



Nedcor technology and operations: enterprise architecture (the knowledge- base)

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1 Introduction

Hyper competitive, fast-change organizations will focus on:

- managing the enterprise's information value chain by facilitating the creation, manipulation and movement of the enterprise's internal and external information products; and
- externalizing business processes to suppliers and customers, delivering mass customization and just-in-time fulfillment across the value chain.

Effective planning and deployment of information and technology resources are active (versus supportive) functions of successful Global 2000 companies. Indeed, a flexible and speedy planning function enables an enterprise to rapidly respond to changes in a dynamic global market. Planning for and managing business information and associated constructs (for example, acquisition, access, content, quality, integrity and security) become more pervasive within an effective, adaptive enterprise.

According to META Group (2000), by 2003, 40% of Global 2000 companies will have moved from narrowly defined technical architectures to holistic enterprise architectures that

encompass business, information, application and domain architectures (Macpherson 1999:1).

Two major thrusts in the new, connected economy are forcing increased attention on enterprise architecture. One is e-business itself, which demands a more intense level of broad, fast, easy information exchange or interoperability. The second is the pronounced trend among larger enterprises to move to a single, global, centralized infrastructure for IT foundation services. This enables better interoperability and speed of implementation, and helps to contain the rapid rise of increased IT expenditures, especially on IT infrastructure. A sound infrastructure can become part of the business strategy when it establishes itself as a capable foundation that enables a project to focus on business benefits (Rosser 2001:1).

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2 What is enterprise architecture?

Enterprise architecture reinforces and operationalizes three competitive weapons: business strategy; digital innovation; and infrastructure development. It is the holistic expression of the enterprise's key business, information, application and technology strategies and their impact on business functions and processes. It typically consists of current and future state models of four key components, namely enterprise business architecture, enterprise information architecture, enterprise application architecture and enterprise-wide technical architecture.

Enterprise architecture also facilitates the establishment and implementation of standards that drive the design of systems across the enterprise. In addition, it develops and documents the framework for integration and implementation of changes to technical standards. Enterprise architects also help develop and manage an architecture governance process, provide technical guidance to project teams and track emerging technologies (Gomolski 2000:1).

Enterprise architecture is the bridge between the enterprises business and technological domains, being directly derived from business requirements and explicitly defining the role of IT in realizing business strategy.

Enterprise architecture makes it possible to navigate through today's constantly changing speed-based business environment by accelerating the flow of information. An enterprise architecture is the connective tissue between business strategy, processes, organization and technology, explicitly defining the role of information technology in realizing business strategy (Young 2000:1).

2.1 Business and information technology synergy

The business domain focuses on business processes and information requirements. These are primarily driven by the organization's strategic response to external business realities, but are further shaped by IT and the capabilities of the IT infrastructure (or lack thereof). The business success and management of this domain rests primarily with business leaders.

The IT service management domain includes the business processes and information consumption the IT organization engages in to manage the enterprise computing environment and deliver IT-based products and services. These are driven and influenced by business strategies represented in the enterprise architecture. The business success and management of this domain rests primarily with IT leaders.

The enterprise IT architecture domain links the business and IT service management domains

by normalizing the strategies, processes and information requirements of both into a single, comprehensive technology strategy. The enterprise architecture makes the symbiotic relationship between the business and the IS organization explicit and is the formal expression of the manner in which mutual interdependencies will be addressed. The physical-computing infrastructure resides in this domain and is driven by the requirements articulated in the enterprise architecture. The viability of this domain directly impacts the success of both the business and IT service management domains. As a result, management of the enterprise architecture domain is the joint responsibility of business and IT leaders (Young 2000:2).

2.2 Conceptual architecture principles

Conceptual architecture principles are guiding statements of position that communicate fundamental elements, truths, rules, or qualities that must be exhibited by an enterprise. The purpose of principles is to enable an organization to take an incremental and iterative approach to transitioning to formal modelling, while allowing it to influence decision making immediately and consistently. Principles should be used as evaluation criteria in the absence of detailed models that direct decision making more discretely and comprehensively (META Group 2000).

