IBM

Business Process Management Enabled by SOA

Build processes that support your business strategy

Lay the foundation for continuous improvement

Proactively manage and optimize your processes

Anthony Catts
Joseph St. Clair

Redpaper

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International Technical Support Organization

Business Process Management Enabled by SOA

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Contents

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Preface

The IBM® Business Process Management (BPM) Enabled by SOA Method provides a structured process for developing an organization's cross-functional, customer-focused, end-to-end core business processes that achieves strategic business objectives, integrates verticals, optimizes core work, and creates a framework for continuous improvement. This methodology is an IBM intellectual property that is used in BPM engagements but not available in detail to readers of the IBM Redbooks® publication outside of IBM.

Our purpose in this IBM Redpaper is to introduce you to the concepts that we use in the IBM BPM Enabled by SOA methodology.

The team that wrote this paper

This paper was produced by a team of specialists from around the world working at the International Technical Support Organization, Raleigh Center.

Anthony Catts (Andy) is a Senior Managing Consultant for IBM Software Services for WebSphere®. He assists customers with requirements and strategies for developing and deploying business solutions. He helped customers in aligning information technology to support business strategies by identifying governance frameworks, organizations, management frameworks, and strategy frameworks. Andy's current focus is BPM frameworks, methodologies, and tools that enable customers to define, assess, and deploy operational business processes.

Joseph St. Clair (Joe) is a software specialist working with IBM Software Group clients to help them adopt and deploy the IBM BPM technology. Joe worked in the BPM space for the last eight years specializing in analysis, simulation, and design of business processes. He is a heritage Holosofx consultant that has seen the product suite evolve into a leader in the market place. Joe has experience in working with clients on process modeling, modeling for execution, workflow, and monitoring engagements that also include pre-sales, training, and architecture reviews. Joe is an IBM Certified Business Process Analyst on WebSphere Business Modeler Advanced V6.0.2.

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Introduction

The Business Process Management (BPM) Enabled by SOA methodology and services offering can help you to achieve process excellence by continuously improving your business processes. The methodology provides a cycle of activities that ensure that business processes are aligned with business goals and perform to meet your business objectives.

In this chapter, we introduce the BPM Enabled by SOA methodology and some of the supporting IBM products.

1.1 Business Process Management

Business Process Management is most often associated with the life cycle of a business process. The process life cycle spans identifying and improving processes that deliver business capability to deploying and managing the process when it is operational. What is often forgotten about is managing process performance after a process is operational. In a way, this is probably the most important phase of the life cycle. After a business process is deployed, it must be managed, and, to manage the business process, you must have visibility into process performance. When a process is no longer meeting its performance goals, it is time to jump back in the life cycle to assess the root cause of the performance problem and to look for additional improvement opportunities.

Underlying BPM is governance. Governance is an essential component of BPM because it provides the framework that ensures that business strategy and goals are implemented at the operational level. A governance framework also enables business and IT alignment by providing mechanisms that enhance collaboration and cooperation between the two.

1.2 BPM Enabled by SOA

Figure 1-1 on page 3 illustrates the IBM BPM Enabled by SOA methodology and the WebSphere products that enhance a company's ability to realize the value of applying BPM to deliver business processes.
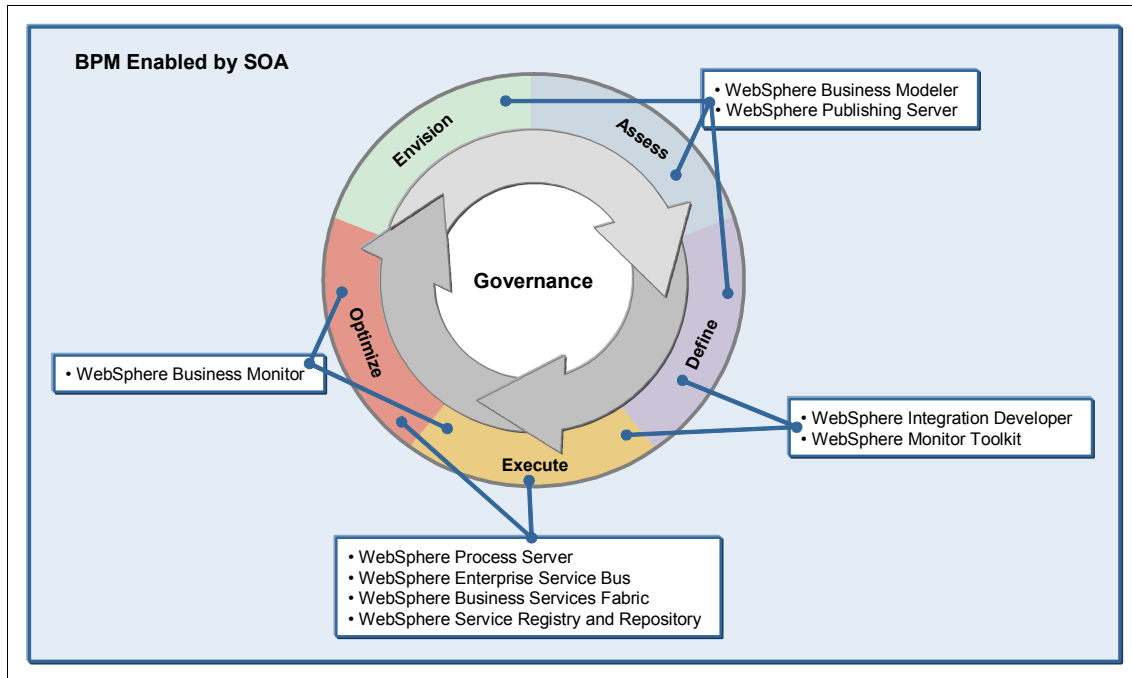
Figure 1-1   WebSphere support for BPM Enabled by SOA Methodology

The WebSphere BPM products in Figure 1-1 include:

► *WebSphere Business Modeler Publishing Server* enables business leaders to translate business strategy into process improvement initiatives. Business leaders can capture business intent and motivation, desired operational capabilities, and the supporting high-level business processes. These high-level business processes can then be imported to WebSphere Business Modeler where they can be used by Business Analysts to create more detailed models of the business processes, conduct a rigorous analysis of the business processes, and improve the business processes. Business Analysts can publish their work whenever necessary in order to conduct collaborative reviews with business leaders and process stakeholders to ensure that the business intent is being achieved.

► *WebSphere Business Modeler* provides business process modeling capabilities that enable you to visualize, document, and model business processes for understanding and process execution. It provides simple-to-use modeling tools that help the business analyst to maximize process and business resource reuse.

With WebSphere Business Modeler, you can document process tasks and flow, task attributes (for example, roles, systems used, effort required, cost,

and so on), business documents and forms that are used in the process, business rules that are used to guide decisions within the process, and performance requirements. You can also analyze the behavior of the modeled business process.

► *WebSphere Integration Developer* provides the tools for building SOA-based BPM and integration solutions across WebSphere Process Server, WebSphere ESB, and WebSphere Adapters. It enables integration developers to assemble complex business solutions using drag-and-drop technology to define, in a visual way, the sequence and flow of business processes.

► *WebSphere Process Server* deploys and executes the business processes that orchestrate services (people, information, systems, and trading partners) within your service-oriented architecture (SOA) or non-SOA infrastructure.

► *WebSphere Business Monitor* and the *WebSphere Monitor Toolkit* provide business activity monitoring capabilities that offer real-time insight into your business processes. It provides business users with predictive capabilities, which allows you to take advantage of market opportunities and prevent problems before they occur.

► *WebSphere Enterprise Service Bus* delivers a standards-based connectivity and integration solution with which you can create and deploy interactions quickly and easily between applications and services, with a reduced number and complexity of interfaces.

► *WebSphere Business Services Fabric* is a platform for modeling, assembling, deploying, managing, and governing business services. You can use it with optional Industry Content Packs that contain prebuilt SOA assets that help accelerate the development of industry-specific, service-oriented applications. Industry Content Packs are available for health care, telecommunications, banking, and product life cycle management. Reference models that are provided in the content packs include HIPAA, ACCORD, NGOSS, among others. You can use these models to jump-start or augment information modeling.

► *WebSphere Service Registry and Repository* is an industry-leading solution with which you can easily and quickly publish, find, enrich, manage, and govern services and policies in your SOA.

Figure 1-2 on page 5 is a high-level architecture for the IBM BPM products overlaid with the IBM BPM method. It illustrates how you can use the IBM BPM products to deliver your business process solutions. The figure shows the relationship and interaction between these products and the relationship between these products and the methodology phases that they enable.
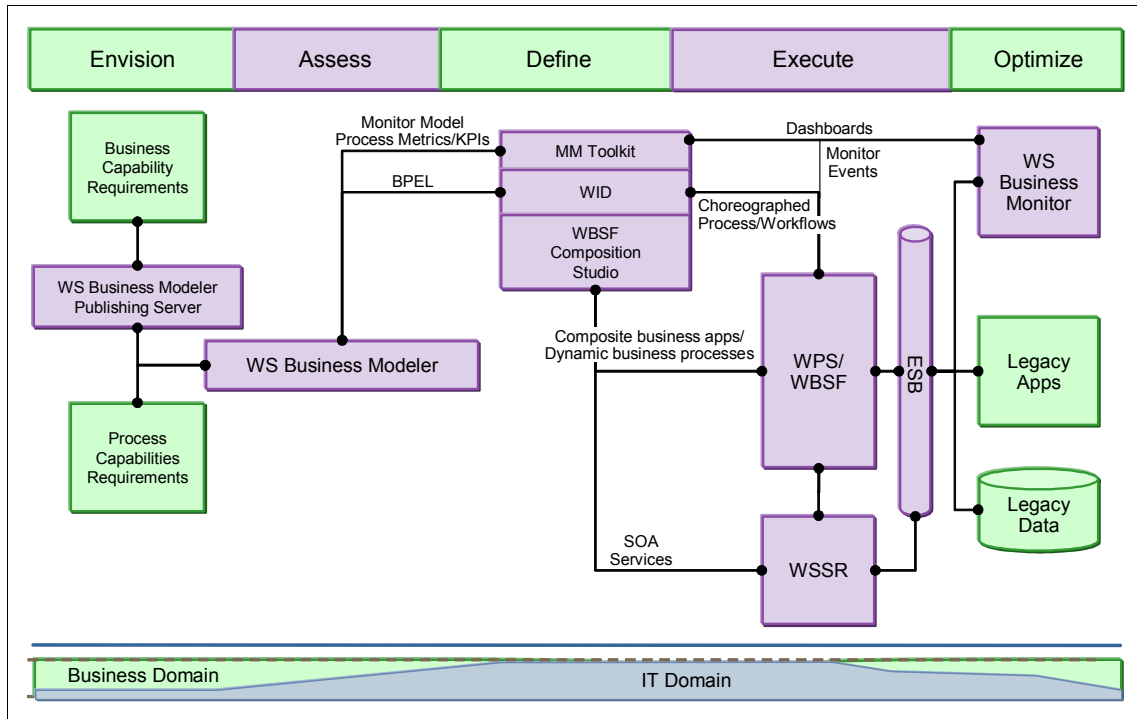
Figure 1-2   WebSphere BPM high-level product architecture

1.2.1 BPM Enabled by SOA phases

The methodology provides a set of phases that each consist of activities and deliverables that provide the foundation for the BPM solution development and management. A common set of workstreams is executed across the phases.

Figure 1-3 on page 6 shows the methodology phases and a subset of the workstreams for the BPM Enabled by SOA Methodology.
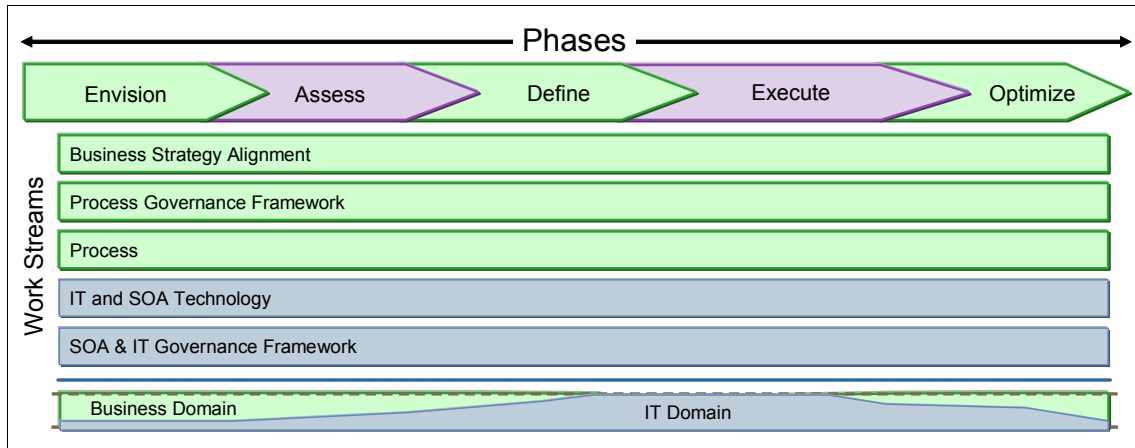
Figure 1-3   BPM Enabled by SOA Methodology phases and work streams

The five primary phases in the BPM Enabled by SOA method are:

Envision   Identifying process capabilities and processes that support future business capabilities

Assess   Assessing current processes, process performance, and process enablers (technology, organization, and knowledge) to develop the requirements for future business processes

Define   Designing future business processes, defining future process performance, and supporting process enablers (technology, organization, and knowledge)

Execute   Building, testing, and deploying business processes, performance monitoring and reporting, and supporting process enablers (technology, organization, and knowledge)

Optimize   Operating, monitoring, and managing operational processes and their supporting process enablers (technology, organization, and knowledge)

1.2.2 BPM Enabled by SOA work streams

Across each phase are work streams that refine and produce deliverables that lead to the final implemented BPM solution.

