Technical Standard

The Open Group Service Integration Maturity Model (OSIMM)

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Preface

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This Document

This document is the Technical Standard for The Open Group Service Integration Maturity Model (OSIMM). It has been developed and approved by The Open Group.

The Open Group SOA Integration Maturity Model (OSIMM) provides consultants and IT practitioners with a means to assess an organization's Service Oriented Architecture (SOA) maturity level. It defines a process to create a roadmap for incremental adoption which maximizes business benefits at each stage along the way. The model consists of seven levels of maturity and seven dimensions of consideration that represent significant views of business and IT capabilities where the application of SOA principles is essential for the deployment of services. The OSIMM acts as a quantitative model to aid in assessment of current state and desired future state of SOA maturity.

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Referenced Documents

The following documents are referenced in this Technical Standard:

[BPEL] Business Process Execution Language Standard; refer to: http://docs.oasis-open.org/wsbpel/2.0/OS/wsbpel-v2.0-OS.html

[SOA GF] The Open Group SOA Governance Framework, Technical Standard, August 2009 (C093); refer to: www.opengroup.org/bookstore/catalog/c093.htm

[SOA RM] OASIS Reference Model for SOA (SOA RM), Version 1.0, OASIS Standard, 12 October 2006; refer to: docs.oasis-open.org/soa-rm/v1.0/soa-rm.pdf

[SOAWG] SOA Definition, The Open Group SOA Work Group; refer to: www.opengroup.org/projects/soa

[SOA WP] Navigating the SOA Open Standards Landscape Around Architecture", Joint White Paper from OASIS, OMG, and The Open Group, July 2009 (W096); refer to: www.opengroup.org/bookstore/catalog/w096.htm

[TOGAF] The Open Group Architecture Framework (TOGAF); refer to: www.opengroup.org/architecture/togaf9

See also Appendix C.

1 Introduction

1.1 Objective

This document is The Open Group Service Integration Maturity Model (OSIMM). It specifies:

- A model against which the degree of service integration maturity of an organization can be assessed
- A process for assessing the current and desired degree of service integration maturity of an organization, using the model

1.2 Overview

Service Oriented Architecture (SOA) is an *architectural style* that supports *service orientation*. A service is a business task with an externalized service description that often represents a contract between a provider and a consumer. As organizations adopt SOA and the use of services as the fundamental structuring element of their architecture, they increasingly encounter the need to assess where they are in their migration path and how best to achieve the expected benefit derived from integrating and investing in greater levels of SOA maturity.

OSIMM helps an organization to create a roadmap for its incremental transformation towards more mature levels of service integration, in order to achieve increasing business benefits associated with higher levels of maturity. OSIMM is used to determine which organizational characteristics are desirable in order to attain a new level of maturity. This will also help determine whether problems occurring at the current level of service integration maturity can be solved by evolving to a higher level.

OSIMM is offered to the industry as a standardized model to help organizations guide their SOA transformation journey. A standard maturity model enables enterprises to benchmark their SOA levels and develop roadmaps for transformation to assist their planning. It can also be used by vendors to position their services and software against these benchmarks. OSIMM may also serve as a framework for the transformation process that can be customized to suit the specific needs of organizations and assessments. This process consists of the following steps:

- Prepare the OSIMM assessment framework
- Determine the initial level of maturity
- Determine the target level of maturity
- Identify the transformation path necessary for the organization to achieve the desired level of maturity

OSIMM structures the assessment of the organization's current state in service integration and flexibility (including service orientation) and of its desired or future state for different lines of business or enterprise, taking into account pain-points in flexibility or integration that need to be improved. It provides a model for assisting the organization in determining its architectural strategy when adopting service orientation, including the creation of an architectural roadmap for initiatives in legacy transformation, integration with one or more packaged applications, application renovation and development, and systems integration. This roadmap helps to determine the scope, focus, and incremental steps for different parts of the organization in order to transform them towards a higher level of service orientation and service integration, with justifications in terms of anticipated business benefits. OSIMM provides a framework for surfacing insights and identifying IT improvements in terms of component development, service integration, SOA, and IT governance.

OSIMM focuses on increasing levels of flexibility in seven aspects of an organization or enterprise: business, organization and governance, methods and processes, application portfolio, architecture, information, infrastructure, and operational management. Focus on these aspects aids the adoption of a more flexible business by planning integration in advance and constructing business models, processes, applications, and infrastructure mindful of flexibility.

The OSIMM base model is specified by this document. The base model defines the OSIMM framework and the assessment process. The base model is designed to be extended by allowing customers and consulting organizations to add additional maturity indicators. By extending the model, the maturity assessment can be focused on the adoption of evolving industry frameworks, new techniques, or organizational imperatives. The authors of the OSIMM standard fully expect that a database of OSIMM extensions will evolve, providing greater insight into the process of SOA adoption.

OSIMM may be used to conduct assessments of the current and desired levels of maturity for an enterprise or line of business within an organization and design a plan of action to transform from the current to the desired levels. For example, an organization may wish to apply OSIMM to a particular set of applications in the organization's portfolio. A decision is made to partition the large number of applications into a small number of partitions, based upon affinity to business function. The current state of each partition is then assessed using the maturity model. Based upon the pain-points, business drivers, and goals, the target state for each partition is established. The transformation increment for each partition (which may be different for each partition) is then defined in order to achieve the target state for that partition.

1.3 Conformance

This specification describes the OSIMM SOA maturity model and a corresponding SOA maturity assessment process. It describes the characteristics of architectures necessary to achieve a particular level of SOA maturity. Maturity models and maturity model assessments must use at least the terminology, matrix, dimensions, levels, and attributes described herein in order to be conformant with this specification. Particular maturity model indicators are not mandated for conformance. An exemplary process for assessment that conforms to this specification is provided in Chapter 10 but is not mandated for conformance.

1.4 Terminology

This terminology section provides definition for terms that have a specialized meaning within OSIMM or are prone to alternative interpretations.

Adoption

The detailed steps that are required to achieve a transformation. These steps may include the adoption of new technologies, methods, processes, and integration techniques, and the establishment of corporate initiatives, IT directives, technical standards, Executive Councils, Architecture Boards, and Governance.

Architectural Style

A combination of distinctive features in which architecture is performed or expressed. The SOA architectural style has the following distinctive features:

- It is based on the design of the services – which mirror real-world business activities – comprising the enterprise (or inter-enterprise) business processes.
- Service representation utilizes business descriptions to provide context (i.e., business process, goal, rule, policy, service interface, and service component) and implements services using service orchestration.
- It places unique requirements on the infrastructure – it is recommended that implementations use open standards to realize interoperability and location transparency.
- Implementations are environment-specific – they are constrained or enabled by context and must be described within that context.
- It requires strong governance of service representation and implementation.
- It requires a "Litmus Test", which determines a "good service".[*]

BPEL

Business Process Execution Language Standard (see Referenced Documents).

Business Service

A self-contained piece of business functionality that may be called through a well-defined standard interface and protocol, independent of implementation platform, and managed under a contract specifying availability levels and quality-of-service.

[*] The explanations of these terms are taken from the definition of SOA that was developed by The Open Group SOA Work Group; refer to www.opengroup.org/projects/soa.

Can

Describes a permissible optional feature or behavior that an assessment may have.

Dimension (or View)

A major axis, along which the SOA maturity level of an organization may be measured.

The dimensions represent significant views of the business and IT environment where the application of SOA principles can have a major effect. An organization may be at a different maturity level on each dimension, and the overall maturity level of the organization may be aggregated from the dimension levels. Dimensions are to a first approximation independent, but there are relationships between them.

Domain

A subdivision of a dimension, representing a more specific aspect of that dimension, along which the organization may be measured as to its SOA maturity level. Again these represent aspects where SOA principles can have an effect. Each domain has one or more maturity indicators at each maturity level, and the sequence of indicators identifies a pathway from less to more mature SOA. The overall maturity level of a dimension is aggregated from the individual maturity levels of its domains.

Dynamic Configuration

The ability of a system to look up new services, based upon the matching of a required specification, and to configure itself to call these new services without the development of new programming code.

Framework

A foundational structure or set of structures, which can be used for developing a broad range of architectural products. An architecture framework should contain a method for designing an information system in terms of a set of services, and for showing how the services fit together. It should contain a set of tools and provide a common vocabulary. [TOGAF]

Master Data Model

A virtualized federated data model service with a master view.

Maturity

The creation of characteristics and behavior in an organization, as a result of transformation and adoption, that permits it to operate better in accordance with its business goals.

For example, an organization may have put in place processes for the identification of new services, which will facilitate the creation of services in the future. The nature of the

characteristics and behavior created in the organization defines the service integration maturity level, and this is contained within the OSIMM model.

The concepts of SOA transformation, adoption, and maturity are inter-related; transformations are broken down into adoptions, which create new characteristics – a sign of maturity.

Maturity Indicator (or Characteristic)

A characteristic of the business or IT that may be measured and assessed by asking specific questions. Each maturity indicator is associated with a specific domain (and by implication a dimension) and maturity level; if the indicator is assessed as true, then this is evidence for the domain being at that level of maturity.

Maturity Level Attribute

Observed characteristics of a maturity indicator within a dimension for each maturity level.

Maturity Model

A means of and scale for evaluating and assessing the current state of maturity.

A maturity model also provides a means for developing a transformation roadmap to achieve a target state of maturity from a given current state of maturity. It quantifies the relative growth of certain salient aspects within various dimensions typically within, but not limited to, organizational boundaries.

Must

Describes a feature or behavior that is mandatory for an assessment. An assessment that conforms to this specification shall include this feature or behavior.

Open Group Service Integration Maturity Model (OSIMM)

A model that enables estimation of the degree to which an organization or enterprise has taken up the principles of SOA within their IT and business. There are seven levels, Level 1 being the least take-up and Level 7 being the greatest take-up. Higher degrees of maturity are likely to lead to a higher degree of agility in the business, but are not necessarily "better", as each organization may have an ideal level of maturity depending upon their business requirements and business and IT context.

Organization

Any entity interested in SOA adoption for the purpose of deploying service-enabled business processes, including governments, businesses, lines of business, projects, an enterprise, service ecosystem, or an industry.

Service

A logical representation of a repeatable business activity that:

- Has a specified outcome (e.g., check customer credit; provide weather data, consolidate drilling reports)
- Is self-contained
- May be composed of other services
- Is a "black box" to consumers of the service*

Service Integration Maturity

The level of service integration necessary to realize service orientations defined by the seven levels of service maturity.

Service-Level Agreement (SLA)

A contract mostly used between service providers and their users to establish availability, volume, and response time agreements.

Service Orientation

A way of thinking in terms of services and service-based development and the outcomes of services.*

Should

For an assessment that conforms to this specification, describes a feature or behavior that is recommended but not mandatory.

SOA

An architectural style that supports service orientation.*

(SOA) Eco-System

A group of one or more organizations that are co-dependent on one another for achieving business goals by executing services that may leverage another company's business processes.

