

# Service Oriented Architecture White Paper

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# Document Sensitivity

This document contains HP propriety information.

## Executive summary

Organizations vary tremendously in their purpose, scope, size, structure and community. Nevertheless, careful study of their underlying information technology presents a broad set of common concerns and requirements, such as the need to align IT with the organizations missions and objectives, IT governance, providing competencies and abilities to share information and collaborate effective and efficiently. HP's answer to these requirements is what we call an "Adaptive Enterprise" (AE).

The Adaptive Enterprise is HP's vision of an organization in which business and IT are synchronized to capitalize on change. The Adaptive Enterprise helps companies lower IT-related costs while making IT flexible enough to deliver what they really need - simplicity, agility, and value. An Adaptive Enterprise enables companies to achieve a tight coupling between business and IT so they are able to quickly and easily respond to change, helping to maximize return, mitigate risk, improve performance and increase agility.

The Adaptive Enterprise design principles: simplification, standardization, modularity, and integration, along with the key architecture design rules- service-oriented architecture (SOA), virtualization, and model-based automation. HP uses these principles to drive technology decisions that give sustainable and practical value.

"SOA" is arguably the most recognizable acronym in IT these days. This is because Service-Oriented Architecture has the potential to enable a much higher degree of business agility by transforming enterprise IT based on a service-driven delivery model. HP's Adaptive Enterprise visualization methodology provides a practical approach for developing an SOA implementation roadmap that focuses on mission critical process and provides the organization agility to collaborate and share information in a secure manner.

IT organizations experience a range of challenges as they move from tactical Web services to enterprise SOA and business services. These challenges involve build-, deployment- and run-time issues. Some of the challenges introduced by an SOA are business service security, business service governance and auditing, service level compliance and business service life cycle management.

Critical success factors for an SOA implementation that alleviate and mitigate the challenges include defining coarse grained services and agile, loosely coupled business process. Furthermore, there is a need for SOA governance which provides a set of solutions, policies and practices which enable organizations to implement and manage an enterprise SOA. It is the SOA governance which makes it possible to realize ROI and the business benefits of loosely coupled services.

Finally, for any federal organization compliance with the five Federal Enterprise Architecture (FEA) reference models is a mandatory requirement. The six layers of Adaptive Enterprise map directly to the FEA reference models, their by assuring compliance with all federal mandates and regulation such as the Clinger Cohen Act, ITMRA, OMB A-300, A-130 et al.

# 1. About Service Oriented Architecture

A Service Oriented Architecture (SOA) is set of principles that define an architecture that is loosely coupled and comprised of service providers and service consumers that interact according to a negotiated contract or interface. These services provide the Interfaces to Applications in the IT landscape. The primary goal of SOA is to expose application functions in a standardized way so that they can be leveraged across multiple projects. This approach greatly reduces the time, effort and cost it takes to maintain and expand solutions to meet business needs.

It is important to note that SOA is not an off-the-shelf technology; rather it is a way of architecting and organizing IT infrastructure and business functionality. SOA is a paradigm for designing, developing, deploying and managing discrete units of logic i.e. services, within a computing environment, and has the following attributes:

- Functionality is organized as a set of modular, reusable shared services
- Services have well-defined interfaces and encapsulate key business processes
- Customer facing solutions serve as customized views of these services for different segments, and can access these shared services as needed.
- The reusable shared services are built without making any assumptions of who (portal or another service) will consume these services

SOA is vital to an enterprise as an architecture paradigm because it allows the business to become agile and respond rapidly to changes and challenges it faces internally and externally from its customers, stakeholders and various federal mandates and regulations to accomplish mission critical objectives.

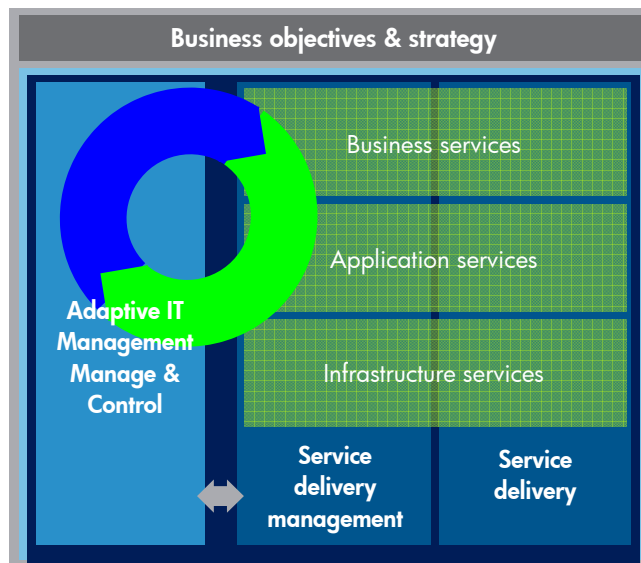


Figure 1: HP's Adaptive Enterprise Darwin Architecture

The Adaptive Enterprise is HP's vision of an organization in which business and IT are synchronized to capitalize on change. The Adaptive Enterprise helps organization's to lower IT-related costs while making IT flexible enough to deliver what they really need i.e. simplicity, agility, and value. An Adaptive Enterprise enables organizations to achieve agility so they are able to quickly and easily

respond to change, helping to maximize return, mitigate risk, improve performance and increase agility.

SOA concepts are at the core of HP's Adaptive Enterprise vision. HP's Adaptive Enterprise is built around service as a unit of modularity and separates functional and management perspective, which allows an organization to become an agile enterprise in responding to mission critical objectives.

