

Oracle® Practitioner Guide

Creating an SOA Roadmap

Release 3.2

E14986-03

February 2012

Creating an SOA Roadmap, Release 3.2

E14986-03

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Preface

An SOA Roadmap provides the guidance to successfully adopt a service-oriented approach to building IT solutions to support the business. A well constructed SOA Roadmap will define projects that incrementally deliver SOA and provide business value at each step while minimizing the risks associated with SOA adoption. To build such a roadmap requires a solid understanding of the current situation with respect to SOA, a clear vision of what the SOA initiative needs to accomplish to be successful, and a structured approach to defining the iterations that comprise the path to successful SOA adoption.

Purpose

The purpose of this document is to describe a repeatable process for constructing an SOA Roadmap. The process described follows the standard four steps used within the industry to create roadmaps i.e. establish the current state, define the future vision, analyze the gap, and define the phases and schedule of the roadmap. It is the particulars within each phase of the overall process that provide the uniqueness and value of the approach described in this document.

Audience

This document is intended for Program Managers and Enterprise Architects that want to understand how to build a fact-based SOA Roadmap. Some level of understanding of SOA is required since this document does not provide any SOA background or primer material.

How to Use This Document

This document is intended to be read from start to finish. However, the first two sections in Chapter 1 can be read standalone if the goal is only to get a high level understanding of the roadmap creation process.

Document Structure

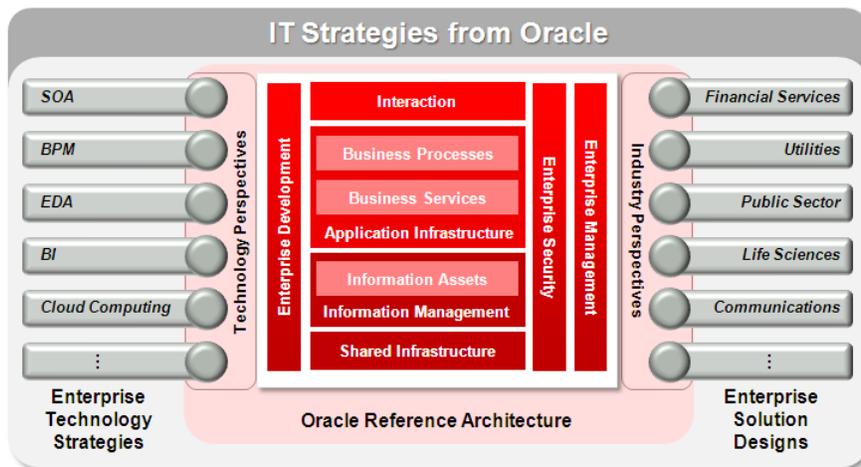
This document is organized chronologically. It describes the SOA Roadmap building process from start to finish. Specifically,

- [Chapter 1](#) describes the process for creating an SOA Roadmap.
- [Appendix A](#) describes the SOA Maturity Model that is used to evaluate the current state and identify capabilities that are lacking or lagging.

- [Appendix B](#) describes the Project Selection Framework that is used to evaluate and select projects for inclusion in the roadmap.
- [Appendix C](#) describes Service Candidate Selection Framework that is used to evaluate and select service candidates for inclusion in the roadmap.

Related Documents

IT Strategies from Oracle (ITSO) is a series of documentation and supporting collateral designed to enable organizations to develop an architecture-centric approach to enterprise-class IT initiatives. ITSO presents successful technology strategies and solution designs by defining universally adopted architecture concepts, principles, guidelines, standards, and patterns.



ITSO is made up of three primary elements:

- **Oracle Reference Architecture (ORA)** defines a detailed and consistent architecture for developing and integrating solutions based on Oracle technologies. The reference architecture offers architecture principles and guidance based on recommendations from technical experts across Oracle. It covers a broad spectrum of concerns pertaining to technology architecture, including middleware, database, hardware, processes, and services.
- **Enterprise Technology Strategies (ETS)** offer valuable guidance on the adoption of horizontal technologies for the enterprise. They explain how to successfully execute on a strategy by addressing concerns pertaining to architecture, technology, engineering, strategy, and governance. An organization can use this material to measure their maturity, develop their strategy, and achieve greater levels of adoption and success. In addition, each ETS extends the Oracle Reference Architecture by adding the unique capabilities and components provided by that particular technology. It offers a horizontal technology-based perspective of ORA.
- **Enterprise Solution Designs (ESD)** are industry specific solution perspectives based on ORA. They define the high level business processes and functions, and the software capabilities in an underlying technology infrastructure that are required to build enterprise-wide industry solutions. ESDs also map the relevant application and technology products against solutions to illustrate how capabilities in Oracle's complete integrated stack can best meet the business, technical, and quality of service requirements within a particular industry.

This document is one of the series of documents that comprise the SOA Enterprise Technology Strategy. The SOA ETS includes reference architecture documents (*ORA SOA Foundation* and *ORA SOA Infrastructure*) as well as “how to” documents such as this guide to creating an SOA Roadmap.

Please consult the [ITSO web site](#) for a complete listing of ORA documents as well as other materials in the ITSO series.

Of particular relevance to this document are the following documents which provide additional information for the SOA Roadmap creation process:

- *SOA Maturity Model Capabilities* - This spreadsheet contains the specific capabilities that are measured as part of the current state analysis. For each capability a description is provided for each level of maturity and adoption.
- *SOA Maturity Model Analysis* - This spreadsheet is used to analyze the scores for the capabilities on both maturity and adoption. The spreadsheet contains various graphical depictions of the scores.
- *SOA Project Selection Framework* - This framework is a spreadsheet used to evaluate the effort, complexity, benefits, and risks associated with each project. The result of this evaluation is a numeric score for the effort, complexity, benefits, and risks.
- *Service Candidate Selection Framework* - This framework is a spreadsheet that is used to score each service candidate against realization benefits and realization inhibitors. The result of this evaluation is a Decision Basis Score for each service candidate.
- *SOA Maturity Model Whitepaper* - This whitepaper describes the SOA Maturity Model and how it can be used to evaluate an SOA initiative.

Acknowledgements

This document is based on a variety of materials that have been created by many different individuals and groups. Thanks to all who contributed. The purpose of this document is to catalogue the materials and describe the process for using the materials together to create an SOA Roadmap.

Conventions

The following typeface conventions are used in this document:

Convention	Meaning
boldface text	Boldface type in text indicates a term defined in the text, the glossary, or in both locations.
<i>italic text</i>	Italics type in text indicates the name of a document or external reference.
<u>underline text</u>	Underline text indicates a hypertext link.

In addition, the following conventions are used throughout the SOA documentation:

“Service” v. “service” - In order to distinguish the “Service” of Service Oriented Architecture, referred to throughout the SOA ETS document series, the word appears with its initial letter capitalized (“Service”), while all other uses of the word appear in all lower-case (e.g. “telephone service”); exceptions to this rule arise only when the

word "service" is part of a name, such as, "Java Message Service" ("JMS"), "Web Service", etc.

Creating an SOA Roadmap

This chapter describes the SOA Roadmap creation process. First, a definition of what is encompassed by an SOA Roadmap is provided followed by an overview of the entire roadmap creation process. Then details for each phase in the process are provided.

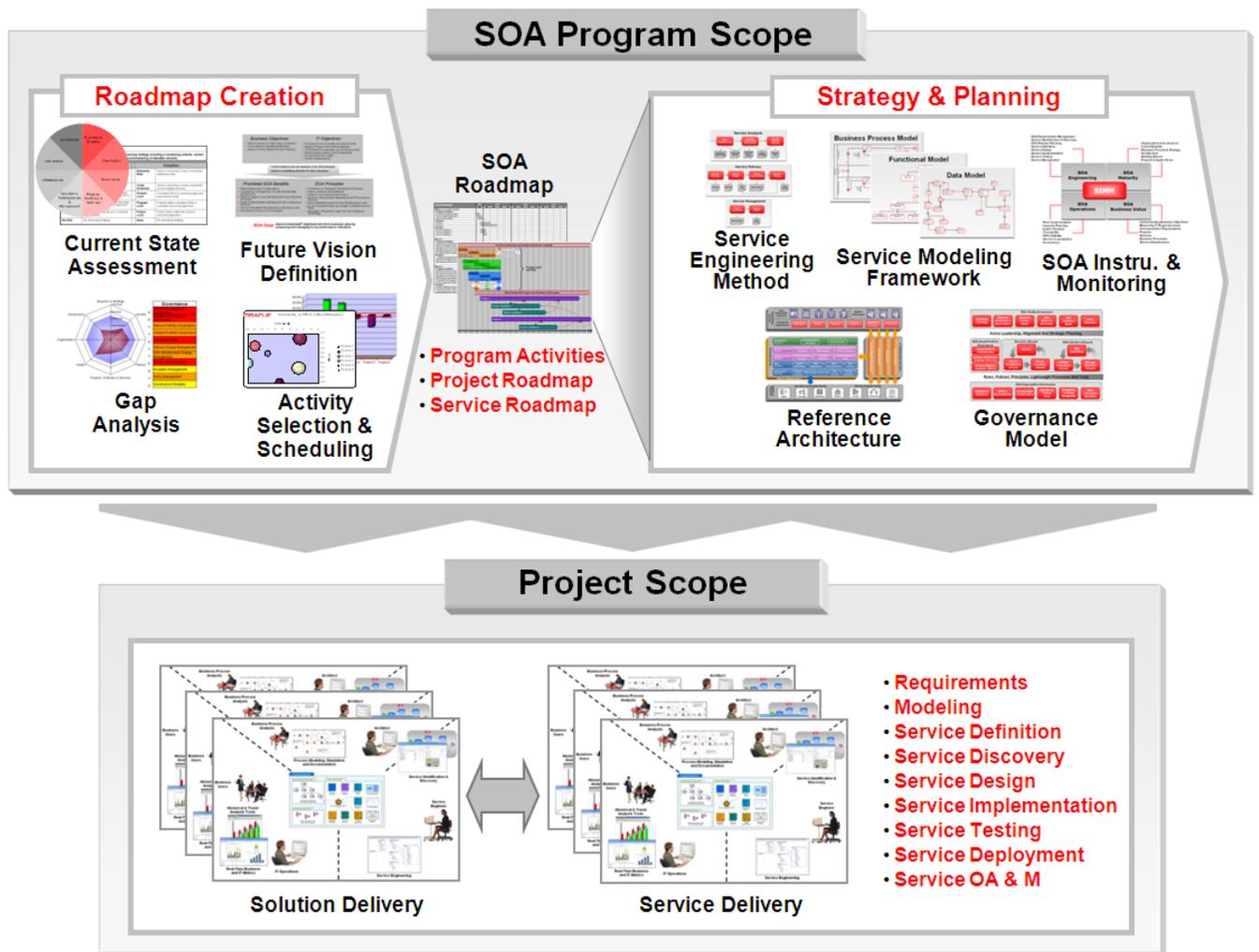
1.1 SOA Roadmap Defined

An SOA Roadmap provides guidance to the SOA initiative allowing multiple projects to progress in parallel yet remain coordinated and ultimately resulting in a common end goal that provides value greater than the sum of the individual projects. The SOA Roadmap consists of three fundamental parts:

- Program-level efforts
- A portfolio of projects that build specific business solutions
- A portfolio of shared Services

The relationship for these three fundamental parts is illustrated in [Figure 1-1](#).

Figure 1-1 SOA Roadmap Fundamental Relationships



The program-level efforts create the processes and assets that are leveraged across all of the individual projects. Examples include the SOA Reference Architecture, governance policies and processes, standards, metrics, training and mentoring, Service engineering method, etc. The program level efforts provide and enforce the necessary consistency required to succeed at SOA adoption. A delicate balance needs to be struck between too little control and too much control. With too little control SOA adoption will be haphazard at best. Too much control may stifle project teams resulting in pushback or, in the worst case, outright defiance.

The portfolio of projects is the route to realizing the SOA Reference Architecture, identifying shared Services, and delivering measurable business benefit. The projects that make up the portfolio need to be chosen based on their business benefit, risk, and Service reuse opportunity. Initial projects drive the Service infrastructure build-out and identify the initial shared Services. Follow-on projects leverage the Service infrastructure and reuse the shared Services. Obviously it is the follow-on projects that demonstrate the full value of SOA.

For most companies it is advantageous to separate the Service infrastructure deployment and configuration into a separate project from the business solution projects. This allows the infrastructure project to focus on creating a sound Service infrastructure that meets the needs of multiple business solution projects. There will

likely be an infrastructure project for each phase of the SOA Roadmap to incrementally deploy the Service infrastructure.

