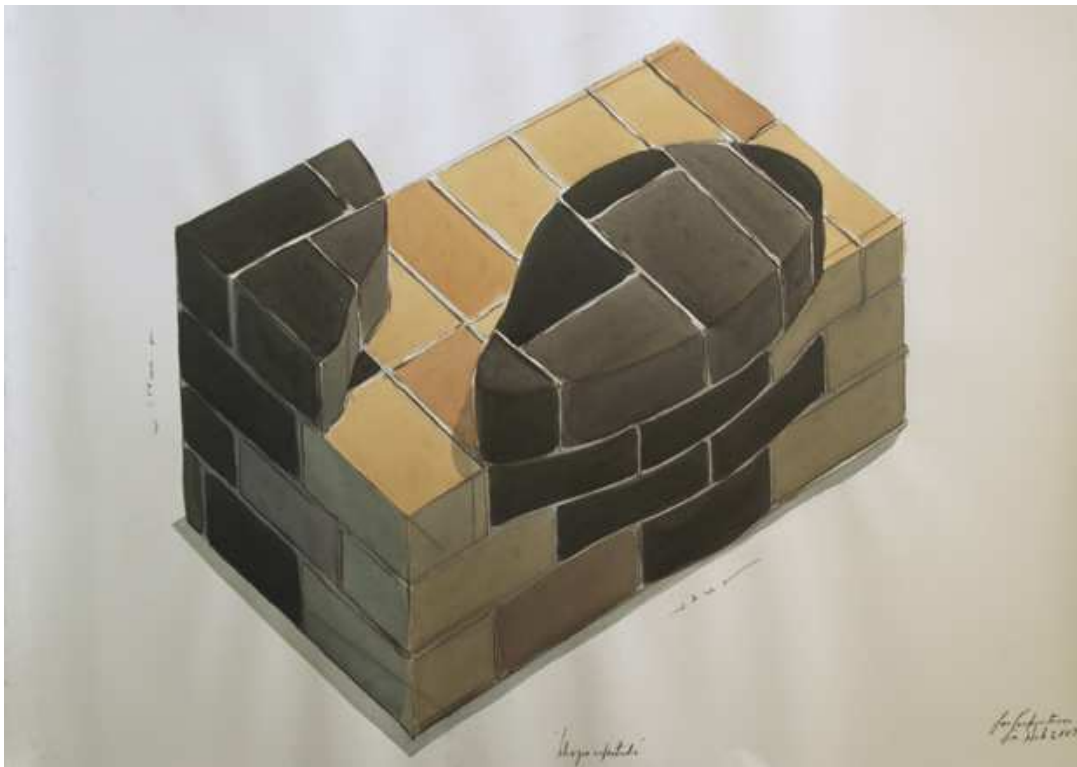




Institute For  
Enterprise Architecture  
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# Enterprise Architecture Tool Selection Guide



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**Version 4.2**

**July 2007**



## Preface

An enterprise architecture (EA) establishes the organization-wide roadmap to achieve an organization's mission through optimal performance of its core business processes within an efficient information technology (IT) environment. Simply stated, enterprise architectures are "blueprints" for systematically and completely defining an organization's current (baseline) or desired (target) environment. Enterprise architectures are essential for evolving information systems and developing new systems that optimize their mission value. This is accomplished in logical or business terms (e.g., mission, business functions, information flows, and systems environments) and technical terms (e.g., software, hardware, communications), and includes a transition plan for transitioning from the baseline environment to the target environment.

If defined, maintained, and implemented effectively, these blueprints assist in optimizing the interdependencies and interrelationships among the business operations of the enterprise and the underlying IT that support these operations. It has shown that without a complete and enforced EA (Strategic) Business Units of the enterprise run the risk of buying and building systems that are duplicative, incompatible, and unnecessarily costly to maintain and interface.

For EAs to be useful and provide business value, their development, maintenance, and implementation should be managed effectively and supported by tools. This step-by-step process guide is intended to assist in defining, maintaining, and implementing EAs by providing a disciplined and rigorous approach to EA life cycle management. It describes major EA program management areas, beginning with:

1. Suggested organizational structure and management controls
2. A process for development of a baseline and target architecture,
3. Development of a transition plan.

The guide is especially focusing on EA tool selection requirements in the broadest sense including risk, compliance, portfolio and program management, as well as showing an oversight of existing products today on the market

## Conclusion

The items described in this guide present fundamental requirement for good EA tool selections.

An electronic version of this guide can be ordered at the following Internet address:  
<http://www/enterprise-architecture.info>

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# 1. Introduction

Enterprise Architectures are an emerging approach for capturing complex knowledge about organizations and technology. Enterprise Architectural approaches range from broad, enterprise focused approaches, through to approaches aimed at specific domains.

The focus of enterprise architecture efforts is now shifting to become more holistic, thereby necessitating the use of comprehensive modeling tools to analyze and optimize the portfolio of business strategies, organizational structures, risks, compliancy issues, business processes / tasks and activities, information flows, applications, and technology infrastructure.

Important to adoption of an enterprise architectural approach is the availability of tools to support the development, storage, presentation and enhancement of enterprise architecture representations. As with enterprise architecture methodologies, enterprise architecture tools to support the architectural development process are still emerging.

High value is derived from consolidating this portfolio of business artifacts into a single repository in a standardized manner to support enterprise analysis and optimization.

## 1.1. EA Tools Review Framework

To consistently review enterprise architecture tools, a review framework is defined. The review framework consists of two dimensions: the basic functionality of the tool, and the utility of the tool to different professionals.