## 2. Benefits of SOA

SOA promotes loose coupling of software resulting in services that are easier to integrate as they utilize lower-cost tools and have standards based exchange formats and interface. Some of the key benefits that an enterprise can achieve from SOA are:

- **Agility to collaborate** – SOA provides ability to securely and easily share information, with partners and stakeholders by presenting a standard coarse grained service which any authorized business partner can use, there by extending the enterprise.
- **Agility to adapt** – SOA promotes the ability to rapidly reconfigure the business process by selecting from the available set of services, thereby providing the agility to adapt to the business requirements introduced by stakeholders and business partners.
- **Reduction of cost** - SOA primitives are standards based For example, WSDL, SAML, SOAP & UDDI, providing a modular architecture, thereby enabling sharing and reuse of services.
- **Improvement in efficiency** - SOA promotes a modular enterprise, promising a high degree of reusability of business services, ensuring consistency.
- **Better business operations:** SOA based services enable a common architecture and approach to be pervasive in an enterprise containing heterogeneous legacy systems.
- **Ease of introducing new technologies** – SOA's coarse grain modularity allows enhancements to service by introducing new more efficient technologies as they are introduced without actually changing the service interface.

### 3. SOA Implementation Roadmap & Enterprise Visualization

Typical implementation strategy for SOA consists of leveraging existing IT applications and assets to create “grass roots” web services implementation. It should be noted that *web services* do not equate to *service-oriented architecture*. Web services primitives are merely a set of technology tools that enable the implementation of service oriented architecture.

This “grass roots” web services implementation transforms heterogeneous systems with proprietary interfaces and wraps legacy systems into standards based coarse grain web based services interfaces that can be leveraged by authorized business process or entity. This is followed by creation of Mission Critical Business Processes using underlying web services and secure service interface. The Mission Critical Process and services must then be managed to provide efficient operation. Creation of this environment is typically done in a SOA pilot within the enterprise, which is then extended to the enterprise as shown in the roadmap in Figure 2.

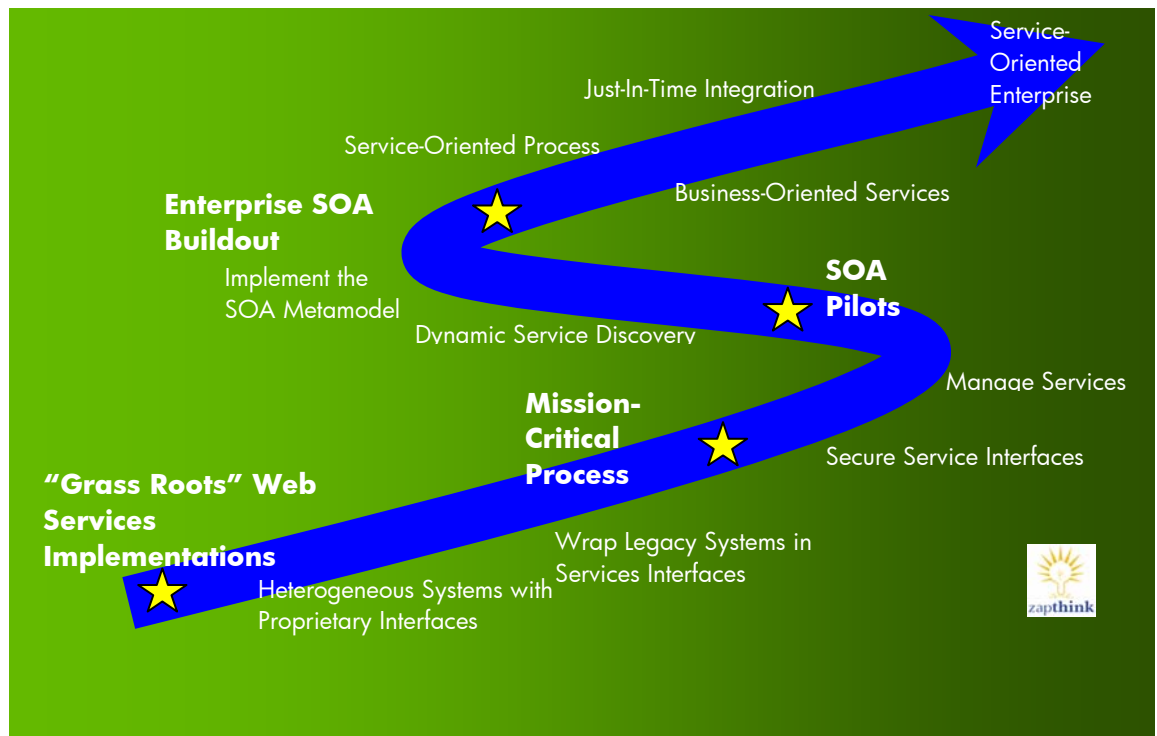


Figure 2: SOA Implementation Roadmap

Current best practices and state-of-art technology has evolved from operational and platform centric paradigm, where IT was in a reactive mode, with distributed architectures and tightly coupled custom applications, to a service and process centric paradigm, where business processes govern infrastructure and IT systems correlated with business processes using shared services.

This new service and process paradigm can be visualized using HP’s Darwin Architecture Framework and consists of four layers (as shown in Figure 3), namely the business process layer, the business services layer, the application services layer and the infrastructure services layer. These layers help

demonstrate how a low lying asset is leveraged to create application services and further abstracted to create business services, which are then used as building blocks for creation of mission critical business processes.