The work streams that we discuss in this book are:

► *Business Strategy Alignment* is the work stream in which future process capabilities are identified to deliver targeted future business capabilities.

► *Process Governance* is the work stream in which the guiding principles for a business process throughout its life cycle are defined. This work stream builds the governance mechanisms to ensure consistency and to deliver the desired business capability.

► *Business Process* is the work stream in which business processes are identified, assessed, documented in their current and future states, and implemented as an operational process. This work stream also includes process organization and process measurement.

► *SOA and IT Technology* is the work stream in which SOA and IT architectures, infrastructures, applications, and services are assessed, designed, and deployed in support of the targeted processes that are identified in the Business Process Phase.

► *SOA and IT Governance* is the work stream in which the guiding principles for the SOA service life cycle are defined. This work stream builds the governance mechanisms to ensure that SOA and IT investments maximize business value of the delivered business solutions.

In addition to these work streams, a comprehensive BPM project includes work streams for change management and project management; however, we do not cover these work streams in this publication.

2

Envision phase

The activities that you perform in the Envision phase are designed to:

► Document the impact and magnitude of your BPM initiative

► Identify and gain commitment of both business and IT stakeholders

► Secure resources for your BPM initiative

► Develop a BPM Strategic Roadmap that lays out a timeline for specific projects and activities required to realize the end state of your BPM initiative

To that end, you must accomplish a number of activities in both the business domain and the IT domain.

Business domain activities include understanding and documenting:

► Business strategy and its related business goals

► Future business capabilities that are required to deliver the business strategy

► Current business capabilities that might change to align to the business strategy

► Future process capabilities that must exist to support the business capabilities

► Process governance that is required to ensure that business processes employ the right people, using the right technology, with the right knowledge, and ensuring process design and performance consistency.

IT domain activities include understanding and documenting:

► Technology that supports current business capabilities and business processes

► Technology that is required to support future business capability and business processes

► IT governance that is required to ensure that IT assets support business requirements and perform in a way that supports business goals and ensures that technology is applied in a consistence manner that can take advantage of reuse to maximize IT investment

2.1 Overview of the Envision phase

Table 2-1 shows an outline of the actions that you take during the Envision phase and the resulting deliverables. They are used in future phases to ensure that the design and implementation of future processes meet the strategic vision that is identified in this phase.

Table 2-1   Envision overview and deliverables

Work Stream	Actions and deliverables
Business Strategy Alignment	The deliverable for this work stream is a Future Capability Vision. To develop this deliverable you must: ► Understand the business strategy and the business goal that are used to measure the success of the strategy ► Identify the business capabilities that are needed to deliver the business strategy ► Identify the business capabilities that must change or that must be created to deliver the business strategy ► Identify the process capabilities that support the business capabilities
Process Governance	The output of the activities in this work stream provide the business domain component for the Future Governance Vision deliverable and the BPM Strategic Roadmap Deliverable: ► Assess the current governance capabilities and maturity ► Identify the appropriate level of process governance and management that is needed to ensure that business processes deliver the business capabilities and performance goals that are identified in the Business Strategy Alignment work stream

Work Stream	Actions and deliverables
Business Process	The output of the activities of this work stream enable the creation of the business domain component for the BPM Strategic Roadmap deliverable: ► Identify what changes to make to current business processes to support the business capabilities that are identified in the Business Strategy Alignment work stream ► Identify what new business processes to create to support the business capabilities that are identified in the Business Strategy Alignment work stream ► Identify process enablers (organization, technology, knowledge) ► Identify the performance levels that the business process must achieve to support the business goals that are identified in the Business Strategy Alignment work stream
IT (non-SOA) and SOA Technology	The output of the activities of this work stream enable the creation of the IT domain component for the BPM Strategic Roadmap deliverable: ► Assess the current IT environment and performance (infrastructure, systems, applications, and internal and external services) that support current capabilities and business processes ► Identify the future IT environment and performance measures that are needed to support future capabilities and future business processes ► Identify an SOA solution strategy to enable future business processes to be SOA enabled
IT and SOA Governance	The output of the activities in this work stream provide the IT domain component for the Future Governance Vision deliverable and the BPM Strategic Roadmap Deliverable: ► Assess the current governance capabilities and maturity ► Identify the appropriate level of IT and SOA governance and management that is needed to ensure that IT enables the business capabilities and performance goals that are identified in the Business Strategy Alignment work stream

2.1.1 Leading practices

The leading practices in this phase are:

► During this phase, try to remain "technology agnostic". Identifying technology solutions too early in the analysis can lead to unintentional limitations.

► The activities and deliverables are all high-level but contain the essential information that can be defined in-depth in downstream phases.

- The BPM Strategic Roadmap contains a mapping of high-level initiatives with timelines that are based on what must be done to close gaps between current and future capabilities.

- Create high-level project plans, cost estimates, business impact statements, and resource plans for the initiatives that are identified in the BPM Strategic Road Map.

- Because it is not likely that all of the identified initiatives to deliver future business capabilities and future business processes can be acted on, simultaneously gain agreement with stakeholders on a prioritized list of initiatives to undertake.

- Gain stakeholder agreement and commitment on the scope of the BPM initiative before moving on to later phases because not doing so causes problematic results.

2.2 Business strategy alignment

All companies must constantly adapt to retain their competitive advantage. When companies define or modify business strategies, it typically means that existing business capabilities that define a value proposition requires change. A key step to understanding these changes is to assess the ability of current business capability enablers to deliver future business capabilities. The intent of Business Strategy Alignment is to identify the future business capability enablers that you address in later phases.

A *Business Capability* identifies any combination of knowledge, organization, process, and technology *enablers* that allow a company (or business unit) to deliver a specific value proposition *directly* to a defined set of stakeholders, for example, customers or suppliers, or *indirectly* through the support of other business capabilities.
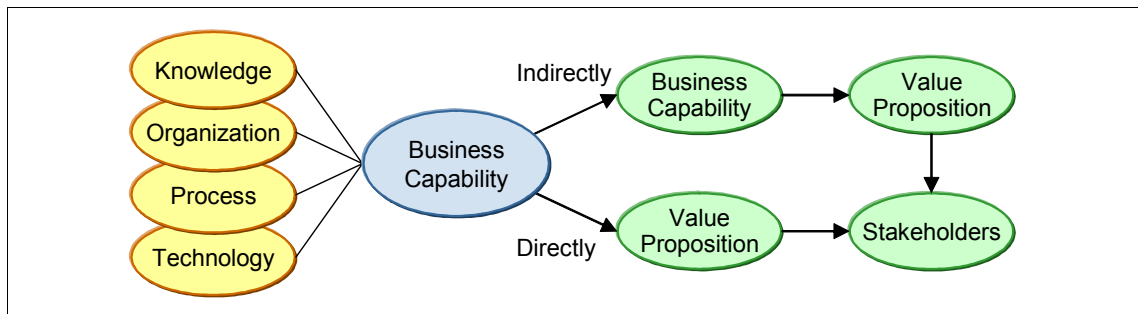
Figure 2-1   Business capabilities

Examples of business capabilities are the ability to:

► Access customer information
► Generate customer awareness
► Source high-quality components
► Create and maintain partnerships and alliances
► Quickly identify and analyze competitor actions in the marketplace
► Dynamically source capacity from competitors

The most detailed business capability descriptions contain information about Capability Enablers, which include:

► Processes that are in place or that must be in place to deliver the value that the capability produced

► What knowledge and skills the organization must have, which includes any critical information or data

► The organization required in terms of roles and responsibilities and critical management practices and policies

► Technology deployed or necessary to enable this capability, which includes classes of required applications and any necessary technical infrastructure

2.3 Process governance

In general, governance means to establish and enforce how a group agrees to work together. Specifically, governance is the establishment of:

► Chains of responsibility to empower people
► Measurements to gauge effectiveness
► Policies to guide the organization to meet its goals
► Processes to ensure compliance
► Communication to keep all required parties informed

Governance determines who is responsible for making decisions, what decisions to make, and policies for making decisions consistently. Governance is different from management. However, it is useful to keep in mind that governance and management form a highly-integrated system. It ensures the operational implementation of a company's business objectives and performance goals. Governance is the mechanism that ensures that a company accomplishes its stated goals and objectives while adhering to internal and external mandates. Management activities are guided and executed within the governance framework.

Process governance is applied within the framework of corporate governance. It includes the enterprise's executive management and lower levels of

management. The purpose of process governance is to ensure that the enterprise's operational and support processes:

- ► Implement the enterprise's business strategy
- ► Incorporate the constraints defined by governance decisions made by the enterprise
- ► Have the right organization, with the right knowledge, and using the right technology to achieve the desired value realization
- ► Have the right system of performance measurements to monitor organizational performance, process vitality, strategic alignment, and value realization
- ► Contain the processes that are needed to sense and respond to organizational and process performance issues
- ► Contain the processes that are needed to provide insight and oversight of enterprise operations to certify compliance of external mandates and internal decisions

To successfully support these objectives, there must be a mandate and commitment from the enterprise's executive management team to move toward process management. Process governance has little value or chance of success without a management structure that has the authority and responsibility to manage end-to-end processes. Getting a mandate and commitment for process governance and management might not be easily achieved. Movement in this direction creates a paradigm shift in how most companies manage their business processes: from one that manages processes within functional silos to one that manages end-to-end processes across functional silos.

2.3.1 Components of a process governance framework

The components of a process governance framework are:

- ► Organizations and organizational relationships that ensure that processes are aligned with business goals, for example, Process Management Teams, Process Board or Process Management Office, BPM *Center of Excellence* (CoE):
  - – Roles and responsibilities for organizations and individuals that manage processes, for example, process owners, process managers, and the BPM CoE manager.
- ► Performance measurement framework:
  - – Process measurement: A company-wide performance framework that identifies the strategy in which *key performance indicators* (KPIs) are derived to measure end-to-end process performance.

- – Organization measurement: Compensation, incentives, and rewards to motivate employees to behave in a way that helps end-to-end processes achieve the business goals.
- ► Governance processes:
  - – Processes that channel the enterprise's efforts to align processes, organization, and resources with the company's business goals.
- ► Policies, standards, guidelines, and leading practices:
  - – Policies that define decisions that must be complied with, for example, end-to-end processes must have performance measurements that support the performance objectives of business goals.
  - – Process standards that define practices that must be complied with, for example, performance analysis, design, simulation, change control, performance metrics, repository use, and so on.
  - – Process guidelines that provide general criteria that allow for deviation based on circumstances, therefore, can be modified or not applicable based on the needs of a specific situation or condition.
  - – Process leading practices that formalize lessons learned from experience, when applied, improve the outcomes of process work.

For a Process Governance Framework to be effective, it is important that the scope of the framework is clearly defined, communicated, and accepted by the business and process stakeholders.

2.3.2 Performance management

When a company begins to measure performance from a customer's point-of-view the initial results can be startling. The most commonly cited example is with respect to on-time delivery. Many firms find that although their performance in delivering their products or services when they promised is 90% or higher, it is less than 80% when they examine the metric from the perspective of when the customer asked for it.

Candor and honesty are needed here; otherwise, companies are tempted to focus on those metrics that make performance look good and not on what truly depicts a fair picture of performance from a customer's point-of-view. Also, the sustainability of measuring what counts for customers is compromised unless a company links customer-focused performance metrics to the traditional financial measurements and attempts to correlate improvements in process performance to improvements in financial performance. The linkage aspect involves making the monitoring and review of customer-focused metrics part of the company's monthly operating review along side the traditionally monitored results for

revenues, gross margin, net income, and cash flow. The correlation of improvements in process performance to improvements in financial performance requires asking *what if* questions, such as, What would the impact be on our *days of sales outstanding*" (DSO) if we improved on-time delivery by X%?

2.3.3 Process management

Measuring the performance of a company's key end-to-end business processes is necessary but not sufficient for effective governance. Assignment of accountability for the improvement and management of these business processes is required for sustainable results. Although there are various approaches to assigning accountability or ownership, the two most common might be called the *two hats line* and the *one hat staff* approach:

- ► In the two hats line approach, a senior line executive assumes responsibility for an end-to-end process and retains accountability for the functional area. This approach relies upon matrix management principles.

- ► In the one hat staff approach, a senior executive is appointed to a staff position of process owner or process steward for an end-to-end business process.

Role clarity and aligned recognition and reward systems are essential to both approaches. The former involves clearly defining the scope of the associated end-to-end processes, being clear about the size of the gap between current and desired performance, broadly communicating improvement goals, and investing in a common methodology for process improvement and management. Modifying compensation such that some significant part of the discretionary component of an executive's and a manager's bonus becomes directly related to the performance of end-to-end processes is equally important.

2.3.4 Maturity assessment

An important activity that you must complete to create the your Future Governance Vision and the BPM Strategic Roadmap deliverables is an assessment of your current process governance maturity, which helps you in three ways:

- ► It gives you insight on where your maturity level is today.

- ► It gives you insight into what you must do to raise your maturity level to a point that supports the Future Capabilities Vision that you created in the Business Strategy Alignment work stream.