As organizations drive towards greater cross-regional, cross-line-of business and cross-departmental integration, architecture will be increasingly important to the success of an organization and must be recognized as a valuable discipline.

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3 Why does an organization need an enterprise architecture? (Or, what is the role and value of architecture?)

According to Gartner Group, architecture is an investment in process, technology and interface standards for the purpose of improving the organization's capabilities of reducing the cost of information systems, development and operations (Jones 2001:1).

3.1 Why the demand for enterprise architecture?

Many previous information technology strategies and architectures failed as a result of focusing on the wrong problem and misalignment with the business requirements. the following business and organizational changes contribute to the problem:

- Collapsing business process cycle times;
- dynamic mergers and acquisitions, the search for scale, the capture of new value networks and the ability to predict who 'we' will be tomorrow decline;
- e-business changes: new e-business competitors attack narrow market niches. Increased numbers of competitors use digital linkages as competitive weapons for and defining their unique competency;
- information technology and infrastructure are inhibiting business process innovation and automation;
- changing business models: digital innovation and information technology have become the business (e-business) and demands a new organization structure – information technology and e-business are two sides of the same coin;
- information technology implementation is reactive, that is project focused instead of pro-active and innovative; and
- the information technology value proposition is poorly understood.

3.2 Enterprise Architecture Benefits

Six categories of business effectiveness benefits can be identified:

- Tighter alignment with business strategies is possible because the architecture process demands a top-down, business-strategy-driven, future-oriented analytical process that 'decomposes' or translates business drivers and strategies into a language that can be used by engineers to make technical investment decisions.
- The architecture process enhances knowledge development and sharing because it forces information technology professionals and business decision makers to collaborate and share information concerning information technology and business trends.
- Enterprise asset management can be improved because resources are allocated according to a consensus understanding of business strategic value rather than being based on 'who is screaming the loudest' or 'who has the most political power'.
- Organizations also report that architecture efforts enable them to reduce investment decision risks, because a formal method of strategic planning or architecting can be institutionalized and refined to enable considerable time savings.
- Tighter, more leverageable linkages to strategic partners can be forged because the architecture process provides an opportunity to critique and model existing and future value delivery mechanisms, thus clarifying business relationships.
- Legal and financial risk can be reduced as business engagement rules become more detailed, formalized and automated.
- Business adaptability improvements are reported by organizations that have used the enterprise architecture process to account for emerging market, competitive and technical trends and identify digital innovation opportunities that feed into the programme management process.

According to META Group IT Architecture provides two classes of benefits, namely financial efficiency and business effectiveness (Table 1).

Table 1 META Group (Buchanan, 2001:3)

Financial Efficiency Benefits	Business Effectiveness Benefits
1. Reuse	1. Alignment
<p>Reuse of hardware components</p> <ul style="list-style-type: none"> • Infrastructure subassemblies • Common client platforms for well-defined types of users • Servers run as multiple instances of a single image <p>Reuse of software components</p> <ul style="list-style-type: none"> • Systems software components • Middleware components • Business-specific components • Application components and variants 	<p>Tighter alignment of business strategy</p> <ul style="list-style-type: none"> • Architecture process is top-down, business-strategic-driven, and future-oriented • Value opportunities tested and analysed <p>The architecture process provides a stream of logic</p> <ul style="list-style-type: none"> • Environmental trend analysis identifies threats and opportunities

