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Regis University
College for Professional Studies Graduate Programs
Final Project/Thesis

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**WHEN IS AN ENTERPRISE SERVICE BUS (ESB) THE RIGHT CHOICE
FOR AN INTEGRATED TECHNOLOGY SOLUTION?**

A THESIS

SUBMITTED ON THE 6TH DAY OF FEBRUARY, 2011

TO THE DEPARTMENT OF INFORMATION TECHNOLOGY

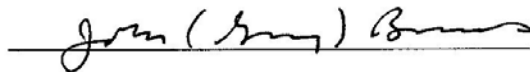
OF THE SCHOOL OF COMPUTER & INFORMATION SCIENCES

OF REGIS UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN

COMPUTER INFORMATION TECHNOLOGY

BY



John (Gerry) Burns

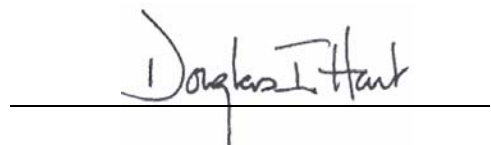
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Abstract

The Enterprise Service Bus (ESB) is an important systems integration technology often closely associated with Service Oriented Architecture (SOA). Some maintain that an ESB should not be used apart from SOA. Others see the ESB simply as the next generation of middleware, incorporating the best of its predecessors, Enterprise Application Integration (EAI) and Message Oriented Middleware (MOM), and a candidate for any integration requirement.

Is the ESB a one-size-fits-all solution to be trusted for any integration requirement, or must its use be carefully considered with proper due diligence based on application complexity and/or the presence or absence of a defined SOA?

This thesis probes these questions in an analysis of a world-wide survey of 230 industry SOA and middleware professionals conducted via the LinkedIn Professional Network during a six week period in November and December of 2010.

In addition, the thesis applies a review of the survey results and current SOA and ESB literature to an architectural decision being made within the Systems Engineering and Application Development (SEAD) Practicum in the Master of Science program in Computer Information Systems at Regis University in Denver, which provides support for the University's Academic Research Network (ARN). An ESB has been proposed as a new architectural component for the ARN infrastructure and this paper reviews the merit of this proposal.

This thesis employs an interpretivist epistemology, understanding that there may be more than one acceptable answer to the question, "When is an Enterprise Service Bus an appropriate component of an integrated technology solution?"

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Chapter 1 – Introduction

When is an Enterprise Service Bus (ESB) an appropriate component of an integrated technology solution? Is it only when situated within a Service Oriented Architecture (SOA)? Or is it rather the answer to most integration needs previously serviced by Enterprise Application Architecture (EAI) and Message Oriented Middleware (MOM) solutions? Are there middleware solutions for which an ESB is not the right choice?

These questions are the subject of this thesis and impact an accompanying project regarding the advisability to integrate an ESB into the Regis University Academic Research Network (ARN) infrastructure, which is supported by graduate students in the University's Systems Engineering and Application Development (SEAD) Practicum and serves as the case associated with the thesis.

Focus will be placed on two aspects of the ESB: 1) its role as the workhorse of a mature SOA and 2) that its complexity may be more than is warranted for a given integration solution. The question will be answered, enlightened with the insight of industry experts whose opinions have been elicited via an online survey to illumine the issues that larger enterprises face in making this determination, and with a review of the existing literature, and then applied to the ARN case.

The technical challenge faced within the ARN project is the architectural decision for a SEAD application infrastructure beginning with the planned deployment of a new Radio Telescope application and through the progressive elaboration of the Radio Telescope project in subsequent phases including integration of additional nodes for seismic or meteorological study, along with other future unrelated projects, potentially including Cloud Computing and connectivity to Microsoft Azure. The context of this challenge is an assessment of the relation

between the ESB and a Service Oriented Architecture and the decision as to whether an Enterprise Service Bus is appropriate.

Although the ESB is considered an essential component within enterprise wide Service-Oriented Architectures, it can be over-kill when used to address less sophisticated application requirements. *MuleSource* is a leading Open Source ESB, and Mule CTO Ross Mason discourages use of ESB's within architectures where either the integration requirement is not complex or where too few features of the ESB are required by the integration. According to Mason (Gardner, 2009, p. 1), questions to ask to make this determination would include:

- How many communications protocols are being integrated and which ones?
- How many applications must be integrated? Is data transformation required? Are the subject applications of disparate technologies, such as J2EE, .NET, legacy?
- Are there any event-driven requirements or the need for workflow or business process management?

Other considerations include the cost of acquisition of the ESB along with installation costs, ongoing new service integration costs and savings, and ongoing support requirements and costs. If you have a complex web of application end points needing integration, you may well need an ESB. But says Mason, "If I'm only using HTTP or Web services, I'm not going to get a lot of value from an ESB as opposed to using a simpler Web services framework," because, "Web services frameworks are very good at handling HTTP and SOAP. By putting in an ESB, you're adding an extra layer of complexity that's not required for that job" (ibid.).

Hevner (2004, p. 76) tells us that it is "incumbent upon researchers in the Information Systems (IS) discipline to 'further knowledge that aids in the productive application of information technology to human organizations and their management.'" He continues, "Here

we argue, is an opportunity for IS research to make significant contributions by engaging the complementary research cycle between design-science and behavioral-science to address fundamental problems faced in the productive application of information technology.” And again, “The realm of IS research is at the confluence of people, organizations and technology,” (ibid., p. 77).

The primary artifact produced for this thesis was the *ESB Practices Survey*, a survey of industry professionals familiar with the ESB within their organizations to gain their perspective on a variety of ESB, SOA and middleware topics to better assess when use of an ESB is appropriate. That knowledge along with the literature review in Chapter 2 are used to answer the thesis questions directly and provide the basis for a recommendation to the SEAD Practicum in conjunction with the ARN ESB Radio Telescope implementation. This ESB Practices Survey was designed to collect data in a number of targeted areas that provide input to the thesis questions and to the ARN case, which are brought together in Chapter 5. The survey was open for six weeks, yielding 230 responses; an additional 70 persons responded to request survey results.

The criterion for aiding in a successful SEAD Practicum project will be the matching of ARN requirements to an appropriate middleware solution with the focus on the ESB in the context of the Radio Telescope project and expected future SEAD projects, evidenced by responses to a targeted survey of industry experts.

Various research methods may overlap in a number of ways. Case studies, surveys, experiments, and histories are all ways of performing social science research (Yin, 2009, p. 2). A survey can be used as the primary method of an exploratory study; surveys can answer the questions who, what, where, how many and how much, while case studies are best answering

how and why questions. Neither requires control of behavioral events and both focus on contemporary events (ibid.). This thesis employs a survey, the results of which are applied to a specific case; both methods concentrate on contemporary events.

The thesis views its subject from an interpretivist epistemology, understanding that there may be more than one acceptable answer to the question, “When is an Enterprise Service Bus (ESB) an appropriate component of an integrated technology solution?”

Chapter 2 – Review of Literature and Research

Service Oriented Architecture provides for the re-use of software assets through vendor-neutral technologies, allowing for loosely coupled systems to share components across heterogeneous platforms, such as .NET and J2EE. The Enterprise Service Bus (ESB) is a central component of a mature SOA, connecting services and consumers, providing workflow and orchestration, and data transformation and connections via disparate communications protocols, but can an ESB function effectively apart from an SOA?

In the evolution of the goal to re-use software assets in order to deploy solutions quickly and economically, Service Oriented Architecture (SOA) burst upon the scene during this millennium. As architecture progressed through client-server and n-tier models to distributed objects and components, the opportunity to reuse whole services in a loosely-coupled, protocol-independent, internet-enabled infrastructure arose (Swithinbank, 2005, Ch. 4). Chappell (2004, p. 1) sees SOA as a key technology trend of the early portion of the millennium, along with Enterprise Application Integration (EAI), Business-to-Business (B2B) and web services, but quickly notes that the Enterprise Service Bus (ESB) draws the best traits from each.

Service Oriented Architecture (SOA)

The *SOA Manifesto*, signed by key SOA proponents and practitioners, emphasizes “applying service orientation to help organizations consistently deliver sustainable business value, with increased agility and cost effectiveness, in line with changing business needs” (SOA Manifesto, 1). Examples of priorities listed in the Manifesto are: “business value over technical strategy; strategic goals over project-specific benefits; intrinsic interoperability over custom integration; shared services over specific-purpose implementations; flexibility over optimization; and evolution refinement over pursuit of initial perfection. That is, while we value the items on

the right, we value the items on the left more” (ibid.). Manifesto signees include Grady Booch, David Chappell and SOA guru Thomas Erl.

“Service-oriented architecture represents an architectural model that aims to enhance the agility and cost-effectiveness of an enterprise while reducing the burden of IT on the overall organization,” Erl tells us. “It accomplishes this by positioning services as the primary means through which solution logic is represented. SOA supports service-orientation in the realization of the strategic goals associated with service-oriented computing” (Erl, 2009, p. 37). Key SOA drivers are reuse, business flexibility, ease of integration, speed of integration, and compliance; and central to reuse are the SOA Registry and Repository (Hurwitz, 2009, p. 1-2),

Erl (2009, p. 61) describes four types of SOA as follows: Service Architecture, which is the architecture of a single service; Service Composition Architecture or the architecture for “a set of services assembled into a service composition;” Service Inventory Architecture or architecture to support a collection of related services that are independently standardized and governed;” Service-Oriented Enterprise Architecture, which is the “architecture of the enterprise itself, to whatever extent it is service-oriented.”

SOA governance is the overarching framework for an SOA program. An important first step in establishing governance is to understand the software assets that may be candidates for your SOA program. Therefore, an inventory of assets is a fundamental action in determining SOA strategy: what available components across the enterprise are best suited for re-use, irrespective of the platform (.NET, J2EE, etc.) on which it resides? In order to deal with the ongoing optimization of software assets, Bieberstein (2004, Ch. 4) advocates for the following organization structures in support of an SOA Project Office: an SOA business transformation architecture council; an SOA technical architecture board; component design and development

centers; and operations center. SOA governance is associated with four different aspects of a service's life cycle: design-time governance, "which involves policies and procedures to ensure that the right services are built and used;" deploy-time governance, whose policies impact how a service is deployed to production; run-time governance, impacting the binding of consumers with services; and change-time governance, where policies and procedures impact design, versioning and provisioning decisions of service enhancements (Rosen, 2008, Ch. 1).

Davies (2008, p. xxi) argues that "SOA is not a technology; it is architecture and a strategy. In order for you to implement your own SOA, you will need to learn a new way of thinking about your enterprise and managing software assets. SOA is generally implemented using newer technologies – not a single new technology, but a whole series of different technologies." Key technical SOA Enablers are web services, XML, the ESB and SOAP/REST.

When a company's SOA grows to at least 25 services an intermediary "SOA backplane" middleware is required of which an ESB is a core component. According to Gupta (2008, p. 5) Gartner defines SOA Adoption Phases as follows:

- *Introduction*: single application focus, fewer than 25 services and 10,000 service calls per day;
- *Spreading*: multiple applications, up to 100 services integrated and up to 100,000 service calls daily from as many as 25 consumers;
- *Exploitation*: shared services across multiple applications with up to 500 services and up to 1 million calls/day from up to 50 consumers;
- *Plateau*: final stage, continuous adaption and evolution enterprise-wide with more than 500 services and millions of service calls daily from more than 50 consumers.

The Enterprise Service Bus (ESB)

"The ESB is a standards-based SOA backbone, capable of connecting applications through service interfaces. By combining messaging, Web services, XML, and data

transformation/management, an ESB can reliably connect, mediate, and control communications and interactions among services” (Sturek, 2008). ESB’s align around standardization for connectivity, supporting J2EE, .COM, and .NET, along with SOAP and web services (Chappell, 2004, p. 8).

Similarly, for data transformation, ESB’s focus on XML standards such as XPATH, XSLT and XQuery (ibid., p.8). Web Services Description Language (WSDL), Business Process Execution Language for Web Services (BPEL4WS) and WS-Choreography provide other standards native to the ESB.

Rademakers (2009, p. 6) gives the following reasons where you might want to be considering an ESB in your architecture. First you see the necessity to integrate applications, second, this integration must take place in a heterogeneous environment, and third your goal is to reduce total cost of ownership (TCO).

Davies (2008, p. 1) suggests that elimination of a proliferation of point-to-point connections is a key value of the ESB. For a Developer or Integrator, use of an ESB means no longer worrying about physical locations or point-to-point (P2P) integration. Rather, the ESB abstracts the location data and the Developer needs only connect to the bus and specify the logical destination point – the ESB takes care of locating and delivering to that end point (Chappell, 2004, p. 10).

ESB functionality is a combination of message-driven services as part of an overall infrastructure architecture, and while the ESB can be an excellent facilitator for SOA, an ESB does not technically require the presence of an SOA or by itself provide an SOA (Kooijmans, 2007, p. 2).

In the first quarter of 2009, Forrester produced a report ranking available ESB offerings and listed the following as the “basic operational capabilities of the ESB”: support of multiple protocols; protocol conversion; data transformation and data-based routing; support of multiple connectivity options; support of composite services through lightweight orchestration; support of multiple standard business file formats; integrated security features; a comprehensive error handling mechanism; support of both synchronous and asynchronous operations; highly available and scalable infrastructure; support of many options in each of the above categories; and extensibility (Fulton, 2009, p. 2-3). ESB’s can be further characterized by loose coupling, location transparency, mediation, schema transformation, service aggregation, load balancing, security enforcement, monitoring and configuration vs. coding (Davies, 2008, p. 8).

ESB’s have evolved from prior middleware approaches, most notably Enterprise Application Integration (EAI) software and Message-Oriented Middleware (MOM). The ESB draws the best from EAI, SOA, B2B and web services, technologies that have attempted to increase value and improve the results of integrated solutions during the second half of the 1990’s and the early part of the new millennium (Chappell, 2004, p. 1). EAI and other previous technologies such as Common Object Request Broker Architecture (CORBA) had fallen short. EAI suffered from steep learning curves and other barriers to entry at the project level, and while CORBA moved in the direction of SOA, its complexity and tight coupling of applications and services brought its demise (ibid., p. 6).

Although generally viewed as an SOA enabler, the ESB can actually hinder SOA growth if it becomes an island of integration not accessible by remote applications or other ESB’s. The solution is a federated approach of interconnected ESB’s (McKendrick, 2007, p. 1).

The ESB was first introduced in 2002 and caught the attention of middleware, integration and web services communities. An ESB ties applications and services together in a loosely coupled fashion, allowing them to operate independent of one another as it creates value through providing a broader business function (Chappell, 2004, p. 3).

Process flow in an ESB can be simple or complex, with a small number of steps or flows that can be split or joined across parallel execution paths, driven either by simple metadata or by an orchestration language such as BPEL4WS (ibid., p. 11). In superior fashion to EAI, an ESB solution can define business flows easily at both the departmental level or through the larger network. In part, this is because the ESB more easily spans network domains and firewalls (ibid.). Through its embedded Message-Oriented-Middleware, reliable flows are established so that the ESB can provide “asynchronous communications, reliable delivery of business data, and transactional integrity (ibid., p. 12).

Aside from conformance with newer standards, ESB's differ from EAI's in that the latter employ a hub-spoke model that limits scalability as opposed to the bus model. Both are improvements over point-to-point (P2P) models (Rademakers, 2009, p. 4).

As with SOA, the ESB lends itself to incremental adoption, so that it can be implemented first at the project level and later expanded. The initial implementation becomes the foundation upon which additional solutions can be crafted in succeeding phases (Chappell, 2004, p. 18). The ESB provides a unified and highly capable architectural unit that is more likely to preserve initial design integrity through the years as it is enhanced and maintained by multiple personnel, rather than the bolt-on additions often seen with EAI (ibid., p. 28). Adopting the ESB at the departmental level on a project basis allows the team to become familiar with an ESB's capabilities and anomalies before tackling a succeeding set of projects, as the project team learns

standards-based integration using ESB service containers, but with the full confidence that this initial investment in the ESB will pay dividends with a consistent architecture as solutions expand to the departmental and enterprise level, interleave with existing EAI solutions, and begin integration with business partners (ibid., p. 38-41). Later, connecting a supplier with scores of distribution partners is a relatively small challenge for an ESB (ibid., p. 56).

The ESB service container is “the physical manifestation of an abstract endpoint” that provides for implementation of the service interface (ibid., p. 110). ESB deployment of containers is more flexible than that of its predecessors, EAI and J2EE application servers, allowing selective deployment of integration broker functionality specifically where it is needed with little added overhead (ibid., p. 111).

For both SOA and ESB, incremental implementation can help to minimize up-front investments in ESB software and hardware. Development effort beyond initial infrastructure acquisition is proportional to “number and complexity” of services planned. ESB strategy should reflect SOA strategy (Fulton, 2007, p. 4) but governance issues can be addressed over time; similarly, the service catalog and service life-cycle management policies can also be implemented over time. Regarding ESB architecture, Fulton (2007, p.5) says, “Even if you see your ESB primarily as a vehicle for publishing service interfaces, it will be a key integration point to legacy systems.”

An ESB works well with application servers, which are often the workhorses of the IT landscape, so there is no specific concern that application servers need to be replaced. Portal solutions are an example of such useful integration, where the ESB provides the connection between the portal server and back-end applications where needed (Chappell, 2004, p. 125).

Portal servers can struggle when they are required to coordinate complex requests from multiple systems, particularly if the systems are geographically dispersed. An ESB inserted between the portal server and the back end systems can actually improve performance and overall throughput and responsiveness for the end user and even reduce errors. The ESB provides more flexible integration capabilities through asynchronous communications and reliable delivery and correlation, at times using a federated query approach or alternatively a cache forward pattern (ibid., p. 223-4).

Portal applications commonly pull data from multiple back-end applications and data sources, typically using application servers in synchronous RPC- style communications. An ESB can be added to this scenario to provide an alternative, more flexible architectural approach (ibid., p. 204).

J2EE Connector Architecture (JCA) can be used to provide a generic JMS interface into an application server where a specialized adapter is not available, even connecting multiple application servers from different vendors into a common JMS layer. An application server connecting into an ESB can provide an interface to a servlet, portlet or SSB – Stateless Session Bean (ibid., 188).

Roshen (2009, Ch. 9) divides ESB's into three fundamental types: Application-based, Messaging System-Based, and Hardware-Based. IBM WebSphere Enterprise Service Bus is a prime example of the application-based server, while WebSphere Message Broker is an example of a message-based ESB, says Roshen. WebSphere DataPower Integration Appliance X150 is Roshen's example of a hardware-based ESB.

Although based on standards, the many ESB offerings still accommodate solutions provided by EAI, a combination of the best of both worlds that allows ESB solutions to supplant

EAI implementations forming “architecture for a highly distributed, loosely coupled integration fabric to deliver all the key features of an integration broker, but without all the barriers (Chappell, 2004, p. 35). But migrating away from “accidental architecture” and refactoring toward a consistent, uniform integration backbone requires adoption of standards such as XML, web services and SOA (ibid.).

Leading commercial ESB vendors such as IBM, TIBCO, Microsoft and Oracle, often have roots in EAI, and may or may not have an ESB offering built on top of their legacy EAI product. Some vendors, such as IBM and TIBCO, market separate ESB offerings, one with roots in EAI and the other newly-built to ESB standards such as Java Messaging Service (JMS), XML, J2EE Connector Architecture (JCA) and web services (ibid.).

With roots in EAI, IBM offers WebSphere Message Broker (version 6) while TIBCO markets its Business-Works product. At the same time, the companies provide new ESB offerings in IBM’s WebSphere ESB and TIBCO’s ActiveMatrix (Rademakers, 2009, p. 4).

ESB’s eliminate the need for a proliferation of point-to-point connections, especially where P2P interfaces have been customized and thus provide for faster integration as the calling application can more easily “connect to the bus” (if it is not already connected) and route data to the new service or application. IT departments do well to consider the ESB when they have the necessity to integrate applications in a heterogeneous environment and are looking to reduce their total cost of ownership – TCO (ibid., p. 5-6).

35% of software maintenance budgets are spent on maintenance of point-to-point application connections (Chappell, 2004, p. 33). Roshen (2009, Ch. 9) provides a formula to calculate the number of P2P connections required for a given integration, assuming all components must connect to all others. The number of distinct pairs of applications where N is

the number of applications is calculated as $N * (N-1) / 2$. To integrate ten applications in this manner, the number of connections to support would be $10 * (10-1) / 2 = 45$ connection pairs!

With an ESB, just ten connections would need to be supported, one for each application connecting to the ESB.

Although an ESB is a technical product with a great variety of integration capabilities, “workbenches and management environments out of the box,” its use within an organization’s architecture must be well planned. Core functionalities of the ESB are (Rademakers, 2009, p. 13): location transparency (decoupling service consumer from service provider locations); transport protocol conversion (the service consumer need not communicate to the provider in the provider’s protocol – the ESB handles that connection); message transformation (XSLT and XPath are most popular, but an abundance of other tools are also available); message routing (determining a message’s proper endpoint); message enhancement (adding data to an incoming message); security (authentication, authorization, encryption/decryption both inbound to the ESB and outbound to the service provider or consumer); and monitoring and management (to assure reliability and high performance).

While an ESB is often associated with web services the ESB must also support Enterprise requirements including transport, routing, data handling and mediation between requestors and providers (Kooijmans, 2007, p. 2). Communications, integration, service interaction and management capabilities are all core capabilities of the ESB, while extended capabilities may include Quality of Service (QoS), integration (with connectivity to a wide range of service providers), security (via identification, authentication and access controls to assure data integrity), support of multiple service level requirements, modeling of XML and web services

industry standards, message processing (including routing), and infrastructure intelligence to integrate business rules and policies.

Microsoft BizTalk ESB Guidance provides itinerary processing, a resolver to determine end-points, transformation, exception handling, and UDDI registry manipulation (Hogg, 2008, Ch. 3).

Open Source ESB's and Total Cost of Ownership (TCO)

Open Source ESB's deliver results comparable to commercial offerings and often provide a benefit that some commercial ESB's do not, which is adherence to standards such as JBI.

Open Source ESB's are well tested and documented (online), and come with an extensive array of adapters to a variety of protocols (Rademakers, 2009, p. 5).

Regarding the appropriateness of an ESB for a given integration solution, the Open Source Mule ESB community offers the following questions as a guide (Mule ESB Community, 2011, p. 2):

1. "Are you integrating 3 or more applications/services?"
2. Will you need to plug in more applications in the future?
3. Do you need to use more than one type of communications protocol?
4. Do you need message routing capabilities such as forking and aggregating message flows, or content-based routing?
5. Do you need to publish services for consumption by other applications?"

Open Source offerings are more likely to have been built from the ground up with ESB standards in mind, including Java Business Integration – JBI, although their tooling, such as drag-and-drop GUI's, may be lacking in comparison to their commercial counterparts (ibid., p.

8). Familiarity with java coding and XML configuration are typical requirements to implementing and supporting an Open Source ESB (ibid.).

But Open Source requires a more technical administrative and support user, typically with a background in java and XML. Service endpoints may be defined in XML, while application logic resides in java code. A commercial ESB is more likely to provide a graphical user interface that a business analyst could use to configure a similar result (ibid.).

Without effective SOA governance, users within a company could generate extraneous services that are duplications of existing services leading to inefficiency. Registries and repositories can aid in this area and minimize failures where a broken service can cripple multiple applications (Sturek, 2008). Mule Galaxy offers governance features such as its registry, rivaling commercial offerings.

TCO for Open Source equates to time, effort – and expertise. IT teams must learn the Open Source ESB's framework, and component and XML scripting models, with java and Spring skills. Open Source ESB's offer governance and testing features that rival commercial products, in addition to comparable built-in scalability, reliability and availability (ibid.).

Commenting on Open Source ESB products Fuse, JBoss, Mule and Sun ESB Suite, Fulton (2009, p. 6) says the products are stable, scalable and reliable and can be downloaded and used in production at no charge. But zero-priced licensing does not mean zero, or even low, costs. Vendor support can be costly, sometimes running on a per-node basis, with nodes potentially running into the thousands. Fulton further points out the lack of features and tooling – not enterprise class – of the Open Source ESB's. As of early 2009, speaking for the analyst Forrester, Fulton tells us that "Open Source ESBs are coming of age but aren't there yet" (ibid.).

Forrester ranks Fuse and JBoss at the top of the Open Source ESB pack, while MuleSource drops to the next tier (ibid., p. 14).

ESB's and the Future of Integration

Comprehensive Integration Solutions (CIS) are today being viewed by some as the successor middleware to the ESB, having more capabilities, including features from EAI, BPM, B2B for EDI and XML, Model Driven Development (MDD), embedded SOA capability, and Managed File Transfer (MFT). Vollmer points out that the top commercial vendors are the same as with ESB: Oracle, IBM, TIBCO, and Software AG (Vollmer, 2010-2, p. 2).

“CIS's can be thought of as ESB's on steroids. The integration features are more comprehensive than those found in most ESB's and the level of support for application development is stronger as well, providing direct links between model-driven application development and business process management and B2B integration features.” Says Vollmer, “Use an ESB for your basic integration needs and move up to a CIS as the business requirements demand it” (Vollmer, 2010-1, p. 2).

McKendrick points to an Enterprise Service Cloud (ESC) as another potential replacement for the ESB (McKendrick, 2010, p. 1), but indicates that the jury is still out on the ESC, as debate continues on the fate of ESB's in Cloud integration and the ESC appears to be only in the early stages of the Gartner “hype cycle.”

Chapter 3 – Methodology

The primary artifact produced for this thesis was the *ESB Practices Survey*, a survey of industry professionals familiar with the ESB to gain their perspective on a variety of ESB, SOA and middleware topics to better assess when use of an ESB is appropriate. That knowledge and the literature review in Chapter 2 provide the basis to answer the thesis questions directly and to make a recommendation to the Regis University School of Computer & Information Sciences (SCIS) SEAD Practicum in conjunction with the ARN ESB Radio Telescope implementation.

Participants

Survey respondents represent the primary participants in this thesis study. Initial target sources of survey respondents included Regis University graduate students, faculty members, and alumni associated with the SEAD Practicum, but the required detailed familiarity with the ESB by this target community was not expected to be high. The ideal respondent would have first-hand knowledge of a specific ESB implementation. So the author made a list of professional colleagues with a background in middleware solutions. However, since the author's experience with middleware is primarily in Business-to-Business (B2B) Gateway solutions, along with some experience in EAI, the list included fewer than 20 potential ESB survey respondents, given the detailed ESB product knowledge required, an insufficient population for the survey.

The idea of using the LinkedIn professional network was considered. LinkedIn describes itself as an online network of 85 million professionals world-wide, and contains thousands of Special Interest Groups (SIG's). Exploring this avenue seemed appropriate. Twenty-one initial SIG's were located from a search of groups using the strings "Enterprise Service Bus" and "ESB." These groups represented a target population of approximately 80,000 ESB

professionals. The Regis School of Computer and Information Sciences LinkedIn SIG and the iCMG architecture group (at the suggestion of one survey respondent) were then added, bringing the potential survey population to more than 100,000. Later, additional SIG's associated with SOA were added, bringing the total number of potential respondents to more than 185,000. This chapter details how the ESB Practices Survey was developed and circulated to this target population.

Table 1 – LinkedIn Special Interest Groups (SIG) Sorted by Number of Survey Responses

#	Target LinkedIn SIG Survey Responders	# in Group	# Responses	Response Rate
1	Service Oriented Architecture Special Interest Group	17,106	22	0.129%
2	Oracle SOA	3,396	20	0.589%
3	BizTalk	3,649	19	0.521%
4	Sonic Network	363	17	4.683%
5	Fuse Source	195	13	6.667%
6	IBM Websphere Enterprise Service Bus	291	12	4.124%
7	Enterprise Architecture Forum	5,276	12	0.227%
8	TIBCO Global	3,170	12	0.379%
9	The IT Architect Network	19,196	11	0.057%
10	TIBCO Architects	1,938	11	0.568%
11	SOA Architects	1,031	10	0.970%
12	Mule ESB	382	10	2.618%
13	iCMG Architecture World	19,292	10	0.052%
14	Open ESB	578	9	1.557%
15	IASA: The Global IT Architect Association	35,046	8	0.023%
16	AquaLogic/Oracle Service Bus	272	8	2.941%
17	SOA Service Oriented Architecture Technology Architects	2,850	8	0.281%

#	Target LinkedIn SIG Survey Responders	# in Group	# Responses	Response Rate
18	SOA Professionals Worldwide	3,433	7	0.204%
19	Progress Software	3,381	7	0.207%
20	Oracle Fusion SOA / BPEL Global Consultants	765	6	0.784%
21	servicemix	109	5	4.587%
22	GlassFish Users	941	5	0.531%
23	SOA Data Integration Architecture Group	1,135	5	0.441%
24	JBoss ESB	59	4	6.780%
25	Petals	46	4	8.696%
26	Integration Consortium	2,731	4	0.146%
27	Enterprise SOA	952	4	0.420%
28	WebMethods Global	1,752	4	0.228%
29	SOA Testing	364	4	1.099%
30	Middleware Masters	198	3	1.515%
31	Enterprise Service Bus (SOA SIG)	164	3	1.829%
32	SOA Contractors and Consultants	937	3	0.320%
33	Platform-as-a-Service	2,949	2	0.068%
34	The Enterprise Architecture Network	49,978	2	0.004%
35	<u>Regis University School of Computer & Information Sciences</u>	375	1	0.267%
36	Enterprise2.0	1,071	1	0.093%
37	Advanced Center of Excellence for BPM, SOA, Cloud...	363	1	0.275%
Tot	Total Potential LinkedIn SIG Responders	185,734	287	0.155%

Special Interest Groups advertising the ESB, SOA or middleware as a key interest area, along with the number of members in the group, the number who responded to the survey, and the response rate, are listed in Table 1. Only the 37 sites producing at least one survey response

are listed. In all, the author joined 46 LinkedIn SIG's to post survey announcements as part of the thesis investigation. Applying to the SIG for membership (and being accepted) are pre-requisites for posting a discussion topic providing information about the survey.

In addition to posting the survey link to multiple LinkedIn SIG sites, emails to 17 potential participants were also used to elicit survey responses. Table 2 shows response rates, comparing LinkedIn SIG discussion postings to direct email. Although the LinkedIn response rates were very low by comparison, the total number of responses far exceeded those of email, since the pool of potential responders was so much greater. The efficiency of the LinkedIn approach was further demonstrated by the significantly lower effort required per response (just 6.3 minutes vs. 10 minutes for email).

Table 2 – Response Rate Comparison by Method

Category	# in Target Group	Number Responded	Response Rate	Effort (Hours)	Effort (Minutes)/ Response
Email	17	12	70.59%	2.0	10.0
LinkedIn	185,776	288	0.16%	30.0	6.3

Figure 1 profiles the overall survey population. IT Architects comprised the highest percentage of respondents (62%), while Developers (29%) and Systems Integrators (31%) placed second and third, respectively. Many respondents wore multiple hats – of those identifying as Architects, 30% were also System Integrators and 25% Developers. A significant group of respondents identified themselves as ESB Consultants. Only two individuals listed Education (staff or student) in identifying themselves, indicating a highly commercial/ organizationally oriented response group. Other job titles listed by individuals in the comments section

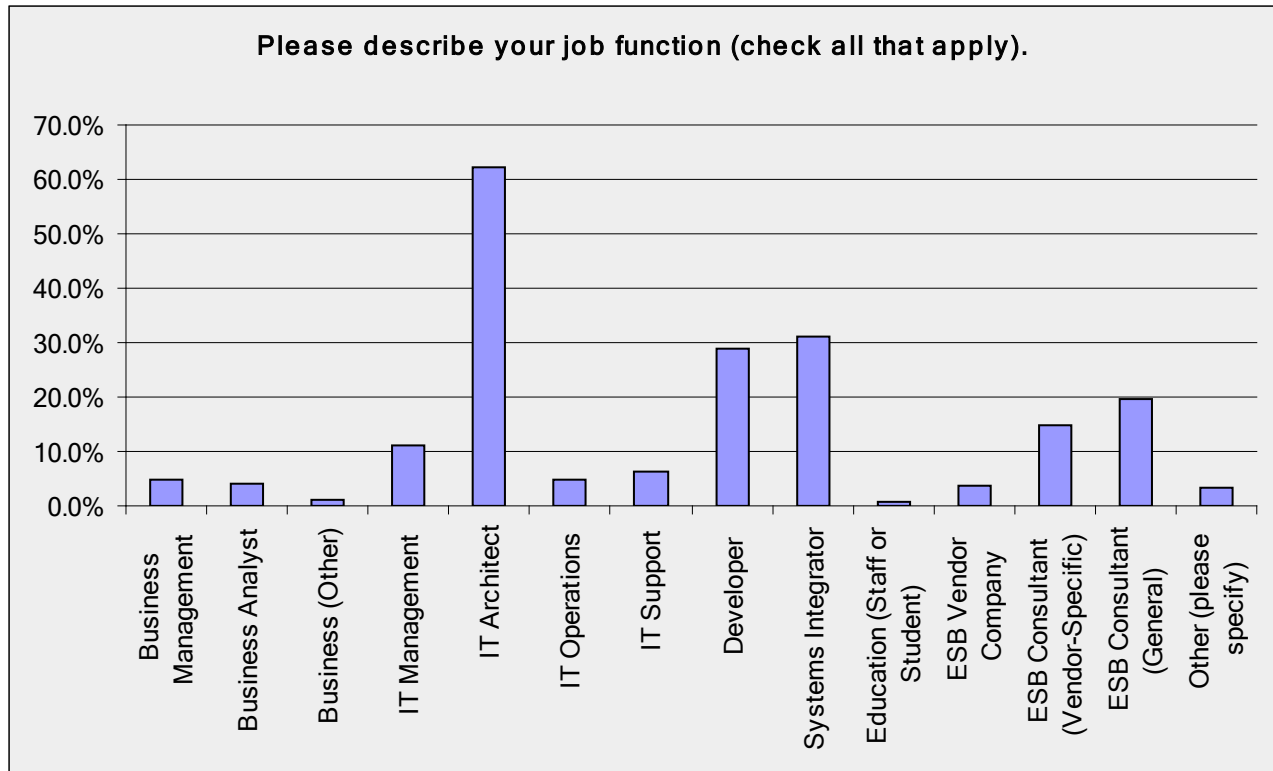


Figure 1 Survey Respondents (Survey Question 1)

were Data Architect, Performance Architect, SOA/BPM/BI Architect and Software Architect; Professor; Sales Consultant; ESB Testing Software Vendor; and one CEO (of an SOA consulting firm). 300 individuals answered ESB Practices Survey question number 1.

The highest number of respondents (35%) indicated having 5-10 years of middleware experience. Overall, respondents were well experienced with middleware, with more than eighty percent having greater than three years of middleware experience. ESB Consultants specifically tended to be highly experienced with middleware, with 32% of generic ESB Consultants indicating more than ten years of middleware experience. One IT Architect noted his middleware history with distributed Tuxedo and CORBA systems in the 90's, followed by messaging with

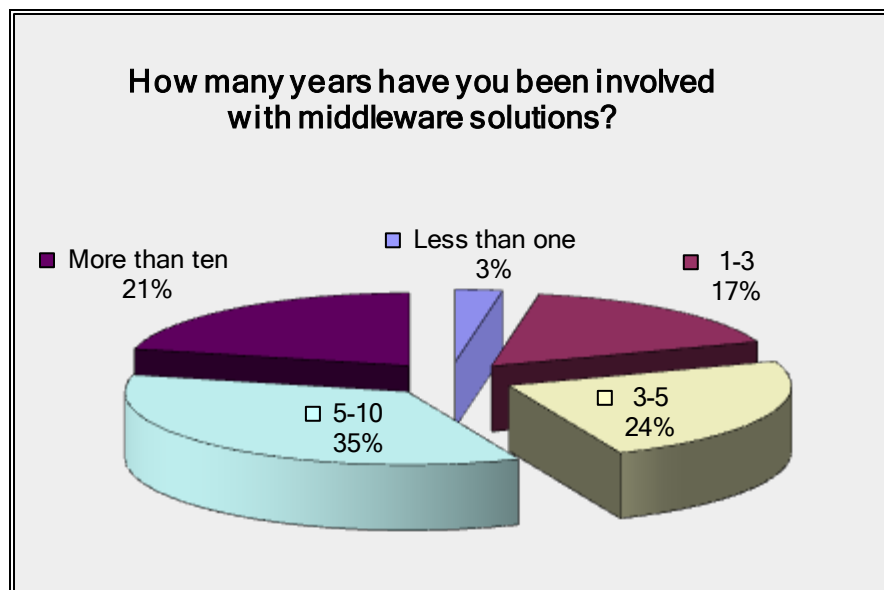


Figure 2 Respondents' Experience Levels (Survey Question 2)

WebSphere MQ and SonicMQ, later moving to TIBCO EMS. 21% of respondents overall had more than ten years of middleware experience. ESB Consultant Generalists tended to have the most experience, with 55% having more than five years experience. Users of top Open Source ESB products had the most experience overall with 62% having more than five years. Generally, the author considered survey respondents to be suitably experienced with middleware solutions and qualified to provide the information sought. *297 individuals answered ESB Practices Survey question number 2.*

All surveys were anonymous – no user data was collected. The survey was approved November 2, 2010, by the Regis University Institutional Review Board (IRB) as case # 157-10.

Table 3 shows the top 15 LinkedIn SIG's based on response rate. Note that smaller SIG's produced the highest response rates.

Table 3 – Top Fifteen LinkedIn SIG Responder Sites (by Response Rate)

#	Target LinkedIn SIG Survey Responders	# in Group	# Responses	Response Rate
1	Petals	46	4	8.696%
2	JBoss ESB	59	4	6.780%
3	Fuse Source	195	13	6.667%
4	Sonic Network	363	17	4.683%
5	servicemix	109	5	4.587%
6	IBM Websphere Enterprise Service Bus	291	12	4.124%
7	AquaLogic/Oracle Service Bus	272	8	2.941%
8	Mule ESB	382	10	2.618%
9	Enterprise Service Bus (SOA SIG)	164	3	1.829%
10	Open ESB	578	9	1.557%
11	Middleware Masters	198	3	1.515%
12	SOA Testing	364	4	1.099%
13	SOA Architects	1,031	10	0.970%
14	Oracle Fusion SOA / BPEL Global Consultants	765	6	0.784%
15	Oracle SOA	3,396	20	0.589%

Place

As noted earlier in this chapter, the location of the survey was the online SurveyMonkey.com

site with most access provided via a URL provided on the professional network LinkedIn.

Specifically, the survey was announced on the 37 LinkedIn SIG's listed in Table 1, where a link was provided to allow for survey access. Some SIG's do not allow surveys; only SIG'S that produced one or more responses are included in Table 1.

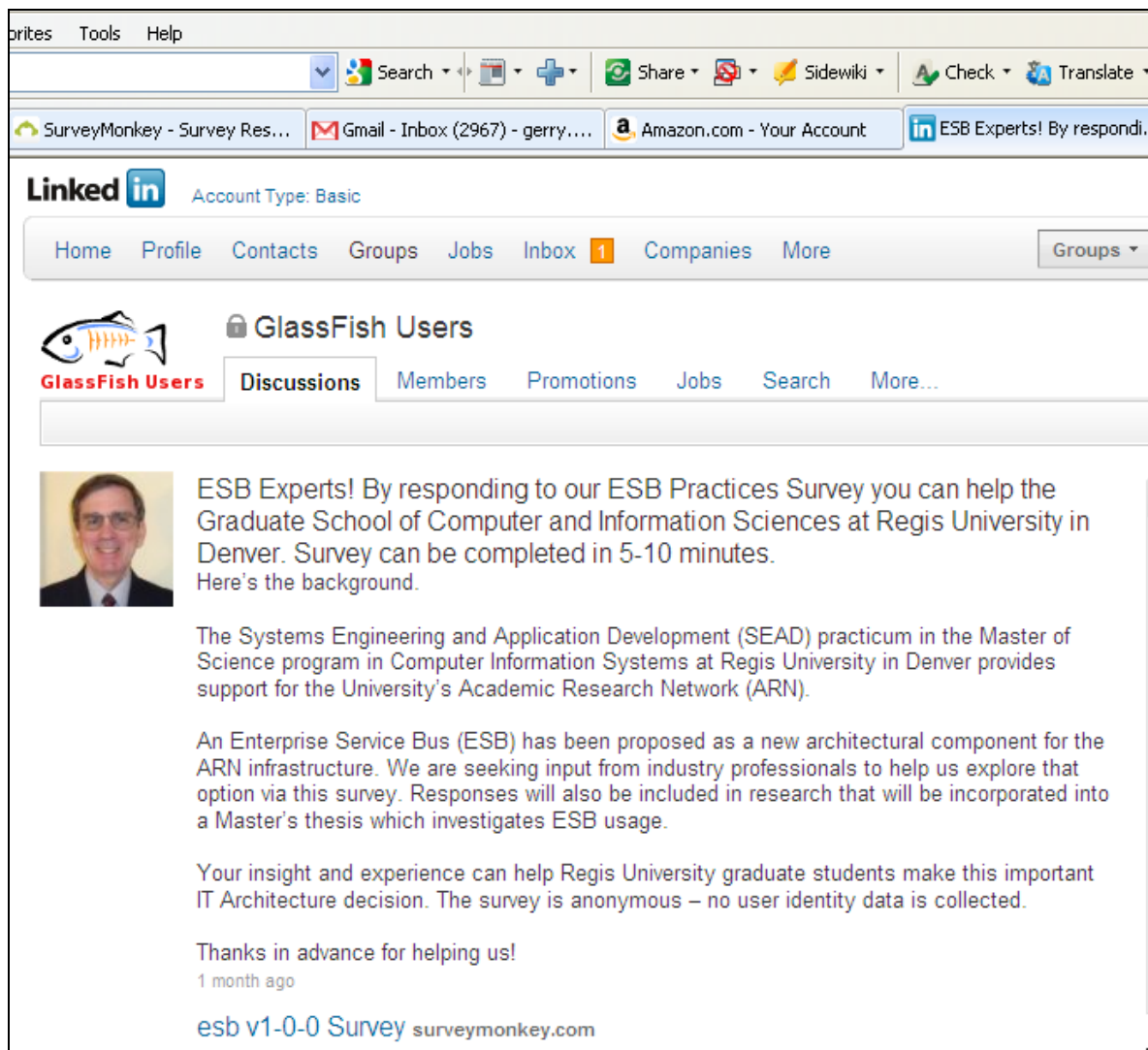


Figure 3 LinkedIn Survey Announcement Example

A typical SIG survey announcement appears in Figure 3. Direct email was also used to contact 17 individuals known to the author as persons likely to have professional experience suited to successful completion of the survey. These individuals were encouraged not only to take the survey but to forward the survey link via email to others known to them whom they believed would be qualified to complete the survey.

Instruments and Materials

The primary instrument to gather information was an online survey, the “ESB Practices Survey,” conducted via the SurveyMonkey.com website. A secondary instrument, to attract respondents, was the LinkedIn website. A third component was the “anchor” ESB Survey blog site (see Figure 4) where ongoing information about the survey can be communicated along with actual survey results. A fourth instrument was email, as described above. Other tools included Microsoft Excel, for analysis and chart creation; X1 Search Engine, for desktop-based searches of survey results; and Smart PDF Converter, for converting PDF’s to Word files.

Survey Development

SurveyMonkey (surveymonkey.com) was recommended to the author as the survey tool of choice, and SurveyMonkey did not disappoint. Survey Monkey offered access to fifteen distinct types of questions for use in survey construction and provided examples and clear documentation, along with the ability to experiment with the questions’ online behavior to understand which question types are appropriate in varying situations.

Initially 35 questions were developed, categorized by topics germane to different aspects of the thesis investigation. Advice was provided to trim the survey with the goal that it would not exceed 10 minutes completion time. The 35 questions were pared to 25; others recommended trimming the survey to just 10 questions, but early testing of the survey with a test target population showed that 25 questions could be completed in ten minutes on average, with no complaints by testers about survey length. Actual results showed that for the 300 responses received the median amount of time spent by respondents in completing the survey was 9 minutes 47 seconds. The ESB Practices Survey included a free-form box at the end of each question, with the result that more than 400 text comments were collected.

SurveyMonkey's "skip logic" capability allows a respondent to skip a group of questions based on their answer to a prior question. This feature was useful for the ESB Practices Survey because two groups of respondents were anticipated: one group familiar with ESB's but not with any specific ESB implementation; and a second group with close familiarity with a particular ESB installation. Specifically, based on their answer to question 11, respondents were either presented with all remaining questions (because they were familiar with a specific ESB implementation), or routed directly to the final two questions, since their answer to question 11 showed they did not have appropriate experience to answer the remaining questions.

The author invested many hours reading SurveyMonkey documentation and creating practice survey questions on the SurveyMonkey site. Access to SurveyMonkey to create a survey of up to ten questions was provided at no cost and provided a means to allow the author to understand the online survey tool's capabilities, for design, collection and analysis, by actually creating sample surveys at no cost.

SurveyMonkey offered a rich tool set to design the survey, collect responses and analyze results. Investing \$20/month to upgrade to Professional level allowed the author access to high quality design, distribution, and analysis tools with unlimited questions per survey. The author retained SurveyMonkey Professional membership for a three month period, with the first two weeks devoted to the survey build and test; six weeks for survey collection; and the final weeks for analysis. As of early 2011 SurveyMonkey was revising its membership packages, requiring annual commitments rather than just monthly. Future investigators should review available SurveyMonkey options to determine if one is suitable for their work or if another survey vendor or method is appropriate.

Survey questions were divided into the following categories:

- “Who Participated” (questions 1 and 2): to understand the professional background and experience levels of respondents;
- “ESB Product Selection” (questions 11 and 13): to establish what specific ESB a respondent is referencing;
- “Implementation Sizes” (questions 16, 17, 18): relevant to both the thesis question and the ARN case;
- “SOA” (questions 3, 5 and 12): central to the thesis question;
- “ESB Pro’s and Con’s” (questions 3, 4, 6, 14, 15, 19): impacting both the thesis question and the ARN case;
- Implementation and Support (questions 9, 10, and 20 through 23): impacting the ARN case;
- Total Cost of Ownership (questions 7 and 8): relating to the ARN case.

As noted, the survey was structured to accommodate two kinds of users: those with general ESB and middleware knowledge, and further, those with knowledge of a specific ESB product implementation.

LinkedIn

LinkedIn was viewed as a potential location to contact IT Architects, Developers, Integrators, Technology Managers and others familiar with the ESB, targeting those familiar at a detail level with one or more specific ESB installation(s).

At the time of the survey, LinkedIn indicated that it had 85 million registered users. The target would be professionals familiar with the ESB, middleware and/or SOA, with a focus on those who use the ESB in a professional setting.

Survey Results Web Site

Initially, potential survey respondents were solicited and asked to assist the Regis SEAD Practicum by providing their expertise in responding to survey questions that would help the practicum in its choice of middleware for the ARN. This resulted in a response of 45 surveys submitted. Later, a strategy to attract more users was devised to offer access to survey *results* to those who would participate in the survey. This provided an incentive that attracted scores of additional respondents. Rather than provide this information while the survey was still being conducted (SurveyMonkey provides an online “up to the minute” survey summary capability) the decision was made to provide survey results along with this thesis at a later point in time, once the thesis would be complete. This would be an enhanced offering providing the analysis

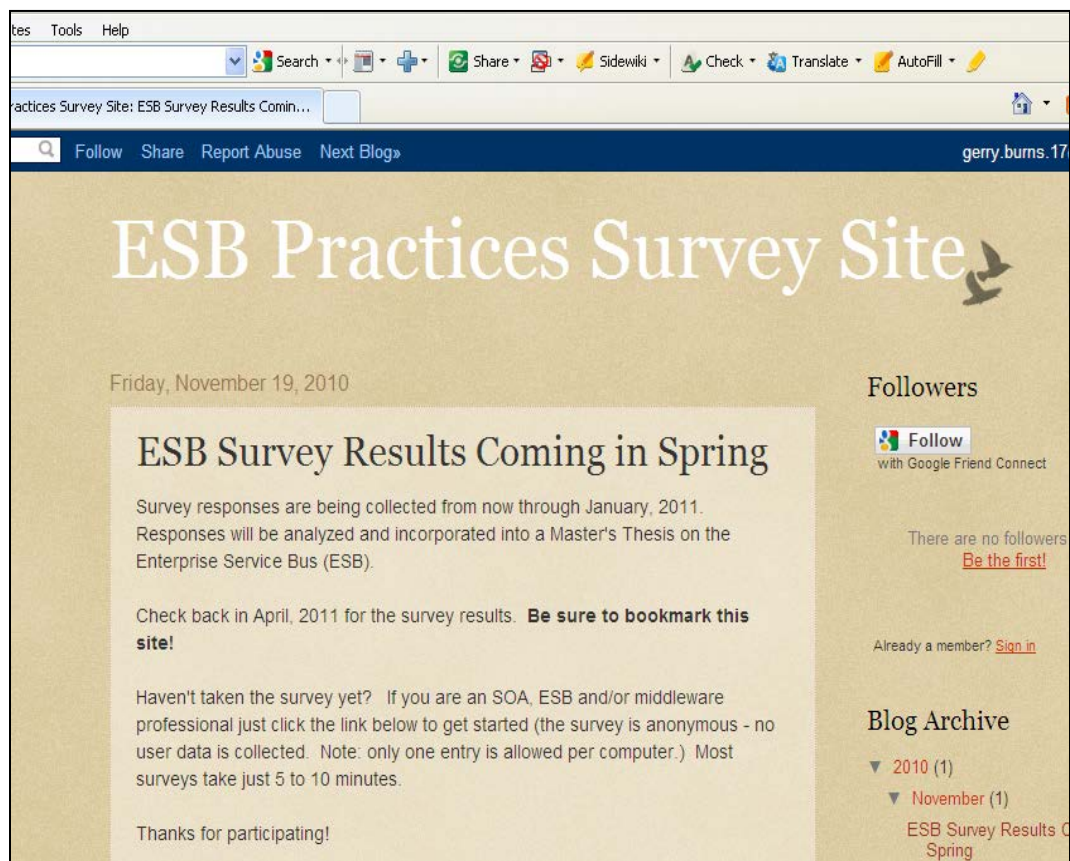


Figure 4 Survey Results Site

and context presented in this thesis, rather than just bare statistics provided by SurveyMonkey, and would require a web site where survey respondents could return once the survey and thesis were made available.

To this end, a site was created to provide information on how and when to obtain survey results and the SurveyMonkey tool was then configured to send users to this site once they had

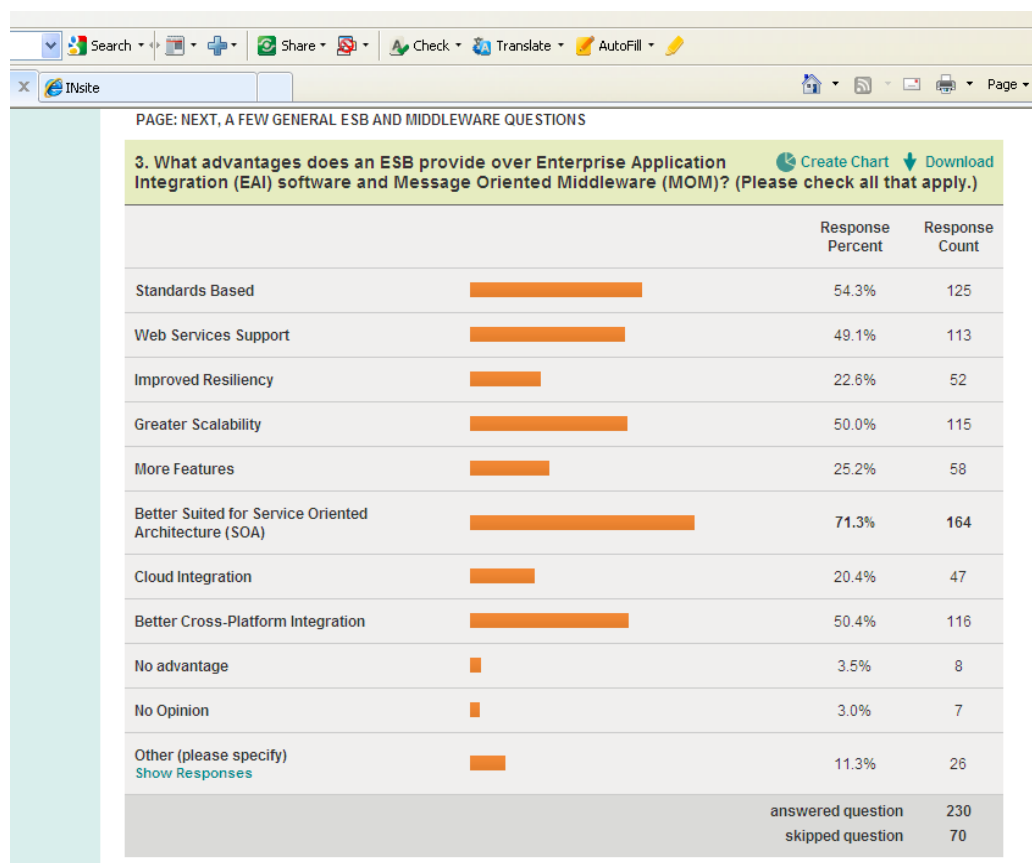


Figure 5 Online View of Final Survey Monkey Results Question # 3.

completed the survey. Google's blogger.com was used to create this site, which is shown in Figure 4. Google Docs is expected to be the actual thesis location for results downloads.

This thesis and other survey results information are expected to be provided at this site during the spring of 2011.

Procedure

As noted in the introduction to this chapter, the location of the survey was online through the professional network LinkedIn. Most respondents accessed the survey by clicking a link provided on a LinkedIn SIG that brought them to the online survey

Investigators wishing to try this survey distribution technique in future research should search for the LinkedIn SIG Groups related to their field of interest, and then select the groups

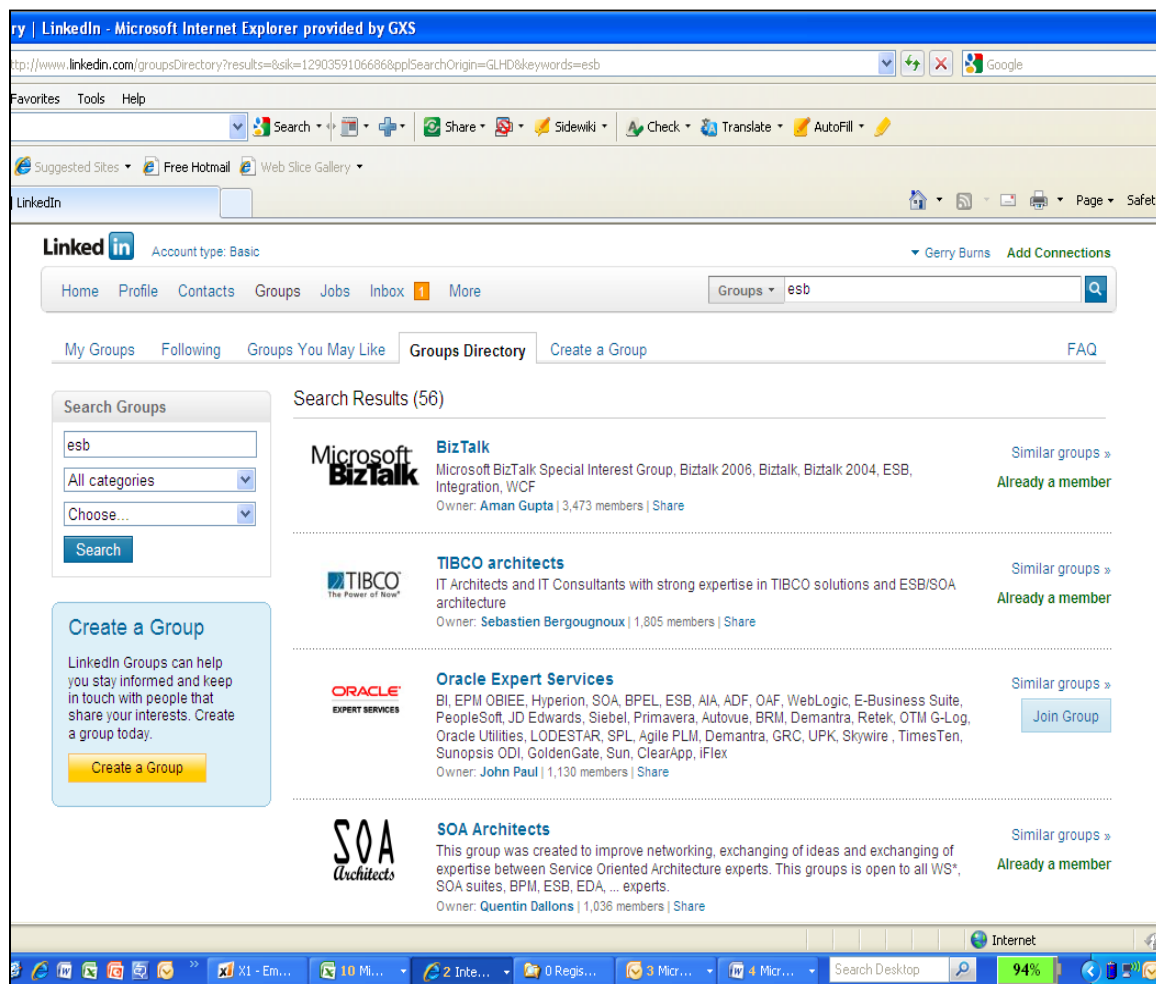


Figure 6 Description of four of the 46 LinkedIn SIG's targeted for survey

based on relevance and other factors such as number of members. (Note that more members in a SIG may not directly translate to more survey replies, as the larger SIG's receive many more discussion postings and the chances of any single post remaining in view over time are lower

than in sites with fewer members.) Figure 6 shows some of the SIG's used to announce the ESB Practices Survey.

Posting a message is, for the most part, the same process for every LinkedIn SIG. First produce a topic summary description and headline of 200 characters or less. Then provide the details that potential respondents might need to know. Finally, provide the link to access the survey location. The same text can likely be used repeatedly in SIG survey postings, so write the text in a text editor or word processor program and copy and paste into each SIG's discussion page as needed. Copying the message to a site can allow you to post your link in just a minute or two per SIG. Figure 7 shows a revised survey invitation message posted approximately two weeks after the initial survey posting that was made possible by initial survey responses.

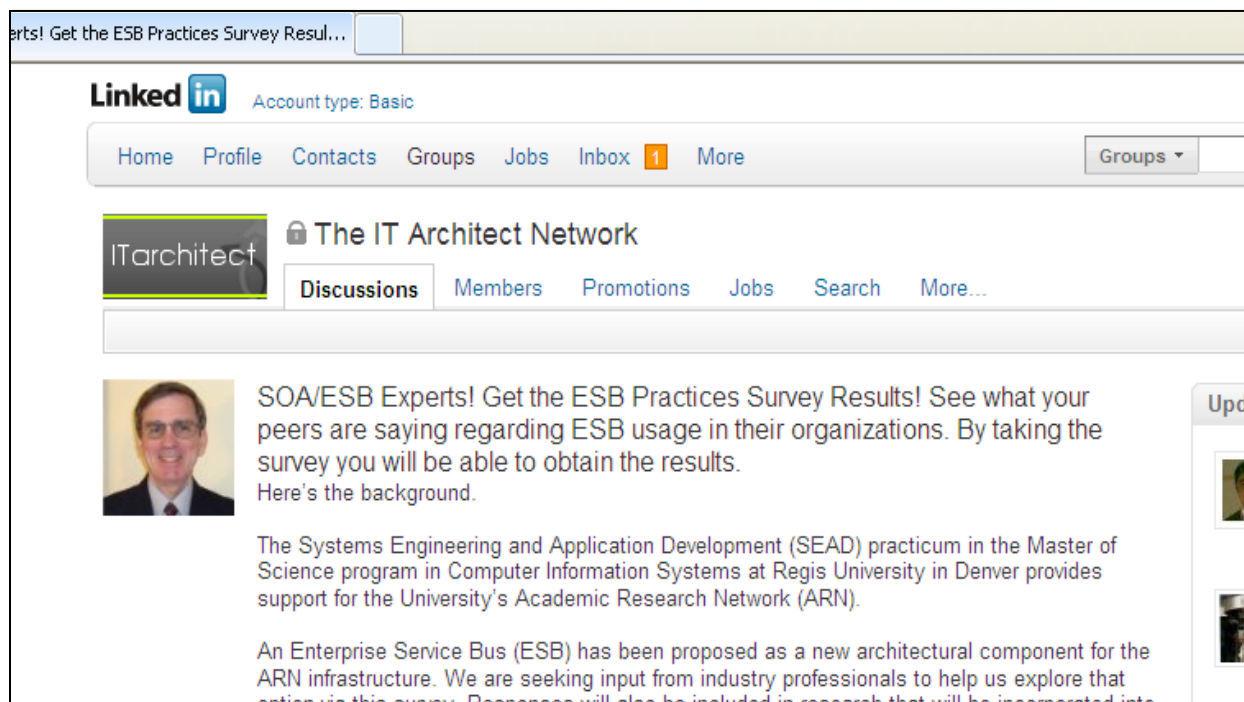


Figure 7 Updating the message helps attract survey respondents

The author refreshed the LinkedIn survey announcements weekly on average over the six week period while the survey was available, with each updated followed by a wave of additional responses.

Data Analysis

SurveyMonkey allows the researcher multiple analysis tools to view results. The ability to browse each individual response is shown in Figure 8. Note at the top of Figure 8 the overall settings for an individual's surveys, provided in addition to actual question responses:

- *Response Type:* All responses in this survey were anonymous, but SurveyMonkey offers the option to track responses, such as by IP address. (This option was not used for the ESB Practices Survey.)

Figure 8 Online Analysis Tool Survey Response #300

- *Custom Values:* This field allows tracking by URL. Each SIG was assigned a unique URL. Knowing which sites are producing the most (and fewest) results can be valuable,

particularly in a long-standing survey. Custom values are appended to the survey's base URL; how to use them is explained in the SurveyMonkey documentation.

- *Responses Started*: time when first value selected
- *Collector*: a means to aggregate survey results; a survey may have many collectors defined.
- *IP Address*: this option was disabled for the ESB Practices Survey. However, the survey was configured to allow only one response per IP Address, a related option.
- *Response Modified*: typically the end of the response. Together with the start time, can provide statistical data on the time it takes respondents to complete the survey.

Note that SurveyMonkey allows the option to limit one response per IP address to limit multiple responses from one individual. This option was used in this survey.

SurveyMonkey - Survey ... X InSite

3. What advantages does an ESB provide over Enterprise Application Integration (EAI) software and Message Oriented Middleware (MOM)? (Please check all that apply.)

Standards Based
 Web Services Support
 Improved Resiliency
 Greater Scalability
 More Features
 Better Suited for Service Oriented Architecture (SOA)

4. In your experience, which middleware component(s) listed below CAUSE(S) significant latency (i.e. DELAY) in end-to-end transaction throughput? (Please check all that apply.)

Web Services Framework

5. An organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. Should an ESB be considered here?

YES. But only if an SOA strategy is planned.

6. What disadvantages have you seen in implementing a middleware component such as an ESB? (Please check all that apply.)

More complex analysis skill set required for implementations
 More complex skill set required for support

7. Which commercial ESB offers the lowest Total Cost of Ownership (TCO)?

Figure 9 Online Analysis Tool (Continued)

Another analysis tool provided by SurveyMonkey is shown in Figure 10, which is a screenshot of a summary Excel download from the SurveyMonkey site. Both detail and summary views of survey results are available in multiple formats, including Excel, CSV, HTML and PDF.

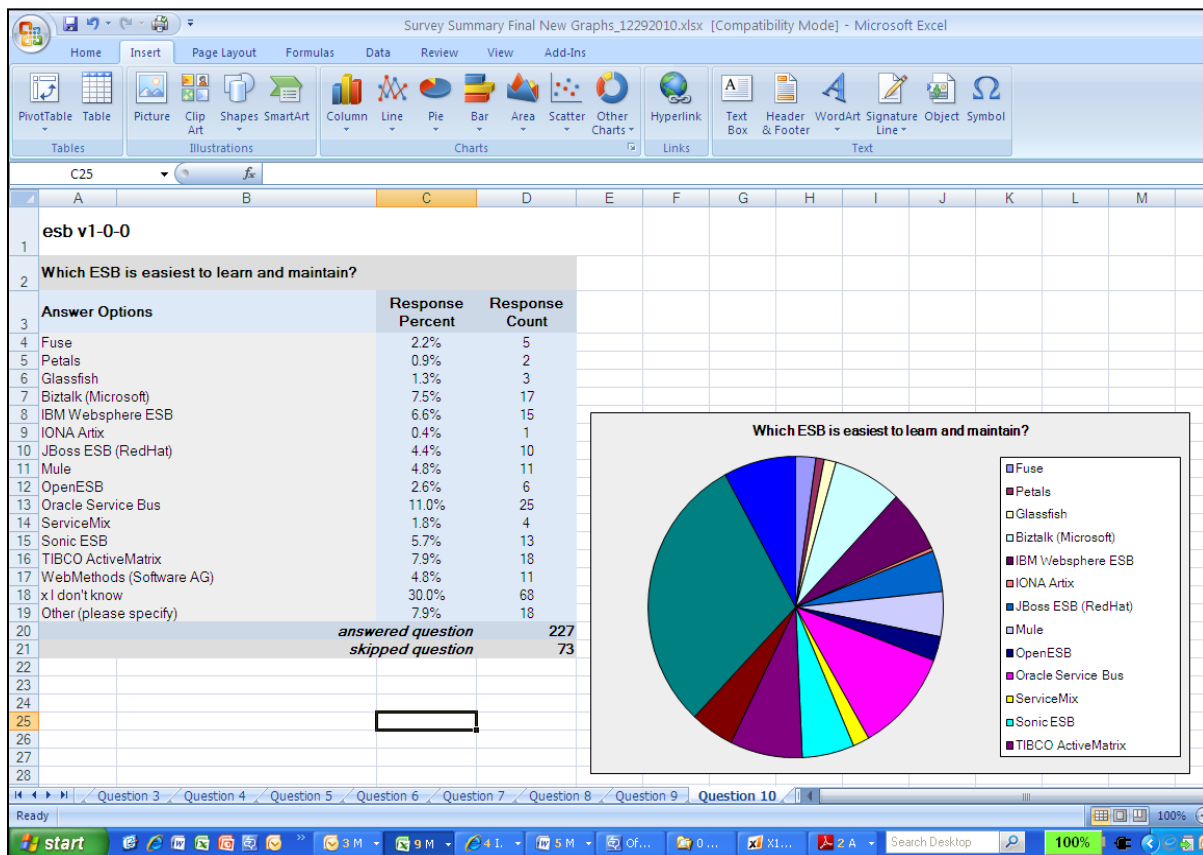


Figure 10 Summary Analysis Excel Download

Data analysis was performed on two levels. Initially, monitoring the number of received questionnaires by site was considered important to maximize yield. Secondly in sequence, but primary to the research, was the analysis of the actual survey responses.

Figure 11 shows a screen shot of an Excel worksheet used to monitor survey respondent rates during the six weeks while the survey was open. This tracking is made possible by the

SurveyMonkey URL “custom value” indicator which can allow the investigator to track survey response rates from specific site links.

URL	Target Survey Respondees	# in Group	Responses	Comments	Date Posted	Time Posted	Potential Responses to Date
http://www.surveymonkey.com/s/ESB_SURVEY?c=00001	Early Testing	ESB_SURVEY					
http://www.surveymonkey.com/s/ESB_SURVEY?c=00002	Gerry Revisions 11/19/10						
http://www.surveymonkey.com/s/ESB_SURVEY?c=00003	NA						
http://www.surveymonkey.com/s/ESB_SURVEY?c=00004	GX5 Testers						
http://www.surveymonkey.com/s/ESB_SURVEY?c=00005	NA		4		9-Jan	12:30	
http://www.surveymonkey.com/s/ESB_SURVEY?c=00006	IASA: The Global IT Architect Association	34,418	2	allows comments	14-Nov	17:15	34,418
http://www.surveymonkey.com/s/ESB_SURVEY?c=00007	The IT Architect Network	18,101	1	allows comments	14-Nov	17:15	18,101
http://www.surveymonkey.com/s/ESB_SURVEY?c=00008	Service Oriented Architecture Special Interest Group	16,354	6	allows comments	12-Nov	15:30	16,354
http://www.surveymonkey.com/s/ESB_SURVEY?c=00009	SOA Professionals Worldwide	3,054	3	allows comments	12-Nov	10:54	3,054
http://www.surveymonkey.com/s/ESB_SURVEY?c=00010	SOA Architects	1,034	2	allows comments	11-Nov	18:05	1,034
http://www.surveymonkey.com/s/ESB_SURVEY?c=00011	Oracle Fusion SOA / BPOL Global Consultants	730	2		11-Nov	17:45	730
http://www.surveymonkey.com/s/ESB_SURVEY?c=00012	Open ESB	572	3		11-Nov	17:45	572
http://www.surveymonkey.com/s/ESB_SURVEY?c=00013	IBM Websphere Enterprise Service Bus	262	3		10-Nov	13:20	262
http://www.surveymonkey.com/s/ESB_SURVEY?c=00014	AquaLogic/Oracle Service Bus	229	3		10-Nov	13:15	229
http://www.surveymonkey.com/s/ESB_SURVEY?c=00015	service mix	97	4		10-Nov	13:15	97
http://www.surveymonkey.com/s/ESB_SURVEY?c=00016	Jboss ESB	51	1		10-Nov	11:00	51
http://www.surveymonkey.com/s/ESB_SURVEY?c=00017	Middleware Masters	178	2		10-Nov	11:00	178
http://www.surveymonkey.com/s/ESB_SURVEY?c=00018	TIBCO Architects	1,810	-		11-Nov	17:45	1,810
http://www.surveymonkey.com/s/ESB_SURVEY?c=00019	Mule ESB	360	2		10-Nov	14:00	360
http://www.surveymonkey.com/s/ESB_SURVEY?c=00020	Sonic Network	362	4		10-Nov	14:05	362
http://www.surveymonkey.com/s/ESB_SURVEY?c=00021	Regis University School of Computer & Information S	345	-		16-Nov	8:40	345
http://www.surveymonkey.com/s/ESB_SURVEY?c=00022	BizTalk	3,458	1	Joined 11/14/10	15-Nov	8:00	3,458
http://www.surveymonkey.com/s/ESB_SURVEY?c=00023	GlasFish Users	917	1	Joined 11/11/10	15-Nov	8:00	917
http://www.surveymonkey.com/s/ESB_SURVEY?c=00024	Fuse Source	190		Joined 11/11/10	15-Nov	8:00	190
http://www.surveymonkey.com/s/ESB_SURVEY?c=00025	Enterprise Service Bus (SOA SIG)	130			11-Nov	18:05	130
http://www.surveymonkey.com/s/ESB_SURVEY?c=00026	Petals	44		Joined 11/11/10	15-Nov	8:00	44
http://www.surveymonkey.com/s/ESB_SURVEY?c=00027	ICMG Architecture World	18,140	1	Joined 11/15/10	15-Nov	17:00	18,140
http://www.surveymonkey.com/s/ESB_SURVEY?c=00028	Enterprise Architecture Forum	5,158		Joined 11/15/10	17-Nov	8:00	5,158
http://www.surveymonkey.com/s/ESB_SURVEY?c=00029	annamaria1917.blogspot.com	unknown			19-Nov		

Figure 11 Tracking LinkedIn SIG sites to generate more survey responses

Below are some of the author’s experiences of the use of LinkedIn SIG’s as a source for surveys:

1. Many who join a SIG rarely sign on to view discussion topics and updates;
2. Very large SIG groups have rapid discussion topic turnover, limiting visibility to any specific posting to the casual member who signs on only occasionally;
3. Frequent updates to the survey announcement message (the author updated every 7-10 days) are likely to make the message more visible to potential survey responders;
4. SIG sites may generate emails to members, a more pro-active means of getting the message out; however, this capability is under site control, and not a member option;

5. In “profiling” the respondents from a professional networking site, it’s worth adding the title “Recruiter” to the list; no one self-identified as a recruiter in the ESB Practices Survey, but recruiter postings are common.

ARN Integration Requirements Elicitation

The other major thesis research component besides the ESB Practices Survey is the case of the SEAD Practicum’s planned ESB implementation in the Regis University Academic Research Network (ARN). A preliminary call for ARN integration requirements input was issued November 10, 2009. SEAD Faculty advisors Dan Likarish and Erik Moore and Practicum Technical Lead Russell Perry responded with commentary for SOA/ESB infrastructure requirements for the Radio Telescope project. SEAD student emeritus David Adams, who conducted an ESB Proof of Concept implementation during 2008 using JBoss ESB 4.6, also made himself available for a one-hour interview. Other requirements were gathered in SEAD Practicum weekly meetings and presentations in the first half of 2010.

Chapter 4 – Survey Analysis and Project Results

The ESB Practices Survey, the primary research artifact associated with this thesis, was designed to collect data in a number of targeted areas that provide input to the thesis questions and to the ARN case in Chapter 5. The survey was open for six weeks in November and December of 2010, yielding 230 responses; an additional 70 persons responded to request survey results.

In addition to analyzing survey results at the summary level, this chapter provides added insight through three separate “lenses” resulting from cross-tab views of the data from three perspectives of interest:

1. By the five highest respondent job functions (IT Architect, Developer, Systems Integrator, Vendor-Specific ESB Consultants, and Vendor-Neutral ESB Consultants);
2. By the five commercial ESB’s used by the most respondents (Oracle Service Bus, TIBCO ActiveMatrix, IBM Websphere ESB, Microsoft Biztalk, and Sonic ESB).
3. By the five Open Source ESB’s used by the most respondents (ServiceMix, OpenESB, JBoss ESB, Mule and Fuse).

Slicing the data from these views helps to understand survey results in greater depth. Often there is unanimity across the five highest respondents in each category, but significant differences are highlighted in the analysis. Summary statistics for all questions, along with more than 400 respondent free-form respondent comments, can be found in Appendix A.

ESB Product Selection

As shown in Figure 12, survey respondents used a variety of ESB’s within their own organizations with 34 (16%) individuals identifying Oracle Service Bus as the highest single

ESB product in use by those taking the survey. Next was TIBCO ActiveMatrix with 24 respondents (12%), IBM Websphere ESB with 22 (11%), Microsoft's Biztalk with 21 (11%),

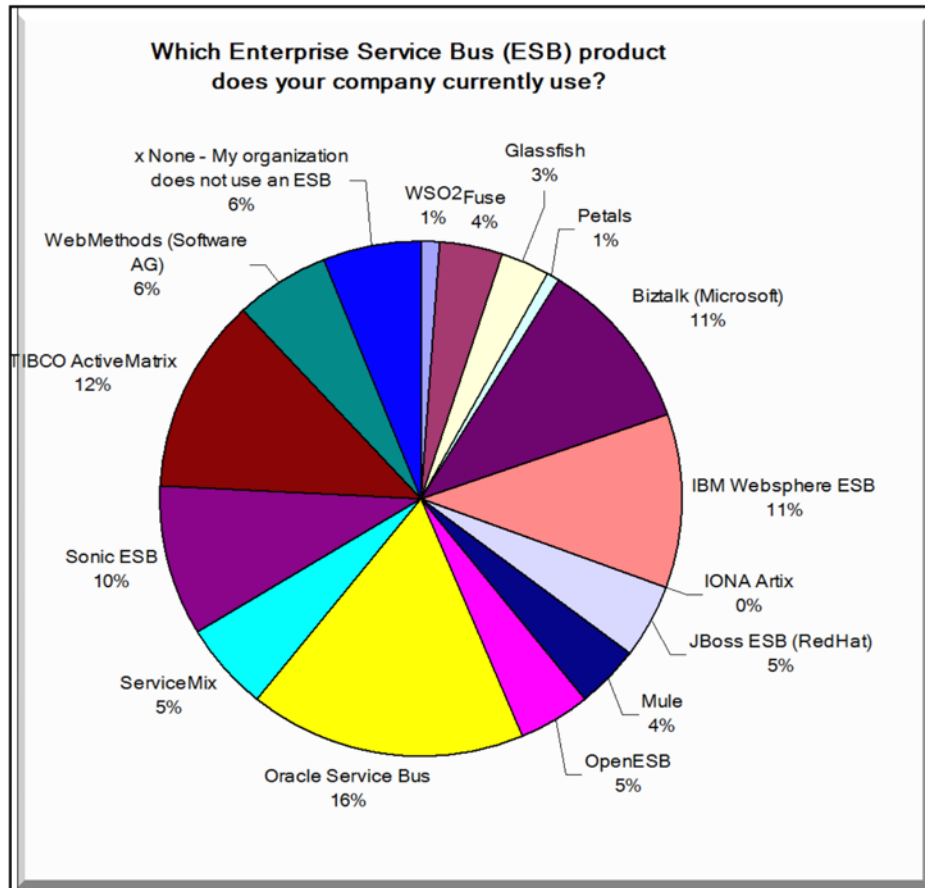


Figure 12 ESB Product Selection (Survey Question 11)

and Sonic ESB with 19 (10%), all commercial ESB products. Top Open Source ESB's represented in the survey were ServiceMix (11 – 5%), OpenESB and JBoss ESB (9 – 5%), and Mule and Fuse (8 – 4%). Camel was mentioned several times as a “write in” selection. 6% of respondents to this question belonged to organizations which did not use an ESB. 227 individuals answered this ESB Practices Survey question.

When asked if an ESB was the right solution for their organization (question 13, Figure 13), 84% said yes, with just 6% saying no and 10% indicating they were not sure. Comments

from respondents included a reminder that ESB appropriateness depends on “requirements and goals.” You “need to understand complete requirements only then can [you] recommend,” said

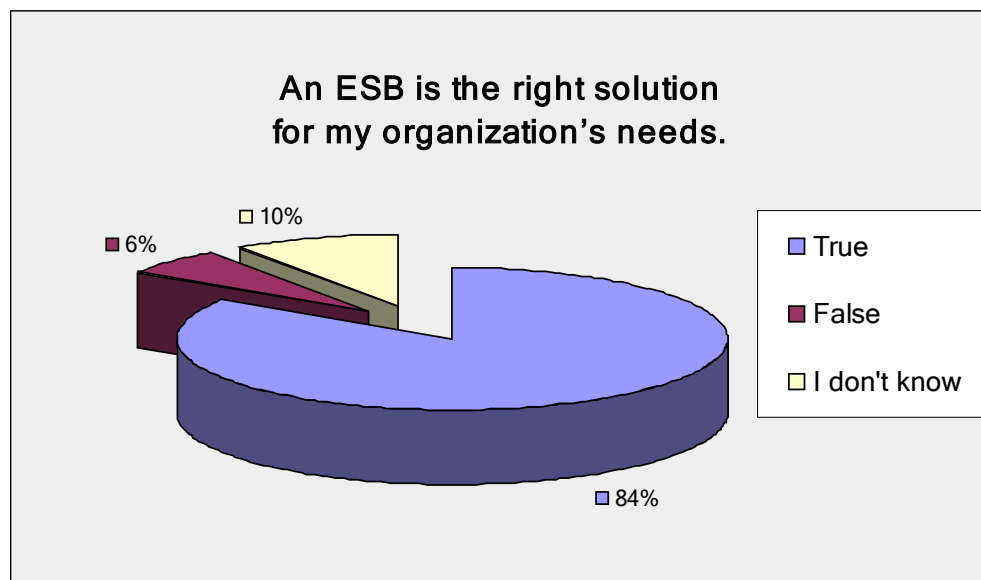


Figure 13 Was ESB the right choice? (Survey Question 13)

an Architect/Integrator and ESB Consultant who uses IBM WebSphere ESB. Another Architect from the OpenESB SIG warned, “Remember to keep it simple, a full blown ESB may add more complexity than you need.” Respondents from all major job categories described above agreed that the ESB was the right solution for their organization, and there was likewise unanimity among users of the top commercial and Open Source ESB’s. *198 individuals answered this ESB Practices Survey question.*

ESB Implementation Sizes

Implementation size is of interest in two areas of this inquiry. First, the relation of ESB implementation size for Open Source vs. Commercial ESB’s, as described by survey respondents: can Open Source products handle the high volumes processed by the commercial offerings? At the lower end, would an ESB be the right middleware choice or would it be over-kill for smaller integration requirements? And second, to compare the size of ESB

implementations with reference to the intended use of an ESB within the Regis Academic Regis Network (ARN).

Gartner categorizes ESB implementation maturity based on a number of criteria, including the number of application calls or service invocations daily, and the number of available services (Gupta, 2008, p. 5). Information from question 17 in Figure 14 indicates that the implementations familiar to the survey respondents range from small to large, providing a full cross-section of implementation sizes. In terms of service calls, the Open Source products held their own with their commercial counterparts, with only a slight edge in higher volumes reported for the commercial ESB's. *193 individuals answered ESB Practices Survey question 17.*

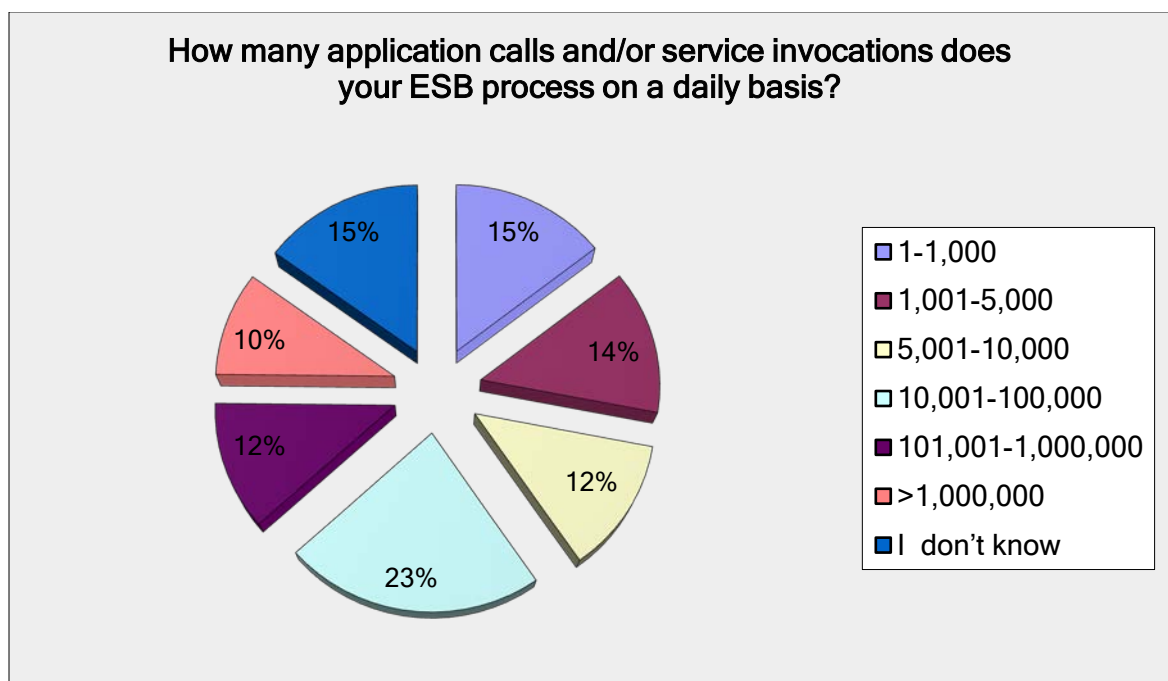


Figure 14 ESB Implementation Size (Survey Question 17)

The other Gartner measure for ESB maturity relates to the number of services and/or applications available to consumers via a given ESB. Figure 15 (Survey Question 16) shows that 77% of respondents who were knowledgeable worked with ESB's offering fewer than 100

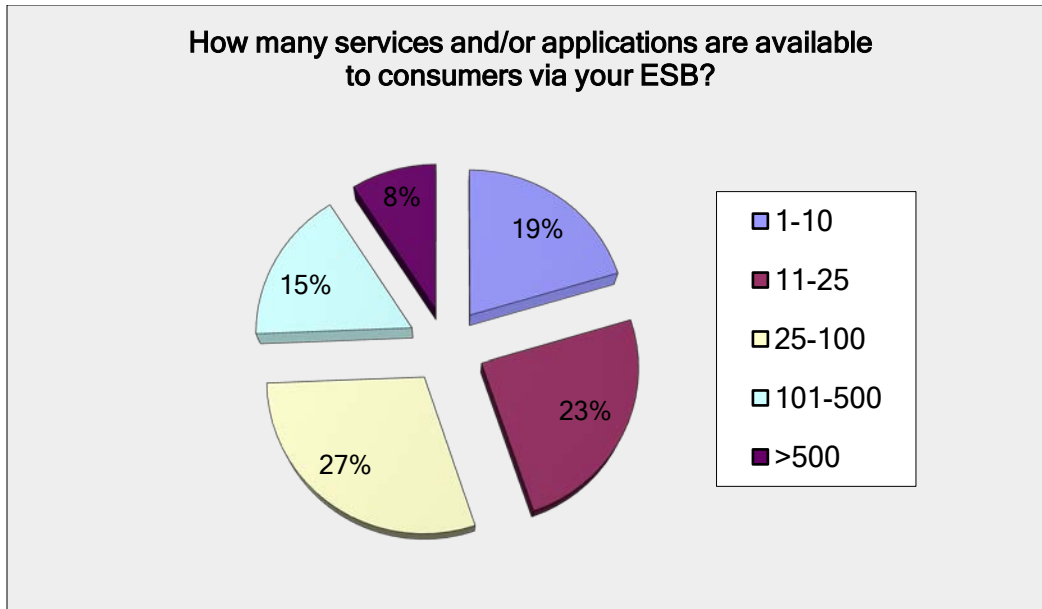


Figure 15 ESB Services – Sizing (Survey Question 16)

services, while 42% worked with ESB's supporting 25 or fewer services. 7% of users answered "I don't know" although this group is not depicted in the diagram. The number of services for commercial ESB's was slightly higher than for the Open Source ESB's. In some cases, a lower number of services or transactions corresponded to that particular ESB being earlier in its deployment life cycle. *191 individuals answered this ESB Practices Survey question.*

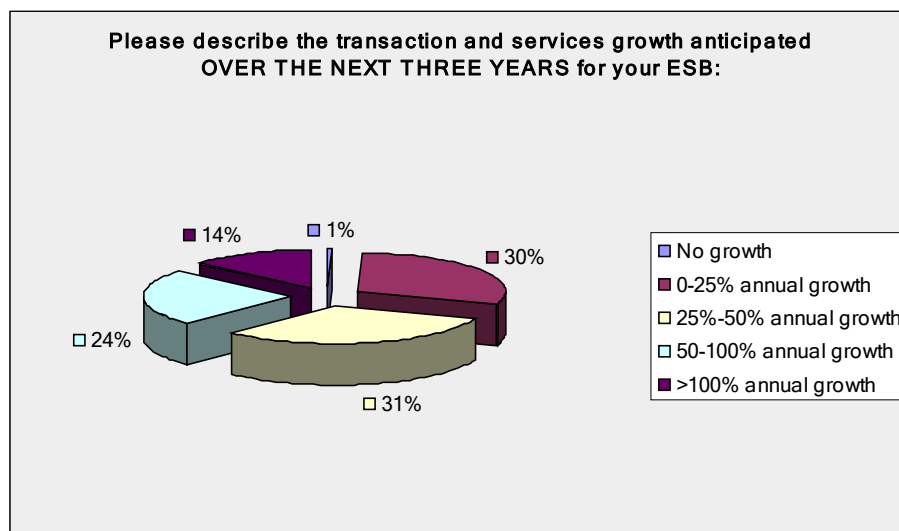


Figure 16 ESB Sizing – Anticipated Growth (Survey Question 18)

Thirty nine percent of respondents worked with ESB's whose anticipated growth (Figure 16) was more than 50% annually over the next three years. Sixty-nine percent expect growth of 25% or more, as evidenced in Figure 16, indicating robust growth overall. Planned growth showed similar patterns across the leading commercial and Open Source ESB's. *188 individuals answered ESB Practices Survey question 18.*

ESB and SOA

Figure 17 shows how respondents to the ESB Practices Survey viewed the advantages of the ESB over previous generations of middleware, EAI and MOM. 71% viewed the ESB's suitability for SOA as its primary advantage, while being standards-based (54%), having greater scalability (50%) and better cross-platform integration (50%), and web services support (49%)

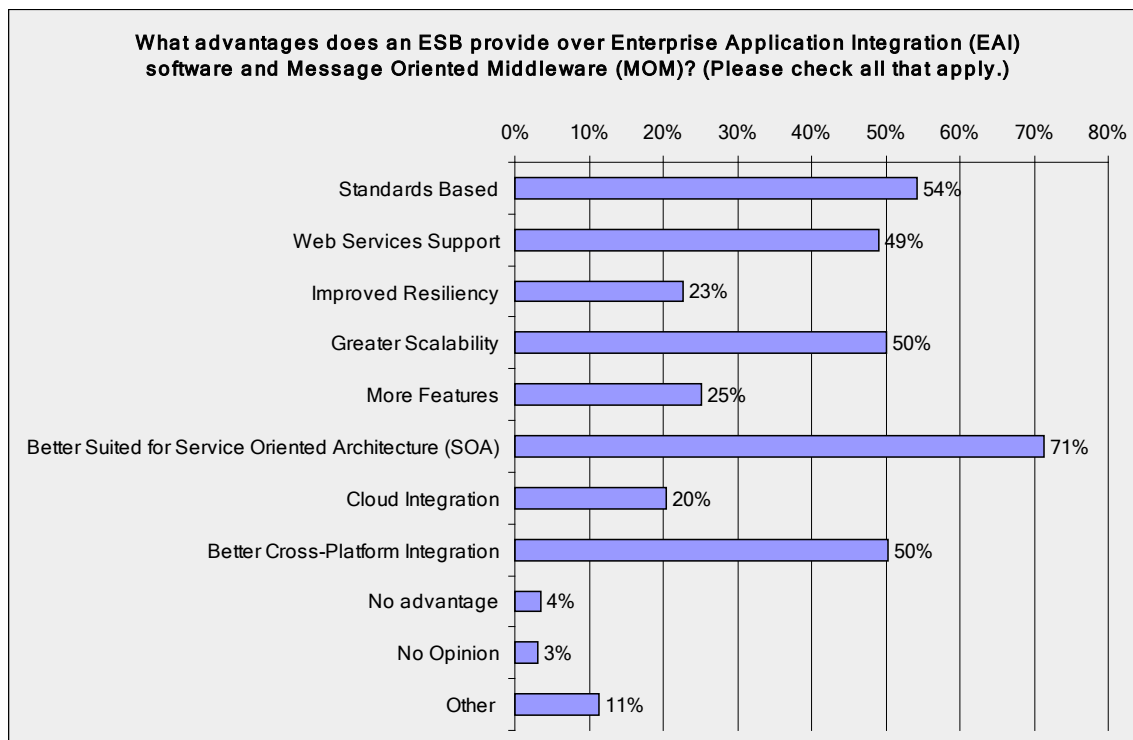


Figure 17 ESB Advantages (Survey Question 3)

also scored high. Members of all of the top job categories of survey respondents agreed with SOA as the top choice, although vendor-specific ESB Consultants rated greater scalability

equally as high. Also deemed to be of benefit were additional features found in the ESB (25%), improved resiliency (23%), and cloud integration (20%). From an SOA perspective, one ESB Architect noted the practical value of the ESB in SOA governance, while another emphasized the ESB's facility to enforce contract usage via WSDL. *230 individuals answered ESB Practices Survey question number 3.*

One Architect/Integrator Consultant, who identified himself as the CEO of an award-winning consulting company specializing in SOA, summarized: "The key benefit of ESB's is their enablement of loosely coupled enterprise architecture. It is this loose coupling that gives way to the other benefits listed above." In commenting on question 3, others noted that EAI and MOM play a significant role in the ESB, which incorporates elements of each.

Another advantage of the ESB seen in the survey comments section from an email respondent was a "lighter weight implementation, simpler" than EAI/MOM. Also noted was that MOM, as a component of ESB, might itself not have available adapters as the ESB does and that EAI has *evolved into* ESB, depending on the product chosen, but more often the case with commercial vendors. That is, some vendors have built their ESB products in many cases "on top of" prior EAI offerings.

Users of Open Source ESB's Mule and OpenESB selected better cross-platform integration as the leading differentiator of the ESB over EAI and MOM, while users of the commercial ESB Sonic ESB chose greater scalability as number one differentiator.

Survey question 5 (Figure 18) addresses the relation between SOA and ESB usage from a different angle. 52% of respondents believe that an ESB should not be used apart from an SOA, or a planned SOA implementation. This, however, leaves a sizeable 48% of the opinion that

implementing an ESB is not dependent on an organization adopting an SOA. Responses were uniform across all major job functions reporting.

Said one IT Architect from the LinkedIn OpenESB SIG, “An ESB can be beneficial without an SOA strategy, but won’t realize its potential without one.” An ESB Consultant from the AquaLogic/Oracle Service Bus SIG argued that an “ESB can be used just as a configuration-driven integration tool. It facilitates SOA [but] having an ESB does not mean you have SOA.” One Architect/Integrator from the Middleware Masters SIG put it this way: “ESB complements

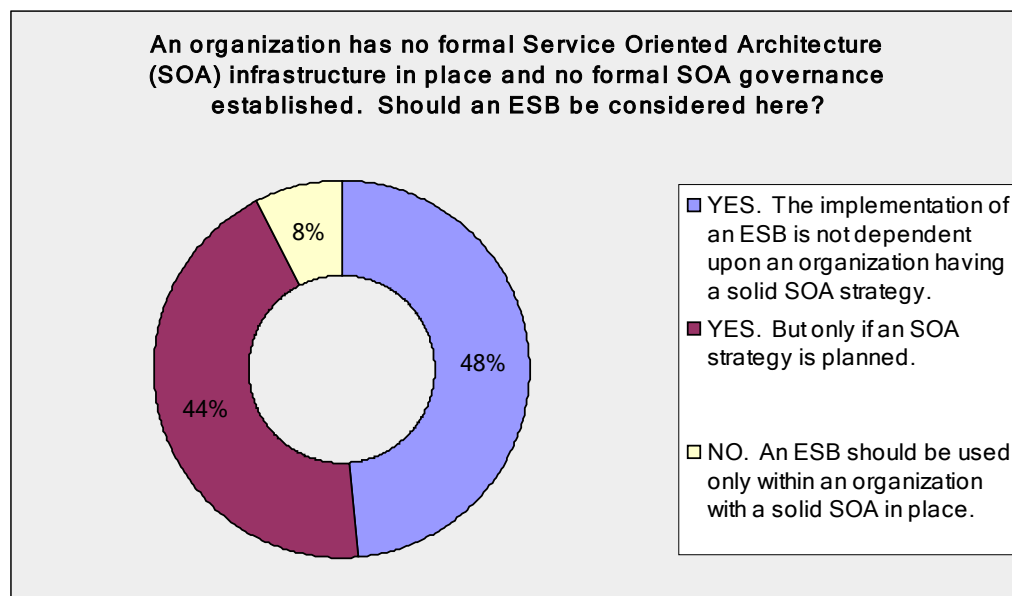


Figure 18 ESB and SOA (Survey Question 5)

SOA. Even if you don’t have a SOA strategy, ESB can help a lot in integrating the applications.”

More insightful comments follow. A TIBCO ActiveMatrix Architect commented succinctly, “None of the above. Complete your SOA strategy and use it to determine if you need an ESB or not.” Yet another Architect from the Enterprise Architecture Forum SIG answered the question in the affirmative and commented, “SOA is an architecture style, and does not require an ESB. SOA seeks inherent interoperability (read the SOA Manifesto), and if

components / services are inherently interoperable, you don't need an ESB. With that said, an ESB can provide benefit, as long as it does not become a crutch, or the focus of a 'SOA' program."

Users of Open Source ESB's were less likely to link ESB value with an SOA than their commercial ESB counterparts. The most popular sentiment overall, however, was that an ESB provides maximum value when used within a defined SOA. *224 individuals answered ESB Practices Survey question 5.*

Answering question 12 (Figure 19), "How does your organization use its ESB?" (Figure 19) an overwhelming majority (72%) of respondents indicated "within a Service Oriented Architecture." Other top choices were for web services (52%) and for general integration (48%). Tied at 44% were the choices as next-generation EAI or MOM along with for Business-to-Business (B2B) integration. Besides the choices provided with the question, other responses

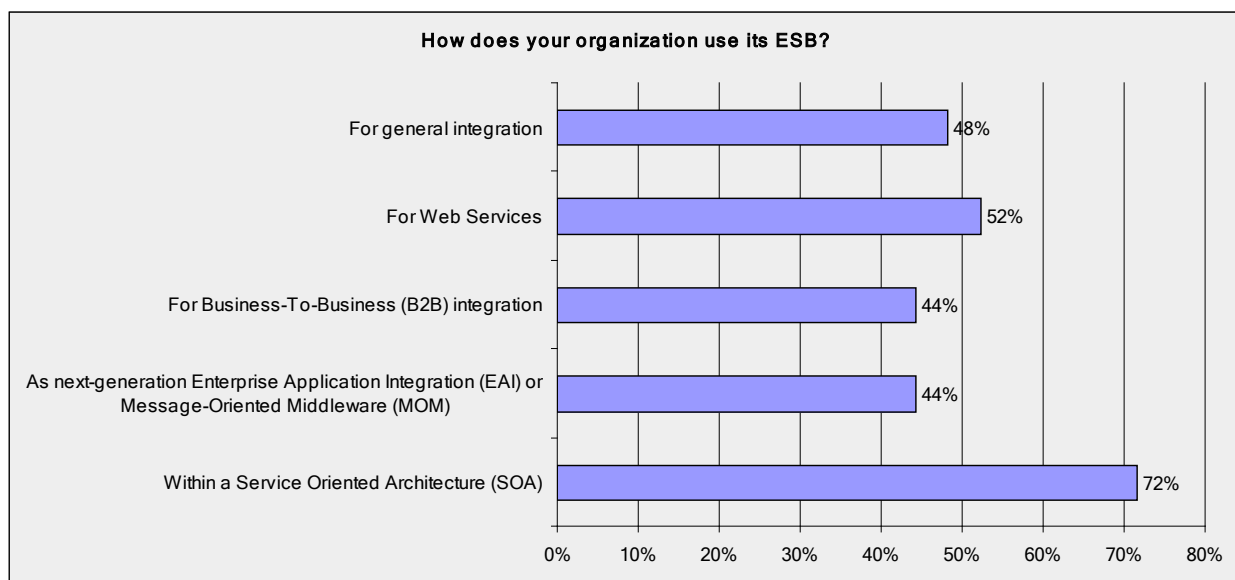


Figure 19 ESB Purpose and Use (Survey Question 12)

were “to provide loose coupling between source and client systems” and “as a business process management tool.” Responders from the top survey job categories all agreed with the SOA choice as number one for this question, but not all users of specific ESB’s agreed. Sonic ESB users overwhelmingly chose “general integration” while users of the Open Source ESB’s Fuse and Mule chose next generation EAI and MOM. Fuse users also selected B2B integration as tied for their top choice. *197 individuals answered ESB Practices Survey question 12.*

ESB Pro’s and Con’s

Key advantages of ESB’s over EAI and MOM were listed earlier in Figure 17 and were described in the previous section. Another ESB advantage is described in survey question 4 (Figure 20) evaluating latency. ESB’s scored lowest (low is good), meaning that of the

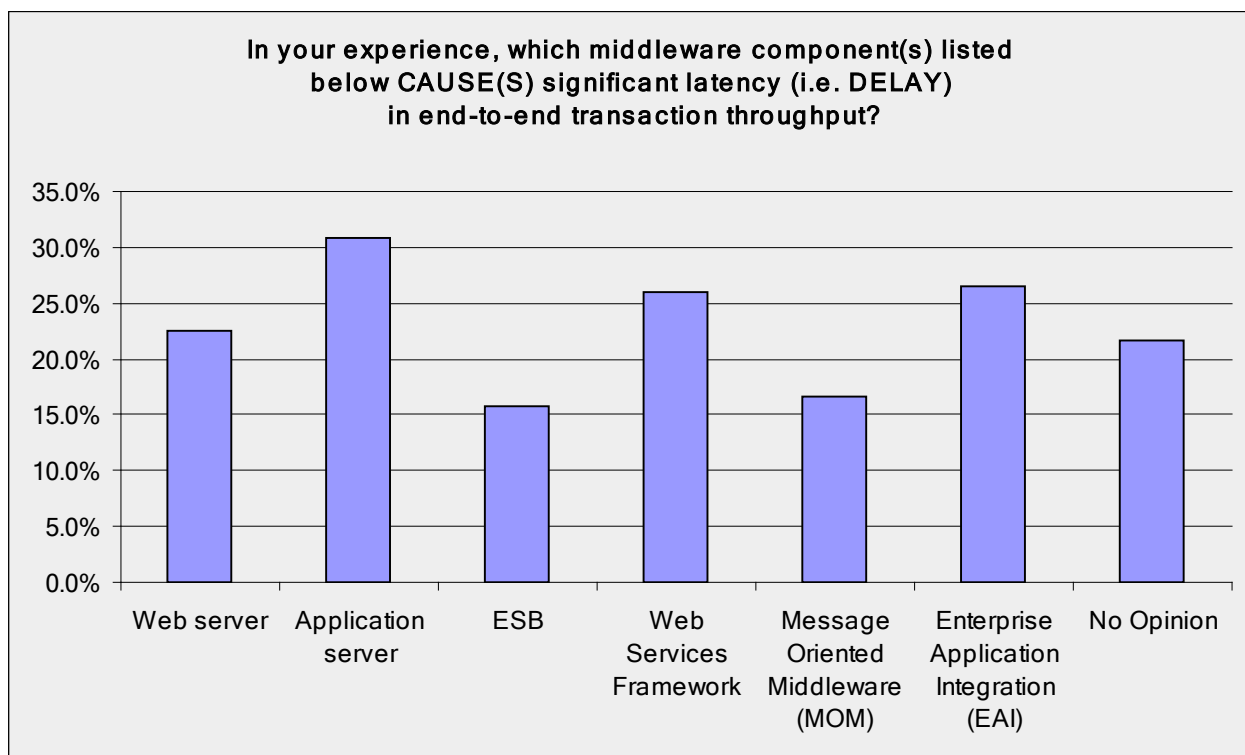


Figure 20 Evaluating Latency (Survey Question 4)

middleware types presented, the ESB was seen by respondents as having the least latency (i.e. best throughput). In general, the application server was seen as introducing the greatest amount

of latency, although Developers responding to the survey chose web services frameworks as having the greatest latency, and generic ESB Consultants chose EAI as the slowest of the middleware options presented.

One business/IT manager and Architect noted it is not the middleware technology itself that necessarily causes latency, but rather the services invoked. Others elaborated, citing a variety of causes, including back end system processing, file IO and database access, XML processing and data transformation. Polling can be a performance culprit pointed out an Architect/Developer/Integrator from the Integration Consortium SIG, but of course that behavior is not endemic to the middleware type. Architecture decisions and bad design were cited by others as the primary cause of latency. This question evoked a wide variety of responses overall, with no consensus among users of the top commercial and Open Source ESB's. *204 individuals answered ESB Practices Survey question 4.*

Survey question 6 (Figure 21) looks at *disadvantages* of middleware components such as the ESB. The leading concern was using the ESB to solve a problem that could have been addressed in a simpler fashion. The more complex skill sets required for ESB implementations and support were equally problematic. Mule and Sonic ESB users in particular were concerned about the more complex *support* skill required. One less obvious consideration cited by a respondent was that Developers may feel a “loss of freedom of creativity” and are therefore unhappy working in the ESB framework, but also noted that the positives of the ESB outweigh these negatives. See Appendix A for a wealth of comments on this question. *225 individuals answered ESB Practices Survey question 6.*

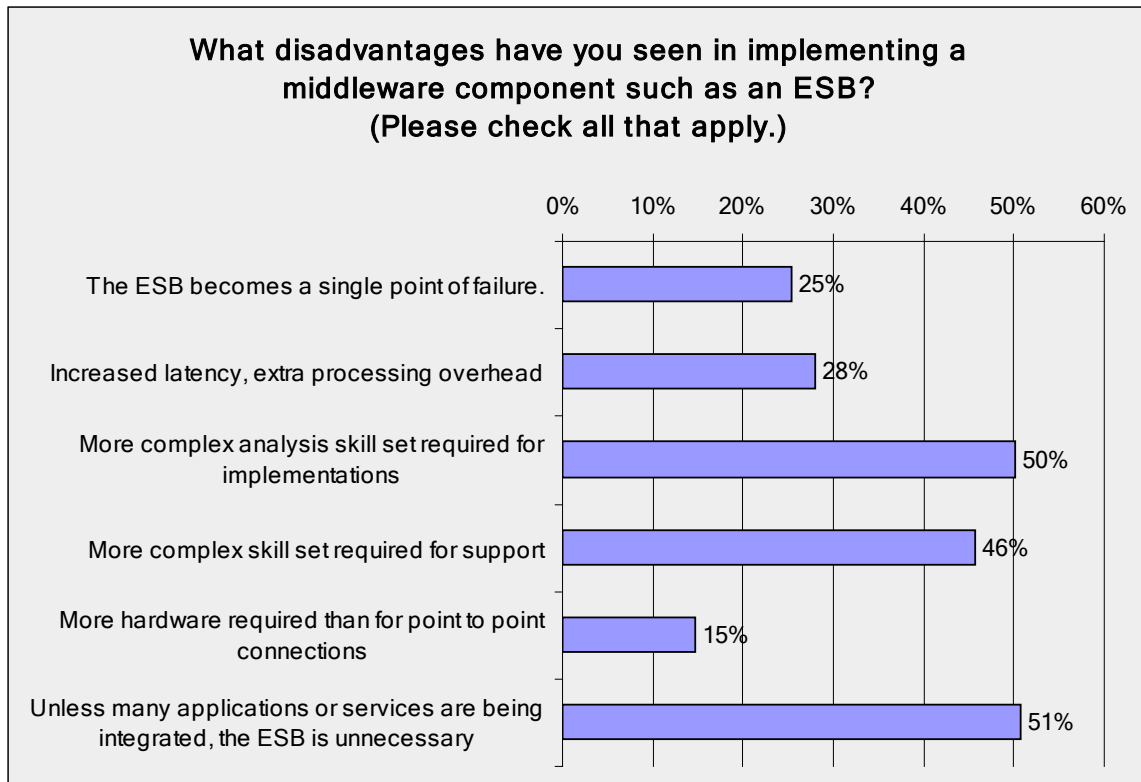


Figure 21 ESB Issues (Survey Question 6)

Results for survey question 14 (Figure 22) “What are the most important characteristics and features of the ESB at your site?” show 47% highlighting event-driven SOA and messaging as among the most important characteristics of their ESB. Top characteristics of ESB’s overall were distributed data transformation and data-based routing (60%); availability of both synchronous and asynchronous capabilities (59%); support of multiple communications protocols (58%); loose coupling – preferred in an SOA environment (57%); and composite services support via lightweight orchestration (53%).

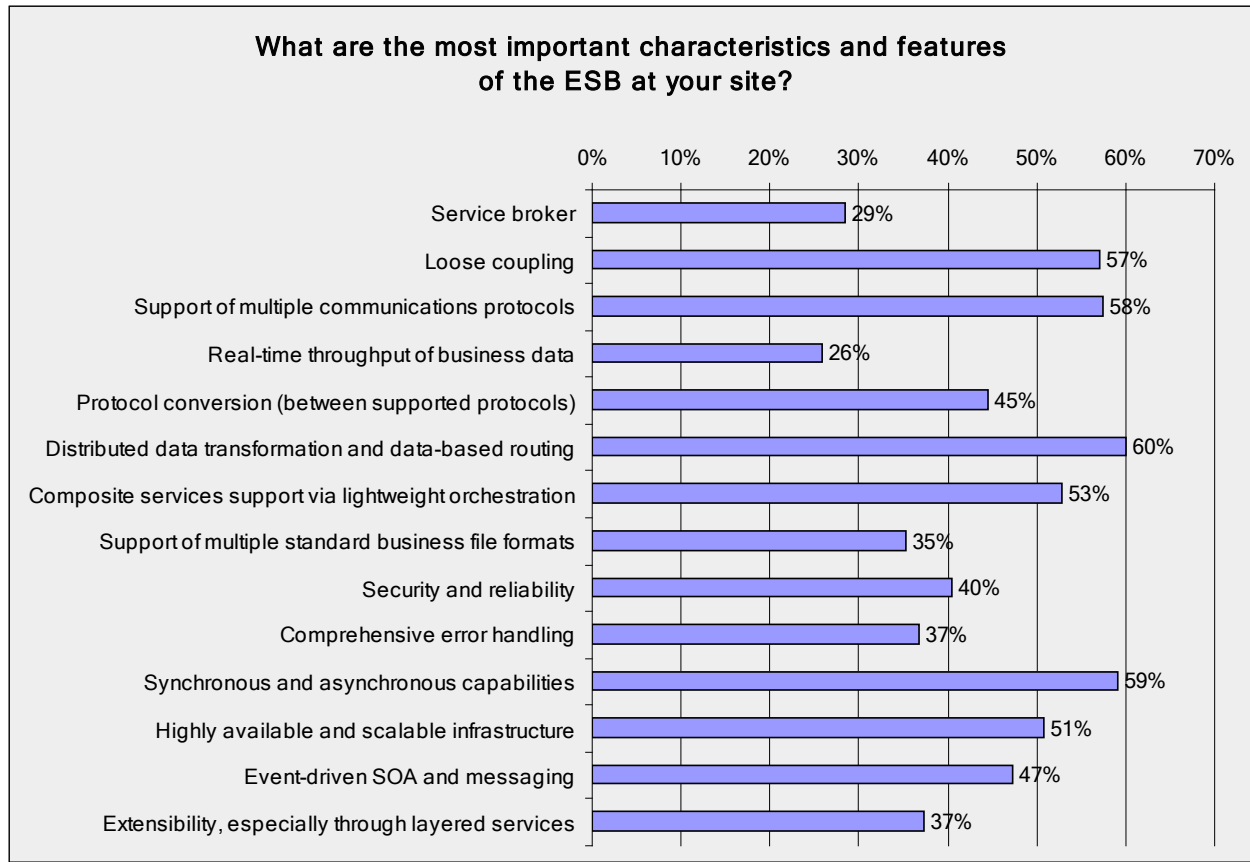


Figure 22 ESB Features (Survey Question 14)

Other advantages mentioned by survey respondents in their comments included federation, the ability to throttle traffic, SLA management, and profiling of traffic through the bus. Said the SOA consulting firm CEO who responded to the survey, “80% of the value of ESB’s comes from loose coupling alone. The rest are applicable but ancillary.” Support of a common information model which de-couples application integration was important to another, who noted that the common information model should be established up front. A wide range of answers to this question was found across respondent job types and ESB products. 193 individuals answered ESB Practices Survey question 14.

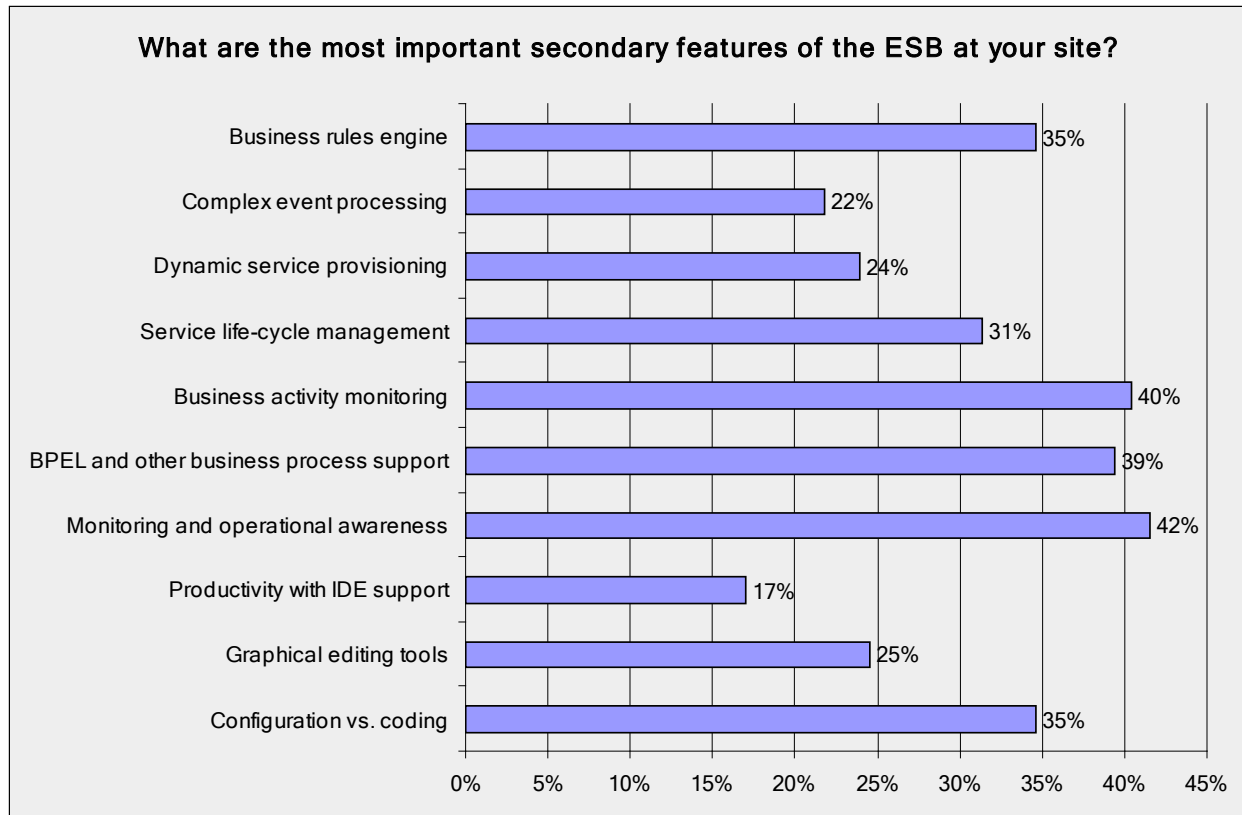


Figure 23 ESB Secondary Features (Survey Question 15)

The most important ESB secondary features noted (Survey Question 15, Figure 23) were monitoring and operational awareness (42%); Business Activity Monitoring (40%); and BPEL (Business Process Execution Language) and other business process support (39%). Also important to the ESB experts surveyed was a business rules engine (35%), the ability to configure rather than code (35%); and service life-cycle management capabilities (31%).

Secondary features cited in the Question 15 comments section included dynamic rules management, SLA management and governance tool integration. Architects, Developers and general ESB Consultants saw business activity monitoring as the top secondary feature, while Systems Integrators and Vendor ESB Consultants considered BPEL to be the most important. General ESB Consultants also ranked monitoring and operational awareness as number one. 188 individuals answered ESB Practices Survey question 15.

The survey also looked at primary non-functional features of *the survey respondent's ESB* compared to *other ESB's* in question 19 (see Figure 24) and found that flexibility and

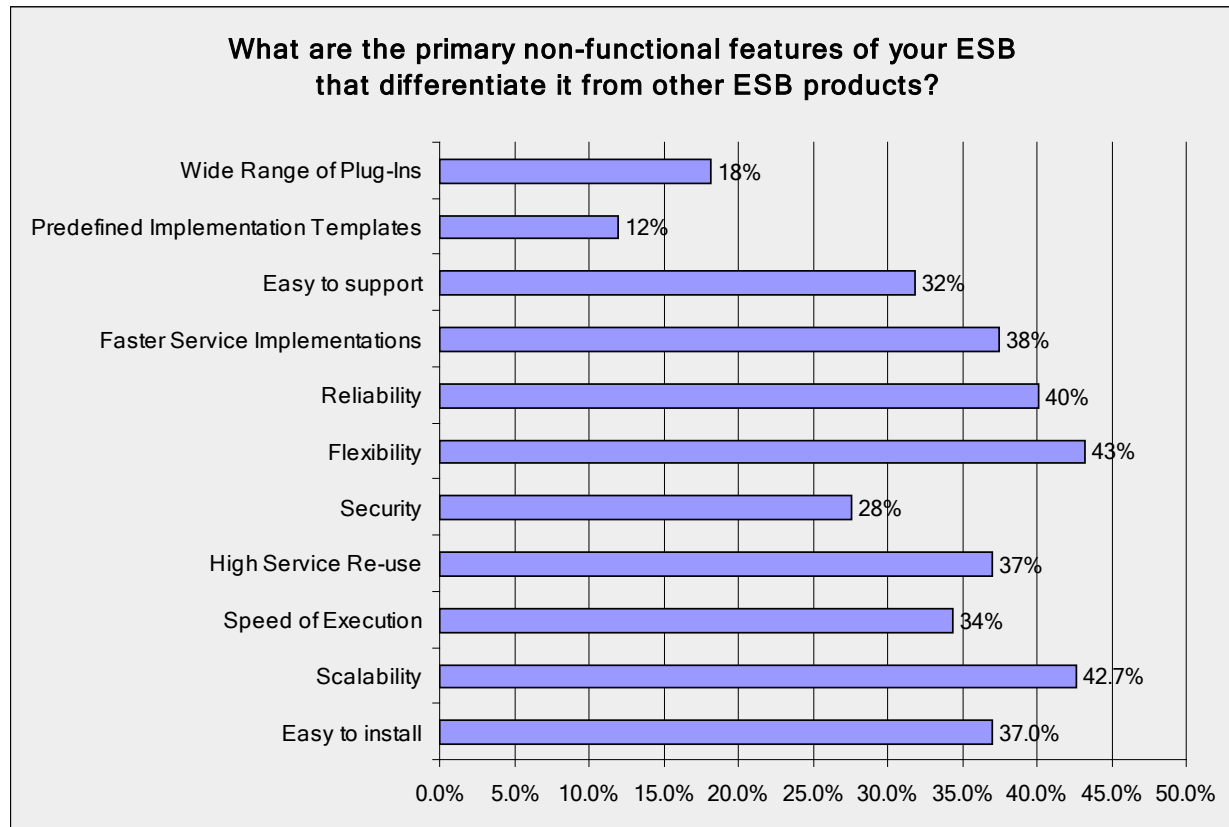


Figure 24 Primary Non-Functional ESB Features (Survey Question 19)

scalability were number one (both 43%), followed by reliability (40%); the ability to perform faster service implementations (38%); high service re-use (37%); speed of execution (34%); and ease of support (32%) rated highest. While security received just 28% of the responses, this does not reflect on ESB security generally but rather as a factor in differentiating between various ESB products.

Some important additions to the list included zero license fee (likely from an Open Source ESB user); first rate administrative tooling and support; vendor support; easy to deploy to multiple machines at a time; model driven architecture; tools built on Microsoft skill-sets; changes can be made very quickly; and good support of Developer tools (Eclipse, Maven, SCM).

“Easy to install” was the top choice among Open Source ESB users. 192 individuals answered ESB Practices Survey question 19.

ESB Implementation and Support

The survey asked a number of questions (9, 10, and 20 through 23) to understand how easy or difficult it is to implement and support services on a given ESB, and generally how long it takes for a person to come up to speed on the ESB. Survey question 10 asked, “Which ESB is easiest to learn and maintain?” And the response generally mirrored the specific ESB used, meaning that individuals generally felt good about the usability of their ESB, viewing their own ESB as easiest to use. This was particularly noticeable with Open Source ESB users. 227 individuals answered ESB Practices Survey question 10.

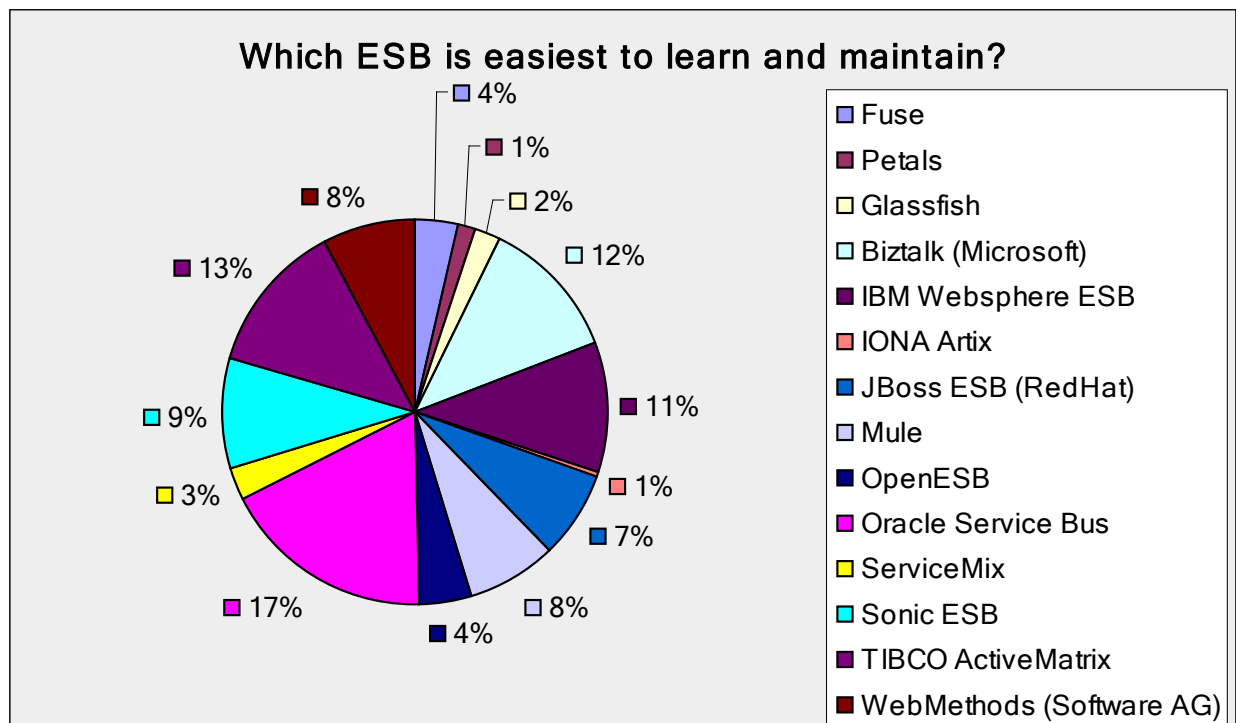


Figure 25 ESB Ease of Use (Survey Question 10)

Question 9 (Figure 26) probed the nature of support of Open Source ESB's, asking if Open Source ESB's required a more technical support staff. Fifty three percent responded yes;

28% said no; with the remainder offering no opinion (those with no opinion were removed from the graph). Users of the top commercial ESB's were unanimous in this choice, while from the Open Source ESB segment, JBoss ESB, Mule and ServiceMix users agreed that a much more technical staff is needed. However, Fuse and OpenESB users disagreed, suggesting that their products required a less technical support user. Agreement with the "yes" response was also seen across the five top job function respondents.

Comments from this question pointed out the *advantages* of both the more technical staff and the ability to see "inside the box" that is available with Open Source. One astute Architect from the OpenESB SIG cautioned, "Do not fall into the trap of thinking that configuration is

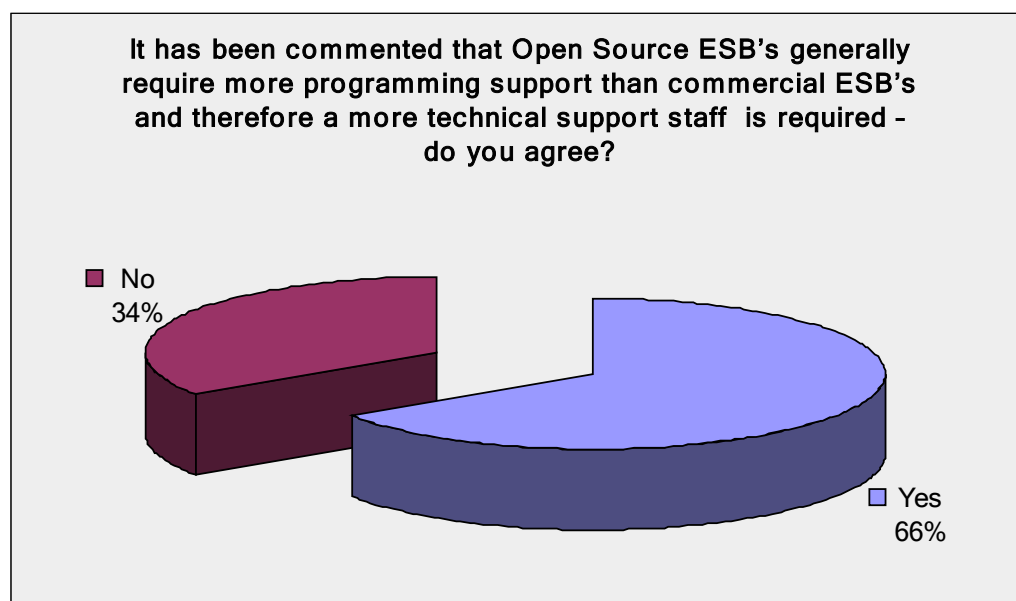


Figure 26 Open Source ESB Support (Survey Question 9)

inherently better than programming – if the configuration is more complex than (well known) programming paradigms then it is worthless. Also, configurations must be protected in the same way as source code (i.e. within an SCM) which increases their complexity. So I do think that Open Source ESB's generally require more programming support, but I think that reduces the requirement for specialized support.”

Commented an Architect from the TIBCO Global SIG: “This is definitely the case with Mule and TIBCO. TIBCO as well as other commercial ESB’s centralize administration, where Mule’s administration is decentralized. We then have all of our Developers doing administrative tasks on Mule and having to do administration conflict resolution, where TIBCO administration is all done by one resource.” See Appendix A for 30 thoughtful comments on this question. 219 individuals answered ESB Practices Survey question 9.

“What are the primary skills required to support your ESB?” asked Question 20 (Figure 27). Top responses included XML (86%); Web Services/WSDL (82%); and SOAP (69%). Also important were programming (java, c#, etc. – 56%); a detailed understanding of the ESB product (43%); and Architect (41%) and senior level IT skills primarily (37%). Of lesser

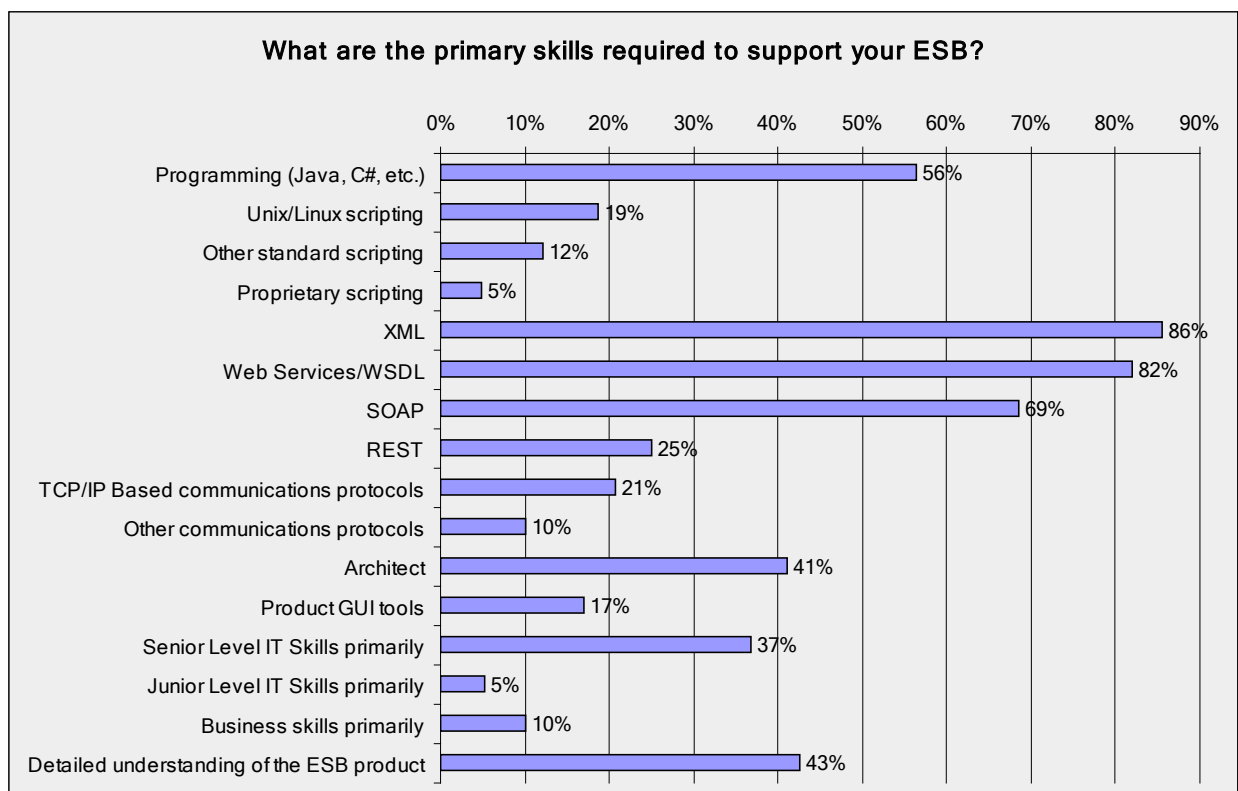


Figure 27 Skills to Support the ESB (Survey Question 20)

importance were REST (25%); TCP/IP communications (21%); Unix/Linux scripting (19%); and other standard scripting (12%). XSL, XQuery and Spring were highlighted in the survey comments as other skills needed to support specific ESB's, along with a "deep understanding of what is (or must be) a service." 188 individuals answered ESB Practices Survey question 20.

Question 21 (see Figure 28) asked how many days it takes to integrate, test and deploy access to a new service or application. This was another in a series of questions designed to understand ESB service implementation and support requirements. 27% said two days or less, with 26% saying 3-5 days. More than half of all survey respondents indicated one week or less, but 42% of surveyed *commercial* ESB users indicated just 1-2 days. Just 20% of Open Source ESB users pointed to an implementation cycle that short. Architects, Integrators and Developers aligned with the 1-2 day figure but ESB Consultants viewed 3-5 days as more typical.

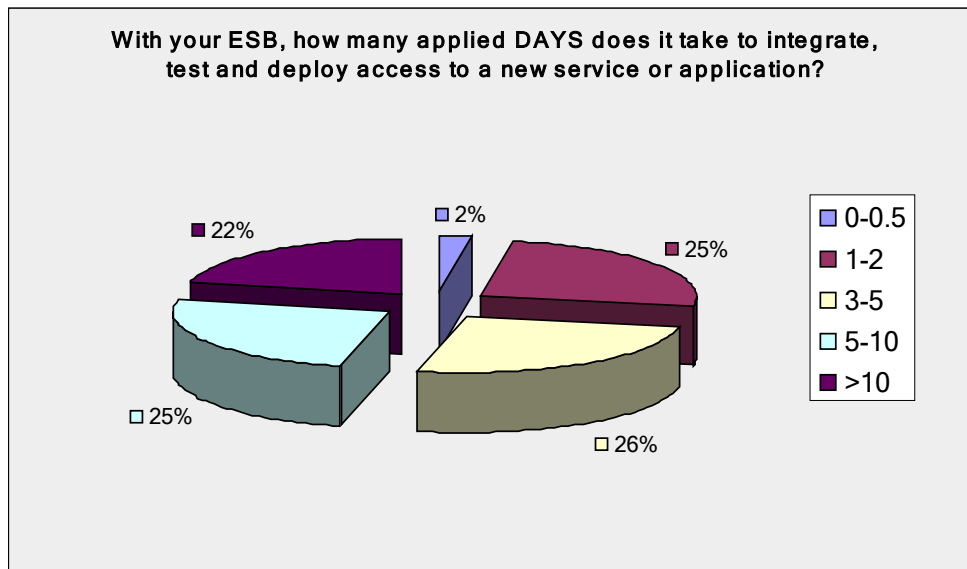


Figure 28 ESB Support Efforts (Survey Question 21)

Several respondents noted obvious factors impacting this question, such as customer needs and the complexity of the implementation, as well as available component re-use. Testing phases and regulatory requirements can also impact service implementation time. One

Architect/Integrator from the LinkedIn Enterprise Architecture Forum SIG who specified more than ten days for a service indicated that this length was due to the “extensive level of peer-review and governance requirements inherent in the Health Care/Insurance field.” Several comments pointed out that the nature of the configuration dictated the effort. Availability of required programmer skill sets was also cited as a factor. *185 individuals answered ESB Practices Survey question 21.*

Most respondents regarded their ESB as easy to manage (Question 22, Figure 29). This view was shared across all primary survey job classifications and the top ten ESB products represented, although IBM Websphere ESB users split between Easy and Difficult, perhaps indicating some added complexity with that product. *186 individuals answered ESB Practices Survey question 22.*

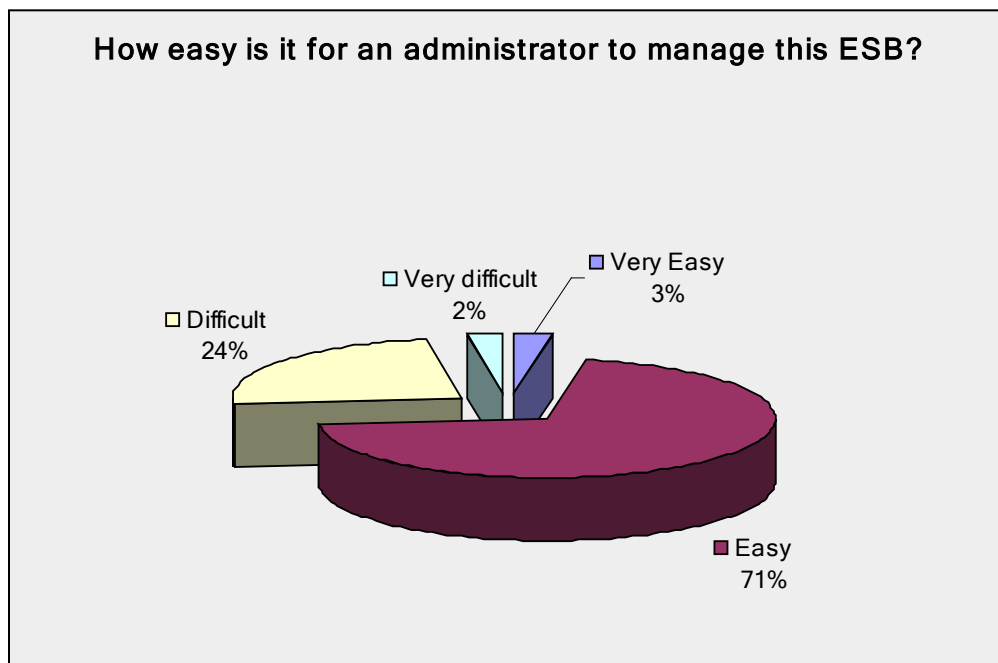


Figure 29 ESB Systems Management Complexity (Survey Question 22)

Figure 30 (Question 23) shows that the average ESB support person can be trained in less than 2 months. This opinion was shared by all of the five top job functions represented in the survey and most of the top ten ESB's represented. Biztalk and Servicemix users split between 0-2 months and 3-6 months, while Websphere users selected 3-6 months. Considerations impacting length of training included user background and skill set. *186 individuals answered ESB Practices Survey question 23.*

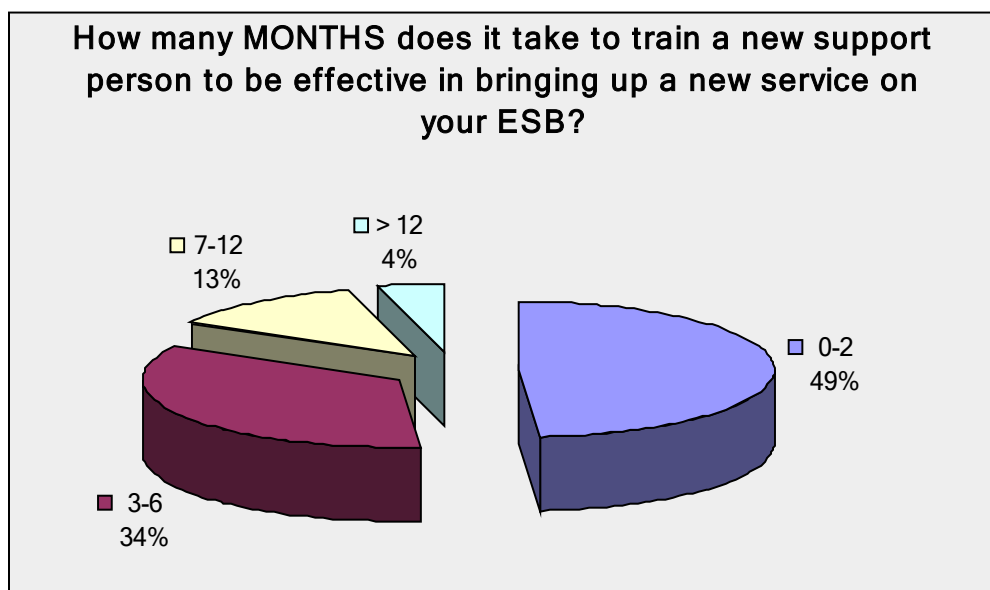


Figure 30 Training an ESB Support Person (Survey Question 23)

ESB Total Cost of Ownership (TCO)

Total Cost of Ownership includes far more than the acquisition cost of the software. In addition, it includes the cost of installation, vendor support, internal support, ongoing maintenance and hardware, to name a few components.

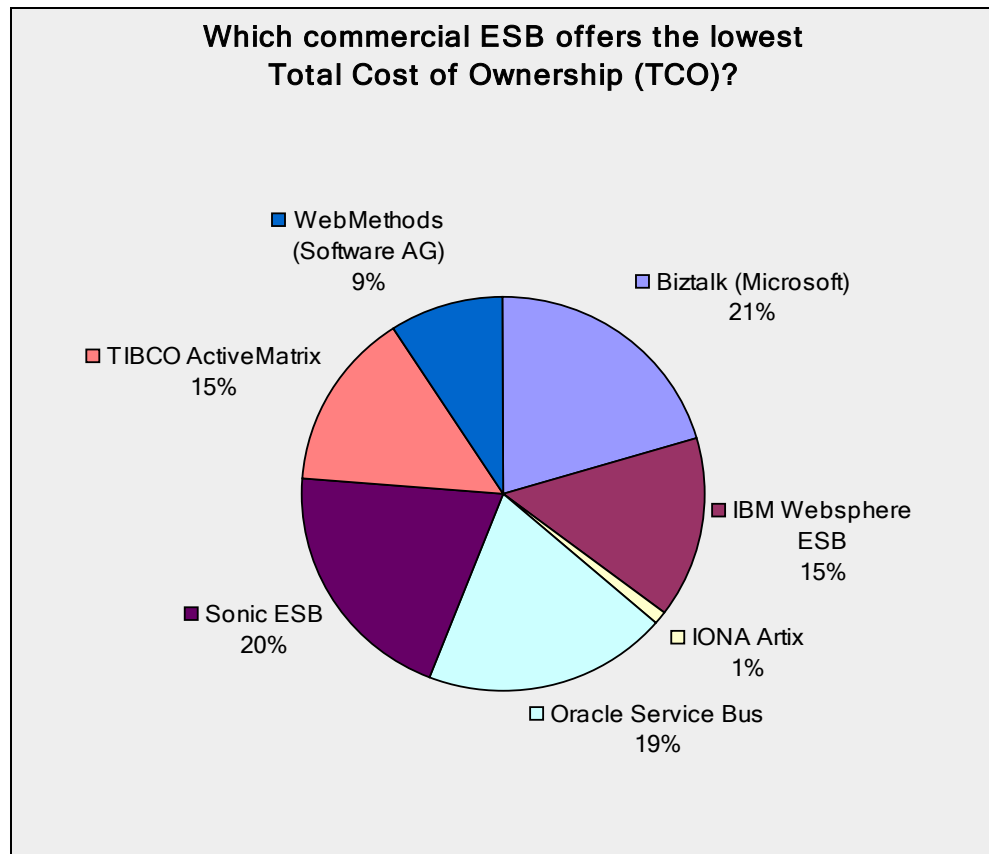


Figure 31 TCO for Commercial ESB's (Survey Question 7)

Survey results did not show any specific ESB as head and shoulders above the competition in this area. Question 7 (Figure 31) targeted commercial ESB's while question 8 (Figure 32) focused on Open Source products. Generally one expects that Open Source offerings will have the lower TCO, but one survey participant commented that his company is moving away from Mule (an Open Source ESB) to TIBCO, citing Mule's support contracts as more costly! An Open Source vendor from the Petals SIG noted that support for several Open Source products can be very expensive, but that overall, regardless of commercial vs. Open Source, TCO "will depend on your needs and competencies."

Note that 52% of respondents indicated that they did not know which ESB had the lowest TCO for both questions 7 and 8, and that the graphs shown represent the adjusted percentages of

those who answered the question with a specific ESB. 228 individuals answered both questions 7 and 8.

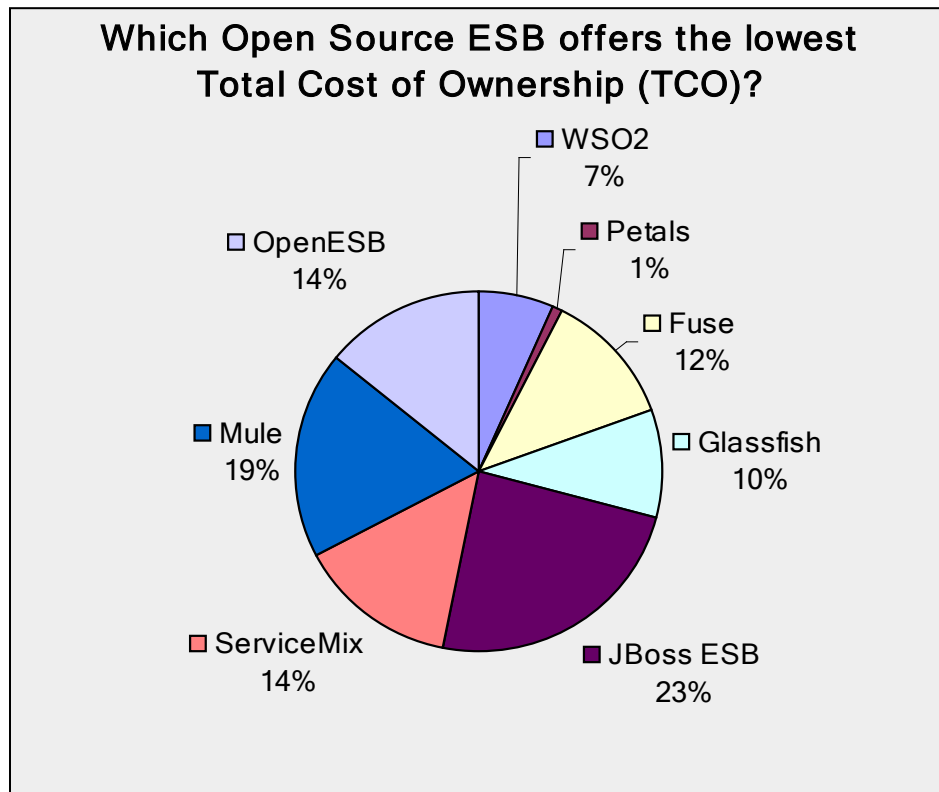


Figure 32 TCO for Open Source ESB's (Survey Question 8)

ARN Integration Requirements

The Radio Telescope application is to be the first using a new infrastructure in the Regis SCIS ARN. Functional requirements of the Telescope application can be summarized as follows: “The end goal is to create a software system over the bus architecture that will enable astronomy students to view real-time data that is received by the radio telescope. The user interface will be a web browser that can view a streaming video of the telescope itself, and also display the real-time data output in a graphical format. Users will also be able to control the direction of the telescope by sending commands to move the motors that control the pitch and angle of the dish” (Jackson, 2009, p. 1). Key components of the Telescope application include:



Figure 33 Regis University ARN Radio Telescopes

- “*Computational Cluster* – Receives Data either from the data warehouse or the Science Node, performs computation for storage in the Data warehouse (Moore, 2009, p. 1),” expected to run on a 1.5 TB SAN HP EVA fiber channel;
- “*Data Warehouse* – To hold data from Science Nodes in potentially a hypercube data repository. Provide access to stored data and variations of that data along different variables (ibid.);” the database team needs to determine how it will store binary streams captured by the telescope; it is not deemed efficient to uuencode;
- “*Drupal Web Portal* – To provide access to different project participants for accessing data, system controls, and computational processes as appropriate for each group. Must include astronomical support resources and links to curricular materials (ibid.);
- “The *ESB* is to provide routing between services of nodes. Initially this will be trivial connection routing, but as the number of nodes in each category expands it will become critical for service routing between sets of nodes at different locations (ibid.).” (The Academic Research Network operates six data center locations along the Colorado Front

Range, from Colorado Springs through Denver and on to Boulder); the project is expected to include bandwidth study of the VPN capabilities connecting the ARN nodes;

- *EPICS (Experimental Physics and Industrial Control Software) SCADA software* at the science node as the telescope interface. SCADA stands for “Supervisory Control and Data Acquisition.”

Like the ESB’s used by respondents in the ESB Practices Survey, the ARN ESB is anticipating significant growth with simultaneous users: in the first release just 5, but later growing to 100; and initially only one application/service on the bus, but later 50 are anticipated.

With the Radio Telescope application, a hydrogen spike will allow “viewing” of gas clouds and nebula, and high energy sources such as Jupiter, the sun and pulsars. An outreach program would be created for K-12 students starting with Junior HS students using a pre-packaged curriculum in classrooms. A typical use case would be to log on to the telescope, point at Jupiter, and see what you get. Long-term, according to former SEAD Practicum co-leader Erik Moore, the computational cluster will be used for de-convolution from the signals. Other radio telescopes from campuses around the world could interface with the Regis radio telescope producing interferometry and high resolution images; and hydrogen spectroscopy with locations potentially in Europe, China and South America. Future science nodes using the ESB infrastructure, beyond astronomy, are expected in the areas of meteorology and seismology; a research lab monitor system is also under consideration.

Availability requirements are 24x7x365 to record observational data. Full sky scans are needed daily, with one degree of observation per night. Given this high level of availability expected, application supportability becomes paramount. Skill sets needed within the practicum are required for supporting and extending SOA/ESB would include ESB product knowledge and

skills for the potential ESB (expected to be one of several available Open Source ESB's), Oracle RAC, Web Services, Java, and other. With 24x365 availability requirements, a robust support model must be put in place.

Chapter 5 – Conclusions

In this section are presented conclusions resulting from this investigation regarding the ESB and the question as to whether an ESB is appropriate in the case of the Regis University SCIS Academic Research Network (ARN) Radio Telescope implementation. In addition, summary views of the thesis methodology, thoughts on limitations of the study, and future research in this area are presented. In the process additional insights from the Architect community are provided via “final thoughts” responses from ESB Practices Survey question #25.

ESB Investigation

Two questions framed the primary investigation of this thesis: What is the relationship between an ESB and SOA? And what are the minimum integration requirements for which an ESB is appropriate?

ESB and SOA

From the literature cited in Chapter 2, and from a review of survey questions 3, 5 and 12 in Chapter 4, we see a strong connection between SOA and the ESB, although that connection is not a necessary one, since the ESB is often well-used for general integration apart from an SOA infrastructure. In survey question 3 the highest number of respondents (71%) noted suitability for SOA as the greatest advantage of the ESB over its predecessor technologies EAI and MOM.

Survey question 5 asked whether an organization without a formal SOA in place should consider using an ESB. 48% of respondents answered in the affirmative, while 44% answered yes but only if an SOA strategy is planned. 8% answered no, totaling 52% of respondents solidly identifying the ESB with SOA. The bottom line is that nearly half of the 224 Architects, Integrators, Developers and Consultants who responded view the ESB as valuable *apart from* an SOA. In actual ESB implementations familiar to survey respondents, 72% responding to

question 12, “How does your organization use its ESB?” cited “Within a Service Oriented Architecture,” as the leading response overall to this question, again showing the strong link between the ESB and SOA.

Said the SOA consulting firm CEO who responded to the survey, “Although ESBs are a key component of SOA, it is best to evaluate, deploy, and use them based on concrete business cases. Successful ESB implementations are always a function of how much value they deliver to the organization, never a function of how well they fit into a SOA plan.”

ESB Minimum Configuration

Not only does Mule CTO Ross Mason caution against the use of an ESB where a simpler solution will suffice, but respondents to the ESB Practices Survey issued this warning as well. The literature reviewed in Chapter 2 and the survey results support Mason’s view.

A member of the IT Architect Network SIG put it this way: “An ESB is just an expensive and complex tool, find out if your needs justifies this investment. Usually if you decide that an ESB is needed, I guess you'll also have drawn the conclusion that (event driven) SOA is the ‘right’ paradigm for your business' challenges. But start small and acquire experience.”

From ESB Practices Survey question 6 the highest response rate (51%) to the question “What disadvantages have you seen in implementing a middleware component such as an ESB?” from the 225 ESB professionals responding was, “Unless many applications or services are being integrated, the ESB is unnecessary.” The second highest response as a potential disadvantage, at 50%, was “More complex analysis skill set required for implementations,” suggesting that the selection of an ESB as a middleware solution demands careful consideration.

ESB Investigation Conclusion

The survey results generally affirm the existing literature summarized in Chapter 2 and reinforce the interpretivist epistemology view that there can be more than one valid answer to the thesis questions, as described above.

ESB Suitability For Academic Research Network (ARN) Radio Telescope Project

Future applications accessed via the Regis University Academic Research Network (ARN) are expected to utilize the Enterprise Service Bus (ESB) as a strategic architectural infrastructure component. The initial application planned for the ARN to make use of the proposed ESB architecture is the Radio Telescope project, which integrates a portal with a database, a computational cluster, and a Supervisory Control and Data Acquisition (SCADA) application which controls the radio telescope, as described in Chapter 4.

The ARN ESB implementation will follow the incremental model, starting small and building on early success; the SEAD Practicum team also sees this as an opportunity to establish its data management architecture early in the process. An added advantage to choosing an ESB within an academic environment is the value it brings to the curriculum generally and to the students who become involved in the life cycle of the initial Radio Telescope application and later in expected future projects.

ESB Support in the ARN

Survey questions 9, 10 and 20 through 23 address ESB implementation and support requirements. If an ESB is to be deployed to the ARN, a suitable support infrastructure must be available. Given budget constraints, it is likely that an Open Source ESB will be an attractive option. Already a JBoss ESB Proof of Concept has been conducted within the Practicum and the ESB Practices Survey highlighted other Open Source ESB's which were wholly endorsed by

their users. With a zero-price license and the required technical skill sets available among members of the SEAD Practicum in conjunction with the Software Development Practicum and the Database Practicum, an Open Source ESB is a viable option.

Another potential advantage to an Open Source ESB is access to core product source code and a development community that can accelerate enhancements. Two options to assure that required ESB implementation, administration and support skills are available include: 1.) funding a part-time Practicum support person with the requisite ESB XML and java skills; and 2.) creating an advanced middleware class covering the ESB hands-on, which could help create a pipeline of support personnel for the ARN ESB. As a Business Analyst/Architect from the LinkedIn Integration Consortium SIG said, “Choosing an ESB should consider not only the needs of the organization but also its prevailing technical environment and overall IT skill sets!”

ESB Latency Concerns

As noted in Chapter 4, the results from survey question 20 indicate that latency is not a concern with the ESB. Coupled with the Drupal portal, throughput will be enhanced, not gaited, by an ESB middleware infrastructure.

ESB Portal Integration

As described in Chapter 2, Chappell provides an ESB Portal Integration pattern, which is adapted to the ARN design in Figure 34. In addition to expectations of no latency issues with the ESB (per ESB Practices Survey question 20) Chappell maintains that the ESB, due to asynchronous communication, reliable delivery and correlation, along with the use of federated queries and ESB caching services, actually *improves throughput* in complex portal implementations (Chappell, 2004, p. 224).

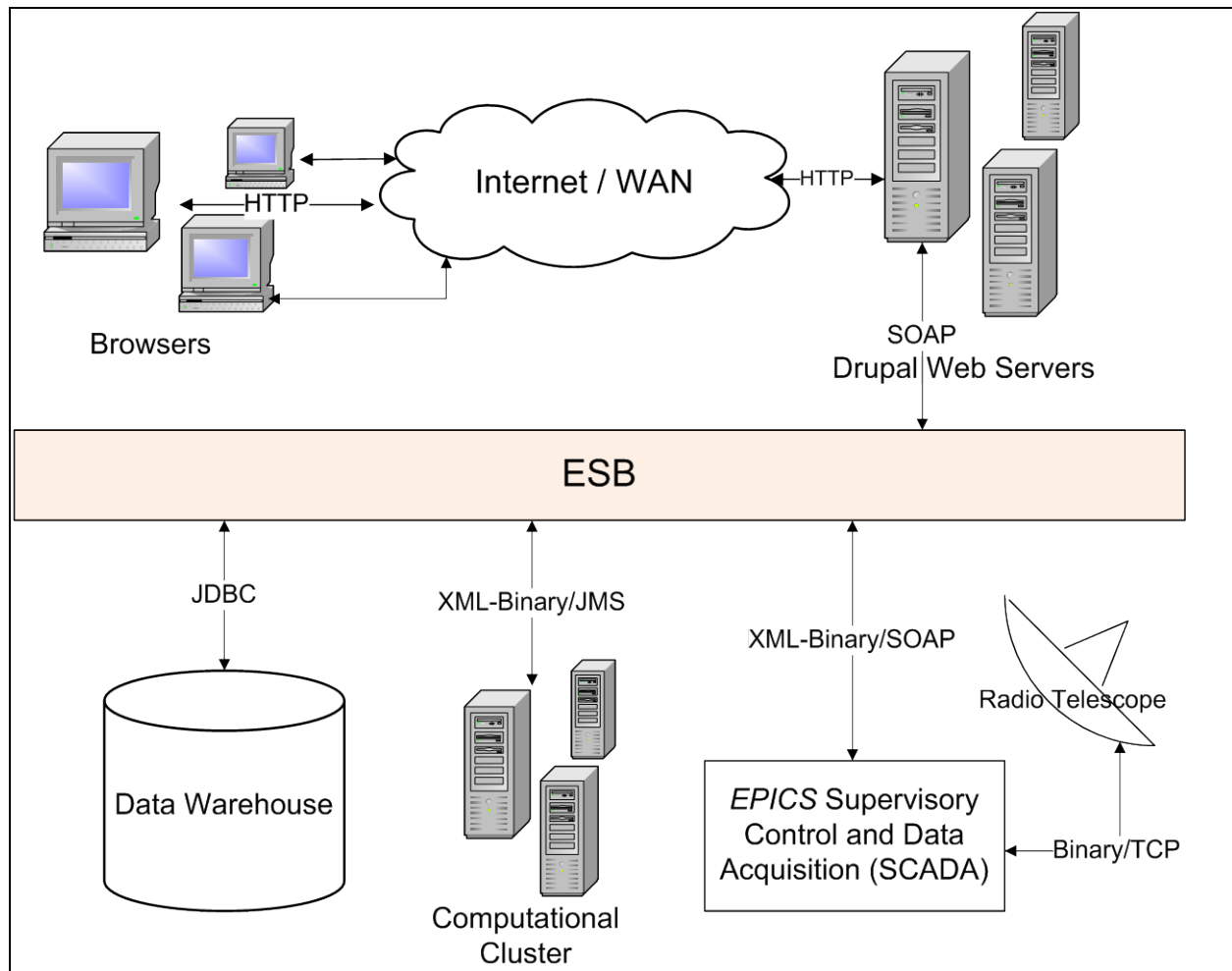


Figure 34 Proposed Phase One ARN ESB Infrastructure

ESB Total Cost of Ownership (TCO)

As mentioned in survey comments in Chapter 4, a zero-priced ESB license does not mean zero or even low total costs of ownership. However, with technical skill sets, including java and XML readily available, either within the SEAD Practicum or within the Software Development Practicum, the ARN ESB can be expected to be a low-budget implementation and operation if an Open Source solution is chosen.

ARN ESB Conclusion

Using Mason's criteria and Chappell's Portal Pattern, the ESB is a proper fit for the SEAD Practicum based on the expected number of protocols to be supported (three), the planned expansion to multiple applications on the bus architecture, and the integration of the portal to initially three, and eventually more, back-end systems. The SEAD Practicum envisions an "SOA Lite" environment, which suggests that even more of the benefits of the ESB can be leveraged.

From a review of the literature and the responses from the ESB Practices Survey, the author recommends that any of the top Open Source ESB products be considered when the SEAD Practicum team is ready to make its ESB selection. Aside from a review of features and functions provided by each ESB, the presence of a vibrant Open Source community dedicated the product chosen will assure assistance with implementation and support questions down the road at little to no cost.

Methodology

The ESB Practices Survey results produced for this thesis bring together views of industry professionals on the ESB middleware technology deployed within their organizations, and as such the survey comprises the primary artifact created in this investigation. As Hevner (2004, p. 76) notes, "The rich phenomena that emerge from the interaction of people, organizations, and technology may need to be qualitatively assessed to yield an understanding of the phenomena adequate for theory development or problem solving." It is the author's view that the ESB Practices Survey conducted for this thesis exemplifies the type of research and assessment that Hevner describes.

Limitations of Study

The following limitations of this study are noted:

1. Regarding SOA questions, responses may have been biased toward the linking of the ESB with SOA, since more than 40% of potential respondents came from LinkedIn SIG sites specializing in SOA.
2. This was a qualitative study, using survey results to corroborate (or contradict) the literature summarized in Chapter 2 of this thesis.
3. The survey views respondent answers at face value. For example, there is no guarantee or validation that a respondent claiming to be an Architect is in fact so, or is otherwise responding other than truthfully and accurately.

Considerations for Future Research

A number of ideas for future research come to mind based on the research in this thesis:

1. *Comparing professional networking sites in terms of their ability to provide quality survey responses:* which sites offer the best access to targeted professional responses and which provide ample returns given an investigator's time and cost investments?

Examples of professional networking sites other than LinkedIn that could be tested for survey responses include Viadeo, XING and Plaxo. This aspect of the research could be secondary in support of a more IT-specific thesis, using multiple professional networks to measure the relative response rates from each, including total responses, response percentages, and investigator effort per response. Open Source responders might also be located at the standard Open Source support site. Posting a survey link there, if permitted, may yield quality respondents. It is up to a future investigator to determine.
2. *Case study of the ARN ESB implementation,* to track the actual implementation and initial business results. Case studies are appropriate when how or why questions are asked; when the investigator does not control the events; and when the focus is on "a

contemporary phenomenon within a real-life context” (Yin, 2009, p. 2). This thesis makes a recommendation to the SEAD Practicum regarding the ARN Telescope middleware implementation. A follow-on case study could assess the wisdom of the choice made.

3. *ESB and Systems Integration Evolution*: Popular through the first decade of the third millennium, the ESB has more recently been included in a new larger Comprehensive Integration Solutions category (CIS) which looks at the ESB, EAI and other integration approaches in a new way. CIS or the Enterprise Service Cloud (ESC) may be possible successor areas of investigation for this thread.

Summary Findings

The relation between SOA and the ESB can be complex and intricate. The ESB can deliver great value apart from an SOA, but arguably even greater value within an SOA. With its intention to implement an “SOA Lite” architecture within the Academic Research Network and with requirements justifying use of an ESB, the Regis SEAD Practicum is properly positioned to deploy an ESB within its ARN infrastructure, initially to support the Radio Telescope Project.

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Appendix A – ESB Practices Survey Results

Attached are complete results of the survey conducted from November 10, 2010 through December 23, 2010. Results from every question are summarized and all respondent comments are provided.

esb v1-0-0

Default Report

+ Add Report

Response Summary

Total Started Survey: 300
Total Completed Survey: 202 (67.3%)

Show this Page On

PAGE: ENTERPRISE SERVICE BUS (ESB) SURVEY

1. Please describe your job function (check all that apply).

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Business Management	4.7%	14
Business Analyst	4.0%	12
Business (Other)	1.0%	3
IT Management	11.0%	33
IT Architect	62.3%	187
IT Operations	4.7%	14
IT Support	6.3%	19
Developer	29.0%	87
Systems Integrator	31.0%	93
Education (Staff or Student)	0.7%	2
ESB Vendor Company Employee/Principal	3.7%	11
ESB Consultant (Vendor-Specific)	15.0%	45
ESB Consultant (General)	19.7%	59
answered question		300
skipped question		0

1. Please describe your job function (check all that apply).

[Create Chart](#)[Download](#)Other (please specify)
[Hide Responses](#)

3.3%

10

1. Data Architect	Wed, Dec 22, 2010 1:40 PM	Find...
2. Sales Consultant	Sat, Dec 18, 2010 8:34 AM	Find...
3. CEO of B*****, Inc., an award-winning consulting company specializing in SOA.	Wed, Dec 15, 2010 4:49 PM	Find...
4. ESB Testing Software Vendor	Mon, Dec 13, 2010 2:01 PM	Find...
5. Performance Architect	Mon, Dec 13, 2010 12:48 PM	Find...
6. ISV	Mon, Dec 13, 2010 11:47 AM	Find...
7. SOA & BPM & BI Architect	Fri, Dec 3, 2010 7:58 AM	Find...
8. Professor	Sun, Nov 21, 2010 3:39 PM	Find...
9. Software Architect at FuseSource	Mon, Nov 15, 2010 11:20 PM	Find...
10. BPM and SOA expert	Sat, Nov 13, 2010 1:42 AM	Find...

answered question

300

skipped question

0

2. How many years have you been involved with middleware solutions?

[Create Chart](#)[Download](#)

	Response Percent	Response Count
None	0.3%	1
Less than one	2.7%	8
1-3	16.8%	50
3-5	23.9%	71
5-10	35.0%	104
More than ten	21.2%	63
Optional Comment Field Hide Responses		3

answered question

297

skipped question

3

2. How many years have you been involved with middleware solutions?[Create Chart](#)[Download](#)

1. Started working with Microsoft BizTalk and now working with Oracle Fusion Middleware.	Wed, Dec 15, 2010 2:14 PM	Find...
2. I worked with distributed systems in the 90 (Tuxedo, CORBA servers) and several messaging systems from 2000 onwards (WebSphere MQ, Tibco EMS, SonicMQ), and then with ESBs later on.	Sun, Nov 21, 2010 6:18 AM	Find...
3. Been working on Microsoft .Net Platforms other than middleware solutions.	Mon, Nov 15, 2010 10:30 PM	Find...
answered question		297
skipped question		3

[Show this Page On](#)

PAGE: NEXT, A FEW GENERAL ESB AND MIDDLEWARE QUESTIONS

3. What advantages does an ESB provide over Enterprise Application Integration (EAI) software and Message Oriented Middleware (MOM)? (Please check all that apply.)[Create Chart](#)[Download](#)

	Response Percent	Response Count
Standards Based	54.3%	125
Web Services Support	49.1%	113
Improved Resiliency	22.6%	52
Greater Scalability	50.0%	115
More Features	25.2%	58
Better Suited for Service Oriented Architecture (SOA)	71.3%	164
Cloud Integration	20.4%	47
Better Cross-Platform Integration	50.4%	116
No advantage	3.5%	8
No Opinion	3.0%	7
Other (please specify) Hide Responses	11.3%	26

answered question **230**
skipped question **70**

3. What advantages does an ESB provide over Enterprise Application Integration (EAI) software and Message Oriented Middleware (MOM)? (Please check all that apply.)

[Create Chart](#)[Download](#)

1. Lighter weight implementation, simpler	Mon, Dec 20, 2010 4:19 PM	Find...
2. Adapters. MOM might not necessarily have adapters. EAI need not necessarily support the latest web services stack	Mon, Dec 20, 2010 12:05 PM	Find...
3. The key benefit of ESBs is their enablement of loosely coupled enterprise architecture. It is this loose coupling that gives way to the other benefits listed above.	Wed, Dec 15, 2010 5:07 PM	Find...
4. You are using jargon. All these things have elements of all the others incorporated into them. Differences are not meaningful at this high level. Only when you get down to specific products and architectures.	Wed, Dec 15, 2010 4:17 PM	Find...
5. Highly depends what ESB you use.	Wed, Dec 15, 2010 1:18 PM	Find...
6. More flexible.	Wed, Dec 15, 2010 3:32 AM	Find...
7. virtualization	Thu, Dec 9, 2010 10:29 AM	Find...
8. Also useful in SOA Governance and message Transformation	Tue, Dec 7, 2010 4:32 AM	Find...
9. Maintainability, reliability, smaller skills set	Sat, Dec 4, 2010 1:12 AM	Find...
10. Easy and Faster implementation, Reusable patterns	Wed, Nov 24, 2010 9:47 AM	Find...
11. I could not tell the difference until all three are properly defined. SMX for example falls into all three categories in my mind	Wed, Nov 24, 2010 8:08 AM	Find...
12. Note that the MOM is a part of the ESB. In fact the mom aims to transport message over the network. the MOM is the 'B' of ESB.	Wed, Nov 24, 2010 4:43 AM	Find...
13. Possible common place for logging/monitoring transactions if done properly	Wed, Nov 24, 2010 4:20 AM	Find...
14. Time to integrate applications is comparatively shorter with ESB and Message/Protocol independence (SOAP to JMS etc.,)	Tue, Nov 23, 2010 11:42 PM	Find...
15. EAI is outdated, from the 90. You have very proprietary ESBs and very standard based ESB. Buying an ESB doesn't guaranty any standardization, nor doesn't solve any architecture problem due to siloed organization. Cloud integration has nothing to do with ESB and shouldnt appear in "integration". It's like mentioning VPM integration. So what?	Sun, Nov 21, 2010 6:34 AM	Find...
16. -Can easily develop custom adpters if any third party vendor products (eg. EMC DOCUMENTUM)with support of vendor api and ESB SDK	Sat, Nov 20, 2010 7:06 PM	Find...
17. Structural and independent supply of business information. Consider it as a store which gets you everything whats available(to your application). Without the need to what, where and how. When you have only 1on1 communication and predict no changes to that aspect an ESB has little advantages over direct SOA implementations.	Thu, Nov 18, 2010 4:50 PM	Find...
18. Impose Contract usage ex: WSDL	Thu, Nov 18, 2010 6:06 AM	Find...
19. Most EAI product suites are being incorporated into or evolving to an ESB	Wed, Nov 17, 2010 5:06 PM	Find...
20. Simpler and more flexible. Less features.	Wed, Nov 17, 2010 4:11 AM	Find...
50 responses per page		

answered question

230

skipped question

70

3. What advantages does an ESB provide over Enterprise Application Integration (EAI) software and Message Oriented Middleware (MOM)? (Please check all that apply.)

[Create Chart](#)[Download](#)

21. Fundamental parts of the ESB is EAI, and MOM together with more part. See neuron esb as an example.	Tue, Nov 16, 2010 1:57 AM	Find...
22. More likely to support an adoption model where you can start small and add to the infrastructure investment incrementally. Also, there are a number of good open source ESB products on the market.	Mon, Nov 15, 2010 11:31 PM	Find...
23. Extensibility to add new functionality with minimal impact on existing infrastructure.	Mon, Nov 15, 2010 10:33 PM	Find...
24. Versioning support.	Sat, Nov 13, 2010 1:55 AM	Find...
25. Monitoring, SLA, Policy Enforcement	Fri, Nov 12, 2010 4:56 AM	Find...
26. This question is not relevant. ESB works in tandem with MOM and part of EAI.	Thu, Nov 11, 2010 5:03 PM	Find...
50 responses per page		

answered question 230

skipped question 70

4. In your experience, which middleware component(s) listed below CAUSE (S) significant latency (i.e. DELAY) in end-to-end transaction throughput? (Please check all that apply.)

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Web server	22.5%	46
Application server	30.9%	63
ESB	15.7%	32
Web Services Framework	26.0%	53
Message Oriented Middleware (MOM)	16.7%	34
Enterprise Application Integration (EAI)	26.5%	54
No Opinion	21.6%	44
Optional Comment Field		36
Hide Responses		

- | | | |
|----------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. Definitely stay away from Oracle Active Queues -- 3 second latency BOTH DIRECTIONS; for 10.1.3.4, at least. | Thu, Dec 23, 2010 10:23 AM | Find... |
|----------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|

50 responses per page

answered question 204

skipped question 96

4. In your experience, which middleware component(s) listed below CAUSE (S) significant latency (i.e. DELAY) in end-to-end transaction throughput? (Please check all that apply.) [Create Chart](#) [Download](#)

2.	I guess we cannot pin point on this question. Any of the participating apps could be the cause at any given time. However if a Middleware/ESB is involved the blame game normally starts and points to ESB and it becomes the responsibility of the ESB layer to prove otherwise.	Wed, Dec 22, 2010 6:04 PM	Find...
3.	Any of the "can", there is no one answer.	Wed, Dec 22, 2010 1:10 PM	Find...
4.	I don't think any of these definitely cause latency, though any of them can. Most of these are invoking services, and it is those services that cause the latency.	Mon, Dec 20, 2010 4:19 PM	Find...
5.	The backend applications	Mon, