



Whitemarsh
Information Systems Corporation

*Data Management
Independent Verification and Validation
Architecture and Concept of Operations*

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Table of Contents

| | | |
|--------|---|----|
| 1.0 | Overview | 1 |
| 2.0 | Data Management Contextual Environment | 1 |
| 3.0 | Business Information Systems Work Products | 5 |
| 4.0 | Business Information System Work Products Interrelationships | 12 |
| 5.0 | Data Management IVV Example Scenario | 13 |
| 6.0 | Data Management IVV WBS and Deliverables | 14 |
| 6.1 | Data Model Assessments | 16 |
| 6.1.1 | Data Model: Data Element Model Assessment | 16 |
| 6.1.2 | Data Model: Concepts Data Model Assessment | 18 |
| 6.1.3 | Data Model: Logical Data Model Assessment | 19 |
| 6.1.4 | Data Model: Physical Data Model Assessment | 22 |
| 6.1.5 | Data Model: SQL View Data Model Assessment | 25 |
| 6.1.6 | Data Model: XML Interface Model Assessment | 28 |
| 6.2 | Business Information System Work Product to Data Model Assessments | 30 |
| 6.2.1 | Business Information Systems Assessment | 30 |
| 6.2.2 | Business Requirements Assessment | 32 |
| 6.2.3 | Business Rules Assessment | 33 |
| 6.2.4 | Database Domains Assessment | 35 |
| 6.2.5 | Database Objects Assessment | 35 |
| 6.2.6 | External data interface Requirements Assessment | 36 |
| 6.2.7 | External Quality Standards Assessment | 37 |
| 6.2.8 | Information Needs Assessment | 38 |
| 6.2.9 | Mission Organization Function Assessment | 39 |
| 6.2.10 | Resource Life Cycles Assessment | 40 |
| 6.2.11 | Use Cases Assessment | 41 |
| 6.2.12 | User Acceptance Tests Assessment | 42 |
| 6.2.13 | Value Domains and Management Assessment | 43 |
| 6.2.14 | Contract Work Breakdown Structure (WBS) Assessment | 44 |
| 6.3 | Business Information System Work Product to Business Information System Work Product Assessments | 47 |
| 6.3.1 | Business Information Systems Assessment | 47 |
| 6.3.2 | Business Requirements Assessment | 51 |
| 6.3.3 | Business Rules Assessment | 54 |
| 6.3.4 | Database Domains Assessment | 56 |



| | | |
|--------|--|----|
| 6.3.5 | Database Objects Assessment | 57 |
| 6.3.6 | External Data Interface Requirements Assessment | 59 |
| 6.3.7 | External Quality Standards Assessment | 62 |
| 6.3.8 | Information Needs Assessment | 64 |
| 6.3.9 | Mission Organization Function Assessment | 66 |
| 6.3.10 | Resource Life Cycle Assessment | 68 |
| 6.3.11 | Use Cases Assessment | 70 |
| 6.3.12 | User Acceptance Tests Assessment | 73 |
| 6.3.13 | Value Domains and Management Assessment | 76 |
| 6.3.14 | Contract Work Breakdown Structure (WBS) Assessment | 78 |
| 7.0 | Risk Assessment | 87 |



1.0 Overview

In a large scale data-centric environment, there are a number of factors in the determination of an overall success. Among these are:

- Project Management which includes the overall project's architecture, engineering and deployment with special focus on requirements, schedule, and costs.
- Data Management which includes data architecture, modeling, engineering, and deployment along with evolution and maintenance.
- Hardware Management which includes computing and network hardware architecture, engineering and deployment along with evolution and maintenance.
- Software Management which includes software application, engineering and deployment along with evolution and maintenance.

The focus of this paper is Data Management. To that end, the objective of this paper is to set out an overall contextual data management environment as it relates to a large scale data-centric business information system project. This contextual environment includes:

- An enumeration and brief definition of the data architecture reference model data models that comprise this data management environment.
- An enumeration and brief description of the various key business information system work products.
- A cross reference table between the data architecture reference model data models and various key business information system work products.
- A cross reference table among the various key business information system work products.
- An illustration of how these data management component interconnects through the use of a scenario.
- A detailed set of procedures through which the data architecture reference model data models and the business information system work products can be assessed.
- A section on the creation of a risk matrix including the development of risk indicators, that is, red, yellow, and green.

2.0 Data Management Contextual Environment

There are two major classes of components in the data management contextual environment:

- Data Models
- Business Information System Work Products



The data models component consists of six classes of data models, which are all interrelated one to the other. These are depicted in Figure 1. The objective of these six models is to significantly increase semantic interoperability, increase re-use, eliminate redundancy, and reduce the overall cost of project specification, implementation, and maintenance. The effect of having these six models is a way to decrease overall project risk while at the same time increasing quality. The consequence of not having these models is the converse of these objectives and effects.

Table 1 enumerates and briefly describes each of these six data model classes. These six data model classes have real, practical, and existence implications for enterprises. To wit: The Y2K data debacles were a direct consequence of enterprise failure to have these six data models within a non-redundant, unambiguous and integrated data model management environment. Most recently, the NASA 1999 Mars Climate Orbiter crash was directly tied to fact that one organization was computing with "metric" unit measurements and another was computing with "English" unit measurements. The existence of a Data Element Model semantics capstone would have controlled data specifications, implementations, and operations would have surfaced this semantic disconnect.

This document does not address how to create each of these data models because the creation process is more than adequately addressed within other Whitemarsh books, courses, seminars, and methodology documents. Rather, the focus of this document presumes is to assess the necessary and sufficient interaction between these data models and the other key business information system work products.

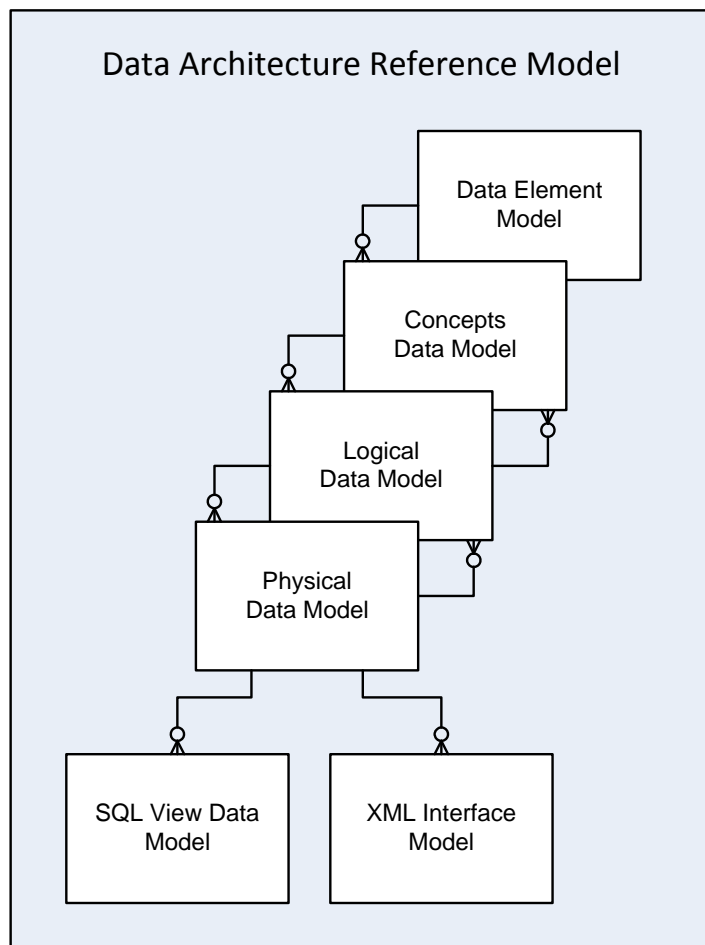


Figure 1. Data Architecture Reference Model.



| Data Model Class | Description |
|-------------------------------------|--|
| Data Element | <p>Data elements are the enterprise facts that are employed as the semantic foundations for attributes of entities within data models of concepts (Specified Data Models), columns of tables within database models (Implemented Data Models) that support the requirements of business and are implemented through database management systems (Operational Data Models), that, in turn, are employed by business information systems (View Data Models) that materialize the database objects necessary for within the resources of the enterprise that support the fulfillment of enterprise missions. Key components are Concepts, Conceptual Value Domain, Data Element Concepts, Data Elements and Value Domains. Semantic and data use modifiers can be assigned to every data element concept and data element.</p> |
| Specified or Concepts Data Model | <p>Specified Data Models are the data models of concepts. These models consist of subjects, entities, attributes, and inter-entity relationships. Relationships can interrelate entities within multiple subjects. Each data model should address only one concept such as a person's name, or an address, etc. These concept data models can be templates for use in developing database models (Implemented or Operational). Every entity attribute should map to its parent Data Element. Semantic and data use modifiers can be assigned to every entity attribute. Key components are subjects, entities, attributes, and relationships.</p> <p>A concepts data model is a data model of a specific concept, represented as a container such as student, school, organization, or address. These containers (e.g., student or school) must be specified before they can be implemented in one or more different database collections of tables that ultimately become operational through a DBMS such as Oracle.</p> |
| Implemented or Logical Data Model | <p>Implemented Data Models, are the data models of databases that are independent of DBMSs. These models consist of the data structure components: schema, tables, columns, and inter-table relationships. Relationships are restricted to tables within a single schema. While each implemented database data model can address multiple concept data models from the collection of concept data models, each implemented data model should address only one broad subject. Every table column should map to a parent Attribute. Semantic and data use modifiers can be assigned to every column. There is a many-to-many relationship between the Specified Data Model and the Implemented Data Model. Key components are schemas, tables, columns, and relationships</p> |
| Operational or Physical Data Models | <p>Operational, or Physical Data Models, are the data models of databases that have been bound to a specific DBMSs. These models consist of the data structure components: DBMS schema, DBMS tables, DBMS columns, and inter-table DBMS relationships. DBMS Relationships are restricted to DBMS tables within a single DBMS schema. Each operational database data model can address multiple implemented data models. Every DBMS Column should map to a parent Column. There is a many-to-many relationship between the Implemented Data Model and the Operational Data Model. Key components are DBMS schemas, DBMS tables, DBMS columns, and DBMS Relationships.</p> <p>In this state, that is, dependent upon a particular DBMS and upon the performance requirements of a particular software application, this data model is termed "physical." These data models are the operational data models that are bound to application business information systems through view data models. These data models are often not in third</p> |



| Data Model Class | Description |
|---------------------------|---|
| | normal form as a way to meet needed performance requirements. DBMS Columns from the DBMS tables from within these operational data models are deployments of a single column of a table from a logical data model. |
| View Data Model | <p>The View data models represent the interfaces between operational data models and business information systems. View and their view columns can be characterized as Input and/or Output. Additionally, these views can be mapped one to the other on a view column basis and processes can be specified to define any appropriate data value transformation. Key components are Views, View columns, and view-column interrelationships.</p> <p>View data models are bound to the particular DBMS through which they are defined. View data models enable application systems to select, employ, and update databases according to their physical data models without having to include physical data model details within the application systems.</p> |
| XML Interface Data Models | <p>A XML interface model represents a specialized construction of importable or exportable data with respect to the business information system. Each XML data stream is defined through a XML Schema. Both XML schemas and XML data streams are independent of the software applications that create and/or use them. XML Schemas and XML data streams are DBMS represented in plain ASCII text. Key Components are XSDs, XML elements, and XML attributes.</p> <p>The structure of XML data is expressed through an XML schema that is employed to then understand the contents of XML data records. XML schemas are created through special software applications. XML data streams are created by source application business information systems and are subsequently read and processed by target application business information systems.</p> |

Table 1. Data Model Layers within the Data Architecture Reference Model.

Figure 1 shows that the core of the data management environment is the data model environment. Within this environment there are six distinct data models. For example, the Data Element model captures the once-only identification, specification, and definition of data elements that may be represented as database table columns in many different database tables.

Similarly, there may be concept data models, for example, for students, schools, organizations, or addresses. These concept data models can be deployed in one or more logical database models, which, in turn are operationally deployed in one or more DBMS specific physical data models.

Each of these six data model classes serve a special purpose and is interrelated with the other data models in some integrity-enhancing and work-saving manner. Again, Table 2 provides definitions and interrelationships.

Figure 1 shows a left-side set of one-to-many relationships going "down." This relationship supports two meanings. The first is the mapping of an individual component of a model, and the second is the mapping of a whole collection from within a data model. In the Data Element model there can be individual data elements such as Person First Name, and there



can be collections of data elements within a specific data element concept collection, for example, Person Related Information such as Person Identifier, Person Birth Date, Person First Name, Person Middle Name, and Person Last Name.

In the first type of left-side one-to-many relationship, the individual data element, Persons First Name would be semantically mapped to zero, one, or more attributes within different entities. For example, to Employee First Name, to Customer Contact First Name, or to Causality Insurance Contract First Name.

In the second type of "left-side" relationship, a whole collection of data elements can be mapped to a whole collection of attributes across one or more entities. For example, all the Data Elements within a Data Element Concept collection called Biographic Data Elements might be mapped to the entity, Person Information, or to the entity, Customer Contact Information. In this case, the mapping of the data elements, Person Identifier, Person First Name, etc., is mapped to a corresponding set of attributes within one or more entities.

On the right-side of Figure 1, there is also a set of one-to-many relationships. This set, like the left-side one-to-many relationships has two meanings: individual component, and whole collections. The meanings of the right-side one-to-many relationship are different from the left-side one-to-many. The first type of right-side relationship, the mapping of an individual component is not one-to-many, but one-to-one. Thus, an individual DBMS Column, for example, EmpFrstNam can be inherited from only one higher level component, for example, the single column, EmployeeFirstName.

The second type of right-side relationship, the mapping of collections can be one-to-many. That is, one collection can map to one set of columns within one table of a single Logical Data Model while another collection from the same Physical Data Model can be mapped to a different collection within a different Logical Data Model. Hence, the collections can be seen as "from" one Physical Data Model to zero, one, or more Logical Data Models.

3.0 Business Information Systems Work Products

We are all familiar with the collection of work products that are identified, engineered, created, evolved and maintained during the life cycle of business information systems. While there can be an endless array of names for some of these work products, they generally fall into the work product categories that are listed in column one of Table 2. A depiction of the interrelationships of the data models and of the work products is presented in Figure 2. Table 2 also shows the cross reference between the Data Architecture reference model data models and the typical work products of a business information system effort.

Business Information System Work Products, for example, Business Requirements, shown in Figure 2 can have a one-to-many relationship between one or more different business information system work products and zero, one or more of the data models. When two or more business information system work products are interrelated with one or more of the data models, there may exist relationship between those two business information system work products



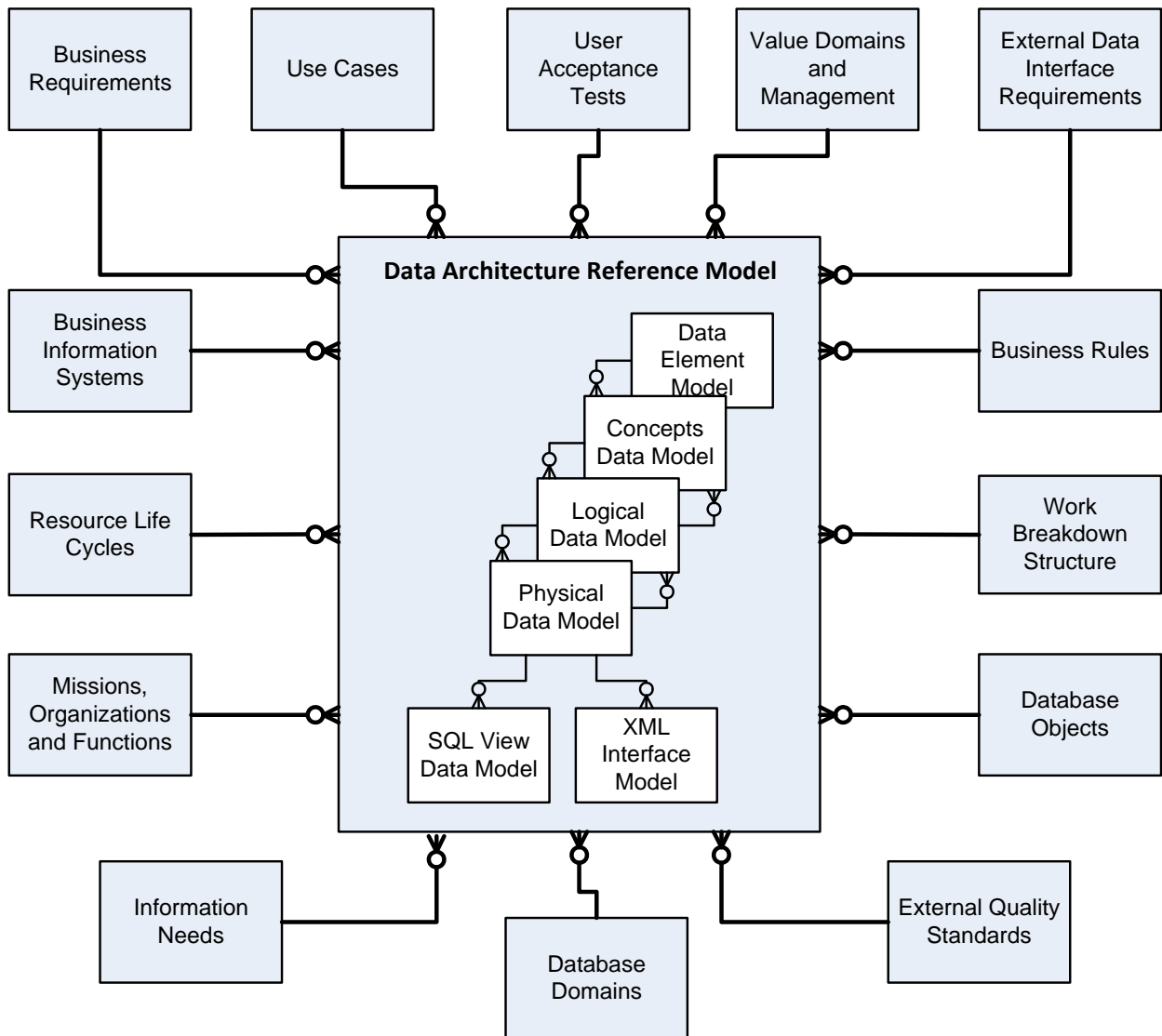


Figure 2. Cross Reference between Data Architecture Models and Business Information System Work Products.

through artifacts contained in the data models. For example, there is a business requirement to capture student addresses. Additionally, there is a use case through which a student's address is captured. Apart from the obviousness of the interrelationship, the fact that there is a common data structure, Student Address, there is an interrelationship between the two business information system work products, business requirements and use cases. When both work products and the data models are stored in a comprehensive metadata management systems, the exposition of the business information system work product traceability of one work product to the other is a simple report request.



Table 2 identifies each of the business information system work products in the data management environment are listed in alphabetical order in Table 2. These are cross referenced with the data models with which they are involved in Table 2. The data models from Figure 2 that are identified in Table 2 are not accomplished in isolation. They result from an initial and then on-going analysis of the business information system work product. That is, Business Requirements, Business Rules, and the like. As each of these business information system work products are developed, reviewed, and evolved, the effect of those activities must be reflected in one or more of the data models depicted in Figure 1 and identified in Table 2.

| Work Products | Data Architecture Reference Model Component | | | | | |
|--------------------------------------|---|---------------------|--------------------|---------------------|-----------------|----------------|
| | Data Element | Concepts Data Model | Logical Data Model | Physical Data Model | View Data Model | XML Data Model |
| Business Information Systems | | | | ✓ | ✓ | ✓ |
| Business Requirements | | ✓ | ✓ | ✓ | | ✓ |
| Business Rules | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Database Domains | | | ✓ | | | |
| Database Objects | | | ✓ | | | |
| External Data Interface Requirements | | | | ✓ | ✓ | ✓ |
| Eternal Quality Standards | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Information Needs | ✓ | | ✓ | | | |
| Mission Organization Functions | | | ✓ | | | |
| Resource Life Cycles | | | ✓ | | | |
| Use Cases | | | ✓ | ✓ | ✓ | ✓ |
| User Acceptance Tests | | | | ✓ | ✓ | ✓ |
| Value Domains and Management | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Work Breakdown Structure (WBS) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Table 2. Cross reference between work products and data architecture reference model component.



Each of the business information system work products are identified and described in Table 3. The last column of Table 3 enumerates the key data model artifacts that are involved with the work product. The data models that contain these artifacts are identified in Table 1.

This document does not address how to create each of these business information system work products because the creation process is more than adequately addressed within other Whitemarsh books, courses, seminars, and methodology documents. Rather, the focus of this document presumes is to assess the necessary and sufficient interaction among all the business information system work products.

| Business Information System Life Cycle Work Products | | |
|---|---|--|
| Component | Description | Data Model Components |
| Business Requirements | <p>Business Requirements are the identification, specification, and definition of the components that must exist in the ultimate solution delivered by the contractor.</p> <p>Business Requirements form the foundation upon which all components of are engineered, implemented, and maintained. Business requirements will evolve over time. Thus, it is important to be able to track the initial and evolved requirements. It is unrealistic to initially have all requirements because new and/or revised requirements are discovered all during the project's architecture, engineering, and implementation.</p> | Subjects, Entities Attributes Data Elements Database Domains Database Objects |
| Business Rules | <p>Business Rules are assertions of truth-states in the database. Each business rule includes the identification, name, description, and exact specification of data-based rules that must either be true or that, after the execution of an information system process, results in a state of truth.</p> <p>There are two classes of Business Rules: data and process. Almost invariably, business rules depend on existing data, reference or control data, or data that is determined as a consequence of a process's execution. Almost all business rules are mappable to data, whether persistent or temporary.</p> <p>Business rules are almost always discovered during design sessions, and use-case walkthroughs. As business rules are discovered, the various data models need to be concurrently examined to determine whether the database can support the rules. Since every business rule has a process component, a key component of each rule is the specification of the process and a determination of where that rule is bound. That is, bound into the data model component (e.g., Data Element, or DBMS column), a low-level application component, a mid-level application process, or in the user presentation layer.</p> <p>Because of this multiplicity of possible bindings, business rules need to be centrally defined and managed, but bound only into the data model</p> | Schema Tables Columns DBMS Schema DBMS Tables DBMS Columns Value Domains |



| Business Information System Life Cycle Work Products | | |
|--|--|--|
| Component | Description | Data Model Components |
| | or business information system work product within which it is accomplished. | |
| Work Breakdown Structure (WBS) | <p>Work Breakdown Structures are hierarchical representations of two classes of effort: What, and How. The “what” type of WBS contains an action phrase and a noun phrase that together describe what is to be done, and the name of the work product creation or evolution.</p> <p>The second class of WBS, the “how WBSs” are tuned to deliverables but to the actual techniques employed to accomplish the data model or business information system work product.</p> <p>Both the “What” WBS and the “How” WBSs need to be interlinked. Well developed metadata management systems include complete project management so that work plans and progress against work plans can be directly tied to and integrated with accomplishments.</p> | Subjects, Entities Attributes Data Elements Database Domains Database Objects Schema Tables Columns DBMS Schema DBMS Tables DBMS Columns |
| External data interface Data Requirements | <p>External data interface Requirements are the specifications of an interface between an internal database data structure and some external data source. Each interface essentially consists of a fully defined data model that defines every field in the interface to the extent that a software module can be created to read the records represented by the interface and take appropriate action against the database. Such actions can be to insert, delete, or modify database records.</p> | DBMS Schemas DBMS Tables DBMS Columns DBMS Relationships Value Domains Views View Columns Relationships XML Schemas XML Elements XML Attributes |
| External Quality Standards | <p>External Quality Standards are de jure and de facto standards through which data management products and/or processes can be judged.</p> <p>The ISO Standard 11179 enables assessment of the adequacy and completeness of the metadata associated with data elements. Included in this class of assessment are Concepts, Conceptual Value Domains, Data Element Concepts, Value Domains including mapping among equivalent values, Data Element Classifications, and Administrative Information (for Stewardship).</p> <p>The ISO/ANSI SQL standard enables the assessment of SQL data structures and languages employed in database designs and application program access.</p> | Schemas Tables Columns Relationships Views View Columns Relationships XML Schemas XML Elements XML Attributes |



| Business Information System Life Cycle Work Products | | |
|--|--|---|
| Component | Description | Data Model Components |
| | WC3 XML standards enable an analysis of the names and engineering of XML schemas and XML data streams so as to ensure maximum interoperability conformity to existing sets of XML schema models. | |
| Business Information Systems Business Information Systems | Business Information Systems are the broad characterizations of the application systems that capture, update, and report data. Business Information Systems are additionally detailed into their specific components, and those that deal with database data are mapped to the appropriate data model component. | Views View Columns Relationships XML Schemas XML Elements XML Attributes |
| Use Cases | Use Cases are highly engineered pseudo-process models that clearly define the behavior of the users and business information systems, and also the responses provided from the databases as they take in, modify, or provide data to users. Use-cases are detailed to the level such that a programmer can interpret the process intent and write an application system module without semantic and/or process misunderstanding. Use Cases present behavior-based scenarios of the use of the database to accomplish the requirements. Because use-cases directly identify database data, mappings can be created between one use-case and another to identify redundancy and possible conflict. Mappings can also be made between the detailed data and process aspects of use-cases and business requirements, deployments of use-cases in software and hardware, value domains, business rules, and WBS. | Schemas Tables Columns Relationships Value Domains DBMS Schemas DBMS Tables DBMS Columns DBMS Relationships Views View Columns Relationships XML Schemas XML Elements XML Attributes |
| User Acceptance Tests | User Acceptance Tests are stylized user-application system interaction scripts that can be exercised to the extent that fully informed users can determine that all the requirements have been met and all use-cases are satisfactorily performed. User Acceptance Tests (UAT) are the ultimate mechanisms through which organizations determine that it has received the business information system that was specified. Because of all the different data models, and work products, the User Acceptance tests can be very comprehensive and very telling. | DBMS Schemas DBMS Tables DBMS Columns DBMS Relationships Value Domains Views View Columns Relationships XML Schemas XML Elements XML Attributes |
| Value Domains | Value domains relate to the allowed, disallowed, or other defined collections of values and interconnection of values that represent discrete choices (Gender = Male, Female, unknown), or sequenced | DBMS Schemas DBMS Tables DBMS Columns |



| Business Information System Life Cycle Work Products | | |
|---|--|---|
| Component | Description | Data Model Components |
| | states such as Applied, Reviewed, Accepted, Rejected, or Appealed. Included as well are the mappings across time of evolved and/or changed value domains. Value domains commonly stand alone and are allocated to data elements, or to attributes, columns, or DBMS columns. In all cases of value domain allocation, the allocations must be such that semantics conflicts are prohibited. | DBMS Relationships Value Domains Views View Columns Relationships XML Schemas XML Elements XML Attributes |
| Resource Life Cycle Analyses | Resource Life Cycle of Analysis identifies, defines, and sets out the resources of the enterprises, the life cycles that represent their accomplishments, and the interrelationships among the different enterprise resource life cycles. Resource life cycle nodes represent the end-state data resulting from the execution of business information systems. The end-state data is represented through database object classes. | Schemas Tables Columns Relationships |
| Missions Organizations and Functions | Missions, organizations, functions, and position assignments represent the identification, definition, and interrelationships among the persons who, through their positions, perform functions within their organizations that accomplish enterprise missions. Missions define the very existence of the enterprise, and that are the ultimate goals and objectives that measure enterprise accomplishment from within different business functions and organizations. Functions represent the procedures performed by enterprise organization groups as they achieve the various missions of the enterprise from within different enterprise organizations. Organizations represent the bureaucratic units created to perform through their functions the mission of the enterprise. | Schemas Tables Columns Relationships |
| Information Needs | Information needs represent the identification, definition, and interrelationship of the information needed by various organizations in their functional accomplishment of missions and what databases and information systems provide this information? | Schemas Tables Columns Relationships |
| Database Domains | Database domains are the data-intensive bridge between mission descriptions and database object classes. While database object classes are non redundant, they may be referenced by several database domains. | Schemas Tables Columns Relationships |
| Database Object Classes | Database object classes represent the identification of 1) the critical data structures, 2) the processes ensure high quality and integrity data within these data structures, 3) the value-based states represented by these data structures, and 4) the database object centric information systems that | Schemas Tables Columns Relationships |



| Business Information System Life Cycle Work Products | | |
|--|--|-----------------------|
| Component | Description | Data Model Components |
| | value and transform database objects from one state to the next. Database Objects are transformed from one valid state to another in support of fulfilling the information needs of business information systems as they operation within the business functions of organizations. | |

Table 3. Data Management Components and affected Data Models.

4.0 Business Information System Work Products Interrelationships

Table 4 provides a cross reference between business information system work products and other business information system work products . The intention of Table 4 is that, for example, a Business Rule "knows about" or must take into account zero, one or more Business Requirements.

The assessment strategy of the involvement of both Table 3 and Table 4 is set out in the Data Management WBSs that are provided in Section 6.

The implication of the interrelationships is that when a given business information system work products (e.g., Business Rules) is presented for review, the interrelated data models (e.g., Data Elements) need to be assessed to determine whether there has been a complete specification.

As a presentation of an business information system work products is underway, the effect on the interrelated data model must be determined. For example, it is not uncommon that during the walk through of a use-case that a large quantity of data evaluation and value setting discussions surface. If the data model steward is present at these sessions, the implication of the data impact issues can be quickly identified, researched, and the impact discussed. Once a use-case walk-thru is concluded the write-up of the walk-thru would naturally have a set of data and process impact statements.



| Business Information System Work Products | Interrelationships Among Business Information System Components | | | | | | | | | | | | | |
|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1. Business Information Systems | na | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2. Business Requirements | ✓ | na | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3. Business Rules | ✓ | ✓ | na | | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ |
| 4. Database Domains | | | | na | ✓ | | | | ✓ | | | | | ✓ |
| 5. Database Objects | ✓ | ✓ | ✓ | | na | ✓ | | | ✓ | ✓ | | | | ✓ |
| 6. External Data Interface Requirements | ✓ | ✓ | ✓ | | ✓ | na | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7. External Quality standards | ✓ | | | | ✓ | ✓ | na | | | | | ✓ | ✓ | ✓ |
| 8. Information Needs | | | | | | | | na | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 9. Mission Organization Functions | ✓ | ✓ | | ✓ | | ✓ | | ✓ | na | | ✓ | ✓ | | ✓ |
| 10. Resource Life Cycles | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | na | ✓ | ✓ | | ✓ |
| 11. Use Cases | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | na | ✓ | | ✓ |
| 12. User Acceptance Tests | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | ✓ | na | ✓ | ✓ |
| 13. Value Domains and Management | | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | ✓ | na | ✓ |
| 14. Work Breakdown Structure | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | na |

Table 4. Interrelationships Among Business Information System Work Products.

5.0 Data Management IVV Example Scenario

The following is an example scenario of how a data management IVV activity would occur for the evaluation of a work product. The product in question is Customer Management. The data models in hand were dated July 15, 2007. Thus, while these data models are likely not current, they are the only data models in possession by the IVV team. These data models do address Customer, Organization, Person, and Credit Form.

During the presentation of the Customer Use Case, a number of issues were presented. The following is a subset of those issues that seem to have an impact on the data models:



- The ability to record the change in status of a Credit Form and to maintain the history of those status changes.
- The ability to record the change in status of an organization, and to maintain the history of those status changes.
- The enumeration of various statuses including what each exactly means, how it was created, and how it is supported by corporate credit policy.
- The recording of statuses, that is, how or what determines a status, when it was determined, how it is recorded, when it can change, and the like.
- The specification of relationships between core data instances. That is, between customers, organizations, persons, credit forms, and the like.
- The formal specification of business rules that clearly specify, for example, the status issues, under what conditions the business rules are executed, the consequence of success and failure, and the like.
- How business rules are discovered, recorded, specified, prototyped, formally presented, accepted or rejected, and upon acceptance, the impacts on data models, system/process models, and data values is determined.
- Where business rules are bound. That is, in the presentation layer, application layer, or DBMS layer. Under what conditions is this determined and then finally resolved. When business rules are determined to be bound into multiple places, how it is determined that the business rules are implemented in the same way, are tested, and finally are documented.
- The ability for an applicant to see history. Is the history that is seen complete or a subset? Under what rules is this determined and implemented?

At the end of the use case presentation it is presumed that the following would occur:

- A use-case presentation finding document that identifies all the issues raised and how each issue was resolved is created.
- The findings document is sent to all involved for acceptance and/or revision.
- The stewards of the affected data models and involved components (e.g., business rules, requirements, and user acceptance tests) are tasked to formally determine the impacts from the use-case findings.
- Impact statements are circulated to all involved parties for review.
- Accepted impact findings that result in changes are drafted into change requirements.

6.0 Data Management IVV WBS and Deliverables

The actual involvement of the six data models depicted in Figure 2 to the business information system work products is set out in Section 6.1 of the Data Management WBS provided in this section, and cross-referenced in Table 4. Section 6.2 of this section provides an business



information system work product interaction with one or more data models. Section 6.3 of this section sets out the WBS for business information system work product interactions with another business information system work products. These inter-Involved Component interactions are cross-referenced in Table 4. Each of the WBSs within sections 6.2 and 6.3:

- Identifies the materials needed for the assessment.
- Sets out the high-level assessment steps.
- Determines the findings and create draft assessment report
- Present the findings and revise draft assessment report
- Create final report and deliver to The Agency

The Data Management IVV WBSs are the complete list of both the data models (six), and the business information system work products (fourteen).

Section 6.1 focuses on the work steps for assessing the completeness and quality of the individual data models (e.g., Data Elements, Concepts, or Logical Data Model) in context with business information system work products (e.g., Business Requirements, Business Rules, or User Acceptance Tests).

Section 6.2 focuses on the work steps involved with the assessment of business information system work products (e.g., Business Requirements, Business Rules, External data interfaces, or User Acceptance Tests) with respect to the involved data models (e.g., Data Elements, Concepts, or Logical Data Model). Section 6.2 does not address the completeness or quality of each business information work product. Rather it focuses on the interaction between business information system work products and the data architecture reference model data models.

Section 6.3 focuses on the work steps involved with the assessment of a business information system work products (e.g., Business Requirements, Business Rules, or User Acceptance Tests) with respect to other business information system work products that likely have been determined earlier in the business information system development process. Hence all the references are "backwards" references. For example, that a given business rule identifies the business requirement that it fulfills, or that a task within the work breakdown structure identifies that business requirements, or business rules, etc., have to be properly addressed.

It is proper to include all three sets rather than just the data models set because when an involved area is presented or examined, it has an effect on a data model that consequently needs to be assessed and/or examined. Similarly, when a data model is developed and subsequently assessed, the contents of the data model must reflect on the content of one or more business information system work products. Finally, when a business information system work products is addressed it must take into account one or more predecessor business information system work products.

The WBS listings in Sections 6.1, 6.2, and 6.3 presume the existence of capable data architects, modelers, and engineers as well as the appropriate staff for each of the involved components. Hence there are few to no details about "how" each of the tasks and/or assessments



is accomplished. Without such a presumption, the quantity of tasks within each of the sections would take many pages. Needless to say, the efficient and effective accomplishment of the WBS elements in these sections depends on the deployment of a metadata management system that not only takes in all these data architecture reference model data models and business information system work products but also completely supports their integration, interoperability, and non-redundancy. Without such a metadata management system, for example, the Whitemarsh Metabase System, accomplishing this work is very problematic. It must additionally be said that without such a metadata management system and without these assessments business information system development success is almost accidental.

The ultimate objective is that assessments can be performed and valid conclusions drawn about content, completeness and quality about the data models, the business information system work products, the interactions between the data models and the business information system work products, and the interaction among business information system work products.

6.1 Data Model Assessments

6.1.1 Data Model: Data Element Model Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of data element models
 - 1.1.1. Review requirements documents
 - 1.1.2. Review scope and business problem related documentation
 - 1.1.3. Identify the data elements that are to be defined and captured
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of data element models
 - 1.2. For each data element:
 - 1.2.1. Identify components, that is, concept, conceptual value domain, value domain, data element concept, data element classification, and data element.
 - 1.2.2. Identify the definitions for each data element model component.
2. Perform the assessment
 - 2.1. Assess each data element model against business information system work product
 - 2.1.1. Assess the adequacy of each data element with respect to the business rules.
 - 2.1.1.1. Assess whether all implied business rules implied data elements are reflected in an appropriate data element model
 - 2.1.1.2. Assess whether all data element models are reflected in business rules.
 - 2.1.2. Assess the adequacy of each data element with respect to the External Quality Standards.
 - 2.1.2.1. Assess whether every data element is properly comports to Part 3 of the ISO 11179 for data element metadata.
 - 2.1.2.2. Assess whether every data element is properly comports to Part 5 of the ISO 11179 for data element metadata.



- 2.1.2.3. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.2.4. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.3. Assess the adequacy of each data element with respect to the Information Needs.
 - 2.1.3.1. Assess whether every data element is able to be inferred from an information need that is developed during analysis and design.
 - 2.1.3.2. Assess whether every data element, inferred through information needs analysis is in the best form for use subsequently by appropriate data models.
- 2.1.4. Assess the adequacy of each data element with respect to the Value Domain Management.
 - 2.1.4.1. Assess whether the set of value domains for every data element are defined unambiguously, clearly, distinctly, and not-overlapping.
 - 2.1.4.2. Assess whether every data element that is to have a restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
- 2.1.5. Assess the adequacy of each data element with respect to the work breakdown structure.
 - 2.1.5.1. Assess whether there is sufficient work being allocated in the WBS to discover and to record data elements.
 - 2.1.5.2. Assess whether data elements are properly recorded when they are discovered during data modeling efforts for Concepts, Logical, and Physical data models.
- 2.2. Assess data element meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all concepts are identified and are properly constructed
 - 2.2.1.2. Assess that all conceptual value domains are identified and are properly constructed.
 - 2.2.1.3. Assess that all value domains of conceptual value domains are identified and are properly constructed.
 - 2.2.1.4. Assess that all data element concepts, which are the proper joining of contextual conceptual value domains and contextually employed concepts are identified and are properly constructed.
 - 2.2.1.5. Assess that all data elements, which are the proper joining of contextual data element concepts and contextually employed value domains are identified and are properly constructed.
 - 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to the Agency

6.1.2 Data Model: Concepts Data Model Assessment



1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of concept data models
 - 1.1.1. Review requirements documents
 - 1.1.2. Review scope and business problem related documentation
 - 1.1.3. Identify the data-based concepts that are to be defined and captured
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of concept data models
 - 1.2. For each concept:
 - 1.2.1. Identify components, that is, subjects, entities, attributes and relationships
 - 1.2.2. Identify the definitions for each concept data model component
2. Perform the assessment
 - 2.1. Assess each concept data model against business information system work product
 - 2.1.1. Assess the adequacy of each concept data model with respect to the Business Requirements.
 - 2.1.1.1. Assess whether all implied business requirement concepts are reflected in an appropriate concept data model
 - 2.1.1.2. Assess whether all concept data models are reflected in business requirements
 - 2.1.2. Assess the adequacy of each concept data model with respect to the External Quality Standards.
 - 2.1.2.1. Assess whether every data concept data model is properly reflected in a data model that may exist.
 - 2.1.2.2. Assess whether every data model that may be appropriate within the collection of concept data models is properly defined.
 - 2.1.2.3. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.2.4. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.4. Assess the adequacy of each concept model with respect to the Value Domain Management.
 - 2.1.4.1. Assess whether the set of value domains for every attribute is defined unambiguously, clearly, distinctly, and not-overlapping.
 - 2.1.4.2. Assess whether every attribute that is to have a restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
 - 2.1.4.3. Assess that every attribute value domain does not semantically conflict with a data element value domain.
 - 2.1.4. Assess the adequacy of each concept model with respect to the work breakdown structure.
 - 2.1.4.1. Assess whether there are sufficient steps and processes to accomplish a complete concepts data model for each model that is discovered.
 - 2.1.4.2. Assess the WBS to determine whether there is sufficient automation support to generate a prototype based on the concepts data model that can be demonstrated



- in expectation that insufficiently identified entities, attributes, relationships and assigned data semantics are allocated, assigned, and modified as needed.
- 2.1.4.3. Assess the WBS to determine if there is sufficient time to ensure that every attribute is mapped to a corresponding data element.
- 2.2. Assess concept data model meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all subjects are identified and are properly constructed
 - 2.2.1.2. Assess that all entities within subjects are identified and are properly constructed.
 - 2.2.1.3. Assess that all entity super and subtypes are identified and are properly constructed.
 - 2.2.1.4. Assess that all entity attributes are identified and are properly constructed.
 - 2.2.1.5. Assess that all attributes are mapped to data elements
 - 2.2.1.6. Assess that appropriate attributes are properly constrained by value domain assignments.
 - 2.2.1.7. Assess that all intra-subject entity relationships are identified and are properly constructed.
 - 2.2.1.8. Assess that all inter-subject entity relationships are identified and are properly constructed.
 - 2.2.1.9. Assess that the entity's primary key exclusively consists of business-fact-data and enables the selection of one and only one row given that the entity was an implemented DBMS table.
 - 2.2.1.10. Assess that the collections of entity attributes are sufficient to reflect the implied policy of the entity.
 - 2.2.1.11. Assess that the collection of entity attributes are sufficient for the entity's instance infrastructure.
 - 2.2.1.12. Assess that the collection of entity attributes are sufficient for history and for auditability.
 - 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.1.3 Data Model: Logical Data Model Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of logical data models
 - 1.1.1. Review requirements documents
 - 1.1.2. Review scope and business problem related documentation
 - 1.1.3. Identify the logical data models that are to be defined and captured
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of logical data models



- 1.2. For each logical data model:
 - 1.2.1. Identify components, that is, schemas, tables, columns, and relationships
 - 1.2.2. Identify the definitions for each logical data model component
2. Perform the assessment
 - 2.1. Assess each logical data model against business information system work product
 - 2.1.1. Assess the adequacy of each logical data model with respect to the Business Requirements.
 - 2.1.1.1. Assess whether all implied business requirement logical data models are reflected in an appropriate logical data model
 - 2.1.1.2. Assess whether all logical data models are reflected in business requirements
 - 2.1.2. Assess the adequacy of each logical data model with respect to the Business Rules.
 - 2.1.2.1. Assess whether all implied business rules implied logical data model components are reflected in an appropriate logical data model
 - 2.1.2.2. Assess whether all logical data model components are reflected in business rules.
 - 2.1.3. Assess the adequacy of each logical data model with respect to Database Domains
 - 2.1.3.1. Assess whether each logical data model table can be explicitly mapped to a noun-phrase that is contained in the database domain.
 - 2.1.4. Assess the adequacy of each logical data model with respect to Database Objects
 - 2.1.4.1. Assess whether each logical data model table can be explicitly mapped to a table that is contained in the database object.
 - 2.1.5. Assess the adequacy of each logical data model with respect to the External Quality Standards.
 - 2.1.5.1. Assess whether the facilities defined within every logical data model is properly drawn from at most ISO ANSI Standard for entry level SQL:1992.
 - 2.1.5.2. Assess whether every logical data model that may be appropriate within the collection of logical data models is properly defined through the use of logical data modeling standards.
 - 2.1.5.3. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.5.4. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.6. Assess the adequacy of each logical data model with respect to Information Needs
 - 2.1.6.1. Assess each logical data model component can be mapped to at least one information need item.
 - 2.1.7. Assess the adequacy of each logical data model with respect to Mission Organization Functions
 - 2.1.7.1. Assess that each logical data model component is addressed by one or more aspects of a mission.
 - 2.1.7.2. Assess that each logical data model component is addressed by one or more mission-organization components.
 - 2.1.7.3. Assess that each logical data model component is addressed by one or more mission-organization-function components.



- 2.1.8. Assess the adequacy of each logical data model with respect to Resource Life Cycles
 - 2.1.8.1. Assess that each logical data model component within the context of a database object table is addressed by one or more resource life cycle nodes.
- 2.1.9. Assess the adequacy of each logical data model with respect to the Use Cases.
 - 2.1.9.1. Assess whether there is a sufficient set of use cases to account for all the logical data models.
 - 2.1.9.2. Assess whether every logical data model is addressed by at least one use case.
 - 2.1.9.3. Assess whether the use case is sufficiently detailed to fully address all the tables, columns, and relationships of the relevant logical data model.
- 2.1.10. Assess the adequacy of each logical data model with respect to the Value Domain Management.
 - 2.1.10.1. Assess whether the set of value domains for every column is defined unambiguously, clearly, distinctly, and not-overlapping.
 - 2.1.10.2. Assess whether every column that is to have a restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
 - 2.1.10.3. Assess that every column value domain does not semantically conflict with an attribute value domain.
- 2.1.11. Assess the adequacy of each logical data model with respect to WBS.
 - 2.1.11.1. Assess whether all implied WBS logical data models are reflected in an appropriate logical data model
 - 2.1.11.2. Assess whether all logical data model components are reflected in one or more of the WBS elements
- 2.2. Assess logical data model meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all schemas are identified and are properly constructed
 - 2.2.1.2. Assess that all tables within the schemas are identified and are properly constructed.
 - 2.2.1.3. Assess that all table super and subtypes are identified and are properly constructed.
 - 2.2.1.4. Assess that all columns are identified and are properly constructed.
 - 2.2.1.5. Assess that all columns are mapped to attributes
 - 2.2.1.6. Assess that appropriate columns are properly constrained by value domain assignments.
 - 2.2.1.7. Assess that all columns contain the appropriate integrity constraints that are supported by assertions and triggers
 - 2.2.1.8. Assess that all stored procedures are properly identified, designed, coded and tested to meet integrity requirements.
 - 2.2.1.9. Assess that all table relationships are identified and are properly constructed.
 - 2.2.1.10. Assess that the table's primary key exclusively consists of business-fact-data and enables the selection of one and only one row given that the table was an implemented DBMS table.



- 2.2.1.11. Assess that the collections of table columns are sufficient to reflect the implied policy of the table.
- 2.2.1.12. Assess that the collection of table columns are sufficient for the table's instance infrastructure.
- 2.2.1.13. Assess that the collection of table columns are sufficient for history and for auditability.
- 2.2.1.14. Assess keys and relationships.
 - 2.2.1.14.1. Assess whether primary key is a surrogate key or natural key.
 - 2.2.1.14.2. Assess that one and only one row is selected if a natural key
 - 2.2.1.14.3. Assess that one and only one row of business data is selected if a surrogate key.
 - 2.2.1.14.4. Assess whether there a unique constraint comprised of natural data if row uniqueness is enforced through a surrogate key.
 - 2.2.1.14.5. Ensure that the specification of referential integrity and referential actions correctly matches the business requirements for data retention and deletion.
- 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.1.4 Data Model: Physical Data Model Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of physical data models
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the physical data models that are to be defined and captured.
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of physical data models.
 - 1.2. For each physical data model:
 - 1.2.1. Identify components, that is, DBMS schemas, DBMS tables, DBMS columns, and DBMS relationships.
 - 1.2.2. Identify the definitions for each physical data model component
- 2. Perform the assessment
 - 2.1. Assess each physical data model against business information system work product
 - 2.1.1. Assess the adequacy of each physical data model with respect to the Business Information Systems.
 - 2.1.1.1. Assess whether the business information systems environment on which the physical database is to be located has the most efficient and effective architecture and deployment strategy for the performance needs of the physical model.
 - 2.1.2. Assess the adequacy of each physical data model with respect to the Business Requirements.



- 2.1.2.1. Assess whether all implied business requirement physical data models are reflected in an appropriate physical data model.
- 2.1.2.2. Assess whether all physical data models are reflected in business requirements.
- 2.13. Assess the adequacy of each physical data model with respect to the Business Rules.
- 2.1.3.1. Assess whether all implied business rules implied physical data model components are reflected in an appropriate physical data model
- 2.1.3.2. Assess whether all physical data model components are reflected in business rules.
- 2.1.4. Assess the adequacy of each physical data model that is to be populated by with respect to the External data interface Requirements.
- 2.1.4.1. Assess whether every physical data model that is to be populated by external data is addressed by at least one external data interface requirement.
- 2.1.4.2. Assess whether every physical data model that is to be populated by external data is designed appropriately so that it can respond to the external data interface requirement.
- 2.15. Assess the adequacy of each physical data model with respect to the External Quality Standards.
- 2.1.5.1. Assess whether the facilities defined within every physical data model is properly drawn from an Oracle DBMS facility that is at most ISO ANSI Standard for entry level SQL:1992.
- 2.1.5.2. Assess whether every physical data model that may be appropriate within the collection of physical data models is properly defined through the use of physical data modeling standards.
- 2.1.8.3. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.8.4. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.6 Assess the adequacy of each physical data model with respect to the Use Cases.
- 2.1.61. Assess whether there is a sufficient set of use cases to account for all the logical data models.
- 2.1.62. Assess whether every physical data model is addressed by at least one use case.
- 2.1.63. Assess whether the use case is sufficiently detailed to fully address all the tables, columns, and relationships of the relevant logical data model.
- 2.1.64. Assess whether the use cases properly specify the functions by organization and that the allowed access to the column in terms of read, write, select, and update are completely specified.
- 2.1.7 Assess the adequacy of each physical data model with respect to the User Acceptance Tests.
- 2.1.7.1. Assess whether the tests adequately test Inserts, Deletes, and Modifies for every physical data model DBMS table.
- 2.1.7.2. Assess whether referential integrity has been sufficiently defined to correctly model Restrict, Set Null, and Cascade.



- 2.1.7.3. Assess whether every Referential Action is properly engineered and tested.
- 2.1.7.4. Assess whether every value domain management action correctly executes and provide end-user violation messages that are clear, unambiguous, and helpful to the end user.
- 2.1.7.5. Assess whether every inappropriate and/or out-of-bounds value for every physical data model database column is appropriately trapped.
- 2.1.8 Assess the adequacy of each physical data model with respect to the Value Domain Management.
 - 2.1.8.1. Assess whether the set of value domains for every DBMS column is defined unambiguously, clearly, distinctly, and not-overlapping.
 - 2.1.8.2. Assess whether every DBMS column that is to have a restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
 - 2.1.8.3. Assess that every DBMS column value domain does not semantically conflict with a column value domain.
- 2.1.9. Assess the adequacy of each physical data model with respect to WBS.
 - 2.1.9.1. Assess whether all implied WBS physical data models are reflected in an appropriate physical data model
 - 2.1.9.2. Assess whether all physical data model components are reflected in one or more of the WBS elements
- 2.2. Assess physical data model meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all DBMS schemas are identified and are properly constructed
 - 2.2.1.2. Assess that all DBMS tables within the schemas are identified and are properly constructed.
 - 2.2.1.3. Assess that all DBMS table super and subtypes are identified and are properly constructed.
 - 2.2.1.4. Assess that all DBMS columns are identified and are properly constructed.
 - 2.2.1.5. Assess that all DBMS columns contain the appropriate integrity constraints that are supported by assertions and triggers
 - 2.2.1.6. Assess that all stored procedures are properly identified, designed, coded and tested to meet integrity requirements.
 - 2.2.1.7. Assess that all DBMS columns are mapped to columns
 - 2.2.1.8. Assess that appropriate DBMS columns are properly constrained by value domain assignments.
 - 2.2.1.9. Assess that all DBMS table relationships are identified and are properly constructed.
 - 2.2.1.10. Assess that the DBMS table's primary key exclusively consists of business-fact-data and enables the selection of one and only one.
 - 2.2.1.11. Assess that the collections of DBMS table columns are sufficient to reflect the implied policy of the DBMS table.



- 2.2.1.12. Assess that the collection of DBMS table columns are sufficient for the DBMS table's instance infrastructure.
- 2.2.1.13. Assess that the collection of DBMS table columns are sufficient for history and for auditability.
- 2.2.1.14. Assess keys and relationships.
 - 2.2.1.14.1. Assess whether primary key is a surrogate key or natural key.
 - 2.2.1.14.2. Assess that one and only one row is selected if a natural key
 - 2.2.1.14.3. Assess that one and only one row of business data is selected if a surrogate key.
 - 2.2.1.14.4. Assess whether there a unique constraint comprised of natural data if row uniqueness is enforced through a surrogate key.
 - 2.2.1.14.5. Ensure that the specification of referential integrity and referential actions correctly matches the business requirements for data retention and deletion.
- 2.2.1.15. Assess the SQL DDL Scripts
 - 2.2.1.15.1. Ensure that the SQL scripts for reference data match the value domain requirements
 - 2.2.1.15.2. Ensure that the SQL scripts for security roles match the security requirements as it relates to the use cases, named user roles, organizations, and extent of permission to read, write, update, and select data.
 - 2.2.1.15.3. Ensure that the SQL scripts for primary key sequence value specifications match the primary key requirements
 - 2.2.1.15.4. Ensure that the SQL scripts for tables, columns and appropriate key specifications match the DBMS table requirements
 - 2.2.1.15.5. Ensure that the SQL scripts for triggers and other stored procedures match the data integrity constraints
- 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.1.5 Data Model: SQL View Data Model Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of view data models
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the view data models that are to be defined and captured.
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of view data models.
 - 1.2. For each view data model:
 - 1.2.1. Identify components, such as, views, view columns, select and join clauses.
 - 1.2.2. Identify the definitions for each view data model component.



2. Perform the assessment
 - 2.1. Assess each view data model against business information system work product
 - 2.1.1. Assess the adequacy of each view data model with respect to the Business Information Systems.
 - 2.1.1.1. Assess whether every view data model is properly interfaced with one or more business information systems.
 - 2.1.1.2. Ensure that every information system has database access only through a view data model.
 - 2.1.2. Assess the adequacy of each view data model with respect to the Business Rules.
 - 2.1.2.1. Assess whether all implied business rules implied view data model components are reflected in an appropriate view data model
 - 2.1.2.2. Assess whether all view data model components are reflected in business rules.
 - 2.1.3. Assess the adequacy of each view data model that is to be populated by with respect to the External data interface Requirements.
 - 2.1.3.1. Assess whether every view data model that is to be populated by external data is addressed by at least one external data interface requirement.
 - 2.1.3.2. Assess whether every view data model that is to be populated by external data is designed appropriately so that it can respond to the external data interface requirement.
 - 2.1.4. Assess the adequacy of each view data model with respect to the External Quality Standards.
 - 2.1.4.1. Assess whether the facilities defined within every physical data model is properly drawn from an Oracle DBMS facility that is at most ISO ANSI Standard for entry level SQL:1992.
 - 2.1.4.2. Assess whether every physical data model that may be appropriate within the collection of physical data models is properly defined through the use of the Agency physical data modeling standards.
 - 2.1.4.3. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.4.4. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
 - 2.1.5. Assess the adequacy of each view data model with respect to the Use Cases.
 - 2.1.5.1. Assess whether the use cases adequately specify the complete set of Inserts, Deletes, and Modifies.
 - 2.1.5.2. Assess whether every value domain management action correctly executes and provide end-user violation messages that are clear, unambiguous, and helpful as specified in one or more use cases.
 - 2.1.5.3. Assess whether every inappropriate and/or out-of-bounds value for every physical data model database column is appropriately trapped as specified in a use case.
 - 2.1.6. Assess the adequacy of each view data model with respect to the User Acceptance Tests.