- ► It gives you insight into the effort that is required to get from your current maturity level to the maturity level that you feel you must be to support the

process capabilities that you identified in the Business Strategy Alignment work stream. A side benefit of the maturity assessment is an understanding of how much process governance is feasible to implement at a given time, for example, the gap between your current maturity level and your target maturity level can be too great to implement in one time period.

You might roll out process governance in multiple phases over a longer time period, starting with the process governance that is required to ensure that your current initiative and near-term initiatives deliver their intended process capabilities and business goals. Consider implementing a BPM CoE as a near-term process governance structure, and address process management, performance management, and so on, in later governance implementations.

One tool to assist you with determining process governance maturity is the OMG Business Process Maturity Model (BPMM). This model is for business process, measuring the maturity of processes, process management and measurement, process organization, and process alignment. Although this model targets business processes, there is a high correlation between process maturity and process governance maturity.

> **Tools and methodologies:**
>
> Business Process Maturity Model (BPMM)
>
> http://www.omg.org/spec/BPMM/1.0/

2.3.5 Leading practices

Consider these leading practices when you define your future process governance strategy:

▶ When you define the future process governance framework, start by defining a Governance Mission and Charter, which defines the role and span of influence and control of the governance organization within the enterprise. It is critical that the mission and charter have an executive champion and sponsor that actively *sells* the concept of process governance.

▶ Establish a performance measurement framework to guide the development of end-to-end process KPIs. Keep in mind that if a company-wide measurement framework already exists, for example, Balanced Scorecard, leverage it.

▶ Measuring the performance of a company's key end-to-end business processes is a necessary but not sufficient condition for effective governance. Assigning accountability for the improvement and management of these

business processes is required for sustainable results. Customer-centric measurement practices and assigning ownership for a company's end-to-end business processes are arguably the two most important aspects of governance. The combined effect is to shift company culture so people begin to assign their loyalty to serving customers through the key business processes.

► Using a *big bang* approach to establish process governance and management most certainly does not work. A better approach is to incrementally establish process governance and management across the enterprise, for example, starting with one core end-to-end process.

► Establish a BPM Center of Excellence as early as possible. A Center of Excellence can provide the following structure and support to the governance process:

– Socialize process management

Communicate framework, leading practices, assets, patterns, templates, and methods

– Provide project support

Provide direct project assistance to drive BPM, capture feedback on viability, and harvest assets

– Provide skills transfer and early proof of concepts

Identify skill gaps and create development roadmaps for use of tools and techniques

– Promote asset adoption

Manage process pattern and process standards to reduce project risk and accelerate delivery

– Provide best practice policy and procedures

Provide expert resources to accelerate delivery of critical BPM practices

– Process management support

Enable management teams to execute on programs to monitor and optimize processes

– Conduct project reviews

Perform independent process management reviews for key applications

– Provide BPM vitality and thought leadership

Continuously assess and refine the BPM framework and supporting assets based on internal and external experience

- ► Create a BPM CoE roadmap that describes the phased inclusion of capabilities and staff appropriate for the envisioned end state of the business transformation being driven by the adoption of BPM principles and discipline.

2.4 Business process

In Business Strategy Alignment, you identified the future business capabilities that support the business strategy. You also identified current process capabilities that must change to support these future business capabilities, which we now use to document:

- ► Future process capabilities that must be applied to the current business processes
- ► Current business processes that require further analysis on what needs to change to deliver the future process capabilities
- ► Future process capability enablers (organization, technology, and knowledge)
- ► Future process performance capabilities

> **Business process:** A business process consists of activities or tasks that transform information from one form to another to achieve a business outcome. Business processes can be further defined into three process types:
>
> - ► *Management processes* used to manage system operations.
> - ► *Operational processes* used to provide core business functions. This term is often used interchangeably with the term business processes, which is most notable when working with the modeling and assembly tools.
> - ► *Supporting processes* that provide support for the other process types (for example IT support).

As part of understanding a business process, we must document:

- ► What the task is
- ► Who performs the task (typically in the form of a role or skill rather than an individual)
- ► Where they perform the task (typically as a functional area and not just a location)
- ► When they perform the task (in what sequence and under what conditions)
- ► How they perform the task (which tools and systems are used)

A process typically documents the handling of a single business transaction, but occasionally deals with batches of business transactions.

2.4.1 Process decomposition chart

The business process documentation must include a process decomposition chart and a supporting process narrative.
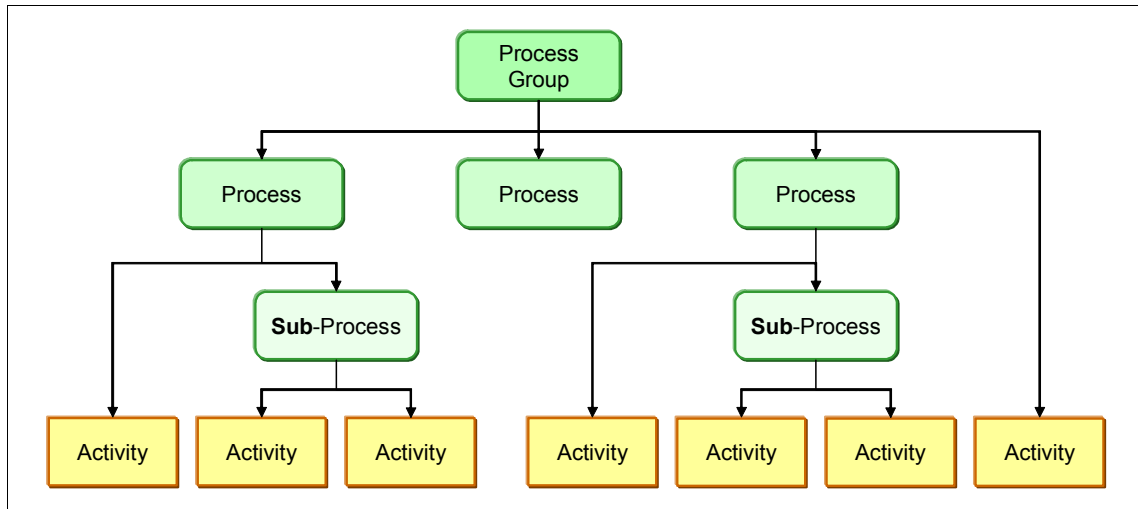
Figure 2-2   Process decomposition chart

A process narrative must contain the detail characteristics of the process and capture additional information to support the functional decomposition chart. Process narratives are typically documented at the sub-process level for each process and describes the steps or activities that the sub-process performed.

2.4.2 Process capability

A *process capability* defines the process design points and the capabilities requirements of each of the business processes that are necessary to support the business capabilities. You can identify process capabilities at the process group, process, sub-process, or activity level, and address process design points (major process elements).

Process capabilities identify and describe:

- ► The design points of the processes
- ► The required capabilities of the processes
- ► The performance targets of the processes
- ► The linkage to the business capabilities

Process capabilities represent those critical things that a business process must be able to do to ensure that Business Capabilities can be enabled.
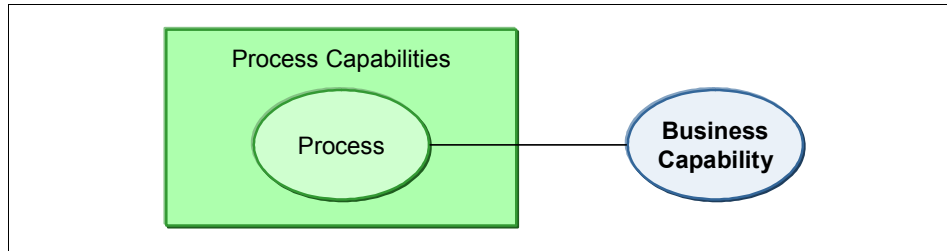
Figure 2-3   Process capabilities

Examples of process capabilities is the ability to:

- ► Enter Customer orders
- ► Perform credit check
- ► Check inventory status
- ► Handle multiple currencies
- ► Handle multiple languages

In the Envision Phase, we do not describe business processes at the same level of detail that is in the Assess Phase. Remember, in the Envision Phase, we capture high-level information that we articulate in greater detail in later phases. The purpose here is to gain a high-level understanding to quantify the magnitude and impact of the required changes.

2.4.3 Process capability enablers

Process capability enablers define and document the enablers that are required for a business process:

- ► Organization job roles and skills that are necessary to realize required process capabilities
- ► Knowledge and information that is necessary to realize required process capabilities

- Technology necessary to realize required process capabilities
- Documents:
  - The risks (a risk is an unresolved issue)
  - The assumptions that were made about each process capability enabler
  - The benefits of each process capability enabler
  - The requirements for each process capability enabler
  - The cost estimate for each process capability enabler
  - The gaps between the current and future process capabilities

Examples of process capability technology enablers are:

- ERP application with distribution optimization and EDI enabled
- Multiple language support
- Multiple currency support

Examples of organization enablers for process capabilities are:

- Roles: Centralize planning and dispatch management, centralized supplier management, inventory management at individual warehouse
- Skill necessary to perform roles

2.5 IT and SOA technology

Previously identified Process Capabilities and Process Capability Enablers are used in this work stream to:

- Identify the current IT environment that is supporting business processes
- Develop a strategy for a SOA Solution and Architecture

Documentation of the current IT environment must include:

- An inventory of installed applications, services, data, computing and network infrastructure, and the current security architecture
- The current status of all the non-technical, management aspects of the overall IT environment, which includes:
  - Security organization(s), roles and responsibilities
  - Existing IT strategy, policies and plans (including skills acquisition and sourcing options)
  - Security policies, standards and processes
  - Development policies and practices
  - System management policies and practices

This information is the basis for the future architecture, design, and infrastructure delivery and management activities that are required to enable future business capabilities. It allows you to gain a high-level understanding of the technology services and functions (IT capabilities) that are required to support business processes, which includes common application and services, common data, common systems, network services, security services, platform services, and the management tools that are used to support the delivery of IT and SOA services.

The current IT environment information also enables the development of a SOA Solution and Architecture strategy. The SOA Solution and Architecture strategy must include:

► An overall Business Services Strategy and SOA Reference Architecture

► Identification of critical services that might require critical performance considerations

► Identification of the strategy to incorporate existing systems into the SOA architecture

► A future state vision of how SOA will enable the identified business process

2.5.1 Leading practices

Documenting the current IT environment and developing the SOA strategy is limited to the part of the IT environment that is affected by the changes that are identified in the Process Capabilities and the Process Capability Enablers documents.

In the Envision Phase, your documentation is high-level and provides a base for more detailed documentation that occurs in the Assess Phase.

2.6 IT and SOA governance

IT governance is governance for IT, namely: The application of governance to an IT organization, its people, processes and information to guide the way these assets support the needs of the business. SOA governance is a specialization of IT governance that puts key IT governance decisions within the context of the life cycle of service components, services, and business processes. It is the effective management of this life cycle that is the key goal of SOA governance.

IT governance is broader than SOA governance. IT governance covers all aspects of IT, which includes issues that affect SOA, such as data models and security, and issues beyond SOA, such as data storage and desktop support.

SOA governance addresses aspects of the service life cycle, such as: planning, publishing, discovery, versioning, management, and security.

2.6.1 IT governance

IT governance refers to the aspects of governance that pertain to an organization's information technology processes and the way those processes support the goals of the business. IT governance represents a significant part of enterprise governance, and, given the horizontal nature of IT, where almost everyone in the enterprise uses IT assets to complete their responsibilities, it is also the most visible part of enterprise governance. Employees can easily assess effective and ineffective IT governance.

IT governance defines a structure of relationships and processes to direct and control the enterprise's IT assets. It helps to achieve the enterprise's goals by adding value while balancing the risks and benefits related to IT. IT governance deals with the management and control of IT assets, people, processes and infrastructures, and the manner in which the assets are procured. IT governance also defines roles and responsibilities and specifies the decision rights and accountability framework that helps to encourage desirable behavior within IT departments. IT governance promotes the use of leading practices and defines monitoring practices that ensure effective and efficient use of IT assets.

2.6.2 SOA governance

SOA governance is an extension of IT governance that specifically focuses on the life cycle of services, metadata, and composite applications in an organization's service-oriented architecture. SOA governance defines the changes to IT governance to ensure that the concepts and principles for service orientation and its distributed architecture are managed appropriately and can deliver on the stated business goals for services.

As a specialization of IT governance, SOA governance addresses how an organization's IT governance decision rights, policies, and measures must be modified and augmented for a successful adoption of SOA, thus forming an effective SOA governance model.

In SOA, service consumers and service providers that run in different processes are developed and managed by different departments and require a lot of coordination to work together successfully. For SOA to succeed, multiple applications must share common services, which means that they must coordinate on making those services common and reusable. These are governance issues, and they are much more complex than in the days of monolithic applications or even in the days of reusable code and components.

SOA governance extends IT governance by assigning decision rights, policies, and measures around the services, processes, and life cycle of SOA to address concerns, such as:

- ► Service definition
- ► Service migration
- ► Service message model
- ► Service ownership
- ► Service testing
- ► Service registration
- ► Service versioning
- ► Service ownership
- ► Service funding
- ► Service monitoring
- ► Service auditing
- ► Service diagnostics
- ► Service identification
- ► Service modeling
- ► Service publishing
- ► Service discovery
- ► Service development
- ► Service consumption
- ► Service provisioning
- ► Access to services
- ► Deployment of services and composite applications
- ► Security for services

2.6.3 SOA governance maturity assessment

You must determine your SOA governance maturity level for the same reasons that you determined your process governance maturity level in the Process Governance work stream, namely, determining the level of maturity required to support delivering the technology to support the process capabilities that you identified in the Business Strategy Alignment work stream. You might find that for the near-term, implementing a SOA CoE structure is appropriate.

