Assessing your SOA Program

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Executive summary

No one would disagree that service-oriented architecture, or SOA, is a hot topic for enterprise IT. And, as we’ve come to expect with all hot topics, there’s also the usual mountain of hyperbole surrounding SOA. However, as the number of enterprises that have successfully adopted SOA grows, it is becoming clear that amidst all the hype there are also real and significant benefits in adopting SOA for an enterprise’s business and its IT operations.

But, for every enterprise that successfully adopts SOA and can testify to its benefits, there are others whose SOA initiatives have either failed or stalled, leaving them wondering where they went wrong. Why do some enterprise’s SOA initiatives succeed, while others fail? What is it that successful SOA adopters do differently? And most importantly of all, how can you ensure that your enterprise’s SOA initiative is on the path to success and not on the road to failure?

Hewlett-Packard has successfully adopted SOA in a number of areas across its business operations. Every day HP consultants engage with our client’s enterprises to help them successfully realize the benefits of adopting an SOA. These experiences have led us to recognize that one of the critical factors in successfully adopting SOA across an enterprise lies in the ability to measure and assess the progress and effectiveness of the SOA investment.

Hewlett-Packard has combined our extensive experience in the emerging area of SOA, along with best practices, the HP SOA Maturity Model, and HP’s unique agility assessment methodology to create a method for assessing an enterprise’s service-oriented architecture.

This paper describes HP’s approach to SOA assessment. To effectively assess all aspects of SOA adoption, we have identified a set of eight SOA domains. Taking an overview of those SOA domains, we’ll examine the capabilities and assets that are critical to the successful adoption of SOA, as well as the impact upon the business agility of each part of the enterprise. We’ll look at how HP addresses the fundamental questions of where are we, where do we need to be, and how are we going to get there in terms of implementing—and assessing the effectiveness of—an SOA.

SOA as an architectural approach

Service-oriented architecture is, first and foremost, an architectural approach and specifically one that is centered on the concept of services. We use the term “services” in this case, and in its most general form, to refer to work done by one entity for another or on behalf of another. At its heart, SOA is about thinking of—and using—enterprise resources in terms of the services they provide, to better achieve the overall business goals and objectives of the enterprise.

The SOA approach is not purely IT-centric. Rather, it’s an approach that will have an impact right across the enterprise, requiring the commitment and direct involvement of both business and IT to deliver real and recognized value. It is true that SOA implemented solely within an IT organization can have a positive impact on the IT organization. But, to fully reap the benefits of SOA, it’s important that any SOA initiative extends right across the enterprise—having an impact and bringing value to both business and IT operations.
In an enterprise that has embraced SOA, we see a breakdown of the traditional rigid demarcation between business and IT. In today’s dynamic business environment, synchronization of IT and business is essential. The business organization must drive service development around specific business initiatives, taking ownership of business services and working closely with IT to deliver those services. This results in an operating mode where IT and business work in genuine partnership to create and manage business services.

SOA will affect the way the business uses information technology, how the business interacts with people within the enterprise who are responsible for providing information technology services, and how the IT organization delivers the capabilities that the business needs.

**The HP SOA journey**

HP has been making use of SOA for some time. One example of where SOA has had a clear impact upon HP business agility is in the Personal Systems Group (PSG) Partner Direct program, a part of HP’s business that supports the sale of personal computer equipment through retail partners. That business includes the sale of configured-to-order PCs, typically utilizing either kiosk or web-based sales models. The provision of a comprehensive and flexible infrastructure to attract and nurture additional business partners is a critical objective for PSG.

In the past, it sometimes took HP as long as six months to make a technology connection with a partner. Doing so was expensive and time consuming, and limited our ability to establish new relationships with some retailers.

PSG Partner Direct found a huge diversity among the environments of its partners and knew from experience the associated pain and cost of combining diverse infrastructures. It rapidly became apparent that the creation of a highly flexible operating environment could provide PSG with a significant advantage over its less responsive competitors.

What also became apparent was that employing a service-oriented architecture to offer a menu of multiple services to meet partners’ diverse needs would be an ideal way of creating such an environment. PSG decided to use emerging technologies to develop a solution that would allow them to provide business services in which they already had expertise with far greater agility.

The first step was the creation of a prioritized set of real-time web services that would deliver the functionality PSG and its partners needed. Web services are self-contained, self-describing, modular components that can be published, located and invoked across the web according to well-defined industry standards. Web services perform multiple functions, which can be anything from simple requests to complicated business processes.

As HP went through the process of focusing on improving our agility and ability to connect to those partners, done through the implementation of an SOA, we were able to bring the time to connect to a new retailer down to a matter of hours. This has created a fundamental change in our business model. Technology is no longer a limiting factor—in fact, technology is not really a factor at all. Any constraints on our ability to develop relationships with partners are now solely restricted to commercial negotiations, the signing of contracts, and other business issues. And, of course, that’s the way it should be.

The introduction of an SOA that can continually assess its values in terms of business need has allowed PSG Partner Direct to remove the constraints that IT had imposed upon the way HP did business. As a result, technology decisions are now driven by the business strategies that PSG Partner Direct has adopted to support HP’s core business goals. At HP, thanks to SOA, we now establish relationships and connect with or disconnect from partners in an entirely flexible way, driven solely by business requirements.

**Bringing the SOA journey to HP customers**

**Assessing an SOA program**

How does one go about assessing an enterprise SOA program, judging its value to an organization?

At HP, we structure the assessment of an SOA program around two key parts. The first part examines the capabilities and assets that the organization has—the SOA Maturity Assessment. The maturity assessment is a way of examining the broad range of capabilities and assets that are required to support the successful adoption of SOA, and assessing their maturity.
The second part of our assessment looks at the organization in more dynamic terms and is the SOA Agility Assessment. The agility assessment measures the ability of the enterprise to change and considers this in relation to the importance of change across the enterprise.

Assessment of an SOA program is based on a core set of domains that comprise the HP SOA Domain Model. The HP SOA Domain Model provides a unifying framework for assessment and forms the basis for both the HP Maturity Model and the HP Agility Assessment.

The HP SOA Domain Model

Based on analysis of the many different SOA implementations we’ve undertaken, both within HP and working with our customers, we’ve identified eight primary domains: business, people, program management, governance, architecture, enabling technologies, operations and management, and supply and demand. When you’re the master of all those domains, you have the capabilities and the assets in place to effectively adopt and operate an SOA. The domain model outlines the key areas of capability, activity, and assets that need to be in place for an enterprise to successfully adopt and operate an SOA.

The time, cost, and effort required to accommodate the needs of each SOA domain will vary. But to achieve success in the adoption of SOA, it is important to ensure that the needs of every domain are taken into consideration.
The Business Domain

SOA adoption has an impact upon and provides benefits for both business and IT. In order to successfully adopt SOA across the enterprise, it’s imperative that both business and IT commit to the program. Both sides must recognize that there will be different ways of working, and both should recognize that there will be benefits realized for each.

As the adoption of SOA proceeds across the enterprise, the Business Domain must consider:

- Stakeholder commitment. There are many stakeholders across the business community who must commit to and participate in the move to SOA—from executive management and the managers of business units to partners, suppliers, and, in some cases, even customers.

- Synchronization of business and IT. Better alignment of business and IT strategy and operations is a key benefit of the adoption of SOA. To make this happen, changes to operating processes and structures will be required, decisions will have to be linked and measurements and goals will need to be aligned.

- Underlying perceptions of how IT is seen by business must change (see “People Domain”).

Of course, when we talk about business there’s the importance of connecting all of the things done in the SOA program back to fundamental business measures. We need to make sure that the right incentives are in place for people to participate in the program. We need to make sure that each decision made, whether a technology or an organizational decision, can be tied back to the fundamental business strategies that the enterprise has adopted to support its core business goals.

The People Domain

At the heart of the People Domain is simple communication. Looking at the other domains, it is clear that all our discoveries and decisions need to be communicated across the organization. People need to understand what is happening from the beginning, the goals of the program, how all these disparate pieces actually fit together, and what the benefits will be realized—not only for the organization as a whole, but for them specifically.

We will see people taking on new roles that are more of a combination of business and IT rather than being just one or the other. We will see organizational structure changes, moving away from layers of technology to structures that are more based around services. For example, rather than having the team that looks after the network or a specific software application, we have a team that looks after the financial services, the team that overlooks inventory management services, and so on.

Fundamentally, SOA requires a change in the way that IT people work together and in the way they work with others in the organization. Trust becomes a key issue, particularly as resources are shared across an enterprise and business managers find that a system that was once solely under their control is now being shared with others. Similarly, they will find that they are now dependent on other groups and other parts of the business to meet their needs.

The Program Management Domain

While program management is certainly not unique to the adoption of SOA, it is a key ingredient of any SOA program. In the Program Management Domain an important element is the organizational span of the SOA rollout across teams, departments, business units, and the entire enterprise, as well as managing the depth of the service portfolio.

SOA adoption requires an iterative approach, with SOA rolled out as a series of steps. Each step provides a complete business solution, and each step delivers measurable business value.

It’s in this domain particularly that we see the importance of measurement and management. We must measure on an ongoing basis the progress of the program; the ability of the program to fulfill the goals and aspirations that have been set for it; and of course, our ability to take control and make the changes needed to keep on track.

The Governance Domain

When talking to enterprises that have successfully adopted SOA, probably the single, most consistent message we hear is, “of all the things we have done to adopt SOA, the area which most caught us by surprise was the need to significantly enhance our governance systems.”

The Governance Domain concerns the models, systems and processes by which the enterprise’s operations are governed: “What are the key activities that need to happen?” “What are the key decisions that need to be made?” “Who is responsible for making those decisions?” “What information is needed to be able to make those decisions?” The Governance Domain must include things such as portfolio management, risk and compliance management and,
of course, financial management. While most of the focus is upon governance of information technology, it is imperative that the IT governance models are coupled directly to the enterprise’s overall corporate governance model.