- 2.1.6.1. Assess whether the tests adequately test Inserts, Deletes, and Modifies for every view data model DBMS table.
- 2.1.6.2. Assess whether referential integrity has been sufficiently defined to accomplish the behavior defined within the view data model.
- 2.1.6.3. Assess whether every value domain management action correctly executes and provide end-user violation messages that are clear, unambiguous, and helpful to the end user.
- 2.1.6.4. Assess whether every inappropriate and/or out-of-bounds value for every physical data model database column is appropriately trapped.
- 2.1.6.5. Assess whether the view-based derived and compound columns, selects, nested selects, and the defined classes of joins are properly defined and product the pre-defined expected results.
- 2.1.7. Assess the adequacy of each view data model with respect to the Value Domain Management.
 - 2.1.7.1. Assess whether the set of value domains for every view column defined within the physical data model is employed appropriately within the view.
 - 2.1.7.2. Assess whether every view column that has a corresponding DBMS column restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
- 2.1.7. Assess the adequacy of each view data model with respect to the WBS
 - 2.1.7.1. Assess whether there are sufficient resources and processes contained within the WBS to properly accomplish the specification of a view data model.
 - 2.1.7.2. Assess whether there are sufficient resources and processes contained within the WBS to properly accomplish the creation of SQL view DDL including its testing.
- 2.2. Assess view data model meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all views are identified and are properly constructed
 - 2.2.1.2. Assess that all view columns are identified and are properly constructed.
 - 2.2.1.3. Assess that all view columns are mapped to DBMS columns
 - 2.2.1.4. Assess that all view columns contain the appropriate integrity constraint clauses
 - 2.2.1.5. Assess that all selects, nested selects, joins, renames, derived and compound data view columns are properly constructed.
 - 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.1.6 Data Model: XML Interface Model Assessment

- 1. Identify artifacts that bear on the assessment



- 1.1. Identify the appropriate set of XML interface models
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the XML interface models that are to be defined and captured.
 - 1.1.4. Identify the meta-artifacts appropriate to the evaluation of XML interface models.
- 1.2. For each XML interface model:
 - 1.2.1. Identify components, such as, XML schema, XML element, and XML attributes.
 - 1.2.2. Identify the definitions for each XML interface model component.
2. Perform the assessment
 - 2.1.1. Assess the adequacy of each XML data model with respect to the Business Information Systems.
 - 2.1.1.1. Assess whether every XML data model is properly interfaced with one or more business information systems as may be appropriate.
 - 2.1.1.2. Ensure that every appropriate information system has database access only through a XML data model.
 - 2.1.2. Assess the adequacy of each XML data model with respect to Business Requirements.
 - 2.1.2.1. Assess that all the business requirements that state or imply the use of XML are properly reflected in the XML data model.
 - 2.1.3. Assess the adequacy of each XML data model with respect to Business Rules.
 - 2.1.3.1. Assess that all the business rules that state or imply the use of XML are properly reflected in the XML data model
 - 2.1.4. Assess the adequacy of each XML data model that is to be populated by with respect to the External data interface Requirements.
 - 2.1.4.1. Assess whether every XML data model that is to be populated by external data is addressed by at least one external data interface requirement.
 - 2.1.4.2. Assess whether every XML data model that is to be populated by external data is designed appropriately so that it can respond to the external data interface requirement.
 - 2.1.5. Assess the adequacy of each XML data model with respect to the External Quality Standards.
 - 2.1.5.1. Assess whether the facilities defined within every XML data model is properly drawn from an established set of conventions from within the W3C.
 - 2.1.5.2. Assess whether every XML data model that may be appropriate within the collection of XML data models is properly defined through the use of the AgencyXML data modeling standards.
 - 2.1.5.3. Assess whether every XML data model that may be appropriate within the collection of XML data models is properly defined through the use of CIO Council for XML data modeling standards.
 - 2.1.5.4. Assess whether every XML data model that may be appropriate within the collection of XML data models is properly defined through the use of the Agency XLM data modeling standards.



- 2.1.5.5. Assess the Data Management Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.5.6. Assess the Data Interoperability Maturity Model level appropriate for the concept data model as it relates to process and organization.
- 2.1.6. Assess the adequacy of each XML data model with respect to the Use Cases.
 - 2.1.6.1. Assess whether the use cases adequately specify the required XML Schema and that the XML Schema appropriately maps to the DBMS Data Model.
- 2.1.7. Assess the adequacy of each XML data model with respect to the User Acceptance Tests.
 - 2.1.7.1. Assess whether the tests adequately test Inserts, Deletes, and Modifies for every XML data model DBMS table.
 - 2.1.7.2. Assess whether every value domain management action correctly executes and provide end-user violation messages that are clear, unambiguous, and helpful to the end user.
 - 2.1.7.3. Assess whether every inappropriate and/or out-of-bounds value for every XML data model database column is appropriately trapped.
- 2.1.8. Assess the adequacy of each XML data model with respect to the Value Domain Management.
 - 2.1.8.1. Assess whether the set of value domains for every XML element is defined unambiguously, clearly, distinctly, and not-overlapping.
 - 2.1.8.2. Assess whether every XML element that is to have a restricted value domain is identified and is correctly addressed by the appropriate set of properly configured value domain management metadata.
 - 2.1.8.3. Assess that every XML element value domain does not semantically conflict with a DBMS column value domain.
- 2.1.9. Assess the adequacy of each XML data model with respect to WBS.
 - 2.1.9.1. Assess whether all implied WBS XML data models are reflected in an appropriate XML data model
 - 2.1.9.2. Assess whether all XML data model components are reflected in one or more of the WBS elements
- 2.2. Assess XML data model meta-artifacts
 - 2.2.1. Assess the completeness of each meta-artifact
 - 2.2.1.1. Assess that all XML schemas are identified and are properly constructed
 - 2.2.1.2. Assess that all XML elements within the schemas are identified and are properly constructed.
 - 2.2.1.3. Assess that all XML elements are mapped to DBMS columns
 - 2.2.1.4. Assess that appropriate XML elements are properly constrained by value domain assignments.
 - 2.2.1.5. Assess that the collections of XML elements are sufficient to reflect the implied policy of the mapped to one or more DBMS tables.
 - 2.2.1.6. Assess that the collection of XML elements are sufficient to present the information necessary for updating a DBMS table's instance infrastructure.



- 2.2.1.7. Assess that the collection of XML elements are sufficient to present the information necessary for updating a DBMS table's history and for auditability.
- 2.2.2. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.2 Business Information System Work Product to Data Model Assessments

6.2.1 Business Information Systems Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of business information systems documents
 - 1.1.1. Review business information systems documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the business information system that is defined and captured.
 - 1.1.4. Identify the business information systems related data architecture reference model data model components.
 - 1.2. For each business information system work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated Business Information Systems data model component.
- 2. Perform the assessment
 - 2.1. Assess the adequacy of each physical data model with respect to the Business Information Systems
 - 2.1.1. Assess whether every DBMS column from every table is addressed through an insert, update, or possibly delete by at least one module of a software system.
 - 2.1.2. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a software system.
 - 2.1.3. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a software system.
 - 2.1.4. Assess whether all user acceptance tests are properly addressed by one or more appropriate modules of a software system.
 - 2.1.5. Assess whether all use cases are completely and properly addressed by one or more appropriate modules of a software system.
 - 2.1.6. Assess whether all data updates are properly recorded on a re-processable audit train.
 - 2.1.7. Assess whether all data updates are able to be properly backed out as may be allowed by a use case.
 - 2.2. Assess the adequacy of each view data model with respect to the Business Information Systems.



- 2.2.1. Assess whether every view column from every view is addressed through an insert, update, or possibly delete by at least one module of a software system..
- 2.2.2. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a software system.
- 2.2.3. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a software system.
- 2.2.4. Assess whether all user acceptance tests are properly addressed by one or more appropriate modules of a software system.
- 2.2.5. Assess whether all use cases are completely and properly addressed by one or more appropriate modules of a software system.
- 2.2.6. Assess whether all data updates are properly recorded on a re-processable audit train.
- 2.2.7. Assess whether all data updates are able to be properly backed out as may be allowed by a use case.
- 2.3. Assess the adequacy of each XML data model with respect to the Business Information Systems.
 - 2.3.1. Assess whether an XML data package is properly constructed by the appropriate software system according to the XML Schema.
 - 2.3.2. Assess whether an XML data package is properly read and the appropriate updates are made to the database by the appropriate software system according to the rules set out in the XML Schema.
- 2.4. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.2 Business Requirements Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of business requirements documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the business requirement that is defined and captured.
 - 1.1.4. Identify the business requirements related data architecture reference model data model components.
 - 1.2. For each business requirement work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Concepts Data Model, Logical Data Model, Physical Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated business requirement data model component.
2. Perform the assessment.



- 2.1. Assess the adequacy of each concept data model with respect to the business requirement.
 - 2.1.1. Assess whether all the implied concept data model components, that is, Subject, Entity, Attribute, Assigned Value Domain, and Relationship from the business requirement have been addressed in one or more aspects of the concept data model.
 - 2.1.2. Assess concept data model components, that is, Subject, Entity, Attribute, Assigned Value Domain, and Relationship with respect to the specific business requirement are sufficiently specified.
 - 2.1.3. Assess whether every Subject, Entity, Attribute, Assigned Value Domain, and Relationship is called for by one or more business requirement.
 - 2.2. Assess the adequacy of each logical data model with respect to the business requirement.
 - 2.2.1. Assess whether all the implied logical data model components, that is, Schema, Table, Column, Assigned Value Domain, and Relationship from the business requirement have been addressed in one or more aspects of the logical data model.
 - 2.2.2. Assess logical data model components, that is, Schema, Table, Column, Assigned Value Domain, and Relationship with respect to the specific business requirement are sufficiently specified.
 - 2.2.3. Assess whether every Schema, Table, Column, Assigned Value Domain, and Relationship is called for by one or more business requirement.
 - 2.3. Assess the adequacy of each physical data model with respect to the business requirement.
 - 2.3.1. Assess whether all the implied physical data model components, that is, DBMS schema, DBMS tables, and DBMS columns from the business requirement have been addressed in one or more aspects of the physical data model.
 - 2.3.2. Assess physical data model components, that is, DBMS Schema, DBMS Table, DBMS Column, Assigned Value Domain, and Relationship with respect to the specific business requirement are sufficiently specified.
 - 2.3.3. Assess whether every DBMS Schema, DBMS Table, DBMS Column, Assigned Value Domain, and Relationship is called for by one or more business requirement.
 - 2.4. Assess the adequacy of each XML data model with respect to the business requirement.
 - 2.4.1. Assess whether all the implied XML data model components, that is, XML schema, XML elements and supporting XML structures from the business requirement have been addressed in one or more aspects of the XML data model.
 - 2.4.2. Assess XML data model components, that is, XML schema, XML elements and supporting XML structures with respect to the specific business requirement are sufficiently specified.
 - 2.4.3. Assess whether every XML schema, XML elements and supporting XML structures is called for by one or more business requirement.
 - 2.5. Assess the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
 4. Present the findings and revise draft assessment report



5. Create final report and deliver to The Agency

6.2.3 Business Rules Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of business rule documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the business rule that is defined and captured.
 - 1.1.4. Identify the business rule related data architecture reference model data model components.
 - 1.2. For each business rule work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Data Element Model, Logical Data Model, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated Business Rules data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each data element model with respect to the business rule.
 - 2.1.1. Assess whether all the implied data element model components, that is, Value Domains, and Data Elements from the business rule have been addressed in one or more aspects of the data element model.
 - 2.1.2. Assess data element model components, that is, Value Domains, and Data Elements with respect to the specific business rule are sufficiently specified.
 - 2.1.3. Assess whether every Value Domain and Data Element is called for by one or more business requirement.
 - 2.2. Assess the adequacy of each logical data model with respect to the business rule.
 - 2.2.1. Assess whether all the implied logical data model components, that is, Column, and Assigned Value Domain from the business rule have been addressed in one or more aspects of the logical data model.
 - 2.2.2. Assess logical data model components, that is, Column, and Assigned Value Domain with respect to the specific business rule is sufficiently specified.
 - 2.2.3. Assess whether every Column and Assigned Value Domain is called for by one or more business requirement.
 - 2.3. Assess the adequacy of each physical data model with respect to the business requirement.
 - 2.3.1. Assess whether all the implied physical data model components, that is, DBMS columns and Assigned Value Domains from the business rule have been addressed in one or more aspects of the physical data model.
 - 2.3.2. Assess physical data model components, that is, DBMS Column, and Assigned Value Domain with respect to the specific business rules are sufficiently specified.
 - 2.3.3. Assess whether the business rule use of DBMS columns are appropriate with respect to data type, allowed operation, and if appropriate SQL functions.



- 2.3.4. Assess whether business rule stored procedure implementations are correctly engineered and result in unambiguous messages provided the end user or up through the application system calling sequence.
- 2.3.5. Assess whether every DBMS Column and Assigned Value Domain is called for by one or more business requirement.
- 2.4. Assess the adequacy of each View data model with respect to the business requirement.
 - 2.4.1. Assess whether all the implied View data model components, that is, view and view columns from the business rule have been addressed in one or more aspects of the XML data model.
 - 2.4.2. Assess View data model components, that is, view and view columns with respect to the specific business rule are sufficiently specified.
 - 2.4.3. Assess whether the business rule use of view columns are appropriate with respect to allowed functionality of views.
 - 2.4.4. Assess whether business rule stored procedure implementations are correctly engineered and result in unambiguous messages provided the end user or up through the application system calling sequence.
 - 2.4.5. Assess whether every view and view column is called for by one or more business requirement.
- 2.5. Assess the adequacy of each XML data model with respect to the business requirement.
 - 2.5.1. Assess whether all the implied XML data model components, that is, XML schema, XML elements and supporting XML structures from the business rule have been addressed in one or more aspects of the XML data model.
 - 2.5.2. Assess XML data model components, that is, XML schema, XML elements and supporting XML structures with respect to the specific business rule are sufficiently specified.
 - 2.5.3. Assess whether every XML schema, XML elements and supporting XML structures is called for by one or more business requirement.
- 2.6. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.2.4 Database Domains Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of database domain documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the database domain that is defined and captured.
 - 1.1.4. Identify the database domain related data architecture reference model data model components.



- 1.2. For each database domain work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Data Element Model, and Logical Data Model
 - 1.2.2. Identify the description for each interrelated database domain component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each database domain with respect to the data element model.
 - 2.1.1. Assess whether the appropriate noun phrases contained in a database domain are properly allocated to data elements.
 - 2.2. Assess the adequacy of each database domain with respect to the logical data model.
 - 2.2.1. Assess whether the appropriate noun phrases contained in a database domain are properly allocated to database object tables, or to property classes (likely to then become tables).
 - 2.3. Assess the adequacy of each database domain.
 - 2.3.1. Assess whether all the noun phrases contained in a database domain have been properly allocated to data elements or database object tables, or to property classes (likely to then become tables).
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.5 Database Objects Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of database object documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the database object that is defined and captured.
 - 1.1.4. Identify the database object related data architecture reference model data model components.
 - 1.2. For each database object work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Logical Data Model
 - 1.2.2. Identify the description for each interrelated database object component.
 2. Perform the assessment
 - 2.1. Assess whether the appropriate tables contained in a database object are properly allocated.
 - 2.2. Assess whether all the logical data model tables have been properly allocated to database object tables.
 - 2.3. Assess whether all the logical data model table processes properly add, delete, or modify all table columns allocated to the database object table.
 - 2.4. Assess whether database object table processes, upon failure return the database object table row to its original state.
 - 2.5. Assess whether all the logical data model tables have been properly allocated to database object states.



- 2.6. Assess whether all the logical data model table states proceed from the null state to a series of valued-states in a proper sequence and finally return to a null state.
- 2.7. Assess whether all the database object information systems are properly engineered to transform database object tables from one valid state to the next.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.6 External data interface Requirements Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of External data interface Requirements documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the external data interface requirement that is defined and captured.
 - 1.1.4. Identify the external data interface requirement related data architecture reference model data model components.
 - 1.2. For each external data interface requirement system work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated External data interface Requirements data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each physical data model with respect to the External data interface Requirements
 - 2.1.1. Assess whether the external data interface is sufficiently identified and specified to the level that an Extract, Transform, and Load process can be expertly constructed.
 - 2.1.2. Assess whether there is sufficient detail to the external data interface to unambiguously address issues related to granularity of both sides of the interface, precision of the various values for the data fields, and an exact matching of the values for any data fields that is to be imported.
 - 2.1.3. Assess whether there is sufficient information to be able to fill out audit trail information and to be able to back out data once it has been imported.
 - 2.2. Assess the adequacy of each view data model with respect to the External data interface Requirements.
 - 2.2.1. Assess whether the external data interface is sufficiently identified and specified to the level that a set of views can be constructed to directly import the data from a connected source.
 - 2.2.2. Assess whether there is sufficient detail to the external data interface to unambiguously construct views that that address the granularity of both sides of the interface, precision



- of the various values for the data fields, and an exact matching of the values for any data fields that is to be imported.
- 2.2.3. Assess whether there is sufficient information to be able to fill out audit trail information built into views.
- 2.3. Assess the adequacy of each XML data model with respect to the External data interface Requirements.
 - 2.3.1. Assess whether the external data interface is sufficiently identified and specified to the level that a set of XML Schemas can be constructed to process data that is exported from external sources.
 - 2.3.2. Assess whether there is sufficient detail to the external data interface to unambiguously construct XML schemas that that address the granularity of both sides of the interface, precision of the various values for the data fields, and an exact matching of the values for any data fields that is to be imported.
 - 2.3.3. Assess whether there is sufficient information to be able to fill out audit trail information built into the XML schemas.
- 2.4. Assign the risk level associated with each meta-artifact not properly constructed.
 - 3. Determine the findings and create draft assessment report
 - 4. Present the findings and revise draft assessment report
 - 5. Create final report and deliver to The Agency

6.2.7 External Quality Standards Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of External Quality Standards documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the external quality standard that is defined and captured.
 - 1.1.4. Identify the external quality standard data architecture reference model data model components.
 - 1.2. For each external quality standard work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Data Element Model, Concepts Data Model, Logical Data Model, Physical View Data Model, View Data Model and XML Data Model
 - 1.2.2. Identify the description for each interrelated External Quality Standards data model component.
- 2. Perform the assessment
 - 2.1. Assess the components of the Data Element Model against required metadata components from ISO 11179 standard (Part 3) for data element metadata.
 - 2.2. Assess the components of the Concepts Data Model against the required metadata for the U.S. Federal The Agency CIO Council's Data Performance Plan



- 2.3. Assess the components of the Logical Data Model against ISO ANSI SQL 1992 Entry Level.
- 2.4. Assess the components of the Physical Data Model against Oracle 10g but not to contain any SQL facility and/or syntax that exceeds ISO ANSI SQL 1992 Entry Level without a specific waiver.
- 2.5. Assess the components of the View Data Model against ISO ANSI SQL 1992 Entry Level.
- 2.6. Assess the components of the XML Data Model against W3C guidelines, the U.S. Department of Justice's NEAM model, and the XML Guidelines published by the U.S. Department of the Navy.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.8 Information Needs Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of Information Needs documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the information need that is defined and captured.
 - 1.1.4. Identify the information need related data architecture reference model data model components.
 - 1.2. For each information need system work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Data Elements and Logical Data Model
 - 1.2.2. Identify the description for each interrelated Information Needs component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each data element with respect to Information Needs
 - 2.1.1. Assess each information need component that is inferred to be a data element is represented appropriately as a data element.
 - 2.1.2. Assess each information need component that is inferred to be a data element and ensure that it is both atomic and non-derived.
 - 2.1.3. Assess each information need component that is inferred to be a data element and ensure that it contains the proper data type, scale, and precision.
 - 2.1.4. Assess each information need component that is inferred to be a data element and ensure that it contains the proper value domain mappings..
 - 2.2. Assess the adequacy of each logical data model with respect to Information Needs
 - 2.2.1. Assess each information need component that is inferred to be a table is represented within a table within a logical data model.



- 2.2.2. Assess each information need component that is inferred to be a table is represented appropriately by one or more table columns in terms of the information need's name, description and purpose.
- 2.2.3. Assess each information need component that is inferred to be a table is represented appropriately by one or more table columns within a logical data model in terms of data type, scale, precision, granularity and temporalness.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.9 Mission Organization Function Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of Mission Organization Function documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the mission organization functions that are defined and captured.
 - 1.1.4. Identify the mission organization function related data architecture reference model data model components.
 - 1.2. For each mission organization function work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Logical Data Model
 2. Perform the assessment
 - 2.1. Assess whether each mission is addressed by one or more logical data model tables to ensure complete coverage.
 - 2.2. Assess whether each organization is addressed by one or more logical data model tables with respect to adding, modifying, or deletion.
 - 2.3. Assess whether each function is addressed by one or more logical data model tables with respect to having the appropriate processes to accomplish adding, modifying, or deletion..
 - 2.4. Assess whether each mission-organization is addressed by one or more logical data model tables to appropriateness of coverage within the organization and to ensure economy of work.
 - 2.5. Assess whether each mission-organization-function is addressed by one or more logical data model tables to appropriateness of coverage within functions performed by various mission-organizations to ensure economy of work.
3. Determine the findings and create draft assessment report.
4. Present the findings and revise draft assessment report.
5. Create final report and deliver to The Agency.

6.2.10 Resource Life Cycles Assessment



1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of Resource Life Cycle documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the resource life cycle that is defined and captured.
 - 1.1.4. Identify the resource life cycle related data architecture reference model data model components.
 - 1.2. For each resource life cycle work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Logical Data Model
 - 1.2.2. Identify the description for each interrelated Resource Life Cycle data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of the resource life cycle node database object assignment.
 - 2.2. Assess the adequacy of the resource life cycle node database object assignment to a database table.
 - 2.3. Assess the adequacy of the resource life cycle node database object assignment to one or more database table columns in terms of name, description and purpose.
 - 2.4. Assess the adequacy of the resource life cycle node database object assignment to one or more database table columns in terms of data type, scale, precision, granularity and temporalness.
3. Determine the findings and create draft assessment report.
4. Present the findings and revise draft assessment report.
5. Create final report and deliver to The Agency.

6.2.11 Use Cases Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of Use Case documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the use case that is defined and captured.
 - 1.1.4. Identify the use case related data architecture reference model data model components.
 - 1.2. For each use case work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Logical Data Model, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated Use Cases data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each logical data model with respect to the Use Cases
 - 2.1.1. Assess whether every user case implied logical data model components are properly constructed in the concept data model, that is, Schemas, Tables, Columns, and Assigned Value Domains.
 - 2.1.2. Assess whether every user case implied logical data model table column



- 2.1.3. Assess whether every user case implied one or more logical data model table columns is properly defined in terms of name, description and purpose.
- 2.1.4. Assess whether every user case implied one or more logical data model table columns is properly defined in terms of data type, scale, precision, granularity and temporalness.
- 2.1.5. Assess whether every value domain value for every restricted value domain database table column is properly addressed by one or more appropriate modules of a use case.
- 2.2. Assess the adequacy of each physical data model with respect to the Use Cases
 - 2.2.1. Assess whether every DBMS column from every table is addressed through an insert, update, or possibly delete by at least one component and/or section of a use case.
 - 2.2.2. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a use case.
 - 2.2.3. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a use case.
 - 2.2.4. Assess whether all data updates are able to be properly backed out as may be allowed by a use case.
- 2.3. Assess the adequacy of each view data model with respect to the Use Cases.
 - 2.3.1. Assess the adequacy of each view data model with respect to the Use Cases
 - 2.3.2. Assess whether every view column from every table is addressed through an insert, update, or possibly delete by at least one component and/or section of a use case.
 - 2.3.3. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a use case.
 - 2.3.4. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a use case.
 - 2.3.5. Assess whether all data updates are able to be properly backed out as may be allowed by a use case.
- 2.4. Assess the adequacy of each XML data model with respect to the Use Cases.
 - 2.4.1. Assess whether an XML data package is specified in sufficient detail as to be unambiguous.
 - 2.4.2. Assess whether an XML data package is specified in sufficient detail to ensure that it can be unambiguous properly read and the appropriate updates are made to the database.
- 2.5. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report.
4. Present the findings and revise draft assessment report.
5. Create final report and deliver to The Agency.

6.2.12 User Acceptance Tests Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of user acceptance test assessment documents
 - 1.1.1. Review user acceptance test assessment documents.
 - 1.1.2. Review scope and business problem related documentation.



- 1.1.3. Identify the use acceptance test that is defined and captured.
- 1.1.4. Identify the use acceptance test related data architecture reference model data model components.
- 1.2. For each user acceptance test work product
 - 1.2.1. Identify the relevant data architecture reference model, that is, Logical Data Model, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated User Acceptance Test data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each physical data model with respect to User Acceptance Tests
 - 2.1.1. Assess whether every DBMS column from every table is addressed through an insert, update, or possibly delete by at least one component and/or section of a User Acceptance Test.
 - 2.1.2. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a User Acceptance Test.
 - 2.1.3. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a User Acceptance Test.
 - 2.1.4. Assess whether all data updates are able to be properly backed out as may be allowed by a User Acceptance Test.
 - 2.2. Assess the adequacy of each view data model with respect to User Acceptance Tests.
 - 2.2.1. Assess the adequacy of each view data model with respect to User Acceptance Tests
 - 2.2.2. Assess whether every view column from every table is addressed through an insert, update, or possibly delete by at least one component and/or section of a User Acceptance Test.
 - 2.2.3. Assess whether every identified business rule is properly accomplished by one or more appropriate modules of a User Acceptance Test.
 - 2.2.4. Assess whether every value domain value for every restricted value domain DBMS column is properly addressed by one or more appropriate modules of a User Acceptance Test.
 - 2.2.5. Assess whether all data updates are able to be properly backed out as may be allowed by a User Acceptance Test.
 - 2.3. Assess the adequacy of each XML data model with respect to User Acceptance Tests.
 - 2.3.1. Assess whether an XML data package is specified in sufficient detail as to be unambiguous.
 - 2.3.2. Assess whether an XML data package is specified in sufficient detail to ensure that it can be unambiguous properly read and the appropriate updates are made to the database.
 - 2.4. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency



6.2.13 Value Domains and Management Assessment

- 1.1. Identify the appropriate set of value domain management assessment documents
 - 1.1.1. Review value domain management documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the value domains that is defined and captured.
 - 1.1.4. Identify the value domain related data architecture reference model data model components.
- 1.2. For each value domain management work product:
 - 1.2.1. Identify the relevant data architecture reference model, that is, Data Element Model, Concept Data Model, Logical Data Model, Physical Data Model, View Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated Value Domain Management data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each data element model with respect to Value Domain Management.
 - 2.1.1. Assess whether each value domain is properly specified and that all value domain values allowed are well defined, non-overlapping, and have been formally approved for use in the databases and enforced through the business information systems.
 - 2.1.2. Assess whether restricted value data elements are properly assigned a specific value domain.
 - 2.2. Assess the adequacy of each concept data model with respect to Value Domain Management.
 - 2.2.1. Assess whether a value domain that is assigned to an attribute is a subset of a value domain that is assigned to a data element.
 - 2.3. Assess the adequacy of each logical data model with respect to Value Domain Management .
 - 2.3.1. Assess whether a value domain that is assigned to an column is a subset of a value domain that is assigned to an attribute.
 - 2.4. Assess the adequacy of each physical data model with respect to the Value Domain Management.
 - 2.4.1. Assess whether a value domain that is assigned to a DBMS column is a subset of a value domain that is assigned to a column.
 - 2.5. Assess the adequacy of each view data model with respect to the Value Domain Management.
 - 2.5.1. Assess whether each view column is properly established to enforce a DBMS column's assigned value domain.
 - 2.5.2. Assess whether each software system module that employs a view column that represents a restricted value domain is established such that it will only allow legal values.
 - 2.6. Assess the adequacy of each XML data model with respect to the Value Domain Management.



- 2.6.1. Assess whether each view column is properly established to enforce a DBMS column's assigned value domain.
- 2.6.2. Assess whether each software system module that employs an XML element that represents a restricted value domain is established such that it will only allow legal values.
- 2.7. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.2.14 Contract Work Breakdown Structure (WBS) Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of WBS documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the WBSs that are defined and captured.
 - 1.1.4. Identify the WBS related data components.
 - 1.2. For each WBS development, review, or evolution effort:
 - 1.2.1. Identify the relevant components, that is, Data Element Model, Concepts Data Model, Logical Data Model, Physical Data Model, and XML Data Model
 - 1.2.2. Identify the description for each interrelated WBS data model component.
2. Perform the assessment
 - 2.1. Assess the adequacy of each data element data model with respect to the WBS.
 - 2.1.1. Assess whether all the implied data element data model components have been delivered in terms of components, instances, and stored metadata work products.
 - 2.1.2. Assess whether all the implied data element data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.1.3. Assess whether all the implied data element data model components have been properly allocated sufficient unit effort estimates.
 - 2.1.4. Assess whether all the implied data element data model components have been properly allocated sufficient quantity of units that have to be developed.
 - 2.1.5. Assess whether all the implied data element data model components have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.1.6. Assess whether all the implied data element data model components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.1.7. Assess whether all the implied data element data model components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.



- 2.2. Assess the adequacy of each concepts data model with respect to the WBS.
- 2.2.1. Assess whether all the implied concepts data model components have been delivered in terms of components, instances, and stored metadata work products.
- 2.2.2. Assess whether all the implied concepts data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.2.1. Assess whether all the implied concepts data model components have been delivered in terms of components, instances, and stored metadata work products.
- 2.2.2. Assess whether all the implied concepts data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.2.2. Assess whether all the implied concepts data model components have been properly allocated sufficient unit effort estimates.
- 2.2.3. Assess whether all the implied concepts data model components have been properly allocated sufficient quantity of units that have to be developed.
- 2.2.4. Assess whether all the implied concepts data model components have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.2.5. Assess whether all the implied concepts data model components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.2.6. Assess whether all the implied concepts data model components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.3. Assess the adequacy of each logical data model with respect to the WBS.
- 2.3.1. Assess whether all the implied logical data model components have been delivered in terms of components, instances, and stored metadata work products.
- 2.3.2. Assess whether all the implied logical data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.3.3. Assess whether all the implied logical data model components have been properly allocated sufficient unit effort estimates.
- 2.3.4. Assess whether all the implied logical data model components have been properly allocated sufficient quantity of units that have to be developed.
- 2.3.5. Assess whether all the implied logical data model components have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.3.6. Assess whether all the implied logical data model components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.3.7. Assess whether all the implied logical data model components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.4. Assess the adequacy of each physical data model with respect to the WBS.



- 2.4.1. Assess whether all the implied physical data model components have been delivered in terms of components, instances, and stored metadata work products.
- 2.4.2. Assess whether all the implied physical data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.4.2. Assess whether all the implied physical data model components have been properly allocated sufficient unit effort estimates.
- 2.4.3. Assess whether all the implied physical data model components have been properly allocated sufficient quantity of units that have to be developed.
- 2.4.4. Assess whether all the implied physical data model components have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.4.5. Assess whether all the implied physical data model components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.4.6. Assess whether all the implied physical data model components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.5. Assess the adequacy of each XML data model with respect to the WBS
 - 2.5.1. Assess whether all the implied XML data model components have been delivered in terms of components, instances, and stored metadata work products.
 - 2.5.2. Assess whether all the implied XML data model components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.5.3. Assess whether all the implied XML data model components have been properly allocated sufficient unit effort estimates.
 - 2.5.4. Assess whether all the implied XML data model components have been properly allocated sufficient quantity of units that have to be developed.
 - 2.5.5. Assess whether all the implied XML data model components have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.5.6. Assess whether all the implied XML data model components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.5.7. Assess whether all the implied XML data model components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.6. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency



6.3 Business Information System Work Product to Business Information System Work Product Assessments

Figure Table 4 provides the cross reference of work products to work products. As an instance of a work product is delivered, the following are key items that should be assessed with respect to all the other work products that can be affected.

6.3.1 Business Information Systems Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of Business Information Systems documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the Business Information Systems that are defined and captured.
 - 1.1.4. Identify the Business Information Systems related work products.
 - 1.2. For each Business Information Systems related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Requirements, Business Rules, Database Objects, External data interface Requirements, External Quality Standards, Mission Organization Function, Resource Life Cycles, Use Cases, User Acceptance Tests, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated business information systems component.
2. Perform the assessment
 - 2.1. Assess whether the business information system individual components properly identify the specific business requirements that are accomplished.
 - 2.1.1. Assess how the allocated business information system requirements are to be met, how it is to be tested and through what means the testing is reported.
 - 2.1.2. Assess how allocated business information system requirements that are in conflict one with another are to be resolved.
 - 2.2. Assess whether the business information system individual components properly identify and accomplish the business rules.
 - 2.2.1. Assess how the allocated business rules are to be met, how it is to be tested and through what means the testing is reported.
 - 2.2.2. Assess how allocated business rules that are in conflict one with another are to be resolved.
 - 2.3. Assess whether the business information system individual components properly identify and are appropriately engineered to address the database objects for this effort.
 - 2.3.1. Assess the allocated database object table processes to ensure that they result in processes that either maintain or restore a state of integrity of a given database object table.
 - 2.3.2. Assess that the allocated database object table process column are properly acted upon by the business information system with respect to selection, valuation, modification, or



- value deletion to either maintain or restore a state of integrity of a given database object table.
- 2.3.3. Assess that the allocated database object table states are accomplished in an appropriate sequence according to the database object states identified in the complete specification of database object classes.
 - 2.4. Assess whether the business information system individual components properly identify and are appropriately engineered to address the external data interface requirements for this effort.
 - 2.4.1. Assess the data specification of the external data interface requirement to ensure that all the logical data model table columns is properly defined in terms of name, description and purpose.
 - 2.4.2. Assess the data specification of the external data interface requirement to ensure that all the logical data model table columns is properly defined in terms of data type, scale, precision, granularity and temporalness.
 - 2.4.3. Assess the data specification of the external data interface requirement to ensure that all the value domain values for every restricted value domain database table column are properly addressed.
 - 2.5. Assess whether the business information system individual components properly identify and are appropriately engineered to address the external quality standards for this effort.
 - 2.5.1. Assess whether every data element implied for use as a database table column properly comports to Part 3 of the ISO 11179 for data element metadata.
 - 2.5.2. Assess whether every data element implied for use as a database table column properly comports to Part 5 of the ISO 11179 for data element metadata.
 - 2.5.3. Assess that every database column employed in the external data interface requirement conforms to an allowed data type from ISO ANSI SQL 1992 Entry Level.
 - 2.5.4. Assess that every DBMS table column employed in the external data interface requirement conforms to an allowed data type from ISO ANSI SQL 1992 Entry Level.
 - 2.5.5. Assess that every view column employed in the external data interface requirement conforms to an allowed data type from ISO ANSI SQL 1992 Entry Level.
 - 2.6. Assess whether the business information system individual components properly identify and are appropriately engineered to address the mission organization function for this effort.
 - 2.6.1. Assess whether each mission is addressed by one or more logical data model tables to ensure complete coverage.
 - 2.6.2. Assess whether each organization is addressed by one or more business information system components with respect to adding, modifying, or deletion.
 - 2.6.3. Assess whether each function is addressed by one or more business information system components with respect to having the appropriate processes to accomplish adding, modifying, or deletion..
 - 2.6.4. Assess whether each mission-organization is addressed by one or more business information system components to appropriateness of coverage within the organization and to ensure economy of work.



- 2.6.5. Assess whether each mission-organization-function is addressed by one or business information system components to appropriateness of coverage within functions performed by various mission-organizations to ensure economy of work.
- 2.7. Assess whether the business information system individual components properly identify and are appropriately engineered to address the resource life cycle analysis for this effort.
 - 2.7.1 Assess whether the business information system individual components fulfill the implied requirements of the accomplishment of the end state of a resource life cycle node.
- 2.8. Assess whether the business information system individual components properly identified and are appropriately engineered and accomplish the appropriate sections of the use cases from which they are derived.
 - 2.8.1. Assess whether the business transactions accomplished by the business information systems are properly identified through their use cases.
 - 2.8.2. Assess whether the business transactions accomplished by the business information systems properly identify column in terms of read, write, select, and update are completely specified.
 - 2.8.3. Assess whether there sufficient metadata captured for each business transaction.
 - 2.8.4. Assess whether the logical database tables identified for the proper capture of a business transaction.
 - 2.8.5. Assess whether the relevant tables associated with a business transaction history are properly identified.
 - 2.8.6. Assess whether there sufficient metadata captured for each business transaction history.
 - 2.8.7. Assess whether the logical database tables identified for the proper retrieval of a business transaction history.
 - 2.8.8. Assess whether the history destination tables are properly identified for the capture of business transaction history.
- 2.9. Assess whether the business information system individual components properly identify and are appropriately engineered to address the user acceptance tests for this effort.
 - 2.9.1. Assess whether every business information system component user acceptance test is properly engineered to reflect success or failure and that appropriate messages are generated and actions taken.
- 2.10. Assess whether the business information system individual components properly identify and are appropriately engineered to address the value domains for this effort.
 - 2.10.1. Assess whether there is sufficient business information system individual components to ensure that only an appropriate set of restricted value domain data element values are presented.
 - 2.10.2. Assess whether sufficient business information system individual components in support of a restricted value domain choice.
- 2.11. Assess whether the business information system individual components properly identify and are appropriately engineered to address the WBS for this effort.
 - 2.11.1. Assess whether all the business information system individual components have been delivered in terms of components, instances, and stored metadata work products.



- 2.11.2. Assess whether all the business information system individual components have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.11.3. Assess whether all the business information system individual components have been properly allocated sufficient unit effort estimates.
- 2.11.4. Assess whether all the business information system individual components have been properly allocated sufficient quantity of units that have to be developed.
- 2.11.5. Assess whether all the business information system individual components have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.11.6. Assess whether all the business information system individual components have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.11.7. Assess whether all the business information system individual components have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.12. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.2 Business Requirements Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of business requirements documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the business requirements that are defined and captured.
 - 1.1.4. Identify the business requirements related work products.
 - 1.2. For each business requirement related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Rules, Database Domains, Database Objects, External data interface Requirements, External Quality Standards, Information Needs, Mission Organization Function, Resource Life Cycles, Use Cases, User Acceptance Tests, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated business requirement component.
2. Perform the assessment
 - 2.1. Assess whether each business requirement is addressed by one or more business information systems and contained components as may be appropriate.
 - 2.1.1. Assess whether each allocated business requirement is satisfied by the portion of the business information system to which it is allocated.
 - 2.1.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.



- 2.2. Assess whether each business requirement is addressed by one or more business rules as may be appropriate.
 - 2.2.1 Assess whether each allocated business requirement is satisfied by the business rule in a manner that clearly results in a pass/fail.
 - 2.2.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.3. Assess whether each business requirement is addressed by one or more database domains as may be appropriate.
 - 2.3.1 Assess whether each allocated business requirement is satisfied by the database domain in a manner that clearly results in a pass/fail.
 - 2.3.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.4 Assess whether each business requirement is addressed by one or more database object is addressed by one or more business information systems as may be appropriate.
 - 2.4.1 Assess whether each allocated business requirement is satisfied by the database object in a manner that clearly results in a pass/fail.
 - 2.4.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.5 Assess whether each business requirement is addressed by one or more external data interface requirement as may be appropriate.
 - 2.5.1 Assess whether each allocated business requirement is satisfied by the external data interface requirement in a manner that clearly results in a pass/fail.
 - 2.5.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.6. Assess whether each business requirement is addressed by one or more external quality standard as may be appropriate.
 - 2.6.1 Assess whether each allocated business requirement is satisfied by the external quality standard in a manner that clearly results in a pass/fail.
 - 2.6.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.7. Assess whether each business requirement is addressed by one or more information need as may be appropriate.
 - 2.7.1 Assess whether each allocated business requirement is satisfied by the information needs in a manner that clearly results in a pass/fail.
 - 2.7.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.8. Assess whether each business requirement is addressed by one or more mission organization functions as may be appropriate.
 - 2.8.1 Assess whether each allocated business requirement is satisfied by the mission organization function in a manner that clearly results in a pass/fail.
 - 2.8.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.



- 2.9. Assess whether each business requirement is addressed by one or more resource life cycles as may be appropriate.
 - 2.9.1 Assess whether each allocated business requirement is satisfied by the resource life cycle in a manner that clearly results in a pass/fail.
 - 2.9.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.10. Assess whether each business requirement is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.10.1 Assess whether each allocated business requirement is satisfied by the external data interface requirement in a manner that clearly results in a pass/fail.
 - 2.10.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.11. Assess whether each business requirement is addressed by one or more user acceptance tests as may be appropriate.
 - 2.11.1 Assess whether each allocated business requirement is satisfied by the external data interface requirement in a manner that clearly results in a pass/fail.
 - 2.11.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.12. Assess whether each business requirement is addressed by one or more value domain management as may be appropriate.
 - 2.12.1 Assess whether each allocated business requirement is satisfied by the value domains in a manner that clearly results in a pass/fail.
 - 2.12.2. Assess whether the collection of allocated business requirements do not result in an conflicts that need to be resolved.
- 2.13. Assess whether each business requirement is addressed by one or more WBS as may be appropriate.
 - 2.13.1. Assess whether all the business requirements have been delivered in terms of components, instances, and stored metadata work products.
 - 2.13.2. Assess whether all the business requirements have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.13.3. Assess whether all the business requirements have been properly allocated sufficient unit effort estimates.
 - 2.13.4. Assess whether all the business requirements have been properly allocated sufficient quantity of units that have to be developed.
 - 2.13.5. Assess whether all the business requirements have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.13.6. Assess whether all the business requirements have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.13.7. Assess whether all the business requirements have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.14. Assign the risk level associated with each meta-artifact not properly constructed.



3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.3 Business Rules Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of business rule documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the business rules that are defined and captured.
 - 1.1.4. Identify the business rules related work products.
 - 1.2. For each business rule related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, External data interface Requirements, Use Cases, User Acceptance Tests, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated business rule component.
2. Perform the assessment
 - 2.1. Assess, as applicable, whether each business rule is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether there is sufficient logic within the business information system to adequately execute the business rule in a pass/fail manner.
 - 2.1.2. Assess whether the allocated business information system business rules do not adequately result in conflicts that need to be resolved.
 - 2.2. Assess, as applicable, whether each business rule is addressed by one or more business requirements as may be appropriate.
 - 2.2.1. Assess whether each business rule maps to at least one business requirement.
 - 2.2.2. Determine whether business rules that are not matched by requirements are to be deleted, or whether the requirements document requires revision.
 - 2.3. Assess, as applicable, whether each business rule is addressed by one or more database object is addressed by one or more business information systems as may be appropriate.
 - 2.3.1. Assess whether each business rule is properly addressed by one or more database object database table data structures.
 - 2.3.2. Assess whether each business rule is properly addressed by one or more database object database table processes.
 - 2.3.3. Assess whether each business rule is properly addressed by one or more database object states.
 - 2.3.4. Assess whether each business rule is properly addressed by one or more database object business information systems.
 - 2.3.5. Assess whether the allocated database object business rules do not result in conflicts that need to be resolved.



- 2.4. Assess, as applicable, whether each business rule is addressed by one or more external data interface requirements as may be appropriate.
 - 2.4.1 Assess whether the business rule can be adequately supported by the specifications of the external data interface data columns.
 - 2.4.2 Assess whether the business rule can be adequately supported by the specifications of the external data interface data column data types.
 - 2.4.3 Assess whether the business rule can be adequately supported by the specifications of the external data interface data column value domains.
 - 2.4.4 Assess whether the business rule can be adequately supported by the specifications of the external data interface data column precision, scale, and granularity.

- 2.5. Assess whether each business rule is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.5.1. Assess whether the business rules is sufficiently detailed to reflect the actions, conditions, and logic of use cases as specified.
- 2.6. Assess whether each business rule is addressed by one or more user acceptance tests as may be appropriate.
 - 2.6.1. Assess whether the user acceptance test allocated business rules are of sufficient detail to enable a pass/fail result.
 - 2.6.2. Assess whether each business rule is addressed by one or more user acceptance test is addressed by one or more value domains and management as may be appropriate.
 - 2.6.3. Assess whether the allocated user acceptance test business rules do not result in conflicts that need to be resolved.
- 2.7. Assess whether each business rule is addressed by one or more value domain management as may be appropriate.
 - 2.7.1. Assess whether the business rules is sufficiently detailed to address the value domains as specified.
 - 2.7.2. Assess whether the allocated value domain business rules do not result in conflicts that need to be resolved.
- 2.8. Assess whether each business rule is addressed by one or more WBS as may be appropriate.
 - 2.8.1. Assess whether all the business rules have been delivered in terms of components, instances, and stored metadata work products.
 - 2.8.2. Assess whether all the business rules have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.8.3. Assess whether all the business rules have been properly allocated sufficient unit effort estimates.
 - 2.8.4. Assess whether all the business rules have been properly allocated sufficient quantity of units that have to be developed.
 - 2.8.5. Assess whether all the business rules have been properly allocated work environment factors to determine an accurate estimate of required resources.



- 2.8.6. Assess whether all the business rules have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.8.7. Assess whether all the business rules have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.9. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.4 Database Domains Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of database domain documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the database domains that are defined and captured.
 - 1.1.4. Identify the database domains related work products.
 - 1.2. For each database domain related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Database Objects, Mission Organization Function, and WBS.
 - 1.2.2. Identify the description for each interrelated database domain component.
2. Perform the assessment
 - 2.1. Assess whether each database domain is addressed by one or more database objects as may be appropriate.
 - 2.3. Assess whether each database domain is addressed by one or more mission organization functions as may be appropriate.
 - 2.3. Assess whether each database domain is addressed by one or more WBS as may be appropriate.
 - 2.3.1. Assess whether all the database domain have been delivered in terms of components, instances, and stored metadata work products.
 - 2.3.2. Assess whether all the database domain have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.3.3. Assess whether all the database domain have been properly allocated sufficient unit effort estimates.
 - 2.3.4. Assess whether all the database domain have been properly allocated sufficient quantity of units that have to be developed.
 - 2.3.5. Assess whether all the database domain have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.3.6. Assess whether all the database domain have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.



- 2.3.7. Assess whether all the database domain have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.4. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.5 Database Objects Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of database object documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the database object that are defined and captured.
 - 1.1.4. Identify the database object related work products.
 - 1.2. For each database object related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Business Rules, External data interface Requirements, Mission Organization Function, Resource Life Cycles, and WBS.
 - 1.2.2. Identify the description for each interrelated database objects component.
2. Perform the assessment
 - 2.1. Assess whether each database object is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether database object table structures are properly reflected in the use of views that are employed by the business information systems.
 - 2.1.2. Assess whether database object table processes are properly reflected in programmed processes of business information systems.
 - 2.1.3. Assess whether database object states are properly engineered to be achieved in business information systems that are retained if the business information system is successful or are returned to a previous state if the business information system fails.
 - 2.1.4. Assess whether database object information systems are properly accomplished within the business information systems to which they are allocated.
 - 2.2. Assess whether each database object is addressed by one or more business requirements as may be appropriate.
 - 2.2.1. Assess whether a database object business requirement is sufficiently detailed to be allocated to an appropriate database object contained component.
 - 2.2.2. For inadequately specified business requirements, enhance/detail their specification so that they can be allocated to an appropriate database object contained component.
 - 2.3. Assess whether each database object is addressed by one or more business rules as may be appropriate.



- 2.3.1. Assess whether database object table data structure business rules are properly configured to be achieved through SQL DDL data integrity clauses.
- 2.3.2. Assess whether database object table process business rules are properly configured to be achieved through SQL stored procedures or business information system contained procedures.
- 2.3.3. Assess whether database object states business rules are properly configured to be properly sequenced and able to be achieved through database object information systems.
- 2.3.4. Assess whether database object information systems business rules are properly configured to be achieved through business information system contained processes.
- 2.4. Assess whether each database object is addressed by one or more external data interface requirements as may be appropriate.
 - 2.4.1. Assess whether the database object table structure is completely addressed by an external data interface.
 - 2.4.2. On partially addressed database object table structures, assess whether there is a sufficient data structure within the database to complete the importing of a complete database object in one or more states.
 - 2.4.2. Assess whether there are sufficient database object processes to adequately process data provided through a external data interface.
 - 2.4.3. Assess whether there is supporting database object states that already exist to import or export a database object in the required external data interface database object state.
 - 2.4.4. Assess whether there is sufficient database object information system specification and implementation to import or export a database object in the desired state.
- 2.5. Assess whether each database object is addressed by one or more mission organization functions as may be appropriate.
 - 2.5.1. Assess whether each database object is able to be identified through a database domain description with one or more mission organization functions.
 - 2.5.2. For database objects that are not discoverable from database domains within mission organization functions enhance the database domain statements and if necessary the mission organization function statements.
- 2.6. Assess whether each database object is addressed by one or more resource life cycles as may be appropriate.
 - 2.6.1. Assess whether every database object can be properly identified from one or more resource life cycle node statements.
 - 2.6.2. For database objects that are not discoverable from resource life cycle node statements, enhance these statements and if necessary the resource life cycles and possibly even the resource hierarchies.
- 2.7. Assess whether each database object is addressed by one or more WBS as may be appropriate.
 - 2.7.1. Assess whether all the database objects have been delivered in terms of components, instances, and stored metadata work products.
 - 2.7.2. Assess whether all the database objects have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.



- 2.7.3. Assess whether all the database objects have been properly allocated sufficient unit effort estimates.
- 2.7.4. Assess whether all the database objects have been properly allocated sufficient quantity of units that have to be developed.
- 2.7.5. Assess whether all the database objects have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.7.6. Assess whether all the database objects have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.7.7. Assess whether all the database objects have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.8. Assign the risk level associated with each meta-artifact not properly constructed. 3.
Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.3.6 External Data Interface Requirements Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of external data interface requirements documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the external data interface requirements that are defined and captured.
 - 1.1.4. Identify the external data interface requirements related work products.
 - 1.2. For each external data interface requirements related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Business Rules, Database Objects, External Quality Standards, Mission Organization Function, Resource Life Cycles, Use Cases, User Acceptance Tests, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated external data interface requirements component.
- 2. Perform the assessment
 - 2.1. Assess whether each external data interface requirements is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether the external data interface requirements business information system component is sufficiently detailed to assure coverage of the requirement.
 - 2.1.2. Assess whether the performance requirements from the external data interface is acceptable for the resources currently allowed for the operation of the business information systems.



- 2.1.3. If external data interfaces are not able to be inferred from business information systems, determine whether external data interfaces and/or business information systems need to be enhanced.
- 2.2. Assess whether each external data interface requirements is addressed by one or more business requirements as may be appropriate.
 - 2.2.1 Assess whether the external data interface requirements business requirement is specified to such an extent that it can be executed and will result in a pass/fail result in addition to any data value calculation or transformation.
 - 2.2.2. If external data interfaces are not able to be inferred from business requirements, determine whether external data interfaces and/or business requirements need to be enhanced.
- 2.3. Assess whether each external data interface requirements is addressed by one or more business rules as may be appropriate.
 - 2.3.1 Assess whether the external data interface requirements business rule is specified to such an extent that it can be executed and will result in a pass/fail result in addition to any data value calculation or transformation.
 - 2.3.2. If external data interfaces are not able to be inferred from business rules, determine whether external data interfaces and/or business rules need to be enhanced.
- 2.4 Assess whether each external data interface requirements is addressed by one or more database objects as may be appropriate.
 - 2.4.1. Assess whether each external data interface database object table data structure is clearly identified and satisfies the needs of the external data interface requirement.
 - 2.4.2. Assess whether an under specified external data interface database object data structure needs to be enhanced to meet the needs of the external data interface requirement.
 - 2.4.3. Assess whether each external data interface database object table process is sufficiently specified to carry out the required data acquisition, transformation and storage of the data represented by the external data interface.
 - 2.4.4. Assess whether each external data interface requirement database object table state is sufficiently set out and exists within a sequence such that it can be achieved when the database object is properly created, or if the creation fails that the database object returns to a prior state.
 - 2.4.5. Assess whether each external data interface requirement database object business information system is sufficiently specified that when executed the specified ending state is achieved through the proper execution of the database object table processes.
 - 2.4.6. If external data interfaces are not able to be inferred from database objects, determine whether external data interfaces and/or database objects need to be enhanced.
- 2.5 Assess whether each external data interface requirements is addressed by one or more external quality standards as may be appropriate.
 - 2.5.1. Assess whether the data interface requirement is expressed within an external quality standard such as ANSI SQL and/or WC3 so that it can be ported from one technology to the next without major recreation.



- 2.5.2. If external data interfaces are not able to be inferred from external quality standards, determine whether external data interfaces and/or external quality standards inventory needs to be enhanced.
- 2.6 Assess whether each external data interface requirements is addressed by one or more mission organization functions as may be appropriate.
 - 2.6.1. Assess whether the external data interface requirement is discoverable from within mission organization functions.
 - 2.6.2. If external data interfaces are not able to be inferred from mission organization functions, determine whether external data interfaces and/or mission organization functions need to be enhanced.
- 2.7 Assess whether each external data interface requirements is addressed by one or more resource life cycles as may be appropriate.
 - 2.7.1. Assess whether each external data interface requirement resource life cycle is clearly identified and that through its execution fulfills a needed action that contributes to the achievement of the resource life cycle node.
 - 2.7.2. If external data interfaces are not able to be inferred from resource life cycles, determine whether external data interfaces and/or resource life cycles need to be enhanced.
- 2.8 Assess whether each external data interface requirements is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.8.1. Assess external data interface requirement value domain to ensure that it is sufficiently specified to meet the needs of both the external data interface requirement and the needs of the database in terms of data transformation between an externally defined value and an internally defined value.
 - 2.8.2. If external data interfaces are not able to be inferred from use cases, determine whether external data interfaces and/or use cases need to be enhanced.
- 2.9 Assess whether each external data interface requirements is addressed by one or more user acceptance tests as may be appropriate.
 - 2.9.1. Assess each external data interface requirement user acceptance test to ensure that it is valid, reliable, repeatable, and discriminating.
 - 2.9.2. Assess each external data interface requirement user acceptance test to ensure that its results are pass or fail.
 - 2.9.3. If external data interfaces are not able to be inferred from user acceptance tests, determine whether external data interfaces and/or user acceptance tests need to be enhanced.
- 2.10 Assess whether each external data interface requirements is addressed by one or more value domains as may be appropriate.