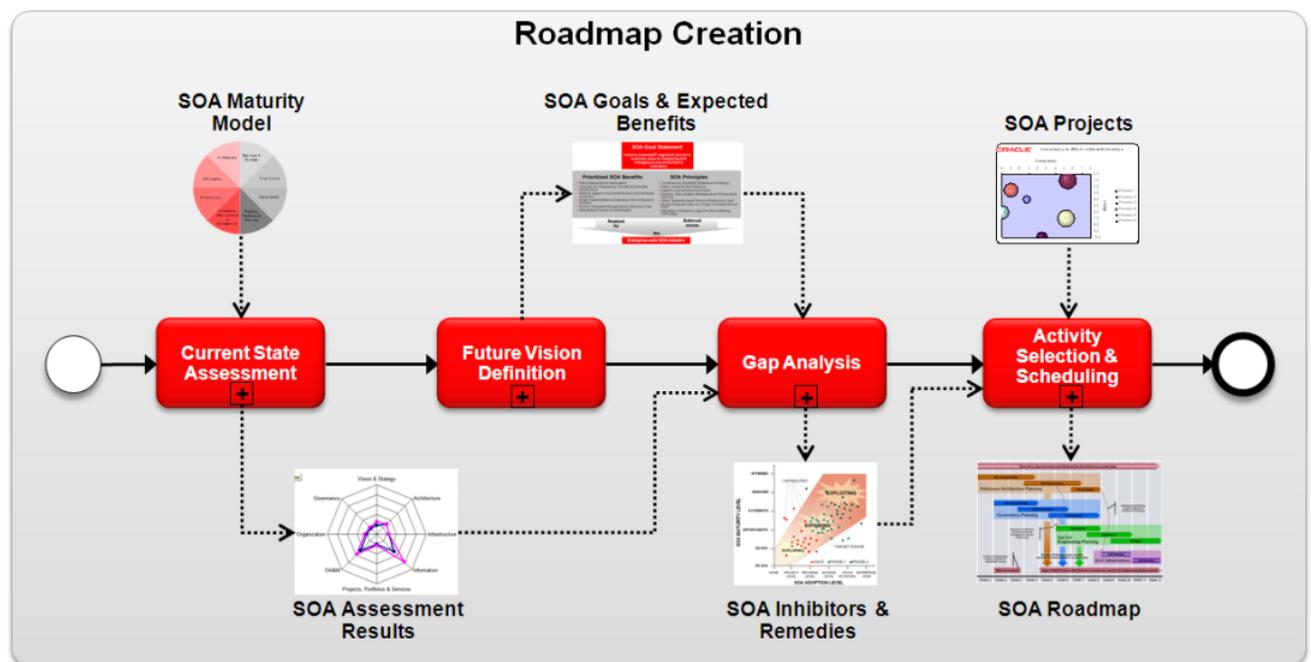
The portfolio of shared Services creates the catalogue of Services that are used (and reused) by projects to delivery business solutions. The portfolio of Services is separated from the portfolio of projects to eliminate Service redundancy and to foster better Service reuse by ensuring that each Service is designed and constructed based on the needs of more than just a single project. Separating the portfolio of Services from the projects also helps prevent tight coupling between the shared Service and the business solution that uses the Service.

Generally, the most effective planning horizon for an SOA Roadmap is 2-3 years. This could be longer or shorter depending on the planning cycles for each organization. The initial phases (e.g. first six months) of the roadmap will contain much greater detail than the later phases. This is appropriate and by design. The SOA journey is a journey of discovery, incremental improvement, and regular course corrections. The SOA Roadmap should be regularly reviewed and updated. The business never stays static, so do not expect the SOA Roadmap to remain static either.

1.2 Roadmap Creation Process

As depicted in [Figure 1-2](#), there are four main phases in the roadmap creation process: Current State Assessment, Future Vision Definition, Gap Analysis, and Activity Selection & Scheduling.

Figure 1-2 Roadmap Creation Process



The current state is measured based on the Oracle SOA Maturity Model. Using this approach to assess the current state of the SOA initiative provides a consistent measurement scale while keeping the effort focused on capabilities important to SOA success and avoiding the scope creep that frequently undermines current state evaluation efforts.

The Future Vision Definition phase is used to establish the high-level goal and reason for the SOA program. While a fully fleshed out future vision is needed eventually, the initial roadmap creation only requires the high-level vision since the development of the detailed vision can itself be part of the SOA Roadmap. Of course, if the current state of the SOA initiative includes a more detailed future vision, that vision can be leveraged when creating the roadmap.

The Gap Analysis phase evaluates the gap between the current state and the future vision for each of the capabilities. Generally the capabilities exhibiting the largest gap are given highest priority during the roadmap creation phase. However, part of the gap analysis also includes evaluating the relative importance for each of the capabilities for this particular organization. Size, organizational structure, existing assets, funding priorities, even politics can significantly impact the relative importance of capabilities.

The final phase is the Activity Selection & Scheduling phase. This phase uses the output from the Gap Analysis phase to create a logical ordering of work to be done. Emphasis is placed on the program-level efforts for the initial phases to establish the assets and processes used across projects and Services. Projects are evaluated for business benefit, risk, and SOA applicability and are then prioritized based on that evaluation. The Service portfolio is derived from the needs of the prioritized projects.

The SOA Roadmap creation process is itself an iterative process. The first iteration may have very limited detail on the project and Service portfolios and focus heavily on the program level efforts. As the roadmap is reviewed and updated, additional details will be added for the project and Service portfolios. As maturity increases and adoption spreads, it is also likely that later phases will include additional program-level activities.

1.2.1 Current State Assessment

Attempting to capture a full, detailed description of the current state of an IT environment of a large company can lead to analysis paralysis. To avoid this problem, the method described here uses a focused scope and a pragmatic, time-boxed approach. The underlying goal is not to fully capture an IT environment current state; rather it is to evaluate the current state relative to the capabilities that are required to successfully adopt SOA.

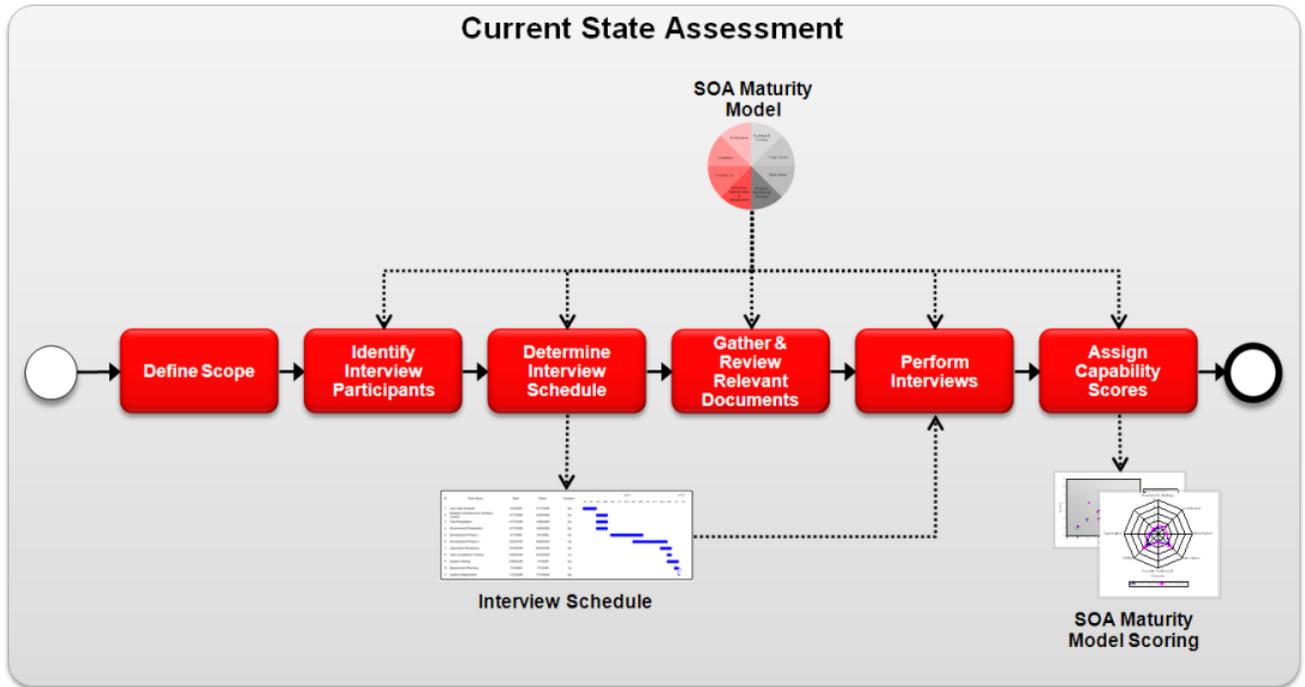
1.2.1.1 Overview

The current state assessment is based on the Oracle SOA Maturity Model. (See [Appendix A](#) for a description of the SOA Maturity Model.) The SOA Maturity Model includes over ninety capabilities that capture the best practices that Oracle has collected over many years working with a wide variety of companies. These capabilities provide the detail necessary to accurately measure and guide the progress of an SOA initiative. Focusing the current state assessment on these specific capabilities ensures a focused scope for the assessment.

Further, the current state assessment should be tightly time-boxed to ensure timely completion of this phase. The size and complexity of an organization determines the actual amount of time that must be allocated to the assessment. Nominally, two weeks is the amount of time required.

An overview of the current state assessment process is shown below:

Figure 1-3 Current State Assessment Process



1.2.1.2 Details

This section details the steps defined in the previous section.

1.2.1.2.1 Define Scope

Before beginning the actual assessment, it is vital that the scope of the assessment is determined and that all involved parties agree to the defined scope. For example, the scope could be limited to a single division or line-of-business within a larger enterprise. Or the scope could be limited to a single geographic location. The scope defines both the scope of the assessment and, ultimately, the scope of the roadmap.

1.2.1.2.2 Identify Interview Participants

Once the scope has been determined, the participants in the assessment can be identified. The participants are chosen to ensure that all capabilities within the SOA Maturity Model can be accurately scored. The following table describes the typical areas of interest and interview participants:

Table 1-1 Typical Interview Participants

Area of Interest	Typical Participant
Business Objectives	VP of Business Unit(s)
	LOB IT
IT Objectives	CIO
	VP of Application Development
	VP of IT Infrastructure
Enterprise Architecture	VP of Enterprise Architecture
	Enterprise Architect(s)

Table 1–1 (Cont.) Typical Interview Participants

Area of Interest	Typical Participant
Program Management	PMO Manager
	Project Manager(s)
Development Process	Application Architect(s)
	Business Analyst(s)
	Development Lead(s)
	Methodologist
	Build Manager
	CM Manger
	QA Manager
Operations	Director of Operations
	Administrator(s)
Security	Chief Security Architect

1.2.1.2.3 Determine Interview Schedule

Once the interview participants have been identified, the next step is to create a schedule for when each participant will be interviewed. The goal is to limit the length of the assessment phase by creating a compacted schedule. It may be necessary to delay the start of the assessment to get times on the participants' schedules that fit into a two week (or so) period. Time before or between interviews can be productive time spent reviewing documentation (i.e. the next step).

1.2.1.2.4 Gather and Review Relevant Documents

Before beginning the interview process, the assessment team should gather and review all the existing documents that describe various aspects of the current IT environment and SOA initiative. This allows the assessment team to ask more focused questions in the interviews and also provides the opportunity to ask questions about the written material for clarification or to resolve conflicting information. The following table gives some examples of the types of documents that should be gathered and reviewed:

Table 1–2 Typical Relevant Documents

Typical Documents to Review
Balanced Score Card, Strategy Map (or similar business strategy/goals document)
Enterprise Architecture Document(s)
Project Management Handbook(s)
Software Development Process Document(s)
Operational Process and Procedures Document(s)
Corporate Security Policies
Organizational Structure Document
SOA Program Document(s)

1.2.1.2.5 Perform Interviews

Before each interview the assessment team should review the SOA Maturity Model to identify capabilities that are particularly relevant for the person being interviewed. It is NOT recommended that the assessment team simply ask a question for each of the capabilities. Rather the interview team should ask open ended questions that allow the interviewee to describe how things are currently done and to identify any problems that currently exists. Remember, the interviewees are the experts on what goes on within the organization being evaluated, so encourage them to explain the current situation.

1.2.1.2.6 Assign Capability Scores

Once the interviews have been completed and the documents have been reviewed, each of the capabilities in the SOA Maturity Matrix should be scored for both maturity and adoption. These scores provide the raw data that can then be analyzed in the gap analysis phase of the roadmap creation process.

The SOA Maturity Model includes a description for each level of maturity and each level of adoption for each capability. When scoring a capability, the scores selected should be the scores where the descriptions of maturity level and adoption level most accurately match the current situation based on the information collected in interviews and from the documents reviewed. Although there is always some level of subjectivity when measuring capability, the goal is to provide an objective measure. This allows future measurements to be performed by a different assessment team, yet still provide results that can be used to accurately measure progress.

Frequently when the assessment results are presented there are questions and even disagreements about the score that was assigned. Therefore, it is also important that in addition to the score, the assessment team also record the rationale for assigning the maturity and adoption scores. This rationale could include quotes from interviews or specific sections from the documents that were reviewed.