When reviewing an EA tool's basic functionality, the reviewer has to describe how well the tool performed the different functions needed for the enterprise to support their activities. The tools basic functionality was examined in the following areas:

- **Methodologies and Models;**
- **Model Development Interface;**
- **Tool Automation;**
- **Extendibility and Customization;**
- **Analysis and Manipulation;**
- **Repository;**
- **Deployment Architecture;**
- **Costs and Vendor Support.**

The second dimension, the tool's utility to different professionals, captures the fitness for purpose of the tool, and describes how useful the tool would be to particular professionals. The types of professionals considered were:

- **Enterprise Architects;**
- **Strategic Planners;**
- **Enterprise Program Managers.**



## **1.2. Functionality Dimension**

This dimension of the EA Tools review framework attempts to capture how well the tool performs the core functions needed to support the enterprise architecture development activity. This dimension breaks the functionality of an enterprise architecture tool into eight key areas.

### **1.2.1. Methodologies and Models**

The most important feature of an enterprise architecture tool the methodologies and modeling the approaches it supports. The approaches the tool supports dictate the types of enterprise architectures the tool is capable of supporting, and to an extent, the type of analysis and manipulation functions the tool is capable of performing. As well as reviewing the methodologies and modeling approaches, this functional area also reviews how well, or how completely, the tool implements the methodologies and modeling approaches it claims to support.

For tools that are capable of supporting multiple methodologies and modeling approaches, this functional area also examines how well the different approaches are integrated. For example, when complementary methodologies and modeling approaches (for example process modeling and data modeling) are used, how well can the different approaches be used together in an overall enterprise architectural approach?

When a tool supports competing approaches (for example two approaches to data modeling) how well can the data being modeled be moved between the different perspectives offered by the competing approaches?

### **1.2.2. Model Development Interface**

The model development interface is the most obvious part of an enterprise architecture development tool. It is the interface used to design, build, maintain and often manipulate, the models that make up the architecture. Generally, models are built and maintained graphically, by manipulating icons and the connections between them. The tool's model development interface may also use textual interfaces to allow additional information to be appended to the graphical models.

The overall quality of the model development interface is an important characteristic of any enterprise architecture development tool. The interface must support the modeling activity well, for example by automating some of the drawing functions, by automatically laying out models, or by providing pick lists of alternative values at the appropriate places during the modeling activity. The model development interface must also be intelligently structured, make good use of limited screen space, be logical and consistent to use and navigate. The tool should ideally follow the graphical user interface conventions and guidelines that apply to its host operating system.

### **1.2.3. Tool Automation**

Developing and populating enterprise architecture models is often the most time consuming part of the enterprise architecture development activity. By providing support for automating parts of the enterprise architecture development processes, a tool can help speed up the overall development activity.

A tool may support the creation of macros or scripts, to automate common functions or actions, or to group several functions together into one action. These



may be used to automate parts of the model development activity. This feature is closely related to the tool's ability to be customized, which is described in the next section.

The tool may also provide the ability to automatically generate enterprise architecture models based on data held within the tool's repository, or have the ability to generate enterprise architecture models as a result of data manipulation functions.

#### **1.2.4. Extensibility and Customization**

This functional group captures how well an enterprise architecture tool can be modified to meet the unique enterprise architectural requirements of a unique organization. Enterprise Architecture tools may support customization by allowing users to add new modeling approaches or to modify the modeling approaches already supported by the tool. A tool may also support modification by providing a programming interface, allowing the functions of the tool to be modified, or allowing the tool to be integrated with other software products. Most enterprise architecture tools that support high levels of customization allow the underlying meta-models of the tool to be modified, and new meta-models added. Meta-models are literally models about models. They describe what entities can exist within particular models, the legal relationships between the different entities, and their properties. By modifying the existing meta-models, or adding completely new meta-models, a tool can be customized to support new modeling approaches. The ability to modify the tool via a programming interface allows the functionality and behavior of the tool to be customized to meet the unique requirements of the organization.

Programming customization may be achieved through the use of an application scripting language, for example Visual Basics for Applications (VBA), or through support for adding external components, for example, Active X/DCOM components.

Enterprise Architecture tools may be extended by integrating them with other software products. This may be achieved via direct integration through an exposed API within the tool, or via a middleware layer, for example ActiveX/DCOM, CORBA, and so on. Integration may also be supported via importing and exporting data into and out of the tool via standard file types; for example, character delimited or fixed width delimited text files, HTML, or SYLK files and so on.

#### **1.2.5. Analysis and Manipulation**

As well as supporting the development of enterprise architecture models, an enterprise architecture tool may also provide support for analysis and manipulation of the developed models. The type of analysis and manipulation support provided by the tool is often tied to the particular modeling approaches supported by the tool. For example, Flow Analysis is often tied to process/workflow modeling.

Analysis support provided by a tool may simply examine how correct or complete the model is, relative to a particular modeling approach used. More sophisticated analysis support may allow the model to be interrogated in some way, or be subjected to particular analysis methods. Analysis support may include the ability to compare different versions of models, allowing current and to-be enterprise architectures to be compared. Manipulation functions capture a tool's ability to change the way the models are represented and viewed. This may include the ability to view models from particular perspectives, for example showing only





particular classes of entities, or the ability to amalgamate separate models into a single model.

### **1.2.6. Repository**

Most of the tools on the market make use of some kind of data repository to hold the developed models. The functions provided by the tool's repository have a significant impact on the overall functionality, scalability and extendibility of an enterprise architecture tool.

Some tools make use of commercial relational database management systems, or commercial Object Orientated or Object/Relational database systems, while others use proprietary repository systems.

A tool's repository often dictates the way users can collaborate. A repository may provide support for collaboration by supporting multiple, concurrent, users on the one repository, or by providing the ability to combine models developed by different modelers into one model.

The repository may also provide many different data management functions, including the ability to support model versioning, the ability to roll back to previous versions, the ability to lock parts of the model against change, and the ability to control access to part or the entire model.

### **1.2.7. Deployment Architecture**

A tool's deployment architecture describes the tool's software structure and software implementation. Generally, enterprise architecture tools tend to adopt one of two deployment architectures: either a single user/single client structure, or a simple two-tier client/server structure.