Transformation

A high-level change from one organizational state to another in order to support business imperatives and goals. Transformations may be business transformations (for example, a

* The explanations of these terms are taken from the definition of SOA that was developed by The Open Group SOA Work Group; refer to www.opengroup.org/projects/soa.

reduction in the number of customer calls) or IT transformations (for example, the introduction of support for markets in different geographies). It may be necessary to perform business and IT transformations in parallel in order to ensure that the business activities are aligned with the IT activities.

Virtualized Service

A service that is hidden behind a "façade", so that the caller of the service does not call it directly but via a proxy that intercepts the call and routes it to a real service based upon considerations such as load and availability.

1.5 Future Directions

- Development of an OSIMM maturity indicator repository
- Development of an OSIMM case study repository

2 The Model

2.1 Overview

The Open Group Service Integration Maturity Model (OSIMM) specifies how to measure the service integration levels of an organization and its IT systems and business applications. In addition, it provides guidance on how to achieve certain levels of service maturity necessary to realize related business benefits.

The OSIMM has seven dimensions across seven maturity levels. Each maturity level represents a significant increase in the level of maturity necessary to realize service orientation. This concept is referred to as *service integration maturity* within OSIMM. OSIMM may also be utilized as an SOA maturity model. While many SOA techniques and practices are used to realize service orientation, the OSIMM is intentionally inclusive of new and evolving techniques for implementing services such as cloud computing. The extensibility of the OSIMM framework is intended to provide a method to augment the base OSIMM model to include such concepts.

OSIMM defines a set of *dimensions*, representing different views (e.g., business, architectural) of an organization, as follows:

- Business
- Organization & Governance
- Method
- Application
- Architecture
- Information
- Infrastructure & Management

The seven SOA *maturity levels* are:

- Silo
- Integrated
- Componentized
- Service
- Composite Services
- Virtualized Services

- Dynamically Re-Configurable Services

The maturity level of each dimension is assessed by matching maturity indicators to maturity level attributes. The total assessment of maturity indicators for all the dimensions provides a holistic view of the service integration maturity level of the organization.

The OSIMM maturity matrix which defines the maturity dimensions and levels is shown in Figure 1.

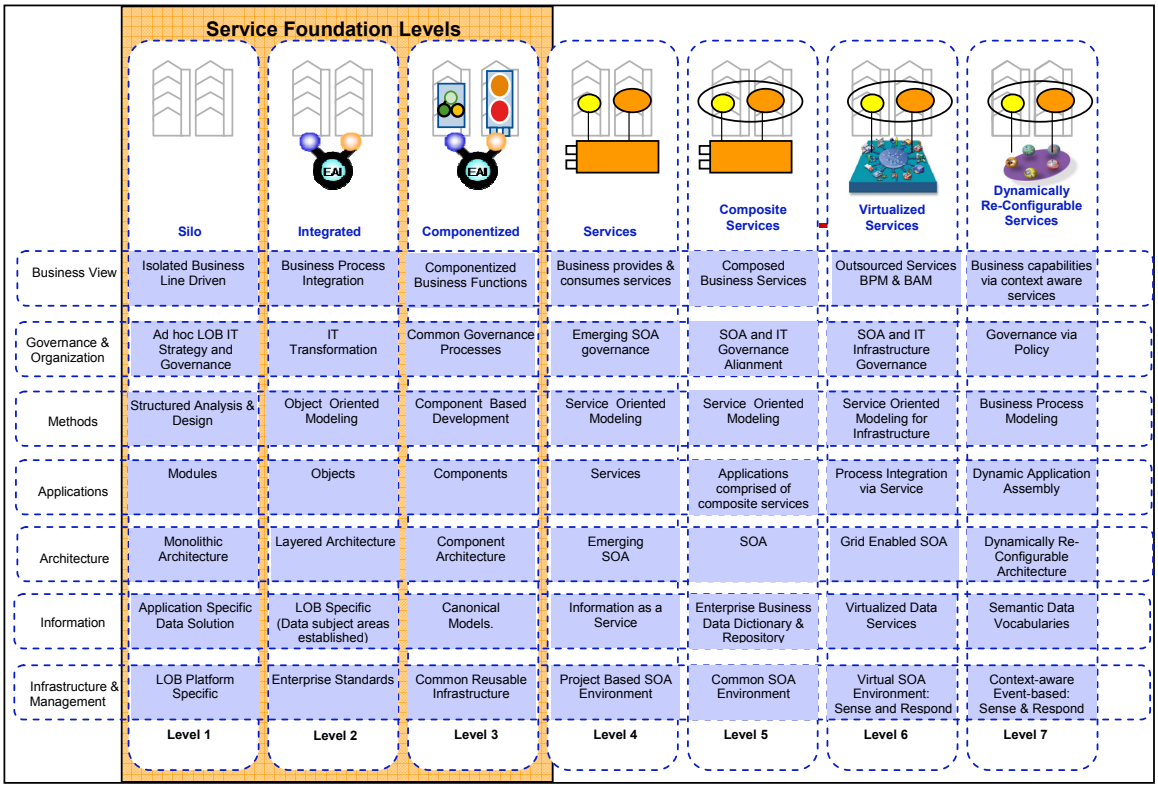


Figure 1: OSIMM Maturity Matrix

The columns of the matrix correspond to the maturity levels, and the rows correspond to the dimensions. Each cell in the matrix defines the maturity level for each of the dimensions in each column. The overall SOA maturity of an organization is assessed by identifying its maturity level in each dimension.

For example, consider the cell *Information x Silo*, with the label "Application-Specific Data Solution". Maturity attributes are mapped to maturity indicators within OSIMM (see Section 2.5). If the maturity attributes suggest that the Silo level maturity indicators are present for a particular assessed application or system, then the maturity of the Information dimension is considered to be Silo (Level 1), so the assessed application or system is characterized as having an *Application-Specific Data Solution*.

Each dimension may be assessed in a similar way, leading to a level assessment for each dimension or business view, organization, etc. The overall picture, in terms of the assessed

maturity level for each dimension, may itself be assessed to provide a view of the overall maturity level of the organization.

2.2 Maturity Levels

At the heart of OSIMM are the seven levels of enterprise business and IT service-integration maturity. Each of the seven levels reflects a possible abstract state of an organization in terms of its maturity in the integration of its services (business and/or IT) and SOA solution. Each maturity level builds on the foundation of its predecessors and will have a cumulative set of maturity attributes.

2.2.1 Level 1: Silo

Individual parts of the organization are developing their own software independently, with no integration of data, processes, standards, or technologies. This severely limits the ability of the organization to implement business processes that require co-operation between the different parts, and the IT systems cannot be integrated without significant manual intervention, such as re-keying and re-interpretation of data.

2.2.2 Level 2: Integrated

Technologies have been put in place to communicate between the silos, and to integrate the data and interconnections. The construction of an IT system that integrates across different parts of the organization becomes possible. However, integration does not extend to common standards in data or business processes. Therefore, to connect two systems, it requires a, possibly complex, conversion of the data, operations, and protocols used by these systems. Each such connection may require bespoke code and adapters, leading to a proliferation of software that is difficult to manage and complex to code. It is therefore not easy to develop or automate new business processes.

2.2.3 Level 3: Componentized

The IT systems in the silos have been analyzed and broken down into component parts, with a framework in which they can be developed into new configurations and systems. There may also be some limited analysis of the business functionality into components. Although components interact through defined interfaces, they are not loosely coupled, which limits agility and interoperability between different segments of the organization (or even different organizations within the business "eco-system"). This causes difficulties in development and deployment of shared business processes. Business and infrastructure components are discrete and re-usable through code and EAI re-use techniques. However, they are often replicated and redundant.

2.2.4 Level 4: Service

Composite applications are built from loosely-coupled services. The way that services may be invoked is based upon open standards and is independent of the underling application technology. Services run on an IT infrastructure that is supported by the appropriate protocols, security mechanisms, data transformation, and service management capabilities. The services may therefore interoperate across all of the parts of the organization and even across different

organizations within the eco-system, and are often managed by assigning responsibilities for managing Service-Level Agreements (SLAs) to segments of the organization. The business functionality has been analyzed in detail and is broken down into services residing within a business architecture that ensures that services will interoperate at the business level. In addition, it is possible to define the services via a specification language – such as WSDL or SCA – that unambiguously defines the operations performed by the service, permitting the construction of a catalog of services. The combination of IT and service architectures permits the construction of systems based upon these services, operating right across the organizations in the ecosystem. However, at this stage the composition of services and flow of control within a composite application are still defined by developers writing bespoke code, rather than by a declarative flow language. This limits the agility of the development of new business processes as services.

2.2.5 Level 5: Composite Services

At this level of service maturity it is now possible to construct a business process for a set of interacting services, not just by bespoke development, but by the use of a composition or business process modeling language, such as BPEL [BPEL] of information and control through the individual services. Composite services include static, process, and activity-based services. This permits the assembly of services into composite business processes, which may be short or long running, without significant construction of code. Thus, the design and development of services is agile, and may be performed by developers under the close guidance of business analysts.

2.2.6 Level 6: Virtualized Services

The business and IT services are now provided through a façade – a level of indirection. The service consumer does not invoke the service directly, but through the invocation of a "virtual service". The infrastructure performs the work of converting the virtual invocation into a physical call of the real service, and may as part of this conversion change the address, the network, the protocol, the data, and the synchronization pattern that is contained in the call. Such conversions may be a complex service in their own right, such as the transformation of data from one data model to another. The virtual service thereby becomes more loosely coupled from the infrastructure on which it is running, permitting more opportunities for the composition of services. This is in contrast to the lower levels of service maturity, where the service is more closely coupled to the infrastructure. Although virtualization has been used in non-SOA systems, this level extends the concept (and advantages) of virtualization to services.

2.2.7 Level 7: Dynamically Re-Configurable Services

Prior to this level, the business process assembly, although agile, is performed at design time by developers (under the guidance of business analysis and product managers) using suitable tooling. Now this assembly may be performed at runtime, either assisted by the business analysts via suitable tooling, or by the system itself. This requires the ability to access a repository of services and to query this repository via the characteristics of the required services. In its simplest form, these characteristics may have been defined in advance, restricting the system to selecting and locating specific instances of services.

2.3 Dimensions

An organization's level of SOA maturity can be assessed across the following set of dimensions which are essential indicators for effective SOA adoption.

2.3.1 Business

The Business dimension is focused on the business architecture; i.e., the organization's current business practices and policies; how business processes are designed, structured, implemented, and executed. The Business dimension also addresses how the cost of IT capabilities is allocated across the enterprise, and how well the IT capabilities support the flexibility of the business, agility, and SLAs. The Business dimension includes IT strategy. And thus includes the necessary value proposition for moving from one maturity level to a higher level maturity level. A discussion of these value propositions are in Appendix B.

2.3.2 Organization & Governance

The Organization & Governance dimension is focused on the structure and design of the organization itself and the necessary measures of organizational effectiveness in the context of an SOA and SOA governance. The Organization aspect is focused on organizational structure, relationships, roles, and the empowerment necessary to adopt a service-oriented strategy. This includes the types and extent of skills, training, and education that are available within the organization. Governance is associated with formal management processes to keep IT activities, service capabilities, and SOA solutions aligned with the needs of the business. Governance guides many aspects of the other maturity dimensions, including how management is structured and costs are allocated.

