SMART-MP Interview Guide

Version 1.4

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The SMART-MP Interview Guide (SMIG) is an instrument that guides the discussions with stakeholders and developers in the first four activities of the SMART-MP process:

* Establish Migration Context
* Describe Existing Capabilities
* Define Candidate Services
* Describe Target SOA Environment

Answers to these questions will help determine the degree of difficulty and level of effort required to migrate a legacy system to an SOA environment. The use of this instrument assures broad coverage and consistent analysis of difficulty, risk, and cost.

Information gathered during the interviews is captured in artifacts used throughout the process:

* Stakeholder information is captured in the **Stakeholder List**
* General migration issues are captured in the **Migration Issues List**
* Candidate services and their characteristics are captured in the **Service Table**
* Mapping between key business processes and candidate services is captured in the **Business Process-Service Mapping**
* Risks and issues specific to the legacy system components targeted for migration are captured in the **Characteristics List** and will later become column headers in the **Component Table**
* A **Notional Service-Oriented System Architecture** is developed to share understanding of the major components of the system: service consumers, SOA infrastructure, service interfaces and service implementation

The subsections will contain details about artifacts affected.

# Establish Migration Context

This activity develops an understanding of the goals and expectations of the migration effort; budget and schedule; outcome of any previous migration efforts; and the legacy system, and target SOA environment at a high level. Appropriate stakeholders and candidate services for migration are identified, together with the business/operational processes or mission threads that they support. After this activity, there should be enough information to determine quickly if the legacy system is a good candidate for migration and there is sufficient information to continue the process. The system could potentially not be a good candidate for business or technical reasons. In some cases, the recommendation will be to gather additional information before attempting the migration and in other cases the recommendation will be that the system is simply not a good candidate for migration.

The organization will be asked to present:

* Business and technical drivers for the migration effort
* Characteristics of the organization that is sponsoring the migration effort
* Budget and schedule for the migration effort
* Characteristics of the organization that owns the legacy system (if different)
* Characteristics of the organization that is performing the migration (if different)
* Characteristics of service consumers
* High-level description of the system (functionality, history, users)
* High-level architecture of the system
* High-level description of the target SOA environment
* If available
  + List of candidate services
  + Main business processes or mission threads that will be supported by these services
  + Portions of the legacy system that contain the capabilities to support the candidate services

The list of artifacts created in this step is:

* Migration issues are captured in the **Migration Issues List**
* Information that needs to be gathered about legacy components targeted for migration is captured in the **Characteristics List**
* Stakeholder information is captured in the **Stakeholder List**
* Key business processes and their mapping to candidate services are captured in the **Business Process-Service Mapping**

## Business and Technical Context

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| **Discussion Topic** | **Questions** |
| Goal and Expectations of Migration | * What are the business drivers for the migration effort? * Have any studies been conducted to verify these business drivers? * What are the technical drivers for the migration effort? * Are the technical drivers compatible with the business drivers? * What are the short-term goals of the migration effort? * What are the long-term goals of the migration effort? * Are the short-term and long-term goals compatible? * What are perceived advantages of migrating to an SOA environment? * What are perceived disadvantages of migrating to an SOA environment? |
| Budget and Schedule | * What is the timeframe for the migration? * Who is paying for the effort? * What is the budget for the migration? |
| Other Migration Efforts | * Have any other migration efforts been attempted? * What was the outcome? * Why did it fail or succeed? * What are lessons learned? |

## Stakeholders

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| **Discussion Topic** | **Questions** |
| Legacy System End Users | * Who are the end users of the legacy system? * Will legacy system end users be available during the migration process? |
| Legacy System Owners | * Who owns the legacy system? * If there is more than one owner, are these separate organizations? * Will legacy system owners be available during the migration process? |
| Legacy System Developers and Maintainers | * Who is the developer for the legacy system? * Are developers available to support the migration process? * Is the maintenance group separate from the development group? * If so, are maintainers available to support the migration process? |
| Organization Performing the Migration | * Are current developers or maintainers going to be performing the migration? * If not, what organization is performing the migration? * What is the process for bringing them up to speed on the legacy system? * Will this organization be available during the migration planning? |
| Target SOA Environment Owners | * Is the target SOA environment owned and maintained by a separate organization? * If so, will representatives be available to support the migration process? |

