



The Service-Oriented Enterprise

Learn Enterprise Architecture and
Its Viable Services

Tom Graves

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About the Author



Tom Graves has been an independent consultant for more than four decades in business transformation, enterprise architecture, and knowledge management. His clients in Europe, Australasia, and the Americas cover a broad range of industries including small-businesses, banking, utilities, manufacturing, logistics, engineering, media, telecoms, research, defense, and government. He has a special interest in whole-enterprise architectures for nonprofit, social, government, and commercial enterprises.

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Please note that, to preserve commercial and personal confidentiality, the stories and examples in this book have often been adapted, combined, and in part fictionalized from experiences in a variety of contexts, and do not and are not intended to represent any specific individual or organization.

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Introduction

Everything in the enterprise is a service. Everything the enterprise does is a service. Everything the enterprise delivers is a service – even products are services, in a sense. And the enterprise itself is a service. *Everything* is a service.

That’s the key idea behind the *service-oriented enterprise*: a view of the enterprise in which everything is seen in terms of services and their interactions and interdependencies, providing consistency and simplicity everywhere, and creating new space for agility and innovation in the enterprise.

This book explores why and how to put that idea into practice, with real business benefits across the entire enterprise.

Who Should Read This Book?

The book is intended for enterprise architects and others who deal with the practical implications of whole-of-enterprise issues.

It should also be useful for strategists, service-managers, decision-makers, and influencers, and also for anyone who works with “pervasive” themes such as supply-chains, value-webs, quality, security, knowledge-sharing, business ethics and social responsibility, health, safety, and environment.

What's in This Book?

The text is divided into three main parts:

- *Part 1: Basics – An Overview*: Reviewing key terms such as “enterprise architecture” and “service-oriented architecture,” and the core metaphors underlying the service-oriented enterprise
- *Part 2: Principles – An Overview*: Describing core ideas about the structure and relationships between services, and their relationship to the structure of the enterprise
- *Part 3: Practice – An Overview*: Illustrating how to apply the principles in real-world business contexts, using a Functional Business Model as the anchor for the enterprise service map, process tree, costing model, and other variants

Each part contains several chapters, as smaller chunks to apply straightaway in your day-to-day work. Although there's a fair amount of theory, the keyword here is *practice*: the aim is to give you something that you can *use*.

So each chapter includes examples and stories to place the ideas into a real-life context, with references to other relevant resources. Most chapters include an “Into Practice” section, with questions to help you apply the material within your own context. At the end of the book, there's also a glossary, which should help in clarifying the broader meaning of some of the common terms used in the architecture of the service-oriented enterprise, and a “Resources” section, pointing to sources for further information.

But first, what *is* the service-oriented enterprise? To answer that, we need to explore some basic terms such as “enterprise architecture” and “service-oriented architecture” and the underlying metaphors that we use to describe the enterprise.

One Last Note Before We Begin

There are a handful of images in this book that had to be reduced in size to fit the book, and may be difficult to read. We've made full-size versions available for download at github.com/apress-service-oriented-enterprise.

PART I

Basics – An Overview

Before we get into the meat of the issues, there are a few background items we need to address.

One of these is the role of enterprise architecture, which we'll explore in Chapter 1, "Basics – Enterprise Architecture." At present, this field is often regarded as a subset of IT, and specifically of IT governance. But it makes far more sense if we extend it outward to its more literal meaning as the architecture of the enterprise as a whole.

Enterprise architecture is about the structure and story of the enterprise – how everything fits together in support of the enterprise vision, values, and goals. Viewing an enterprise entirely in terms of services is one of the more valuable ways to assess that structure, especially as it provides consistency between every part and every level within the enterprise.

A service-oriented architecture also starts to make more sense from that point of view, as we'll see in Chapter 2, "Basics – Service-Oriented Architecture." As with enterprise-architecture, it initially arose as a way to resolve issues around detail-level IT, but here we expand its scope outward, as an architectural style to understand the entire enterprise in terms of service structures and content and their mutual interactions and interdependencies.

As part of this, we'll also need to introduce some basic themes and terminology from formal systems-theory. This still isn't well-known in business as yet: unfortunate but understandable, because much of "hard-systems theory" is described in a complex, arcane mathematics that may well seem impenetrable – and, frankly, irrelevant – to most people in business. The type we need here, though, is the human-oriented "soft-systems" approach, which is much more approachable, and more easily expressed in business terms for the real business context.