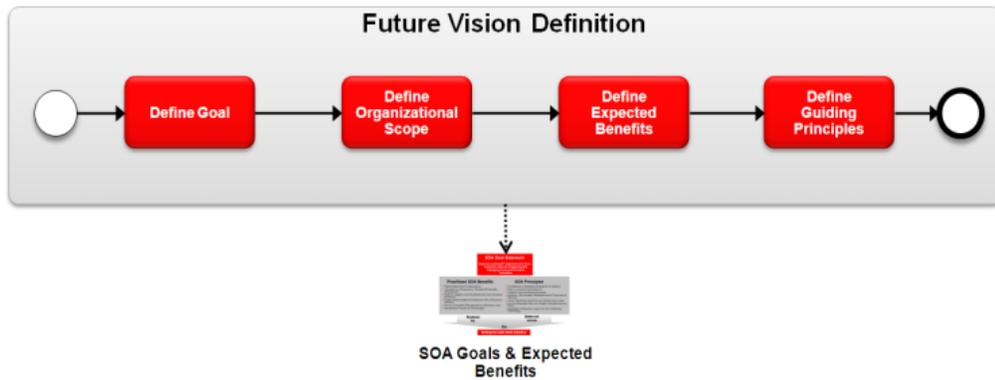
1.2.1.3 Output

The output of the current state assessment is the maturity and adoption score for each of the capabilities in the SOA Maturity Matrix. Additionally, the assessment team will have an understanding of the current state and should have collected known issues and problems that were identified and discussed during the interview process.

1.2.2 Future Vision Definition

For the SOA Roadmap creation process, the future vision definition phase focuses solely on the high level goals and principles that will be used to guide the entire SOA initiative. This phase does not attempt to create a detailed future state vision. While a more detailed future vision is required to achieve successful SOA adoption, it is not something that must be created prior to creating the initial SOA Roadmap. The initial phases of the SOA Roadmap may focus on creating the detailed SOA future vision. (See [Figure 1-4](#))

Figure 1–4 Future Vision Definition Process



1.2.2.1 Overview

The SOA vision definition answers the following questions:

1. What is goal of the SOA initiative?
2. What is the organizational scope of the SOA initiative?
3. What are the benefits that SOA is expected to deliver to the organization?
4. What are the guiding principles for the SOA initiative?

These questions must be answered by the executive(s) leading the SOA initiative. This is accomplished in a facilitated workshop. Nominally the workshop should take about two hours, but may take longer if there is no pre-existing understanding of SOA or there is substantial disagreement on why SOA is being pursued.

1.2.2.2 Details

This section provides greater detail on how to collect answers to the questions that the previous section introduced.

1.2.2.2.1 What is goal of the SOA initiative?

The goal being defined is the goal for the SOA initiative by the end of the roadmap. The recommended roadmap planning horizon is 2-3 years; therefore the goal should be the goal of the SOA initiative 2-3 years from now. The following table provides goal statements from which to choose.

Table 1–3 SOA Goal Statements

Goal Statement	Score
Develop experience building Services to provide a foundation for further investments in SOA.	1
Apply SOA to a limited set of projects to demonstrate the benefits of SOA and build credibility with the business owners.	2
Drive widespread sharing and reuse by consistently applying SOA concepts.	3
Improve business/IT alignment and drive business value by measuring and managing to key performance indicators.	4
Support new business initiatives and exploit new revenue opportunities enabled by SOA.	5

The goal statements in the above table are used to gage the extent and complexity of the entire SOA initiative and are listed in order of increasing difficulty. It should be obvious that accomplishing the first goal statement is far less difficult than accomplishing the fifth goal statement. Greater organizational maturity is required to achieve the more difficult goals for SOA. Of course, the benefits provided by SOA are commensurably greater as well. The 'Score' column in the table is used (and will be explained) in the gap analysis phase.

1.2.2.2 What is the organizational scope of the SOA initiative?

The organizational scope defines which departments, divisions, lines-of-business, etc. are included in the SOA initiative. The most common scopes are either division or enterprise, but other options are possible depending on the company's organizational structure. The following table provides example levels of scope for the SOA initiative.

Table 1-4 SOA Initiative Scope

SOA Initiative Scope	Score
A small number of projects will be applying service-orientation.	1
One or more business units will use SOA to address all of their projects.	2
The SOA initiative will span all business units within a single division.	3
The SOA initiative will span multiple divisions within the enterprise.	4
The SOA initiative will span the entire enterprise.	5

Defining the scope of the SOA initiative is essential to determining a roadmap. With greater scope, the number of organizational boundaries that must be crossed increases. This increases the complexity of the effort, and, therefore, requires greater organizational maturity. The 'Score' column in the table is used (and will be explained) in the gap analysis phase.

1.2.2.3 What are the benefits that SOA is expected to deliver to the organization?

There are many different benefits that an organization can realize by successfully adopting SOA. However, not all benefits can be realized in parallel. When creating an SOA Roadmap emphasis should be placed on the benefits that are highest priority and leave the lower priority benefits for later phases. The table below lists possible benefits from SOA adoption:

Table 1-5 Example SOA Benefits

Rapid deployment of applications	Unified, simplified data access
Transition to a responsive, flexible, and extensible infrastructure	Flexible architecture that enables business and IT agility
Ability to support cross functional and cross divisional processes	Effective use of external service providers
Single implementation and enterprise-view of business services	Operational improvements
Service granularity recognized by a business user	Skill-set portability
Standardize process and technologies	Standards based integration
Quicker re-composition of business processes	Integration with business partners
De-commissioning of older applications	Better visibility into business processes

Table 1–5 (Cont.) Example SOA Benefits

Incremental development and deployment	Business process standardization
Decoupling of applications	Productivity gains

The benefits in the above table can be used as a starting place to identify the benefits that an organization hopes to achieve via SOA adoption. The above table is only a start on the possible benefits and is by no means a complete list. Part of the vision definition is to create a list of possible SOA benefits and prioritize the list.

Once a list has been created, the benefits should be prioritized based on the business and IT objectives of the organization. The easiest way to prioritize the benefits is to assign a high, medium, or low prioritization to each possible benefit. Roughly one third of the possible benefits should be in each prioritization i.e. it does no good to list all the possible benefits as high priority.

1.2.2.4 What are the guiding principles for the SOA initiative?

The guiding principles are derived from the top priority benefits and provide enforceable guidance to the SOA initiative. The following table provides some example guiding principles.

Table 1–6 Example SOA Guiding Principles

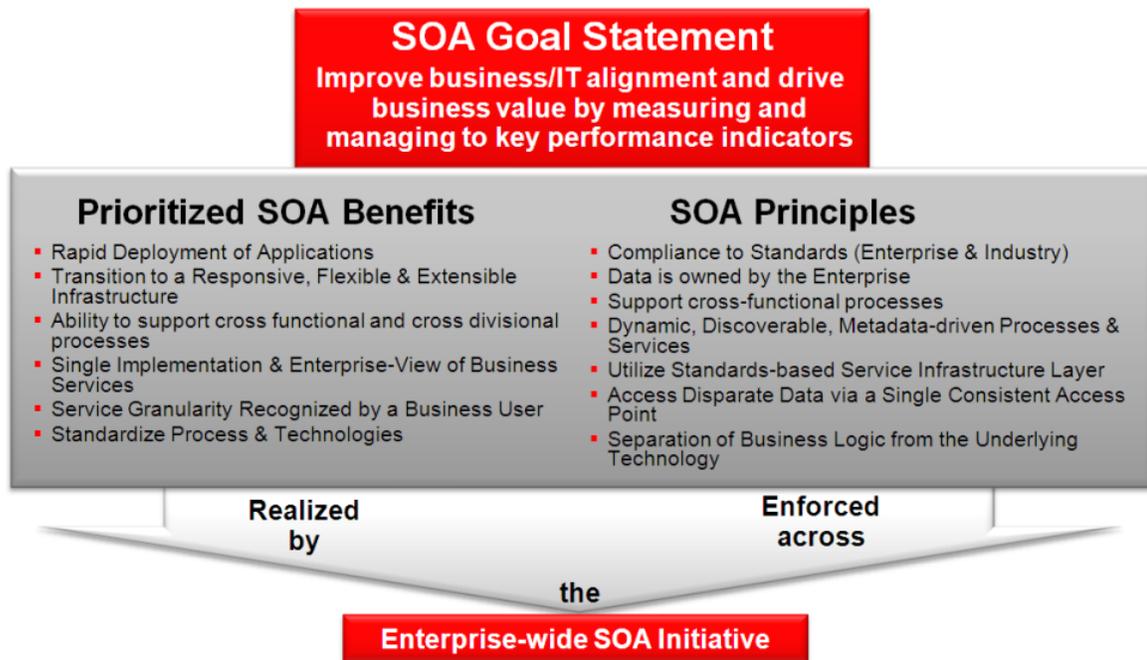
Every Service must be documented following company standards
Apply a consistent and controlled Service identification process
Utilize standards-based Service infrastructure
Data is owned by the enterprise
Enterprise data should be accessed via shared Services
Avoid use of point-to-point connections
Reuse existing Services wherever possible
Buy before build, reuse before enhance, enhance before build new

The guiding principles should be sufficiently clear and detailed that the principles can be enforced across the entire scope of the SOA initiative and on specific projects that fall under the purview of the initiative. The principles should also serve as a foundation to make more specific decisions in the future.

1.2.2.3 Output

The output from the vision definition phase is the overall goal of the initiative, the scope of the initiative, the expected benefits, and the guiding principles to achieve the goal and the benefits. This vision for the SOA initiative can be captured in a single summary slide and used to educate and align the organization with the SOA initiative. An example of this summary slide is shown in [Figure 1–5](#).

Figure 1–5 Example SOA Vision Summary



This clearly shows the goal and scope of the SOA initiative. It also shows that the SOA principles will be enforced across the entire SOA initiative and that the SOA initiative is expected to deliver the prioritized benefits.

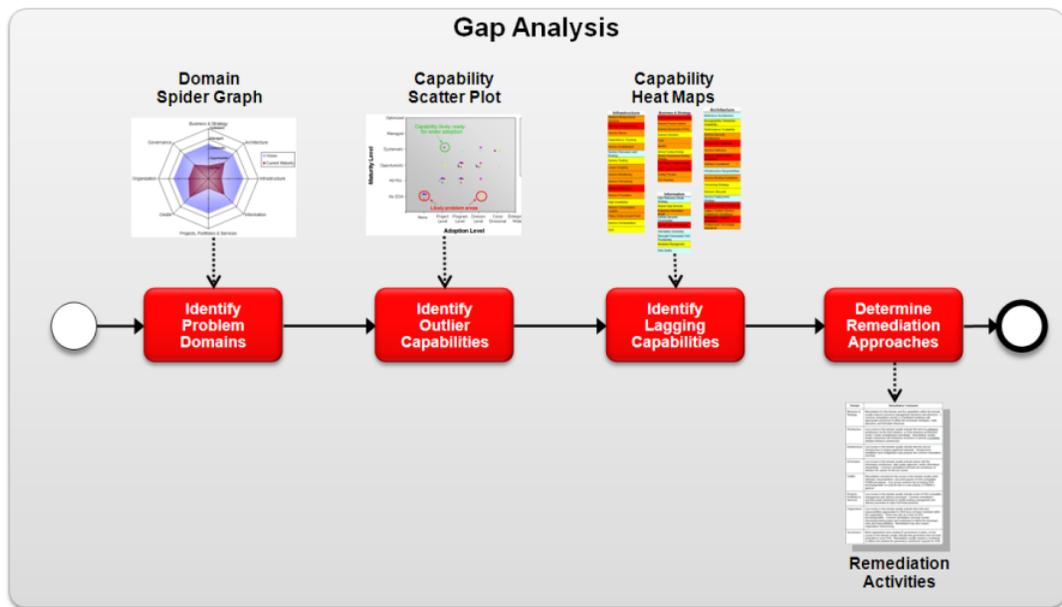
1.2.3 Gap Analysis

The gap analysis phase compares the current state of the SOA initiative (as measured in the assessment phase) with the goal for the initiative (defined in the vision phase). The gap between these two is then analyzed to determine the causes and remediation approaches are identified.

1.2.3.1 Overview

The maturity and adoption scores from the current state assessment phase measure the progress of an SOA initiative and, more importantly, identifies specific capabilities that are lacking or lagging and are therefore inhibiting the SOA initiative. The gap between where the organization is currently and where they need to be to achieve their goal is broken down by capability domain (from the SOA Maturity Model) to identify lagging domains. It is further broken down by individual capability to identify specific capabilities that are lacking or lagging. The following diagram illustrates the process:

Figure 1–6 Gap Analysis Process



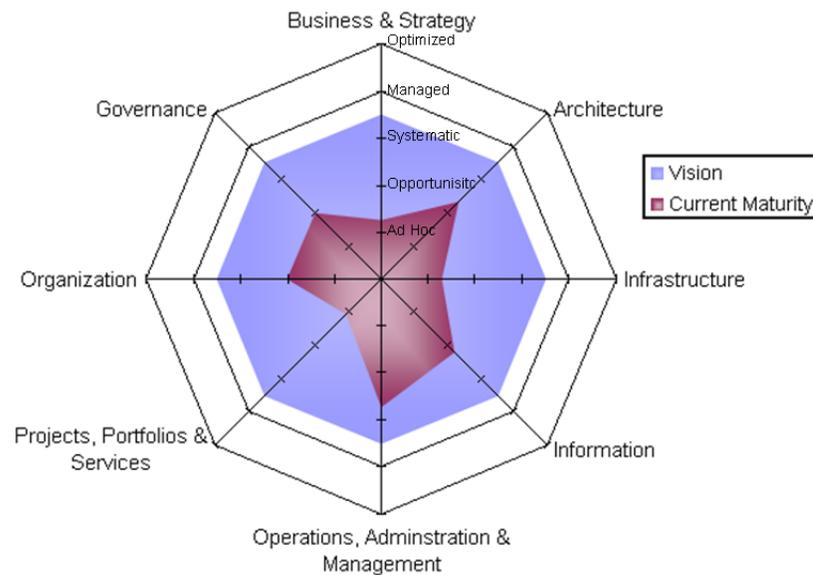
Once the lagging capabilities have been identified, a remediation approach for each of the identified inhibitors is determined from industry best practices and prior Oracle experience.