<ul style="list-style-type: none"> • Architecture technical domains <p>Reuse of methods</p> <ul style="list-style-type: none"> • Architecture analyses and process model • Object-oriented business and software engineering methods • System and software test methods • Engineering tools methods 	<ul style="list-style-type: none"> • Business strategy requirements identify strategic intent and business architecture: 'Who does what?' • Information requirements identify, 'What information is required for strategic success?' • Architecture requirements identify, 'What technical functionality is required to supply the information?' • Enterprise application portfolio and infrastructure requirements identify, 'How will the technical functionality be provided?' • Enterprise programme management identifies the most efficient delivery plan
<p>2. Reduced time to delivery</p>	<p>2. Knowledge development</p>
<ul style="list-style-type: none"> • Application delivery can leverage common infrastructure services • Business objects and components do not need to be rebuilt • Subcontractors can predict infrastructure capability and information technology management skills • Integration frameworks minimize engineering time requirements 	<ul style="list-style-type: none"> • Business managers are educated about information technology • Information technology managers are educated about business • Financial and architecture methods interoperate • Information requirements / architecture is formalized • Information is user-focused, not simply a data element
<p>3. More efficient programme management</p>	<p>3. More sophisticated asset management</p>
<ul style="list-style-type: none"> • Programmes manage portfolios of information technology work products • Programme disciplines enhanced through reuse of methods • Emphasis on leading, not lagging, programme indicators 	<ul style="list-style-type: none"> • Resource allocation based on business strategic value • Emphasis on leading, not lagging, indicators of strategic success
<p>4. Reduced support costs</p>	<p>4. Reduced decision risks</p>
<ul style="list-style-type: none"> • Reduced complexity • More rigorous 'lab-based design' • More accurate, integrated data 	<ul style="list-style-type: none"> • Time saving in strategic planning • Architecture artefacts describe the 'theory of the business' and improve consensual decision making • More rigorous 'strategy-based decision making' • More accurate market, competitive, and operational calculus
<p>5. Lower acquisition costs</p>	<p>5. Tighter strategic alignment with</p>

	partners
<ul style="list-style-type: none"> • Smaller sets of components • Enhanced negotiating leverage 	<ul style="list-style-type: none"> • Roles within the integrated value chain modelled and negotiated • Business engagement rules formalized and automated • Visibility of business models reduces risk
6. Technical adaptability	6. Business adaptability
<ul style="list-style-type: none"> • Geographic range of architecture extended • Range of data types expanded • Scalability • Extensibility • Portability • Interoperability 	<ul style="list-style-type: none"> • Sensitivity to future and technology trends • Digital innovation • Replace movement of physical goods with sharing of information • Identification of opportunities for strategic alliances • Speed of decision making and implementation

Business impact: Organizations that develop a discipline for assessing/measuring the business strategic value of enterprise architecture will enjoy two competitive advantages:

- IT investments will align with business strategic goals
- IT community insights will supercharge the enterprise strategic planning and digital innovation efforts, providing more integrated enterprise decision-making (Buchanan 2001:1–3).

The primary design goal for information systems needs to be to:

- Facilitate change in the administrative or business processes;
- in the applications and technical infrastructure which enable them.

Enterprise architects are change agents.

Business and information technology strategy and architectures are organic, evolutionary and dynamic. As a result of business and technology changes and innovation, the architecture artifacts will need to adapt to ongoing change. Change also includes the principles, guidelines, standards and designs that architectures need to adhere to.

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4 Architecture products or services and outputs

The Nedcor Technology and Operations Enterprise Architecture Division delivers the products and services and resulting outputs as in Figure 1:

Figure 1 Products and services of the Nedcor Technology and Operations Enterprise Architecture Division



[Click for larger image.](#)