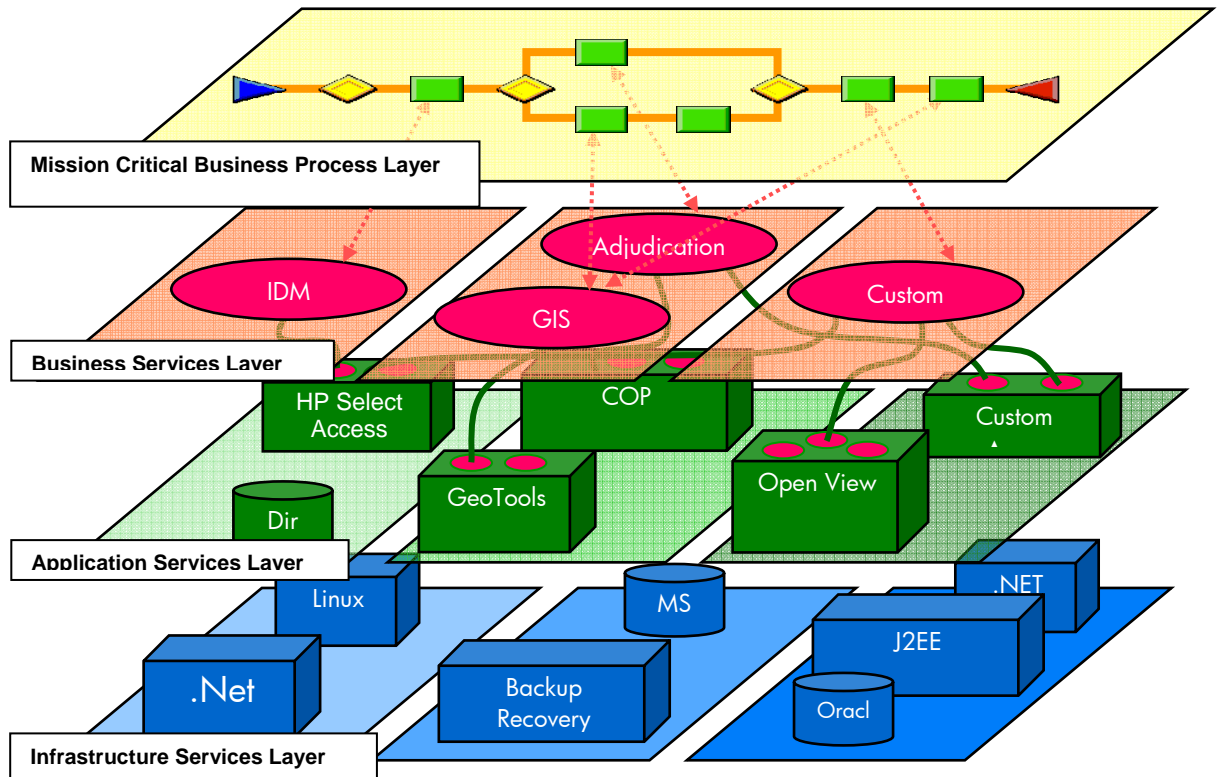


Figure 3: HP's Darwin Architecture Enterprise Visualization

Each of the layers provide a level of abstraction thereby creating a loosely coupled coarse grained service architecture. The business process layer manages and automates business processes using work flow and rules, the business services layer provides yet another level of abstraction, it abstracts the service from the application by creating a meaningful business interface that encapsulate complex sub-process. The application service layer focuses on integration interoperability, not semantic interoperability and exposes web services directly from database, object or component and finally the infrastructure services layer underscores the provisioning resources and environments, enabling platforms hardware and network.

This enterprise visualization can be then leveraged to create a succinct organization specific SOA implementation roadmap, including the prioritization of the mission critical business process and the underlying "grass roots" web services that need to be developed. Enterprise visualization provides a succinct picture of the organization, its boundaries and processes that span the organizations boundaries, the services and capabilities that exist within the enterprise, which promotes and provides:

- Effective and efficient governance
- Agility to respond to mission critical objectives
- Ability to collaborate and securely share information
- Agility to adapt to new challenges and opportunities



## 4. SOA Challenges

IT organizations experience a range of challenges as they move from tactical Web services to enterprise SOA and business services. These challenges involve build-, deployment- and run-time issues. Key build- and deployment-time challenges are described below.

Business services are designed to perform a business-level function and be reused across organizational boundaries. It is crucial to have a mechanism for guiding how and when services are built, ensuring that the services meet basic technical criteria for interoperability, and identifying and avoiding unnecessary duplication of services.

Reuse of services and elimination of redundancy are important business benefits of SOA. Indeed, the ROI for SOA is reuse, with some early adopters of SOA estimating savings of \$30k for every service that is reused rather than needlessly reinvented. When business analysts, architects and developer build new applications or implement new business processes, they need a well-known, systematic way of finding business services that they can reuse.

Once a service is published to the SOA, users of that service come to depend on it as a reliable IT asset. It's important to establish a controlled process for "provisioning" services to the SOA, including checkpoints and approval mechanisms to ensure that services conform to both IT and business policy and best practices, and to guarantee the quality of metadata about the services.

Business services are often composed from multiple underlying businesses and IT services. IT services in the context of a service model are virtualizations of physical services, such as application servers, brokers, data bases, etc. The interdependencies of these services and the higher level business services are manually mapped and recorded within a service catalog.

Once business services have been built and deployed, organizations will immediately experience new challenges in managing the services. Heterogeneous assets that are bound by policy-enforced contracts are a completely new concept for IT operations to tackle. Traditional security, policy and governance issues are compounded as service permutations grow and changes occur within the SOA. Such challenges include:

### **1. Business Service Security**

The requirements for Web services security will become increasingly important as more Web services are published to a registry by a variety of constituents. Therefore, authentication and authorization of services not well-known within an environment will become critical to any enterprise-wide SOA.