Single user/single client structured tools are designed to operate on one workstation, and can generally only be used by one user at a time. Tools that implement this style of deployment architecture generally have a very tight coupling between the tool and its repository. In this type of deployment architecture, only one modeler can have access to the repository at any one time. The second common deployment architecture found within the enterprise architecture tool domain is a simple two tier client/server structure. Tools that implement this style of deployment architecture generally have looser coupling between the tool and the repository. Generally, the repository is stored on a network server, and can often be accessed by multiple concurrent users. This deployment architecture allows multiple modelers to work on the same models concurrently.

### **1.2.8. Costs and Vendor Support**

The final functional group considered is the cost of the tool and after sales support provided by the vendor. The cost of enterprise architecture tool licenses can range anywhere from € 1,500 to € 7,000 per license, and optional extras are often available for an additional cost. Given the high costs of this type of tool, the types of licensing agreements offered by the vendor, and how they may lower the overall cost, is important. For example, does the vendor support floating licenses, allowing expensive licenses to be shared among a large group of users? Does the vendor offer discounts for bulk purchases, or site licenses? Does the vendor offer discounts to government or non-profit organizations?

Also important in the overall cost of adopting an enterprise architecture tool, are the cost and type of maintenance and/or after sales support contracts offered by the vendor. Is the vendor able to offer comprehensive, in-house training? If the





vendor is a foreign company, do they have an Australian representative available to provide training? Does the vendor offer free technical support? Is the vendor able to offer free or heavily discounted upgrades? How does the vendor address software faults discovered by the user? What is the yearly maintenance costs associated with the tool?

### **1.3. Different Professionals Dimension**

The evaluation of the tools considered their suitability for use by different professionals. The needs of other groups, such as software architects, are not considered in this EA tools selection framework.

#### **1.3.1. Enterprise Architects**

Enterprise Architects investigate all aspects of enterprise architectural approaches and methodologies. This can involve researching different representations and enterprise architectural structures, including the development and investigation of alternative modeling approaches. As such, the requirements for a tool to support enterprise architectural research are quite challenging. The over-arching requirement is flexibility in defining and adapting modeling approaches. However, a robust tool is also required to develop large-scale demonstrators to investigate, and promote these alternative approaches.

#### **1.3.2. Strategic Planners**

Strategic planners, including executive management and innovating staff, use the enterprise architectures results for strategic decision making. They need to be assembled and modified quickly, and should be based on current (or planned) future capability.

Strategic planners need a tool that is easy to use. It is highly desirable that local support is available when required. The tool should have strong drawing and reuse facilities including support for multiple, related, configurations within a single architecture. Quick, automated, analysis and consistency checking is highly desirable. Integration with existing data sources is essential, particularly when implementing planning facilities.

#### **1.3.3. Enterprise Program Managers**

Enterprise Program Managers as well as domain program managers and often project managers supports the enterprise architecture program in order to support the implementation and transformation phase. The enterprise architecture tools should be able to capture current and future resources (such as platforms, assets and components), organizations, people, information exchanges, tasks or activities, and processes and their relationships as well as program planning facilities.

Enterprise Program managers need a tool that is easy to use, with support available when required. Local support is desirable, but probably not essential providing it is very responsive. The tool should have a strong planning and analysis capability and allow reuse between enterprise architectures for different activities undertaken at different times.



## 2. Overview of Enterprise Architecture Tools<sup>(2)</sup>

### 2.1. Listing of the vendors most recognized in the market. <sup>(3)</sup>

Institute For Enterprise Architecture Developments Your Partner in Information		Risk / Strategy / Enterprise / Solution Architecture Tools Overview - 2007						v4.2	(C) Copyrights IFEAD 2001 - 2007
Supplier	Tool	Governance, Risk, Compliancy	Program Management	Enterprise/ITPo rtfolio management	Business/IT Strategy	Enterprise Architecture	Service Oriented Architecture	Software Engineering	Frameworks, Modelling Languages
Aam tech	SAMU								Not Specified
Acceptsoftware	Accept 360								Not Specified
Adaptive	Adaptive EA Manager, IT Portfolio Manager, Metadata Manager, Project Portfolio Manager								Adaptive, Zachman, FEAF, Archimate, CWM
Agilense	EA Webmodeler								Agilense, Synthesis, Zachman, TOGAF, DoDAF, FEAF/TEAF, FEA
Altova	Altova Enterprise Suite								UMODEL, XML Suite
Alfabet	Planning IT								SITM framework
ASG Software Solutions	ASG-Rochade								Not Specified
Avolution	Abacus								Zachman
BEA AquaLogic	Enterprise Repository								FEAF
Bizzdesign	BizZdesign Architect, BizZdesigner, Riskmanager								Archimate
Casewise	Corporate Modeler Enterprise Edition								Casewise Framework, Zachman, FEAF, TEAF eTOM, DoDAF, etc.
CACI International	SimProcess								Zachman
Enterprise Elements	Elements Repository								CPIC / DoDAF
Forsight	Modeling & Validation Tool set								DoDAF
Framework Software, Inc	Structure								FEAF, DoDAF, Zachman
Future Tech Systems, Inc	ENVISION® VIP								Not Specified
GoAgile	GoAgile MAP Product Suite								Not Specified
IBM	IBM Rational Software Architect								Not Specified
IDS Scheer	ARIS Process Platform								ARIS Framework, Archimate
Intelligie Corporation	MAP Suite + ITAA								Zachman, TOGAF, DODAF, E2AF, FEAF, TEAF
Knotion Consulting	SYNAP-C SOLUTION								Not Specified
LogicLibrary	Logidex								Not Specified
Méga International	Méga (Process, Architect, Designer)								Zachman
NetViz	NetViz Suite								Not Specified
Palisade	Risk & Decision Analysis								Not Specified
Proforma	Provision Modeling Suite								Zachman, C4ISR
Qualiware	Qualiware Product Suite								Not Specified
Salamander Organisation	MooD Transformation Technology								MoDAF
Select Business Solutions	Select Component Architect								Zachman
Simon Labs	SimonTool								Simon Enterprise Architecture, Zachman
Sparx Systems	Enterprise Architect								Not Specified
TeleLogic	System Architect Family + Rhapsody								Zachman, TOGAF 8, DoDAF, MoDAF
Troux	Metis Product Family								Zachman, TOGAF, DoDAF, FEAF / TEAF, Archimate
Visible	Visible Advantage								Not Specified



### 3. Candidate Tool Requirements Checklist

First and foremost, objectives for acquiring and using a comprehensive modeling tool must be articulated and agreed to by all stakeholders.