Beneath that distinction between "hard-systems" and "soft-systems" is a fundamental difference in the underlying metaphor, in the overall way we describe the enterprise. We'll explore this in Chapter 3, "Basics – A Matter of Metaphor." There's a key contrast here between the notion of "enterprise as a machine" – probably *the* most common business metaphor since the days of "scientific management," in the early part of the twentieth century – and the more recent concept of "enterprise as living organism." The mechanistic view has some real value at the detail-level of technology and process-design, but it simply does not work when we try to apply it to the whole enterprise – as many business-folk have discovered the hard way, in expensive debacles such as the failure of so many attempts at IT-centered "business process reengineering." Instead, if we are to gain the full value from a service-oriented architecture, we need to shift toward the more holistic, all-encompassing view of the "living enterprise" model.

CHAPTER 1

Basics – Enterprise Architecture

What *is* the enterprise? What holds it together? What structures do we need to make it work better, to help it adapt to its changing circumstances and business environment?

These are the core questions underlying the formal discipline of enterprise architecture. It's still a relatively new discipline: the term itself was coined only a few decades ago, building on previous ideas about “information systems architecture” and the like. There are several standards and formats – TOGAF (The Open Group Architecture Framework), FEAF (US Federal Enterprise Architecture Framework), and the Zachman framework being some of the best-known examples. This leads us, though, to ask: What *is* an “enterprise”? For that matter, what is meant by “architecture” in this context?

In every form of architecture – building architecture, naval architecture, process architecture, business architecture, whatever – the real focus is on structure, and the *use* of that structure. In the architecture and design of a hospital, for example, we would be as concerned with the workflows and other usage-patterns *within* the hospital as its physical framework of walls and wiring, passageways, and plumbing. The same is true of enterprise architecture: it's about structure – *any* kind of structure within the enterprise, from data-definitions to downpipes and dumper-trucks – and the principles and guidelines that govern the *use* of that structure.

So what then is an enterprise? According to the FEAF specification, it's any kind of entity "supporting a defined business scope and mission" within which the various members or components "must coordinate their functions and share information" to achieve that purpose. Perhaps more generally, we might think of an enterprise as a collective human endeavor – a shared story that drives action. In that latter sense, the "enterprise" might be a commercial business; it might be government or nonprofit; it might be the local football club or the village New Mothers group; it actually doesn't matter what the size or purpose might be, as long as there is a defined scope and mission to share.

There's an important catch here about which we do need to be aware. In colloquial usage, "organization" and "enterprise" are often considered to be the same thing: an organization is an enterprise, and an enterprise is an organization. Yet in architectural terms, there are some fundamental differences between "organization" and "enterprise": an organization is a legal entity bounded by rules, roles, and responsibilities, whereas an enterprise is more an emotive construct bounded by vision, values, and commitments. Their boundaries *can* coincide, of course, but that isn't always the case: for example, when we need to talk about supply-chain or market, we'll be dealing with an enterprise that by definition *must* be broader than the organization. In effect, the "enterprise" provides the *context* for whatever aspect of the organization we're addressing at that time, and in essence, in enterprise architecture, we create an architecture *for* an organization *about* the enterprise that provides its context.

To keep things simple, I'll generally use "the enterprise" here in that colloquial sense, that it's sort of the same as "the organization." Just be aware that they're not *actually* the same at all, and that in few places that difference will matter. I'll highlight those when we get there.

Although an organization is a kind of enterprise, not every enterprise is delimited by the legal and other boundaries of an organization. *An enterprise may be any subset or superset of the organization:* the IT department is an enterprise in its own right, within the overall enterprise of the parent organization; a multipartner cross-industry consortium is likewise an enterprise made up of a shared "mission and scope" to which a group of smaller enterprises choose to align. There's no inherent restriction there, and in some cases, the effective boundaries of the enterprise may well change from minute to minute.

Under those circumstances, governance of the enterprise can get complicated, to say the least. This is where enterprise architecture comes into the picture:

- **Enterprise architecture is a discipline through which an enterprise can identify, develop, and maintain its knowledge of and choices about its purpose, its structure, its story, and itself.**

Enterprise architecture identifies and monitors the structures and more that are needed to support that shared mission; it assists in managing change and responses to change; it provides guidance and consistency across the whole scope.

But here we may hit up against a problem of divergence between what is commonly thought to be the scope of enterprise architecture and the real scope it needs to have. We need to address that issue of scope before we can move on.

The Scope of Enterprise Architecture

In most current descriptions, “enterprise architecture” is associated almost entirely with IT – in effect, the term is a kind of shorthand for “enterprise-wide IT architecture.” But with each new stage of maturity, the scope has needed to expand further, from low-level technology and interfaces to structures for data and applications and then to a somewhat belated recognition that all of this needed to be linked to and driven from business strategy.

Yet all of this is still centered solely on IT. Yes, there is a distinct and separate discipline of business-architecture that addresses business-models, process-flows, organizational structures, and so on, yet still far too often what’s called “business-architecture” in the enterprise-architecture context is still little more just an IT-oriented summary of “anything not IT that might affect IT.” So as shown in Figure 1-1, a typical view of the scope of that “enterprise architecture” would be as in the TOGAF specification.

