performed, trigger business events that activate business information systems that add, delete, or modify the data of the database objects in the fulfillment of data interoperability missions.

It is because interoperable data environments are needed, are specified, exist within organizations, and are employed by persons as they perform their functions in support of accomplishing some aspect of the data interoperability mission that this framework, the Knowledge Worker Framework, is ideally suited to these purposes.

The metadata repository that is to contain the complete specifications of data interoperability environments is described in Chapter 3. It's a high-level data model and is further specified in Chapter 5. The data model's corresponding process model is specified in Chapter 6.

The positions that should be established are described in Chapter 10. Chapter 11 provides the specifications for key documents and guidance for document creation. Chapter 12 enumerates the types of data interoperability projects that should be undertaken. The final chapter, Chapter 13, provides a set of rules that govern the establishment of communities of interest, the conduct of meetings, voting, the collection of fees and other necessary activities that reduced the need for a real Sergeant of Arms.

In general, Chapters 4 through 13 represent the policies, products, processes, projects, procedures, positions, organizations, and rules for instituting and operating a Data Interoperability Program through its contained Communities of Interest.

This book is intended to be a day-to-day cookbook for any subgroup within a Data Interoperability Program. The form of the book's content is sometimes narrative paragraphs, and other times hierarchal lists and/or specifications. The intention was to create the material in the best use-form. In short, this book contains: the what, the when, and the how to accomplish data interoperability's specification, implementation, and evolution.

To that end, this book is organized into three overall parts:

- Part 1, that is, Chapters 1, 2, introduction and rationale chapters.
- Part 2, that is, Chapters 3 through 8, is the infrastructures chapters for establishing data interoperability programs and their communities of interest.
- Part 3, that is, Chapters 9 through 13, are the governance chapters. The parts, chapters and descriptions are provided in the table that follows.

Data Interoperability Community of Interest Handbook Organization		
Part	Chapter	Description
1. Introduction and Rationale	1.Demand for Data Interoperability	This chapter presents the overall rationale for the demand for data interoperability, its value proposition, the objective of the book and its organizational framework.
	2. Rationale for Data Interoperability	This chapter presents the rationale for a community of interest. Included in the rationale are its key reasons for existence, the role of shared policy, and the need to focus on database objects ¹⁰ classes as the foundation stones for shared data.

¹⁰. A database object is a Whitmarsh crafted term that refers to "object oriented" features contained within databases that are managed by database management systems. The ANSI INCITS H2 Technical Committee on Database has gone a long way in defining database object classes within the SQL language. In this book and in Information Technology in general, "class" implies type and the string without "class" implies instance. Thus, there is the class of sandwich, Peanut-Butter and Jelly. It would therefore be referred to as a Peanut-Butter and Jelly sandwich "class." But "my" Peanut-Butter and Jelly sandwich that I hold in my hand is just that, a Peanut-Butter and Jelly sandwich. No "class."

Data Interoperability Community of Interest Handbook Organization		
Part	Chapter	Description
2. Infrastructure	3. Metadata	This chapter sets forth the requirements for metadata with the objective that the reader concludes that to have any reasonable hope of being successful in data interoperability there must first be success with metadata.
	4. Mission	Chapter 4 presents the overall mission of data interoperability. Missions describe the objective in idealized terms without the “who” (Positions and Organization), or the “how” (functions).
	5. Database Objects	Chapter 5 present the “what.” That is, the metadata products that need to be created during the existence of a data interoperability project. In this case these products are the specifications necessary to then implement so as to enable data interoperability throughout an enterprise’s operations.
	6. Business Information Systems	Chapter 6 identifies the business information systems, which, in the case of a Data Interoperability Program, are actually metadata information systems that enable members of the various Data Interoperability Programs to create, evolve, and maintain the products set out in Chapter 5. Again, once the metadata-based products of Chapter 5 are created, they, as specifications, are implemented and made operational through normal information technology processes. Over the years the implementation technology of these metadata-based products has and will change. In years gone by, the implementation technologies were shared tapes that were transported across distances to then run on different computers. This implementation technology was replaced by computers residing in commonly employable networks. Thereafter, these were replaced by client-server environments with enterprise-based proprietary networks. Today, there are the Internet and web-based services. Tomorrow? All during these technology evolutions the fundamental set of metadata-based products and the processes to create the products have largely remained the same. Some things, needs and processes are constant.