Since this tool is to support enterprise architecture, enterprise-level objectives must be included. Once that is accomplished, the objectives must be translated into requirements for both vendor presence and performance.

Also, architectural principles both high-level conceptual and domain-level detailed must be included as screening criteria. Principles can either be converted into requirements or left as-is, requiring vendors to demonstrate their support of such principles.

The functional requirements of a tool must be understood prior to embarking on a selection. Only the functionality that is currently required of the tool or that which will be realistically necessary in the future should be selected.

The next list is a candidate listing of requirements and specifications. Enhance this list for your own specific situation.

***Only the functionality that is currently required of the EA tool, or that which will be realistically necessary in the future, should be selected.***

#### 3.1. Candidate list of EA Tool Requirements & Specifications

##### **1 Operational & Technical Fit**

##### **1.1 Platform Environment**

- 1.1.1 Can the client software be installed on MS Windows XP?
- 1.1.2 Can the client software be installed on MS Windows Vista?
- 1.1.3 Can the client software be installed on Linux?
- 1.1.4 Can the server component be set up on MS Windows 2003 Server?
- 1.1.5 Can the server component be set up on SunSolaris?
- 1.1.6 Can the server component be set up on Linux Servers?
- 1.1.7 Can the server component be set up on Unix Servers?
- 1.1.8 Can the repository be set up using the latest versions of Oracle DB? Which Versions?
- 1.1.9 Can the repository be set up for SQL Server? Which Versions?
- 1.1.10 Can the web client be set up for MS Internet Explorer? Which Versions?
- 1.1.11 Are there specific requirements or specifications to setup the repository? Which?

##### **1.2 Performance & Availability**

- 1.2.1 Can additional licenses be added dynamically without the need to affect users PC's?
- 1.2.2 Can the tool still operate for a period of time if the server holding the licenses fail, e.g. crashes?
- 1.2.3 Does the tool handle extreme amounts of data e.g. millions of records?
- 1.2.4 Does the tool operate at the same performance if there are 100 users accessing the same repository?
- 1.2.5 Offers the tool facilities to monitor its performance?
- 1.2.6 Is remote access feasible and practical (e.g. via GPRS/notebook)?
- 1.2.7 Can the tool perform several tasks at the same time? (e.g. run a report in the background)?
- 1.2.8 Does the tool have a simultaneous update of open views without user interaction?

##### **1.3 Security (User Admin)**

- 1.3.1 Is the user required to log on every time he uses the tool?
- 1.3.2 Is it possible to authorize the user at the level of objects?
- 1.3.3 Is it possible to authorize the user at the level of class properties?
- 1.3.4 Does the tool support role based user management?



- 1.3.5 Does the tool support check-in/check-out items of repository?
- 1.3.6 Does the tool support read only access?
- 1.3.7 Does the tool support management of user groups?
- 1.3.8 Does the tool support more than 100 simultaneously logged on users?
- 1.3.9 Assuming there are licenses, can any number of users access the repository at the same time?
- 1.3.10 Are there at least four different user profiles which can have hierarchical relationships to each other?
- 1.3.11 Does the tool record the full history of changes to objects?
- 1.3.12 Does the tool run reports on utilization of its licenses?
- 1.3.13 Does the tool support external Accountancy Audits?
- 1.3.14 Does the tool stamp all changes done to objects with a time-user stamp?
- 1.3.15 Is it possible to define own user profiles?
- 1.3.16 Is it possible to (explicitly) lock models or parts of models?

#### **1.4 Software Distribution**

- 1.4.1 Is a central shared installation possible, which allows users to access the tool without local installation procedures?
- 1.4.2 Does the tool support shared installation of upgrades?
- 1.4.3 Are upgrades possible without a system (esp. server) shutdown?
- 1.4.4 Does the tool support shared initial installation? (I.e. can the tool be site-installed and the installation shared by users)?
- 1.4.5 Are bug fixes distributed in the form of patches?
- 1.4.6 Are patches freely available?
- 1.4.7 Can patches be downloaded from the Internet?
- 1.4.8 Do you have less than three releases a year with well before published release plans?

#### **1.5 Release Management**

- 1.5.1 Does the tool support rollback?
- 1.5.2 Does the tool support replication/synchronization mechanisms?
- 1.5.3 Is it possible to replicate parts of the repository to local repositories?

#### **1.6 Tool Architecture**

- 1.6.1 Does the tool have a client / server architecture?
- 1.6.2 Does the tool provide a thin client?
- 1.6.3 Does the tool provide a thick client?
- 1.6.4 Does the tool provide standalone usage?

#### **1.7 Technical and Operational Requirements**

- 1.7.1 Does the tool have below or average requirements on operational memory? Please define.
- 1.7.2 Does the tool have below or average requirements on CPU? Please define.
- 1.7.3 Does the tool have below or average requirements on external memory (disks)? Please define.
- 1.7.4 Does the tool use a standard RDBMS? Please define.