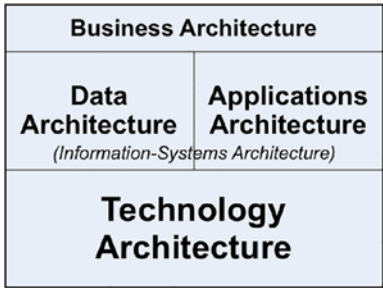


Figure 1-1. *The IT architecture hierarchy*

Note the relative sizes of each area of interest in that diagram. Back in the original TOGAF methodology, for example, assessment of low-level technology was assigned more than six times as many development steps as for the whole of the rest of the business put together. Kind of an imbalance there...

Every enterprise is different, yet very few are as IT-centric as the standard enterprise-architecture models suggest. And for the rest? Perhaps the simplest way is to describe each enterprise in terms of four distinct dimensions, which we could summarize as the four classic ways an enterprise distinguishes itself from its competitors:

- *Through products and services: A physical dimension of actions and transactions, “the way we do things round here”*
- *Through knowledge and innovation: A conceptual dimension of ideas and information, “what we know, how we think”*
- *Through relationships and “feel”: A relational dimension of people and their individual skills and experience, “how we relate with each other and with others”*
- *Through vision and purpose: An aspirational dimension about direction, focus, morale, belonging, “who we are and what we stand for”*

The FEAF-reference-model describes these respectively as “Other Fixed Assets,” “Technology” (by which they mean IT, though that’s actually only a subset of knowledge-technology), “Human Capital,” and “Business.” These dimensions interweave as the distinct and distinctive nature of the enterprise as a whole. So if we were to reframe that classic model, the layering of a *real* whole-enterprise architecture would look more like as shown in Figure 1-2.

<i>Purpose</i> (Aspirational dimension) Business Architecture			IT domain (typical)
People Systems-Architecture	Information/Knowledge Systems-Architecture	Machine / Asset Systems-Architecture	
Manual-Process Detail-Architecture	Information-Process Detail-Architecture (Technology Architecture)	Machine-Process Detail-Architecture	
<i>People</i> (Relational dimension)	<i>Knowledge</i> (Conceptual dimension)	Assets / 'Things' (Physical dimension)	

Figure 1-2. Whole-of-enterprise structure

So enterprise architecture can't be solely about IT, but about how *every* aspect of the enterprise interacts with everything else – including security, marketing, business-models, value-flows, and much, much more. And it also can't be centered on IT: in fact, it isn't centered anywhere, other than on that guiding theme, the “defined business scope and mission.” In short

- **The scope of enterprise architecture is always the whole of the enterprise – the enterprise *as a whole*.**

We may choose, for practical reasons, to set suitable limits on the scope of an architectural assessment or design. But the moment we forget that that's an arbitrary choice, not a fact, we'd be in trouble straightaway: the real scope – *always* – is the whole of the enterprise.

The Purpose of Enterprise Architecture

But what's the point of all of this? What's the *purpose* of enterprise architecture? To answer that, we could perhaps return to that FEAF definition earlier, that an enterprise has various members and components that coordinate their functions and share information to express or achieve

their shared “mission” or vision. From that perspective, the architecture provides a means to support that process of coordination; it provides consistency across the whole of the enterprise scope and a consistent *description* of that scope.

That’s where standard reference-frameworks come into the picture. For example, Open Group’s “Integrated Information Infrastructure Reference Model” provides one such view for the IT industry, while eTOM and SID (“Enhanced Telecom Operations Map” and “Structured Information/Data”) provide the same kind of descriptions for telecommunications service providers, and SCOR (Supply-Chain Operations Reference-model) describes logistics and other supply chain services.

Yet these are all static models: they describe structure, but not much about *interactions* between the components of those structures. And they don’t explain much about the *human* side of the systems – such as the “tacit knowledge” that resides only in people’s heads and is most often shared through stories and action-based learning. For these, we need a broader view of the structure, the system, and the scope and the flows and interactions across all of those elements.

That’s what a “services” view of the architecture can provide for us. Services present a consistent frame through which to understand a structure, and service-choreography describes the *use* of that structure, which leads us, in turn, to a service-oriented view of the enterprise as a whole – the *service-oriented enterprise*.

That in turn would depend on a view of “service-orientation” that’s as broad as the scope of the enterprise itself. But as with “enterprise architecture,” the term is at present strongly associated with IT alone – too strongly for our needs here. To make this work, we need first to take a detour to find the *real* meaning of “service-oriented architecture.”