Data Interoperability Community of Interest Handbook Organization		
Part	Chapter	Description
	7. Business Events	Chapter 7 presents the business events that occur along the road to creating the metadata-based products of Chapter 5. Also presented are the bureaucratic business events that occur while carrying out the scope and program of work of a Data Interoperability Program.
	8. Business Functions	This chapter presents the business functions, that is, the processes that are to be undertaken by the positions within the organizations to build the products necessary for a successful data interoperability mission. Of necessity, these processes are not completely detailed. Additional detail is available from various methodology products from the Whitemarsh website.
3. Governance	9. Business Organizations	This chapter presents the various organizations that should exist for a robust Data Interoperability Program. If your program is merely a single Community of Interest, then the organizational structure should be collapsed into just the organization, Community of Interest. The chair and officers of that one Community of Interest would necessarily have to assume the responsibilities, authorities and duties of the total program. If thereafter additional Communities of Interest emerge, then the additional layers within the organization could be created and set into place.
	10. Positions	This chapter presents the various positions that should exist across the subgroup organizations. In this book "position" applies to members as well as functional positions such as officers, editors, and the like. Included as well in this chapter are the processes for applying for membership, withdrawal of membership, and member status review.

Data Interoperability Community of Interest Handbook Organization		
Part	Chapter	Description
	11. Documents	This chapter presents a sketch of the kinds of documents or “large” products that are built from the collections of metadata products set out in Chapter 5. A strawman collection of documents is identified. These were drawn from the U.S. Federal Government’s Department of Defense’s Architecture Framework (DoDAF). Every other enterprise that has an IT methodology would need to examine, retain, or replace the set of documents described in this Chapter.
	12. Projects	This chapter presents the various projects involved in Data Interoperability Programs and Communities of Interest. A project is creation, evolution, or employment of a collection of metadata products accomplished through a set of functions performed by one or more positions within one or more organizations in support of the data interoperability mission. Projects must be identified, staffed, allocated resources, and monitored for both timeliness and quality.
	13. Rules	This chapter contains a detailed set of rules that govern the operation of any subgroup within a Data Interoperability Program. Rules are needed because the consequences of decisions from any Community of Interest decision are likely to have significant monetary and other resource effects. Adding one table to an existing database design costs about \$32,000. Adding the extract from that table to 10 different systems is likely to cost a similar amount. Thus, every decision is costly. Decisions need to be made in a very rigorous, reliable, and a repeatable manner with strict rules, appropriate notices, sufficient times for implementation, and the like.

Table 1. Chapters organization by part sequence.

Now, if all of this sounds like a lot of work, it really is and isn’t. It is a lot of work if you and your organization are not accomplishing it now. But it isn’t a lot of work when you compare it to the collective set of activities that are performed and products that are built to remedy data interoperability chaos.

Accomplished well, these activities have a negative real-dollar cost and a negative time expenditure. At first, there will be more time and money spent ramping up the effort. But once done, the time and money expenditures that were formerly budgeted can be reduced well in excess of this ramp up cost.

Has this been proven? Of course it has. Chapter 3 contains just a few examples. In one 1980s example, multiple versions of a particular class of business information system were being built, individually, for a cost of about \$400,000. After these practices were put into place, these same systems were being created for about \$100,000. The cost for the ramp up was about \$125,000. So, the first use of these policies and procedure was projected to cost about \$525,000. But the second was to cost 60% (of the \$400,00), and there after, 40% (of the \$400,00). But due to rigorous metadata and excellent systems engineering management, the first system came in at 80% of the \$525,000; the second system came in at 40%; and thereafter, the systems came in at 20%. That actually meant that there was almost a positive ROI on the first use. Actually, the cost was just \$20,000 over the custom system cost.

Has this strategy and fundamental organization been used outside of IT? Of course it has. Just look at the organization, operating procedures, and results from any well run fire department. Within these departments there are well-defined missions for each class of fire or emergency; clearly identified objects that are employed and interrelated one with another; clearly delineated systems that are employed to report fires, dispatch equipment, manage fire suppression, and report and evaluate on results; well-defined events that are the consequence of functions and that employ systems; all manner of human functions that are performed, and finally, detailed and experience honed organizations to perform all manners of fire activities. Similar examples abound for almost every highly organized complex activity. In virtually 100% of these organizations chaos occurs only when the missions through to organizations are not well engineered and rigorously followed. Chaotically engineered and organized activities that produce quality, efficient and cost-effective results are almost always accidental.

1.5 Executing this Book

The chapters of this book, as illustrated through the Knowledge Worker Framework depicted in Figure 1 above, are set out as a way to engineer and constitute a data interoperability program, to establish communities of interest, and to establish data interoperability projects. This stands in stark

contrast to the planning and executing the every day activities to actually build the interoperable data environments. So, if you are not part of the engineering and construction crew but part of the using-crew this section is for you.

Consider a house. You do not start by building the front door, then the hallway, then the dining room or living room, and then the downstairs half-bath, the kitchen, rec-room, and backdoor. And then, build the stairs, the upstairs hallway, the bedrooms, and the bathrooms. Rather, these are “use-ways” once the house is built.

Consequently, either an entirely different book would have had to be created or an alternative manner of executing the contents of this book had to be set out. The latter were chosen.

Section 1.4 identifies the engineering and construction of the house. This section identifies the use-sequence. Sometimes the sequence is the same. Other times it is different. Represented here is the day to day execution of data interoperability programs, organizations, and projects once instituted. As Figure 1 depicts the engineering sequence of key chapters, Figure 2 depicts the “execution sequence” for the chapters. Rules, Chapter 13 is missing from this figure because rules are “called” from many if not all the other chapters. In actuality, “rules” are invoked when decisions cannot be made except through the application of a precise rule set.

The suggested way to read and use this book is set out in the table that follows Figure 2. Each description cell contains guidance as to the reading of the chapter and also a use-based description of the chapter. The first three rows of this table, Demand, Rationale, and Metadata that represent those chapters all need to be read, accepted, and in the case of the metadata repository, deployed. Row 4, Mission, when accomplished will then produce metadata that is stored in row 3's metadata repository.

In the execution sequence, missions are first specified through a boot-strap ad hoc organization. If there is a go-ahead for a data interoperability program then the organizations are created as necessary. It may be a full data interoperability program and its subcommittees along with several communities of interest, or it may be a single community of interest that performs all the necessary functions. Then, as the functions are performed by the persons in various positions within specific projects, the various milestones are accomplished as a consequence of building the various metadata products.