1.2.3.2 Details

This section details the steps defined in the previous section.

1.2.3.2.1 Identify Problem Domains

The first step in the gap analysis phase is to identify the domains that exhibit the largest gap between current maturity and the maturity needed to achieve the SOA goal. The gap for the domains can be visually represented by a spider (aka radar) graph as shown [Figure 1–7](#).

Figure 1-7 Vision versus Current Maturity

The 'Vision' level is determined by the following formula:

$$V_S = \begin{cases} G_S, & \text{if } G_S \geq S_S \\ (G_S + S_S)/2, & \text{if } G_S < S_S \end{cases}$$

Where G_S is the score from the goal statement (see [Table 1-3](#)) and S_S is the score from the scope of the SOA initiative (see [Table 1-4](#)). This formula maps the goal statement to a level of maturity necessary to reach that goal. The scope of the initiative is used as a modifier if the scope score is greater than the goal score i.e. it takes greater maturity to achieve success on a broader scope. The vision score (V_S) is then mapped to the maturity levels in the SOA Maturity Model by applying the simple formula: 1=Ad Hoc, 2=Opportunistic, ... , 5=Optimized.

For the example spider graph shown in [Figure 1-7](#), the 'Vision' level was derived using this formula as follows:

Goal Statement: Drive widespread sharing and reuse by consistently applying SOA concepts.

Scope Statement: The SOA initiative will span multiple divisions within the enterprise.

So $G_S = 3$, $S_S = 4$, and $V_S = (3+4)/2 = 3.5$. The 3.5 score mapped to the maturity levels yields a vision maturity half way between Systematic and Managed. This 'Vision' level of maturity is what is plotted in [Figure 1-7](#).

The 'Current Maturity' level for each domain is calculated by simply averaging the maturity score for each capability within the domain. This provides an average maturity for each of the eight domains which is then plotted in the spider graph.

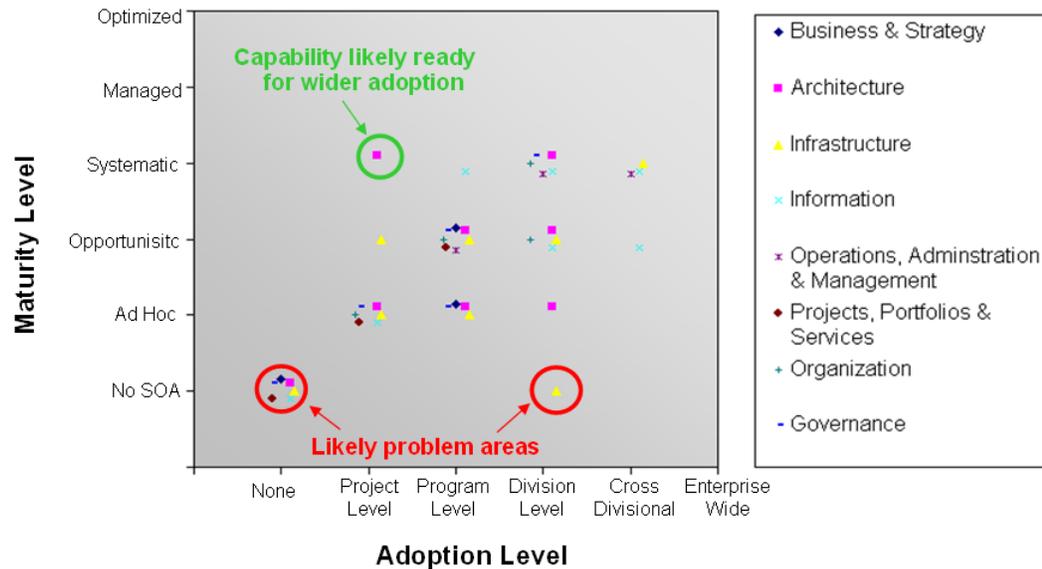
Plotting the Current Maturity relative to the Vision (as shown in [Figure 1-7](#)) provides a visual representation of the gap between where the organization is with respect to SOA and where it needs to be to meet the goal of the SOA initiative. In this example, the graph clearly shows that the Projects, Portfolios & Services domain is the area requiring the most attention followed closely by the Business & Strategy and Infrastructure domains.

This analysis is fed into the roadmap creation phase. In this example, initial activities in the roadmap should center on addressing the lagging capabilities in the Projects, Portfolios & Services, Business & Strategy, and Infrastructure domains.

1.2.3.2.2 Outlier Capabilities

Outlier capabilities are capabilities where the maturity and the adoption are significantly out of sync. This usually indicates a capability that should receive attention early in the roadmap. The outlier capabilities can be easily detected by plotting the maturity and adoption score for each capability in a scatter plot as shown in Figure 1–8.

Figure 1–8 Capabilities Scatter Plot



As shown in the above graph, the maturity and adoption scores for capabilities usually fall along the diagonal when plotted against each other. In the above example, there are two scores that are significantly off the diagonal, one well above the diagonal and one well below the diagonal. The capability well above the diagonal is a capability from the Architecture domain. The capability well below the diagonal is a capability from the Infrastructure domain. The analyst will need to review the actual capability scores to identify exactly which capabilities yielded the outlier points on the graph.

A capability that falls well above the diagonal indicates a capability that is done very well within a relatively small area of the organization. In this example, there is a capability at a 'Systematic' level of maturity done within a single project. Fostering greater adoption of this capability provides an easy win for the SOA initiative i.e. there is no need to develop greater competency for this capability within the organization since it already exists within the organization. Some training or mentoring can spread the ability more broadly within the organization.

A capability well below the diagonal indicates a capability that is done poorly (or in a non-SOA compliant fashion) very broadly. In this example, there is a capability being done at a 'No SOA' level of maturity across the entire division. Corrective action needs to be taken for this capability since if left uncorrected, it will inhibit (and probably already has inhibited) the SOA initiative.

Capabilities that plot nearer the lower left corner are capabilities that are either non-existent or are lagging behind the other capabilities. These capabilities will be addressed in the next step of the gap analysis process.

The capabilities that plot toward the upper right corner are capabilities that are currently being done well. No remediation is required and the organization should continue business as usual for those capabilities.

1.2.3.2.3 Low Maturity Capabilities

The capabilities that plot nearer the lower left corner in the scatter plot are capabilities that require attention in early phases of the roadmap. Capability heat maps can be used to visually identify these low maturity capabilities as shown in Figure 1–9.

Figure 1–9 Capabilities Heat Map



The capabilities heat map colors each of the capabilities based on the maturity score recorded for that capability. The above diagram shows the color coding legend as well as each capability with color coding applied. The capabilities are organized by the domains used in the SOA Maturity Model.

The heat maps draw immediate attention to the capabilities that require attention. In the above example, there are three capabilities in the Business & Strategy domain (SOA Project Funding Strategy, SOA Program Funding Strategy, and Guiding Principles) that scored at the 'No SOA' level of maturity. These capabilities should be addressed in early phases of the SOA Roadmap. Likewise, there are six capabilities in the Projects, Portfolios & Services domain that scored at the 'No SOA' level of maturity. These capabilities should also be addressed in early phases of the SOA Roadmap. It should come as no surprise that these two domains were also identified in Figure 1–7 as lagging domains.

It is important to point out that not all capabilities are of equal importance for a particular organization. In fact, there may be capabilities that are deemed unimportant or even not applicable for a particular organization. Thus, it is necessary to review each capability with a low score and determine whether it is a top priority, a low priority, or unimportant from a roadmap creation perspective.

If a capability is deemed unimportant for a particular organization, it should be removed from the maturity model and the graphics should be regenerated. This

should be done with caution. A capability should only be removed if it is clearly not appropriate for the SOA initiative at this organization.

1.2.3.2.4 Determine Remediation Activities

At this point in the gap analysis process, the problem domains have been identified and the problem capabilities within each domain have also been identified. The next step is to identify remedies for each problem domain and capability. The remedies, obviously, depend on the problem being addressed and also frequently have some aspect that is organization specific. Thus, unfortunately, it is not possible to provide a prescriptive approach to determining remediation activities for all 90+ capabilities.

However, there are some general guidelines based on the domains that can usually be applied to creating remediation activities.

Table 1–7 Remediation per Domain

Domain	Remediation Comments
Business & Strategy	Remediation for this domain and the capabilities within this domain usually requires executive management decisions and directives. A common remediation activity is a facilitated workshop with appropriate executives to define the necessary strategies, make decisions, and formulate directives.
Architecture	Low scores in this domain usually indicate the lack of a reference architecture for the SOA initiative, or if the reference architecture exists, it lacks completeness and details. Remediation usually entails workshops with Enterprise Architects to specify a complete, detailed reference architecture.
Infrastructure	Low scores in this domain usually indicate that the Service infrastructure is lacking significant elements. Infrastructure installation and configuration type projects are common remediation activities.
Information	Low scores in this domain usually indicate issues with the information architecture, data quality approach, and/or information stewardship. Common remediation activities are workshops to address the causes for the low scores.
Operations, Administration & Management	Remediation activities for low scores in this domain usually entail definition, documentation, and enforcement of SOA compatible OA&M procedures. Low scores could be due to lacking SOA knowledge/skills or could be due to a low maturity of OA&M in general.
Projects, Portfolios & Services	Low scores in this domain usually indicate a lack of SOA compatible management and delivery processes. Common remediation activities entail workshops to modify existing management and delivery processes to inject SOA best practices.
Organization	Low scores in this domain usually indicate that roles and responsibilities appropriate for SOA have not been instituted within the organization. There may also be a lack of SOA knowledge/skills. Common remediation activities include developing training plans and workshops to define the necessary roles and responsibilities. Remediation may also require organization restructuring.
Governance	Most organizations have existing IT governance in place, so low scores in this domain usually indicate that governance has not been extended to cover SOA. Remediation usually requires a workshop to define and institute the governance extensions required for SOA.

1.2.3.3 Output

The output from the gap analysis phase is an understanding of which domains and which individual capabilities are inhibiting the successful achievement of the goal of the SOA initiative. Additionally, remediation activities have been identified to address the lagging domains and capabilities. These remediation activities provide the primary input into the roadmap creation process.

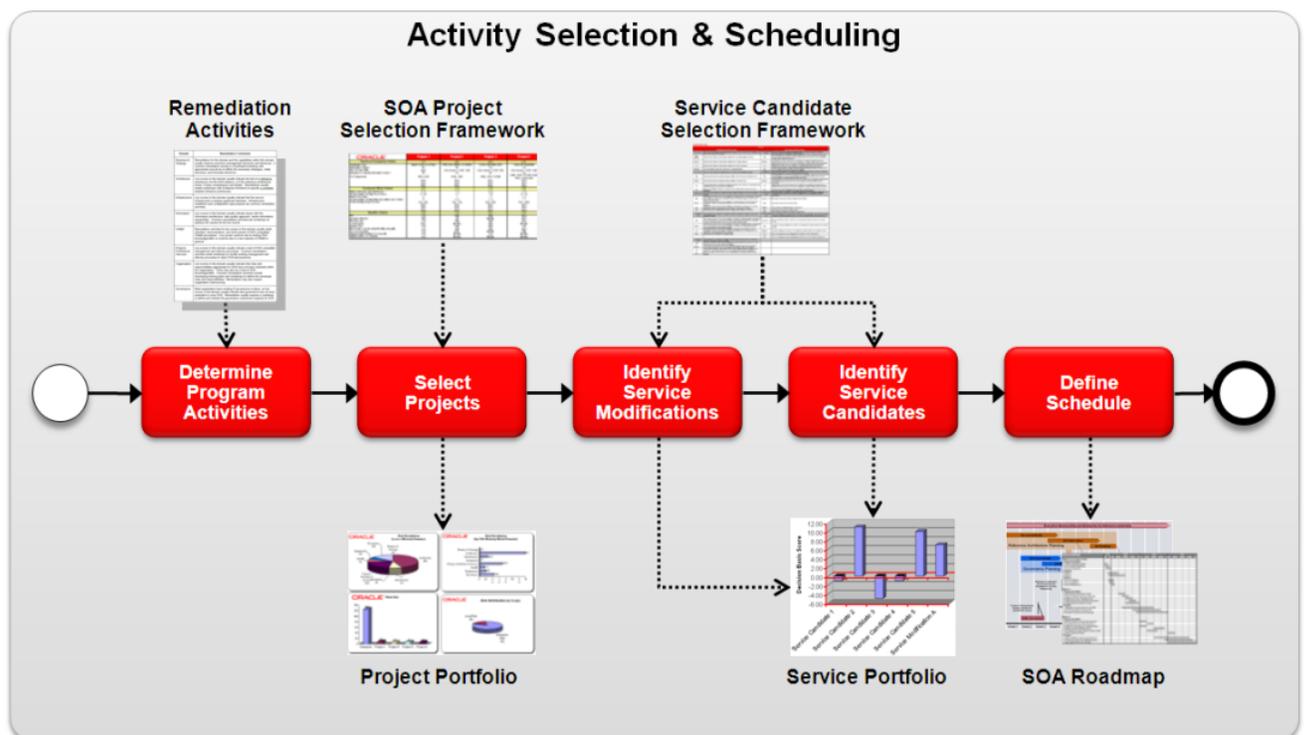
1.2.4 Activity Selection and Scheduling

The remedies identified in the gap analysis phase are prioritized and used to create a plan, called the SOA Roadmap. Projects are then evaluated to select the projects that provide the highest benefit versus the cost, complexity, and risk. The Service portfolio is derived from the needs of the projects.