IBM has the methods, techniques, and tools to assist in your effort. The combination of the IBM Service Integration Maturity Model Assessment (SIMM) and SOA Governance and Management Method (SGMM) planning assessment assists you in determining your current SOA governance level and gives you insight on what needs to be done to reach your target maturity level. As with process governance, you might roll out SOA governance in multiple phases over a longer time period, starting with the SOA governance that is required to ensure that your current initiative and near-term initiatives deliver the SOA technology to

enable the process capabilities identified in the Business Strategy Alignment work stream.

> **Tools and methodologies:**
>
> ► SOA Governance and Management Method (SGMM), see *SOA Governance and Service Lifecycle Management* at:
>
>   `http://www-01.ibm.com/software/solutions/soa/gov/method/?S_TACT=1 05AGX78&S_CMP=ART`
>
> ► Service Integration Maturity Model Assessment (SIMM). See *Increase flexibility with the Service Integration Maturity Model (SIMM)* at
>
>   `http://www.ibm.com/developerworks/webservices/library/ws-soa-simm /`
>
> ► See also The Open Group Service Integration Maturity Model at
>
>   `http://www.opengroup.org/projects/osimm/`

2.6.4 Leading practices

As you build the vision for the SOA and IT governance, there are some general leading practices to keep in mind:

► Assume that more governance processes might be required than what exists today.

► Adopt governance processes incrementally.

► Ensure that the governance processes and the leading practices defined are known and enforceable.

► Use a registry/repository to help effectively manage the SOA service life cycle.

► A well-defined SOA service life cycle is the key to short, crisp functional iterations of your SOA and a great way to avoid the monolithic implementation and deployment.

3

Assess phase

The activities that you perform in the Assess Phase are designed to help you develop requirements for the future process capabilities that were identified in the Envision Phase. You develop requirements for all aspects that are related to business processes, which includes the business process itself, for example, governance, business process enablers (organization, technology, and knowledge), and process performance.

The process of documenting, assessing, and developing requirements is used for all work streams in Assess. The deliverables for this phase are the requirement documents and an updated BPM Strategic Roadmap. These deliverables drive the activities in the next phase, which is the Define Phase.

3.1 Overview of the Assess Phase

Table 3-1 shows an outline of the actions that you take during the Assess phase and the resulting deliverables.

Table 3-1   Envision overview and deliverables

Thread	Input	Actions and deliverables
Business Strategy Alignment	Requirement deliverables from the other Assess work streams	Review and approve requirements

Process Governance	Envision Phase (Process Governance): Future Governance Vision and Future Process Governance Capabilities (organization, governance processes, and governance technology, knowledge)
	
	Envision Phase (Business Process): Business Capabilities, Process Capabilities
		The output of the activities in this work stream result in detailed requirements for the future process governance framework. They provide updated business domain content to update the BPM Strategic Roadmap deliverable:
		
		► Document the current process governance framework:
		  – Process standards, guidelines, and leading practices
		  – Performance measurement framework for process and process organization
		  – Process governance organizations, roles, and responsibilities
		  – Governance process and mechanisms
		  – Enabling tools
		► Assess current process governance framework
		► Document the requirements for the future process governance framework

Thread	Input	Actions and deliverables
Business Process	Envision Phase: Process Capabilities, Process Capability Enablers, and Process Scenarios	The output of the activities of this work stream result in detailed requirements for future business processes. These provide updated business domain content to update the BPM Strategic Roadmap deliverable: ► Document the in scope business processes, process performance measures, and process organization ► Assess the in scope business processes, process performance measures, and process organization ► Document the requirements for the in scope business processes, process performance measures, and process organization

Thread	Input	Actions and deliverables
IT (non-SOA) and SOA Technology	Envision Phase: Current IT Environment, SOA Solution and SOA Architecture Strategy, Future Business and Process Capabilities, and Future Business Process Requirements	The output of the activities of this work stream results in detailed requirements for the future IT and SOA environment needed to support the future business processes. These provide updated IT domain content to update the BPM Strategic Roadmap deliverable: ► Document current IT and SOA Environment ► Document current SOA services ► Document current IT and SOA performance metrics ► Assess the current IT and SOA Environment ► Document the requirements for the future IT and SOA Environment ► Document requirements for future IT and SOA performance metrics ► Develop SOA and IT environment implementation plans ► Document requirements for integrating SOA architectural components

Thread	Input	Actions and deliverables
SOA and IT Governance	Envision Phase: Future Governance Vision	The output of the activities in this work stream result in detailed requirements for future IT and SOA governance. These provide updated IT domain content to update the BPM Strategic Roadmap deliverable: ► Document current IT and SOA Governance ► Assess current IT and SOA Governance ► Document the requirements for future IT and SOA Governance

3.2 Business strategy alignment

The only activity in this phase for this work stream is to review and approve the requirements that are developed in the other Assess work streams. The people that participate in the activity varies depending on their domain. The people that approve the deliverables must be stakeholders for their respective domains and have the authority to make decisions for their domains. Do not move from this phase until approval is obtained.

3.3 Process governance

This work stream documents and assesses the current process governance framework and defines the requirements for the future framework.

3.3.1 Process governance framework

Fully implementing a process governance framework results in a paradigm shift in how your company manages its business processes. It has both a strategic and a tactical component.

The strategic component are:

- ► Aligning core processes with business strategy and business goals
- ► Prioritizing process initiatives to deliver business strategy and goals
- ► Making investment decisions
- ► Responsibility for process outcomes
- ► Responsibility for communicating change

The tactical component are:

- ► Providing a core team of process expertise for the enterprise
- ► Assisting with identifying business architecture
- ► Assisting project teams with delivery
- ► Assisting with implementing change
- ► Assisting with interpreting process performance from business goals
- ► Assisting with process performance analysis
- ► Assisting with identifying process improvement opportunities
- ► Creating and enforcing process policies, standards, methods, and leading practices
- ► Managing a portfolio of reusable process assets

For many reasons, implementing the strategic component of process governance can initially be considered out of scope. The primary reason for this is the impact from organizational change within your company. You are better served, in the short term, to address the tactical aspect of process governance through a BPM CoE. However, at a minimum, the one strategic aspect that you must address is to identify who has the role and responsibility to manage process performance. Managing process performance implies that there must be someone with the authority to make decisions to change the process if it is under-performing. A key precept for BPM is monitoring process performance and responding to process performance when it is no longer achieving its performance targets.

3.3.2 Process standards and leading practices

Standards, guidelines, and leading practices apply to the way in which process work is performed and the format, structure, and appearance of the documents and artifacts that are created:

- ► *Policies*: Decisions that must be complied with, for example, processes that cross functional areas must have supportive performance measurements.

▶ *Process standards*: Practices must be complied with, for example, analysis, design, simulation, change control, performance metrics, repository use, and so on.

▶ *Process guidelines*: Criteria that must be complied with, but might not always apply and, therefore, can be ignored or varied to meet the needs of a specific situation or condition.

▶ *Process leading practices*: Formalized lessons learned from experience that, when used, can improve the outcomes of process work.

The widespread adoption and use of standards, guidelines, and leading practices enables and improves the consistency and quality of process work within an enterprise. Without them, each person and project team is left to decide how they do their work and what they produce, which typically results in uneven quality, delays in completing work, and minimal, if any, ability to share or reuse assets, project deliverables, lessons learned, or skills across different efforts and initiatives.

3.3.3 Process governance organizations

Governance determines who is responsible for making decisions, what decisions to make, and policies for making decisions consistently. Governance is different from management; however, it is useful to keep in mind that governance and management form a highly-integrated system. Governance might determine that end-to-end business processes must have owners with the authority and responsibility to make decisions about the process they own, but management executes this decision.

A *Process Owner* is someone at an executive management level who has a vested interest in the success of an end-to-end process. The Process Owner is empowered with the responsibility and accountability for the end-to-end operation and performance of an integrated set of processes that provide a service or a product that has significant value to an enterprise, its customers, and suppliers.

The Process Owner ensures that the enterprise's business goals and performance objectives are reflected and achieved in process initiatives and in the operations of the end-to-end process.

The role of a Process Owner requires a significant commitment of time, especially during the early stages of implementation, operation, and management of an end-to-end process. Over time, the requirements of the role can lessen as process performance stabilizes.

Without a Process Owner, there is no executive visibility into the contribution that core end-to-end processes have toward achieving the enterprise's strategic performance goals. Not having this executive visibility leads to poor execution of the core end-to-end processes. Managing end-to-end process sub-processes within functional units, instead of collectively across functional units, can result in the sub-processes having conflicting goals or sub-optimized performance.

BPM Center of Excellence

The BPM CoE supports both Process Owners and process project teams. It provides the deep process knowledge and skills that are necessary to support both operational processes and new process initiatives. The BPM CoE provides thought leadership and guidance and develops, implements, manages, and enforces the standards, methods, processes, data, and tools that are essential for the success of the process governance and management function. In a BPM context, this group also provides expertise that is related to the design, deployment, and operation of processes that use BPM concepts and technologies.

The BPM CoE also works closely with their counterparts in the IT governance and management functions (which includes the SOA governance function where established) to ensure that the functional and non-functional requirements of processes are clearly understood and implemented in the technology solutions and are aligned with and supported by the performance commitments, practices, and processes of IT management.

The BPM CoE is necessary to achieve the consistency, predictability, and effectiveness of process initiatives, process improvement efforts, and process operations across the enterprise. By concentrating the process skills and knowledge in one organization and sharing that across multiple process initiatives, the BPM CoE can leverage their experience and lessons learned to continuously improve the performance of business processes. Without a BPM CoE, process projects and operations likely have widely varying rates of success and the enterprise cannot achieve the full business performance results that they need or expect.

Typical roles in a BPM CoE are:
► Business Architect
► Business Process Consultant
► Business Process Analyst
► Business Analyst
► Process Portfolio or Asset Manager
► Methods and Tools Specialist

3.3.4 Enabling tools

Process governance can drive requirements for some unique technology enablers, for example, governance standards, guidance, and leading practices identify and drive technology enablers that are specific to governance, for example, process and asset repositories, version control, process modeling and analysis, and process review and collaboration. It also influences technology to be used to monitor business process performance, collecting and storing performance data, and reporting.

Standardizing the enabling tools is a governance responsibility. Without this standardization, it is difficult to ensure consistency of process life cycle activities, and it certainly impacts asset reusability.

3.3.5 Process performance measurement frameworks

A Process Measurement Framework defines the method in which metrics are applied to measure business results for end-to-end processes. It identifies how the high-level business performance objectives of an end-to-end process are decomposed into an integrated set of lower-level metrics and targets for each of the component processes that might be performed in different organizations, which is needed to ensure that individual process performance contributes optimally to the achievement of the end-to-end process performance objectives.

In addition to defining how metrics for process performance are applied, a Process Measurement Framework must define how metrics are applied for the process performers, which includes guidelines for compensation, incentives, and rewards to motivate employees to behave in a way that helps end-to-end processes achieve its performance goals.

Without a Process Measurement Framework, the individual processes that are performed and managed by different functional units most likely adopt metrics to measure their performance that focus on local priorities and objectives, but likely sub-optimize end-to-end performance. Starting with the end-to-end business performance, objectives help to identify the individual process metrics that contribute to those objectives. The resulting integrated set of KPIs allows organizational process managers to focus on measuring and managing the right behaviors, activities, and performance for optimal business results.

3.3.6 Governance processes

Governance policies and decisions require mechanisms to ensure compliance. These mechanisms are generally implemented through governance processes, for example, after process standards are developed, a governance process must

be deployed to ensure compliance. A good rule-of-thumb is for every governance policy there is a governance process to ensure compliance.

Additionally, governance processes must exist to maintain the vitality of process governance itself, for example, a review and update of governance policies, standards, and so on. You must also define governance processes for exceptions and appeals.

In the Envision Phase we defined three types of business processes: management, operational, and support. Governance processes are part of management. The key point here is that regardless of the type of business process, the same principles and techniques are used to document and assess all business processes. See the Business Process work stream for guidance about documenting, assessing, and defining requirements for business processes.

3.3.7 Leading practices

Consider the following guidelines:

- ► The Process Owner is an executive manager with the authority to make final decisions about the process operations and improvement projects in any given functional unit. Although the decision-making process must be a collaborative one, local functional unit managers must not be in a position to override decisions that are intended to improve end-to-end performance.

- ► Establish a BPM CoE as early as possible so that it can develop and implement the Process Governance Framework components that guide and support future process decisions and initiatives.

- ► Start the development of the Process Measurement Framework by identifying the core drivers of value for the business, for example, the strategic performance goals of the enterprise. Each of the core drivers must then be decomposed into the operational drivers of value that contribute to the core drivers. The operational drivers can then be viewed in the context of a specific end-to-end process to identify specific process operational drivers. Key executive stakeholders must have a major role in developing a measurement framework.

- ► After governance processes are identified, develop and deploy them in the same way that you deploy a business process.

3.4 Business process

In the Envision phase, the scope of the project was determined by identifying and prioritizing future process capabilities. For each future process capability, you identified the process capability enablers (technology, organization, and knowledge), business processes to consider, and future process performance metrics.

