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Information technology — The Open Group Service Integration Maturity Model (OSIMM)

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Technologies de l'information — Modèle de maturité d'intégration du service de groupe ouvert (OSIMM)

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Open Group Standard

The Open Group Service Integration Maturity Model (OSIMM) Version 2

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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), Version 2. 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 (Non-Normative)

The following documents are referenced non-normatively 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 ONT] The Open Group SOA Ontology, Technical Standard, October 2010 (C104); refer to: www.opengroup.org/bookstore/catalog/c104.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

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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

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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 The OSIMM Assessment Method (Chapter 10) but is not mandated for conformance.

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1.4 Terminology

This terminology section provides definition for terms that have a specialized meaning within OSIMM or are prone to alternative interpretations; therefore, the following definitions apply to this OSIMM standard:

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".

Assessment

Evaluation or appraisal process for determining maturity.

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.

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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.

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

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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.

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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 Management

Practice and techniques necessary to manage services in SOA solutions.

Service Orientation

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

Note: 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.

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.

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SOA Method

Best practices, reference architectures, templates, and guides for developing an SOA solution.

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 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

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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

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- 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 OSIMM Maturity Matrix (Figure 1).

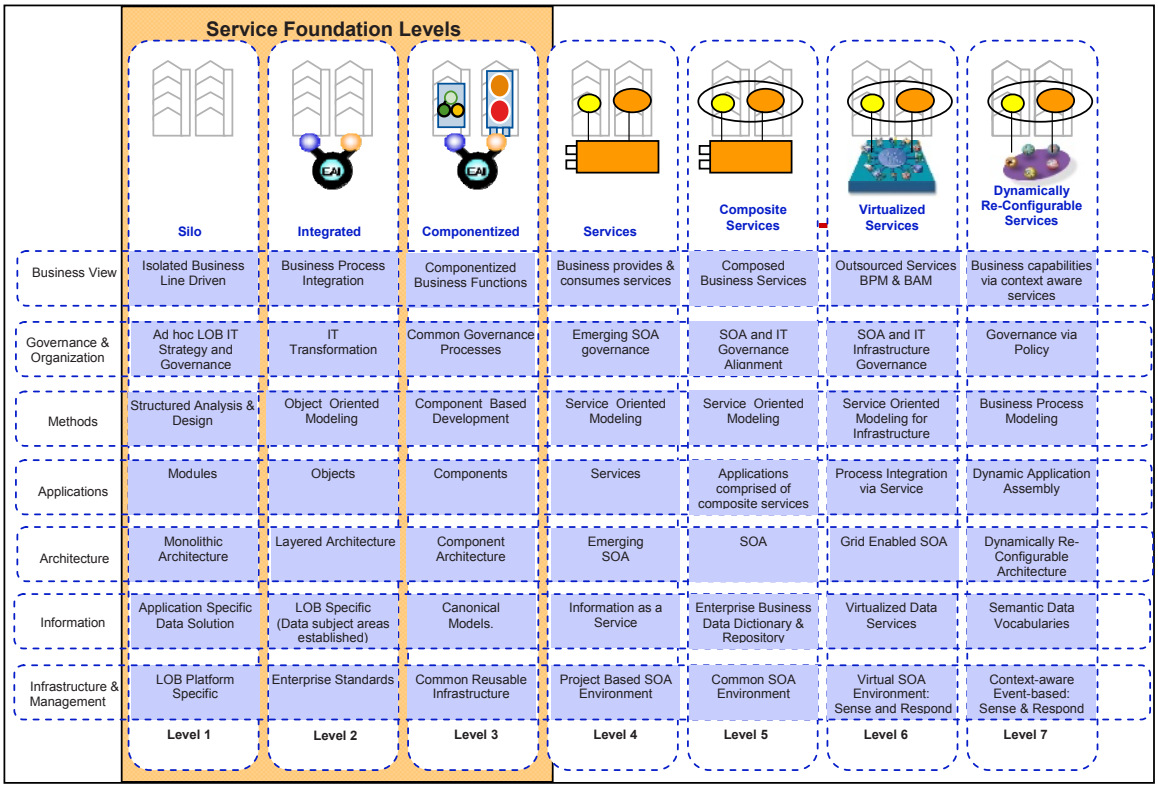

Figure 1: OSIMM Maturity Matrix

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, as described under Assessment Questions and Maturity Indicators by Dimension (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

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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

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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 Service Component Architecture (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.

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