### **2. Business Service Governance & Auditing**

Business services are comprised of different Web services and these often depend on other Web services. Defining overarching policies and auditing compliance on this complex and often dynamic relationships is very challenging. Federal mandates and regulations such Clinger Cohen Act, OMB A-300, A-130, Information Technology Management Review Act (ITMRA) makes it further critical to get this right.

### **3. Service Level Compliance**

Business services are comprised of different Web services and these often depend on other Web services. All of these may have inconsistent service level objectives. Service-level compliance of business services creates new requirements for performance and availability policy definition, reporting and troubleshooting.

### **4. Business Service Lifecycle Management**

Finally, business services will require a highly collaborative life cycle among all constituencies within a service delivery chain to optimize the flexibility and agility afforded by an SOA. Business people,

developers and operators will need to have the same information available to them but within their own context.

This information would come in the form of a model that can be updated by any one of these constituents as events (business, technical or otherwise) occur. Updates to this model will propagate actions taken by others within the service delivery chain to effectively support changes made to the business service(s). These challenges are shown in the figure below.

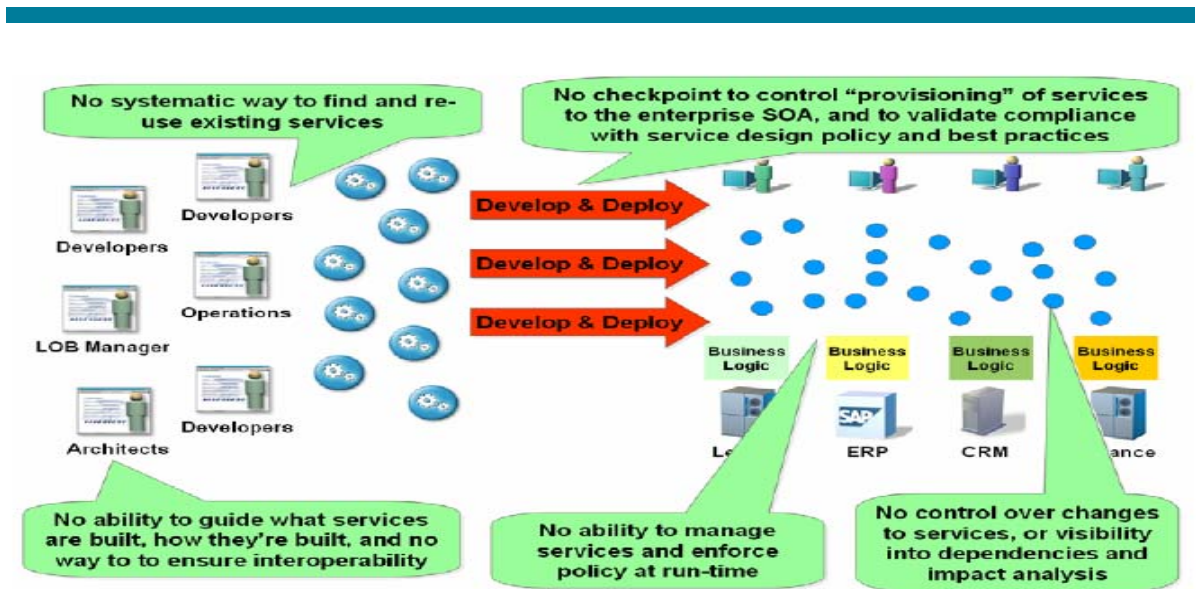


Figure 4: SOA Challenges

## 5. SOA Success factors

The critical success factors for SOA are discussed below:

1. **Coarse Grained Services** – The process of abstraction and aggregation happen across a number of tiers. Web Services could be exposed at any application tier. Vendors have made it straightforward to expose Web Services directly from any database, object or component. Application Package vendors might expose Web Services at a number of different tiers in their applications.

The granularity and abstraction of the interfaces at each of these tiers is likely to be object interfaces, that are very fine grained and reflect internal implementation view. For example, database calls at the object level are likely to be very fine grained. However, this approach is likely to expose the internal database design, which may not be desirable. Business components on the other hand if designed properly can present a coarse grained interface and hide the fine grained object methods.

This illustrates that as you get closer to the consuming application the services become coarser and as we move towards the database and object tiers, the implementation is finer grained, using native platform technologies that provide scalability and performance.

An interesting question is what is the scope of the service that is published as the Business Service. A simplistic answer is “at a business level of abstraction”. However, that is open to interpretation – it is better to have some heuristics, which ensure that the service is the lowest common denominator that meets the criteria of business; is consumer oriented; is agreed upon

and is meaningful to the business. The key point here is that there is a process of aggregation and collaboration that should probably happen separate to the implementing component. By making it separate, there is a level of flexibility that the exposed service(s) can be adjusted without modifying the underlying components.

2. **The Business Process** – SOA is gaining momentum, but implementations are still grassroots and technology driven, focused solely on integration-based services instead of business services. The business process is a basic unit of work for any enterprise, it controls and implements business transactions.