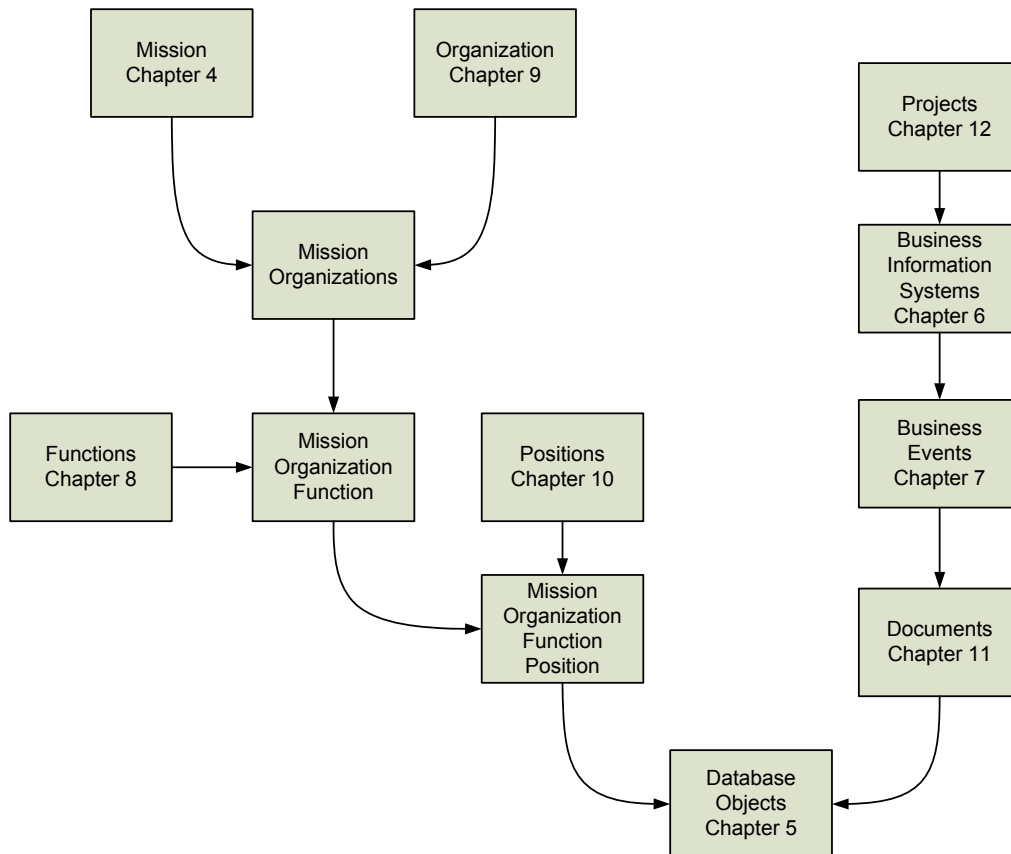


Figure 2. Data interoperability specification build sequence.

Data Interoperability Community of Interest Handbook Use Sequence	
Chapters (short title)	Description
1. Demand	This chapter provides the overall objective of the book and the use of communities of interest to achieve data interoperability then you should not proceed to Chapter 2.
2. Rationale	This chapter presents the overall key reasons for data interoperability the concept of “data is executed policy,” a comprehensive definition of metadata, and the identification and engineering of database objects which are the foundation stones for data interoperability. If data interoperability is merely viewed as vast seas of unintegrated, redundant and semantically conflicting tables over which the DBMS is merely an access method, then you will never achieve data interoperability. In contrast, there is a value proposition for data interoperability. If there is not general agreement on its value proposition or an analogous value proposition then you should stop and not proceed to Chapter 3.
3. Metadata	This chapter presents the value from having the appropriate metadata infrastructure. If that metadata infrastructure is not achieved, then having more than just point-to-point interfaces between systems is largely impossible. If an organization does not have an integrated, end-to-end, nonredundant metadata infrastructure, then even if all the collections of point-to-point interfaces are centrally managed, they will just be another server-farm of stand-alone databases, but this time of metadata. If there is any improvement, it’s marginal. Centralized data brokering of centrally defined collections of point-to-point interfaces is not the mission of a quality Data Interoperability Program. The goal must be first an end-to-end integrated metadata model, and then the loading into a metadata database the appropriate metadata from all systems and databases participating in a nonredundant and integrated manner so that true semantic harmony including precision and granularity can be achieved. That is the true mission of data interoperability. If you cannot agree on the engineering and organization of metadata, or on the creation of formal policies, procedures, and organizations for the creation, maintenance and use of metadata, then stop, do not proceed to Chapter 4.
4. Mission	This chapter presents the missions that must be accomplished in any Data Interoperability Program. These missions should be reviewed and if necessary be refined before any other real work is attempted. Missions are hierarchically organized descriptions of the idealized target or

Data Interoperability Community of Interest Handbook Use Sequence	
Chapters (short title)	Description
	<p>objective of the effort. If you cannot agree on the destination, then do not start the journey.</p> <p>When a data interoperability project is actually started, then the missions related to the areas involved in interoperability are created. These too are then reviewed and revised. Agreement by participants is critical as these become the basis for data sharing. Shared missions beget shared data. Once you have identified shared missions, proceed to create the necessary organizations that build the Information Exchange Data Models and that support the information systems that feed and/or retrieve data from the shared spaces.</p>
9. Organization	<p>This chapter presents the types and kinds of organizations that should be established to be successful. Each organization is defined and the types of positions that should be established are identified. As stated above, if there is only a single Community of Interest, then these organizations do not have to be established. Rather, each organization type should be reviewed and the key functions and duties of the organization should be reflected, if appropriate, in the single Community of Interest. Each of these organizations should be reviewed and modified to make sure they fit into your overall organizational structure.</p> <p>When a data interoperability project starts and after the missions are created then you can know whether this is a single Community of Interest effort or whether there has to be a Data Interoperability Program infrastructure created as well. Each organization has to be established, chartered, and staffed. A metadata management support infrastructure has to be procured or activated. Staff has to be obtained, assigned, and trained. Once the Community of Interest is set into place then the first meetings can start.</p>
10. Positions	<p>This chapter presents the positions that must be established in any of the organizations that are created via Chapter 9. Each position and its duties are generally described. Given your organization, are the positions properly named? Should their duties be enhanced or streamlined? These are all-important issues that should be addressed.</p> <p>Along with the organizations the various positions have to be created and staff assigned to the positions. The actual skills required are implied</p>

