

# Chapter 32

## Green ICT System Architecture Frameworks

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### ABSTRACT

*This chapter introduces the concept of using Enterprise Architecture and associated practices as a method for helping establish and align Green ICT initiatives within organizations as part of an overall ICT Strategy. The chapter introduces the reader to the use of architectural layers – Business, Information, System and Technical as a means of analyzing areas within the ICT environment where Green ICT implementations can have a positive impact. Enterprise Architecture as a function can assist in driving Green ICT initiatives because it is specifically focused as a practice in the long term planning, development and management of an organisation's ICT environment. This provides the opportunity to embed Green ICT objectives in a way not necessarily possible with traditional business planning.*

### INTRODUCTION

Green ICT system architecture provides a robust basis for an organization's push to become an environmentally conscious green organization. This push starts with identification of the Green ICT objectives of the organization. However, without a plan and an approach for implementing them, these objectives may have limited chance of being achieved. Green ICT initiatives are going beyond simply operational or tactical activities – instead,

these green initiatives are becoming an integral part of business strategies and planning. Therefore, the architectural aspects of the enterprise including its solution and enterprise architecture need to be considered afresh in the attempt of the organization to be strategically green. This chapter discusses the use of an ICT Enterprise Architecture function to assist in implementing Green ICT objectives by providing a framework, analysis techniques and measures to help drive success. Additionally, it helps provide guidance on what areas can be investigated that can provide a direct impact on Green ICT. Enterprise Architecture is about long

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term and sustained planning. As a function it is focused on long term planning and alignment of Business and I.T. strategy. A key aspect of this is the ability to gain tracability between an organisation's goals and strategy to the initiatives that will deliver them. Additionally because Enterprise Architecture is intended to address all of the layers of ICT it affords a greater opportunity to effect more fundamental changes.

## **ENTERPRISE ARCHITECTURE OVERVIEW**

Enterprise Architecture (EA) as a function assists with the progress towards a Green ICT environment within an organization (Eas, 2009). Before expanding on this statement, it is important to understand what Enterprise Architecture is and its overall purpose as a function within an organization.

Enterprise Architecture is "a means of ensuring that the ICT strategy of an organization is aligned to its business objectives, goals and vision". Therefore, Enterprise Architecture is an important strategic element of the organization. An EA:

- Provides a mapping between strategic objectives and the ICT capabilities that an organization requires to deliver them.
- Details the Operating Model of an organization which highlights the "core" capabilities required in the environment.
- Provides a framework for detailing the architectural models - business, information, system and technology necessary to deliver the target state.
- Provides a governance framework to drive decision making related to the progress towards the end state architecture. This includes decisions related to priorities, standards and technology alignment amongst others.

- Provides a feedback mechanism constantly updating the current state as new initiatives are completed, new capabilities realized and environmental changes are made.

Figure 1, based on Ross et al. (2006) Foundation for Success, provides an overview of how these components interact to effect this evolution:

As is seen from Figure 1, an EA program typically contains a number of streams:

- Business Strategic Objectives baseline capture.
- Current Technology baseline capture.
- Target State creation including the definition of the operating model to be supported.
- Opportunity analysis and identification.
- Technology and initiative governance review.

As a specialism within ICT, EA still has challenges associated with adoption (Madsen, 2009). Whilst John Zachman, who is considered to be the father of EA, detailed the idea of Enterprise Architecture in his whitepaper "A Framework for Enterprise Architecture" back in 1984 (Zachman, 2009) the adoption of this as a practice within many organizations is only more recently beginning to occur. There are a number of factors for this including lack of availability of expertise and defined process support amongst others. Additionally the early challenge was in providing evidence that the implementation of an EA function could achieve the stated benefits realisation.

A number of frameworks and processes have emerged to support the implementation of an Enterprise Architecture. Some examples include:

- Zachman Framework.
- The Open Group Architecture Framework (TOGAF).
- The Federal Enterprise Architecture Framework (FEAF).<sup>1</sup>
- Garner Architecture Method.

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