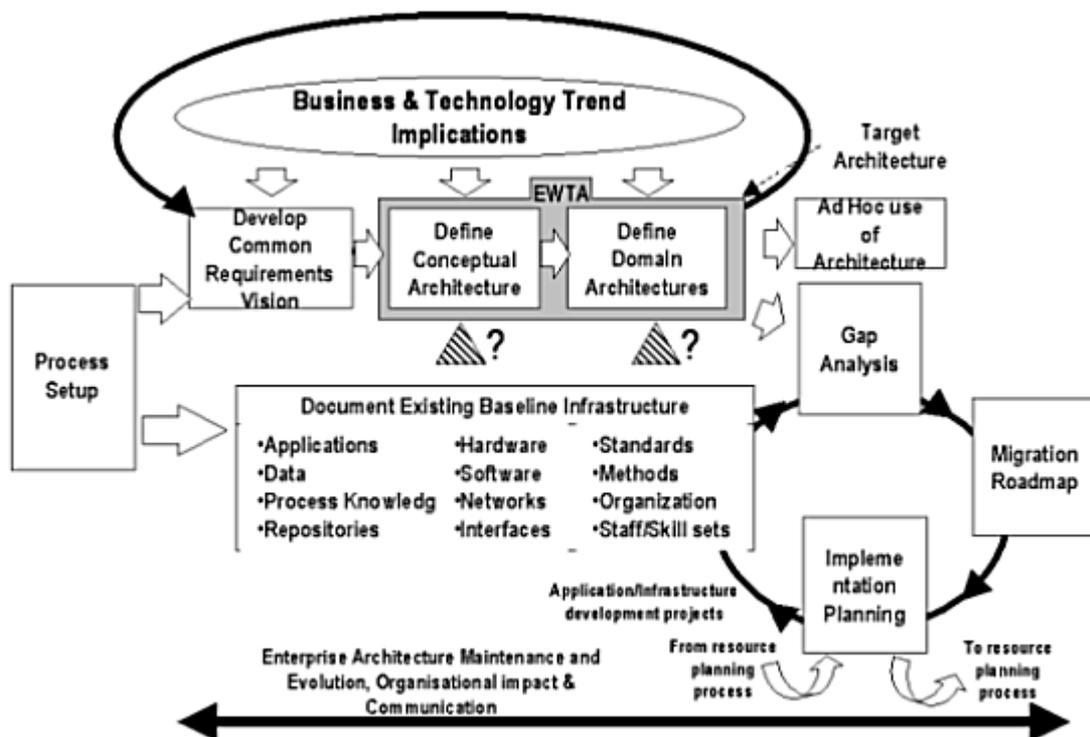
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5 Enterprise architecture process

5.1 The high level architecture building process

The building process is explained in Figure 2.

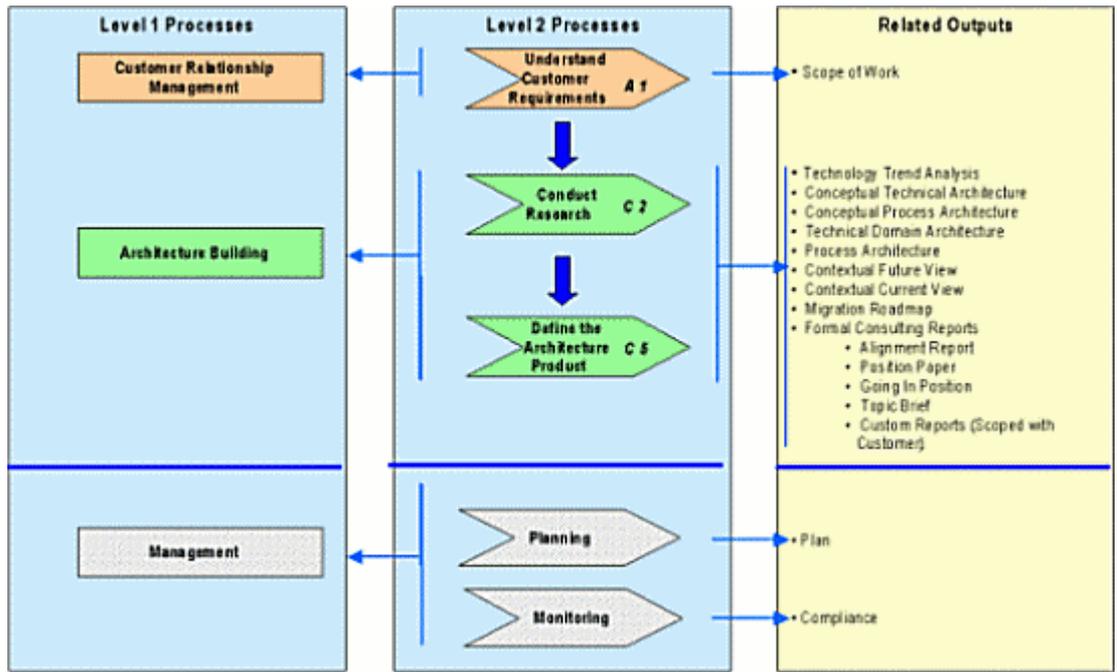
Figure 2 META Group: EAS Process Model: Evolution, 2000