2.3.3 Method

The Method dimension is focused on the methods and processes employed by the organization for its IT and business transformation, and the organization's maturity around the Software Development Lifecycle such as the use of requirements management, estimation techniques, project management, quality assurance processes, design methodologies and techniques, and tools for designing solutions.

2.3.4 Application

The Application dimension is focused on application style, structuring of the application and functional decomposition, re-usability, flexibility, reliability, and extensibility of the applications, understanding, and uniform use of best practices and patterns, whether multiple applications have been created to serve different lines of business with essentially the same functionality, and the availability of enterprise schema and object models.

2.3.5 Architecture

The Architecture dimension is focused on the structure of the architecture which includes topology, integration techniques, enterprise architecture decisions, standards and policies, web services adoption level, experience in SOA implementation, SOA compliance criteria, and typical artifacts produced.

2.3.6 Information

The Information dimension is focused on how information is structured, how information is modeled, the method of access to enterprise data, abstraction of the data access from the functional aspects, data characteristics, data transformation capabilities, service and process definitions, handling of identifiers, security credentials, knowledge management, business information model, and content management.

2.3.7 Infrastructure & Management

The Infrastructure & Management dimension is focused on the organization's infrastructure capability, service management, IT operations, IT management and IT administration, how SLAs are met, how monitoring is performed, and what types of integration platforms are provided.

2.4 Service Foundation Levels

The first three layers of the OSIMM maturity model – Silo, Integrated, and Componentized – are referred to as the Service Foundation Levels. Service integration and orientation is much easier to achieve if business and infrastructure functions are developed as discrete components that are componentized, location-independent, and loosely-coupled from the underlying runtime environment. The Service Foundation Levels can be seen as recommended prerequisites for services enabling a legacy environment (or even aggregating existing services). While it is possible to provide services over poorly structured legacy environments, it may compromise the success of the SOA solution. Green-field SOA applications may be an exception and not require the same steps to achieve service orientation as re-using legacy business functions. Services developed using web services and other service enabling technologies should also meet the maturity characteristics defined by the Service Foundation Levels.

2.5 Assessment Questions and Maturity Indicators by Dimension

The maturity indicators are assessed against a set of questions that elicit an organization's current business and infrastructure-related service and SOA-related practices. The OSIMM base model includes a set of assessment questions and maturity indicators that can be used as provided or extended to determine an organizations service integration maturity.

2.5.1 Service Maturity Assessment Questions

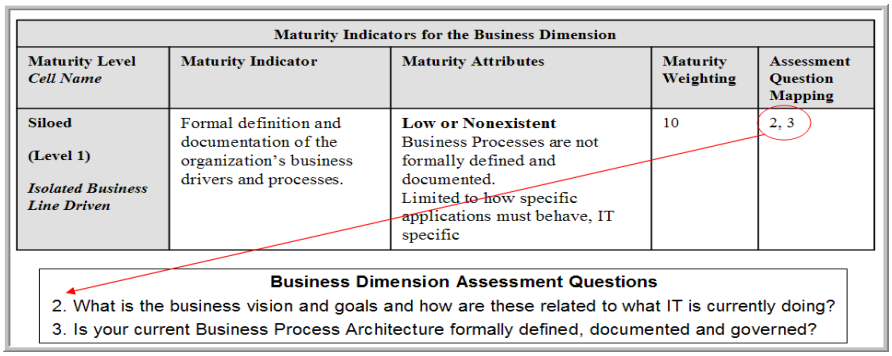
Assessment questions are used to survey the target organization for the purpose of eliciting the service maturity attributes that map to a specific service maturity level. Assessment questions are grouped by maturity dimension. The OSIMM facilitator uses the assessment questions to conduct a survey of the IT and business stakeholders responsible for defining and deploying services. For example, the following groups within an enterprise may be surveyed to gather enough information to map maturity attributes to a maturity indicator:

- IT Operations Team
- Service Development and Deployment Group

- Line of Business staff supporting a service or business area
- Enterprise Architect
- CIO Organization

2.5.2 Maturity Indicators-to-Assessment Question Mapping

Assessment questions are correlated to maturity attributes for each maturity indicator by dimension. This helps the assessment facilitator evaluate which assessment questions are intended to elicit information that can be used to correlate specific maturity attributes to a particular maturity indicator, thereby determining the service maturity level. Figure 2 shows that Business dimension questions 2 and 3 elicit the maturity attributes that would indicate a Silo (Level 1) Business dimension (i.e., business processes are not formally defined and documented).



Maturity Indicators for the Business Dimension				
Maturity Level *Cell Name*	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Siloed **(Level 1)** ***Isolated Business Line Driven***	Formal definition and documentation of the organization's business drivers and processes.	**Low or Nonexistent** Business Processes are not formally defined and documented. Limited to how specific applications must behave, IT specific	10	2, 3

Business Dimension Assessment Questions

2. What is the business vision and goals and how are these related to what IT is currently doing?
3. Is your current Business Process Architecture formally defined, documented and governed?

Figure 2: Assessment Question Mapping for Level 1 Business Dimension Maturity

2.6 Extending the Base OSIMM Model

The standard set of assessment questions and maturity indicators are defined in Chapter 3 as the base OSIMM model. The base OSIMM model can be extended by adding additional maturity indicators, assessment questions, and corresponding attribute mappings; for example, to encompass maturity indicators specific to an industry or enterprise. Industry extensions may be standardized to provide a common baseline to measure service integration maturity against adoption of specific industry service frameworks (such as retail and financial frameworks).

Maturity indicator weighting is used to provide a method to weight multiple maturity indicators within a dimension; for example, when organizational or industry maturity indicators are added to the base model. In addition, the OSIMM facilitator can adjust the weighing at the start of the assessment to align with the target organization's expectations and business requirements.

The OSIMM base model provides maturity indicator weighting based on a 10-point scale by maturity level. Additional maturity indicators could be allocated a maturity weight based on a portion of the total possible dimension maturity score. Scoring and weighting is defined by the assessment facilitator and agreed to by the target organization. The maturity level weighting in the base OSIMM model is based on a 10-point scale. A total maturity assessment score can be established by totaling each of the assessment weights from an assessment. For example, a total

score of 210 would indicate a holistic SOA maturity assessment of Componentized. However, it is important to realize that the organization should focus on the SOA maturity assessment of each dimension and the business value that can be realized by increasing the organization's SOA maturity within a particular dimension.

3 Business Dimension: Base Model

This chapter defines the Business dimension of the base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit how an organization formally defines and documents their business drivers and processes, which ranges from isolated business line-driven to making business capabilities available via context-aware services.

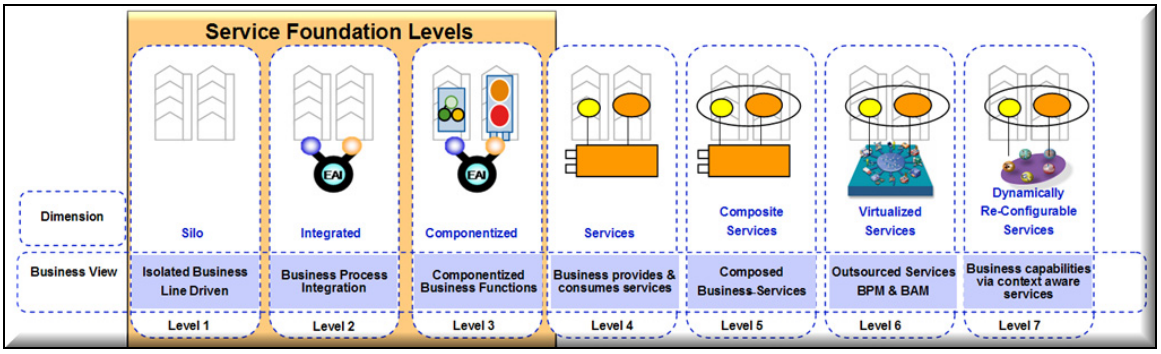


Figure 3: OSIMM Business Dimension

3.1 Business Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Business dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Business dimension is conducted by identifying the *formal definition and documentation of the organization's business drivers and processes*.

3.2 Business Dimension: Assessment Questions

The following assessment questions help elicit information on how an organization formally defines and documents their business drivers and processes. By gathering information using

these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Business dimension maturity level.

1. What are the major business drivers for this initiative?
2. What is the business vision and goals, and how are these related to what IT is currently doing?
3. Is your current Business Process Architecture formally defined, documented, and governed?
4. Is your Business Process Architecture complete and up-to-date?
5. How are metrics for return-on-investment measured in Business Process Management (BPM)?
6. How agile are your current business processes?
7. What are the current funding practices?
8. What is the current cost model?
9. Who owns the portfolio of processes, applications, and services?
10. Do you have a cost model to charge service consumers for the use of the service?
11. How do you currently define the total cost of ownership (including software, hardware, and future maintenance)?
12. What level of partnership exists between the business stakeholders and the IT stakeholders?
13. How are business service levels measured currently?
14. What is the current practice to transform business SLAs into IT SLAs?
15. Do you have a formal enterprise architecture?
16. Do you have formal governance of your enterprise architecture?
17. Do you have multiple lines of business? Do they need to have their own business processes?
18. Do your lines of business use a common information model? Is the data shared or replicated?
19. Do your lines of business share customers, suppliers, or partners?

3.3 Business Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Business dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization's Business dimension. Survey data obtained through the Business dimension assessment questions is used to determine the maturity level by

assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Business Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Isolated Business Line-driven*	Formal definition and documentation of the organization's business drivers and processes.	Low or nonexistent Enterprise architecture is not an element of the IT or Enterprise strategy. Business processes are not formally defined and documented. Limited to how specific applications must behave; IT-specific.	10	 2, 15 3 1, 9, 17, 18
Integrated (Level 2) *Business Process Integration*	Formal definition and documentation of the organization's business drivers and processes.	Limited No formal enterprise architecture. Limited to LOB objectives and need for information from other organizations.	20	 15 1, 2, 3, 4, 6, 9, 17, 18, 19
Componentized (Level 3) *Componentized Business*	Formal definition and documentation of the organization's business drivers and processes.	Cross-organizational Some formal enterprise architecture constructs exist. Organization's business drivers are documented as cross-organizational business objectives.	30	 15, 16 1, 2, 9, 17, 18, 19
Services (Level 4) *Componentized Business Provides and Consumes Services*	Formal definition and documentation of the organization's business drivers and processes.	Enterprise-wide Formal use of enterprise architecture. Organization's business drivers are documented as elements of the enterprise mission and business architecture.	40	 3, 15, 16 1, 2, 3, 8, 9, 10, 11, 17, 18, 19

Maturity Indicators for the Business Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Composite Services (Level 5) *Processes Provided and Consumed via Composite Business Services*	Formal definition and documentation of the organization's business drivers and processes.	Integrated Enterprise-wide Formal use of enterprise architecture and Business Process Management (BPM). Organization's business drivers are documented as elements of the enterprise mission and business architecture.	50	3, 4, 5, 6, 10, 11, 15, 16 1, 2, 3, 8, 9, 10, 11, 17, 18, 19
Virtualized Services (Level 6) *Outsourced Services, BPM, and BAM*	Formal definition and documentation of the organization's business drivers and processes.	Integrated across the enterprise and externally between business partners. Well-defined enterprise architecture that details both internal process flows as well as outsourced processes with and between business partner services. Strong use of Business Activity Monitoring (BAM).	60	4, 5 ,6, 7, 9, 11, 12, 13, 14, 15, 19
Dynamically Re-Configurable Services (Level 7) *Mix-and-match Business Capabilities via Context-aware Services*	Formal definition and documentation of the organization's business drivers and processes.	Enterprise services on demand. Well-defined enterprise architecture that includes a formal end-to-end definition of business process flow. Business Process Management (BPM) is used to define and test process flows necessary to meet well-defined SLAs.	70	5, 6, 13, 15, 16 6, 13, 14

4 Organization & Governance Dimension: Base Model

This chapter defines the base model for the OSIMM Organization & Governance dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit how an organization formally defines and documents their organization and governance processes, which ranges from *ad hoc* LOB IT strategy and governance-driven to policy-driven governance.