1.2.4.1 Overview

There are five steps in this final phase of the process to create an SOA Roadmap. These five steps are illustrated in [Figure 1-10](#).

Figure 1-10 Roadmap Scheduling Process



As shown in the diagram, the main inputs to this phase are the remediation activities identified in the gap analysis phase, the SOA Project Selection Framework, and the Service Candidate Selection Framework. The final step is to determine timelines and dependencies and organize all the activities into a schedule.

1.2.4.2 Details

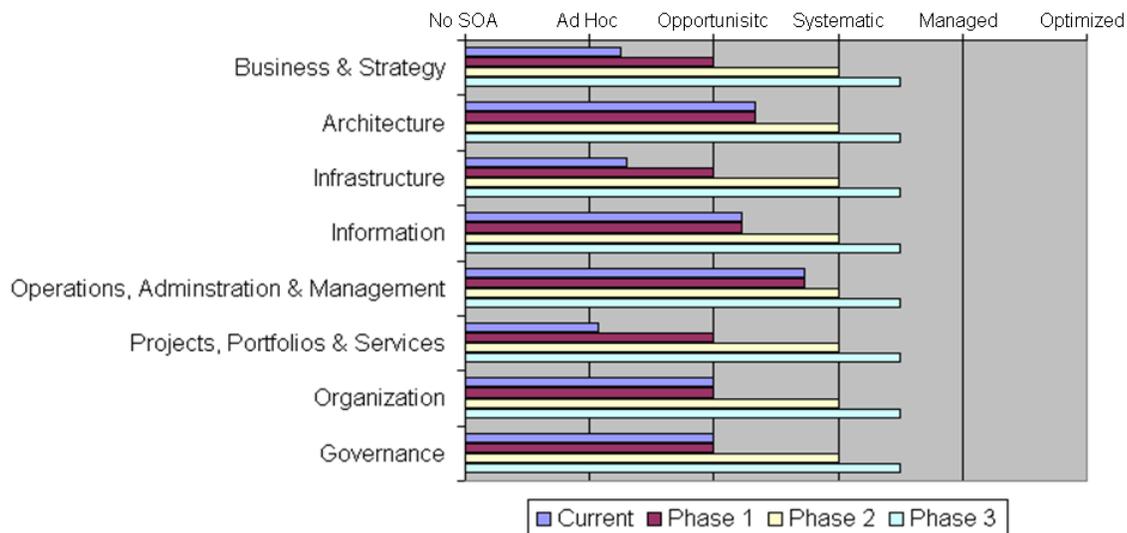
This section details the steps defined in the previous section.

1.2.4.2.1 Determine Program-Level Activities

The program-level activities are determined by prioritizing the remediation activities identified in the gap analysis phase. Top priority is usually given to remediation activities that focus on the domain with lowest current maturity score. Top priority remediation activities are usually the first activities in the roadmap since the results from these activities are leveraged across the solution and Service delivery efforts.

Program-level activities frequently entail changes with wide ranging impacts. For example, changing the software development process (to inject service-oriented best practices) impacts all development teams within the scope of the SOA initiative. Organizational changes can be even more taxing. Therefore, it is usually necessary to undertake these changes in a series of iterations. These iterations become the phases of the overall SOA Roadmap. At a high level, this can be shown graphically as illustrated by [Figure 1-11](#).

Figure 1-11 Increasing Maturity Over Time



The graph illustrates three iterations each increasing maturity of one or more domains until the desired 'vision' level of maturity is achieved. Notice that the first phase focuses on bringing all domains up to the 'Opportunistic' level of maturity. This means that the first phase will include remedy activities for the Business & Strategy, Infrastructure, and Projects, Portfolios & Services domains. Once near parity is achieved across domains, follow-on phases address the eight domains more uniformly to keep the SOA initiative progressing smoothly.

The amount of change introduced by an iteration must not exceed the organization's ability to absorb that change; therefore the scope of each iteration must be carefully planned. Likewise, the duration of each iteration must be long enough to accomplish some meaningful progress, yet remain short enough to minimize risk and maintain a continuous pace of incremental progress.

1.2.4.2.2 Select Projects

Each iteration should increase the maturity of the organization while also providing business value. Usually the program-level activities do not produce quantifiable business value. Rather, it is the solution development efforts that create measurable business value. Therefore, a successful SOA Roadmap must select projects that:

1. Provide measurable business value
2. Are amenable to a service-oriented approach

3. Advance the SOA initiative

The first of these criteria is a standard requirement for traditional project portfolio planning. The second criteria should be used to eliminate certain projects from further analysis. For example, a project to deploy a maintenance release of a legacy application is not a good candidate for inclusion in the SOA Roadmap. (However, a major upgrade to a legacy application might be a good candidate.)

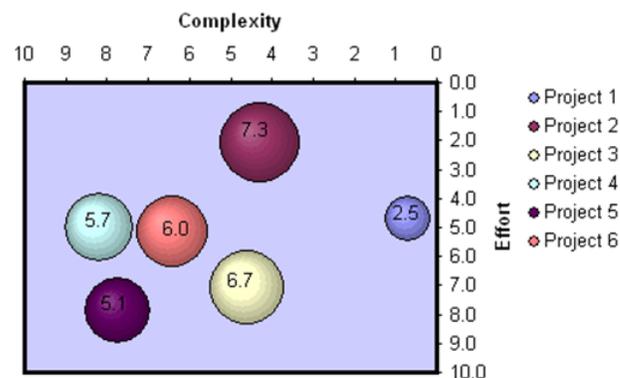
The third criterion is what is added to traditional project portfolio planning. The additional criteria used to rank projects for inclusion in the SOA Roadmap include:

- benefits in line with the prioritized SOA benefits (defined in the vision phase)
- adherence to the SOA principles (also defined in the vision phase)
- functional needs available from already existing shared Services
- functional overlap with other projects
- data requirements overlap with other projects
- ability to leverage existing Service infrastructure
- infrastructure needs aligned with the SOA Reference Architecture

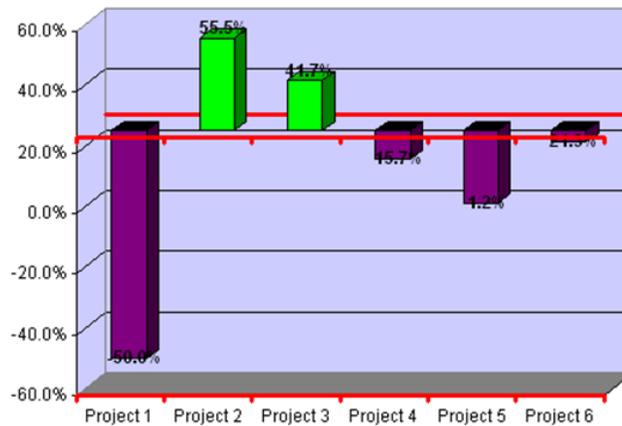
There may also be new risks associated with taking a service-oriented approach to a project. These risks can be specific to the project or might be associated with the SOA initiative itself. For example, if there is no experience or defined best practices for the Service infrastructure, a project using the Service infrastructure has additional risk associated with that usage.

Selecting projects, therefore, requires balancing all these new SOA factors with the traditional factors (e.g. cost, complexity, benefits, risks). To help with this analysis as part of the SOA Roadmap creating process, Oracle has created an 'SOA Project Selection Framework' that can be used to perform this type of analysis. (A description of the framework is provided in [Appendix B](#).) An example graphic from the framework is shown in [Figure 1–12](#).

Figure 1–12 Complexity versus Effort versus Benefit Analysis



The graph shows the analysis results for six different projects. The size of the bubble represents the relative benefit that the project would provide and the bubble is plotted versus the complexity and effort for the project. Large bubbles toward the upper right corner are the projects that provide the greatest benefit for the least effort and complexity. From this analysis, Project 2 is the best choice and Projects 1, 3 and 6 are also contenders for inclusion in the road map. The next step is to analyze the risk associated with the projects. This analysis is shown in [Figure 1–13](#).

Figure 1–13 Benefit to Risk Ratio Analysis

This graph plots the benefit to risk ratio for each of the projects. The higher the number, the greater the benefits from the project as compared to the risks for the project. This graph clearly shows that Project 2 and Project 3 are the best projects to include in the SOA Roadmap. Project 1, which was a contender from the cost and complexity perspective, is clearly not a good choice due to the high risk versus benefit.

1.2.4.2.3 Identify Service Modification

Having selected the projects that will become part of the SOA Roadmap, the next step is to identify Services and candidate Services that should be included in the roadmap. One of the selection criteria used for the projects was the amount of functionality that was already available from existing Services. It may be necessary to make modifications to these Services to support the new project. There are two main types of changes:

1. Increase the performance or capacity of the Service
2. Implement functional enhancements to the Service

The new project may require that additional capacity or better performance than the existing Service currently provides. Essentially these are non-functional changes to the Service to make it usable by the new project.

Another possibility is that the existing Service needs enhanced functionality to support the new project. Ideally the changes can be done in a backward compatible manner; thereby allowing existing consumers of the Services to move to the new version deployed to support the new project. Notice that a Service versioning strategy (see [Figure A–1](#)) should be in place to support these types of changes.

Extensive efforts to modify an existing Service may provide less value than building a new, different shared Service. Therefore, Service modifications are also fed into the Service candidate selection process described in the next section.

Either type of change to existing Services needs to be incorporated into the SOA Roadmap. Obviously the projects that use the Services have a dependency on the Service modification activities, and this dependency must be captured in the roadmap.

1.2.4.2.4 Identify Service Candidates

The projects selected for inclusion in the SOA Roadmap can also lead to the creation of new shared Services. The projects need to be analyzed to identify the Service candidates. There are three primary areas to analyze to identify the Service candidates:

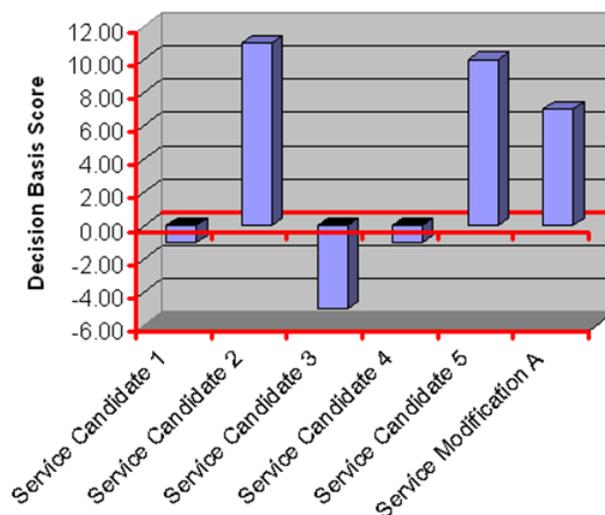
1. Functional overlap between projects

2. Business process tasks that are common across projects
3. Common data requirements across projects

Any of these three areas could entail access to an existing system. It is also possible that the overlap between projects is entirely new functionality or data that does not currently exist anywhere in the organization. In this case, the Service candidate would be designed to provide this new functionality or data.

Service candidate identification and analysis is a large topic unto itself, and as such, is beyond the scope of this document. However, once the Service candidates have been identified, a selection process should be applied to these similar to the process used for the projects. Oracle has created a 'Service Candidate Selection Framework' that can be used to perform this type of selection. (A description of the framework is provided in [Appendix C](#).) An example graphic of Service candidate analysis using the framework is shown in [Figure 1-14](#).

Figure 1-14 Service Candidate Analysis



This example shows five Service candidates and a Service modification. A positive 'Decision Basis Score' indicates a Service candidate that should be realized into a shared Service. Thus, Service Candidates 2, 5, and the Service Modification A should be included in the SOA Roadmap. Service candidates 1, 3, and 4 should not be realized (at this time).

The Service candidates that are selected are included in the SOA Roadmap. Service candidates (and Service modifications) that are not selected should be recorded for future iterations of the roadmap. Although the Service candidate did not make the cut for this iteration of the roadmap, it might very well make the cut in a future iteration.

1.2.4.2.5 Define Schedule

The schedule defined in this step is the schedule for the entire SOA initiative; thus it is the high level schedule that illustrates the ordering and dependency relationships between program-level activities, the selected projects, Service modifications, and the selected Service candidates.

