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TPF Users Group Spring 2007

SOA scenarios and best practices

Venue: Distributed systems subcommittee


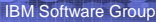
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This presentation describes SOA scenarios and best practices.



Agenda

- Why adopt SOA
- SOA entry points and scenarios
- SOA roadmap for TPF
- SOA principles

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Why adopt SOA?


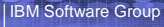
How to adopt SOA?

Create a roadmap for migration

Once you've decided to pursue a migration towards SOA, you need to have buy-in by the business side (dev. manager/CIO...) so to do this the business value would have to have been discussed (that is, SOA's goal is to more closely align information technology with business goals, thus helping companies realize greater efficiencies, cost savings, productivity and so on.)

What makes an SOA?

Several principles are presented that define what makes an SOA environment



Why adopt SOA?

- Enable greater reuse and availability of existing functions and data
- Very good support available for development tools
- Very good support available for test tools
- Use a standardized message transmission/format
- Your corporate strategy

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Use your favorite Internet search engine to find development and test tools available.



SOA entry points and SOA scenarios help you get started

The genesis of these entry points and scenarios was not some IT Architect who thought them up. Rather, they were developed based on +3000 customer experiences and how they were designed to help customers understand how to think about SOA. The scenarios are extensions to the various entry points to get you to start thinking in more concrete ways about how to move forward towards implementing an SOA environment.

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SOA entry points



- Business related
 - **People:** allows you to leverage new methods of customer access into your system, for example, wi-fi, cell phones, browser, and so on
 - **Process:** TPF applications can participate in business processes, but generally would not drive this entry point
 - **Information:** TPF is a treasure-trove of information and is a great candidate for a “super data server”

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Moderate - People: This entry point to SOA focuses on user experience to help generate innovation and greater collaboration, which enables consistent human and process interaction, thus improving business productivity. Using SOA you can, for example, create service-based portlets to increase this collaboration.

Minimal - Process: The process entry point helps companies know what is happening in their business, allowing them to improve existing business models. Using SOA you can transform your business processes into reusable and flexible services, allowing you to improve and optimize these new processes.

Major - Information: Using this entry point to SOA you can leverage information in your company in a consistent and visible way. By providing this consistent and trusted information throughout all areas of your business, you empower all areas of your company to innovate, thus allowing you to compete more effectively. Using SOA you have better control over your information, and by aligning information with your business processes you can discover interesting new relationships.




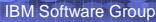
SOA entry points (continued)

- IT related
 - **Connectivity:** allows business, customer, and business partners to access your business logic and data
 - **Reuse:** existing and new applications can be orchestrated into business processes

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Moderate - Connectivity: Take advantage of the connectivity entry point in order to effectively connect your infrastructure, integrating all of the people, processes, and information in your company. By having flexible SOA connections between services, and throughout your environment, you can take an existing business process and deliver it without much effort through a different business channel. You can even connect to external partners outside your firewall in a secure way.

Moderate-major - Reuse: Reusing services with SOA allows you to tap into the services that already exist in your company. By building from your existing resources you can streamline your business processes, ensure consistency throughout your company, and cut development time. All of this saves you time and money. You also reduce any duplication of functionality in your services and get to take advantage of using the proven core applications the people in your company are familiar with.



SOA scenarios

- **Service creation**
 - Expose existing applications as a Web service in a manner that is openly consumable by several platforms
- **Service connectivity**
 - Adapt messages from backend systems to standards based service definitions
- **Interaction and collaboration services**
 - A service or set of services may be presented to a human user
- **Business process management enabled by SOA**
 - a unified way to integrate people, information and applications in the business process

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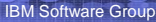
Entry points were defined to help customers understand how to think about SOA. However, further implementation details were needed to help customers get their businesses and IT teams started down the path toward SOA. That's where the more specific scenarios come in.

Again based on real customer experiences and years of input, IBM technical experts realized that there were several common scenarios businesses tended to follow on their way to designing and implementing SOA solutions. By defining these scenarios, IBM provides you with predefined, real world approaches for implementing SOA solutions.

Service creation: Creating flexible, service-based business applications. A new service-oriented application exposes business behavior as a service and reuses business logic which is exposed as a service.