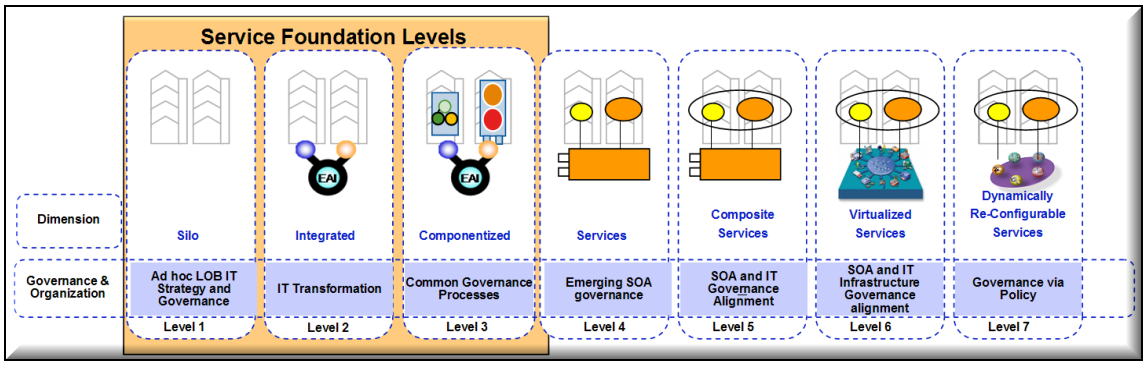


Figure 4: OSIMM Organization & Governance Dimension

4.1 Organization & Governance Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Organization & Governance dimension maturity indicator is provided as part of the base OSIMM specification:

A service integration maturity assessment of the OSIMM Organization & Governance dimension can be conducted by identifying the *formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions)*.

4.2 Organization & Governance Dimension: Assessment Questions

By gathering information using these assessment questions, the assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Organization & Governance dimension maturity level.

1. What types of skills are common in your IT staff?
2. How does IT governance relate to your SOA?
3. How is the IT governance related or aligned with the SOA, enterprise architecture, and the organization's governance?
4. Do SOA governance processes exist, are they documented, and, if so, are they used for services at design time and run time?
5. Is the interaction between organizations involved in the SOA process defined with clear roles and responsibilities?
6. What are the governance functionalities and responsibilities?
7. How would you describe your IT cost model?
8. What type of SOA training is available in your IT organization?
9. What is the relationship between the organization's development team and the infrastructure team?
10. What SOA and governance authorities exist?
11. Do the organization's SOA solutions cross organizational boundaries? Internally? Externally between business partners?

4.3 Organization & Governance Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Organization & Governance dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization's Organization & Governance dimension. Survey data obtained through the Organization & Governance dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Organization & Governance Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Ad hoc LOB IT Strategy and Governance*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Low or nonexistent A vision or strategy for the adoption of SOA does not exist. No recognition of the value of service governance and nonexistent IT-business governance processes. Nonexistent cross organizational (LOB) coordination of services (SOA). Minimal SOA training.	10	2, 3, 4, 5 11 1, 8
Integrated (Level 2) *IT Trans-formation*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Limited A formal SOA strategy is evolving. Some cross-organizational coordination. The value of service and SOA governance has been recognized but has not been holistically adopted by the enterprise.	20	2, 3, 4, 5, 11 6, 9, 10
Componentized (Level 3) *Common SOA Governance Processes*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Cross-organizational A formalized SOA strategy exits between one or more organizations. The value of service and SOA governance has been recognized but has not been holistically adopted by the enterprise. SOA governance has been established but has not been adopted holistically by the enterprise. SOA training and skills are present but limited to IT practitioners. Shared services may be evolving and governed between one or more LOBs.	30	5, 9 2, 3, 4, 6 2, 3, 4, 6 1, 8 7, 11

Maturity Indicators for the Organization & Governance Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Services (Level 4) *Emerging SOA Governance*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Enterprise-wide A formal enterprise-wide SOA strategy and vision has been defined, published, and agreed by the business units across the organization. A formal SOA governance process and structure has been documented and is functioning among most business units. Training programs have been tailored for IT and business unit needs.	40	 2, 3, 5, 10 4, 6 1, 6, 8
Composite Services (Level 5) *SOA and IT Governance Alignment*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Integrated Enterprise-wide The use of SOA and shared services are an accepted element of the organizations strategy, business, and IT models. SOA governance has been adopted across the enterprise by most organizations and is empowered to manage SOA services and solutions.	50	 2, 3, 5, 11 4, 6, 9, 10
Virtualized Services (Level 6) *SOA and IT Infrastructure Governance Alignment*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Integrated across the enterprise and externally between business partners. SOA governance is part of the organizational culture. The organization treats SOA services as enterprise assets. The organization has well-defined SOA metrics and performance indicators.	60	 3, 10 2 4

Maturity Indicators for the Organization & Governance Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Dynamically Re-Configurable Services (Level 7) *Governance Implemented using Automated Policies*	Formal use of service and SOA governance across the organization to develop, deploy, and manage business and IT services (SOA solutions).	Adaptive Enterprise Services are modeled and managed as elements of the evolving business strategy. Service metrics are automatically gathered and input to key business decisions.	70	2, 3, 4, 5, 6 4, 11

5 Method Dimension: Base Model

This chapter defines the base model for the OSIMM Method dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The following assessment questions help elicit the level of formality to which an organization has adopted a formal SOA development and deployment methodology, which ranges from structured design and analysis to business grammar-oriented modeling.

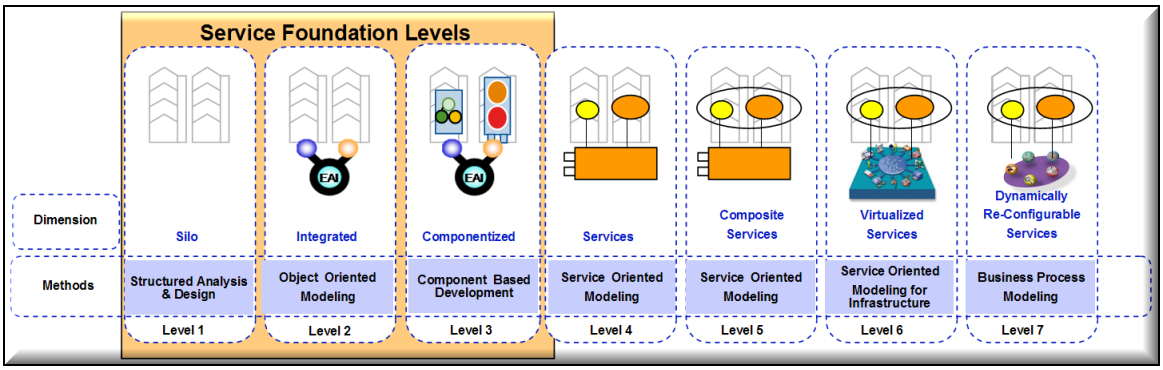


Figure 5: OSIMM Method Dimension

5.1 Method Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Method dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Method dimension can be conducted by identifying the *formal use of an SOA architectural design, construction, and deployment methodology for the implementation of SOA services*.

5.2 Method Dimension: Assessment Questions

By gathering information using these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Method dimension maturity level.

1. What are the current application or systems requirements elicitations and requirements management practices?
2. What design methodologies and best practices are you currently adopting?
3. Do you practice any SOA design techniques?
4. What design tools are in practice today?
5. What is the current practice for service development and management?
6. What is your current project management framework?
7. How is IT project management organized?
8. What are your organization's current QA processes?
9. Do you have an active community that works to evolve your SOA methods and practices?
10. Has your organization developed a repository for best practices and asset re-use?

5.3 Method Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Method dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization's Method dimension. Survey data obtained through the Method dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Method Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Structured Analysis and Design*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Low or nonexistent No formal use of SOA design and implementation methodology. IT and business employees have little understanding or appreciation for implementing business processes as services.	10	2, 3 5, 6
Integrated (Level 2) *Object-oriented Modeling*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Limited SOA methods and practices are limited to the IT development teams and have not been formalized across teams.	20	1, 2, 3
Componentized (Level 3) *Component-based Development*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Cross-organizational SOA method and practices have been enhanced to address the creation, implementation, and deployment of services. Methodology is largely focused on implementing IT infrastructure and integration services.	30	1, 2, 3, 4, 5, 6, 7
Services (Level 4) *Service-oriented Modeling*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Enterprise-wide SOA methods and practices have been implemented across the enterprise. Not all organizations follow a unified approach.	40	1, 2, 3, 4, 5, 6, 7

Maturity Indicators for the Method Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Composite Services (Level 5) *Service-oriented Modeling*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Integrated Enterprise-wide A formal and recognized methodology for the creation, development, deployment, and management is in practice. A recognized community is empowered to manage, train, and update the enterprise SOA methods and practices.	50	 1, 2, 3, 5 7, 9
Virtualized Services (Level 6) *Service-oriented Modeling for Infrastructure*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Integrated across the enterprise and externally between business partners. Formal methods are used to create and manage both internal and external (partner)-based services. Best practice guidance has been developed to facilitate consistent adoption of SOA and virtualization technologies; for example, ESB and registry. Virtualization is a key element of the IT service operations methods and is used to facilitate service performance.	60	 1, 2, 3 4, 9, 10 2, 8

Maturity Indicators for the Method Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Dynamically Re-Configurable Services (Level 7) *Business Process Modeling*	Formal use of an SOA architectural design, construction, and deployment methodology for the implementation of services.	Adaptive Enterprise Formal methods leverage architectural constructs and assets for supporting virtualization and dynamic services and business process modeling.	70	1, 2, 3, 4, 5, 9, 10

6 Application Dimension: Base Model

This chapter defines the base model for the OSIMM Application dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit the level of formality to which an organization has successfully applied SOA application and system design, development, and deployment principles, and adopted SOA-enabling technologies such as an ESB and service registry. Maturity ranges from application modules to dynamic application assembly.

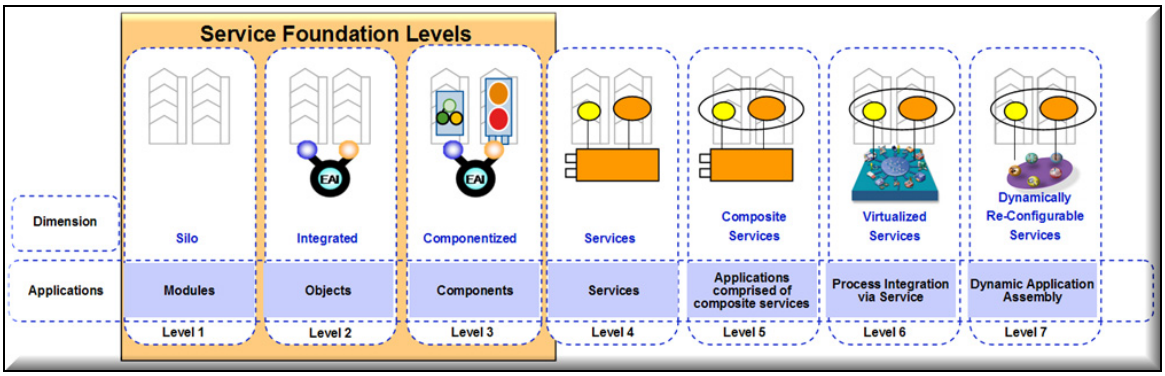


Figure 6: OSIMM Application Dimension

6.1 Application Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Application dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Application dimension can be conducted by identifying the *application architectures that are designed and implemented using SOA principles and development practices and utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization*.

6.2 Application Dimension: Assessment Questions

By gathering information using these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Application dimension maturity level.

1. What is your current application development style?
2. How common is re-use in your organization?
3. What types of re-use do you engage in and how is re-usability measured?
4. How are your organization's applications/systems integrated?
5. What types of languages does your organization use?
6. What types of integration technologies has your organization employed?
7. How is business logic represented within your organization's applications?
8. How reliable are your organization's business-critical applications?
9. How widely is XML used in your organization? How sophisticated is its use?
10. What is the rate of change and required time-to-market of your current applications?
11. Are SOA-enabling technologies, such as ESB, shared data environment, or registry, being used?

6.3 Application Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Application dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization's application or system architectures. Survey data obtained through the Application dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Application Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Modules*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Low or nonexistent Application architectures and topologies are monolithic and lack integration between other systems across the enterprise. The use of web services or other SOA constructs are not present.	10	1, 4, 7, 10 6, 9
Integrated (Level 2) *Objects*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Limited Application architectures and topologies are monolithic with minimal separation of concerns between architectural layers or application tiers. Applications use minimal integration between other systems. Integration is usually implemented using point-to-point techniques.	20	1, 2, 3, 7 4, 6

Maturity Indicators for the Application Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Componentized (Level 3) *Components*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Cross-organizational SOA development practices are applied inconsistently across the organization. Most application architecture topologies have a separation of concerns both physically and logically in presentation, business logic, and data tiers. The use of SOA-enabling technologies – such as an ESB – is inconsistent across the enterprise.	30	1, 2, 3, 4 5, 7, 10 6, 9, 11
Services (Level 4) *Services*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Enterprise-wide Service components of application architectures employ SOA patterns such as separation of concerns between logical and physical layers of the presentation and business logic. Service integration is achieved using an ESB in some but not all business units.	40	1, 2, 3, 4 5, 6

Maturity Indicators for the Application Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Composite Services (Level 5) *Applications Composed of Composite Services*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Integrated Enterprise-wide Application architectures are designed with a separation of concerns at the logical and physical layers. ESB integration patterns are used to support application and process integration to achieve sharing of services.	50	1, 2, 3, 7 4, 6, 11
Virtualized Services (Level 6) *Virtualized Services*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Integrated across the enterprise and externally between business partners. Application architecture is decoupled from infrastructure components. Extensive use of ESB architecture patterns to support Business Process Management (BPM).	60	1, 2, 3, 10 6, 7, 8, 11

Maturity Indicators for the Application Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Dynamically Re-Configurable Services (Level 7) *Dynamic Application Assembly, Context-aware Invocation*	Application architectures are designed and implemented using SOA principles and development practices that utilize constructs such as loose-coupling, separation of concerns, and employ the use of service-enabled technologies such as XML, web services, service bus, service registries, and virtualization.	Adaptive Enterprise Application architecture supports dynamically reconfigurable business and infrastructure services and SOA solution for internal or external partner consumption.	70	All

7 Architecture Dimension: Base Model

This chapter defines the base model for the OSIMM Architecture dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit the level of formality to which an organization has formally adopted SOA design methods, principles, and frameworks. Maturity ranges from monolithic architecture to dynamically reconfigurable architecture.

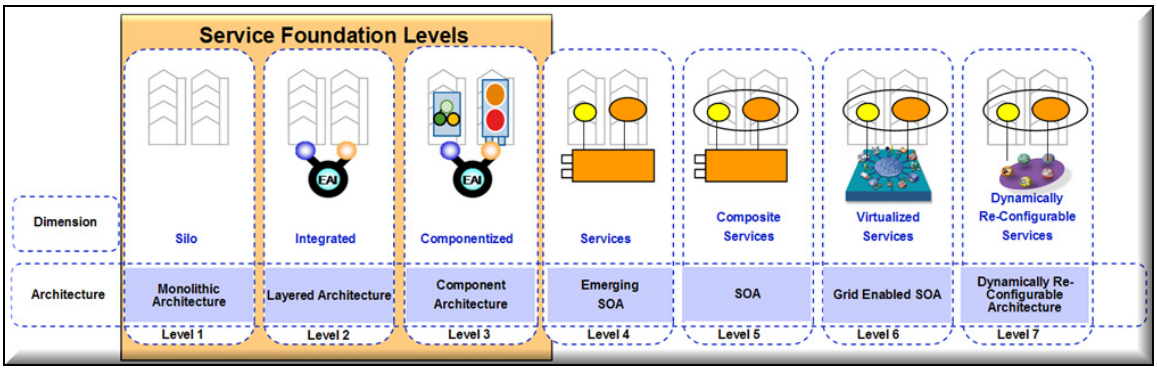


Figure 7: OSIMM Architecture Dimension

7.1 Architecture Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Architecture dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Architecture dimension can be conducted by *identifying those service components that have been designed and are deployed using formal SOA methods, principles, patterns, frameworks, or techniques*.

7.2 Architecture Dimension: Assessment Questions

By gathering information using these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Architecture dimension maturity level.

1. How would you characterize your architectural topologies?
2. What type(s) of data repositories does your organization utilize?
3. What is the standard communication style in your architecture?
4. How is integration achieved in your architecture?
5. What methods do you use to develop your architecture?
6. How mature are your services implementations?
7. How extensive is your SOA?
8. What architectural principles define your approach?
9. How extensive and sophisticated is your organization's use of frameworks in your architecture?
10. How are architectural decisions made in your organization?
11. Does your organization use reference architectures?

7.3 Architecture Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Architecture dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization’s Architecture dimension. Survey data obtained through the Architecture dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Architecture Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Monolithic Architecture*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Low or nonexistent No SOA methods or practices are apparent.	10	1, 7
Integrated (Level 2) *Layered Architecture*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Limited Limited use of formal SOA methods and practices can be observed. Methods and practices are limited to integration between applications or systems.	20	1, 2, 5, 6, 7 4, 8, 9
Componentized (Level 3) *Component Architecture*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Cross-organizational Formal SOA methods and practices are employed by multiple groups within the enterprise. The organization has a loosely defined enterprise architecture supported by limited tooling and governance practices.	30	4, 5, 6, 7, 8 9, 10, 11
Services (Level 4) *Emerging SOA*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Enterprise-wide Formal SOA methods and practices are employed across the enterprise supported by a formal governance process. Applications and services are designed using formal SOA principles and patterns.	40	4, 5, 6 1, 7, 8, 11

Maturity Indicators for the Architecture Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Composite Services (Level 5) *SOA*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Integrated Enterprise-wide Enterprise frameworks and practices supported by the use of a formal SOA method and reference architectures across the enterprise. A formal enterprise business information model is evolving.	50	 7, 8, 9, 11 2, 10
Virtualized Services (Level 6) *Grid-enabled SOA*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Integrated across the enterprise and externally between business partners. Service components are designed using formal methods, practices, and frameworks that promote the re-use of assets. Formal enterprise-wide business information services have been developed and deployed.	60	 1, 3, 4, 5, 6, 9 2, 8, 10, 11
Dynamically Re-Configurable Services (Level 7) *Dynamically Re-configurable Architecture*	Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques.	Adaptive Enterprise Service components are designed using formal SOA methods, principles, patterns, frameworks, or techniques. Formal enterprise business information services have been designed and implemented that includes both enterprise and external relationship entities.	70	 1, 3, 4, 5, 6, 9 2, 8, 10, 11

8 Information Dimension: Base Model

This chapter defines the base model for the OSIMM Information dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit the level of formality to which an organization has successfully applied SOA application (or system) design, development, and deployment principles and adopted SOA-enabling technologies such as an ESB and service registry. Maturity ranges from application-specific data solution to semantic data vocabularies.

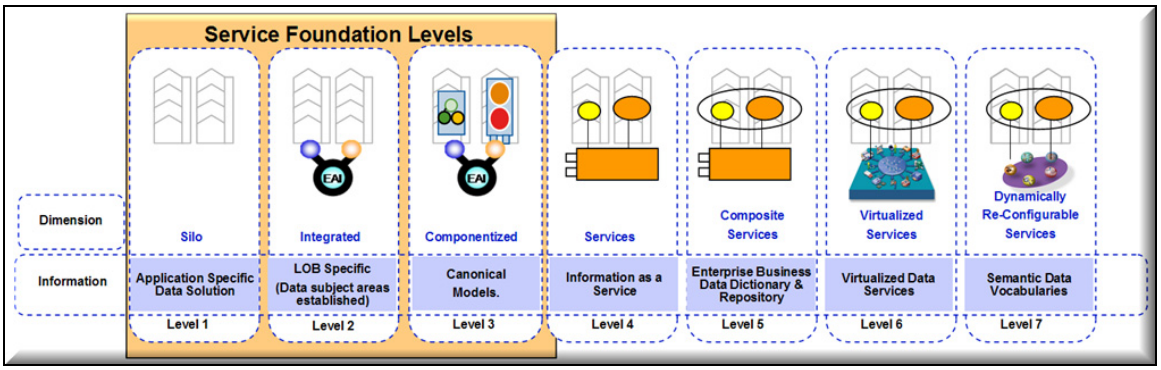


Figure 8: OSIMM Information Dimension

8.1 Information Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Information dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Information dimension can be conducted by identifying *the information architecture that supports a master data model (federated data service) and implements a common business data vocabulary*.

8.2 Information Dimension: Assessment Questions

By gathering information using these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Information dimension maturity level.