The high level phases of the SOA Roadmap were shown in [Figure 1-11](#), but [Figure 1-11](#) does not include actual timelines since that could not be determined until

the projects, Service modifications, and Service candidates had been identified. The steps to put together the schedule are as follows:

1. Create the program level activities schedule
2. Create high-level project schedule
3. Determine delivery dates for Service modifications
4. Determine delivery dates for Service candidates

The first activity of defining the schedule is to determine the start date and duration for the program level activities. These are the initial activities put into the SOA Roadmap.

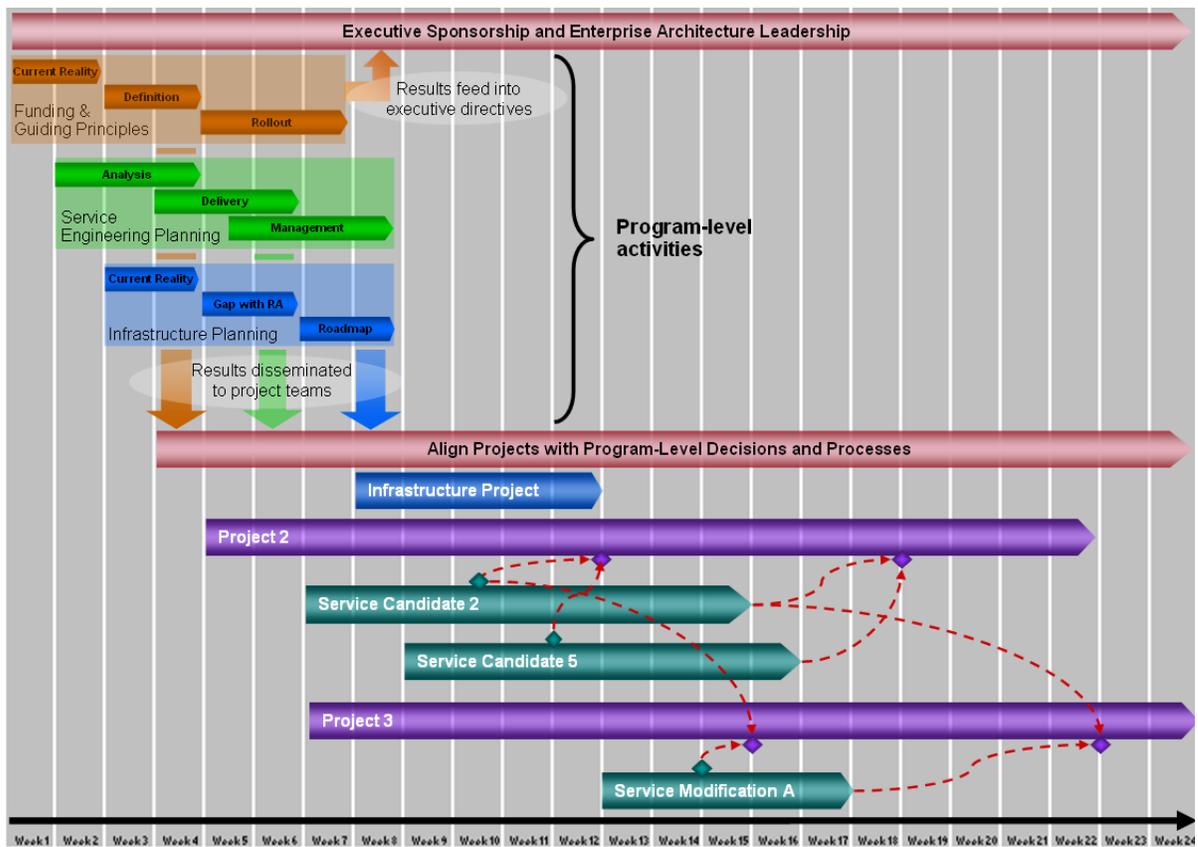
The next step is to determine the start dates for the selected projects. Projects that are expected to leverage the outcomes of the program level activities (usually all projects) should not begin in earnest until the program-level activities complete. Some overlap is allowed since the earliest phases of a project (e.g. Inception in UP) can usually commence before the program-level activities are completed. The end date for the project is determined by effort, complexity, and resource availability. Sometimes the end date is mandated by business needs. In either case the end date for the project is put into the schedule.

The delivery dates for the Service modifications are determined by the needs of the project requiring the changes. Generally the Service modifications must be available in time for project integration testing. Of course, an earlier delivery date is certainly acceptable and is, in fact, preferable.

Finally the delivery dates for the selected Service candidates are determined. These delivery dates are also driven by the needs of the project requiring the new Service. Again, the delivery date should meet or beat the date the integration testing for the project will begin. Additionally the interface definition for the new Service(s) should be available to support detailed design for the project.

At this point any resource constraints need to be incorporated into the schedule. This may require that start dates are delayed or durations may increase. Once these constraints have been included, a schedule can be created and might look something like the schedule shown in [Figure 1-15](#).

Figure 1–15 Roadmap Phase 1 Schedule



The above schedule begins with three program-level activities to address the three domains (Business & Strategy, Projects, Portfolios & Services, and Infrastructure) that scored below the 'Opportunistic' maturity level. The results from the program level activities are then disseminated to all the projects and Service candidate realization activities shown in the bottom half of the figure. The two projects, two Service candidates, and Service modification that were selected for inclusion in the roadmap are included in the schedule. The schedule also shows the dependencies between the Service realization efforts and the two projects. Both the dependency on the Service interface definition and the Service deployment are shown since both of these dependencies are important from a scheduling perspective.

The schedule also shows the Infrastructure Project that deploys and configures new components to the Service infrastructure needed by the projects and the Services. This Service infrastructure project is focused purely on realizing the Service infrastructure defined in the SOA Reference Architecture. The Infrastructure Planning (that was part of the program level activities) defines what technologies and products are deployed by the Infrastructure Project.

As discussed earlier, the detail in the initial phase of the SOA Roadmap will be much greater than the detail provided for the later phases. The later phases likely include additional program level activities and more projects and the Service candidates on which they are dependent, but will contain less detail. An example of such a schedule is shown in Figure 1–16.

Figure 1–16 SOA Roadmap Subsequent Phases

SOA Roadmap	2008	2009				2010				2011			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase 1 (see detailed schedule)													
Program Activities													
Funding and guiding principles	█												
Service engineering planning	█												
Infrastructure planning	█												
Projects													
Infrastructure project		█	█										
Project 2		█	█	█									
Project 3			█	█	█								
Services													
Service Candidate 2		█	█										
Service Candidate 5		█	█										
Service Modification A		█	█										
Phase 2													
Program Activities													
Adopt industry standard data models			█	█	█								
Define an integration reference architecture			█	█	█								
Establish a core set of integration tools			█	█	█								
Establish infrastructure standards enforcement			█	█	█								
Evangelize benefits realized from SOA			█	█	█								
Projects													
Portal infrastructure project			█	█	█								
Integrated, portal based interface for CRM			█	█	█								
Retrofit Fresh Digital to leverage SOA			█	█	█								
Decouple UIs from back-end technology			█	█	█								
Phase 3													
Program Activities													
Define procedures for data model extensions						█	█	█	█				
Re-architect backend to limit data latency						█	█	█	█				
Establish test procedures for composite apps						█	█	█	█				
Implement security auditing practices						█	█	█	█				
Foster BPM tool usage to define business reqmts						█	█	█	█				
Create charge-back models						█	█	█	█				
Projects													
BPM infrastructure project										█	█	█	█
Integrate fulfillment systems and warehouses										█	█	█	█
Automated workflow order fulfillment system										█	█	█	█
Legacy augmentation and sunseting										█	█	█	█

The first phase schedule was broken down into weeks but only covered two quarters. This schedule covers the entire planning horizon (three years) but with significantly less detail. The projects chosen for the first phase were relatively short in duration and effort. This is to help ensure early wins for the SOA initiative. Subsequent phases can then afford to undertake more complex efforts (e.g. legacy sun-setting) that could take years to complete.

Subsequent phases will also likely have additional infrastructure projects that continue to build out the reference architecture. The capabilities of the reference architecture built out in each phase depend on the needs of the projects and Services that are included in the phase.

1.2.4.3 Output

The output from the roadmap creation phase is the SOA Roadmap that includes a detailed initial phase and less detailed subsequent phases. The SOA Roadmap provides guidance for achieving the goal of the SOA initiative via a series of much smaller transitions. Ideally each of the smaller transitions has its own individual business benefit, but it is frequently necessary to invest a little up front to reap larger benefits down the line.

1.3 Closing Comments

It is important to keep the end goal in mind when applying this roadmap creation process and especially when executing against the roadmap. The end goal is achieving the goal of the SOA initiative. It is NOT to attain a particular score on the SOA Maturity Model. The success of the SOA initiative is measured by the realization of the prioritized SOA benefits identified in the Future Vision Definition phase. The SOA

Maturity Model and the various frameworks are merely tools to help build a plan to achieve the goal.

Finally, and perhaps most importantly, this is an incremental approach. The process described in this document to create an SOA Roadmap should be regularly re-applied and the roadmap should be updated to reflect the changing reality. This allows each iteration to focus on the most pressing needs. Areas not of immediate concern can be relegated to future iterations; thereby reducing the size and complexity of the current iteration.

SOA Maturity Model

The Oracle SOA Maturity Model defines the following key concepts: capabilities, domains, maturity, and adoption.

A.1 Capabilities

The SOA Maturity Model includes over ninety capabilities that capture the best practices that Oracle has collected over many years working with a wide variety of companies. There is still considerable debate on what constitutes SOA best practices (e.g. REST versus Web services) and standards and products change fairly regularly; therefore, the SOA Maturity Model remains technology, standards, and product agnostic while still capturing the major tenants of a complete SOA strategy.

Additional capabilities are added as more best practices emerge. Thus, the details of the SOA Maturity Model will continue to evolve as more experience with SOA is gained. This allows the specifics to morph and improve as industry and Oracle knowledge of SOA advance. One of the capabilities from the maturity model is shown in [Figure A-1](#).

Figure A-1 Versioning Strategy Capability

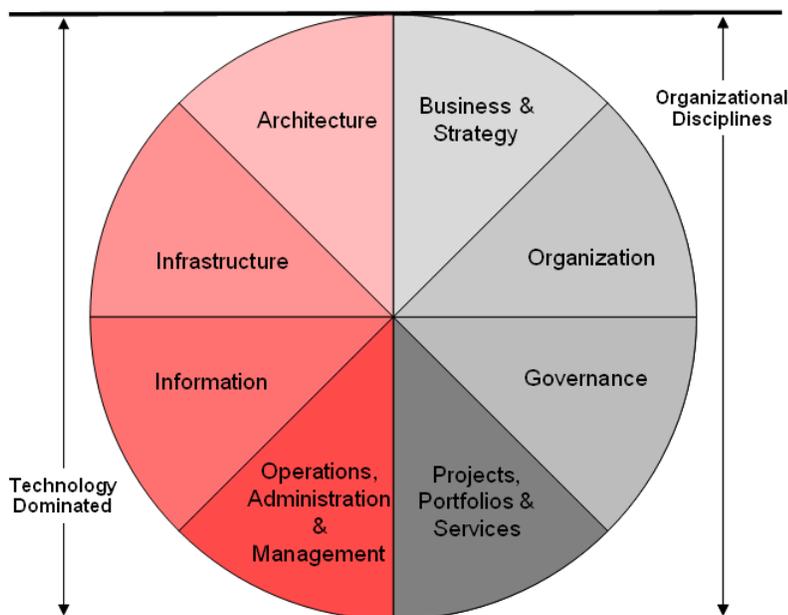
Topic	Versioning Strategy		
Description	Definition of the service versioning strategy including a numbering scheme, version concurrency control, and decommissioning of obsolete versions.		
Maturity		Adoption	
Optimized	New versions of Services are commissioned and old versions decommissioned with minimal or no impact to service consumers	Enterprise Wide	Service versioning is done consistently enterprise-wide
Managed	Adherence to the Service versioning strategy is measured and enforced	Cross Divisional	Service versioning is done consistently across multiple divisions
Systematic	Service versioning strategy has been accepted by all impacted groups and is seeing widespread adoption	Division Level	Consistent Service versioning approach used division-wide
Opportunistic	A service versioning strategy has been defined and adoption of the approach is underway	Program Level	Projects within a program follow a consistent versioning approach
Ad Hoc	Service versioning left up to individual project teams	Project Level	Project teams determine Service versioning approach
No SOA	No versioning strategy	None	No versioning strategy

As shown in the above figure, for each capability included in the model, a description for each level of maturity and each level of adoption is provided. (The maturity and adoption levels are defined below.) Although there is always some level of subjectivity when measuring capability, these descriptions minimize the subjectivity injected, and thereby provide, as best as possible, an objective measure of both maturity and adoption.