## Legacy System and Target SOA Environment

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| **Discussion Topic** | **Questions** |
| High-Level Understanding of Legacy System | * What is the main functionality provided by the legacy system? * What is the history of the legacy system? * What is the high-level architecture of the system? * What portion of the system is envisioned for migration? * What is the current user interface to the legacy system? * How complex is the user interface? * What is the plan with respect to the legacy system(s)? |
| High-Level Understanding of Target SOA Environment | * What are the main components of the target SOA environment? * Is it a standard or a proprietary environment? * Is this the organization’s first attempt to deploy services in this environment? |

## Candidate Services

If the organization has identified candidate services, the goal is to understand the process for their selection and analyze its validity. An ideal process is to identify business/mission goals, identify key business/operational processes or mission threads that support these goals and can use functionality from the legacy system, identify common steps/tasks in these processes or threads, and finally select a number of the steps as candidate services. If the organization has not identified candidate services, the goal is to go through the process and identify some candidate services.

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| **Discussion Topic** | **Questions** |
| Potential Services | * Have potential services been identified? * If so, what was the process? * Is the list of services available? |
| Potential Service Consumers | * Who are the potential service consumers? * Have potential service consumers provided both the business and the quality attribute requirements? In what form? * Are the identified service consumers internal or external to the organization? |
| Business Goals and Processes Supported by Potential Services | * What are the organization’s main business goals to be supported by SOA adoption? * What are the main business processes that support these goals? * What are common steps/tasks between these business processes? |
| Initial Mapping Between Candidate Services and Legacy System Components | * Has a mapping between services and legacy system components been done? * If so, is this mapping available? * What legacy system components provide the functionality required by the services? * How different are the service requirements from the existing capabilities? * If there is a difference, how negotiable are the requirements? |

# Checkpoint for Migration Feasibility

After collecting this initial information, a decision to continue with the process has to be made. The potential outcomes at this point are:

* The migration is initially feasible:
  + - * Migration goals are clear and shared among stakeholders.
      * There is a high-level understanding of the legacy system and the target SOA environment.
      * Candidate services and potential service consumers have been identified.
      * A very preliminary mapping of services to legacy system components has been done.
    - The migration has potential but requires additional information to make an informed decision. In order to proceed further, the following additional information will be needed:
      * Business goals need to be identified for clear understanding of what is expected from the migration.
      * Potential service consumers need to be identified to provide a clear justification of the need for the services.
      * Key stakeholders must be available to support the process: project sponsors, legacy system developers/maintainers, service developers, target SOA environment owners, etc.
      * The target SOA environment needs to be identified.

The recommendation in this type of situation is to gather the required information and repeat the **Establish Migration Context** activity.

* The migration is not feasible. Characteristics of the business context and/or the legacy system indicate that the migration is not feasible, the magnitude of the effort is larger than the expected return on investment, or the results of the migration effort could be lost:
  + - * There are no identifiable consumers for the services to be exposed from the legacy system.
      * The functionality in the legacy system does not have potential for use by multiple consumers, whether applications or other services.
      * There is no functionality in the legacy system of a stateless nature. This means that there is no functionality that can be executed in a request-response mode or without the conservation of state variables. Note that stateless does not mean that there cannot be a state change within the legacy system, such as a change in the information stored in a database. What it means is that there are no variables that need to be maintained in between requests.
      * The input for the candidate services is so complex that it would require the construction of very complex applications.
      * There is an evident incompatibility between the legacy system and the target SOA environment.

## Preparation for Next Steps

Once the migration is considered initially feasible, the next step is to gather additional detail on candidate services, the legacy system(s) and the target SOA environment. Stakeholders will be asked to prepare the following

* Detailed presentation(s) of requirements for services from real or potential service consumers
* Detailed presentation(s) of the legacy system including all architectural views available
* Detailed presentation(s) of the target SOA environment including technologies and any constraints it might place on service consumers and providers
* Legacy code should be available on a laptop for review. LOC data should be available for every legacy component.

# Define Candidate Services

This activity selects a small number of services, usually 3-4, from the initial list of candidate services. For these candidate services, the end goal is to fully specify inputs and outputs.

The list of artifacts created and updated in this step is:

* **Stakeholder List**, **Characteristics List**, **Migration Issues List**, and **Business Process-Service Mapping** are updated as needed.
* Candidate services and mapping to legacy components are captured in the **Service Table**.