Data Interoperability Community of Interest Handbook Use Sequence	
Chapters (short title)	Description
	by the missions, functions, organizations, and positions. All the activities within these positions are common, every day IT activities that should be readily known or learned by professionals. Detailed process specifications, training courses and the like are all contained on the Whitemarsh website.
8. Functions	<p>This chapter presents the functions, but at a high level that needs to be performed by each of the organizations set out in Chapter 9 in support of achieving either the overall Data Interoperability Program and/or any of the Communities of Interest.</p> <p>The functions that are to be performed are every day IT tasks and are fully defined and described in any number of University courses on data modeling, software development, configuration management, unit and system testing and documentation.</p>
12. Projects	<p>This chapter identifies and describes the types of projects that are to be accomplished in the development of any data interoperability standard. Each of these project types should be examined and evaluated to ensure that it is complete. Missing components should be added. Unnecessary components should be deleted. Each project should identify the appropriate milestones and the required metadata products, and ultimately the functions that need to be performed by the positions within organizations to achieve the data interoperability mission.</p> <p>Now that the missions are done, organizations created, positions filled, and staffs are ready to perform tasks, the data interoperability projects can be instituted and accomplished. Each project has its own process model implied in the various sections. Chapter 4 builds the products identified in Chapter 5 according to the specialized work breakdown structures set out in Chapter 8. The level of interoperability achieved depends on the level of the enterprise on which it is focused. The higher the level the higher the level of interoperability and the more useful the work products.</p>
6. Information Systems	<p>This chapter presents the scope of the metadata systems and processes for building these metadata products. You need to assess that you have the right tool set to build the products, that the right processes are being used, and most of all that these metadata products are related to all the other metadata products so that there is one end-to-end, integrated, and</p>

Data Interoperability Community of Interest Handbook Use Sequence	
Chapters (short title)	Description
	<p>nonredundant set of metadata products. When this is accomplished, then manufacturing additional metadata products from already existing ones becomes quite simple.</p> <p>Information systems in the context of the Information Exchange Data Models are the vehicles necessary to feed or access data within the databases regardless of how the data is either obtained and/or retrieved. These information systems have to have extract and/or load processes built within them and then be employed for the purposes of testing the quality of the exchanged data.</p>
7. Events	<p>This chapter presents the milestones that are to be accomplished in the achievement of the program and scope of work of the Data Interoperability Program and of any Community of Interest. Are these the right milestones for standards in your organization? If not, then change them so that you can ensure that data interoperability standards are properly constructed so as to gain maximum acceptance.</p> <p>Each of these milestones should be accomplished through the application of the functions outlined in Chapter 8. The resource assignment strategies should be set into place to ensure that the right quantity of staff is assigned to the functions, positions, and organizations to achieve the milestones.</p>
11. Documents	<p>This chapter provides a strawman set of documents or products that represent collections of metadata products from Chapter 5. Each product should be examined to determine if it is appropriate for your IT organization. If there are different ones, then make modifications accordingly. The goal is to have a complete set of products across all the critical IT dimensions. It is clear that a given metadata product from Chapter 5 is employed multiple times and serves different rolls in the development of complete IT specifications for a complete data interoperability solution.</p> <p>As Community of Interest projects are accomplished, certain "bureaucratic" documents such as progress reports, annual reports, finance reports and also the actual Information Exchange Data Model standards have to be created. These reports will take time to accomplish. If there is a robust infrastructure of metadata, then these reports will mainly be processes of metadata extraction and formulation</p>