5.2 Nedcor Technology and Operations architecture processes

To deliver Nedcor Technology and Operations specific architecture products, services and related outputs, the processes in Figure 3 need to be executed:

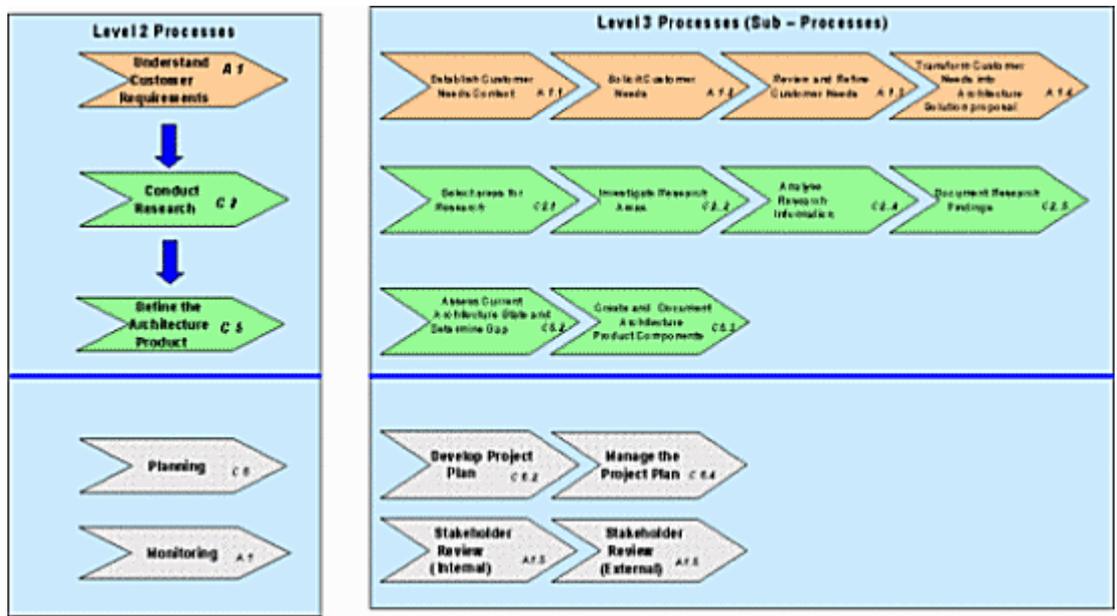
Figure 3 Processes needed to deliver Nedcor Technology and Operations specific architecture products, services and related outputs



5.3 Process flows

Nedcor Technology and Operations strives towards a rigorous adoption of a process culture in order to drive financial efficiency and productivity, which could ensure the organization's competitive edge. Therefore knowing what your products are, the related outputs or artifacts and the processes how to achieve it, are crucial (Figure 4).

Figure 4 Process flow



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6 Information requirements and sources

What information is required in order to deliver the architecture products and services and related outputs?

6.1 Business requirements

Enterprise architects need to pursue a close relationship with the business as the customer and drive their customer relationship efforts in order to successfully execute an architecture that accommodates the requirements of the business. As part of the process culture, potential customers are identified and the customer relationship process provides the opportunity to interact with the customer base by getting involved in the right process at the right time.

6.2 Business environment and technology trends and benchmarking

Nedcor Technology and Operations architecture is subscribing to several industry analyst service providers, namely META Group, Gartner Group, Cutter Consortium and Corporate Executive Board: Operations Council. Access to research and industry analysts provided by these subscription service providers enables the architects and other members of Nedcor Technology and Operations to stay abreast with business and information technology trends. It also gives them the opportunity to benchmark against organizations in similar industries.