## **2 Vendor Support**

### **2.1 Help Desk Support**

- 2.1.1 Can help desk support be offered in English or other languages?
- 2.1.2 Can you offer time to repair guarantee?
- 2.1.3 Do you provide standard escalation procedures for problem resolution?
- 2.1.4 Is a log of all known bugs, including date of first occurrence, status and date of closure, available on-line for at least the last 6 months?
- 2.1.5 Can these resources be contacted by phone and e-mail?
- 2.1.6 Does the help desk have a list of all customizations/work carried out by consultants on the clients site?
- 2.1.7 Can the tool be installed without training?
- 2.1.8 Does the tool provide interactive help?
- 2.1.9 Is the interactive help comprehensive and easy to navigate?
- 2.1.10 Does the tool have an online tutorial?
- 2.1.11 Does the tool have tutorial/help on features?
- 2.1.12 Does the tool have online documentation?
- 2.1.13 Do you run a global bulletin board for raising bug enquiries?



## **2.2 Training**

- 2.2.1 Do you have dedicated in-house product trainers?
- 2.2.2 Do you provide training specifically for Enterprise Modellers?
- 2.2.3 Can the training be conducted in other languages then English? Which languages?
- 2.2.4 Do you publish regular training schedules?
- 2.2.5 Do you provide formal training of the product?
- 2.2.6 Is courseware available for purchase?
- 2.2.7 Do you provide web based training /e-learning?
- 2.2.8 Do you offer on-site trainings all over the world?

## **2.3 Professional Services (Migration)**

- 2.3.1 Do you provide consulting services?
- 2.3.2 Do you offer tools for (assistance with) a one-off conversion of documents from Excel, Visio, Word or other format to your tool?

## **2.4 Documentation**

- 2.4.1 Will you provide us with a full comprehensive set of documentation covering all aspects of the tool?
- 2.4.2 Are changes made available on the Web?
- 2.4.3 Are all documents made available in both hard and soft format?
- 2.4.4 Is the documentation available other languages than English? Define
- 2.4.6 Is there additional documentation available for purchase?

## **2.5 Local Support**

- 2.5.1 Do you offer local support world-wide or in only some regions? Please explain.
- 2.5.2 Do you offer guaranteed reaction times?

## **2.6 Newsgroups**

- 2.6.1 Is there a user group for your product?
- 2.6.2 Do they meet regularly?
- 2.6.3 Do they have a website?
- 2.6.4 Do you run a global newsgroup for discussion?

## **3 Functional Fit (Specific)**

### **3.1 Support Analysis**

- 3.1.1 Does the tool search enterprise architecture design patterns in order to suggest a possible solution?
- 3.1.2 Does the tool support the process of enterprise architecture requirement analysis and the process of generating architecture design?
- 3.1.3 Does the tool offer consistency checking and quality checks for designed architectures in accordance to architecture principles and rules?
- 3.1.4 Does the tool support impact analysis at all levels?
- 3.1.5 Does the tool support delta analysis at all levels?
- 3.1.6 Are there syntax checks through the given data?
- 3.1.7 Are there semantic checks through the given data?
- 3.1.8 Can new consistency checks be defined at any time?
- 3.1.9 Does the tool support bottleneck analysis?
- 3.1.10 Does the tool offer a common meta-model?
- 3.1.11 Does the tool offer mean to force mandatory inputs?
- 3.1.12 Does the tool support the structured access to stored objects and attributes (trees, hierarchy)?

### **3.2 Support of Enterprise Architecture Frameworks**

- 3.2.1 Delivers the tool Support for Zachman Framework?
- 3.2.2 Delivers the tool Support for FEAF (Federal Enterprise Architecture Framework)?
- 3.2.3 Delivers the tool Support for E2AF (Extended Enterprise Architecture Framework)?
- 3.2.4 Delivers the tool Support for DoDAF (C4ISR)?
- 3.2.5 Delivers the tool Support for TOGAF v8x EA Framework?
- 3.2.6 Delivers the tool Support for a custom or proprietary enterprise architecture framework?
- 3.2.7 Can the tool handle references to an external custom enterprise architectural framework?
- 3.2.8 Does the tool aid user with navigation in a custom enterprise architecture framework?

### **3.3 Support of Enterprise Architecture Program (Time)**

- 3.3.1 Does the tool have a timeline marking of objects (e.g. objects valid from..to..)?



- 3.3.2 Does the tool handle different stages of existence of objects (e.g. under discussion, valid, in operation, discarded)?
- 3.3.3 Can the tool produce time-related output? (e.g. to show the enterprise architectural landscape at a specific date (to any freely chosen date)?

### **3.4 Simulation**

- 3.4.1 Does the tool support simulation of alternative enterprise architecture scenarios?
- 3.4.2 Can the tool generate landscapes of (selected) objects of one or more classes?
- 3.4.3 Can the tool generate a landscape of objects which existed on a certain date or over a certain period if time in the past?
- 3.4.4 Is it possible to generate a to-be landscape of objects planned for certain dates?
- 3.4.5 Does the tool simulate impact of changes in a scenario?
- 3.4.6 Does the tool support hierarchy?
- 3.4.7 Has the tool the ability to support discrete simulation?
- 3.4.8 Has the tool the ability to perform Monte Carlo simulation?
- 3.4.9 Have the tool facilities to graphical simulation of processes to demonstrate bottlenecks?

