

## Business-Driven SOA 2

### How business governs the SOA process

In last month's Journal, we introduced a New Theory of Service-Based Design, inspired by the work of Christopher Alexander. This month, we develop this approach in more detail, and place it into a practical governance framework for SOA. We identify six key challenges for effective SOA. (Similar challenges can be found in the field of Urban Design – as explored recently by Pat Helland of Microsoft.) Our SOA Governance framework contains practical guidance for addressing these challenges.

By Richard Veryard

### Introduction

The service-oriented business is configured as a continuous fabric of services – “the corporate web”. This can never be achieved in one large ambitious project. It is achieved progressively through a continuous stream of small and medium projects.

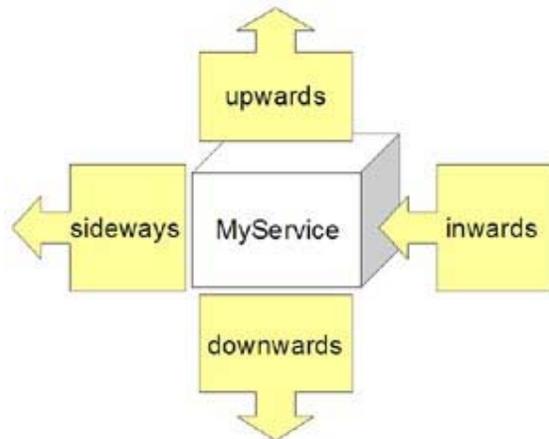
In the organic planning approach, order and coherence emerges from distributed activity, with no central design authority. However, some governance is needed to maintain architectural order. Each unit of procurement, development or maintenance activity is regarded as a project. Project outputs are constituted as services. Each project contributes something positive to the emerging corporate web of services.

SOA Governance is required to ensure that each project satisfies the global demands of the corporate web, and ensure that there is a well-balanced mix of projects – different types as well as different scales (large, medium and small).

### Service Design

#### Service Design Orientation

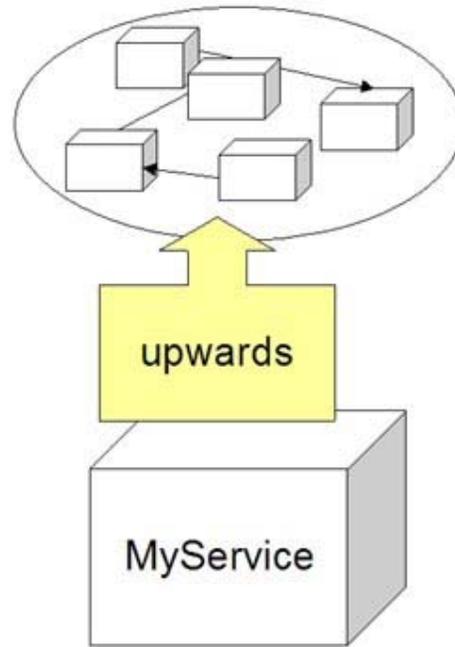
To create a continuous web of interoperating services, each act of servicing must pay attention to four design directions.



### Service Design – Upwards

MyService must contribute (in multiple ways) to some defined larger-scale service/packages.

- Business process / orchestration
- Closed feedback loop
- Entity supertype
- Entity lifecycle
- Knowledge learning cycle