It is the business process that drives the definition of services, orchestrates service execution, and invokes appropriate services as required. Business agility comes from services whose functionality and interface are defined to enable the business process. Some of the key characteristics of a well designed business process are:

- Processes that are coarse-grained: composed of Services and exposed as Services
- Processes that are loosely coupled: a change to a process flow, activity, sub-process doesn't effect other processes
- Processes that are asynchronous
- Processes that are dynamically discoverable
- Processes that can Respond to Change

3. **Understanding when not to use SOA** – There are certain specific environments where an SOA solution may be counter productive for an organization. These are discussed below.
  - a) Real Time Response Environments – in situations where an instantaneous millisecond response time is a critical requirement, such as embedded systems in automobiles, aeronautics, nuclear reactors et al. SOA is not a very good fit, for SOA by its very nature consists of loosely coupled framework that provide asynchronous communication between service consumers and producers. That is not to say that SOA does not provide quick reliable communication. If your response time requirement is as low as fraction of a minute then SOA will definitely be valuable for the enterprise provide great efficiency particularly for legacy batch job applications.
  - b) For end of life cycle legacy systems – In these situations ROI for an SOA initiative will not be realized.
  - c) When there is minimal change – If your enterprise IT architecture is stable and working effectively with custom messaging interfaces and tightly couples applications and the technology is not at the end of life cycle then an SOA initiative could be considered at the next technology refresh point, which would allow for a sufficient ROI.
  - d) When there is no need to collaborate with external business partners – In such cases one of the key benefits of SOA that provides an enterprise agility to extend its business process to its partners and stakeholders it not realized, limiting the ROI and cost benefit of SOA.
4. **SOA Governance** – This is the set of solutions, policies and practices which enable organizations to implement and manage an enterprise SOA. SOA governance addresses the challenges outlined in the previous section, and makes it possible to realize ROI and the business benefits of loosely coupled services. It's helpful to view SOA governance in the context of the life cycle of business services. There are four stages which make up the business service life cycle:
  - a. *Develop*, a set of steps for specifying the properties, policies and functionality of a business service.
  - b. *Enable*, a set of steps for linking between business services and supporting applications and infrastructure.
  - c. *Publish and Provision*, a set of steps for a producer making a contract available in the registry, and other activities of 'deployment.'

- d. *Discover*, a set of steps for consumers and producers locating and ‘negotiating’ with each other.
- e. *Manage*, deals with ongoing monitoring and maintenance of services, inter-relationships, policies, security and other runtime issues.

Two key infrastructure solutions—business service registry, and business service management, help achieve SOA governance throughout the business service life cycle

- Business Service Registry - Reuse of services and elimination of redundancy are important benefits of SOA. When business analysts, architects and developers build new applications or implement new business processes, they need a well-known, systematic way of finding business services that they can reuse. Services are categorized in the registry, and can be browsed through a standard Web browser interface or searched by keyword. The registry provides a way for architects to identify redundant services and avoid duplication of efforts. Similarly, IT operations staff may access the registry to identify critical services that need to be secured and managed.
- Business Service Management – Managing an SOA requires the integration of people, processes, and technology in order to run IT as a service delivery business. It’s important to note that management of the “Adaptive Enterprise” isn’t a specific technology or an API against which a developer can code. Elaborating the Adaptive Enterprise diagram shown in Figure 1, shown below

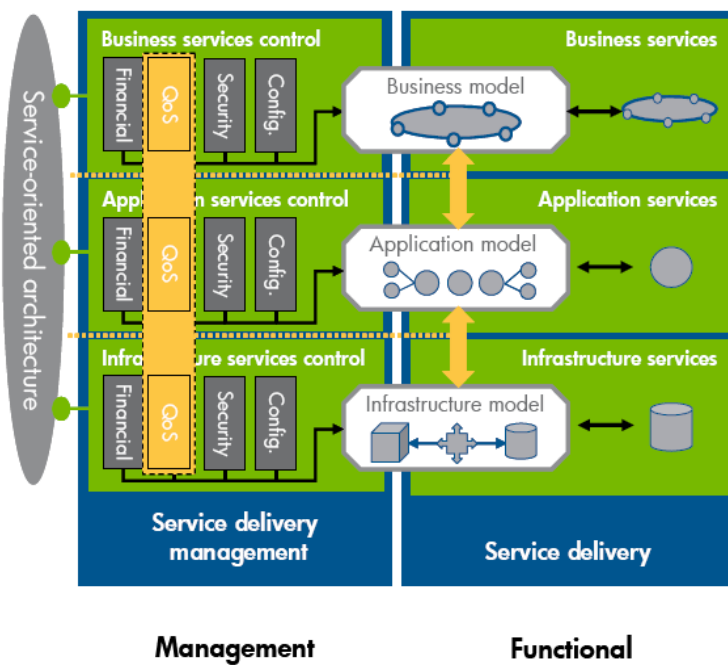


Figure 5: Service Delivery and Management Stacks of Adaptive Enterprise

The service delivery stack describes how and what business value gets delivered, while the service delivery management stack describes how and what services are managed while the business value gets delivered.

Granularity for each of the service levels is based on its specific context. For instance, infrastructure services are highly granular, that describe how they support applications and ultimately business

services. Application services are less granular, but could be point-to-point integrations. And business services look more like orchestration workflows with service providers supporting dependent services. HP's SOA Manager is an instantiation of this architecture and is specifically designed to meet the challenges posed by Web services and to provide a virtualized model of business services based on managing loosely coupled Web services. It is composed of multiple components for lifecycle management, policy enforcement and enterprise management integration.

Some of the key benefits and features of HP SOA Manager are:

- Model-based automation orchestrates responses to demand fluctuations.
- Entitlement and allocation capabilities enhance identity management.
- Task automation eases the burden of repetitive actions, such as resource monitoring, entitlement and allocation.
- Resource monitoring and analysis enable proactive management of business services.
- Event policy response capabilities accelerate staff reaction to web services events.
- Integrations with identity management and systems management enable advanced management solutions.