Typically, SOA governance is much more important than it is in a traditional IT environment. There are a number of reasons for this, but it can largely be attributed to the fact that an organization adopting SOA is moving away from an IT environment consisting of a small number of very large, relatively static applications into an environment comprising many smaller, more focused service components whose relationships are more complex and changeable than they were previously.

While an SOA rewards us with greater flexibility, it also demands significantly stronger governance and management both within each part of the business and between them. As I’ll discuss in the “Operations and Management Domain” section, management is not only about managing technology, but also managing the technology in terms of services, both IT services and business services.

This has been borne out by HP’s own experience. SOA governance is not something that you can simply bolt-on to your existing IT governance models. Rather, the adoption of SOA requires that you examine, extend and evolve your governance models, your processes and your policies to support a new approach.

Effective governance provides an ideal antidote to issues around trust that often arise through the adoption of SOA and a move to sharing services. An SOA governance model needs to accommodate increased collaboration across teams.

The Chief Architect of a financial institution with a quite mature SOA recently described a serious problem that they had experienced. Their enterprise has extended their sourcing model to utilize a number of services that are provided by third-party companies. They recently experienced a significant outage of a core business service that supported the financial institution’s composite business service when it was taken out for planned maintenance. Unfortunately, there was no process in place as part of the third-party’s operational governance processes that outlined something to the effect that, “If you’re going to do this to the service, then you need to contact these service consumers before taking down this service” and the consequences were bad. Notifying affected parties would have been an obvious consideration, you would think, but that’s the sort of real, tangible problem that becomes much more noticeable in an SOA world, and you most assuredly need governance processes in place to address those potential issues before they become issues.

A fundamental part of rolling out an SOA is the whole notion of identifying services and their interconnections. Probably the questions I am most frequently asked by IT organizations moving into SOA (perhaps after “Can we do this without spending any more money?”) are “How do I choose the right services? How do I know I have the right services with the right granularity and the right relationships?” In order to answer those questions, you need the right governance and the right architecture in place.

The Architecture Domain

The Architecture Domain covers the full architecture spectrum: enterprise architecture, solution architecture and technology architecture. The “A” in SOA provides a strong reminder that the Architecture Domain lies at the heart of successful service-oriented architecture.

Architecture is about principles, standards and models. We have repeatedly experienced, during many successful customer engagements, the tremendous value of adopting a set of guiding principles at the heart of the architecture. Each of those principles will have a rationale for their existence that links them to another dependent principle. Ultimately, we should be able to follow the linkage of rationales and principles all the way back to the basic business drivers and business goals that are driving the enterprise. With this kind of architectural framework, we are able to build up a traceable model linking technology and business principles and the related decisions. Such a model is very powerful. Once you reach this point, you’re in a position where you can say, “If we have a business change, we can understand the impact that the change is going to have upon our technology solution. Or if we have change in the technology, we can use the model to understand the impact that the change will have on meeting our business goals and on our ability to provide the services that we need to provide.”

In an SOA world, with well-defined, loosely coupled, modular services, such an architectural model allows us to rapidly and cost effectively respond to change and take advantage of opportunities, with both confidence and predictable results.
In a well-architected SOA, all of the resources used by the enterprise are operated in appropriately sized modules that are described in terms of the service that the modular component provides.

A communications infrastructure provides the ability to connect different services in a manner that allows them to communicate with, and make service requests upon, each other—for example, so that an order handling service could request a calculation from a technical calculation service.

Standards are identified and compliance is enforced for all aspects of operation of the SOA. These standards are published within the enterprise, and where appropriate, externally to the enterprise.

When the services are connected, they are loosely coupled. This means that the method of implementation of a service consumer is not dependent upon the method of implementation of a service provider and vice versa—the only requirement is that both service consumers and service providers that interact must comply to an agreed service interface and an accompanying service contract.

With loose coupling, we can change the implementation of a service consumer and, so long as it is still fully compliant with the service interface, there is absolutely no impact upon the service providers it uses. Likewise, we can change the implementation of a service provider and, as long as it is still fully compliant with the service interface, there should be no impact upon the service consumer.

In this environment, we also have tools that let us orchestrate the services and implement business logic or to describe the particular flow of a transaction. Many different technologies may be used to implement this, and would likely include process engines or workflow handling tools as well as traditional application coding.

For example, as part of an order handling process we might have a service to validate and check inventory, other services to collate the order, and still others to deliver it. The orchestration tools would describe the logic that links and bundles all those services to provide a well-defined service.

Within the well-architected SOA, some type of registry or catalog is also provided so we can see what services exist, their key characteristics and properties, and where and how they can be accessed and used. Alongside the registry or catalog, mechanisms are required to manage the release and retirement of service upgrades—one example is version control.

Security infrastructure is fundamental to a well-architected SOA. With sound security in place, identity is centrally managed, policies are maintained and enforced, and exception handling is clearly defined and acted upon.