Service connectivity: Link people, processes and information in your business with a seamless flow of messages and information. Do this from virtually anywhere at anytime using anything by making assessable a set of core services available to a variety of applications through the usage of an intermediary service gateway or bus.

Interaction and collaboration services: A service or set of services must be presented to a human user through multiple devices such as browser, PC and mobile devices. Interaction and collaboration services also improves people productivity by aggregating these services as views delivering information and interaction in the context of a business process.



SOA scenarios (continued)

- **Information as a service**
 - Enable access to data from a single data store using service interfaces
 - Need for new business processes and applications to access data from a single repository
- **SOA design**
 - Increase productivity by reducing number of iterations and revisions
- **SOA governance**
 - Establish a service management method for the creation and enhancement of services
- **SOA security and management**
 - Ensure that identity and security policy is consistently applied and audited

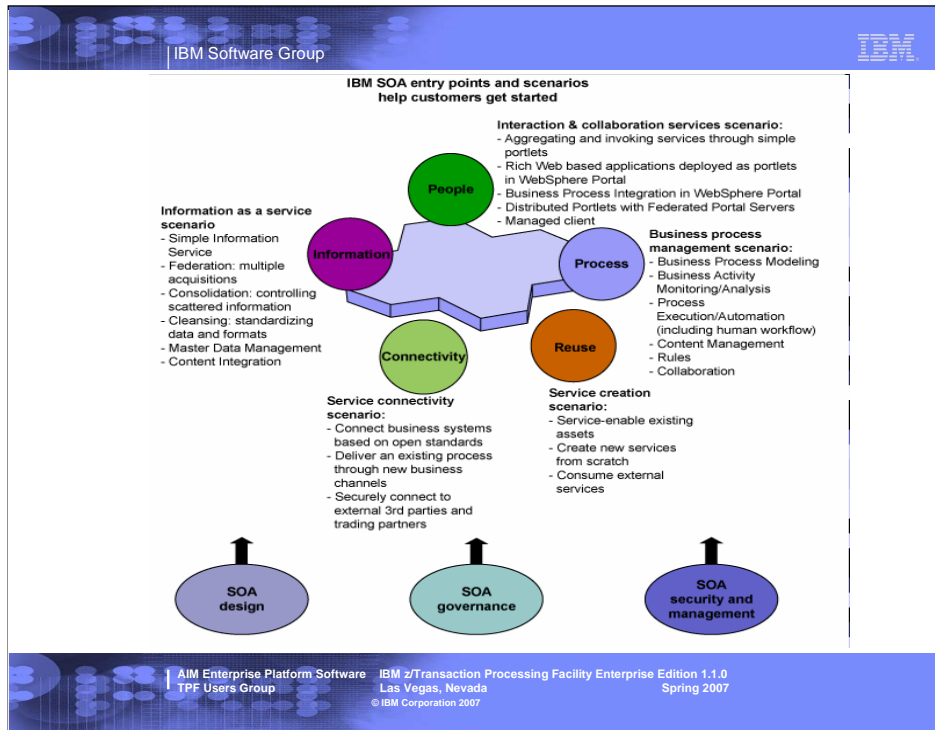
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Information as a service: Information as a service offers information access to complex, heterogeneous data sources within your company as reusable services.

SOA design: Aligning the modeling of business design and IT solution design through a set of roles, methods and artifacts to render a set of explicit business processes for optimization and services for composition and integration.

SOA governance: Establishes and enforces SOA development and runtime processes. Defines the policies, processes, and tools that oversee who owns a service, who can use it, how it can be used, and when it will be available to those needing it.

SOA security and management: Discovery, monitoring, securing, provisioning, change and life cycle management of services as a part of IT Service Management (ITSM).




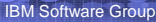
This chart is taken from a DeveloperWorks article, “**New to SOA and Web services**”. It shows how SOA Entry Points are matched to Scenarios, then under those several “realizations” are listed. Although this chart is generic to the IT industry, it is useful to point out some examples of how TPF fits in an SOA environment.