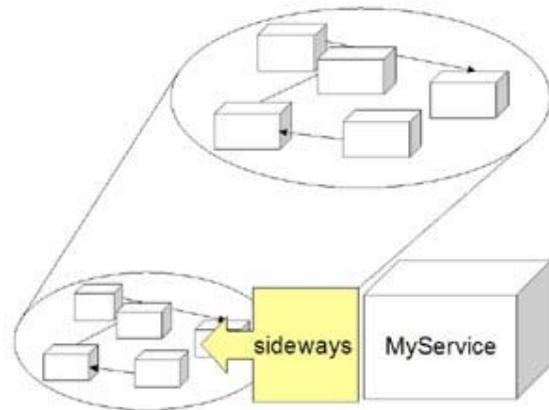


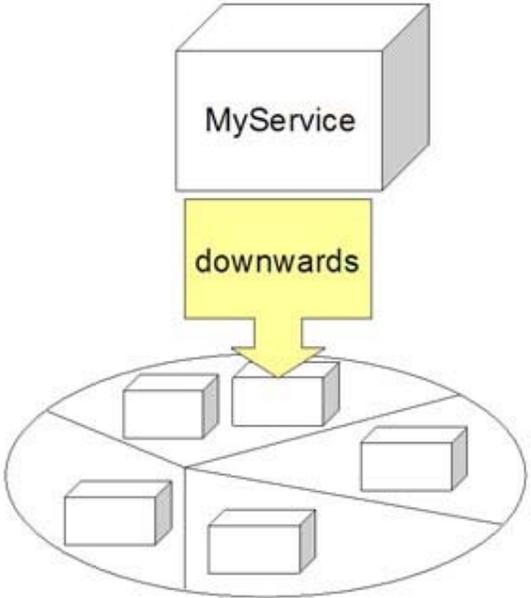
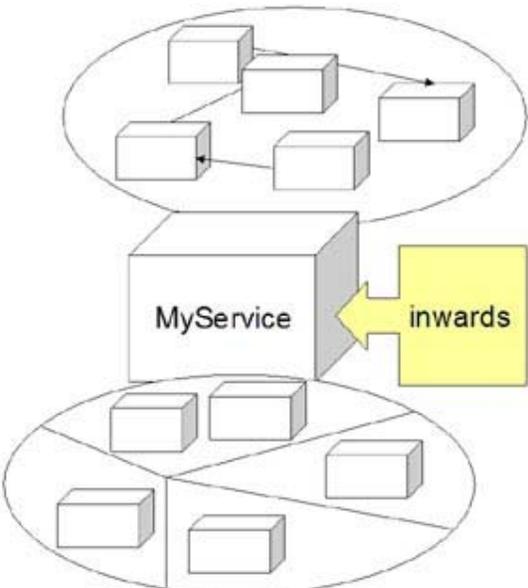
### Service Design – Sideways

MyService must interoperate with sibling services.

No “negative space” between services – this implies some sense of completeness of the service together with its siblings when viewed from above

No conflict between neighboring services – this implies some architectural “deconflicting” effort



<p><b>Service Design – Downwards</b></p> <p>MyService must use or be decomposed into lower-level services in some meaningful way.</p> <ul style="list-style-type: none"> <li>• Process-based separation (e.g. Orchestration / Steps)</li> <li>• Object-based separation</li> <li>• Responsibility-based separation (e.g. Action, Exception, Data, Context, Policy)</li> </ul>	
<p><b>Service Design – Inwards</b></p> <p>How does MyService add value by transforming the input services to the output services?</p> <p>MyService must perform an accurate and complete transformation from input into output – functional composition.</p>	

## Urban Design – City Governance and IT Governance

In a recent article in the Microsoft Architects Journal , Pat Helland compares the planning and management of IT with the planning and management of cities. He argues that IT governance has a lot to learn from city governance.

<p><i>[In contrast to metropolitan city governance ...] IT governance is not so mature.</i></p>	<p><i>Enterprises might learn a lot by looking at how cities manage the difficult process of resource allocation.</i></p>
<p>Who makes the tough choices in IT? Is it the CEO, the CIO, the business unit leaders, techies, or perhaps committees? Are priorities established based on cost, flexibility or</p>	<p>What proposals are projected to pay for themselves? What is the timeframe and risk analysis around these projections? What in your organization is sacred?</p>