A.2 Domains

The SOA Maturity Model uses the concept of domains to classify and organize the related capabilities. As depicted in [Figure A-2](#), there are eight domains in the maturity model:

Figure A-2 SOA Capability Domains



- **Business & Strategy** - Contains capabilities that provide the high-level constructs that allow the SOA initiative to proceed. This includes such things as business motivation, expected benefits, guiding principles, expected costs, funding model, etc.
- **Architecture** - Contains capabilities concerning the definitions of the overall architecture and guidelines for various practitioners to ensure adherence to the architecture.
- **Infrastructure** - Contains capabilities concerning the Service infrastructure and tools that provide the technical foundation for the SOA initiative.
- **Information** - Contains capabilities concerning the information aspects of SOA, e.g., providing Information as a Service (IAAS). This includes shared data models, message formats and schemas, master data management, content management, etc.
- **Projects, Portfolios & Services** - Contains capabilities concerning the planning and building of Services and the Service usage guidelines of Service consumers.

- **Operations, Administration & Management** - Contains capabilities concerning the post deployment aspects of solutions based on a service-oriented architecture i.e. the Operations, Administration, and Management aspects of SOA.
- **Organization** - Contains capabilities concerning the development of corporate competency around SOA including the organizational structure and skills development.
- **Governance** - Contains capabilities concerning the governance structures and processes that support and guide the SOA efforts. Maturity and adoption of an adequate amount of governance is a leading indicator of the overall SOA success.

These eight domains, although interrelated, are sufficiently distinct. To succeed at SOA adoption, an organization must adequate progress in all of these domains. Inevitably an organization will be more advanced in some domains (and further in some of the capabilities within a domain) than others. Therefore, it is important to be able to measure the relative maturity within each domain (and capabilities therein) and across domains to identify areas that are lagging. Once the lagging areas have been identified it is possible to formulate remedies and thereby improve the success of the overall SOA initiative.

A.3 Maturity

Within the software industry, maturity is frequently related to the Capability Maturity Model (CMM) and the CMM successor, the Capability Maturity Model Integration (CMMI). The SOA Maturity Model parallels this understanding and measures SOA capability against defined maturity levels. The levels of maturity used in the SOA Maturity Model (from highest to lowest) are:

- **Optimized** - Metrics are being consistently gathered and are being used to incrementally improve the capability. Assets are proactively maintained to ensure relevancy and correctness.
- **Managed** - The capability is being measured and quantitatively managed via some type of governance structure. Appropriate metrics are being gathered and reported.
- **Systematic** - The approach has been reviewed and accepted by affected parties. There has been buy-in to the documented approach and the approach is always (or nearly always) followed.
- **Opportunistic** - An approach has been decided upon and is being opportunistically applied. The approach has not been widely accepted nor adopted. It may be informally defined, or if documented, may exist primarily as "shelf ware".
- **Ad Hoc** - Awareness of SOA exists and some groups are embarking on building Services. There is no SOA plan being followed.
- **No SOA** - There is no SOA approach being taken. SOA is not underway.

The maturity levels progress from 'No SOA' up to 'Optimized.' These levels define the path an organization usually takes moving toward SOA maturity. SOA by its very nature requires coordination, cooperation, and a common vision to be successful; therefore, it is necessary to define the strategy before it is possible to be truly successful at repeating it and then ultimately optimizing it.

A.4 Adoption

Adoption measures how widely SOA is being accepted, embraced, and applied within the enterprise. For smaller organizations within a single line-of-business, maturity and adoption are usually tightly related since there is a single approach to SOA being followed by the entire organization.

However, within large companies with multiple divisions or lines-of-business this is not usually the case. It is common to have one or more divisions that are relatively mature in SOA while other divisions are not even attempting SOA. The SOA Maturity Model handles these situations by providing a separate measure for adoption level. This allows a single division to be effectively evaluated for SOA maturity while still capturing the lack of widespread adoption as a separate measure.

The levels of adoption used in the SOA Maturity Model are:

- **Enterprise Level** - The capability is implemented consistently across the enterprise i.e. all divisions or business units are applying the same approach.
- **Cross Division** - The capability is implemented by multiple divisions using a common approach i.e. the approach is being shared or is spreading to multiple divisions.
- **Division Wide** - The capability is implemented consistently across a division or business unit. A division or business unit is led by an executive at the VP level or higher.
- **Program Level** - A relatively small group of projects (program) share an implementation of the capability. The program is under a single management structure below the VP level and encompasses less than an entire division or business unit.
- **Project Level** - Individual projects implement the capability as appropriate for that specific project. There may be informal and unregulated sharing across projects.
- **No Implementation** - There is no current implementation anywhere in the organization of the capability being measured.

For small organizations, it may be desirable to ignore the adoption dimension altogether and simply measure maturity. Conversely, for very large organizations with a goal of achieving enterprise-wide SOA adoption, it may be desirable to measure the maturity for each division or line-of-business separately and then provide a single measure of adoption across the enterprise. It should be noted, however, that for the realization of many of the key SOA benefits, a level of adoption across the organization is critical. For example, it is possible to have two divisions with mature but incompatible capabilities in which case the adoption is lower (division-wide) and that will inhibit an enterprise-wide SOA initiative.

Thus, to properly measure the overall progress of SOA initiative in a large organization, the maturity of the individual capabilities and the degree of adoption of such capabilities across the organization is vital.

SOA Project Selection Framework

The SOA Project Selection Framework is used to select projects to include in an SOA initiative. The framework is used to evaluate the effort, complexity, benefits, and risks associated with each project. The result of this evaluation is a numeric score for the effort, complexity, benefits, and risks. These numeric scores are then analyzed to select projects that provide the most benefits as compared to the effort, complexity, and risks.

It is important to note that there are products that are specifically for project portfolio planning. The framework described in this section is not intended to replace such products. Rather, this is a framework that can be used when an organization does not have a project portfolio planning product already deployed.

The framework is Excel spreadsheet based. Each worksheet contained in the spreadsheet is described below.

B.1 Parameters

The parameters worksheet is used to define both the criteria used to score projects and the weights applied to the criteria. The weighting table from the Parameters worksheet is shown in [Figure B-1](#).

Figure B-1 Criteria Weighting Table

ORACLE

Weight Distribution	
Technical Complexity	
Technical Complexity	100%
Architecture Type	30%
Transaction Control ?	5%
Type of Connectivity	30%
Upgrading or Changing Integrated System ?	20%
SOA Components	15%
-	0%
-	0%
-	0%
Functional Effort	
Functional Effort	100%
Number of Process and Sub-Process	30%
Average Number of Steps for a Process	25%
Number of Systems	15%
Average Number of Interactions/Operations (per System)	5%
% from Existing Shared Services	25%
-	0%
-	0%
-	0%
Benefits	
Benefits	100%
ROI	20%
Investment Needed	30%
New Revenues	10%
Cost Reduction	10%
Payback Time	10%
More business and technical flexibility and agility	5%
SOA Asset Creation	5%
Alignment with Prioritized SOA Benefits	5%
Alignment with SOA Principles	5%
-	0%
Risk Analysis (GUT) Weights	
Risk Analysis (GUT) Weights	100.00%
G - Gravity	34.0%
U - Urgency	33.0%
T - Trend	33.0%

The weights for each of the criteria types (Technical Complexity, Functional Effort, Benefits, and Risk) must add up to 100% for the spreadsheet to sum totals properly. The weights should be adjusted for each situation based on the relative importance of each criterion.

For each evaluation criterion, there is a text score and an associated numeric score. These scores are defined on the Parameters worksheet in the table shown in [Figure B-2](#).

Figure B-2 Selection Criteria Scores

Internal Grade					
Technical Complexity		Functional Effort		Benefits	
Architecture Type		Number of Process and Sub-Process		ROI	
Simple Sequence of Steps	1	1 - 3	1	None	0
BPM (Ochestration + Workflow)	3	4 - 8	4	Low	3
System Integration (EAI)	8	9 - 12	8	Medium	6
Composite Application	10	> 12	10	High	10
Transaction Control ?		Average Number of Steps for a Process		Investment Needed	
No	1	1 - 7	1	None	10
Yes	10	8 - 20	4	Low	8
	0	21 - 35	8	Medium	4
	0	> 35	10	High	0
Type of Connectivity		Number of Systems		New Revenues	
None	0	0	0	None	0
JDBC / Database / Files	2	1	3	Low	3
Web Services / WSIF / EJB	4	2 - 4	7	Medium	6
System Adapters	10	> 5	10	High	10
Upgrading or Changing Integrated System ?		Average Number of Interactions/Operations (per System)		Cost Reduction	
No	1	0	0	None	0
Yes	10	1 - 3	3	Low	3
	0	3 - 6	7	Medium	6
	0	> 7	10	High	10
SOA Components		% from Existing Shared Services		Payback Time	
BPEL / ESB	1	0% - 25%	10	Low	10
BPEL / ESB / OWSM	2	26% - 50%	7	Medium	6
BPEL / ESB / OWSM / Rules / BAM	6	51% - 75%	3	High	2
BPEL / ESB / OWSM / BAM / Rules / WebCenter	10	76% - 100%	1	Very High	0

Providing a separate text score makes the Projects worksheet more readable and allows projects to be evaluated without selecting actual numeric values. After the projects have been evaluated by selecting the appropriate text score, the numeric values can be adjusted (if necessary) without requiring revisiting the project evaluations.

B.2 Projects

The Projects worksheet is used to evaluate the projects by selecting a score for each of the criterion. A portion of the Projects worksheet is shown in [Figure B-3](#).

Figure B-3 Projects Worksheet

ORACLE	Project 1	Project 2	Project 3	Project 4	Project 5
Technical Complexity Criteria	0.70	4.30	4.60	8.20	7.75
Architecture Type	Simple Sequence of Steps	BPM (Orchestration + Workflow)	System Integration (EAI)	Composite Application	Composite Application
Transaction Control ?	No	No	Yes	Yes	No
Type of Connectivity	None	Web Services / WSIF / EJB	Web Services / WSIF / EJB	Web Services / WSIF / EJB	System Adapters
Upgrading or Changing Integrated System ?	No	Yes	No	Yes	No
SOA Components	BPEL / ESB	BPEL / ESB	BPEL / ESB / OWSM	BPEL / ESB / OWSM / BAM / Rules / WebCenter	BPEL / ESB / OWSM / BAM / Rules / WebCenter
.	None	None	None	None	None
.	None	None	None	None	None
.	None	None	None	None	None
Functional Effort Criteria	4.70	2.10	7.10	5.00	7.85
Number of Process and Sub-Process	4-8	1-3	4-8	4-8	>12
Average Number of Steps for a Process	8-20	1-7	>35	21-35	>35
Number of Systems	0	1	>5	2-4	1
Average Number of Interactions/Operations (per System)	0	3-6	1-3	>7	1-3
% from Existing Shared Services	0% - 25%	51% - 75%	26% - 50%	76% - 100%	26% - 50%
.	None	None	None	None	None
.	None	None	None	None	None
.	None	None	None	None	None
Benefits Criteria	2.50	7.30	6.65	5.70	5.05
ROI	Low	High	High	None	Low
Investment Needed	High	Low	Medium	None	Low
New Revenues	Low	High	High	None	Low
Cost Reduction	None	Medium	High	Medium	None
Payback Time	Low	High	High	Low	Low
More business and technical flexibility and agility	Low	High	High	None	Low
SOA Asset Creation	Low	None	Medium	High	Medium
Alignment with Prioritized SOA Benefits	Low	Medium	Low	Medium	Low
Alignment with SOA Principles	Low	Medium	Medium	Medium	Low

The selections available for each criterion are limited to the text scores provided in the Parameters worksheet. The project scores are calculated using the weights and numeric scores in the Parameters worksheet.

B.3 Risks

The Risks worksheet is used to evaluate the risks associate with each project. A portion of the worksheet is shown in [Figure B-4](#).

Figure B-4 Risks Worksheet

Risk Number	Risk Name	SOA Maturity Model Domain	Risk Scope	Risk Owner	Risk Mitigation	Answer	G	U	T	GUT (Risk)
1	Run-Time Governance	Infrastructure	Enterprise Risk	Enterprise	Infra-Structure in Place for SOA Run-Time Governance (Policies Appliance)	No	4	4	3	7.4
2	Business Monitoring	Infrastructure	Enterprise Risk	Enterprise	BAM infra-structure in place for process monitoring	No	3	2	2	4.8
3	Error Handling	Architecture	Enterprise Risk	Enterprise	Error Handling Solution already defined	No	5	5	5	10.0
4	Service Discovery	Projects, Portfolios & Services	Enterprise Risk	Enterprise	SOA Project Methodology (Service Discovery Method)	No	5	5	4	9.4
5	Process Control	Architecture	Enterprise Risk	Enterprise	Sequence of Steps is or will be coordinated by an orchestration engine	No	5	5	4	9.4
6	SOA Reference Architecture and SOA Roadmap	Architecture	Enterprise Risk	Enterprise	SOA Reference Architecture created by SOA Roadmap	No	4	5	4	8.8
7	System Infra-structure Pre-Requisites	Projects, Portfolios & Services	Enterprise Risk	Enterprise	All functions (APIs or Functions) needed from systems already mapped	No	5	3	5	8.8
8	SOA Knowledge	Organization	Enterprise Risk	Enterprise	All Technical Team trained in SOA Products and Architecture	No	5	5	5	10.0
9	SOA Packaged Application Blueprint	Architecture	Enterprise Risk	Enterprise	Packaged Application Blueprint already defined ?	No	5	4	3	8.2

For each risk identified, the SOA Maturity Model domain to which it applies is identified. This allows the risk to be categorized by the same domains as the SOA Maturity Model capabilities. The scope of the risk is also identified: either 'Enterprise Risk' or 'Local Risk'. A local risk only applies to a specific project whereas an enterprise risk applies to all projects equally.

