

# SMAT-AUS

## Service Migration Assessment Technology - Australia

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Australian Government  
Department of Communications,  
Information Technology and the Arts  
Australian Research Council

NICTA Members



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## Overview

- Aspects of SOA Migration/Integration
- SMAT-AUS (Service Migration Assessment Technology - Australia)
- Scope, Cost and Effort Estimation
- Performance and QoS Modelling
- Benefits of SMAT-AUS

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## Aspects of SOA Migration/Integration



- The identification and analysis of services from legacy applications
- The integration of Whole-of-Government (WofG) or Common services with legacy applications (including new development environments, tools, skills)
- The acquisition and development of an SOA infrastructure (including middleware)
- The development of applications from services
- The development of governance policies and procedures (including establishing and monitoring Service Level Agreements)
- Analysis of architectural alternatives – performance, scalability and other QoS requirements for SOA systems

Each of these will involve considerable effort and associated cost

**How is the scope, effort and cost determined?**

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## Cost and Effort Estimation



Some techniques exist for cost and effort estimation

- SEI's SMART (Service Migration and Reuse Technique) method<sup>1</sup> can be used for identification and analysis of services from legacy applications

However there are few methods to determine the scope, cost and effort of other aspects of SOA migration/integration

To examine the scope, tasks, effort and cost of integration of common or Whole of Government services with existing applications NICTA is developing the Service Migration Assessment Technology – Australia (SMAT-AUS)

<sup>1</sup>Lewis, G., Morris, M., O'Brien, L., Smith, D. and Wrage, L., *SMART: The Service-Oriented Migration and Reuse Technique*, (CMU/SEI-2005-TN-029), Software Engineering Institute, 2005.

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## Service Migration Assessment Technology - Australia



- Service Migration Assessment Technology – Australia (SMAT-AUS) provides the following:
  - **Scope, Cost and Effort Estimation:** determine the scope, cost and effort of integrating services with existing systems
  - **Performance and QoS Modelling:** provides performance, scalability and QoS simulation and modelling of composite SOA applications (system/software architecture, black box/grey box) to evaluate architectural alternatives

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## SMAT-AUS Scope, Cost and Effort Estimation



During an application of SMAT-AUS Scope, Cost and Effort Estimation the following analyses are carried out:

- Identify the services that are to be integrated with the organisation's existing systems
- Obtain an understanding of the existing systems that are to be integrated with the services
- Determine the scope of what needs to be done, i.e. what additional software has to be developed and what changes need to be made to the existing systems to accomplish the integration
- Determine what options are most appropriate for each existing system
- Determine preliminary estimates of the cost, effort and risk involved in the integration
- Analyse the options and determine an overall strategy for integration

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## SMAT-AUS Scope, Cost and Effort Estimation



SMAT-AUS Scope, Cost and Effort Estimation involves the following activities:

- Establish Integration Context
- Describe Existing Systems
- Describe the Services and Target SOA State
- Analyse the Gap
- Develop Integration Strategy

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## Establish Integration Context



In this activity the following is achieved:

- An understanding of the business and technical context for the integration is obtained – scope, rationale, goals and expectations
- The stakeholders are identified
- The services to be integrated are identified
- An understanding of any organisational constraints – schedule or budget
- An understanding of previous related efforts and analyses
- A high-level understanding of the existing systems to be integrated – business goals and processes

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## Describe Existing Systems



In this activity the following is achieved:

- Details of the existing systems are captured – name, function, size, languages, operating platform, age, etc.
- An understanding of the architecture and design paradigms used in the systems
- An understanding of their complexity, coupling, interfaces, use and users, availability, dependencies and quality of documentation
- An understanding of the systems quality, maturity, existing problems, change history, potential for meeting long term needs, and historical data on development and maintenance

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## Describe the Services and Target SOA State



In this activity the following is achieved:

- Identifying how the existing systems will interact with the services in the new SOA environment
- An understanding of the impact of specific technologies, standards and architecting guidelines
- An understanding of the target SOA implementation state
- An understanding of the QoS (Performance, Security, Availability, Scalability, etc) provided by the existing services and their execution environment