Now, you can document and assess the in scope business processes against the documented future process capabilities. Documenting the business processes creates a baseline for comparison. Assessing the current business processes against the desired future process capabilities identifies gaps and gives you the ability to create detailed requirements to close those gaps. These requirements are used in the Define Phase to create detail designs of your future business processes.

Tools:

► WebSphere Business Modeler models the "as is" process and process measurement requirements.

http://www-01.ibm.com/software/integration/wbimodeler/index.html

► IBM Rational® RequisitePro® used in conjunction with WebSphere Business Modeler to translate business goals into process models and business use cases.

http://www-01.ibm.com/software/awdtools/reqpro/

3.4.1 Documenting the current business processes

The first step in documenting the business process is to gather as much information about the business process as possible, which probably requires you to:

► Review existing business process documentation
► Conduct workshops with key process stakeholders and process performers
► Observe process performers executing the business process

The items that you must document are:

► A description of why the process exists

► The value realized from the process

► The performance metrics and KPIs for the process

- Business rules that control the flow of tasks within the process or impact the output of the process
- Business Events, business documents, or transactions that trigger the process
- Process task flow with key decision points
- Roles and organizations performing tasks within the process
- Resources that enable tasks within the processes, for example, applications, SOA services, systems, and internal and external services
- Automated tasks
- Human tasks and interfaces
- Input and output business documents or transactions for each task in the process
- Business documents or transactions that control the flow of tasks within the process
- Business conditions that stop the process
- Favorable and unfavorable process outcomes
- Perceived problems from the process performer perspective
- Perceived problems from the operations management perspective

It might be appropriate or necessary to analyze the current processes to uncover opportunities for improvement or validate problems and pain points that are uncovered during discovery. Rectifying these are important design points that you must address in the requirements for the future process. Analyzing your current process most likely requires a specialized simulation and analysis tool or tools.

3.4.2 Defining the future process requirements

The primary input for requirements of the future business processes is the gaps that are identified from two separate assessments. The first assessment you must do is to determine what problems exist with delivering current process capabilities, which is important because the last thing you want to do is to carry these problems into the future processes. Document what is needed to fix these problems so that they can be addresses in the requirements for the future process. The second assessment is to compare what the current process needs to do to satisfy the future process capabilities that you identified.

In your requirements for the future business process, be sure to address all of the gaps that are found from the assessments.

3.4.3 Defining the process measurement requirements

In the Envision phase, you created a future performance measurement vision. The vision contains the strategic goals and business objectives for future processes. Based on these goals, you identified new key performance indicators and metrics.

In this phase, you refine the KPIs and metrics into more specific values.

Defining KPIs

KPIs are derived based on the core drivers for the business and reflect the strategic performance goals of the business. You defined the core drivers in the Envision phase.

Apply KPIs to the processes and sub-processes to provide an end-to-end indicator of the process performance. The Process Measurement Framework that you define in the Process Governance work stream determines how KPIs are derived to support business goals.

Leading practices for performance measures

When determining the measures to be used, choose as few indicators as possible. Too many measures are costly to collect and analyze, while too few measures limit your ability to identify defects.

Consider the following guidelines:

► The measure must be linked to critical customer requirements.

► The measure must be clearly defined.

► The measure must be statistically valid and repeatable.

► The measure must be representative and relevant to the process.

► The measure must reveal trends and cycles.

► The measure must be easy to collect. In other words, do not call out a measure if you do not have the data to support it.

► The measure must be simple to read and understand.

► The measure must help drive appropriate corrective actions.

3.4.4 Documenting and assessing the current process organization

Understanding the current organization is instrumental in identifying the people involved and impacted by the current process. Assess the current organization and document it, which includes the following points:

► Roles and responsibilities
► Organizational structures
► Stakeholders
► Knowledge required by the organization.
► Organizational compensation and incentives

Assess this information with regard to the future process capabilities. Make sure you document both strengths and weaknesses in the organization, for example, skills, cost, productivity tools, workload balancing, and utilization. This information helps you to identify improvements that must be made in the organization to support the new process.

3.4.5 Defining the future organization requirements

Developing organizational structures to support the new process must take the entire enterprise into account to minimize disruptions to enterprise operations. Identify areas where the new structure impacts existing operations, and create a plan to minimize the impact to these operations during the transition period. Also, consider potential effects on out-of-scope organizations.

The requirements must include guidelines for the following aspects of the future organizational structure and operations:

► A process to govern organizational structure and relationships
► Process operating rules with decision-making guidelines
► Organizational groupings and relationships
► High-level roles, responsibilities, and skills required
► Performance measurements
► Organization culture

The resulting documentation must be effective in minimizing conflict and accelerating transition. The documentation must provide a mechanism for clarification and dispute resolution of organizational changes.

3.5 IT and SOA technology

The activities in this work stream define detailed requirements for the future IT and SOA environment that are needed to support the future business processes.

3.5.1 Documenting the current IT and SOA environment

In the Envision Phase, you gained a high-level understanding of the technology that currently enables the process capabilities that are in-scope for your BPM initiative. In this phase, you must document this environment in greater detail to be able to assess the technology environment against the detailed process and process performance requirements that you developed in this phase.

You also must document the current technology service level agreements (SLAs) and technology used to collect and report SLAs. Understanding the current SLAs is important because they can have a significant impact on achieving process performance metrics and KPIs.

3.5.2 Documenting the current SOA services

Future business processes rely on SOA services. These SOA services might be existing services that can continue to provide the required function as is or with improvement, or they might be new services. In the Assess phase, identify and document the current SOA services that are in scope for the process initiative. In the Define Phase, you identify candidate SOA services that will enable the future business processes that are in scope for this BPM initiative. After you identify these, the SOA services that currently exist are assessed to determine what, if anything, needs to change to enable the future business processes.

3.5.3 Assessing the current IT and SOA environment

Now that there are detailed requirements for future business processes and process performance, you can conduct a detailed assessment of the IT and SOA environments. The importance of a complete and detailed current environment assessment cannot be overstated. The assessment of the current environment is essential for performing a proper gap analysis.

Your assessment must consider functional and technical quality of the installed applications, business services, databases, and infrastructure that support the in-scope business processes.

For applications and business services, focus the assessment on two complimentary views of functional and technical quality. Functional quality is concerned with both the extent to which the applications and services support the business process and the quality of that support. Technical quality is concerned with their technical efficiency (for example, their age, stability, accessibility, reliability, and maintainability) and the longer term technical potential.

For database assessment, focus on data quality, (currency, redundancy, and accuracy) and the potential to support the future business process.

With respect to the current infrastructure, the assessment is focused on technical efficiency, for example, stability, reliability, maintainability, and age of installed base that support business processes, for example, availability, performance, accessibility, anticipated business growth, and the longer term technical potential.

You also must assess the capability of current SLAs and the technology that enables you to gather and report the SLAs to determine if they support future process performance goals.

At the end of your assessment, you must have a solid understanding of the gaps that exist between the current environment and the environment that needs to exist to support the future business processes. Use this information to document the technology requirements for the future IT and SOA Technology environment.

The roles that must contribute to the IT environment assessment are:

► Solution Architect
► IT/SOA Architect
► Application Architect
► Database Architect
► IT Manager

3.6 SOA and IT governance

As with Process Governance, the Assess Phase is the time that you must develop requirements for the future IT and SOA governance that are required to achieve successful alignment of the IT and SOA environment with the in-scope future capabilities and business processes. This effort is not to redefine existing IT governance but rather to ensure the proper extension of IT governance to include SOA.

During this phase, focus on understanding the overall scope of the SOA governance need within the organization, and identify areas for improved SOA governance. Most of these activities are people-centric and focus on extensive collaboration. Think of this as the step in the life cycle where the team defines the *problem to address*.

This phase includes:

► Explicitly determining the level of SOA capabilities that are needed to ensure that your BPM initiatives are successful and are aligned with the business

- ► Reviewing current governance capabilities and arrangements
- ► Developing requirements for SOA governance

During this phase, gather documentation about the current state of the SOA and IT governance processes to determine the existing capabilities. This documentation serves as a base line for future SOA governance requirements. Establish the needs and priorities of the future SOA governance processes, and identify the gaps between the current state and the future state. The results must provide a clear understanding of what it takes to achieve these goals.

Identify measurements that indicate the success of the end result. Design the measures to ensure that the governance processes contribute to the business goals that you established in the Envision phase.

3.6.1 Defining the SOA governance requirements

SOA governance requirements must define the service-centric processes and checkpoints that must be added to existing IT governance bodies. These processes and checkpoints are used to define, implement, and manage services through their life cycle (for example, identification, definition, development, management, and so on). It also helps to enforce operational leading practices that result in the alignment of IT and business with related operations and regulations directives.

The SOA governance requirements define the guidelines for governance. It promotes reuse and eliminates redundancies through the recommended use of business domains and corresponding business service descriptions. Like Process Governance, the requirements must identify a SOA CoE to manage maintainability and sustainability of components that make up the SOA services, maintain alignment with business, and provide consistency, predictability, and effectiveness of the application of SOA as a technology enabler.

By concentrating the skills and knowledge in one organization and sharing that across initiatives, the SOA CoE can leverage experience and lessons learned to continuously improve the performance and delivery of SOA services. Without a SOA CoE, SOA services would most likely be created to satisfy specific needs and not be able to be leveraged across future business processes.

The SOA governance requirements must also include a recommended approach for establishing a SOA CoE. It is important to understand that the current scope and focus of the requirements is the SOA-related areas of governance; however, the end-to-end IT governance is out of scope.

As part of this phase, identify the tools and technology to use to define, monitor, and manage the SOA governance plan.

3.6.2 Leading practices

The leading practices are:

► Executive-level support for SOA is a must. Without it, a service-oriented architecture is unlikely to be successful. Gain support by making sure that the value of SOA is seen and realized.

► Ensure the buy-in or concurrence of the business domain.

► Implement in an iterative fashion. Do not attempt a big-bang approach. If the initial implementation of SOA and associated governance is too large, the implementation is difficult to manage and value is not realized until much later.

► Make sure to communicate what is to be done, and set expectations for all of the stakeholders.

► Tightly couple business and IT domains in the decision-making processes, and keep them involved in each aspect of model planning and execution.

► Measurement is key to effective governance. If you do not measure the effectiveness of your processes and services, they quickly become outdated and unable to meet the objectives of the business.

► Use tools to assist in governing the service-oriented architecture. Tools are not completely necessary, but they make effective governance a reality. Remember, however, that governance tools are not in themselves governance. Effective processes, procedures, policies and organization make governance.

► Institute processes that verify adherence to policies.

► Implement a SOA CoE as early as possible as the focal point for establishing and maintaining SOA governance.

4

Define phase

The activities that you perform in the Define phase are designed to help you specify the design details that are required for the implementation of processes, which includes information about:

► How processes and their supporting organizations must function
► How governance is implemented to ensure that goals are met
► How technology must change to deliver the solution.

You also develop implementation and integration plans for deploying your designed solution.

The results of this phase are designs that are detailed and in a format that can be acted on in the next phase, which is the Execute phase.

4.1 Overview of the Define phase

Table 4-1 shows an outline of the actions that you take during the Define phase and the resulting deliverables.

Table 4-1   Define overview and deliverables

Thread	Input	Actions and deliverables
Business Strategy Alignment	Design deliverables from the other Design work streams	Review and approve the designed solution
Process Governance	Assess Phase (Process Governance): Documented requirements for the Future Process Governance Framework	The output of the activities in this work stream result in the business domain's contribution to the Future Governance Framework deliverable. For Process Governance, include: ▶ Design of the future governance processes ▶ Design of the future governance organization ▶ Development of the future governance framework integration and implementation plans
Business Process	Assess Phase (Business Process): Documented current business processes, Documented requirements for the in-scope future business processes, process performance measures, and process organization	The output of the activities in this work stream is the Future Process Design deliverable. For Business Process, include: ▶ Design the future business process ▶ Design the future process organization ▶ Design the future business process performance measurements (KPI) ▶ Develop the implementation and integration plans for the future process and the future process organization

Thread	Input	Actions and deliverables
IT (non-SOA) and SOA technology	Assess phase: Documented current SOA services, documented requirements for the future IT and SOA Environment, documented requirements for future IT and SOA performance metrics, and the SOA and IT environment implementation plans Define Phase: Design the future business process, Design the future business process performance measurements (KPI)	The output of the activities in this work stream are the High Service Model and Services deliverables. For IT (non-SOA) and SOA technology, include: ▶ Design user interfaces ▶ Design the IT infrastructure ▶ Develop service level agreements ▶ Design/selection of non-SOA technologies, for example, 3r^{d\} party solutions, custom solutions, integration middleware, packaged solutions, and so on ▶ Design of the SOA Architecture ▶ Identification of candidate SOA services ▶ Assess current SOA services ▶ Identify and design specification of new SOA services ▶ Develop the IT and SOA implementation and integration plans
SOA and IT Governance	Assess phase: Detailed requirements for future IT and SOA governance	The output of the activities in this work stream result in the IT domain's contribution to the Future Governance Framework deliverable. For SOA and IT Governance, include: ▶ Design for the future SOA and IT governance framework ▶ Develop the future SOA and IT governance framework implementation and integration plans

4.2 Business strategy alignment

The only activity in this phase for this work stream is to review and approve the solution designs that you developed in the other Define work streams. The people that participate in the activity vary depending on their domain. The people that approve the deliverables must be stakeholders for their respective domains

and have the authority to make decisions for their domains. Do not move from this phase until you obtain approval.