Starting with **Information entry point**, TPF fits quite well here as it is the most powerful, reliable data server around. With SDO support around the corner and MySQL also in the near future, access to data residing in TPF will be incredibly easy. New applications can be written on middleware such as Websphere, and data can be pulled from the TPF data store. In the same vein, mission critical data stores residing on other, perhaps less reliable or powerful systems, can be migrated to TPF to take advantage of TPF’s performance.

The **People entry point** is similar to the previous entry point. With TPF’s data store now open through Web services, and when you open it’s business applications as services, TPF can now participate in modern application development, such as Web 2.0 mashups, Web portals, and so on.

Even with **Process entry point**, composite applications designed at the orchestration service layer or the business service layer can use application services residing on TPF.

The **Reuse entry point** is covered somewhat in later slides, but essentially this means to catalog your existing TPF applications/transactions and create your services by identifying truly unique functions and refactoring applications that have overlapping

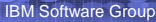



SOA roadmap for TPF

1. Education and tools
2. Determine modeling requirements
3. Determine QoS requirements
4. Identify initial candidates for services
5. Build necessary infrastructure
6. Deploy initial set of service candidates
7. Monitor success of deployed services
8. Continue migration of remaining services



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The SOA roadmap for TPF involves education and tools, determining modeling requirements, determining QoS requirements, identifying initial candidates for services, building necessary infrastructure, deploying initial set of service candidates, monitoring success of deployed services and continuing migration of remaining services.

Education and tools


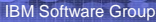
- *New to SOA and Web services*, <http://www.ibm.com/developerworks/webservices/newto/>
- *IBM Certified SOA Solution Designer certification prep, Part 1: SOA best practices*, <http://www.ibm.com/developerworks/edu/ws-dw-ws-soacert1.html>
- *Service-Oriented Architecture (SOA) Compass: Business, Value, Planning, and Enterprise Roadmap*, see your favorite bookseller or go to **IBM Press**
- *Service-Oriented Architecture (SOA): Concepts, Technology, and Design* (The Prentice Hall Service-Oriented Computing Series from Thomas Erl), see your favorite bookseller
- *Service Oriented Architecture (SOA) Readiness Assessment*: <http://www-306.ibm.com/software/solutions/soa/soaassessment/index.html>
- *z/TPF and WebSphere Application Server in a Service Oriented Architecture* (IBM Redbooks): <http://www.redbooks.ibm.com/redpieces/abstracts/sg247309.html?Open>
- *z/TPF's High-Performance Web Services Support*, **upcoming DeveloperWorks article**
- *z/TPF SOA white paper*: <http://www-306.ibm.com/software/http/tpf/tpfug/tgs06/tgs06.htm>
- Use the TPF toolkit

There's an incredible amount of information available for SOA and Web services, here are several sources used for this presentation.

Answer a short set of questions based on the SOA maturity model to assess your SOA capabilities and take stock of where you are and where you would like to go with SOA.

Use the TPF Toolkit



Determine modeling requirements


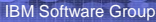
- Top-down
 - Start with the WSDL, driven by business process
- Bottom-up
 - Start with the application, driven by IT needs
- Agile (aka, “meet-in-the-middle”)
 - Use top-down to select application, and bottom-up to implement. This is an iterative process.

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Top-down generally results in a high quality SOA environment. Business process are formalized in a service-oriented fashion, and so on.

Bottom-up is typically selected when converting existing “legacy” applications to an open SOAP communications framework. Web services are built on an ad hoc basis and model to encapsulate application logic. While immediate results are a benefit with this strategy, a true SOA is typically not realized and refitting is usually required as the organization transforms into a formal SOA enterprise. It may be argued that TPF applications transactions are already designed as well-defined business tasks so this may not be as much of a concern with other types of applications (for example, accounting packages, ledger, and so on)

The **Agile** strategy blends both these strategies by using the top-down analysis of the business models and selecting the business logic that will eventually be deployed as services. The top-down business analysis phase is ongoing and as conditions warrant additional business logic is “thrown over the wall” into the development work queue.