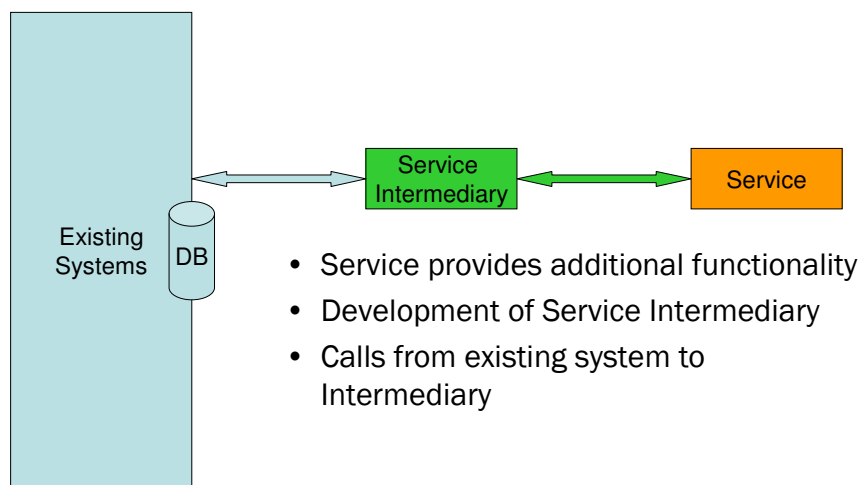
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## Analyse the Gap

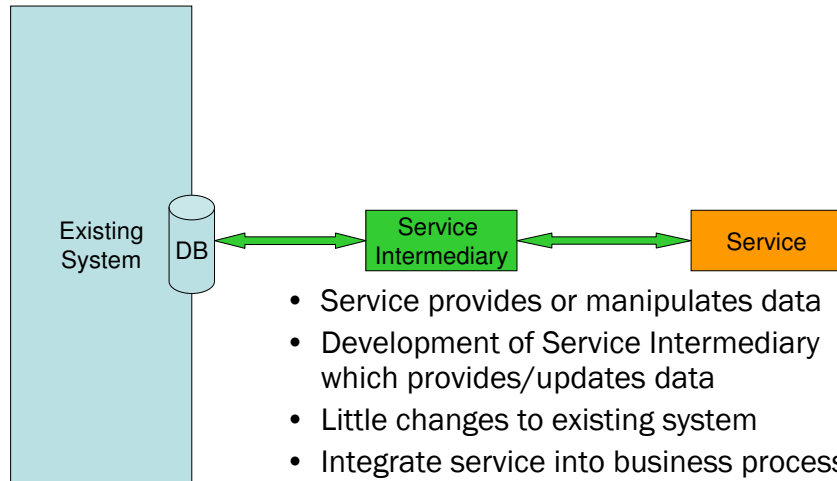
In this activity the following is achieved:

- An examination of the current existing state and the target SOA state
- An analysis and understanding of the new software/code to be developed and changes that need to be made to the existing systems to enable integration with the services – may involve development of new software, removal of existing functionality, legacy modernisation, or restructuring
- A determination of the level of effort and cost of service integration
- A detailed set of options with a determination of the level of difficulty and risk of each option
- A determination of the cost of replacing the existing/legacy system either with COTS or by new development

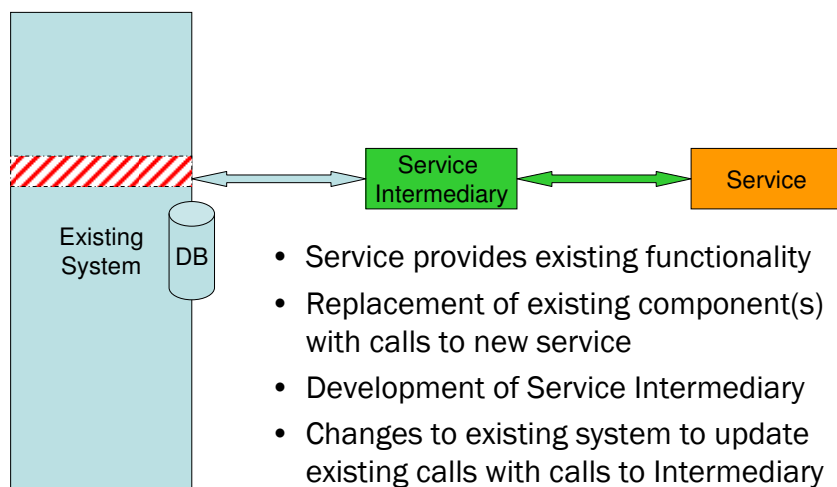
## Analyse the Gap - Options



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## Service Intermediary



- Provides an interface to the service
- Receives calls from the existing system
- Data translation/transformation from existing systems' data format to service's data format
- Invokes service and gets response
- Data translation/transformation from service's data format to existing systems' format

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## Additional Costs



The overall cost of integration of a service has to take into account not only the cost of:

- Changing the existing system
- Developing additional software

But also costs for:

- Hardware – new hardware may be required
- Software – new development environments, middleware, including licensing costs
- Updating/acquiring skills

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## Develop Integration Strategy



In this activity the following is achieved:

- An analysis of the various options
- Selection of one or more options – based on cost, effort, risk or difficulty
- Development of an integration strategy based on the set of options selected
- Presentation of the results to the stakeholders – options, strategy, and any unresolved issues