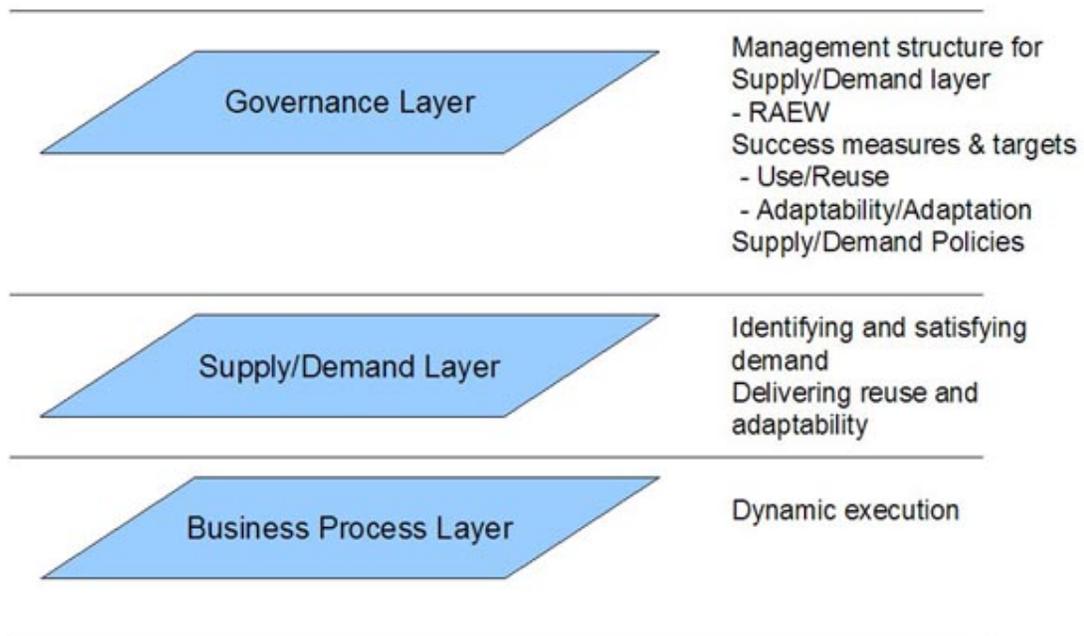
asset utilization? What is success and how is it measured? Are we seeking cost reductions, business process transparency, or competitive advantage?	What resources remain after funding these efforts? What balance of short-term, long-term, and speculative investments are right within the specific corporate culture?
	<i>These problems are common for metropolitan and IT environments</i>

**Table 1: SOA Governance Questions from Microsoft's Pat Helland**

Helland raises some interesting parallels between urban design and SOA, but his material is selective and possibly misleading. We intend to draw some practical lessons for SOA from this parallel. One of the key parallels, which Helland completely overlooks, is the need for modules and actions on many separate scales. Helland talks as if only the large scale exists. This is linked to Helland's attitude to complexity – which is at best ambivalent. Proper alignment to business requirements demands requisite variety.