4.3 Process governance

In the Assess Phase, you documented future process policies, standard, and leading practices. If you recall, governance policies and decisions require mechanisms to ensure their vitality and compliance. These mechanisms are managed by the BPM CoE and are realized through implementing governance activities and processes.

In the Envision Phase, we defined three types of business processes: management, operational, and support. Governance processes are part of management. The key point here is that regardless of the type of business process, the same principles and techniques are used to design all business processes. See the Business Process work stream for guidance about designing business processes.

4.3.1 Designing a process governance organization

To define the roles and responsibilities for a BPM CoE organization, you must first know the intended purpose of the BPM CoE and what the BPM CoE is expected to accomplish. You must gain this insight in the Assess Phase, which is reflected in the requirements that you developed.

Designing an organization structure generally includes developing an organization chart and a *Responsible, Accountable, Consulted, Informed* (RACI) *Chart*. The RACI Chart identifies who is responsible and who is accountable for the activities and processes owned by the organization. Figure 4-1 on page 49 and Figure 4-2 on page 50 are examples for a BPM CoE organization.
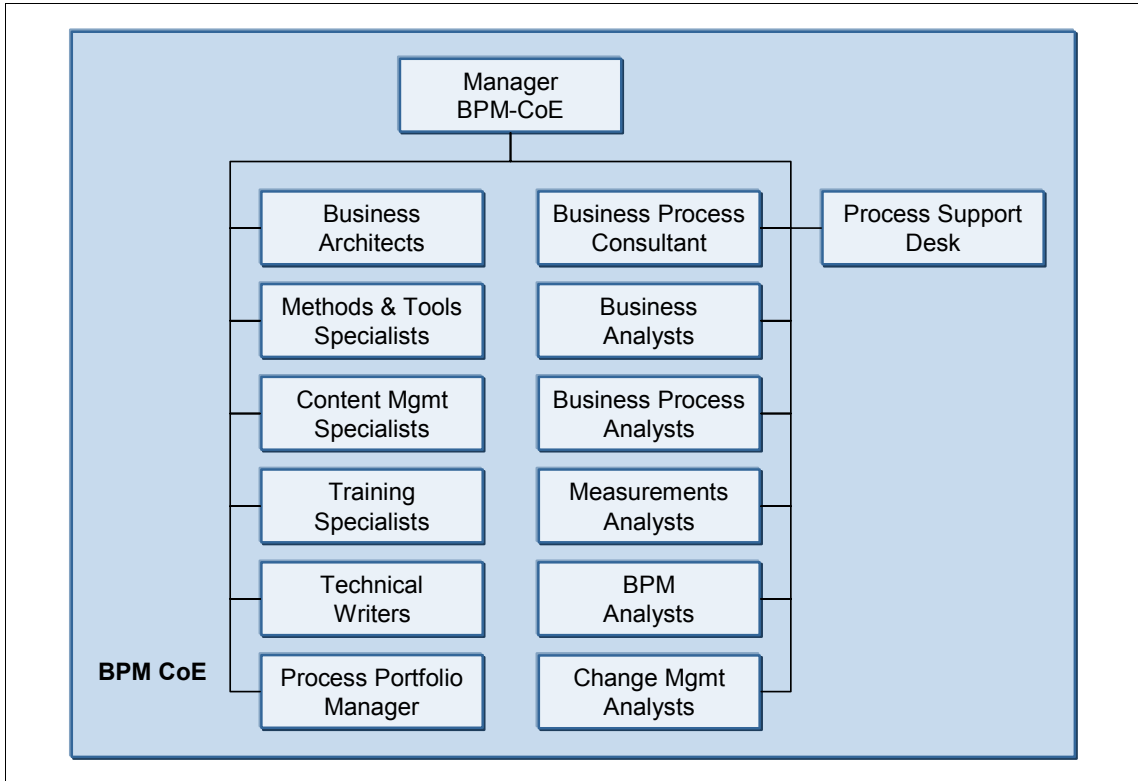
Figure 4-1   BPM CoE organization

BPM CoE	Manager BPM CoE	Business Architect	Method & Tools Specialists	Content Management Spec.	Training Specialists	Technical Writers	Business Process Consult.	Business Analysts	Process Analysts	Measurement Analysts	Change Management Spec.	BPM Analysts
Change Management												
Assist in the development of a multi-year process improvement strategy and plan	R	CS						CS	CS		CS	
Recommend/review process policies and principles for adoption by the Process Board	RA	C		S		S	C		C	C		C
Prepare business cases for evaluating and prioritizing process initiatives, improvement projects	A							R	CS	CS	CS	
Execution and Performance Management												
Enforce process policies and principles	A	CS	S		S		R	S	S	S		S
Define and enforce process standards and guidelines	A	C	C	S		S	R		C	C	CS	C
Develop, communicate and enforce consistence with the enterprise process architecture	A	R		S	S		CS		CS		CS	
Develop, communicate and manage the business rules management framework	A	R	C	S	S		S	CS	CS		CS	CS
Develop, communicate and manage the process model and asset repository	A	R	CS	S	S	S		CS	CS		CS	CS
Develop, communicate and manage the process measurement and analysis framework	A	CS		S	S	S	C	CS	CS	R	CS	CS
Assist in the definition of SLAs in support of processes with IT and external process providers	A			S		S		CS	CS	R		CS
Assist in the definition and implementation of end-to-end process metrics	A			S		S		CS	CS	R		CS
Assist in the design and implementation of process monitoring, dashboards	A		CS	S				C	CS	R		CS
Analyze and report process provider performance against SLAs	A			S				S	CS	R		
Analyze and report process performance against local and end-to-end metrics and targets	A			S				S	CS	R		
Assess the performance of enterprise processes, recommend changes to the Process owners	RA			S		S		CS	CS	CS		
Develop, support and enforce the use of common process methods	A	C	C	S	S	S	C		CS	C		R
Provide cross enterprise process perspective and guidance to process projects	A	R		S		S	C	C	C		CS	CS
Resource Management												
Develop and maintain the enterprise process portfolio	A	C		S		S	R		CS			C
Develop, harvest, catalog, store, and reuse process assets	A	C		S		S	R		CS			C
Provide thought leadership, education, mentoring related to BPM and process improvement	A						CS		CS		CS	R

Figure 4-2   BPM CoE RACI Chart

Keep in mind that you are creating an organization that might identify roles that do not exist in your company. So, work closely with your human resource organization to describe these roles and to identify the appropriate compensation, incentives, and performance criteria.

4.3.2 Defining a process governance implementation plan

A governance implementation plan details how the new process governance is put in place. The actions that help you build the plan are to:

► Define a *standards adoption plan* that outlines the use and dissemination of standards and their enforcement.

- Define a *governance process communication plan* that describes the governance processes and how they intersect and affect activities within the process life cycle, which must include how governance processes are rolled out, who owns the governance processes, who the performers are, and what triggers the execution of the processes.

- Develop a *governance organization implementation plan* that defines the organizational structure that supports the future governance framework. The organization plan must include the required roles, responsibilities, organization structure, and capabilities. The plan must describe the change strategy and risks of implementing the new organization, which includes an assessment of the changes that are required and the cost. It also includes information about the existing skills and how these skills are upgraded.

- Develop a *technology implementation plan* that includes the change strategy, risk mitigation, time lines, and integration. Estimate the cost of enabling the process governance technologies, which includes an assessment of the required changes and the impact analysis.

- Define a *measurement framework adoption plan* that outlines the purpose and importance of the use of a common framework for performance measurement. Develop a communication plan to make the new measurement framework known and that describes how the measurement framework is applied to business processes.

4.3.3 Defining the process governance integration plan

The governance integration plan details how the process governance organization collaborates with IT governance to ensure business and IT alignment throughout the process life cycle.

Process governance processes might also need to be integrated and synchronized with existing IT governance processes to ensure that there is a clear translation and transition of process requirements and performance goals to the IT organization.

4.4 Business process

Designing the future business processes includes designing the process metrics and KPIs and designing the process organization that performs the process' tasks after the process is operational.

In the Assess Phase, you created detailed requirements for these process elements. In this phase, you use those requirements to create a comprehensive design for these elements.

> **Tools for designing processes and process measurements:**
>
> ► WebSphere Business Modeler to model the "to be" process, measurement requirements, and to run simulations:
>
>   http://www-01.ibm.com/software/integration/wbimodeler/index.html
>
> ► IBM Rational RequisitePro is used in conjunction with WebSphere Business Modeler to translate business goals into process models and business use cases:
>
>   http://www-01.ibm.com/software/awdtools/reqpro/
>
> ► IBM WebSphere Business Monitor is a Monitor Toolkit to build the monitor application that measures the process:
>
>   http://www-01.ibm.com/software/integration/wbimonitor/
>
> ► Workflow patterns to design a process. Simple workflow patterns can be combined to achieve more complex business process flows:
>
>   http://www.workflowpatterns.com/

4.4.1 Designing the future process

The detailed requirements that you developed in the Assess Phase must help you to develop a detailed process design. Consider investigating if there are industry standard process maps that are available for the process that you must design. These are useful as a baseline in which to apply your requirements. Industry standard process map are at the APQC Web site (www.apqc.org). The APQC is an open standards organization that focuses industry standard processes and the benchmarking of those processes. The APQC Process Classification Framework includes standard process maps for many industries that are helpful to drive benchmarking analysis and to ensure completeness when designing new processes or when redesigning existing processes.

At a minimum, your process design must include a detailed process flow that includes:

► Business events, business documents, or business transactions that trigger the process

► Business rules that control the flow of tasks within the process or impact the output of the process

- Detailed description of task inputs and outputs, for example, business forms, business documents, and data structures
- Type of task, for example, human or system
- Resources that enable tasks, for example, applications, data, SOA services, systems, internal and external services
- Detailed description of system and application resources that a task uses
- User interface design for human tasks that require interaction with systems or applications
- Decisions that change the flow of the process
- Conditions that stop the process
- Favorable and unfavorable process outcomes

To further elaborate your process map, consider creating both *user scenarios* and *use cases* for the human tasks.

User scenarios

The narrative description in a user scenario includes information about the user, a history of the situation, written descriptions of the experiences, choices, and outcomes from interacting with the process. User scenarios can be illustrated to enhance the effectiveness of the story. A set of user scenarios can be created to describe the majority of user interactions with the application and service that enable the completion of the task. This set includes examples from each audience type, such as customer, stakeholder, and so on. Together, the scenarios establish the high-level description of the essential functionality that is required by the enabling application or service that the user requires to accomplish the task.

Use cases

Use cases augment user scenarios and are typically used for the following purposes:

- To reach a common understanding of application/service behavior
- To design elements that support the required behavior
- To identify test cases
- To plan and assess work
- To write user documentation

A use case typically includes:

Name   The name of the use case.

Brief Description A brief description of the role and purpose of the use case.

Flow of Events	A textual description of what the application or service does in regard to a user scenario (not how specific problems are solved by the application or service). The customer understands the description. The flows can include a basic flow, alternative flows, and sub-flows.
Key scenarios	A textual description of the most important or frequently discussed scenarios.
Special Requirements	A textual description that collects all requirements, such as non-functional requirements, that must be taken care of during design or implementation.
Preconditions	A textual description that defines a constraint on the application or service when the use case might start.
Post conditions	A textual description that defines a constraint on the application or service when the use cases terminate.
Extension points	A list of locations within the flow of events of the use case at which additional behavior can be inserted using the extend-relationship. This commonly has another use case that precedes the current use case.

Business events

Business events are context driven. A business event is one or more specific events or actions that have business context. Business events can be used to trigger business processes or activities with a business process. Signing up for a new account, making a purchase, or receiving an order are sample events that are common to most businesses.

One of the steps in the Define phase is to define and analyze business events that flow across the systems to be able to provide timely insight and response, for example, to deliver the right information to the right place at the right time and take appropriate business actions. Business events can be discovered and described in business terms to meet business objectives based on high-level management goals. You must also document how events are related, when to react, and how to detect meaningful patterns of events and respond quickly with effective action.

Events can disrupt the best designed and managed business processes or have an impact on the business itself. The organization must be able to detect events as they happen and take timely and proactive actions to be responsive. Optimizing how the organization handles events can help improve customer responsiveness and ensure better customer service and higher customer satisfaction.

Events can occur every second or every day. The events that matter and that you must capture are the ones that have significant business impact, which allows companies to seize critical business opportunities or mitigate risks before they negatively affect their ability to compete.

There are a wide range of ways that enterprises approach events, simple or complex. But in all cases, information about the event needs to be quickly disseminated to others who are affected by the event for both awareness and to take appropriate action. Businesses tend to define events and their responses through the IT perspective of processing applications and services. However, it can be faster and simpler for the business to reference and detect actual business actions and events through real-time event processing.

Business rules

Business rules provide the information about how a policy is applied to an activity. Business rules can change with the business. A common example is that of rules that determine whether a loan is approved based on the credit score. Rules can be defined that set the credit score to correspond to an action, for example, a credit score of 100 or less causes the loan to be denied. A score above 300 causes the loan to be automatically approved. And a score in-between invokes a human task (loan officer) to make the decision. If the needs of the business change, for example, only scores above 350 are now approved, you simply change the rules to reflect that.

Using business rules you can separate business policy from the process logic, which increases flexibility in quickly incorporating changes. The parameters of the rules can be modified after the process is deployed. When you define the business rules, rationalize the rules to eliminate duplication and ensure consistency with business policies and operational requirements.