### **3.5 Repository management**

- 3.5.1 Does the tool support Enterprise Architecture Diagrams?
- 3.5.2 Does the tool have Domain Architecture Diagrams?
- 3.5.3 Does the tool have Application Architecture Diagrams?
- 3.5.4 Does the tool have Information Architecture Diagrams?
- 3.5.5 Does the tool have IT Architecture Diagrams?
- 3.5.6 Does the tool fully support Custom Type Diagrams (e. g. Management Dashboard View)?
- 3.5.7 Does the tool support workflow?
- 3.5.8 Does the tool have process modeling functionality i.e. process decomposition and process charts?
- 3.5.9 Does the tool support enterprise architecture design diagrams as standard or can be customized to support this, with the ability to reuse applications and system interfaces from the application architecture diagrams?
- 3.5.10 Does the tool support logical models?
- 3.5.11 Does the tool support physical models (system level)?
- 3.5.12 Does the tool support data flow diagrams?
- 3.5.13 Can the user reuse all objects/definitions (metadata items)?
- 3.5.14 Can the user define and reuse applications within the tool?
- 3.5.15 Can the user define and reuse system interfaces?
- 3.5.16 Can the user define and reuse data flows?
- 3.5.17 Can the user define and reuse functions?
- 3.5.18 Can the user define and reuse services in the context of SOA?
- 3.5.19 Can the user define and reuse technology?
- 3.5.20 Can the user define and reuse requirements?
- 3.5.21 Can the user define and reuse business processes?
- 3.5.22 Can the user define and reuse goals?
- 3.5.23 Is the user able to view the architecture through a function view?
- 3.5.24 Is the user able to view the architecture through an information view?
- 3.5.25 Is the user able to view the architecture through an integration view?
- 3.5.26 Is the user able to view the architecture through a distribution view?
- 3.5.27 Can the user define and reuse location?
- 3.5.28 Can the user define and reuse roles?
- 3.5.29 Does the tool support organization models?
- 3.5.30 Can the user have an is-a relationship between a class of objects and its objects within the tool?
- 3.5.31 Can the user have a belong to relationship between some defined object class?
- 3.5.32 Does the tool support extensibility of repository?
- 3.5.33 Does the tool support different abstraction levels (level of detail)?
- 3.5.34 Can the tool generate diagrams using objects, their properties and relationships out of the repository?
- 3.5.35 Has the tool the ability to create / design network & hardware systems diagrams / models?
- 3.5.36 Has the tool the ability to create / design communication diagrams / models?





- 3.5.37 Has the tool the ability to scan networks and build network systems topology?
- 3.5.38 Has the tool the ability to create an enterprise meta data dictionary?
- 3.5.39 Does the tool support the incorporation of service level agreements?
- 3.5.40 Has the tool the ability to support Business & IT strategy definitions?
- 3.5.41 Has the tool the ability to store Enterprise principles and trace them to decisions?
- 3.5.42 Has the tool the ability to support / trace risk & compliancy issues?
- 3.6 Validation of Models**
- 3.6.1 Does the tool support a goal model, showing business goals?
- 3.6.2 Does the tool support hierarchy and linking of goals?
- 3.6.3 Does the tool support linking of goals to other categories of objects?
- 3.6.4 Does the tool support polymorphism?
- 3.6.5 Does the tool support inheritance?
- 3.6.6 Does the tool support encapsulation?
- 3.6.7 Does the tool have automatic parsing of requirements? (e.g. by keywords Note: Requirement means anything to comply with , e.g. business rules, IT Strategy etc.)
- 3.6.8 Does the tool have a text and graphical interface to follow the links?
- 3.6.9 Does the tool support versioning of requirements, history of requirement changes, log of modifications etc?
- 3.6.10 Does the tool ensure compliance to defined meta model at all levels?
- 3.6.11 Does the tool ensure that involved responsible users for certain objects (e. g. systems) must agree when changes to interfaces between objects will be done? (workflow)
- 3.6.12 Has the tool the ability to do impact analysis?
- 3.6.13 Has the tool the ability to trace inconsistencies over models?
- 3.6.14 Has the tool the ability to trace incompleteness?
- 3.7 Support of Standard modeling languages, methods and techniques**
- 3.7.1 Does the tool support UML?
- 3.7.2 Delivers the tool Support for MDA (i.e., Model Driven Architecture, OMG)?
- 3.7.3 Delivers the tool Support for BPML (i.e., Business Process Modeling Language)?
- 3.7.4 Delivers the tool Support for BPEL 2.0 (i.e., Business Process Execution language)?
- 3.7.5 Delivers the tool Support for BPMN (i.e., Business Process Modeling Notation)?
- 3.7.6 Delivers the tool Support for ADML (i.e., Architecture Description Markup Language, Open Group)?
- 3.7.7 Does the tool support the Yourdon methodology?
- 3.7.8 Does the tool support the Archimate Modeling language?
- 3.7.9 Does the tool support SSADM (i.e., Structured Systems Analysis & Design Methodology)?
- 3.7.10 Does the tool support modeling processes with a swim-lane diagramming approach?
- 3.7.11 Has the tool the ability to develop IDEF0 diagrams?
- 3.7.12 Has the tool the ability to develop IDEF1 diagrams?
- 3.7.13 Has the tool the ability to perform IDEF 1X data modeling?
- 3.7.14 Has the tool the ability to develop IDEF 3 diagrams?
- 3.7.15 Does the tool support for IDL (IDEF Interchange Definition Language)?
- 3.7.16 Does the tool support a Six Sigma approach?
- 3.7.17 Does the tool support ISO 900x methodology?
- 3.7.18 Has the tool the ability to develop ANSI standard flowcharts?
- 3.7.19 Does the tool Support for ABC (i.e., activity based costing)?
- 3.7.20 Has the tool the ability to create UML v 2.0 diagrams (e.q., use cases, state diagrams sequence diagrams, etc)?
- 3.7.21 Has the tool the ability to create IE entity relationship (ER) diagrams?
- 3.7.22 Does the tool support for cardinal notation to create up to fifth normal form ER diagrams?
- 3.7.23 Has the tool the ability to associate multiple attributes per entity (e.q., >25)?
- 3.7.24 Has the tool the ability to generate physical data models (e.q., DDL)?
- 3.7.25 Has the tool the ability to create DFDs (i.e., data flow diagrams)?
- 3.7.26 Does the tool support for Jackson use cases?
- 3.8 Support for Enterprise Architecture Review Management**
- 3.8.1 Does the tool support identification of components where counter steering is required?