Data Interoperability Community of Interest Handbook Use Sequence	
Chapters (short title)	Description
	into the sections of the different administrative reports.
5. Objects	<p>This chapter identifies and describes the actual metadata products that are to be built in order to achieve the data interoperability milestones. Examine each product and determine if you know how to build it. Do you have the proper metadata tools in place to ensure that not only are the metadata products built but that you know how to build the products? There are copious materials on the Whitmarsh website that assist in this regard.</p> <p>Creating the metadata objects is really a critical step. Short cuts should not be taken, for example, not creating missions, organizations, etc. and proceeding directly to data models. It is within the context of the enterprise metadata and the information systems metadata that the Information Exchange Data Models have real life and value. Experience has shown that when the metadata is built at the enterprise and information systems levels that the Information Exchange Data Models almost always have an increased level on the interoperability maturity scale. When this is accomplished then there will be a lessened need to create data exchange bridges between Information Exchange databases.</p>
13. Rules	<p>This chapter provides the individual set of rules that should be observed by the various positions within the different organizations. As stated above, every decision by a community of interest has 10s of thousands of dollars of implications. Some decisions will cost millions of dollars. Each such decision, therefore, should be made with the maximum precision and good-order. Delivery of documents that form the basis for decision making, sufficient review time, proper motions, questions, discussions, and votes are all critical for a well engineered and operating organization with such an important mission.</p> <p>Hopefully, this chapter will never have to be accessed because there is a 100% consensus on every issue. But just in case there isn't, this chapter contains the necessary rules through which decisions can be made.</p>

Table 2. Chapters and description by execution sequence.

Supplementing all the material in this book is a large quantity of books, courses, methodologies, and also a metadata repository software system from Whitemarsh. This book, in conjunction with these materials should make the creation and operation of Data Interoperability Communities of Interest a practical, rational, and accomplishable set of activities.

This book does not contain “the only way” to accomplish interoperable data environments. Rather, it is “a way.” The data and process chapters contain detailed specifications. Again, these detailed specifications represent “a way,” not “the way.” There is a similar quantity of detail in the mission, organization, function, and position chapters. These too represent “a way,” not “the way.” The ultimate goal of the book is to convey a sufficiently detailed strategy such that, if followed, would lead to success. Alternatively, if another approach is desired, then the detail in this book provides good benchmarks for testing comprehensiveness and completeness.

1.6 Questions and Exercises

1. What is the “state” of data interoperability in your enterprise? Rate it from “fantastic” to “sad.” Why do you think it is one rating or the other? How do you really know? What are your measures for computing your rating?
2. How much time, effort, and energy of your organization is expended creating the policies, procedures and rules that govern COIs versus accomplishing the real work of COIs? How much COI start-up time does your organization consume. If this time were “close to zero,” how would that help get real work accomplished?
3. How have the bureaucratic organizational activities that have occurred at the start of COIs affected the quantity and quality of the work accomplished? Has the lack of “getting out of the gates fast” dampened enthusiasm, negatively impacted your budgets, and lost credibility in your COI’s mission?
4. If this book was adopted “as-is,” would this book’s strategies regarding organizations, policies, and procedures affect the time, effort and energy that is able to be expended to achieve data interoperability? How could having all the “bureaucracy” engineered and ready to go before you start help?

5. Have you tried COIs in your enterprise regardless of what they are called? Have they worked? Why and why not? Have they brought benefits? What are they and how have they affected the “bottom line” of your organization?
6. Given that you are going to embark on the development of a reasonable quantity of interoperable databases and interchanges, what would the effect likely be on your current IT environment?
7. How much time and money are you likely to save from a reasonable quantity of interoperable databases and interchanges? How will you know and measure it?
8. What are the management decisions, strategies and plans that are likely to be affected by having a reasonable quantity of interoperable databases and interchanges?
9. What would be the benefits of just “adopting” this book’s COI organizational structures, policies, procedures, offices, roles, responsibilities, and products at the very start of a COI and then modifying this adopted way of running the COI after the first six months or a year? Would such a move stifle or enable the real work of a COI?