1. Is there a common data model across all applications?
2. Are there independent data models for different applications?
3. Are mapping rules used to convert between different data models?
4. Is there difficulty in moving data from one application to another? For all applications? For only some applications?
5. Does your organization have a common data model, (or mappings between multiple data models)? How is this defined? By programming objects in APIs? By XSD schemas? By written documents? By other computer-based modeling tools? By other non-computer-based modeling tools?
6. Are the data models in the form of Business Object Models, understandable to and owned by, the business, or as IT object models, understandable only to, and owned by, the IT teams?
7. If there are mapping rules across different models, are these understandable to and maintained by the business or by IT staff? Are such mapping rules performed by the infrastructure?
8. Are the data models defined by a language that includes taxonomies, ontologies, or other high-level logical representations?
9. Do you maintain a global directory or database of data objects, with global identifiers? Or do you have mechanisms for mapping these objects between different databases/directories? Are these mechanisms electronic or manual? Are all such objects mapped, or is this done only for certain applications and sets of objects? Are these mappings undertaken automatically by the infrastructure?
10. Do you have mechanisms for looking up global objects by searching on their characteristics?
11. How is the transformation of data between applications achieved? Is an ESB used to perform the transformation? Is this achieved by bespoke adapters as required? Or via a comprehensive set of APIs? Or by calling a service?
12. Are there facilities for performing complex inference in order to map data defined in ontologies from one form to another? Does a master data service exist?
13. Does your organization have or are you developing a Business Information Model to standardize data and message formats and concepts across the enterprise?

8.3 Information Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Information dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization's Information dimension. Survey data obtained through the Information dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the data obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Information Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *Application-specific Data Solution*	The information architecture supports a master data model that implements a common business data vocabulary.	Low or nonexistent Information is replicated and redundant. Conceptual enterprise information model is absent..	10	1, 2, 3, 4, 5
Integrated (Level 2) *LOB or Enterprise-specific*	The information architecture supports a master data model that implements a common business data vocabulary.	Limited Information is shared across some applications using Extraction, Transformation, Load, Manipulate (ETLM) or message-oriented technologies. Initial data vocabularies are beginning to emerge.	20	1, 2, 3, 4, 5, 11
Componentized (Level 3) *Canonical Models*	The information architecture supports a master data model that implements a common business data vocabulary.	Cross-organizational Business data vocabularies have emerged but are application or system-specific. Formal business information models have emerged, often accessed though XML schema style interfaces.	30	1, 2, 3, 4, 5, 6 8, 13

Maturity Indicators for the Information Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Services (Level 4) *Information as a Service*	The information architecture supports a master data model that implements a common business data vocabulary.	Enterprise-wide Multiple business units are using meta-data relationships. Business data vocabularies are standardized within a business unit or process area. Business data can be shared within a business unit and with business partners in a consistent manner. Interfaces are defined using common message data vocabularies.	40	5, 7 6 8, 13
Composite Services (Level 5) *Business Data Dictionary and Repository*	The information architecture supports a master data model that implements a common business data vocabulary.	Integrated Enterprise-wide Information services are in place such as data validation, data cleansing, data transformation, partner data integration, or others. Master data services are in place and are utilized across the enterprise. Business data vocabularies are standardized for use across the enterprise.	50	7, 8, 9, 10 11, 12 13

Maturity Indicators for the Information Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Virtualized Services (Level 6) *Virtualized Information Services*	The information architecture supports a master data model that implements a common business data vocabulary.	Integrated across the enterprise and externally between business partners. Business data vocabularies can be expanded and enhanced as required to support new services, external partners, and business process reconfiguration. A registry with metadata is used to manage enterprise service assets. A formal enterprise-wide business information model has been developed and deployed.	60	 7, 8, 9 10, 11, 12 13
Dynamically Re-Configurable Services (Level 7) *Semantic Data Vocabularies*	The information architecture supports a master data model that implements a common business data vocabulary.	Adaptive Enterprise Business data vocabularies can easily be expanded and enhanced as required to support new services, external partners, and business process reconfiguration. Business data is defined using semantic web constructs, or ontologies (e.g., UN/CEFACT Core Components, ISO 11179). A formal enterprise business information model has been designed and implemented that includes both enterprise and external relationship entities.	70	 1, 2, 3, 4, 5, 6, 7, 8, 9 8, 9, 10, 11, 12 13

9 Infrastructure & Management Dimension: Base Model

This section defines the base model for the OSIMM Infrastructure & Management dimension base model. The base model defines a set of generic maturity indicators and attributes that can be used to assess an organization's SOA maturity level against the OSIMM maturity matrix. Additional maturity indicators, assessment questions, and attribute mappings can be added by vendors or user organizations to extend the base OSIMM model.

The assessment questions that follow help elicit the level of formality to which an organization has successfully applied SOA application and system design, development, and deployment principles and adopted SOA-enabling technologies such as an ESB and service registry. Maturity ranges from LOB platform-specific to context-aware event-based sense and respond.

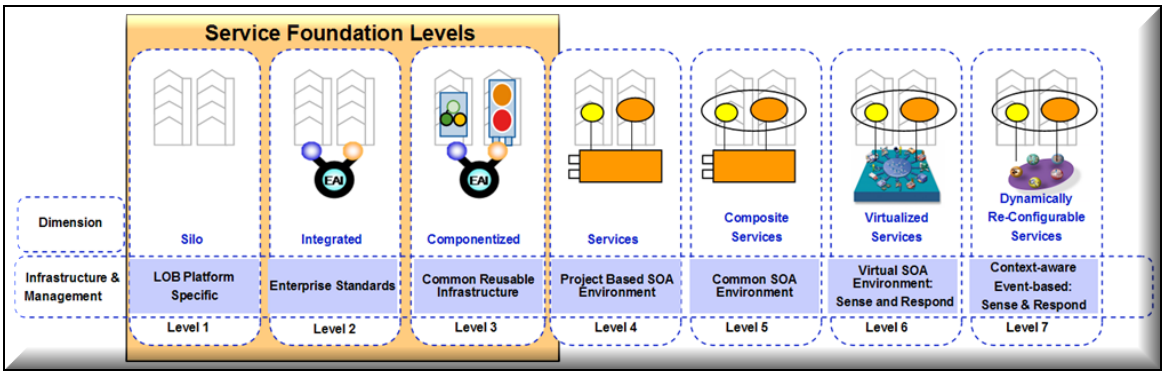


Figure 9: OSIMM Infrastructure & Management Dimension

9.1 Infrastructure & Management Dimension: Base Model Maturity Indicator

The base OSIMM model provides one of many possible maturity indicators per dimension. Organizations, vendors, and consultants can provide additional maturity indicators, assessment questions, and attribute mappings to provide additional guidance necessary for the maturation of an organization's SOA.

The following Infrastructure & Management dimension maturity indicator is provided as part of the base OSIMM specification:

An SOA maturity assessment of the OSIMM Infrastructure & Management dimension can be conducted by identifying *the IT infrastructure that supports the non-functional and operational requirements and SLAs needed to operate an SOA environment*.

9.2 Infrastructure & Management Dimension: Assessment Questions

By gathering information using these assessment questions, an assessor can map a maturity indicator to the associated maturity attributes, thereby determining the Infrastructure & Management dimension maturity level.

1. What are your current infrastructure usage guidelines?
2. How are your IT SLAs derived from the business SLAs?
3. Have you defined SLAs around quality-of-service? How is this monitored and measured?
4. Have you defined any SLAs around security and privacy? How is this measured and monitored?
5. What level of monitoring is in place today? What management tools are in place today?
6. What platforms are currently in use for integration?
7. Which assets are placed under version control?
8. What is your current change management process?
9. What tools are used for configuration management?
10. What are considered as your organization's IT assets (excluding human resource)? How are these assets managed?
11. What does your current operational architecture look like?
12. How does your operational architecture support the non-functional requirements for applications and services?

9.3 Infrastructure & Management Dimension: Maturity Indicator-to-Attribute Mapping

The following are the base set of maturity indicators for the OSIMM Infrastructure & Management dimension. Each maturity indicator is associated with a set of maturity attributes. Maturity attributes are those observed characteristics of a maturity indicator for each maturity level. The assessment questions are used to survey an organization’s Infrastructure & Management dimension. Survey data obtained through the Infrastructure & Management dimension assessment questions is used to determine the maturity level by assessing the data and matching to the maturity attributes that best fit the information obtained. The maturity weighting is used to determine an average maturity score across multiple maturity indicators. The model can be extended by adding additional maturity indicators and assigning weighting to the indicator by maturity level according to the value placed on the maturity indicator by the assessing organization.

Maturity Indicators for the Infrastructure & Management Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Silo (Level 1) *LOB Platform-specific*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Low or nonexistent Little or nonexistent operating support for the deployment of services.	10	1, 5, 6, 7, 8, 9, 11
Integrated (Level 2) *Platform-specific*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Limited Messaging solutions exist to integrate applications and support the migration to an ESB. Service management and service security are partially implemented.	20	1, 6 3, 4, 5, 12
Componentized (Level 3) *Common Re-usable Infrastructure*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Cross-organizational Processes for service management and security have been published and are in use for the business unit or enterprise.	30	1, 3, 4, 5, 12
Services (Level 4) *Project-based SOA Environment*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Enterprise-wide Operating environment supports enterprise-wide service deployment. Identities of distributed users across departmental, organizational, and enterprise boundaries can be administered and managed.	40	3, 4, 5, 6, 11, 12

Maturity Indicators for the Infrastructure & Management Dimension				
Maturity Level ***Cell Name***	**Maturity Indicator**	**Maturity Attributes**	**Maturity Weighting**	**Assessment Question Mapping**
Composite Services (Level 5) *Common SOA Environment*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Integrated Enterprise-wide Service management supports quality-of-service and composite applications. Security policies are managed and enforced.	50	 2, 3, 5, 11, 12 4
Virtualized Services (Level 6) *SOA Environment Sense and Respond*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Integrated across the enterprise and externally between business partners. Services as resources can be virtualized such that an instance may be deployed across multiple runtime environments. Service monitoring and performance management supports deployment of new services.	60	 1, 2, 3, 5, 6, 7 5, 7, 8, 9
Dynamically Re-Configurable Services (Level 7) *Context-aware Event-based Sense and Respond*	The IT infrastructure supports the non-functional and operational requirements and SLAs needed to operate an SOA environment.	Adaptive Enterprise Service management tracks and predicts changes to services necessary to optimize service quality. Services can be re-used in new and dynamic ways without negatively impacting the quality-of-service of existing services. Service security policies are dynamic and managed in real time.	70	 2, 3, 8, 9 3, 4, 11, 12 4

10 The OSIMM Assessment Method

OSIMM may be used to support an SOA assessment of a single project or for an entire line of business, the entire enterprise, a service eco-system, or industry. The purpose of the OSIMM assessment method is to assess the current maturity and determine the target maturity level (goal state) necessary to meet stated business objectives.

Extending the OSIMM model to assess maturity against additional maturity indicators such as SOA industry frameworks is expected and encouraged. The OSIMM assessment method is iterative and evolutionary. As an organization adopts an SOA strategy, becomes more familiar with OSIMM assessments, and accumulates experience implementing SOA systems, it may add its own maturity indicators to the model.