Design analysis

It might be appropriate or necessary to analyze the future process' capability to perform effectively and efficiently. It is important that your design does not create problems that affect targeted performance goals. It is equally important that outputs from preceding tasks satisfy the input requirements of following tasks within your process, which is also true when your future process provides inputs to another process. The output of your future process must satisfy the input requirements of the other process.

Analyzing your future process most likely requires a specialized simulation and analysis tool or tools. There are a number of these available.

4.4.2 Design process performance measurements

Now that you designed the future process, you must determine:

- ► How are metrics captured, for example, a customer request must be captured within 15 minutes?

- ► Where and how long is performance data stored for reporting and KPI calculations?

- ► Where in the process are the metrics captured, for example, process level, task level, combination of both process and task?

- ► How is poor performance determined, for example, checking metric and KPI value against acceptable performance ranges?

- ► How are captured metrics applied to determine the KPI for the process, for example, customer transaction must be completed within 48-60 hours of receiving the customer's request (KPI represents end-to-end process performance)?

- ► How are the performance results reported, for example, media?

- ► How are the appropriate persons notified of performance results, for example, alert notification for performance outside of acceptable ranges, continuous real time performance reporting, or both?

- ► How are performance results escalated to others?

You can choose to build the technology you designed, or you can use the performance requirements that you developed in the Assess Phase to select third-party tools to capture, monitor, and report performance.

If you choose to build, your design will be used in the IT (non-SOA) and SOA Technology work stream to create the detailed technology designs that are required to build your applications and services to capture, monitor, and report performance.

4.4.3 Designing the future process organization

The organizational requirements that you defined in the Assess Phase combined with your future process design must allow you to identify the roles and responsibilities of the future process performers, which might require you to create an organization chart and RACI Chart to clearly articulate which process performers are responsible and which are accountable for decisions made about the process and the tasks that are executed during the execution of the process.

You must clearly define the competencies, skills, training, and if appropriate, the compensation and incentives for the process performers.

As was mentioned in the Process Governance work stream in this phase, you might change or create an organization that identifies roles that do not exist in your company. So, you must work closely with your human resource organization to describe these roles and identify the appropriate compensation, incentives, and performance criteria.

4.4.4 Simulating the model

After completing the Process model, perform the following tasks to ensure that the process can perform to meet the defined objectives and requirements:

1. Simulate future design performance to confirm that performance objectives can be met. Simulation allows the assessment of the performance of a process, just as in a real-life work environment. It generates statistics and reports to pinpoint potential areas of improvement. The organization must be in agreement about implementation of the optimized To-Be process model.

2. Simulate integrated future operational and governance process designs to confirm that they meet design and performance objectives. You can improve an existing business process flow through business process and policy modeling and simulation by running simulated workloads through the process to identify bottlenecks, inefficiencies, and associated costs. This information is used to create a new, more efficient refined business process.

3. Refine operational and governance process designs to meet objectives.

4. Validate final process designs with client.

5. Hand off the Process Model to the Integration Developer to create an Execution Model. The development of an Execution Model, done in Modeler, is to construct the Process Model for execution in WebSphere Process Server.

Some modification might be needed to transform the process model into a Simulation Model. Simulation allows you to assess the performance of a process, just as in a real-life work environment. It generates statistics and reports to pinpoint potential areas of improvement. The organization must be in agreement about implementation of the optimized To-Be process model.

4.4.5 Process implementation and integration plans

Create these plans for your future business process, if there are:

► Workflow or automation elements in the future business process
► Workflow or automation elements that intersect with other processes
► The output of the future business process is required input to another process

If application and service elements are developed to enable tasks within the future business process, the implementation and integrations plans for these are addressed in the Process Technology (non-SOA) and SOA Solutions work streams.

Defining the process test strategy

Define the process testing and implementation strategy for the operational and governance processes. This task includes specifying pilot testing of the processes, the acceptance testing criteria, and the plans for cut-over to production.

Defining the implementation plan

An *implementation plan* includes guidance about how the business-process logic is implemented. An implementation plan contains decisions that affect how the process and the services that support it are deployed, for example, the implementation plan determines these strategies:

► Which activities are automatic and which are manual and require human intervention.

► Which segments of business logic are integrated into the business process, and which are implemented as services to be called from the process.

► When a new business process flow is needed, is the implementation based on a completely new business process or a refinement of an existing business process that was previously modeled and simulated.

The Integration Developer uses this information to create an Execution Model from the Business Model. Elements added to the model for testing are removed and replaced with the external resources to be used in production. The Execution Model is passed to the Execute phase for implementation.

4.4.6 Organization implementation and integration

Because it is unlikely that the process organization that you defined is a standalone unit within your company, you must address how to implement this organization and how to integrate it into your company's other organizations.

The implementation plan for the process organization can include scheduling and conducting skills training and facilities and the equipment needed to perform process tasks.

4.5 IT and SOA technology

At this stage, you must have the detailed requirements and high-level designs for the future business process and future process performance. Combined, this information helps you to accomplish one or more of the following tasks to enable the future business process:

► Identify and select technology infrastructure components

► Identify and select technology for collecting, monitoring, and reporting process performance metrics and KPIs and technology SLAs

► Identify and select any third-party solutions, package solutions, and middleware software

► Create detailed designs for any custom solution

► Identify candidate SOA services

► Assess the current SOA services that you documented in the Assess Phase to reuse or modify

► Create detailed designs for new SOA services

In addition to enabling technologies for the future business process, you must have the necessary information to design the SOA Architecture that supports your service-oriented solution.

Last, for the technologies and solutions you are going to deploy, you must develop both integration and implementation plans.

> **Tools:**
>
> The service-oriented modeling and architecture modeling environment (SOMA-ME) is a framework for the model-driven design of service-oriented architecture solutions using the service-oriented modeling and architecture method. SOMA-ME is also a tool that extends the IBM Rational Software Architect product to provide a development environment and automation features for designing SOA solutions in a systematic and model-driven fashion.
>
> http://www-01.ibm.com/software/awdtools/swarchitect/websphere/
>
> For more information, see *SOMA-ME: A platform for the model-driven design of SOA solutions* at:
>
> http://www.research.ibm.com/journal/sj/473/zhang.html
>
> For more information about SOMA:
>
> ► Designing Service-oriented modeling and architecture How to identify, specify, and realize services for your SOA
>
>   http://www.ibm.com/developerworks/webservices/library/ws-soa-design1/
>
> ► Designing SOA with a business focus
>
>   http://www.ibm.com/developerworks/websphere/techjournal/0706_col_simmons/0706_col_simmons.html

4.6 SOA and IT governance

After you identify the opportunities for improved governance, business and IT professionals work together to define and modify the current governance arrangements and mechanisms, for example, new approaches to creating policies must be agreed on at this time. Other important governance decisions that you make during this phase are:

► Define the governance processes

► Define additional capabilities that are required, such as upgrades to the IT infrastructure

► Agree on policies for service reuse across lines-of-business

► Put funding mechanisms in place to encourage this reuse

► Establish mechanisms to guarantee service levels

- ► Determine service ownership
- ► Define the roles and responsibilities within the SOA governance organization
- ► Define metrics
- ► Define a transition plan and determine change readiness

5

Execute phase

The activities that you perform in the Execute phase are the build, install, test, implementation, and integration activities for the technology components of your solution and the implementation and integration of the non-technology components of your solution. These activities are driven by the detailed designs and the implementation and integration plans that you created in the previous phase, which was the Define Phase.

The results of this phase are deployed business processes and their process enablers (technology, organization, and knowledge/data) and deployed governance frameworks. A key output of this phase, and an important requirement for the Optimize phase, is the mechanisms to monitor and report process KPIs metrics and IT performance metrics.

5.1 Overview of the Execute phase

Table 5-1 shows an outline of the actions that you perform during the Execute phase and the resulting deliverables.

Table 5-1   Execute overview and deliverables

Thread	Input	Actions and deliverables
Business Strategy Alignment	User accepted test results and performance benchmarks	Review and approve the tested integrated solution
Process Governance	Define Phase (Process Governance): Future governance processes designs, future governance organization design, and the future governance framework integration and implementation plans	The output of the activities in this work stream result in the deployed process governance framework. For the process governance framework, include: ► Governance processes ► Governance organization ► Process standards and leading practices ► Governance specific technologies ► Performance measurement framework
Business Process	Define Phase (Business Process): Future business process designs, future process organization design, future business process performance measurements (KPIs and metrics), and the implementation and integration plans for the future process and the future process organization	The output of the activities in this work stream result in deployed business processes. For the Business Process, include: ► Business processes (for example, BPEL representing automated activities, choreographed activities, and workflows) ► Business process performance measurements (KPI and metrics) and performance reports or dashboards (for example, KPI and metric event triggers, KPI and metric event data collection, and real time KPI and metric event dashboards) ► Process organization (for example, process owner, process performers)

Thread	Input	Actions and deliverables
IT (IT (non-SOA)) and SOA technology	Define phase: User interface designs, IT infrastructure design, SLAs, Design/selection of IT (non-SOA) technologies (for example, third-party solutions, custom solutions, integration middleware, packaged solutions, and so on.), SOA Architecture design, SOA service candidates, assessment of current SOA services, design specifications for new SOA services, and IT and SOA implementation and integration plans	The output of the activities in this work stream are deployed IT (non-SOA) and SOA technology components. For IT (non-SOA) and SOA Technology, include: ▸ User Interfaces for the human tasks with business processes ▸ Additions to IT infrastructure ▸ Technology SLAs (for example, availability, response times, turnaround times, and so on.) ▸ IT (non-SOA) technologies (for example, third-party solutions, custom solutions, integration middleware, packaged solutions, SLA and process performance monitoring and reporting, and so on.) ▸ SOA Architecture ▸ Atomic services, composite services, component services, and choreographed services supporting business processes ▸ Dynamic process elements that add agility to the business process
SOA and IT Governance	Define phase: SOA and IT governance framework design and SOA and IT governance framework implementation and integration plans	The output of the activities in this work stream results in the deployed SOA and IT governance framework. For SOA and IT Governance, include: ▸ Governance processes ▸ Governance organization ▸ Standards and leading practices ▸ Governance specific technologies

5.2 Business strategy alignment

The only activity in this phase for this work stream is approval of the results from testing the integrated solution. The people that participate in the activity vary depending on their domain. The people that approve the deliverables must be stakeholders for their respective domains and have the authority to make decisions for their domains. Do not move from this phase until you obtain approval.

5.3 Process governance

In the Assess Phase, you documented future process policies, standard, and leading practices. In the Define Phase, you created designs for your process governance organization, governance processes, and selected governance specific technologies. In this phase, you execute your implementation and integration plans to deploy these process governance components.

You execute your:

► Standards Adoption Plan
► Measurement Framework Adoption Plan
► Governance Process Communication Plan
► Governance Organization Implementation plan
► Technology Implementation Plan
► Governance Integration Plan

5.4 Business process

There are a number of interdependencies between the activities in the Business Process work stream and the IT (non-SOA) and SOA Technology work stream. Before your new business processes can be tested and implemented, a number of activities in the IT (non-SOA) and SOA Technology work stream must be completed. Care must be taken to ensure that these activities are choreographed in a way to enable testing of your integrated solution in a timely manner.

There is also a need for collaboration between the people (Business Process work stream) that created the business process from the business perspective and those that are responsible for the technical implementation (IT (non-SOA) and SOA Technology work stream) of the process.

From a technology perspective, there can be many opportunities to optimize the performance and flexibility of the technology enablers for the business process. These opportunities can ultimately lead to a more high-performing and agile business process for your business users.

In this work stream, you execute the implementation and integration plans that you developed in the Assess Phase for the Business Process work stream, which includes:

► Business processes (for example, BPEL representing automated activities, choreographed activities, and workflows)

- Business process performance measurements (KPI and metrics) and performance reports or dashboards (for example, KPI and metric event triggers, KPI and metric event data collection, and real time KPI and metric event dashboards)
- Process organization (for example, process owner, process performers)

After activities in the IT (non-SOA) and SOA work stream are complete, you must test and integrate the solution that you created for the business process. Ideally, you also conduct acceptance tests with the business stakeholders that are responsible for the performance on operation of the business process in its deployed state.

Tools for process assembly:
- WebSphere Integration Developer

  http://www-01.ibm.com/software/integration/wid/
- WebSphere Business Services Fabric

  http://www-01.ibm.com/software/integration/wbsf/index.html
- Composition Studio

Tools for process execution:
- WebSphere Process Server

  http://www-01.ibm.com/software/integration/wps/
- WebSphere Business Services Fabric

5.5 SOA and IT technology

In this phase, you test, implement, and integrate the technology selections and designs that you created in the Define Phase, which can include one or more of the following items:

- User Interfaces
- IT infrastructure changes
- Third-party solutions, custom solutions, integration middleware, packaged solutions, and so on
- Process performance monitoring and reporting technology solution
- Technology SLA monitoring and reporting solutions

- SOA services that enable the business processes, for example, atomic services, composite services, component services, and choreographed services
- Dynamic process elements that add flexibility and agility to the business process
- SOA services with the BPEL that represent your business process

Much on the effort in this work stream requires coordination and collaboration with the people who execute activities in the Business process work stream to create comprehensive integrated solutions for your business users.

> **Tools for service integration:**
>
> Enterprise service bus technology:
> - WebSphere ESB
>
>   http://www-01.ibm.com/software/integration/wsesb/
> - WebSphere Message Broker
>
>   http://www-01.ibm.com/software/integration/messagebrokerproductline/
> - WebSphere DataPower® SOA Appliances
>
>   http://www-01.ibm.com/software/integration/datapower/index.html
> - WebSphere Adapters for EIS integration
>
>   http://www-01.ibm.com/software/integration/wbiadapters/

5.6 SOA and IT governance

In this phase, you put the governance model into action. Common activities include:

- Executing the transition plan
- Tracking the decision making processes
- Enabling the policy infrastructure
- Providing the monitoring tools
- Deploying technology to discover and manage assets
- Communicating and educating expected behaviors and practices within both the business and IT decision-making communities

► Enabling the policy infrastructure

► Implementing the organization changes for governance

Tools for SOA governance:

► WebSphere Service Registry and Repository

  `http://www-01.ibm.com/software/integration/wsrr/index.html`

► WebSphere Business Services Fabric

  `http://www-01.ibm.com/software/integration/wbsf/index.html`

► Business Services Repository

Leading practices for developing the services

Guidance provided in the SOA governance plan for developing services must include the following leading practices:

► Choose the appropriate communication protocol, depending on the type of the service (for external versus internal use). Ensure that the service design allows for the protocol to be easily changed. If the service is internal, you can use whatever communication protocol you are familiar with: MQ, SCA, SOAP/HTTP, and so on. You might not even have a WSDL. On the other hand, if it is external, stick with SOAP/HTTP (that is, a typical Web service). Make sure you follow standards, particularly the WS-I profiles.

► Consider the design approach:

  – Top down: You design the XSDs and WSDL first and build the implementation from those, which results in the cleanest view of the service by users.

  – Bottom up: You have heritage code and you generate your XSDs and WSDL from that. Easy to generate the WSDL/XSDs, but often results in ugly WSDL/XSDs.

  – Meet-in-the-middle: You typically do this if you have heritage code, but doing pure bottom up ends up with unusable, ugly WSDL/XSDs. You design a set of WSDL/XSDs that logically match the heritage but looks much nicer from a Web services point-of-view. Then you generate skeleton code from this WSDL/XSDs. This generated skeleton is a wrapper that calls the real heritage code.

- Consider fault handling early in the design. You must explicitly define WSDL faults for each operation, and you must use them. Do not expect default SOAP faults to carry any valuable meaning. If you want meaning in your error handling, you must put it there.

- Do not forget general application considerations: performance, QoS, logging, security, and so on.

Leading practices for testing a SOA solution

Guidance provided in the SOA governance plan for testing SOA solutions must include the following leading practices:

- Focus on iterative testing: Iterate test plan, test cases, and test executions.

- Automate the test cases (for example, using Ant).

- Build up to a regression test "bucket" for repeating tests at different levels.

- Functional testing occurs at several levels:
  - Unit test: Tests all functions (normal & error). Performed by the code developers
  - Function test: Tests all functions (normal & error). Performed by an independent test team
  - Inter-application function test: Tests interfaces with other applications and regression tests all functions. Performed by an independent test team
  - User-acceptance test (UAT): Tests key user requirements. Performed by user representatives

Leading practices for service deployment

Guidance provided in the SOA governance plan for service deployment must include the following leading practices:

- Location of Deployment: Understand how a provider gets deployed. What host machine(s) and application server(s) upon which, a service gets deployed.

- Register the Service: Understand when the service interface is added to the registry and the provider it points to. Customers will want to register a service at varying places in the life cycle.

- Policies: Routing selection, Security.

- Understand that mediations have a life cycle of their own to be governed.

Leading practices for system test

Guidance provided in the SOA governance plan for system test (System Integration Test, Environment Test, and Operability Test) must include the following leading practices:

► Systems Integration Test: Tests coexistence with all production applications and services in a production-like environment, which an independent test group performs

► Environment Test: Test the environment configuration:
  – Failover or failure-tolerance
  – Service/maintenance scenarios
  – Test each subsystem, and test plausible multiple failures in subsystems
  – Iterative: Some tests occur early as the environment is built, and others wait until environment and services are both more complete

► Operability Test: Tests proper function in production environment, test admin processes (iterate), which the operations staff performs

6

Optimize phase

In the Execute phase, you specified how business measures are derived from the deployed business and governance processes.

The activities that are performed in the Optimize phase are designed to:

► Observe the success (or failure) of your defined operations.
► Analyze the results, referencing your goals.
► Start the cycle over again.

To that end, a number of activities in both the business domain and the IT domain must be accomplished to operate, monitor, and manage process governance framework, processes, SOA and IT Governance Framework, and SOA Solutions, and to assess the values obtained against the original business targets.

Business domain and IT domain activities are similar in the sense that they evaluate performance, identify its trend issues, identify lessons learned, and respond to the identified issues. Yet, business domain activities are more focused on the functional, high-level, business-related measures while IT domain activities and measures are of more of a low-level operational nature.

6.1 Overview of the Optimize phase

Table 6-1 shows an outline of the actions that you perform during the Optimize phase and the resulting deliverables.

Table 6-1   Optimize overview and deliverables

Work Stream	Input	Actions and deliverables
Process Governance	Execute phase: Performance measurement framework	The output of the activities in this work stream assesses the implemented Governance Framework value realized against the business targets: ► Measure and evaluate the performance of the process governance organization, the governance processes, and the Business Performance Measurement framework ► Identify the performance trends and issues ► Identify the lessons learned ► Develop action plans to address the performance issues related to the process governance
Business Process	Execute phase: Business process performance measurements	The output of the activities in this work stream assesses the implemented business processes value realized against the business targets. These activities utilize the implemented Business Process Performance Measurement framework to: ► Measure and evaluate the process performance ► Identify the process performance trends and issues ► Identify the process lessons learned ► Develop action plans to address the process performance issues

Work Stream	Input	Actions and deliverables
IT (non-SOA) and SOA Technology	Execute phase: Technology SLAs	The output of the activities in this work stream assesses the implementation technologies value realized against the business targets: ► Measure and evaluate the service performance (typically against the promised SLA) ► Identify the performance trends and issues ► Identify the lessons learned ► Develop action plans to address the performance issues
IT and SOA Governance	Execute phase: Governance processes, organization, standards, and leading practices	The output of the activities in this work stream assesses the implemented IT and SOA Governance value realized against the business targets: ► Measure and evaluate the IT and SOA Governance performance, efficiency and effectiveness ► Identify the performance trends and issues ► Identify the lessons learned ► Develop action plans to address the performance issues

6.2 Business process

During the Envision, Assess, Define, and Execute phases we:

1. Agreed on the Key process Performance Indicators.

2. Simulated the business processes to predict the process outcome.

3. Defined risk mitigation procedures for business activities and human tasks. We defined the error handling, compensation, and escalation chains.

4. Predicted and defined the business situations to handle (based on the value ranges of the business process analytic).

Now, in the Optimize phase, we observe the execution of our business process to operate, administer, tune, and analyze the business process execution results to answer the following questions:

► Did the business process meet its performance targets? How close were the actual results to those results obtained from simulation in earlier phases?

► Did our process fulfill all of its functional requirements? Did it handle all of its usage scenario?

► Did our processes successfully expect the unexpected? Did it handle all of the expected risks? Did we predict all of the necessary points of variability?

► Did we focus on observing the right indicators? Was the data that we collected from the business process execution enough for thorough and effective analysis? Can we extract more indicators from the execution data that we collected? Do we need to gather more data from the process execution?

► How about the quality of reports? Did we present our perfectly gathered analytics in an equally perfect presentation?

In the next sections, we suggest ways to answer these questions (along with many others).

Tools for monitoring processes:

► WebSphere Business Monitor

  http://www-01.ibm.com/software/integration/wbimonitor/

► WebSphere Process Server

  http://www-01.ibm.com/software/integration/wps/

► BPC Explorer and BPC Observer

6.2.1 Evaluating the process performance

Using the business process KPIs that you specified in the previous phases, Business Operations Analyst can now observe the performance, pay special attention to any KPI value that is out of its acceptable range, and be notified with any detected business situation. Some Business Process Monitoring frameworks are mature enough to execute some immediate corrective actions based on the business situations.

6.2.2 Identifying the process performance trends and issues

Perform historical analysis and trend analysis using the observation data that you collected during process execution. Compare results between quarters, and observe any operational trends that might strongly reflect a new market trend. Use the collected data as a basis for executive reports and dashboards that correlate the KPI measures and history to the business capabilities and goals.

6.2.3 Identifying the process lessons learned

Real time collected process execution data can, of course, be used as a more realistic input into the process model simulation. Using this data can invalidate some of the process assumptions, highlight the need for additional variability points, spot out the need for additional activities, or the need for modifying and eliminating the already existing ones.

6.2.4 Developing action plans to address the process performance issues

Business Performance Monitoring must have the ability to already perform corrective actions to some of the business situations. Yet, issues identified using the business process performance indicators and trends along with the lessons learned can help develop a more hardened corrective plan based on the real execution data, which typically requires going through the previous phases:

► Issues identified in the process execution and implementation suggest revisiting the *Define and Execute phases*.

► Issues identified in the business use cases and process usage scenario would suggest going back starting from the *Assess phase*.

6.3 IT and SOA technology

A service needs to operate with the correct quality of service (QoS). The following four steps relate to operating with the correct QoS.

Tools for monitoring IT and SOA technology:

IBM Tivoli® Composite Application Manager (ITCAM)

http://www-01.ibm.com/software/tivoli/products/composite-application-mgrproductline/

6.3.1 Managing services

Managing services include service consumers and service providers. Service consumers invoke services, while service providers expose application functions to be consumed. When speaking in general terms, managing services refers to a range of service technologies. The key elements of managing the services layer are:

► Understanding how services relate to each other and to the IT infrastructure, and how the service relates to the business process layer.

► Controlling the message flow in the service environment through management mediations, such as log, filter, and route. The message flow often spans the architectural layers.

► Centralizing the services management policy.

► Defining business-related IT goals.

6.3.2 Managing transaction performance

Managing and monitoring the end-to-end transaction performance is a key measurement for service level agreements. Managing the transaction performance is also a useful analysis and troubleshooting tool, for example, you can proactively detect a slowdown in performance before it becomes a critical problem that stops the transaction from completing. Also, a view of the transactional performance is helpful for troubleshooting to isolate the resources that are not performing or that are failing:

Managing transaction performance includes:

► Understanding the performance of a service and the decomposition of transactions with specific metrics for individual requests

► Providing the relationship between service requests and the implementation artifacts, such as J2EE™ beans and JDBCÑ requests

6.3.3 Managing the supporting middleware

Many of the resources that the services use are found in the middleware, for example, WebSphere Application Server application servers are used to host J2EE and Web services applications. DB2® Universal Database™ is used to host databases. IBM WebSphere MQ is used for messaging. Each of these resources must be managed and monitored.

Managing the supporting middleware includes the following concepts:

- ▶ Understanding the health of the infrastructure that supports the services
- ▶ Correlating problems in the services to infrastructure issues, such as a queue filling up or an exhausted thread pool

6.3.4 Managing the operational systems

SOA environments are built using real resources and those resources must also be managed. Managing the operational systems includes understanding the health of the infrastructure that supports the services. The SOA management solution must give feedback for starting the next life cycle of a service.

6.4 Governance

In the Optimize phase, the governance processes are monitored and measured for compliance, which provides the opportunity to evaluate the results and, if needed, initiate a new cycle of these four phases to refine and enhance its governance effectiveness. The actions in this phase are:

- ▶ Monitoring compliance with policies and governance arrangements, such as Service Level Agreements, reuse levels, and change policies
- ▶ Analyzing IT effectiveness metrics
- ▶ Measuring the effectiveness of the organization changes

6.4.1 Process governance

In this work stream, Business Analysts usually try to assess the effectiveness and efficacy of:

- ▶ Governance processes, policies, and organization changes: An aspect of the business operation and business process monitoring must be developed as *Governance Oriented*, which collects governance Key Performance Indications. These indicators must be analyzed.
- ▶ Process Performance Framework: It is always a best practice to compare the performance measures collected by the other means of observation to assess the effectiveness of the process performance framework. Business Operations Analyst must also assess whether the business situations were detected as expected.

6.4.2 SOA and IT governance

In this work stream, IT Operation Analysts must verify that the SOA and IT Governance framework is effectively designed and effectively deployed with the lightest possible foot print on operational effectiveness and efficiency.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this paper.

Online resources

These Web sites are also relevant as further information sources:

► Business Process Management Powered By Smart SOA

http://www-01.ibm.com/software/info/bpm/?S_TACT=107AG01W&S_CMP=campaign

► IBM business process management enabled by SOA: What is it and what does it mean to your business?

http://www.ibm.com/developerworks/websphere/zones/bpm/newto/

► BPM enabled by SOA services

http://www-935.ibm.com/services/us/index.wss/offerfamily/gbs/a1028749

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Business Process Management Enabled by SOA

Build processes that support your business strategy

Lay the foundation for continuous improvement

Proactively manage and optimize your processes

The IBM® Business Process Management (BPM) Enabled by SOA Method provides a structured process for developing an organization's cross-functional, customer-focused, end-to-end core business processes that achieves strategic business objectives, integrates verticals, optimizes core work, and creates a framework for continuous improvement. This methodology is an IBM intellectual property that is used in BPM engagements but not available in detail to readers of the IBM Redbooks publication outside of IBM.

Our purpose in this IBM Redpaper is to introduce you to the concepts that we use in the IBM BPM Enabled by SOA methodology.