- 3.8.2 Does the tool provide information objects to store, access review reports and results in a structured manner?

#### **4 Functional Fit (General)**

##### **4.1 User Interface**

- 4.1.1 Can the user decide on what level to navigate through the tool?
- 4.1.2 Does the tool navigate through a browser?
- 4.1.3 Does the tool support drill down/drill up between levels of detail?
- 4.1.4 Does the tool support undo/redo functionality?
- 4.1.5 Can any number, without a limit, of levels of diagrams be attached to a top level diagram?
- 4.1.6 Does the tool support navigation between the graphical tool and the database in both directions?
- 4.1.7 Does the tool have a search engine for structured and unstructured information?
- 4.1.8 Does the tool have a database of patterns?
- 4.1.9 Does the tool have a database of customizable examples / solutions?
- 4.1.10 Does the tool have a framework of orientation within the whole projects?
- 4.1.11 Is there a common look and feel across all products?
- 4.1.12 Do all elements of your product employ similar usability functions?
- 4.1.13 Can the system use graphical and non-graphical user interfaces?
- 4.1.14 Is the use of either interchangeable?
- 4.1.15 Can drag & drop be used in the graphical user interface?
- 4.1.16 Does the tool support the definition of specific views for defined objects through all levels?
- 4.1.17 Does the tool model connection between objects as own objects with attributes?
- 4.1.18 Can attributes of connections be displayed automatically?
- 4.1.19 Can the visualization of connections be changed manually/automatically?
- 4.1.20 Has the tool the ability to mine for patterns within multiple models?

##### **4.2 Customization**

- 4.2.1 Can the user create new diagram types?
- 4.2.2 Can the user create new definitions?
- 4.2.3 Can the user create custom visualizations (symbols) for objects?
- 4.2.4 Can the user create new matrices (relations)?
- 4.2.5 Can the user create new properties for existing definitions?
- 4.2.6 Is possible to create custom queries/filters?
- 4.2.7 Is there no limit to the amount of diagrams, definitions, objects and matrices that can be created?
- 4.2.8 Are the reports easy configurable (i.e. with little coding or very little with the help of examples and tutorials)?
- 4.2.9 Can the user define custom views?
- 4.2.10 Does the tool support aggregation of information in order to create one big picture (Overview)?
- 4.2.11 Has the tool the ability to spell-check?
- 4.2.12 Has the tool the ability to find and replace?

##### **4.3 Import/Integration**

- 4.3.1 Are there interfaces to other DB programs like: OracleX, MS SQL Server, MS Access, DB2, other?
- 4.3.2 Does the tool import/export using XML?
- 4.3.3 Does the tool integrate with BEA Workshop?
- 4.3.4 Does the tool integrate with Oracle Designer?
- 4.3.5 Does the tool integrate with Rational Rose?
- 4.3.6 Has the tool the ability to support/export to a certain ERP solution?
- 4.3.7 Has the tool the ability to support/export to certain CRM solution?
- 4.3.8 Has the tool the ability to support/export to a certain SCM solution?
- 4.3.9 Has the tool the ability to generate WFSL?
- 4.3.10 Has the tool the ability to import models and diagrams from other tools (e.q., Visio, etc)?
- 4.3.11 Has the tool the ability to import from CSV (i.e., comma delimited ASCII)?
- 4.3.12 Has the tool the ability to import from XML files)?
- 4.3.13 Has the tool the ability to publish models in Microsoft Word
- 4.3.14 Has the tool the ability to maintain model relationships in HTML via hyperlinks
- 4.3.15 Has the tool the ability to export to Microsoft Project?



#### **4.4 Reporting**

- 4.4.1 Is it possible to generate, to save and to export user defined reports and graphics?
- 4.4.2 Is it possible to generate HTML output, including diagrams?
- 4.4.3 Is it possible to export to MS WinWord?
- 4.4.4 Is it possible to export to MS Excel?
- 4.4.5 Can the tool produce a summary in MS WinWord to give a summary of the architecture landscape?
- 4.4.6 Can the tool produce a summary in MS WinWord or Excel to give a picture of the mappings and how it fits together?
- 4.4.7 Can the MS WinWord templates/reports be changed through GUI ?
- 4.4.8 Does the tool support drill down reporting?
- 4.4.9 Does the tool support summary reporting?
- 4.4.10 Does the tool support queries?
- 4.4.11 Is it possible to export to MS Visio?
- 4.4.12 Is it possible to import from MS Visio?
- 4.4.13 Is it possible to export to MS Powerpoint?
- 4.4.14 Is it possible to print all generated reports, graphics to standard output formats (DIN A0-A4), PDF?
- 4.4.15 Is it possible to publish defined information automatically based on predefined states, events or time?

#### **4.5 Version Management**

- 4.5.1 Is there a version mechanism within the tool?
- 4.5.2 Can the tool provide several versions of one metadata object?
- 4.5.3 Is it possible to compare models within a repository?
- 4.5.4 Can the tool handle conflicts on import and merge commands?
- 4.5.5 Does the tool allow multiple versions of an object?
- 4.5.6 Does the tool support comparisons between versions of objects?
- 4.5.7 Does the tool support migration of individual objects/components through development phases?
- 4.5.8 Does the tool support resolution of migration conflicts during the migration of multiple releases?

#### **4.6 Documentation Management**

- 4.6.1 Does the tool produce documents in industry standard formats (ISO, IEEE ...)?
- 4.6.2 Does the tool support generating of presentations?
- 4.6.3 Does the tool support WYSIWIG preview of output documents and presentations?
- 4.6.4 Does the tool support concurrent review, markup and comment of documents, designs, etc?