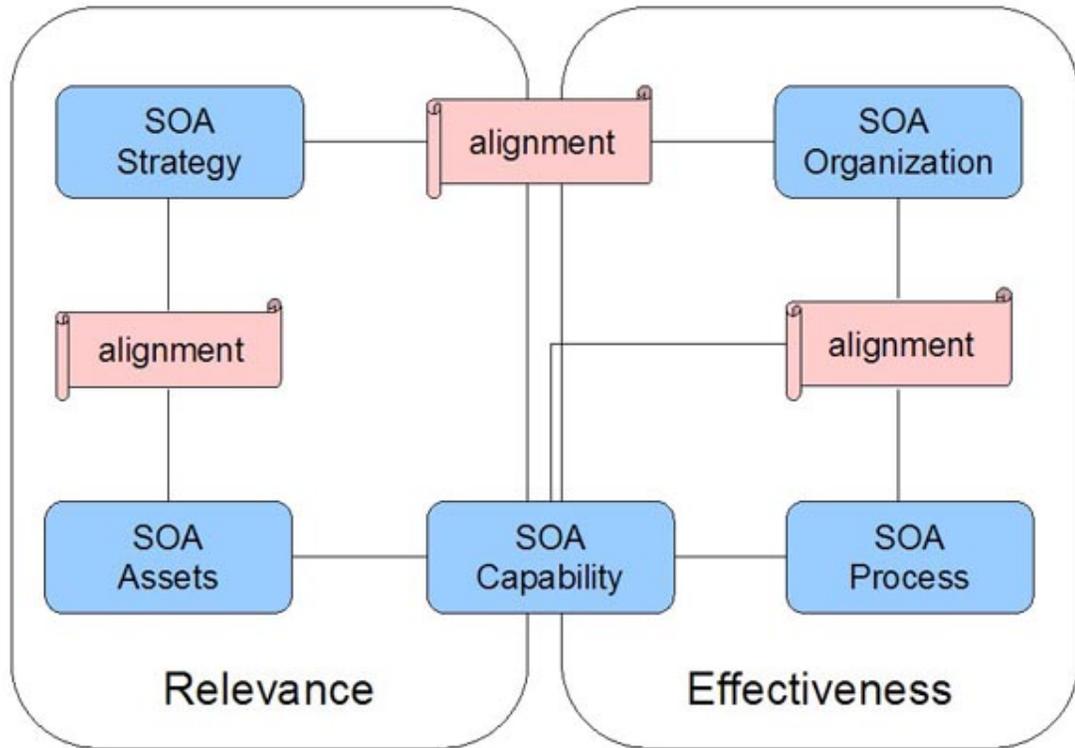
### Governance Framework

In our first report on this [topic](#) we focused on identifying and satisfying demand for services, managing the reuse process. In this follow-up report we show this activity is part of a layered SOA governance framework.



**Figure 1 - Layered Governance Framework**

In our framework, the focus of SOA governance is to achieve inter-alignment between five elements of SOA practice – strategy, organization, assets (including reusable services), capability and process. Each of these elements must also be aligned with elements in the environment. Thus SOA strategy must align with a broader business agenda, SOA process must align with business process, SOA organization with broader organizational issues, and so on.



**Figure 2 SOA Alignment Framework**

This gives us the framework shown in Figure 2, which identifies two key challenges. On the left side of the picture, the key challenge is one of relevance – doing the right things. Relevance addresses the alignment between strategy, assets and capability. On the right side of the picture, the key challenge is one of effectiveness – doing things right. Effectiveness addressed the alignment between capability, process and organization. For further breakdown, see Table 2.

Element	Compliance Points
SOA Strategy	R E L E V A N C E
SOA Assets	SOA Goals and Priorities – reuse versus speed versus flexibility – supporting the business agenda Level of abstraction. Granularity and stratification of services. Levels of use/reuse (targeted/achieved).
SOA Capability	E F F E C T I V
	Adaptability of SOA solutions Ability of the organization to handle a given level of abstraction / granularity. Ability of the organization to handle SOA process innovation. Availability of knowledge / expertise

SOA Process	E N E S S	Management of complexity. Decoupling separate areas of work. Integration and differentiation.
		Efficiency, agility.
SOA Organization		Clarity of responsibility, authority, expertise and work (RAEW). Separation of concerns. Appropriate accounting policies, accounting practices and reporting lines. Management incentives.

**Table 2 SOA Elements**

### Six Challenges for SOA

Challenge	Dimension	Resolution
Alignment	Business v technology	Arises at level 1
Flexibility	Adaptation v adaptability	Addressed at level 2
Granularity	Large v small	Arises at level 1
Design Orientation	Top-down v bottom-up	Addressed at level 3
Use/Reuse	Supply v demand	Arises at level 2
Geometry	Differentiation v integration	Addressed at level 2

One key weakness of Helland's article is that he has failed to acknowledge these challenges – neither in the urban design domain (where these issues have been vigorously disputed for decades) nor in the SOA domain. Instead he is simply favoring/assuming one side of the argument (large, top-down, integrated, adapted, supply infrastructure). We've talked about these challenges many times before, so I don't intend to go over it all again. But the Service-Oriented Design approach generates some new ideas.

### Granularity / Scale

One of the fundamental principles of complex order discovered by Christopher Alexander is that it requires interaction between many different scales. We either need designers who are capable of paying attention to different levels of granularity (not necessarily all at once), or we need to forge collaboration between designers operating at different levels of granularity. There is no single right level of granularity.

### Design Orientation

One of the key problems faced by IT planning has been the dilemma – top-down or bottom-up. Top-down methods produce grand schemes without addressing the problems on the ground (including legacy), while bottom-up methods produce local solutions without any overall order, coherence or reuse.

One way of addressing this dilemma is to introduce a twin track process, as shown in Table 4. However, for this process to be effective, we need clear allocation of responsibility, authority, expertise and work – in other words, RAEW. This is defined in Layer 3 (Governance).