6.3 Organizational experience

Senior or executive members within Nedcor Technology and Operations provide valuable information in terms of knowledge and experience of the business and existing systems.

6.4 Legacy systems and intellectual capital solutions

Knowledge with regard to legacy systems and their purpose is essential in order to create new information system architectures that need to interact with existing systems. The intellectual capital solution system (data warehouse) provides intelligence with regard to internal business trends and customer interaction and relationships.

6.5 Conceptual principles and technology standards

Each enterprise area has many dependencies on or from other areas and its subdomains. It provides guidance to decision making while details are still being analysed and resolved. Clear decisions must be made to suboptimize individual domains in order to optimize total effectiveness of enterprise architecture. It requires an enterprise view and needs to be communicated across the information technology organization (Figure 5).

Figure 5 META Group: EAS Process Model: Evolution, 2000



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7 Managing the knowledge-base

The architecture intranet site, road shows, support and consultancy products, relationship building process, industry analyst research databases and related deliverables are tools or mechanisms exploited in order to leverage use and re-use of tacit and explicit knowledge.

The objectives relating to managing the architecture knowledge-base are to:

- support the enterprise as a learning organization in order to cope with constant change in the quest for competitive advantage;
- support and enhance research activities of the enterprise community in order to generate new knowledge;
- promote the culture of sharing of information and knowledge;
- constantly improve and increase information collection, organization and dissemination.

The architecture intranet site:

- enables visibility and easy access to architecture information and products;
- creates a common vision between the high level management and IT staff;
- demonstrates to corporate management the linkages of business drivers and the alignment to architectures;
- creates actionable architecture by demonstrating linkage of IT projects to architectures; and
- communicates principles and standards.

In support of the Gartner Group Knowledge Management Process Framework, the processes and technical requirements in Table 2 are accommodated in the intranet site as knowledge management tools:

Table 2 Processes and technical requirements in support of the Gartner Group Knowledge Management Process Framework

Processes	Technical and functional requirements
1. Knowledge creation 2. Knowledge sharing 3. Knowledge application	<ul style="list-style-type: none"> • Capture and store • Search and retrieve • Send critical info to individuals or groups • Structure and navigate • Chare and collaborate • Synthesize • Profile and personalize • Solve and recommend • Integration with business applications • Maintenance

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8 Other tools and methods of communication and interaction

8.1 Architecture communication events or road shows

Quarterly events are scheduled in order to address specific audiences and information is presented according to the technical depth or detail required for the particular audience managers versus technical specialists.

8.2 Architecture review board (governance body)

The architecture review board is the governing body for enterprise architecture, comprising business and information technology executives. Architectures need to be signed-off or approved by both the customer and the architecture review board, in order to ensure that the architecture is aligned with the business strategy and conceptual architecture principles.

8.3 Industry research analyst interaction or training opportunities: conferences, workshops and seminars

As part of the subscription deliverables, industry analyst interaction is achieved through teleconferences, on-site visits and conferences. These provide both the Nedcor Technology and Operations members and analysts the opportunity to interact and to exchange knowledge.

8.4 Cross organizational process enhancement groups

To achieve process improvement and interaction between members executing end-to-end processes, cross-organizational process enhancement groups have been established.

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9 Conclusion

Architecture value, for example, the relationship between business effectiveness and financial efficiency, could be related to the following statement: the information coursing through a well architected information system is profoundly valuable, provided it is the right information delivered to the right decision makers, at the right time.

Therefore, leveraging architecture value is dependent on how effectively architecture-related information and knowledge are communicated or distributed to the rest of the enterprise.

Applying enterprise architecture within the context of a specific business enterprise enables an organization to create a joint business and IT planning and execution process. Integration of business and IT planning can result in quicker time to market, an increase in customer intimacy and greater operational efficiency.

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