Compendium Overview

By John Hagel and John Seely Brown

Over four years ago, we began to discern a new technology discontinuity on the horizon. At first, it came in the form of XML (eXtensible Markup Language) an interesting new standard format to facilitate electronic reading of documents. While interesting, XML alone was not sufficient to create a technology discontinuity. But XML was only the beginning. This standard then begat other standards and protocols (e.g., SOAP, UDDI and WSDL). It rapidly became apparent that we were starting to see an entire new generation of technology take shape. This new generation of technology did not seek to replace the vast installed base of technology already operating within enterprises around the world. Instead, it offered the potential to ride on top of that technology and deliver even more value to businesses from the installed base.

Now, technology alone has no ability to create business value. In fact, if not appropriately deployed, it can become a black hole of investment and escalating operating expense. Many of our largest companies are deep within that black hole today.

Nevertheless, new technologies like Web services have the potential to be a powerful catalyst and enabler of business value creation. Executives will only be able to realize the potential by situating this technology within a broader set of innovative business initiatives. Yet, as we began to work together two years ago to investigate the business potential of this technology, we found that virtually all the discussions of Web services were entirely focused on the technology and debates about its functionality and merits relative to other technology. These discussions of course are essential and must continue.

Our focus, however, is different. We want to understand the business implications of this technology. To accomplish this, we began to collaborate on some focused research initiatives and to write up our findings in a series of working papers. This compendium is the result of that effort. We never intended on publishing these working papers (although highly abridged versions of many of them did eventually see the light of day as articles) so we did not worry about deeply about presentation or potential overlaps among the papers. We just wanted to get the substance of our thinking and findings down in writing so that we could both sharpen our own perspectives and share them with others.

As a result, these working papers can be read as independent works or as a collection that spans across many related topics to sketch out a broader perspective. This Compendium Overview will help the reader to navigate through the collection of working papers in either mode. It provides a road map to highlight the connections among the working papers and it also provides a brief view of the key focus of each working paper.

THE BOTTOM LINE

We are optimists regarding the business potential of Web services technology. At the same time, we are realists about the substantial challenges ahead before executives can realize the full business potential of the technology. Some of these challenges are technological, but we would argue that these are really secondary. The biggest challenges in exploiting the potential of Web services will be business challenges.

Executives will need to pursue fundamental business innovation in order to harness the value of the technology. Without this innovation, the technology will remain a relatively marginal event, producing real efficiency savings, but not substantially altering the competitive landscape. With appropriate innovation, executives will be able to change the playing field. They will be able to pursue technology-enabled strategies designed both to generate greater returns with fewer resources and to shift value capture across major markets and industries.

UNDERSTANDING THE ECONOMIC IMPACT

The economic impact of Web services technology will be realized in two distinct stages. The near-term impact over the next 1-2 years will be largely in the form of operating savings. Longer-term, the true economic value of Web services technology will be realized in the form of much more leveraged approaches to growth.

Near term impact

"Break On Through to the Other Side: A Missing Link in Redefining the Enterprise" focuses on understanding the economics driving early adoption of Web services technology. It suggests that Web services technology is already generating tangible operating savings either in terms of assets (especially inventory and working capital) or operating expense. It delivers these savings with modest investment and short lead-times, leveraging existing technology platforms. This is the compelling value proposition driving early (and rapid)

2

adoption of Web services technology. As competitive pressure intensifies and margins continue to shrink, this proposition is hard to resist.

This near term impact of Web services technology is particularly concentrated at the edge of the enterprise in functions like procurement, supply chain management, marketing, sales and customer support. These functions typically have to interact frequently with a broad range of business partners and customers. The connections supporting this interactions today are either expensive and hard to modify (in the case of traditional technologies like EDI) or highly inefficient and prone to errors (in the case of swivel chair integration using employees to output data from one system and manually re-enter it into a second system). Web services technology is distinctively able to reduce the expense associated with these connections, while at the same time increasing flexibility.

Long-term impact

 "Orchestrating Business Processes – Harnessing the Value of Web Services Technology" focuses on some of the longer-term potential to enhance collaboration capability by coupling business innovation with Web services technology. While the near-term savings enabled by Web services technology are compelling, they pale in comparison to the potential to create much more substantial economic value longer-term.

Loosely coupled business processes represent a very different approach to business process management. This approach provides a foundation for new forms of growth. By deepening collaboration capabilities, companies can develop much more leveraged forms of growth where they access and mobilize resources of other companies to deliver more value to their own customers. While these leveraged growth strategies can be implemented without the benefit of Web services technology, the technology can play a key enabling and catalyst role, providing a much more effective way to establish connections across enterprises.

OVERCOMING KEY CHALLENGES

Very little of this potential of Web services technology will be realized unless major challenges can be overcome along the way. The technological challenges are non-trivial – the technology must continue to evolve rapidly around standards that are universally adopted by all the major technology vendors. Far more significant, however, are the business challenges. Executives will need to rethink their business practices and even the nature of their business from the ground up in order to effectively harness the potential of this technology.

Technology missing links

"Service Grids: The Missing Link in Web Services" highlights one of the key requirements to make Web services technology more relevant to mission critical business processes. It introduces the concept of service grids, consisting of highly specialized enabling services, designed to provide much of the functionality required to support mission critical business activities, including reliability, availability and security. Service grids are especially essential to support robust connections across enterprises. As we have maintained in the earlier working papers, these connections can generate significant value both in the near-term and longer-term using Web services technology. Without service grids, Web service technology will play a much more limited role at the edge of the enterprise.

While service grids are a key technology missing link, this paper also explores potential business opportunities created by the need for service grids. It examines potential evolutionary paths for these businesses, highlighting possible "sweet spots" that will support large and profitable businesses over time.