Determine QoS requirements

- Security
 - Identification
 - Authorization
 - Integrity
 - Privacy
- Reliable messaging
- Performance requirements
- Transactional capabilities
- Logging and troubleshooting

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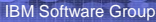
Security is obvious

Reliable messaging guarantees message delivery or notification of failure to deliver

Performance

Transactions

Logging



Identify initial candidates for services

- Inventory existing applications
 - Packages may equate to “services”
 - Action codes within packages may equate to “operations”
- Prioritize applications to convert to services
 - Will you refactor the application or wrapper it?
- Determine changes to testing strategy
 - Vast number of Web services tools available

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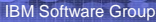
Some design and testing issues to consider are:

What kinds of service consumers could access the service?

What are the exception conditions that can be generated (presented as SOAP faults)?

How easily can the services be composed?

Any special data-types introduced? (for example, city-code, city-pair, customer address)


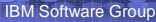


Build necessary TPF infrastructure

- Communications binding
 - MQ, HTTP (Apache)
- SOAP Applications Handler
- Data transformation utility services
- Define service tables
- Create message handlers

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Building the necessary TPF infrastructure requires communications binding, SOAP Applications Handler, data transformation utility services, defining service tables, creating message handlers.


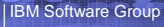


Deploy initial set of service candidates

- Before you are ready to deploy, have you thought of these issues?
- How will any new layers affect environment?
- What security and user accounts are required?
- How do you plan to monitor performance and reliability?

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For example: Did you add any new message handlers? Are you now using crypto features you haven't used before? Did you stress-test the new services on a QA system to validate the performance at high rates?


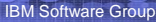


Monitor success of deployed services

- Application stability
 - SERRCs or message anomalies?
- Performance characteristics
 - Look for bottlenecks in service layers
- Usability
 - Service interface defined to be reusable?

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Monitor the success of deployed services with application stability, performance characteristics and usability.



Continue migration of remaining services

- Will introduction of new services impact existing services?
- Any new middleware layers that may impact the system?
- Do you introduce new versions of existing service descriptions that need to be concurrently maintained?

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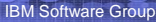
This slide describes migration of remaining services.

Need help with Roadmap?



Contact your IBM Service Rep to lend you a hand

If you need help with Roadmap, contact your IBM service representative.



SOA principles

- Service reusability
 - Service redundancies are eliminated
- Service contract
 - Services have a formal contract (that is, WSDL) that defines the service endpoint, operations, messages and other rules
- Service loose coupling
 - No dependencies exist for location, platform, or language
- Service abstraction
 - Service logic is not known outside of the service


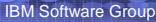
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Service reusability limits or removes redundant services. Similar services should be refactored to a single service. Service interfaces are designed to be more easily used by other services and consumers.

Service contract (the bullet says it all)

Service loose coupling means that service consumers are unconcerned of where and how a service provider may be implemented. By implementing open-standard technologies (TCP/IP, XML, SOAP, WSDL, and so on) you remove platform-specific constraints when coupling heterogeneous providers (such as .NET, J2EE). For TPF this means you can more easily migrate services implemented on resource-challenged hosts onto a TPF system that has a high tolerance for heavy loads.

Service abstraction, also known as Service Encapsulation, among other benefits, allows new types of service consumers to be introduced without the need for reimplementing of the service provider.



SOA principles (continued)

- Service composability
 - Services can call other services to implement complex services
- Service autonomy
 - Services are self-governing
- Service statelessness
 - Services should be stateless by design
- Service discoverability
 - Aids in preventing creation of redundant services

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Service composability is a form of reuse, in which service operations are designed in a standardized manner, and a level of granularity to maximize composition opportunities.

Service autonomy means that service logic is wholly owned by that service. It is not dependant on other services to determine how its own logic should be processed. Also, it is an important consideration when determining how to divide application logic into services and which operations will be grouped within a service.

Service statelessness does not mean that the service cannot persist its state as long as the service has a way to associate the persisted state with a particular consumer. It is important to understand this distinction, since you will rely on the ability of a service to maintain the state of a transaction.

Service discoverability, not to be confused with UDDI, means that services and their operations are sufficiently inventoried, and metadata describing the services purpose and the functions of its operations, are attached to the service. Having such an inventory will help prevent the creation of redundant services and aid in code reuse.

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