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| **Discussion Topic** | **Questions** |
| Service Consumers | * What specific applications or systems will be using these services? * What is the expected service usage? * What is the process for obtaining requirements from service consumers? * What are specific quality requirements, such as response time or security? * Will formal/informal service level agreements (SLAs) need to be defined? |
| Refined List of Candidate Services | * What 3-4 services are the better match for the goals and expectations of the migration effort? * What are the services with greater potential for use by service consumers? * What are services with a better match to existing capabilities? * What are the interfaces for these services in terms of inputs and outputs? |
| Mapping to Legacy System Components | * For each service, what are the specific legacy system components that contain the functionality required by the services? * What new code will have to be written to fully satisfy service requirements? |

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| **Discussion Topic** | **Questions** |
| Interface Negotiation | * What is the procedure for negotiating service interfaces with potential service consumers? * How are conflicts to be solved? |
| Communities of Interest | * Is there a Community of Interest within the domain represented by the service capabilities? * Are communities of interest internal or external to the organization? |

# Describe Existing Capabilities

This activity obtains descriptive data about the legacy system and its components.

## Legacy System Characteristics

The goal is to capture basic characteristics of the legacy system.

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| **Discussion Topic** | **Questions** |
| Functionality | * What is the main functionality provided by the system? |
| History | * What is the history of the system? * How old is it? * How many versions and releases have there been? |
| State | * Is the system a proof of concept, prototype, under development, in testing, or a fielded system? * How stable is the system in general? |
| System Documentation | * What system documentation is available? * How old is the documentation? * What part of the system is not documented or has outdated documentation? |
| Size | * What is the size of the system? * What is included in this number? * What metrics are used in the size estimate for the system? |
| Platform | * What is the execution platform? * Is it a distributed system? If so, have all system elements been included in the migration analysis? |
| Development Environment | * What is the development environment? |
| Interfaces with Other Systems | * Does the system have interfaces to other systems? * Are these interfaces part of the code targeted for migration? * Are interfacing systems aware of the migration effort? |
| System Users | * Is it a single-user or multi-user system? * What are potential locking, persistence, or transaction problems if accessed by multiple users? |

## System Architecture

The goal is to gather information about the architecture of the legacy system.

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| **Discussion Topic** | **Questions** |
| Architecture Documentation | * What architecture views are available? * How old is the architecture documentation? |
| Commercial Components | * Are there dependencies on commercial components? * Is there support available for all commercial components? * How will the commercial components adapt to the services environment? * Are there expected licensing issues? |
| Module View | * What are the major modules of the system? * What are the dependencies between modules? * Does the code structure mimic this modular view? |
| Deployment View | * What is the deployment view of the system? * Are there dependencies on specific hardware or network topology? |
| Runtime View | * What is the runtime view of the system? * How is concurrency handled? * How are hard deadlines handled? |

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| **Discussion Topic** | **Questions** |
| Separation of Concerns | * Is user interface code separate from the business logic code? * Is business logic code separate from middleware code? * Is data access logic separate from the rest of the code? * How tight is the coupling between these elements in the code? * What are other portions of the code where separation of concerns is a problem? |
| Design Paradigms | * Are there any design paradigms or patterns implemented in the system? * Are there any known violations to these paradigms due to tradeoffs with performance, for example? |
| Quality Attributes | * What are the key qualities built into the architecture of the system? * Are there any new qualities that are expected of the system when the services are in place? |

## Code Characteristics

The goal is to capture code characteristics that may affect the migration.

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| **Discussion Topic** | **Questions** |
| Programming Language | * What programming languages were used in the development of the system? * Do these languages have support for the technologies used in the target environment? |
| Documentation | * What code documentation is available? * Can the documentation be extracted using a tool such as DOxygen or JavaDoc? |
| Coding Standards | * What coding standards are followed? * Is the coding standards document available? |
| Input Checking | * Are there complete precondition and constraint checking on inputs? |
| Code Organization | * What is the code structure? * What is the mapping between the code structure and the module view of the system? |

# Describe Target SOA Environment

This activity gathers information about the target SOA environment. The end goal is to produce a high-level notional architecture of the service-oriented system.

* **Stakeholder List**, **Characteristics List**, **Migration Issues List**, **Business Process-Service Mapping**, **Service Table** and **Component Table** are updated as needed.
* Target SOA environment characteristics are captured and used in the creation of the **Notional Service-Oriented System Architecture**.