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## NICTA's Existing Cost Modelling Tool



NICTA's existing cost modelling support tool based on CoBRA (Cost estimation Benchmarking and Risk Assessment) will be incorporated into the SMAT-AUS technology. Tool support both algorithmic and analogy based estimation

This tool will provide existing case study information

Will capture information on cost and can be used as a repository of case study data

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## SMAT-AUS Performance and QoS Modelling



SMAT-AUS Performance and QoS Modelling provides capabilities for:

- Performance and scalability simulation and modelling of composite SOA applications
  - system/software architecture
  - black box/grey box
- Analysis of alternative architectural choices

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## SMAT-AUS Performance and QoS Modelling



Builds on existing work at NICTA:

- e-PASA project with Medicare Australia and current work on the VANguard system with DITR. These projects involve:
  - Modelling a complex distributed, heterogeneous service architecture
  - Calibrating the model with performance metrics from the production systems
  - Running simulations on the model to predict the performance capacity under extreme transaction loads which could not be stress-tested on test-bed or production systems

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## SMAT-AUS Performance and QoS Modelling



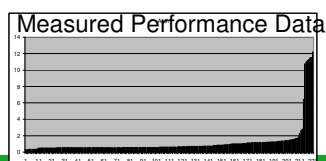
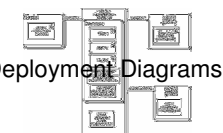
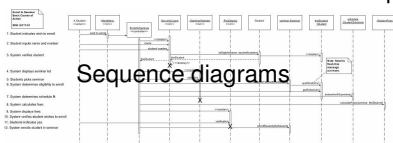
- The architecture modelling/simulation method and tools can be deployed quickly
- An initial model of a system can be constructed
- This model is calibrated with performance data from pre-production and early production releases of a system
- Can be used by system architects to explore a range of architecture options and predict the performance of these options
- Can be used in developing Service Level Agreements (SLAs)
- As SMAT-AUS Performance and QoS Modelling is applied with multiple organisations models that can be reused for SOA implementation can be developed

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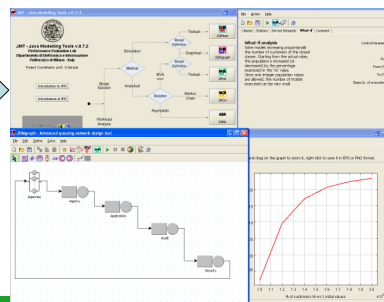
## Performance Modelling



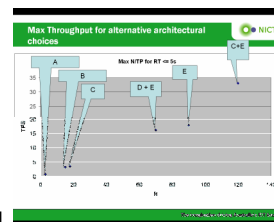
### 1. Architecture and Performance Inputs



### 2. Performance Model



### 3. Architectural Alternatives



build

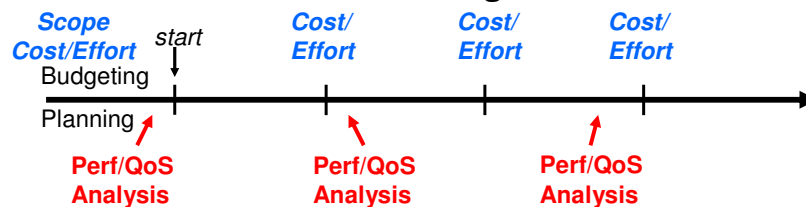
run

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## Use of SMAT-AUS Technology



- The SMAT-AUS technology can be used at the early stage of an integration project where it is necessary to determine scope, cost, and effort and to analyse architectural alternatives
- SMAT-AUS technology can also be used during the execution of a project to analyse decision being taken with regard to the architecture as well as checking to see if the estimates of cost and effort are on track at regular intervals



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## Why SMAT-AUS?



SMAT-AUS provides:

- Scoping of a service integration effort
- Visibility into highly complex integration tasks
- Systematic analysis of migration/integration issues
- Help to organisations to get a handle on cost and effort estimates
- A sound basis for determining costs
- Analysis of alternative architectural choices
- Detailed analysis to determine viability of a particular migration/integration approach
- Needed cost estimates for budgeting purposes and project planning

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## Trialling/Piloting of SMAT-AUS



NICTA is interested in trialling/piloting SMAT-AUS to further develop and calibrate it. We are seeking collaborative organisations that:

- Have started or about to start a legacy modernisation or service integration project
- Have an interest in trying to better understand the scope, cost and effort involved in such an activity
- Have people who are familiar with their existing systems
- Have a level of competency in service integration and SOA so as to understand the integration issues and the target SOA state they want to achieve

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Thank You

Questions?

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