"Security and Security Frameworks within the Service Grids", offered as an appendix to this compendium, goes into much more technical detail regarding a particularly critical component of service grids – security services and frameworks to manage the risk associated with delivering application services and related data across enterprise boundaries. Issues about security remain at the top of the list of CIO concerns holding back adoption of Web services technology to support connections across enterprises. As this working paper discusses, however, these concerns can be addressed in creative ways, resulting in a much more granular and flexible approach to security.

Changes in management practices

"Control vs. Trust – Mastering a Different Management Approach" discusses the fundamental shift in management practices required to realize the potential of Web services technology. Managers have perfected control-based techniques to ensure performance of business processes within the enterprise. When these techniques are extended across enterprises, however, they tend to limit the potential for collaboration, rather than enhance it. Control-based techniques may work if there is a clearly dominant business partner dealing with much smaller companies. Even here, though, the smaller companies will over time tend to migrate to work with business partners who have adopted a different management approach. A trust-based management approach focuses on the role of economic incentives in shaping and deepening collaboration. Rather than relying on market power to impose practices on business partners, this approach

4

creates appropriate incentives to ensure coordination of activities in the most flexible and least expensive way possible.

"Orchestrating Loosely Coupled Business Processes: The Secret to Successful Collaboration" covers much of the same ground as "Orchestrating Business Processes – Harnessing the Value of Web Services Technology" discussed earlier. However, it focuses more on the stages of evolution towards loosely coupled business processes, highlighting the expanding role of the orchestrator in cultivating far-reaching process networks. In this regard, it drives home the great distance that companies must travel in order to implement a very different approach to business process management, one that relies on trust-based management approaches rather than control-based management approaches.

Changes in management mindset

We have not developed a separate working paper discussing the most fundamental business challenge of all, although it is a theme that runs through the two working papers just discussed. To exploit the potential created by Web services technology, managers must be prepared to challenge and abandon some of the most basic assumptions they have developed over their career regarding the nature of their business and the approaches required to create economic value. They will need to adopt a new mindset before they can fully understand the magnitude of the business changes enabled and catalyzed by this new generation of technology.

Most managers have developed a highly mechanistic mental model over the course of their careers. It is this mental model that defines the lens through which they see the world. It is this mental model also that shapes the natural response of executives when confronted with growing complexity and uncertainty. In their minds, the best way to cope with uncertainty is to tighten control over all the elements required for success. In their minds, the best way to manage risk is to own all the assets (intellectual as well as physical) necessary to operate the business. To ensure control, managers seek to define in advance and in fine detail all the activities required to operate in challenging environments. Tighter control also requires managers to closely monitor all activities as they are performed and to intervene when deviations from plan occur. At its foundation, this approach to complexity and uncertainty embodies a top-down, mechanistic approach to technology and business. In practice, this approach paradoxically creates brittle systems that often fail when faced with unexpected events.

The loosely coupled architectures enabled by Web services technologies start with the assumption that robustness – the ability to perform in highly complex and uncertain environments - requires greater flexibility. Systems must be able to respond to unanticipated events and facilitate real-time changes to continue to perform well. Loosely coupled connections must replace hard-wired

5

connections wherever possible. In this way, individual elements within the system can rapidly adapt and exploit opportunities without forcing a redesign of the entire system. Rather than representing a top-down, mechanistic approach, these architectures assume a much more bottom-up, organic approach. This organic approach is much more respectful of context. It does not assume that planners or designers can anticipate the range of needs that will emerge over time. The paradoxical implication is that the best way to cope with uncertainty may be to loosen control rather than tighten control – it requires much more of an evolutionary mental model.

Evolutionary mental models require a different approach to design. Design in a complex and uncertain world becomes a shaping philosophy. Rather than accepting a passive posture and simply reacting to changes in the business landscape, shaping strategies seek to understand the underlying forces shaping the business landscape. They use this understanding to craft targeted interventions intended to shift evolutionary trajectories in more favorable directions. Shapers understand that specific outcomes will vary widely but that the probabilities of certain directions can be influenced by actions taken by participants. Of course, not all actions have equivalent influence. The challenge in shaping strategies is to amplify the impact of actions by understanding and targeting key leverage points in the business landscape.

CAPTURING THE OPPORTUNITIES

"The Secret to Creating Value from Web Services Today: Start Simply" begins to define a promising approach to capture the economic opportunities created by Web services technology. This working paper focuses on one dimension of this approach in particular – the need to move aggressively in rapid increments to implement the technology and related business changes. This approach is consistent with the evolutionary mental model just discussed. It puts the organization on course to rapidly develop fundamentally new capabilities. Near-term performance targets shape operating initiatives. They also help management to monitor progress and learn rapidly regarding additional initiatives required to achieve the necessary performance.

These near-term operating initiatives also need to be shaped by a longer-term strategic direction shared by the entire senior management team. Consistent with the evolutionary mental model, this longer-term strategic direction cannot be very detailed, but it must be explicit and clear enough to help management choose the appropriate near-term operating initiatives and performance targets required to move the organization more quickly towards the longer-term goal. This longer term strategic direction will in turn be refined and evolve based on the learning generated from the near-term operating initiatives.

6

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Web services technology holds substantial promise in terms of addressing the unmet needs of business today. But this promise is not a panacea. It cannot be achieved without addressing significant challenges – both technical and business – along the way. For those who understand the challenges and commit to addressing them, the economic rewards will be substantial. Near-term efficiency savings will fuel the more ambitious initiatives to capture the real economic prize – the potential to create significant new economic value by accessing and mobilizing the resources of others. These working papers are only a start at understanding the road ahead, but they can provide a compass to guide managers along the way. As the journey proceeds, the road ahead will also become clearer.

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