The value of OSIMM as an assessment tool is to provide SOA transformation and adoption guidance for the SOA governance process.

10.1 Overview

Analysis consists of the following three activities:

1. Assessment of the current maturity levels of the business, organization, and IT
2. Goal state identification and definition, building a vision of what the organization's business, processes, staff, and IT solutions would look like if they were transformed to a highly-capable SOA
3. Production of the recommendation report which identifies the current maturity levels of the various domains, describes the ideal goal state, and defines a roadmap showing how to advance to that goal state

These activities are performed in an OSIMM analysis, which has the following steps:

- Identify the business objectives relevant to the target assessment (use enterprise architecture artifacts as input).
- Extend the OSIMM model by adding the desired maturity indicators.
- Add desired attributes for the maturity indicators at each maturity level. Extending the base OSIMM model with additional maturity indicators allows the organization to link SOA adoption to its strategy, thereby alleviating pain-points or adding business capability.
- Assess the current maturity level by comparing the current state of the organization's SOA adoption against the maturity indicators by mapping them to the corresponding maturity attributes.

- Determine the goal state maturity levels by considering the required level of SOA maturity necessary to achieve the stated business goals.
- Compare the current and target-level maturity indicators to identify gaps and determine the organization's transformation roadmap from current maturity to desired target.
- Document the assessment and the transformation roadmap in the assessment report.

Figure 10 depicts the OSIMM assessment process as outlined above.

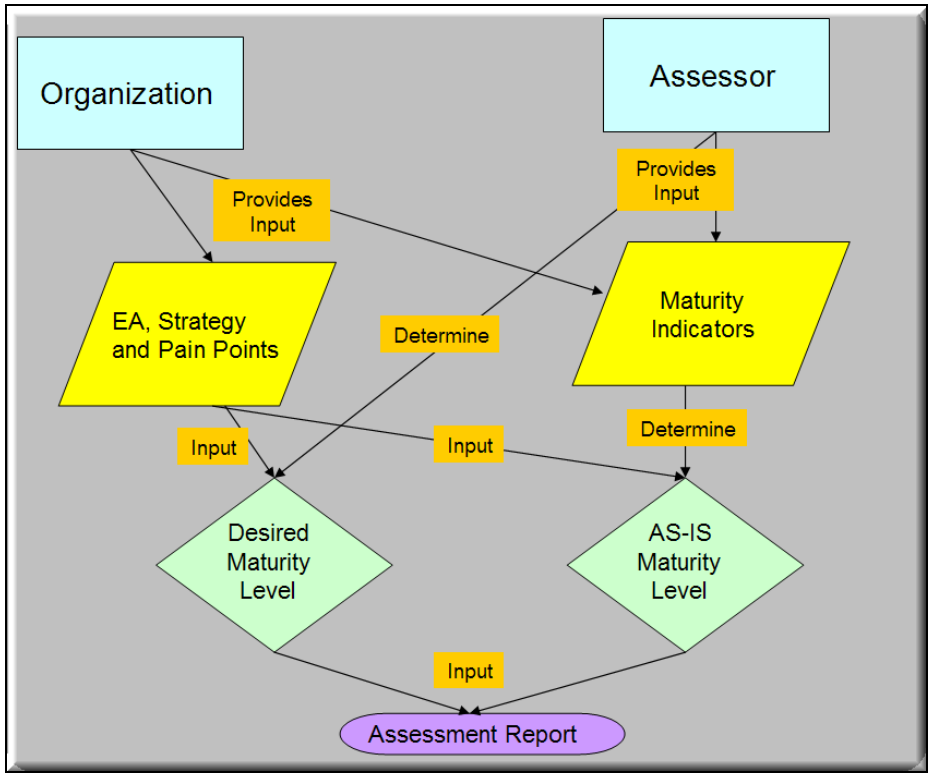


Figure 10: OSIMM Analysis Process

10.2 OSIMM Assessment Steps

10.2.1 Identify the Pain-Points, Scope, and Business Goals

Pain-points define where the organization considers that its processes need to be improved, and can be used to focus the subsequent OSIMM analysis. The assessor should gather material that can help determine the desired goal states of the SOA maturity levels. This material includes strategy documents, user requirements, and enterprise architecture artifacts. At this stage, an initial list of pain-points or strategic goals is determined. Once this is done the scope and structure of the SOA roadmap and transformation can be determined. The dimensions and domains in the OSIMM may be used to assist the definition of the scope.

10.2.2 Extend the OSIMM Model

On the basis of the agreed scope and objectives, an assessment matrix must be created, based upon the full OSIMM matrices, but tailored to focus on the key pain-points. The OSIMM model may be extended by adding additional maturity indicators. Additional maturity indicators can be used to focus on specific pain-points or strategic requirements for the adoption of services. This requires the assessment team to carefully map maturity attributes to any additional maturity indicators. Adding maturity indicators to the OSIMM base model should be conducted by experienced SOA practitioners.

10.2.3 Assess Current State

The assessor uses the extended OSIMM model produced in the previous step to interview key staff in the organization in order to assess the current state of the organization and hence its current maturity level. The interviews should be based upon the base assessment questions provided within the OSIMM and assessment questions added as part of the extension, and can include additional questions considered relevant by the assessor that may help to map indicators to maturity attributes. On the basis of the answers to the assessment questions, the current maturity level is determined for each domain, and aggregated through the dimensions to the overall state of the organization.

10.2.4 Determine Future State

The future desired state is determined using requirements documents, enterprise architecture artifacts, and interviews with the key staff. It is important to focus on those individuals who possess a good understanding and vision of the future requirements for business-based services and SOA infrastructure. The desired future state is determined by assessing the return-on-investment for higher-level SOA maturity within each OSIMM dimension against business requirements.

10.2.5 Identify the Gaps and Determine the Roadmap

The previous steps have identified the current and future maturity levels across all of the domains and dimensions in the assessment matrix created in the first step. The assessor should now determine the gaps between the current and future maturity levels, and create a roadmap that takes the organization from current to target. The maturity indicators for each domain must show the current and desired state, and the steps in the roadmap must be constructed in order to take the domains from current to desired, and to achieve business objectives or alleviate pain-points. The assessor should also consider constraints and prerequisites that will exist between the different IT and business entities that need to be put in place. It should be noted that the output of the OSIMM roadmap is intended to provide a relatively high-level statement of the activities that need to be undertaken, and that further, more detailed analysis can be undertaken, outside of the OSIMM analysis, of the precise nature of the activities.

The conclusions of the OSIMM assessment, including pain-points, assessment matrix, current maturity level, future maturity level, alleviation of pain-points, and roadmap, should be documented in a report to be used to guide the next stage of analysis and planning and provide input into future SOA roadmaps, SOA governance activities, and enterprise architecture spirals.

A Example Assessment

This appendix illustrates the use of the OSIMM by describing an example assessment. The company described – HEALTHCO – is fictional. The assessment is described at an outline level, showing the main features of the method, but not the details of the specific indicators, attributes, weightings, and assessment questions.

A.1 Business Objective

HEALTHCO, a company providing healthcare services, envisioned an SOA to drive integration, promote a common business and IT vision, and optimize IT spending to support its business goals. To accomplish this vision, HEALTHCO needed to identify gaps in its current IT environment from the service integration maturity perspective. The OSIMM was used to assess the current state, determine the target state, and develop recommendations across the OSIMM dimensions.

A.2 Analysis

In the example, a number of applications were divided into two groups – front-end and legacy – and an OSIMM analysis was performed. The steps, focusing on the Business dimension, are summarized below:

- A pain-point is that the business perceives IT as not being sufficiently agile to support the introduction of new business processes.
- By analyzing the maturity indicators, it is determined that the business sees IT as applications rather than composite services that can be created from other services.
- This places the organization currently at Level 2 on the Business dimension.
- The applications are monolithic and are not integrated with other systems.
- By considering the characteristics of different levels as defined in the OSIMM, it can be seen that business at Level 5 will alleviate the pain-point by facilitating the design of new business processes from services.
- The need to go from Level 2 to (at least) Level 5 in the Business dimension suggests a step in the roadmap of introducing business processes and services to structure the functionality.

A.3 Recommendations

The recommendations are summarized in the following table, together with the current and target maturity levels for each of the dimensions:

OSIMM Dimension	Current Maturity Level	Summarized Assessment	Target Maturity Level	Recommendations
Business View	2	Strengths: • Business has good understanding of IT capabilities. Weaknesses: • Business views IT as a set of applications that deliver capabilities to support business processes. • Business capabilities are not aligned with IT. • Application inter-dependencies and complexities affect business agility.	6	A componentized view of the business capabilities should be developed in which business views services as assets that transcend the current application-centric views.
Organization	3	Strengths: • Cross-application organization is in place. • Responsibility for service enablement is managed. Weaknesses: • The IT organization is mostly application-centric with specialized skills to manage the development and support for specific applications.	4	Business owners should drive changes to services, business processes, and the component architecture to meet changing business needs. IT owners should be assigned to support specific business capability areas and their business owners. Business capability owners should be enabled to focus more on sustaining and improving specific capabilities.

OSIMM Dimension	Current Maturity Level	Summarized Assessment	Target Maturity Level	Recommendations
Methods	2	Strengths: • IT planning and governance process in place. • Consistent development methodology followed. • Object-oriented design and development practices in place for front-end applications. • Services standards and guidelines are published. Weaknesses: • Planning and development process does not support services modeling or code re-use, with limited support for business process modeling. • Planning and development process is heavyweight and waterfall-based.	4	Enhance planning and development methods to support services identification, design, and development. Introduce services governance process. Enhance planning and development processes to encourage and promote code re-use. Enhance planning and development processes to support iterative development. Enhance the software development method to support business process modeling and implementation.
Infrastructure	3	Strengths: • System management software is in place. • Security infrastructure is in place. Weaknesses: • SOA-specific infrastructure (services management, BPM) is absent.	5	Deploy web services management infrastructure to support enterprise-scale SOA deployment. Deploy Business Process Management (BPM) infrastructure. Deploy SOA security infrastructure to be able to support security policies defined at the service level.

OSIMM Dimension	Current Maturity Level	Summarized Assessment	Target Maturity Level	Recommendations
Applications (Front-end)	3	Strengths: • Architecture is componentized and layered. • Object models used. Weaknesses: • Minimal code re-use. • Object models not shared and are developed independently. • BPM/workflow is custom or not in place. • Application architecture is not standardized.	5	Implement enterprise domain object model. Introduce code re-use at the component and library level. Standardize reference application architecture, design patterns, and best practices. Implement business rules engine. Modernize and componentize COBOL applications.
Applications (Legacy)	2	Strengths: • Efforts are in place to modernize the application architecture. • Legacy access views provide a consistent approach for code re-use. Weaknesses: • COBOL legacy architecture difficult to change. • No consistent approach for system componentization. • BPM/workflow is custom or not in place. • Application architecture is not standardized and does not address back-end applications.		

OSIMM Dimension	Current Maturity Level	Summarized Assessment	Target Maturity Level	Recommendations
Architecture Integration & Services (Front-end)	3	Strengths: • Most applications consume legacy access views using standard approach. • Some applications act as service providers. • WSDL files published within each application. Weaknesses: • Point-to-point integration. • Different protocols and translation mechanisms used for mainframe integration. • Security architecture is inconsistent.	5	Implement re-usable business services. Implement Enterprise Integration Data Model (Canonical Data Model). Implement uniform transport protocol for web services. All communications with internal and external systems should be handled by ESB. Support legacy consumers using ESB. Implement some of the application components as coarse-grained service components where component's interfaces are exposed using web services. All applications, including mainframe back-end systems, communicate via web services as opposed to re-using copybooks and legacy access views directly. COBOL applications should be able to act as consumers of web services provided by other back-end systems. SOA must provide the support for batch processing; batch processing should be implemented "on the side". Design and implement security policies at the service level.
Architecture Integration & Services (Legacy)	3	Strengths: • Legacy access views are used to provide services to other applications and are documented. • An approach is in place to make the legacy access views available to consuming systems. • ESB implemented. Weaknesses: • Back-end systems tightly coupled. • Some legacy access views not generic. • No enterprise data model for system integration. • Business functions are duplicated in multiple systems. • Heavy reliance on batch feeds. • Security architecture is inconsistent.		

B Benefits of Moving to Higher Maturity Levels

B.1 From Silo to Integrated

Organizations transforming from a Silo maturity level to an Integrated maturity level will significantly reduce operational and maintenance cost. These cost reductions are realized by reducing redundant and laborious data entry processes, reducing batch cycles to transform and transfer the data from one system to another. From this transition the data is available on a real-time basis, with reliable delivery of data, and automated data format conversion for the integrating systems. The transformation from structured programming to object-oriented programming would also leverage re-usability of the code and help in re-usability and reduction of the software maintenance complexities since the software is more modular. The modular code increases readability of the code, thus reducing maintenance time.

B.2 From Integrated to Componentized

Organizations transforming from an Integrated maturity level to a Componentized maturity level would benefit in preparing themselves to expose the business functionality at a more granular level; such exposure is required at more advanced maturity levels. The re-usability also matures to be at a business function level as compared to application level, and enhancements and new functionality are achieved through refactoring of the existing applications into smaller, re-useable components. The disaggregation of the business in itself helps in reducing the complexities and facilitates the analysis of the impact of the componentized organization on new business models and business transformations. This componentization also helps the organization in reducing the time-to-market and increases IT response to business changes.

B.3 From Componentized to Services

The transformation from a Componentized maturity level to a Service maturity level causes the organization to be viewed more as a service provider to other organizations within the enterprise or external to the enterprise participating in the value chain. Business services now become re-usable. This maturity level reduces the need for (and hence the cost of) redeveloping the same functionality for multiple systems by the provision of re-useable services called through standardized interfaces, irrespective of the technology platform on which the application is running. These services can also offer access to data in a controlled and timely manner, which reduces inconsistencies in the data within systems that access and update it. The investment of effort in identification, specification, development, testing, and deployment of a service is paid back when new systems require the same service from the providing organization, since the cost of infrastructure and maintenance of common functionality is reduced.

B.4 From Services to Composite Services

Organizations transforming from a Service maturity to a Composite Service maturity level have structured their business and IT support so that new business processes may be more rapidly constructed out of services, and provision of new business functionality to different parts of the organization may be achieved more easily. This also reduces the time-to-market of a new business model due to a change in business strategy and or business transformation. At this level of transformation it is primarily a re-composition of the services provided by different organizations within an enterprise of the value chain of the enterprise.

B.5 From Composite Services to Virtualized Services

Organizations transforming from a Composite Service maturity to a Virtualized Service maturity level benefit from a significant degree of flexibility in the design of integrated systems, in that different types of service (in terms of protocol, data models, etc.) that would otherwise not be interoperable can be more easily integrated. In addition, a system may be reconfigured to achieve higher reliability, without the consumers having to modify their code. Virtualized services will enable organizations to better align business requirements with IT capabilities by building robust services that are highly flexible, manageable, and scalable consistently.

B.6 From Virtualized Services to Dynamically Re-Configurable Services

Organizations achieving this level of maturity would have completely decomposed services with service configuration information stored in a database for the service to be dynamically configured based on the dynamic nature of service requests. This provides a superior flexibility for business transformation and provides a complete business and IT alignment. This provides autonomic features for the infrastructure to sense and respond to service requests within the organization and enterprise with high resiliency.

Organizations at this level of maturity would have services that provide an agile capability to meet SLAs by allocating capacity dynamically with increased flexibility, which makes the organization highly competitive. This capability would also enable the organization to optimize services for high availability and scalability without impacting service levels and reduce the complexity of deploying services.

C Relationship to Other SOA Standards

The "Navigating the SOA Open Standards Landscape Around Architecture" joint White Paper from OASIS, OMG, and The Open Group [SOA WP] was written to aid the SOA community navigate the myriad of overlapping technical products produced by these organizations with specific emphasis on the "A" in SOA; i.e., Architecture.

This joint White Paper explains and positions standards for SOA reference models, ontologies, reference architectures, maturity models, modeling languages, and standards work on SOA governance. It outlines where the works are similar, highlights the strengths of each body of work, and touches on how the work can be used together in complementary ways. It is also meant as a guide to users of these specifications for selecting the technical products most appropriate for their needs, consistent with where they are today and where they plan to head on their SOA journeys.

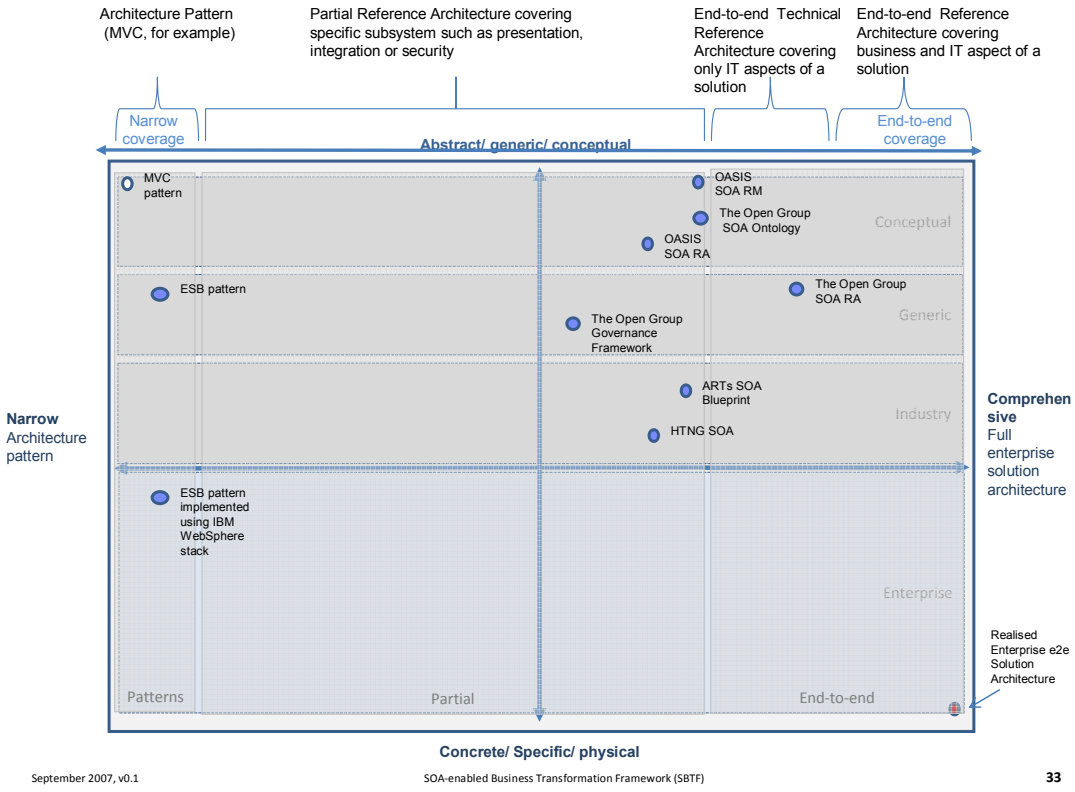
While the understanding of SOA and SOA governance concepts provided by these works is similar, the evolving standards are written from different perspectives. Each specification supports a similar range of opportunity, but has provided different levels of detail for the perspectives on which they focus. Therefore, although the definitions and expressions may differ somewhat, there is agreement on the fundamental concepts of SOA and SOA governance.

The following is a summary of the positioning and guidance on the specifications:

- The OASIS Reference Model for SOA (SOA RM) is the most abstract of the specifications positioned. It is used for understanding core SOA concepts.
  (See [SOA RM].)
- The Open Group SOA Ontology extends, refines, and formalizes some of the core concepts of the SOA RM. It is used for understanding core SOA concepts and facilitates a model-driven approach to SOA development.
  (Refer to: www.opengroup.org/projects/soa-ontology.)
- The OASIS Reference Architecture for SOA Foundation is an abstract, foundation reference architecture addressing the ecosystem viewpoint for building and interacting within the SOA paradigm. It is used for understanding different elements of SOA, the completeness of SOA architectures and implementations, and considerations for cross-ownership boundaries where there is no single authoritative entity for SOA and SOA governance.
  (Refer to: http://docs.oasis-open.org/soa-rm/soa-ra/v1.0/soa-ra-pr-01.pdf.)
- The Open Group SOA Reference Architecture is a layered architecture from a consumer and provider perspective with cross-cutting concerns describing those architectural building blocks and principles that support the realizations of SOA. It is used for understanding the different elements of SOA, deployment of SOA in the enterprise, the basis for an industry or organizational reference architecture, implication of architectural

decisions, and positioning of vendor products in SOA context.
(Refer to: www.opengroup.org/projects/soa-ref-arch.)

- The Open Group SOA Governance Framework is a governance domain reference model and method. It is for understanding SOA governance in organizations. The OASIS Reference Architecture for SOA Foundation contains an abstract discussion of governance principles as applied to SOA with particular application to governance across boundaries. (See [SOA GF].)
- The Open Group SOA Integration Maturity Model (OSIMM) is a means to assess an organization's maturity within a broad SOA spectrum and defines a roadmap for incremental adoption. It is used for understanding the level of SOA maturity in an organization. (This document).
- The Object Management Group SoaML Specification supports services modeling UML extensions. It can be seen as an instantiation of a subset of The Open Group SOA Reference Architecture used for representing SOA artifacts in UML.
(Refer to: www.omg.org.)



Fortunately, there is a great deal of agreement on the foundational core concepts across the many independent specifications and standards for SOA. This could be best explained by broad and common experience of users of SOA and its maturity in the marketplace. It also provides assurance that investing in SOA-based business and IT transformation initiatives that incorporate and use these specifications and standards helps to mitigate risks that might compromise a successful SOA solution.

It is anticipated that future work on SOA standards may consider the positioning in this document to reduce inconsistencies, overlaps, and gaps between related standards and to ensure that they continue to evolve in as consistent and complete a manner as possible.

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