- 2.10.1. Assess each external data interface requirement user acceptance test to ensure that it is completely represented through an appropriate set of value domains.
- 2.10.2. If external data interfaces are not able to be inferred from value domains, determine whether external data interfaces and/or value domains need to be enhanced.
- 2.11. Assess whether each external data interface requirements is addressed by one or more WBS as may be appropriate.
 - 2.11.1. Assess whether all the external data interface requirements have been delivered in terms of components, instances, and stored metadata work products.
 - 2.11.2. Assess whether all the external data interface requirements have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.11.3. Assess whether all the external data interface requirements have been properly allocated sufficient unit effort estimates.
 - 2.11.4. Assess whether all the external data interface requirements have been properly allocated sufficient quantity of units that have to be developed.
 - 2.11.5. Assess whether all the external data interface requirements have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.11.6. Assess whether all the external data interface requirements have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.11.7. Assess whether all the external data interface requirements have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.12. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.7 External Quality Standards Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of external quality standards documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the external quality standards that are defined and captured.
 - 1.1.4. Identify the external quality standards related work products.
 - 1.2.2. For each external quality standards related work product assessment:
 - 2.1. Assess whether each external quality standard is addressed by one or more business information systems as may be appropriate.
1. Identify artifacts that bear on the assessment



- 1.1. Identify the appropriate set of external quality standards documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the external quality standards that are defined and captured.
 - 1.1.4. Identify the external quality standards related work products.
- 1.2. For each external quality standards requirements related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Database Objects, External Data Interfaces Requirements, User Acceptance Tests, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated external data interface requirements component.
2. Perform the assessment
 - 2.1 Assess whether each external quality standard is addressed by one or more business information systems as may be appropriate.
 - 2.1.1 Assess whether there exists an external quality standard that governs the engineering, development, and maintenance of a business information system.
 - 2.1.2. Assess whether the external quality standard can be applied to the business information system in an efficient and effective manner.
 - 2.2 Assess whether each external quality standard is addressed by one or more database object is addressed by one or more business information systems as may be appropriate.
 - 2.2.1 Assess whether there exists an external quality standard that governs the engineering, development, and maintenance of a collection of database object classes.
 - 2.2.2. Assess whether the external quality standard can be applied to the database object class in an efficient and effective manner.
 - 2.3 Assess whether each external quality standard is addressed by one or more external data interface requirement as may be appropriate.
 - 2.3.1 Assess whether there exists an external quality standard that governs the engineering, development, and maintenance of a external data interface requirement .
 - 2.3.2. Assess whether the external quality standard can be applied to the external data interface requirement in an efficient and effective manner.
 - 2.4. Assess whether each external quality standard is addressed by one or more user acceptance tests as may be appropriate.
 - 2.4.1 Assess whether there exists an external quality standard that governs the engineering, development, and maintenance of a collection of user acceptance tests .
 - 2.4.2. Assess whether the external quality standard can be applied to the user acceptance tests in an efficient and effective manner.
 - 2.5. Assess whether each external quality standard is addressed by one or more value domain management as may be appropriate.
 - 2.5.1 Assess whether there exists an external quality standard that governs the engineering, development, and maintenance of value domains.



- 2.5.2. Assess whether the external quality standard can be applied to the value domains an efficient and effective manner.
- 2.6. Assess whether each external quality standard is addressed by one or more WBS as may be appropriate.
 - 2.6.1. Assess whether all the external quality standards have been delivered in terms of components, instances, and stored metadata work products.
 - 2.6.2. Assess whether all the external quality standard have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.6.3. Assess whether all the external quality standard have been properly allocated sufficient unit effort estimates.
 - 2.6.4. Assess whether all the external quality standard have been properly allocated sufficient quantity of units that have to be developed.
 - 2.6.5. Assess whether all the external quality standard have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.6.6. Assess whether all the external quality standard have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.6.7. Assess whether all the external quality standard have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.7. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.8 Information Needs Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of information needs documents
 - 1.1.1. Review information needs documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the information needs that are defined and captured.
 - 1.1.4. Identify the information needs related work products.
 - 1.2. For each information needs related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Mission Organization Function, Resource Life Cycles, Use Cases, User Acceptance Tests, and WBS.
 - 1.2.2. Identify the description for each interrelated information needs component.
2. Perform the assessment
 - 2.1. Assess whether each information need is addressed by one or more mission organization functions as may be appropriate.



- 2.1.1 Assess whether each information need can be properly inferred by a mission organization function such that it can be sufficiently understood and detailed and thus accounted for within database domains, data elements, database objects, and external data interfaces.
- 2.1.2. If information needs are not able to be inferred from mission organization functions, determine whether mission organization functions and/or information needs need to be enhanced.
- 2.2. Assess whether each information need is addressed by one or more resource life cycles as may be appropriate.
 - 2.2.1. Assess whether each information need can be properly identified as having been addressed within one or more resource life cycle nodes.
 - 2.2.2. If information needs are not able to be inferred from resource life cycle nodes, determine whether resource life cycle nodes and/or information needs need to be enhanced.
- 2.3. Assess whether each information need is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.3.1. Assess whether information needs are sufficiently detailed and represented within use cases to assure that the information need is properly addressed.
 - 2.3.2. If information needs are properly addressed by one or more use cases, determine whether use cases and/or information needs need to be enhanced.
- 2.4. Assess whether each information need is addressed by one or more user acceptance tests as may be appropriate.
 - 2.4.1. Assess whether information needs are sufficiently detailed and represented within user acceptance tests to assure that the information need is properly captured, modified, and/or deleted.
 - 2.4.2. If information needs are properly addressed by one or more user acceptance tests, determine whether user acceptance tests and/or information needs need to be enhanced.
- 2.5. Assess whether each information need is addressed by one or more WBS as may be appropriate.
 - 2.5.1. Assess whether all the information needs have been delivered in terms of components, instances, and stored metadata work products.
 - 2.5.2. Assess whether all the information needs have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.5.3. Assess whether all the information needs have been properly allocated sufficient unit effort estimates.
 - 2.5.4. Assess whether all the information needs have been properly allocated sufficient quantity of units that have to be developed.
 - 2.5.5. Assess whether all the information needs have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.5.6. Assess whether all the information needs have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.



- 2.5.7. Assess whether all the information needs have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.6. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.9 Mission Organization Function Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of mission organization function documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the mission organization function that are defined and captured.
 - 1.1.4. Identify the mission organization function related work products.
 - 1.2. For each mission organization function related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Database Domains, External Data Interface Requirements, Information Needs, Use Cases, User Acceptance Tests, Value Domains Management, and WBS..
 - 1.2.2. Identify the description for each interrelated mission organization function component.
2. Perform the assessment
 - 2.1. Assess whether each mission organization function is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether each mission organization function that is to be addressed by automation is properly identified through a business event that is tied to a business information system.
 - 2.1.2. Assess whether each mission organization function business information system is properly set within the context of a business event network.
 - 2.1.3. Assess whether each mission organization function business information system is properly set within the context of a business calendar network.
 - 2.2. Assess whether each mission organization function is addressed by one or more business requirements as may be appropriate.
 - 2.2.1. Assess whether each mission can be allocated to one or more business requirements.
 - 2.2.2. Assess whether each organization can be allocated to one or more business requirements.
 - 2.2.3. Assess whether each mission organization can be allocated to one or more business requirements.
 - 2.2.4. Assess whether each function can be allocated to one or more business requirements.
 - 2.2.5. Assess whether each mission organization function can be allocated to one or more business requirements.



- 2.2.6. If business requirements are not able to be inferred from missions, or organizations or functions, determine whether business requirements and/or missions, organizations, or functions need to be enhanced.
- 2.2.7. If business requirements are not able to be inferred from mission organizations, determine whether business requirements and/or mission organization functions need to be enhanced.
- 2.2.8. If business requirements are not able to be inferred from mission organization functions, determine whether business requirements and/or mission organization functions need to be enhanced.
- 2.3. Assess whether each mission organization function is addressed by one or more database domains as may be appropriate.
 - 2.3.1. Assess whether each mission is properly set out in terms of database domains.
 - 2.3.2. If database domains are not able to be inferred from missions, determine whether database domains and/or mission need to be enhanced.
- 2.4. Assess whether each mission organization function is addressed by one or more external data interface requirement as may be appropriate.
 - 2.4.1. Assess whether mission organization function that infers an external data interface requirement is sufficiently detailed to understand database object and business information system requirements.
 - 2.4.2. If external data interface requirements are not able to be inferred from mission organizations, determine whether data interface requirements and/or mission organization functions need to be enhanced.
- 2.5. Assess whether each mission organization function is addressed by one or more information needs as may be appropriate.
 - 2.5.1. Assess whether the information needs inferred by the mission organization function are sufficiently detailed so that they can be properly identified from within resource life cycle nodes.
 - 2.5.2. If information needs are not able to be inferred from mission organizations, determine whether information needs and/or mission organization functions need to be enhanced.
- 2.6. Assess whether each mission organization function is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.6.1. Assess whether the use cases inferred by the mission organization function are sufficiently detailed so that they can thereafter be properly represented in subsequent work products.
 - 2.6.2. If use cases are not able to be inferred from mission organizations, determine whether use cases and/or mission organization functions need to be enhanced.
- 2.7. Assess whether each mission organization function is addressed by one or more user acceptance tests as may be appropriate.
 - 2.7.1. Assess whether the user acceptance tests inferred by the mission organization functions are sufficiently detailed so that their execution can serve to attest to the successful accomplishment of the mission organization function.



- 2.7.2. If user acceptance tests are not sufficiently detailed to support mission organization function successful accomplishment, determine whether user acceptance tests and/or mission organization functions need to be enhanced.
- 2.8. Assess whether each mission organization function is addressed by one or more WBS as may be appropriate.
 - 2.8.1. Assess whether all the mission organization functions have been delivered in terms of components, instances, and stored metadata work products.
 - 2.8.2. Assess whether all the mission organization functions have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.8.3. Assess whether all the mission organization functions have been properly allocated sufficient unit effort estimates.
 - 2.8.4. Assess whether all the mission organization functions have been properly allocated sufficient quantity of units that have to be developed.
 - 2.8.5. Assess whether all the mission organization functions have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.8.6. Assess whether all the mission organization functions have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.8.7. Assess whether all the mission organization functions have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.11. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report
- 4. Present the findings and revise draft assessment report
- 5. Create final report and deliver to The Agency

6.3.10 Resource Life Cycle Assessment

Business Information Systems, Business Requirements, Database Objects, External data interface Requirements, Information Needs, Use Cases, User Acceptance Tests, and WBS.

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of resource life cycle documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the resource life cycle that are defined and captured.
 - 1.1.4. Identify the resource life cycle related work products.
 - 1.2. For each resource life cycle related work product assessment:
 - 2.1. Assess whether each resource life cycle is addressed by one or more business information systems as may be appropriate.



- 2.1.1. Assess whether each resource life cycle business information systems are sufficiently detailed to assure that the intent of the resource life cycles on a node by node basis are accomplished.
- 2.2.2. If business information systems are determined not to be sufficient to support the successful completion of the resource life cycle nodes, determine whether the business information systems and/or resource life cycle nodes need to be enhanced.
- 2.2. Assess whether each resource life cycle is addressed by one or more business requirements as may be appropriate.
 - 2.2.1 Assess whether there are sufficient business requirements to identify the complete set of resource life cycle components including resources, resource life cycle nodes, allocated business information systems and database objects.
 - 2.2.2. If business requirements are determined not to be sufficient to support the successful completion of the resource life cycle nodes, determine whether the business requirements and/or resource life cycle nodes need to be enhanced.
- 2.3 Assess whether each resource life cycle is addressed by one or more database object is addressed by one or more business information systems as may be appropriate.
 - 2.3.1. Assess whether each allocated resource life cycle node database object is sufficiently detailed as to database object data structure, database object table process, database object states, and database object information systems to support the successful accomplishment of the resource life cycle node end state.
 - 2.3.2. If database objects are determined not to be sufficient to support the successful completion of the resource life cycle nodes, determine whether the database objects and/or resource life cycle nodes need to be enhanced.
- 2.4 Assess whether each resource life cycle is addressed by one or more external data interface requirement as may be appropriate.
 - 2.4.1. Assess whether resource life cycle external data interface requirements are sufficiently detailed to ensure that the data that is captured from the external interface supports the successful completion of the resource life cycle node.
 - 2.4.2. If external data interfaces are determined not to be sufficient to support the successful completion of the resource life cycle nodes, determine whether the external data interfaces and/or resource life cycle nodes need to be enhanced.
- 2.5 Assess whether each resource life cycle is addressed by one or more information need as may be appropriate.
 - 2.5.1. Assess whether the data needs as defined by database object table structures allocated to resource life cycle nodes are sufficient to satisfy the data needs inferred from each information need.
 - 2.5.2. If database object table structures are determined not to be sufficient to support the information needs that are associated with the resource life cycle nodes, determine whether the database object table structures and/or information needs should be enhanced.



- 2.6. Assess whether each resource life cycle is addressed by one or more use case is as may be appropriate.
 - 2.6.1. Assess whether accomplishment of each resource life cycle node associated with a resource life cycle is fully specified within an allocated collection of use cases.
 - 2.6.2. If the allocated collection of use cases are determined not to be sufficient to support the complete set of resource life cycle nodes, determine whether the use cases and/or resource life cycle nodes should be enhanced.
- 2.7. Assess whether each resource life cycle is addressed by one or more user acceptance tests as may be appropriate.
 - 2.7.1. Assess whether the collection of allocated user acceptance tests are sufficiently detailed to produce either a pass or fail for the accomplishment of each resource life cycle node contained in a resource life cycle.
 - 2.7.2. If the allocated collection of user acceptance tests are determined not to be sufficient to support the complete set of resource life cycle nodes, determine whether the user acceptance tests and/or resource life cycle nodes should be enhanced.
- 2.8. Assess whether each resource life cycle is addressed by one or more WBS as may be appropriate.
 - 2.8.1. Assess whether all the resource life cycles have been delivered in terms of components, instances, and stored metadata work products.
 - 2.8.2. Assess whether all the resource life cycles have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.8.3. Assess whether all the resource life cycles have been properly allocated sufficient unit effort estimates.
 - 2.8.4. Assess whether all the resource life cycles have been properly allocated sufficient quantity of units that have to be developed.
 - 2.8.5. Assess whether all the resource life cycles have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.8.6. Assess whether all the resource life cycles have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.8.7. Assess whether all the resource life cycles have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.9. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.11 Use Cases Assessment

1. Identify artifacts that bear on the assessment



- 1.1. Identify the appropriate set of use case documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the use cases that are defined and captured.
 - 1.1.4. Identify the use case related work products.
- 1.2. For each use case related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Business Rules, Database Objects, External data interface Requirements, External Quality Standards, Mission Organization Function, Resource Life Cycles, User Acceptance Tests, and WBS.
 - 1.2.2. Identify the description for each interrelated use case component.
2. Perform the assessment
 - 2.1. Assess whether each use case is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether each business information system and each component within each business information system that result from the collection of use cases that are precursors to the specification and development of business information systems and contained components are sufficiently detailed to infer the organization, construction, and process sequences represented by the business information system.
 - 2.1.2. Identify each business information system component allocated use case that fails to have a sufficient quantity of detailed use cases and determine whether the business information system component and/or use case should be enhanced.
 - 2.2. Assess whether each use case is addressed by one or more business requirements as may be appropriate.
 - 2.2.1. Assess whether each business requirement involved use case is sufficiently detailed to assure that the business rule is tested such that it produces a result of pass or fail.
 - 2.2.2. If each business rule involved business requirement is not sufficiently detailed, determine whether the use case and/or the business rule should be enhanced.
 - 2.3. Assess whether each use case is addressed by one or more business rules as may be appropriate.
 - 2.3.1. Assess whether each business rule involved use case is sufficiently detailed to assure that the business rule is tested such that it produces a result of pass or fail.
 - 2.3.2. If each business rule involved use case is not sufficiently detailed, determine whether the use case and/or the business rule should be enhanced.
 - 2.4. Assess whether each use case is addressed by one or more database objects is addressed by one or more business information systems as may be appropriate.
 - 2.4.1. Assess whether each database object involved use cases is sufficiently detailed to assure that the database object is able to be tested such that it produces a result of pass or fail.
 - 2.4.2. Assess whether each use case involved database object table data structure is sufficiently detailed to assure that the database object table data structure is able to be tested such that it produces a result of pass or fail.



- 2.4.3. Assess whether each use case involved database object table process is sufficiently detailed to assure that the database object table process is able to be tested such that it produces a result of pass or fail.
- 2.4.4. Assess whether each use case involved database object state is sufficiently detailed to assure that the database object state is able to be tested such that it produces a result of pass or fail.
- 2.4.5. If each use case involved database object data structure, process, state or information system is not sufficiently detailed, determine whether the use case and/or the database object data structure, process, state or information system should be enhanced.
- 2.5. Assess whether each use case is addressed by one or more external data interface requirement as may be appropriate.
 - 2.5.1. Assess whether each external data interface involved use case is sufficiently detailed to assure that the use case is tested such that it produces a result of pass or fail.
 - 2.5.2. If each external data interface involved use case is not sufficiently detailed, determine whether the use case and/or the external data interface should be enhanced.
- 2.6. Assess whether each use case is addressed by one or more external quality standard as may be appropriate.
 - 2.6.1. Assess whether each external quality standard involved use case is sufficiently detailed to assure that the use case's adherence to the standard is determined such that it produces a result of pass or fail.
 - 2.6.2. If each external quality standard involved use case is not sufficiently detailed, determine whether the use case and/or the external quality standard should be enhanced.
- 2.7. Assess whether each use case is addressed by one or more mission organization functions as may be appropriate.
 - 2.7.1. Assess whether each mission organization function involved use case is sufficiently detailed to assure that the use case is such that it affirms that the mission organization function is accommodated by the use case.
 - 2.7.2. If each mission organization function involved use case not sufficiently detailed, determine whether the use case and/or the mission organization function should be enhanced.
- 2.8. Assess whether each use case is addressed by one or more resource life cycles as may be appropriate.
 - 2.8.1. Assess whether each resource life cycles involved use case is sufficiently detailed to assure that the use case is tested such that it produces a result of pass or fail.
 - 2.8.2. Assess whether each resource within a resource life cycle is adequately specified to indicate whether the use cases are sufficient for comprehensive resource life cycle use case assessment.
 - 2.8.3. Assess whether each resource life cycle set of nodes within a resource life cycle is adequately specified to indicate whether the use cases are sufficient for determining complete resource life cycle assessment.