Bottom-Up Approach Point Projects	Top-Down Approach Area Projects

Local short-term initiative	Broader, longer-term initiative
Building a solution against immediate requirements (where “building” means design, construct or assemble)	Focus on system properties across a whole area (e.g. business domain, technical domain, infrastructure)
Strongly aligned to local objectives.	Creating value by establishing (procuring or building) conveniently available resources
Cost-effective use of conveniently available resources (improvisation or “bricolage”)	Indirect links between benefits (across area), costs and risks
Direct link between (local) benefits, costs and risks.	
No mandate to pay attention to broader, longer-term opportunities and effects.	<ul style="list-style-type: none"> <li>• Often difficult to create/maintain business case for adequate investment in resources and infrastructure</li> <li>• Often difficult to demonstrate return on investment</li> </ul>

**Table 4 Twin Track Development – Bottom-Up versus Top-Down**

The method suggested by Alexander provides a way out of this trap – an organic method of identifying and governing city development – a method that is equally applicable to IT.

### Geometry (Architecture)

Traditional View	New Role
Fixed methodological notion of what elements are stable and slow-moving.	The business demand for adaptation and adaptability is itself subject to change.
For example, data-driven methods presumed that the data structure was stable and slow-moving.	The role of architecture is to maintain appropriate stratification and coupling between elements.
Meanwhile, ISP methods presumed that the decomposition of the enterprise into discrete business areas was stable and slow-moving.	<ul style="list-style-type: none"> <li>• High cohesion / low coupling between elements within the same layer</li> <li>• High cohesion / low coupling across layers.</li> </ul>
Architectural models describe / prescribe the stable / slow-moving elements.	Architecture now operates at a higher level of abstraction – implementing evidence-based design policies
Development methods build a platform of the stable slow-moving elements, and then build the flexible stuff on top.	

**Table 5 Changing Role of Architecture**

Modern production methods allow for mass customization. This involves a separation of production into two layers – a homogeneous layer of mass production and a heterogeneous layer of customization. The articulation of a complex system into two layers (one homogeneous, one hetero) is an architectural question. One plausible basis for articulation is the differential rate of change. It may appear to make sense to standardize the slow-moving layer, and allow greater diversity in the fast-moving layer. But remember that the slow-moving dominates the fast-moving.

### Summary

The development of SOA for an enterprise or ecosystem has many parallels with urban planning. Perhaps the most important, but least understood parallel is that it will be a life time’s work. We offer the SOA Governance framework as a basis for communicating and guiding this long term project. Some immediate steps we strongly recommend include:

- **Establish project and program governance to implement organic planning.**
- **Review the organization structure - undertake RAEW analysis to define responsibility and derive authority**
- **Establish accounting/measurement regime.**
- **Prioritize knowledge management - understand what knowledge is required by different parts of the organization to support requisite activities.**

### **Acknowledgements**

Thanks to Nikos Salingaros for valuable discussion on the parallels between Urban Design and SOA

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### **Footnotes**

1. Pat Helland, Metropolis. Microsoft Architects Journal2, April 2004.  
Available at <http://msdn.microsoft.com/architecture/journal>
  2. Business Driven SOA - Supply/Demand oriented SOA architecture – driving the SOA from a business perspective, CBDI Journal May 2004  
[http://www.cbdiforum.com/secure/interact/2004-05/Business\\_Driven\\_SOA.php](http://www.cbdiforum.com/secure/interact/2004-05/Business_Driven_SOA.php)
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### **Reference**

CBDI Newswire 20th May 2004 - NEW THEORY OF SERVICE BASED DESIGN

Many organizations are now undertaking development of service oriented architectures, but the probability is that most will result in sub-optimal implementation. Most organizations will focus on a smaller set of objectives than they ought to, because they are overly influenced by project and or technical concerns, and not sufficiently focused on the broader business service view. We discuss a recent article by Pat Helland of Microsoft and contrast this with the thinking of Christopher Alexander, whose thinking has stimulated much IT process and pattern activity.

<http://www.cbdiforum.com/public/news/index.php3?id=1394>