Another characteristic of a well-architected SOA includes management tools that let us visualize and monitor what's going on within our SOA environment so that we can make changes to that environment as needed. HP feels that the best approach to achieving management capability is a model-based approach based upon a model of the services and their interactions. We use that model to understand how the environment is behaving. We can make changes to the model, test the changes, and understand the impact of the changes before actually implementing those changes in our real-world environment.

All aspects of the well-architected SOA are encompassed by IT governance, which is integrally linked to the enterprise’s corporate governance.

As we adopt SOA, each step in the adoption process must be tied back to the context of an overall enterprise architecture. An iterative approach will only work when we have a broad strategy and a broad enterprise architecture that provides the context for each of those iterations. Without this context, the enterprise will simply end up building new silos (silos of service-oriented architecture) and will be barely better off than they were before.

The service model with a detailed description of each service and an understanding of the relationships between services is core to SOA.

In some organizations, the enterprise architectural program may have responsibility for the entire domain model. Other organizations might be structured in different ways, with different groups within the enterprise taking responsibility for different parts of the domain model.

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2In some organizations, “resources” is only used to refer to technology or information technology and assets. However, given the importance of the concept of abstraction in realizing an SOA (that is, focusing upon what the service provides rather than how the service is implemented), the term resource should be used to describe any source of service—e.g., software applications, technology components (storage, communications, processing capacity), people and/or other organizations.
The Enabling Technology Domain
Of all the SOA domains, the Enabling Technology Domain has received the greatest attention and is probably the best described and understood. The Enabling Technology Domain encompasses the tools and technologies needed to support achievement of the goals of the other seven SOA domains and to realize the infrastructure needed to support a service-oriented architecture within an enterprise. The focus is upon the software and hardware technologies that are specifically required for the implementation of a service-oriented architecture, as well as the more traditional technology components such as network, service, storage, operating system, and so on.

SOA is about embracing heterogeneity, leveraging resources and investments already in place. It’s not about rip-and-replace. It doesn’t require everything to be done just one way or by using just one technology. The Enabling Technology Domain encompasses all of the enterprise’s technology assets (with a view to re-use) as well as technology specifically dedicated to SOA.

The Operations and Management Domain
In the Operations and Management Domain, processes and policies defined in the governance model are applied. The domain covers all aspects of operating and managing our service-oriented architecture. In addition to stronger governance, the more flexible and dynamic SOA environment demands significantly stronger management.

Management refers not only to managing technology, but to managing the technology in terms of services delivered by the technology, both IT services and business services. When a particular piece of hardware technology fails, or when a particular device is no longer available, we need to understand which services required that device to be there in the first place. We need to understand which services use that resource and what the impact of the failure means in business terms.

For example, imagine that a storage device used to support a suite of inventory management services fails. Perhaps 23 customer orders are being handled by the inventory management services at this very moment across the enterprise, but not all of those orders will be impacted by the failure of the storage device as some orders may have already successfully completed that part of the inventory management processing. Say only 10 out the 23 customer orders are affected.

Having management information provided within your business context is so much better than thinking, “Well, that old storage device has finally given up and who knows what the impact is going to be?” Instead, we can actually say, “While we have all of these orders in progress only 10 are affected by this outage, so let’s manually process this 10 orders or let’s contact those 10 customers and talk to them about what we can do as an alternative.”

As an idea, service-oriented architecture has been developing and maturing for some time. The concept of SOA is built upon many of the things that the IT industry has learned over the years. One of the things that’s really crystallized interest in SOA and brought it to the attention of decision makers has been the development of various technologies and standards that now allow us to realize the vision of service-oriented architecture effectively. But while technology is an essential part of implementing an SOA, in order to be really effective it’s necessary to go beyond the technologies and begin to look at what is needed to wrap around those technologies in order to make them effective for business.

HP learned quite early on about the importance of management. As we rolled out and implemented an SOA, we have found that there is a pressing need for management tools that allow continual monitoring and control of the environment. That’s not surprising, of course.

The traditional ways of organizing, structuring and architecting information technology solutions, which are cost-effective in an environment with relatively little change, breaks down in a world of rapid change. SOA is an architectural approach designed and structured to make change much easier both on IT organizations and the businesses they serve. One way that is achieved is through breaking resources into separate modular pieces described in terms of the services they provide. Then, equipped with a set of tools, it is possible to reconnect those modules in different ways to provide the services that a business needs.

An obvious benefit to this approach, which HP uses internally and with customers, is that we arrive at a much more flexible environment. If we need to change the way that we handle a particular business transaction, it can sometimes simply be a matter of reorganizing some of the existing modules, or introducing a new module. A traditional IT environment would tend to have large monolithic stand-alone silos of functionality, (more traditionally called “applications”). In the traditional model, each of those applications stands alone. Each does what it does and that’s that. In an SOA world, we have many smaller parts that are combined and recombined as needs dictate.

Therefore, management capability is so much more important in SOA tools because, while SOA gives us the
The Supply & Demand Domain

The Supply & Demand Domain is one where we anticipate significant growth and increasing focus as an enterprise’s SOA implementation matures.

An enterprise’s adoption of SOA often opens up a variety of new opportunities for sourcing. By having the resources and assets of an enterprise described and managed as a set of modular services with standardized interfaces, we have the opportunity to be more granular and more dynamic about how we source those services.

No longer are executives presented with a case of, “Do I outsource everything or nothing?” Now, they can consider questions such as, “Perhaps I can source this particular part of my operation or this particular service to a specialist or to someone cheaper?” or “Maybe I can set this up so that I source this service from whichever service provider is cheaper at that point in time?” which may yield opportunities for saving costs, reducing risk, or for more rapidly bringing new services to the business.

SOA assessment

Assessing an SOA, like any kind of assessment, is aimed at helping us answer three primary questions:

· Where are we now?

· Where do we need to get to?

· What do we need to do to get there?

At HP, we have developed two important tools—the HP SOA Maturity Assessment and the HP SOA Agility Assessment—to help us answer these questions.

The maturity assessment is used to assess the capabilities and assets that exist within the enterprise, across the eight domains, to support the enterprise’s adoption and operation of SOA. In doing so, it identifies the capabilities and assets that need to be developed or acquired and the actions that need to be added to the enterprise’s SOA program.

The agility assessment helps us to create an agility profile for the enterprise, revealing how the agility of different parts of the enterprise compares. This unique capability is extremely valuable, as it helps us identify the areas of the business which will most benefit from the adoption of SOA, estimate the potential magnitude of that benefit from SOA, and effectively prioritize the actions that will comprise the enterprise’s SOA program.

The SOA Maturity Assessment

The establishment of an enterprise SOA is not something that happens overnight; rather the capabilities and assets that are required to support an SOA are acquired, developed and evolved over time as the enterprise’s SOA matures. The SOA Maturity Assessment uses the HP SOA Maturity Model to assess the current maturity level of the enterprise’s SOA and to show how the various SOA capabilities and assets may mature over time.
The top level of the SOA Maturity Model is structured as a matrix with two primary axes (Table 1). Each row represents one of the eight SOA domains. Each column represents a different level of maturity using five maturity levels, from the least mature in the left-most column to the most mature in the right-hand column.

**Level 1 (Ad-hoc)**
Level 1 is the starting point for most SOA journeys. For an enterprise at Level 1, SOA is a relatively new concept. The enterprise has either taken no real steps toward SOA, or they may have conducted some limited, initial web services or service-based activities that are project-centric, experimental and often technology-focused.

**Level 2 (Basic)**
Typically, enterprises that are at Level 2 maturity have made a firm commitment to adopting SOA, although this may still be limited to certain parts of the organization. They will have completed a pilot or initial project with SOA applied consistently across the project and will have deployed a set of services that are in production use by the enterprise’s business.

**Level 3 (Standardized)**
Enterprises that have achieved Level 3 maturity have adopted SOA as a strategic enterprise-wide architectural principle. An enterprise service catalog has been established and an enterprise-wide service model is defined and used. A set of SOA standards has been defined and is applied across the enterprise. The enterprise has governance systems that ensure that all new projects are compliant with the enterprise’s SOA principles.

**Level 4 (Managed)**
At Level 4, SOA is fundamental to the way the enterprise operates both its business and its information technology, and services may extend outside the enterprise. The enterprise’s service portfolio is well-managed with quantitative, integrated, enterprise-wide visibility and control of service operations. Service operational metrics are collected and reported in both business and technology contexts according to the audience.
Level 5 (Adaptive)
When an enterprise reaches Level 5 maturity, it truly can be described as an Adaptive Enterprise. The whole enterprise operates a dynamic SOA with business and IT synchronized to achieve an optimum balance of agility, performance, risk and cost.

Each cell in the HP SOA Maturity Model matrix contains a simple description. This description outlines the high-level characteristics of a given SOA domain at a given maturity level.

The top-level view of the SOA Maturity Model provides a summary view of the overall maturity of an enterprise's SOA. This summary view is provided by aggregating a set of more detailed sub-domains which comprise each of the (top-level) SOA domains. For example, the Governance Domain is made up of three SOA sub-domains:

- Portfolio management
- Risk and compliance management
- Financial management

As with the SOA domains, a set of five descriptions—one description for each maturity level is associated with each SOA sub-domain (See Table 2).

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<td>Some processes, individual responsibility</td>
<td>Guidelines defined and integrated</td>
<td>Value of governance understood</td>
<td>Advanced understanding</td>
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Table 2: Example: SOA Governance sub-domain

Also associated with the SOA domains and sub-domains are hypotheses. For each SOA domain one or more hypotheses provide the rationale for the capabilities and assets described within the domain. Many sub-domains also have associated hypotheses; sub-domains with no directly associated hypothesis inherit, or contribute to, the hypothesis associated with its parent domain.

The current level of SOA maturity

In addition to the maturity description, a set of assertions exists for each maturity level of each SOA domain and sub-domain. It is these assertions that drive the overall maturity assessment. For an enterprise to be assessed as having reached a particular maturity level for a given domain, most of the associated assertions must be true. Experience has shown us that if 80% of the assertions required to achieve a particular maturity level are true, then it is likely that the enterprise has reached that maturity level.

As an example, Table 3 lists the set of assertions associated with maturity Level 2 in the Education sub-domain of the People Domain. In this case, the enterprise in question has not yet reached maturity Level 2.

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<tr>
<td>Pe-E-2.2</td>
<td>Introductory business-focused SOA training is available to all business staff.</td>
<td>?</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pe-E-2.3</td>
<td>Detailed training in the standards and technologies being used to implement SOA is available on demand.</td>
<td>?</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Pe-E-2.4</td>
<td>A broad range of SOA-related information resources is available to all staff.</td>
<td>?</td>
<td></td>
<td></td>
<td>½</td>
</tr>
<tr>
<td>Pe-E-2.5</td>
<td>Senior IT staff (managers, architects and project leads from both development and operations) have a strong understanding of SOA concepts and principles.</td>
<td>?</td>
<td></td>
<td></td>
<td>½</td>
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People Domain, Level 2 (Basic) 3.0 (60%)
The process for assessing the maturity of an SOA requires the analyst to consider each assertion associated with each domain and to determine whether the assertion is false, partially true, or true. Experience has taught us that when testing assertions, it is not enough to just ask the opinion of one person; some tangible evidence should be identified to support the evaluation of each assertion.

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<tbody>
<tr>
<td>Governance</td>
<td>Some acknowledgement of issues</td>
<td>Some processes, individual responsibility</td>
<td>Guidelines defined and integrated</td>
<td>Value of governance understood</td>
<td>Advanced understanding</td>
</tr>
<tr>
<td>Portfolio management</td>
<td>IT as an expense—cost minimisation focus</td>
<td>Project value focused</td>
<td>Risk/return focused</td>
<td>Managed portfolio</td>
<td>Enterprise value optimised</td>
</tr>
<tr>
<td>Risk and compliance management</td>
<td>Security as expense—cost minimisation focus</td>
<td>Project value focused</td>
<td>Enterprise IT risk mitigation</td>
<td>Enterprise business risk mitigation</td>
<td>Agile enterprise risk management</td>
</tr>
<tr>
<td>Financial management</td>
<td>Enterprise driven, budget focused</td>
<td>Allocations based recovery</td>
<td>IT cost transfer</td>
<td>Optimised business value impact</td>
<td>Enterprise cost management</td>
</tr>
</tbody>
</table>

Figure 3: SOA Governance Domain Maturity Profile

Once all of the assertions for a sub-domain have been tested, the maturity level for that sub-domain can be determined. And, once the maturity levels have been determined for a full set of sub-domains, the maturity of the SOA domain can be established. An example of this outcome is shown for the governance domain sub-domains in Figure 3.

An enterprise can only be said to have achieved a given maturity level in the domain once all its sub-domains have reached that maturity level. When the maturity assertions have been evaluated for each of the SOA domains, the result can be plotted on a chart as shown in Figure 4. Doing so provides an overview of the current level of maturity of the enterprise’s SOA program.

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<tbody>
<tr>
<td>Business</td>
<td>Minimal interest in SOA</td>
<td>Aware of SOA</td>
<td>Generally complies with SOA</td>
<td>Proactively supports SOA</td>
<td>SOA fundamental to business ops</td>
</tr>
<tr>
<td>Program Mgmt.</td>
<td>SOA project focused</td>
<td>SOA efforts are BU-based</td>
<td>SOA federated, not integrated</td>
<td>SOA integrated at corporate level</td>
<td>SOA enterprise wide, extends to partners</td>
</tr>
<tr>
<td>Governance</td>
<td>Some acknowledgement of issues</td>
<td>Some processes, individual responsibility</td>
<td>Guidelines defined and integrated</td>
<td>Value of governance understood</td>
<td>Advanced understanding</td>
</tr>
<tr>
<td>Architecture</td>
<td>Limited or ineffective architecture</td>
<td>Program exists &amp; architecture well defined</td>
<td>All IT initiatives comply</td>
<td>Business driven and auditable linked</td>
<td>Architecture and business executed as integrated</td>
</tr>
<tr>
<td>Operations &amp; Mgmt.</td>
<td>No mgmt. of services, infrastructures elements only</td>
<td>Mgmt. in terms of Slaps</td>
<td>Mgmt. of business services</td>
<td>Proactive mgmt. of svcs. linked to component svcs.</td>
<td>Integrated mgmt. of business services into operations</td>
</tr>
<tr>
<td>Supply &amp; demand</td>
<td>Business needs met using tech. components</td>
<td>Services provided internally</td>
<td>Value-based sourcing</td>
<td>Sourced from multiple providers</td>
<td>Dynamic service sourcing of multiple sources</td>
</tr>
<tr>
<td>People</td>
<td>Little or no knowledge of SOA</td>
<td>Knowledge limited to IT mgmt. &amp; architects</td>
<td>SOA education required for IT staff</td>
<td>Ongoing education for all staff</td>
<td>SOA is embraced &amp; actively promoted</td>
</tr>
<tr>
<td>Enabling technologies</td>
<td>No service infrastructure</td>
<td>SOA infrastructure limited</td>
<td>Standard enterprise wide SOA</td>
<td>Large-scale managed SOA infrastructure</td>
<td>Integrated, dynamic SOA infrastructure</td>
</tr>
</tbody>
</table>

Figure 4: Enterprise Current Maturity Profile

With the completion of the SOA Maturity Model, we have an answer to the question "Where are we now?" at least in terms of the capabilities and assets that the enterprise needs to implement and operate an SOA.
The target level of SOA maturity

With the answer to the “Where are we now?” question firmly in hand, we can turn our attention to the next question: “Where do we need to get to?”

Working out a desired future state is a relatively straightforward, though not necessarily simple, task. The value of increasing the maturity of the enterprise’s SOA capabilities and assets can be determined by examining domain hypotheses and their associated value propositions for each domain and sub-domain.

There is a natural desire to set out immediately upon a journey to achieve the highest possible level of maturity. But, each enterprise operates within its own unique business context—in different industries and marketplaces, with different partners, histories, strategies, value propositions, etc. The ideal or target maturity level for each enterprise will vary and may not necessarily always be at the highest level. The value of each incremental step to higher maturity must be evaluated in the light of an enterprise’s business strategy and context.

As the term maturity implies, the journey to increased maturity is not something that is going to be completed in a week; it will take time and it will take investment. Different domains have different impacts on the organization at different stages and a phased approach to SOA adoption is usually needed: "Based on our current position and our business strategy, this is where we need to be in 12 months, and this is where we need to be in 18 months." With that knowledge, the enterprise can then plan the actions and projects required to realize the desired end state.

Determining “Where do we need to get to?” is also done using the SOA Maturity Model. In addition to a set of assertions, each maturity level of each sub-domain has a set of associated value propositions. Actually, the value propositions are associated with the transition within a sub-domain from one level of maturity to another. A value proposition is made up of two parts: (1) the achievement of a particular capability or asset (often derived from a related assertion) and (2) the value to the business of achieving that particular capability or asset. For example: "If all services in use across the enterprise are registered in a central service catalogue, sharing of services across enterprise will be maximized.” In this case, this value proposition is associated with the assertion "All services in use across the enterprise are registered in a central service catalogue."

The optimal target maturity level for an enterprise is determined by taking each value proposition, in each sub-domain, and considering whether or not the value proposition is valid given the enterprise’s business strategy and context. For example, if we look at the preceding value proposition: For most enterprises, maximizing the sharing of services will bring clear and significant business value; if however, the enterprise has a strategy to spin-off a number of business units, then this value will not be realized and the value proposition would not be valid for this enterprise.

When each of the value propositions in the HP SOA Maturity Model has been evaluated, the result can be plotted on a table as shown in Figure 5. This provides an overview of the target level of maturity for the enterprise’s SOA program.

![Figure 5: Enterprise Target Maturity Profile](image-url)
SOA action planning

Answering the "What do we need to do to get there?" question is the next logical step in the planning process. The difference between the enterprise’s target maturity profile and the current maturity profile shows, for each domain and sub-domain, the changes in maturity level that are required. Within the HP SOA Maturity Model are a well-defined set of actions that need to be performed in order to realize the value propositions associated with each maturity level transition and to make the related assertions true.

Following on from our previous example: The assertion, "All services in use across the enterprise are registered in a central service catalog" and associated value proposition, "If all services in use across the enterprise are registered in a central service catalogue, sharing of services across enterprise will be maximized" will be realized with the following actions:

- Deploy a standards-based, enterprise-wide SOA service catalog.
- Populate the enterprise-wide SOA service catalogue with all existing services.
- Update governance systems to ensure that all services are registered with the enterprise-wide SOA service catalog.

Flowing from the maturity model is the set of actions required to move the enterprise from the current maturity level to the target maturity level. Often, there are relationships between the actions because some actions will be dependent on others. The action to, "Populate the enterprise-wide SOA service catalogue with all existing services," has a dependency upon a preceding action to “Deploy a standards-based, enterprise-wide SOA service catalogue”. These dependencies are incorporated into the SOA Maturity Model.

Through their relationships the different activities are also grouped into a set of projects. These projects then form a basis for developing the enterprise’s SOA transformation roadmap to move their organization along their own unique journey to a more mature SOA and to complete an initial answer to the question “What do we need to do to get there?”

The SOA Agility Assessment

The SOA Maturity Assessment has provided a firm basis for examining the enterprise’s SOA capabilities and assets to assess their current state, plan future needs, and develop a roadmap of interdependent activities that will mature the enterprise’s SOA capabilities and assets. However, it does not tell the full story. Having mature and effective SOA capabilities and assets across each of the SOA domains is absolutely vital to any enterprise SOA program, but to fully reap the benefits of SOA requires the deployment of business solutions within the SOA.