- 2.8.4. Assess whether each resource life cycle node allocated set of database objects are adequately specified to indicate whether the use cases are sufficient for determining comprehensive database object allocation assessment.
- 02.8.4. Assess whether each resource life cycle node allocated set of business information systems are adequately specified to indicate whether the use cases are sufficient for determining comprehensive business information system allocation assessment.
- 2.8.5. If each resource life cycles involved component of resources, resource life cycle nodes, and allocated sets of database objects and business information systems are not sufficiently detailed, determine whether the use case and/or the resource life cycles and contained resource life cycle components need to be enhanced.
- 2.9. Assess whether each use case is addressed by one or more user acceptance tests as may be appropriate.
 - 2.9.1. Assess whether each user acceptance test involved use case is sufficiently detailed to assure that the use case is tested such that it produces a result of pass or fail.
 - 2.9.2. If each user acceptance test use case not sufficiently detailed, determine whether the use case and/or the use case should be enhanced.
- 2.10. Assess whether each use case is addressed by one or more WBS as may be appropriate.
 - 2.10.1. Assess whether all the use cases have been delivered in terms of components, instances, and stored metadata work products.
 - 2.10.2. Assess whether all the use cases have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.10.3. Assess whether all the use cases have been properly allocated sufficient unit effort estimates.
 - 2.10.4. Assess whether all the use cases have been properly allocated sufficient quantity of units that have to be developed.
 - 2.10.5. Assess whether all the use cases have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.10.6. Assess whether all the use cases have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.10.7. Assess whether all the use cases have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.11. Assign the risk level associated with each meta-artifact not properly constructed.
- 3. Determine the findings and create draft assessment report.
- 4. Present the findings and revise draft assessment report.
- 5. Create final report and deliver to The Agency.

6.3.12 User Acceptance Tests Assessment

- 1. Identify artifacts that bear on the assessment



- 1.1. Identify the appropriate set of user acceptance test documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the user acceptance test that are defined and captured.
 - 1.1.4. Identify the user acceptance test related work products.
- 1.2. For each user acceptance test related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Business Rules, External data interface Requirements, Use Cases, Value Domains Management, and WBS.
 - 1.2.2. Identify the description for each interrelated user acceptance test component.
2. Perform the assessment
 - 2.1. Assess whether each user acceptance test is addressed by one or more business information systems as may be appropriate.
 - 2.1.1. Assess whether each user acceptance test allocated to a business information system contained component is sufficiently detailed to result in a pass/fail.
 - 2.2.2. If each business information system user acceptance test use case not sufficiently detailed, determine whether the user acceptance test and/or the various business information system components should be enhanced.
 - 2.2. Assess whether each user acceptance test is addressed by one or more business requirements as may be appropriate.
 - 2.2.1. Assess whether each user acceptance test business requirement is sufficiently detailed that the business requirement can be determined as having been met or not.
 - 2.2.2. If each user acceptance test business requirement is not sufficiently detailed, determine whether the user acceptance test or the business requirement should be enhanced.
 - 2.3. Assess whether each user acceptance test business requirement is addressed by one or more business rules as may be appropriate.
 - 2.3.1. Assess whether each user acceptance test business rule is sufficiently specified to determine whether the user acceptance test fully tests the business rule.
 - 2.3.2. If each user acceptance test business rule is not sufficiently detailed, determine whether the user acceptance test or the business rule should be enhanced.
 - 2.4. Assess whether each user acceptance test is addressed by one or more database objects as may be appropriate.
 - 2.4.1. Assess whether each user acceptance test database object is sufficiently specified to determine whether the user acceptance test produces a pass/fail result.
 - 2.4.2. Assess whether each user acceptance test involved database object table data structure is sufficiently detailed to assure that the database object table data structure is tested such that it produces a result of pass or fail.
 - 2.4.3. Assess whether each user acceptance test involved database object table process is sufficiently detailed to assure that the database object table process is tested such that it produces a result of pass or fail.



- 2.4.4. Assess whether each user acceptance test involved database object state is sufficiently detailed to assure that the database object state is tested such that it produces a result of pass or fail.
- 2.4.5. If each user acceptance test involved database object data structure, process, state or information system is not sufficiently detailed, determine whether the user acceptance test and/or the database object data structure, process, state or information system should be enhanced.
- 2.5. Assess whether each user acceptance test is addressed by one or more external data interface requirement as may be appropriate.
 - 2.5.1. Assess whether each user acceptance test external data interface is sufficiently specified to determine whether the user acceptance test fully tests the business rule.
 - 2.5.2. If each user acceptance test external data interface is not sufficiently detailed, determine whether the user acceptance test or the external data interface should be enhanced.
- 2.6. Assess whether each user acceptance test is addressed by one or more use cases as may be appropriate.
 - 2.6.1. Assess whether each user acceptance test use case is sufficiently detailed to result in the assurance that every aspect of the use case will be fully tested.
 - 2.6.2. If each user acceptance test use case is not sufficiently detailed, determine whether the user acceptance test or the use case should be enhanced.
- 2.7. Assess whether each user acceptance test is addressed by one or more value domain management as may be appropriate.
 - 2.7.1. Assess whether each user acceptance test value domain is sufficiently detailed as to the employment mechanism that employs the value domain for validation, selection, update, and integrity control to ensure proper use.
 - 2.7.2. If each user acceptance test value domain is not sufficiently detailed, determine whether the user acceptance test, the value domain, or the value domain employment mechanisms should be enhanced.
- 2.8. Assess whether each user acceptance test is addressed by one or more WBS as may be appropriate.
 - 2.8.1. Assess whether all the user acceptance test have been delivered in terms of components, instances, and stored metadata work products.
 - 2.8.2. Assess whether all the user acceptance test have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.8.3. Assess whether all the user acceptance test have been properly allocated sufficient unit effort estimates.
 - 2.8.4. Assess whether all the user acceptance test have been properly allocated sufficient quantity of units that have to be developed.
 - 2.8.5. Assess whether all the user acceptance test have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.8.6. Assess whether all the user acceptance test have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.



- 2.8.7. Assess whether all the user acceptance test have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.8. Assign the risk level associated with each meta-artifact not properly constructed.

6.3.13 Value Domains and Management Assessment

- 1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of value domain management documents
 - 1.1.1. Review requirements documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the value domain management that are defined and captured.
 - 1.1.4. Identify the value domain management related work products.
 - 1.2. For each value domain management related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Requirements, Business Rules, External data interface Requirements, External Quality Standards, Use Cases, User Acceptance Tests, and WBS.
 - 1.2.2. Identify the description for each interrelated value domain management component.
- 2. Perform the assessment
 - 2.1. Assess whether each value domain management is addressed by one or more business requirements as may be appropriate.
 - 2.1.1. Assess whether each value domain management business requirement is sufficiently detailed to know whether the business requirement has been properly met.
 - 2.1.2. If each value domain management business requirement is not sufficiently detailed, determine whether any of the value domains, business requirements, or the value domain employment mechanisms should be enhanced.
 - 2.2. Assess whether each value domain management is addressed by one or more business rule as may be appropriate.
 - 2.2.1. Assess whether each value domain management business rule is sufficiently detailed to know whether the business rule has been properly met.
 - 2.2.2. If each value domain management business rule is not sufficiently detailed, determine whether any of the value domains, business rules, or the value domain employment mechanisms should be enhanced.
 - 2.3. Assess whether each value domain is addressed by one or more database objects as may be appropriate.
 - 2.3.1. Assess whether each value domain database object is sufficiently specified to determine whether the user acceptance test produces a pass/fail result.
 - 2.3.2. Assess whether each value domain involved database object table data structure is sufficiently detailed to assure that the database object table data structure is tested such that it produces a result of pass or fail.



- 2.3.3. Assess whether each value domain involved database object table process is sufficiently detailed to assure that the database object table process is tested such that it produces a result of pass or fail.
- 2.3.4. Assess whether each value domain involved database object state is sufficiently detailed to assure that the database object state is tested such that it produces a result of pass or fail.
- 2.3.5. If each value domain database object data structure, process, state or information system is not sufficiently detailed, determine whether the user acceptance test and/or the database object data structure, process, state or information system should be enhanced.
- 2.4. Assess whether each value domain management is addressed by one or more external data interface requirement as may be appropriate.
 - 2.4.1. Assess whether each value domain management external data interface requirement is sufficiently detailed to know whether the value domain has been properly employed.
 - 2.4.2. If each value domain management external data interface requirement is not sufficiently detailed, determine whether any of the value domains, external data interfaces, or the value domain employment mechanisms should be enhanced.
- 2.5. Assess whether each value domain management is addressed by one or more external quality standard as may be appropriate.
 - 2.5.1. Assess whether each value domain management external quality standard is sufficiently detailed to know whether the external quality standard has been properly met.
 - 2.5.2. If each value domain management external quality standard is not sufficiently detailed, determine whether any of the value domains, external quality standard, or the value domain employment mechanisms should be enhanced.
- 2.6. Assess whether each value domain management is addressed by one or more use case is addressed by one or more value domains and management as may be appropriate.
 - 2.6.1. Assess whether each value domain management use case is sufficiently detailed to know whether the use case has been properly employed the value domain to carry out it specified processes.
 - 2.6.2. If each value domain management use case is not sufficiently detailed, determine whether any of the value domains, use cases, or the value domain employment mechanisms should be enhanced.
- 2.7. Assess whether each business requirement is addressed by one or more user acceptance tests as may be appropriate.
 - 2.7.1. Assess whether each value domain management user acceptance test is sufficiently detailed to know whether the user acceptance test sufficiently exercises the allocated value domains.
 - 2.7.2. If each value domain management user acceptance test is not sufficiently detailed, determine whether any of the value domains, user acceptance tests, or the value domain employment mechanisms should be enhanced.
- 2.8. Assess whether each value domains is addressed by one or more WBS as may be appropriate.



- 2.8.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
- 2.8.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.8.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
- 2.8.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
- 2.8.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.8.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.8.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.9. Assign the risk level associated with each meta-artifact not properly constructed.
3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

6.3.14 Contract Work Breakdown Structure (WBS) Assessment

1. Identify artifacts that bear on the assessment
 - 1.1. Identify the appropriate set of work breakdown structure documents
 - 1.1.1. Review work breakdown structure documents.
 - 1.1.2. Review scope and business problem related documentation.
 - 1.1.3. Identify the work breakdown structures that are defined and captured.
 - 1.1.4. Identify the work breakdown structure related work products.
 - 1.2. For each work breakdown structure related work product assessment:
 - 1.2.1. Identify the relevant components, that is, Business Information Systems, Business Requirements, Business Rules, Database Domains, Database Objects, External data interface Requirements, External Quality Standards, Information Needs, Mission Organization Function, Resource Life Cycles, Use Cases, User Acceptance Tests, and Value Domains Management.
 - 1.2.2. Identify the description for each interrelated work breakdown structure component.
2. Perform the assessment
 - 2.1. Assess whether the work breakdown structure document is accomplished through the appropriate set of business information systems as may be appropriate.
 - 2.1.1. Assess whether all the business information systems have been delivered in terms of components, instances, and stored metadata work products.



- 2.1.2. Assess whether all the business information systems have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.1.3. Assess whether all the business information systems have been properly allocated sufficient unit effort estimates.
- 2.1.4. Assess whether all the business information systems have been properly allocated sufficient quantity of units that have to be developed.
- 2.1.5. Assess whether all the business information systems have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.1.6. Assess whether all the business information systems have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.1.7. Assess whether all the business information systems have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.1.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.1.9. Assess whether all business information systems work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.1.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.2. Assess whether the work breakdown structure document is accomplished through business rules as may be appropriate.
 - 2.2.1. Assess whether all the business rules have been delivered in terms of components, instances, and stored metadata work products.
 - 2.2.2. Assess whether all the business rules have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.2.3. Assess whether all the business rules have been properly allocated sufficient unit effort estimates.
 - 2.2.4. Assess whether all the business rules have been properly allocated sufficient quantity of units that have to be developed.
 - 2.2.5. Assess whether all the business rules have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.2.6. Assess whether all the business rules have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.2.7. Assess whether all the business rules have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.2.8. Assess whether all the business rules are accomplished such that they make maximum use of previously created work products.



- 2.2.9. Assess whether all business rule work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.2.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business rules.
- 2.3. Assess whether the work breakdown structure document is accomplished through the appropriate set of external data interface requirements as may be appropriate.
 - 2.3.1. Assess whether all the external data interfaces have been delivered in terms of components, instances, and stored metadata work products.
 - 2.3.2. Assess whether all the external data interfaces have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.3.3. Assess whether all the external data interfaces have been properly allocated sufficient unit effort estimates.
 - 2.3.4. Assess whether all the external data interfaces have been properly allocated sufficient quantity of units that have to be developed.
 - 2.3.5. Assess whether all the external data interfaces have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.3.6. Assess whether all the external data interfaces have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.3.7. Assess whether all the external data interfaces have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.3.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
 - 2.3.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
 - 2.3.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.4. Assess whether the work breakdown structure document is accomplished through the appropriate set of database domains as may be appropriate.
 - 2.4.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.4.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.4.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.4.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.



- 2.4.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.4.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.4.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.4.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.4.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.4.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.5. Assess whether the work breakdown structure document is accomplished through the appropriate set of database object is addressed by one or more business information systems as may be appropriate.
 - 2.5.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.5.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.5.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.5.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.5.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.5.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.5.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.5.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
 - 2.5.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
 - 2.5.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.



- 2.6 Assess whether the work breakdown structure document is accomplished through the appropriate set of external data interface requirement as may be appropriate.
 - 2.6.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.6.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.6.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.6.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.6.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.6.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.6.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.6.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
 - 2.6.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata.
 - 2.6.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.7 Assess whether the work breakdown structure document is accomplished through the appropriate set of external quality standard as may be appropriate.
 - 2.7.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.7.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.7.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.7.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.7.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.7.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.



- 2.7.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.7.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.7.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.7.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.8. Assess whether the work breakdown structure document is accomplished through the appropriate set of more information need as may be appropriate.
 - 2.8.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.8.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.8.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.8.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.8.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.8.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.8.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.8.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
 - 2.8.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
 - 2.8.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.9. Assess whether the work breakdown structure document is accomplished through the appropriate set of mission organization functions as may be appropriate.
 - 2.9.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.



- 2.9.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.9.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
- 2.9.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
- 2.9.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.9.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.9.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.9.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.9.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.9.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.10. Assess whether the work breakdown structure document is accomplished through the appropriate set of user acceptance tests as may be appropriate.
 - 2.10.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.10.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.10.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.10.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.10.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.10.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.10.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.10.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.



- 2.10.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.10.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.11. Assess whether the work breakdown structure document is accomplished through the appropriate set of resource life cycles as may be appropriate.
 - 2.11.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.11.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.11.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.11.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
 - 2.11.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
 - 2.11.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
 - 2.11.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
 - 2.11.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
 - 2.11.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
 - 2.11.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.12. Assess whether the work breakdown structure document is accomplished through the appropriate set of use cases as may be appropriate.
 - 2.12.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
 - 2.12.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
 - 2.12.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
 - 2.12.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.



- 2.12.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.12.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.12.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.12.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.12.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.12.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.13. Assess whether the work breakdown structure document is accomplished through the appropriate set of user acceptance tests as may be appropriate.
- 2.13.1. Assess whether all the value domains have been delivered in terms of components, instances, and stored metadata work products.
- 2.13.2. Assess whether all the value domains have been properly detailed as to methodology, evaluation, presentation, and delivery work steps.
- 2.13.3. Assess whether all the value domains have been properly allocated sufficient unit effort estimates.
- 2.13.4. Assess whether all the value domains have been properly allocated sufficient quantity of units that have to be developed.
- 2.13.5. Assess whether all the value domains have been properly allocated work environment factors to determine an accurate estimate of required resources.
- 2.13.6. Assess whether all the value domains have been properly allocated work accomplishment and recording functions necessary to support earned value reporting.
- 2.13.7. Assess whether all the value domains have been properly allocated metadata recording effort to ensure that all interrelationships are properly recorded into the metadata management system database.
- 2.13.8. Assess whether all the business information systems are accomplished such that they make maximum use of previously created work products.
- 2.13.9. Assess whether all work products are stored as metadata to the maximum extent possible and that all stored metadata is integrated, interrelated, and non redundant with previously stored metadata from other work products.
- 2.13.10. Assess whether earned value reporting can occur as an automatic byproduct of the architecture, engineering, development, deployment and evolution of business information systems.
- 2.14. Assign the risk level associated with each meta-artifact not properly constructed.



3. Determine the findings and create draft assessment report
4. Present the findings and revise draft assessment report
5. Create final report and deliver to The Agency

7.0 Risk Assessment

To the maximum extent practical, every data management assessment includes a list of the items assessed and a rating for each item. The proposed risk assessments are: no risk (0), low (1), moderate (2), or high (3).

Additionally, weighting factor multipliers of the risk assessments are: Concepts Data Model (1), Data Element Model (2), Logical Data Model (2), Physical Data Model (3), View Data Model (3), and XML Model (3).

Every data component, whether it is a Data Model such as Data Element, Concepts, Logical, Physical, View, or XML, and every Interrelated Component such as Business Requirements, Use Cases, or User Acceptance Tests should be evaluated for its data or interrelated data characteristics. The evaluation strategy will conclude that the component represents one of the following five categories of product and process maturity and quality:

- Effective implementation
- Implementation evident-not effective
- Implementation underway-not yet in place
- Respondent aware of requirement-not yet implemented
- Component not evident

In addition, an overall risk will be assigned to the component. The strategy for assessing risks is common to most risk management plan. The risk process is represented by a matrix and consists of two dimensions: likelihood, and consequence. The Likelihood dimension consists of five levels:

- Remote
- Unlikely
- Likely
- Highly Likely
- Near Certainty

The consequence dimension also consists of five levels:

- Minimal or no Impact
- Acceptable with Some Reduction in Margin
- Acceptable with Significant reduction in margin



- Acceptable No Remaining margin
- Unacceptable

The combination of these two five levels produces an overall risk as set out in the following table:

| Likelihood Levels | Consequence Levels | | | | |
|-------------------|--------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 5 | Y | Y | R | R | R |
| 4 | G | Y | Y | R | R |
| 3 | G | G | G | Y | R |
| 2 | G | G | G | G | R |
| 1 | G | G | G | G | Y |