## 6. Mapping the Federal Enterprise Architecture Reference Models to Adaptive Enterprise

The HP vision for the Adaptive Enterprise is one in which IT service levels match the flow of real-time business activities where low-cost, dependable, reliable, and scalable services are available, and dynamically tapped, whenever needed—during peak times, lulls, and anytime in-between.

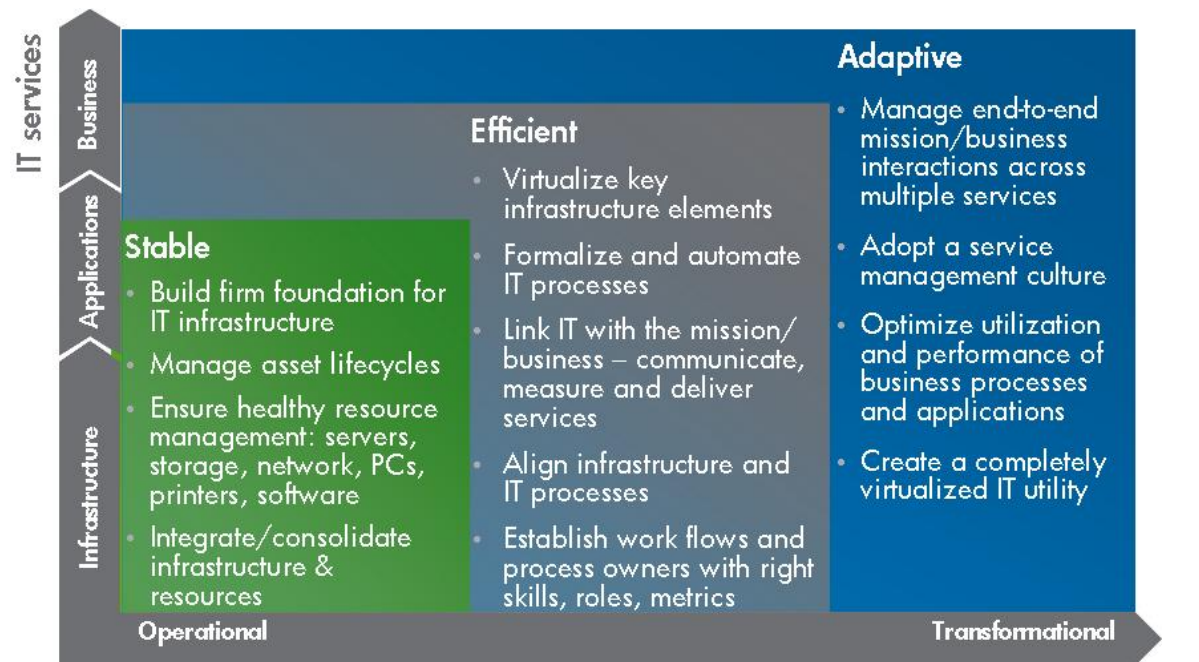


Figure 6: Journey to the Adaptive Enterprise

In the journey to the Adaptive Enterprise, an organization’s people, processes, and technology must evolve together. While some goals are long-term, others can be achieved today using the Adaptive Enterprise architecture. The above model shows three stages in the evolution of your IT environment. Organization’s need to journey through this evolutionary path becoming “Stable” in their infrastructure foundation and management, then maturing to a point where they can become “Efficient” in being able to virtualize key infrastructure elements, align and automate IT processes and ultimately evolving into an Adaptive enterprise.

Adaptive Enterprise is defined in the HP Darwin Reference Architecture, which includes a portfolio of HP adaptive infrastructure and management offerings comprising solutions, services, products, and technologies. While this architecture tightens the integration and synchronization between IT resources and business processes, it also delivers the interoperability needed to support requirements for ongoing change in a new infrastructure ecosystem.

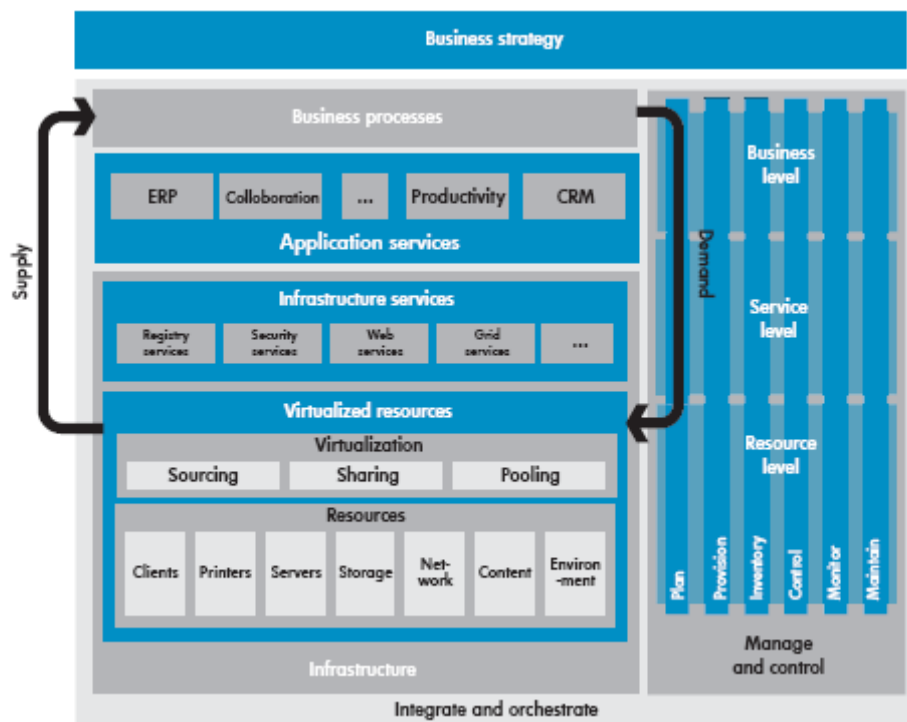


Figure 7: The Adaptive Enterprise

The Adaptive Enterprise model shown above consists of 6 layers, these are:

1. **Business Strategy Layer:** While every enterprise wants to achieve the ultimate state of business fitness, each is unique—differing by mission, business model, strategy, and existing IT environment. The business strategy layer helps in IT alignment with the mission critical objectives; it helps an organization visualize key processes that span and in some cases extends the enterprise, providing capability to efficiently and effectively govern IT and respond to mission critical objectives.
2. **Manage and Control Layer:** Coordination and orchestration of infrastructure depends on moment-to-moment inventory and monitoring, planning, provisioning and maintenance. All management and control processes are driven by demands at the IT element level and the IT service and business levels, and are communicated according to open standards. By synchronizing infrastructure, application services and processes with business processes through automated and intelligent management and provisioning, HP enables enterprises to reduce the cost of change, reduce the total cost of ownership, simplify management complexity and provide the enterprise with the ability to rapidly implement the solutions that provide the corporation with a competitive advantage.
3. **Business Process Layer:** The business processes collectively and continually set and adjust levels of IT resources to meet changing demands. While the priorities for allocating resources to each business process are in constant flux, the supply of resources available to the business must always meet the demand. This is core to creating an adaptive enterprise. Some of the key characteristics of a well designed business process are:
  - Processes that are *coarse-grained*: composed of Services and exposed as Services

- Processes that are loosely coupled: a change to a process flow, activity, sub-process doesn't effect other processes
  - Processes that are asynchronous
  - Processes that are dynamically discoverable
  - Processes that can Respond to Change
4. Application Services Layer: Applications acquire, organize and transform the information needed to support business processes. In the Darwin Reference Architecture, applications will be requested and delivered as services, using web services standards like J2EE and .NET. For example, rather than being built redundantly into monolithic "order entry" and CRM applications, a discrete business process like "verify customer entitlement" may be delivered as an application service in both contexts.
  5. Infrastructure Services Layer: Infrastructure services deliver the secure, continuous computing power and storage capacity applications require. In the past, resources were delivered by assigning servers directly to applications. But low utilization and high cost from "one application, one server" policies compel organizations toward shared, virtualized and on-demand solutions that make better use of processor and storage capacity. The HP adaptive infrastructure technologies and solutions accept requirements from and deliver infrastructure services to applications through open industry interfaces and web services.
  6. Virtualized Resources Layer: Virtualized resources provide the foundation for the adaptive enterprise, with computing power, information and communications delivered as services abstracted from their underlying physical servers, storage and network infrastructures. Business agility is realized when shared resources are dynamically allocated as needed by business procedures. The creation of this dynamic link between business and IT is aided by a clear assessment and measurement of the agility from the transformation of the underlying IT infrastructure.



The Federal Enterprise Architecture (FEA) consists of a set of interrelated “reference models” designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across agencies. Collectively, the reference models comprise a framework for describing important elements of the FEA in a common and consistent way.

The FEA defines five reference models:

1. Performance Reference Model (PRM)

The PRM is a framework for performance measurement providing common output measurements throughout the federal government. The model articulates the linkage between internal business components and the achievement of business and customer-centric outputs.

2. Business Reference Model (BRM)

The BRM provides a framework that facilitates a functional (rather than organizational) view of the federal government’s lines of business (LoBs), including its internal operations and its services for citizens, independent of the agencies, bureaus and offices that perform them. The BRM describes the federal government around common business areas instead of through a stove-piped, agency-by-agency view. It thus promotes agency collaboration and serves as the underlying foundation for the FEA and E-Gov strategies.

3. Service Component Reference Model (SRM)

The SRM is a business-driven, functional framework classifying Service Components according to how they support business and performance objectives. It serves to identify and classify horizontal and vertical Service Components supporting federal agencies and their IT investments and assets.

4. Technical Reference Model (TRM)

The TRM is a component-driven, technical framework that categorizes the standards and technologies to support and enable the delivery of Service Components and capabilities. TRM leverages common, standardized vocabulary, allowing interagency discovery, collaboration, and interoperability.

5. Data Reference Model (DRM)

The FEA Data Reference Model (DRM) is intended to promote the common identification, use, and appropriate sharing of data/information across the federal government through its standardization of data in the following three areas: data context, data sharing, and data description.

The Adaptive Enterprise virtually maps to the FEA Reference Models as shown below:

# Mapping the Federal Enterprise Architecture to HP's Adaptive Reference Architecture

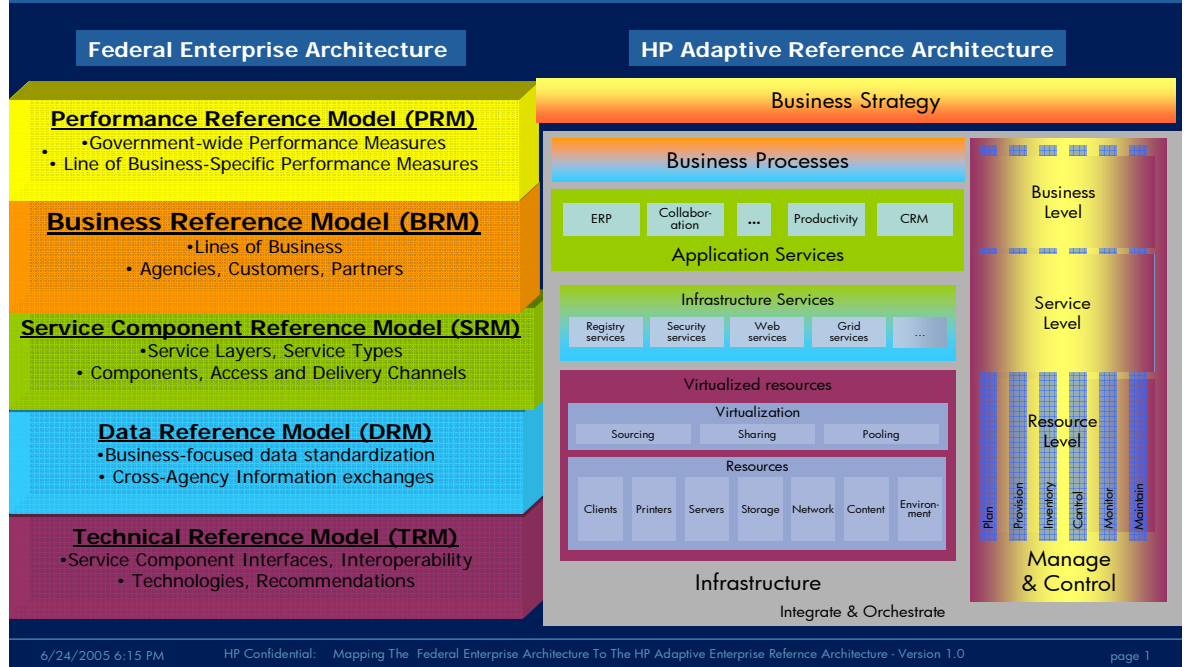


Figure 8: Mapping Adaptive Enterprise to FEA Reference Models

- The Federal PRM layer maps to the HP Business Strategy layer and the Manage and Control stack
- The Federal BRM maps to the Business Strategy layer and the Business Process layer
- The Federal SRM maps to the Infrastructure Services Layer and Application Services layer
- The Federal DRM maps to the Business Process layer and the Infrastructure Services layer
- The Federal TRM maps to the HP Virtualized Resource layer and the Manage and Control stack

## 7. HP SOA Solution Space

HP has a comprehensive suite of service-oriented architecture (SOA) consulting services and provides four worldwide competency centers in Atlanta, Bangalore, India, Sophia Antipolis, France and Tokyo to assist customers in planning, designing, implementing and managing SOA solutions to improve their business performance and offer customers access to architecture and consulting skills, software and hardware demonstrations, seminars and hands-on workshops. The competency centers are built on HP's SOA consulting services and management software the HP OpenView SOA Manager, a SOA governance tool designed to manage the lifecycle of business services in order to achieve better linkages between business and IT.

The consulting services are designed to assist customers through the entire SOA process, from envisioning and assessment to development and governance, and are listed below.

### **SOA Envisioning**

Intended for large enterprises to develop an understanding of Service-Oriented Architecture (SOA) concepts, and to identify the benefits and potential impacts on the enterprise.

### **SOA Service Development**

Helps the customer define, develop and deploy SOA business and IT services across the enterprise, line-of-business, department, or at a project level.

### **SOA Assessment**

Utilizes the HP SOA Agility Assessment approach to help the customer develop a comprehensive roadmap to guide the adoption of SOA across their enterprise.

### **SOA Software Development**

Provides for volume and scale in development and delivery of business and IT services through the SOA adoption. Ensures maximized productivity from customer development teams, by utilizing global software development capability.

### **SOA Governance and Architecture**

Establishes the SOA Architecture Program Office to oversee enterprise architecture and the SOA governance model as the enterprise is transformed.

### **SOA Enablement**

Based on learnings from the Governance and Architecture service, SOA Enablement prepares the infrastructure for the implementation of service-oriented architecture.

### **SOA Management**

For enterprises that are looking to gain control of their SOA adoption, including lifecycle management, services management, monitoring, auditing, analysis, service level agreements and policies.

## 8. Conclusion

Clearly, we have a case for Service Oriented Architecture and Adaptive Enterprise. From the discussion presented here, there is tremendous value proposition for an organization to initiate and follow through, a successful Adaptive Enterprise program, which will help an agency realize its mission and vision. Reiterating these value propositions, which include effective IT alignment, efficient IT governance, controlled change management and the holy grail of secure integration and information sharing.

Federal Organizations have to continually adapt to the changing business environment based upon regulations, mandates and stakeholder requirements. Traditionally, the IT response to such changes would be to embark on new projects involving new applications, hardware, software, and services that take months or years to complete.

A Service-Oriented Architecture (SOA) addresses software infrastructure challenges for organizations that require more flexible applications and systems, and greater alignment of IT with business goals. SOA blurs the traditional application and organizational boundaries, allowing businesses to leverage new and existing investments in applications, system development and ubiquitous Internet infrastructure inside and outside of the enterprise.

With the HP Darwin Reference Architecture, which uses key architecture design rules- service-oriented architecture (SOA), virtualization, and model-based automation, adjustments to the infrastructure are automated and performed dynamically, utilizing available resources. The architecture provides an infrastructure that dynamically reconfigures and transforms to respond to new business strategies and processes

## For more information

For more information about the HP Adaptive Enterprise and SOA, visit HP on the Web at [www.hp.com/go/Adaptive](http://www.hp.com/go/Adaptive) and [www.hp.com/go/SOA](http://www.hp.com/go/SOA)

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