The HP SOA Agility Assessment provides a means for developing an enterprise-wide profile of its business agility. The agility profile shows the current level of agility being experienced in each aspect of the enterprise’s business and the relative importance of agility for each of those business areas. The contribution of the SOA Agility Assessment to the overall SOA assessment process is to:

- Establish a benchmark of current levels of business agility that will enable the measurement and monitoring of the changes in business agility as the SOA program is executed
- Determine which parts of the enterprise are likely to reap the greatest benefit from increased agility and hence from the adoption of SOA

A primary motivation for enterprises to adopt SOA is the need to enhance their business agility. Paradoxically the drive to enhanced agility raises one of the key challenges that enterprise executives face in adopting SOA.

In the past, when preparing a business case, benefits such as agility were treated as intangible or soft benefits and typically, these soft benefits were not perceived as core benefits for making a business case—rather, they were treated as bonuses or extras that might, or might not, be realized. However, in the dynamic and ever-changing business world of today, business agility has become a key factor for success that cannot be ignored or pushed aside as a second-class requirement—agility must be a core, critical value.

And this is where the challenge arises, if enhanced agility is one of the core benefits that we were looking to get from our investment in SOA, it is imperative that we have a way of measuring agility. Without the ability to measure agility we cannot estimate the benefit, focus our effort, or evaluate our success.

3Of course, there are many other potential reasons for adopting SOA. However, almost all relate either directly or indirectly to a need for greater flexibility or agility. For example: cost reduction is a common motivator for enterprises adopting SOA. But, this is usually achieved through improved agility, since cost of change is a major part of it operational cost, and improved agility will directly reduce the cost of change.
Few enterprises today keep quantitative measures of business agility. But, if you go to almost any senior executive from almost any enterprise, they will be able to talk to you at length about the challenges that they face in terms of business agility.

Given that there were few measures previously available for quantitative measure of agility but plenty of qualitative data, HP worked in partnership with the INSEAD business school to develop a technique for capturing qualitative business agility data and converting it to be expressed as quantitative data.

The agility assessment technique applies a set of carefully crafted questionnaires through a series of interviews and surveys to extract and quantify agility data using three dimensions:

- **Time**—The speed at which infrastructure and business process changes can be implemented.
- **Range**—The breadth of change that can be introduced or supported.
- **Ease**—The facility with which change can be introduced or supported.

The SOA Agility Assessment is designed to assess the agility provided by IT services from a business perspective. As a consequence, different questionnaires are required for different industries.

There is a great deal of interesting and useful analysis that can be applied to the data collected by the agility assessment. One of the most valuable outcomes takes the form of a chart plotting the enterprise’s key business service domains according to the current level of agility and the importance of agility for that service domain to deliver business value. Figure 6 shows a sample agility assessment chart taken from a high-tech manufacturer.

![Figure 6: Example SOA Agility Assessment analysis (High-tech manufacturer)](image)

More agile business services will be plotted toward the right-hand side of the chart and those that need to become more agile will be plotted toward the top of the chart. In the example shown, financial services (9) and product lifecycle management services (5) have an agility level that is low relative to the importance of agility to those parts of the business. Although the enterprise’s human resources services (10) are relatively inflexible, agility is less critical to their business operations.

Of course there are other factors to be considered, but on the basis of the agility assessment analysis, there is clearly a strong indicator that the services supporting finance and product lifecycle management should be an early focus for this enterprise's SOA program.
An agility profile also provides a basis for identifying key quantitative metrics that can be used to measure and monitor the impact that each part of an SOA program has upon the agility of each business capability. This provides essential validation that the assumptions that have been made and the relationships that have been identified are actually correct, and that the goals are valid. And, of course, if it becomes apparent that the goals are not being achieved, the measurement provides the opportunity to re-focus and re-target in order to keep on track.

The SOA Agility Assessment enhances our answers to the questions where are we now, where do we need to get to, and what do we need to do to get there—from a dynamic perspective. It also helps ensure that an enterprise’s adoption of SOA will improve IT’s ability to support business change, making the business more agile and more competitive.

Putting it all together

The adoption of SOA helps enterprises address problems and meet challenges. But, as importantly, it will also open up opportunities. In today’s changing world, you never know what is going to happen just around the corner. I’ve found it tremendously exciting to work with organizations that have embarked upon an SOA program to address a specific set of problems and then have gone on discover an array of other, unanticipated opportunities and benefits that have been enabled by their adoption of SOA.

The SOA journey will not be the same for every enterprise. Even when in the same industry and in the same marketplace, there will be a difference among enterprises in value proposition, history, a different background, and a different set of needs.

In a world of ever-changing business conditions and rapidly developing technology, it is imperative to include assessment as a fundamental part of any SOA program. Assessment plays a key role in preparing to embark upon the adoption of SOA, providing you with a firm basis upon which to develop goals, strategy and plans. But it is equally important to continue to assess your SOA program on an ongoing basis to track progress, verify assumptions and make decisions. SOA Assessment is not just about deploying the right technology, it must encompass every aspect of your enterprise that has an impact upon the success of your program.

By implementing a careful regime of assessment on an ongoing basis, you can confidently develop strategy and goals based upon fact rather than guesswork and can execute your enterprise SOA program to realize your strategy and achieve your goals in a controlled environment, maximizing the value returned by your investment in information technology.