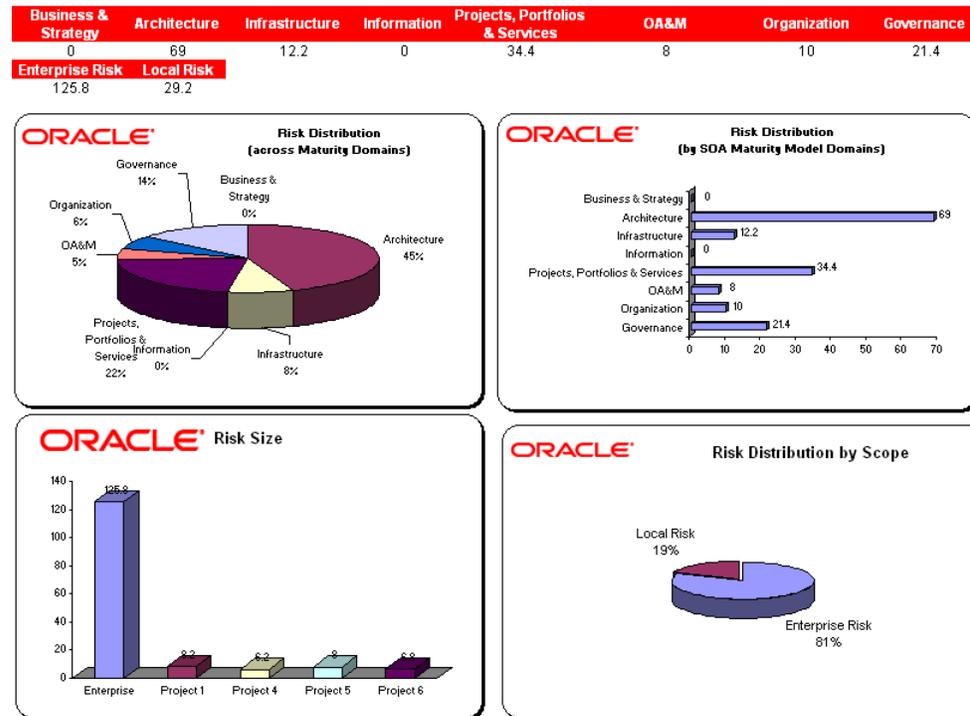
For each risk, assign a value from 0 to 5 for the gravity, urgency, and trend. The gravity value measures how severe are the consequences of the risk, the urgency value measures how soon the risk will manifest, and the trend measures how much worse the risk will get with time.

The worksheet also allows for the identification of a product/process/approach/etc. that will remove the risk i.e. a risk mitigation strategy. If that risk mitigation is in place, then selecting 'Yes' in the 'Answer' column will zero out that risk.

B.4 Risk Analysis

The Risk Analysis worksheet provides summaries and graphics of the scores in the Risks worksheet. A sampling of the risk analysis provided by this worksheet is shown in [Figure B-5](#).

Figure B-5 Risk Analysis Worksheet



In this example, the risk analysis shows that most of the risks are at enterprise scope and that the SOA domain yielding the largest portion of the risk is the Architecture domain.

B.5 SOA Project Portfolio Analysis

The final worksheet in the SOA Project Selection Framework is the SOA Project Portfolio Analysis worksheet. This worksheet combines the values from the Projects and Risks worksheets to create a summary as shown in Figure B-6.

Figure B-6 SOA Project Portfolio Analysis Worksheet

Project List	Complexity	Effort	Benefit	Local Risk	Local + Enterprise Risk	Relative Risk	Normalized Relative Risk	Benefit / Risk Ratio
Project 1	0.7	4.7	2.5	8.2	134.0	1.1	5.0	-50.0%
Project 2	4.3	2.1	7.3	0.0	125.8	1.0	4.7	55.5%
Project 3	4.6	7.1	6.7	0.0	125.8	1.0	4.7	41.7%
Project 4	8.2	5.0	5.7	6.2	132.0	1.0	4.9	15.7%
Project 5	7.8	7.9	5.1	8.0	133.8	1.1	5.0	1.2%
Project 6	6.4	5.2	6.0	6.8	132.6	1.1	4.9	21.3%
Max	8.2	7.9	7.3	8.2	134.0	1.1	5.0	55.5%

The summary values are used to create graphics that help to analyze the various projects. Examples of the graphics were shown previously in Figure 1-12 and Figure 1-13 when projects were being selected for inclusion in the SOA Roadmap.

Service Candidate Selection Framework

The Service Candidate Selection Framework is used to select which potential shared Services should be realized. The scoring for Service candidates is substantially different than project scoring. Service candidate scoring is not being used to decide if the functionality should be created; rather it is being used to decide if the functionality should be realized as a shared Service. Whether or not the functionality should be created is decided by the project selection process. If a Service candidate fails selection for realization, then the functionality needs to be created as part of (and internal to) the project that led to the proposal of the Service candidate.

The framework is an Excel spreadsheet that is used to score each Service candidate against realization benefits and realization inhibitors. Each worksheet contained in the spreadsheet is described below.

C.1 Parameters

The Parameters worksheet is used to define the criteria used to score the Service candidates. Both the realization benefit criteria and the realization inhibitor criteria are defined in this worksheet. The Parameters worksheet is shown in [Figure C-1](#).

Figure C-1 Parameters Worksheet

		Scores			
		Realization Benefits Scores		Realization Inhibitor Scores	
Scope Score	The scope score weighs the benefit that the intended scope of the service candidate will have on the enterprise if realized.	Skill-set Impact	The skill-set impact score weighs the additional skill-set necessary to realize the functions proposed by the service candidate in a shared manner.		
Multi-Enterprise	3 If realized, this shared asset has usage potential across the partner/supplier ecosystem.	High	3	The organization does not have the skill-set to realize this service in a shared environment and meet the expected functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
Enterprise	2 If realized, this shared asset has usage potential across the entire enterprise.	Medium	2	Significant gaps in skill-set would need to be filled prior to realizing the functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
LOB	1 If realized, this shared asset has usage potential across one line-of-business.	Low	1	Minimal gaps in skill-set need to be filled prior to realizing the functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
Application	0 The only identified usage of this shared asset is a single application.	None	0	All necessary skill required to realize the functional and non-functional demands proposed by the service candidate for a shared environment are available.	
Reuse Score	The reuse score weighs the potential reuse levels for the service candidate if realized.	Technology Capability	The technology capability score weighs the additional tools or technology necessary to realize the functions proposed by the service candidate in a shared manner.		
High	3 If realized this shared asset will have a large potential for both short-term and long-term reuse.	High	3	The organization does not have the necessary tools or technology to realize this service in a shared environment and meet the expected functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
Medium	2 If realized this shared asset will have a large potential for short-term reuse.	Medium	2	Significant gaps in tools and technology would need to be filled prior to realizing the functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
Low	1 If realized this shared asset will have potential for long-term reuse, but there is no immediate reuse potential outside the proposed project or application.	Low	1	Minimal gaps in tools and technology need to be filled prior to realizing the functional and non-functional demands proposed by the service candidate for operation within a shared environment.	
None	0 There is no identifiable short-term or long-term reuse potential outside the proposed project or application.	None	0	All necessary tools and technology required to realize the functional and non-functional demands proposed by the service candidate for a shared environment are available.	
Agility Score	The agility score weighs the potential for enterprise agility resulting from the service candidate if realized.	Project Impact Score	The project impact score weighs the additional impact placed on the proposed, in-flight, and operational projects that would be incurred by realizing the service candidate in a shared environment.		
High	3 The functions proposed by the service candidate are strategic and core to the enterprise's business and if realized as a shared asset, will greatly enhance the enterprise's ability to respond to new business demands quickly.	Immense	100	The impact to the project is simply too large to even consider.	
Medium	2 The functions proposed by the service candidate are strategic and core at the LOB level and if realized as a shared asset, will greatly enhance the LOB's responsiveness to new business demands.	High	3	The impact to the project would be large.	
Low	1 The functions proposed by the service candidate are important to the enterprise or LOB, and if realized as a shared asset will enhance responsiveness to new business demands.	Medium	2	There would be significant impact to the project.	
None	0 The functions are not significantly important or strategic at the enterprise or LOB level.	Low	1	The impact on the project would be minor.	
		None	0	There would be minimal or no impact on the project.	
Compliance Score	The compliance score weighs the potential for enterprise compliance resulting from the service candidate if realized.	QoS Feasibility Score	The QoS feasibility score weighs the level of difficulty and risk that will be encountered when trying to realize the nonfunctional requirements of the service candidate within a shared environment.		
High	3 The functions proposed by the service candidate are strategic to realizing mandatory compliance in one or more areas across the enterprise's business and if realized as a shared asset, will greatly enhance the enterprise's ability to respond to new business demands quickly.	Impossible	100	It is not currently possible to meet the QoS requirements when deployed as a shared service.	
Medium	2 The functions proposed by the service candidate are strategic to realizing mandatory compliance in one or more areas at the LOB level and if realized as a shared asset, will greatly enhance the LOB's responsiveness to new business demands.	High	3	It would be extremely difficult to meet the QoS requirements when deployed as a shared service.	
Low	1 The functions proposed by the service candidate are important to the enterprise or LOB for compliance purposes, and if realized as a shared asset will decrease the overall burden on the enterprise or LOB attempting to become compliant.	Medium	2	It would be difficult to meet the QoS requirements when deployed as a shared service.	
None	0 The functions are not related to a compliance effort.	Low	1	The QoS requirements are manageable for a shared service environment.	
		None	0	The QoS requirements have minimal impact with respect to the shared environment.	
Enablement Score	The enablement score weighs the potential to leverage existing enterprise assets to realize the functions of the proposed service candidate.				
High	3 The proposed functions of the service candidate are already implemented in existing IT systems which only need to be service enabled for realization.				
Medium	2 The majority of the functions of the service candidate are already implemented in existing IT systems which would need to be service enabled and minimally extended for				
Low	1 Some (but not a majority) of the functions of the service candidate are already implemented in existing IT systems which would need to be service enabled and extended				
None	0 None of the functions of the proposed service candidate have been implemented in existing IT systems.				

For each criterion, a text score and the numeric score are defined. Providing a separate text score makes the Service Candidates worksheet more readable and allows Service candidates to be evaluated without selecting actual numeric values. After the Service candidates have been evaluated by selecting the appropriate text score, the numeric values can be adjusted (if necessary) without requiring revisiting the evaluations.

C.2 Weighting

The weighting worksheet allows the individual criterion to be weighted based on the relative importance of each. The Weighting worksheet is shown in Figure C-2.

Figure C–2 Weighting Worksheet

ORACLE	
Weight Distribution	
Realization Benefits Scores	100%
Scope Score	20%
Reuse Score	20%
Agility Score	20%
Compliance Score	20%
Enablement Score	20%
-	0%
-	0%
-	0%
Realization Inhibitor Scores	100%
Skill-set Impact Score	25%
Technology Capability Score	25%
Project Impact Score	25%
QoS Feasibility Score	25%
-	0%
-	0%
-	0%
-	0%

The weights for both the realization benefits and realization inhibitor scores must total 100% for the spreadsheet to score the Service candidates correctly.

C.3 Service Candidates

The Service Candidates worksheet is used to evaluate Service candidates by selecting a score for each of the criterion. The Service Candidates worksheet is shown in [Figure C–3](#).

Figure C–3 Service Candidate Worksheet

ORACLE	Service Candidate 1	Service Candidate 2	Service Candidate 3	Service Candidate 4	Service Candidate 5	Service Modification
Realization Benefits Scores	9.00	12.00	1.00	6.00	12.00	11.00
Scope Score	Enterprise	Enterprise	Application	LOB	Multi-Enterprise	Multi-Enterprise
Reuse Score	Low	High	Low	Medium	High	Low
Agility Score	Low	High	None	Medium	High	High
Compliance Score	Medium	High	None	Low	High	Low
Enablement Score	High	Low	None	None	None	High
-	None	None	None	None	None	None
-	None	None	None	None	None	None
-	None	None	None	None	None	None
Realization Inhibitor Scores	10.00	1.00	6.00	7.00	2.00	4.00
Skill-set Impact Score	High	None	Low	Medium	Low	Medium
Technology Capability Score	Medium	None	High	Medium	None	Low
Project Impact Score	High	Low	Low	Medium	None	None
QoS Feasibility Score	Medium	None	Low	Low	Low	Low
-	None	None	None	None	None	None
-	None	None	None	None	None	None
-	None	None	None	None	None	None
-	None	None	None	None	None	None
Decision Basis Score	-1.00	11.00	-5.00	-1.00	10.00	7.00

The selections available for each criterion are limited to the text scores provided in the Parameters worksheet. The numeric scores are calculated using the numeric scores in the Parameters worksheet and the weights from the Weighting worksheet.

C.4 Service Candidate Analysis

The Service Candidate Analysis worksheet generates a graph from the Decision Basis Score calculated in the Service Candidate worksheet. An example of this graph is shown in [Figure 1–14](#).