#### **4.7 Help and Tutorials**

- 4.7.1 Installation: Can the tool be installed without vendor's assistance?
- 4.7.2 Installation: Can the tool be installed without training?
- 4.7.3 Can the tool be configured without vendor's assistance?
- 4.7.4 Can the tool be configured without training?
- 4.7.5 Does the tool have interactive help?
- 4.7.6 Is the interactive help comprehensive and easy to navigate?
- 4.7.7 Does the tool have an online tutorial?
- 4.7.8 Is the online tutorial comprehensive and easy to navigate?
- 4.7.9 Does the tool have a tutorial/help on features?
- 4.7.10 Does the tool have online documentation?

#### **4.8 Libraries, as in Customization**

- 4.8.1 Can the user extend the supplied graphical library?
- 4.8.2 Can the user extend the supplied graphical library with inheritance?
- 4.8.3 Does the tool have a branch / market specific library?

#### **4.9 Code Generation**

- 4.9.1 Has the tool the ability to generate code in Java, J2EE?
- 4.9.2 Has the tool the ability to generate code in C++?
- 4.9.3 Has the tool the ability to generate code in C#?
- 4.9.4 Has the tool the ability to generate other codes? Which?

### **5 Commercial & Credibility**

#### **5.1 Financial Status of Vendors**

- 5.1.1 Do you have sufficient cash reserves to fund operations for the next financial year?



- 5.1.2 Do you have any joint ventures or do you plan any?
- 5.1.3 Can you confirm that you are not aware of any attempts to acquire your company?
- 5.1.4 Has your company been in the business for longer than 10 years?
- 5.1.5 Has your company been in the business for longer than 5 years?
- 5.1.6 Is your company making profit?
- 5.2 Experiences (within Branches / Markets)**
- 5.2.1 Have you previously delivered solutions to specific branches / markets? Which?
- 5.2.2 Have you previously delivered solutions to system integrators & consultancy firms? Which?
- 5.2.3 Which markets perform a significant portion of your revenue stream?
- 5.2.4 Are you building branch specific functionality?
- 5.2.5 Can you provide references in specific branch / market environments?
- 5.2.6 Are these references available in Europe?
- 5.2.7 Are these references available in the USA?
- 5.2.8 Can you provide contacts of references?
- 5.2.9 Do you have a list of the number of licenses that are active?
- 5.2.10 Do you sell and support your products globally?
- 5.2.11 Do you sell your products via resellers?
- 5.2.12 Do you have an aligned vision of the tool developments?
- 5.2.13 Is the products commercial release 3 or higher?
- 5.2.14 Do you have more than 1000 licensed customer sites
- 5.2.15 Do you have more between 500-1000 licensed customer sites?
- 5.2.16 Do you have more than 10000 product licenses active?
- 5.2.17 Do you have between 5000-9999 licenses active?
- 5.3 Sharing Risks and Revenues**
- 5.3.1 Are you willing to negotiate fixed prices for any customization/integration work?
- 5.3.2 Are you prepared to undertake the proof of concept free of charge?
- 5.3.3 Are you willing to incur missed target penalties?
- 5.3.4 Has your product been on the market for how many years?
- 5.3.5 Is enterprise architecture a core competency of your product portfolio?
- 5.3.6 Do you support old versions for at least two years?
- 5.3.7 Are any significant changes to your product portfolio planned?
- 5.3.8 Are you willing to allow customers to influence your product roadmap?
- 5.3.9 Do you actively participate in forums for defining industry standards?
- 5.3.10 Do you conduct research for long term requirements?
- 5.3.11 Are new releases backward compatible?
- 5.3.12 Can you offer a warranty?
- 5.4 Strategic Partnership**
- 5.4.1 Do you have any strategic alliances with other companies? Which?
- 5.5 Capital Expenditure**
- 5.5.1 Is the software priced on an enterprise basis?
- 5.5.2 Is the software priced on a registered user pricing model?
- 5.5.3 Is the software priced on a concurrent user pricing model?
- 5.5.4 Can you provide a standard price list?
- 5.5.5 Can you provide a detailed cost breakdown?
- 5.6 Operational Expenditure**
- 5.6.1 Do you have support packages available?
- 5.6.2 Do you charge runtime fees?
- 5.6.3 Are licenses based on user rather than on installation? (i.e. can I access from my PC or my notebook on one license?)
- 5.6.4 Do you charge maintenance costs based on purchase price?
- 5.6.5 Are there additional costs related to the use of your product (DB licenses...)?
- 5.6.6 Would you support potential customers to calculate a detailed TCO scenario?



These requirements should be weighted in importance relative to one another. This will enable the selection of the tool with the best functional fit. However, all modeling efforts within the enterprise and their functional requirements should be considered. A desired outcome is to minimize the number of modeling tools and repositories.

Each of the aforementioned criteria under presence and performance must be decomposed into related sub criteria and weighted or ranked. In addition, the content for the enterprise technical architecture must be included in the decision criteria.

Selecting a comprehensive modeling tool that violates the enterprise technical architecture of the enterprise erodes the credibility of the tool and the EA team.

### **3.2. The purpose of adopting an EA Tool?**

Supporting decision making of management requires another level of detail in models and diagrams than supporting application development. One of the common mistakes in using EA tools is to spend too much time at details that are not relevant for decision making. While supporting application development requires enough details in the models and diagrams for developers to continue their work. So decide up front what kind of activities must be supported and check which tools support your requirements.



## Appendix A: References

1. Report, 'A Review of Architecture Tools for the Australian Defense Force', DSTO-TR-1139, 2001
2. Book, 'How to survive in the jungle of Enterprise Architecture Frameworks', by Jaap Schekkerman, Trafford Publishing, Canada, Third Edition 2006; ISBN 141201607-X (<http://www.trafford.com/robots/03-1984.html>)
3. Enterprise Architecture Tools Evaluation Section, Institute For Enterprise Architecture Developments, 2007 ([http://www.enterprise-architecture.info/EA\\_Tools.htm](http://www.enterprise-architecture.info/EA_Tools.htm))

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