## Target SOA Environment Characteristics

The goal of this section is to identify and gather sufficient detail about the target SOA environment to know how services will interact with the environment and identify constraints or risks that may affect the migration effort. Potential conflicts between the legacy system components and the target architecture are also identified.

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| **Discussion Topic** | **Questions** |
| Status | * What is the status of the Target SOA environment? * What builds are available? Are these the latest builds? * What is the release schedule? Is it aligned with the migration schedule? |
| Communication with Target SOA Environment Organization | * If target SOA environment belongs to an external organization, what current communication and collaboration exists? |

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| **Discussion Topic** | **Questions** |
| SOA Infrastructure Components | * What are the major components of the SOA infrastructure? * Which components are commercial and which will be developed internally? * Is there documentation available? * How well specified is the SOA infrastructure? |
| Infrastructure Services | * Does the target SOA environment provide infrastructure services; i.e. communication, discovery, security, data storage? * Is there redundancy between service implementation code and the infrastructure services? * Would it be feasible to replace this code with calls to the infrastructure services? |
| Communication Model | * What is the communication model(s) provided by the target SOA environment? * Are there available libraries and tools in the legacy platform to support this communication model? |
| Standards and Mandates | * What are the standards or mandates that have to be followed? * What is necessary to bring the legacy code in compliance with relevant standards and mandates? |

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| **Discussion Topic** | **Questions** |
| SOA Environment Constraints | * What constraints does the target SOA environment impose on services? * What are potential problems caused by these constraints? * Are there constraints on the use of commercial products? * If there are problems, are there potential replacements? * Are there constraints on programming languages? |
| Architectural Mismatch | * Does the legacy system have any behavior that would be incompatible with the target SOA environment, such as batch-oriented or highly transactional? * What effort is required to eliminate or modify this behavior? |
| Data Models | * Does the target SOA environment impose a shared data model or a data infrastructure service? * What is the required effort to translate the legacy data model to the imposed data model? * What is the negotiation process for incompatibilities? |

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| **Discussion Topic** | **Questions** |
| Interfaces to Other Systems or Services | * Does the target SOA environment provide interfaces to other systems or services? * Is there functionality in the legacy system that could be replaced by functionality is these systems or services? * What is necessary to use these systems or services or to prepare the system for future use of these systems or services? |
| Service Description and Discovery | * What are the requirements for description of services, i.e. WSDL for Web services? * What are the requirements with respect to making service descriptions available to potential consumers; i.e. UDDI, NCES directory service, appropriate agreements, other registries? |
| Ontologies | * Is there a requirement for an ontology to be used in the description of services, i.e. OWL or other ontologies within the DoD Metadata Repository and Clearinghouse? * How mature is the ontology? * Is it widely used? * Is a proprietary ontology being developed in-house? * Are there other ontologies in the same domain? |
| Quality of Service (QoS) | * Is it required to document QoS expectations and promises, preconditions, and other necessary characteristics of a service not covered by the service description specification; i.e. performance, reliability, error rate? * What is the maturity of the specifications in this area? |

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| **Discussion Topic** | **Questions** |
| Quality of Protection (QoP) (Security) | * Is it required to document QoP expectations and promises, preconditions, and other necessary characteristics of a service not covered by the service description specification; i.e. authentication mechanism, security classification, certification and accreditation status? * What is the maturity of the specifications in this area? |
| Service Execution Platform | * Will developed services be hosted or will they be delivered to be deployed as needed? |
| Service Management | * What startup and initialization code is required for the services? * Is remote administration for monitoring and upgrade required? |

## Support

This goal is to collect information and generate awareness of the effort that is required once the services are deployed for use, especially in the case of external consumers.

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| **Discussion Topic** | **Questions** |
| Testing | * Is there a requirement/need to provide test scripts and/or test cases for the services and make them publicly available? * Is there a requirement/need to create test instances for services? * If the execution of the service writes data into the system, how will consumers test the service without adding bad data to the system? |
| Service Consumer Setup and Installation | * Is there a requirement to develop setup and installation procedures for potential service consumers? * Will consumers require configuration files or other mechanisms for setup? |
| Problem Reporting and Feedback | * Is there a requirement/need to establish problem reporting and feedback mechanisms for service consumers? |
| Updates and Upgrades | * How will service consumers be informed of potential changes in service interfaces and down time due to upgrades or problems? |
| User Communities | * Is there a user community for service consumers; i.e. demonstrations, tutorials, support for organizations attempting to use the service? |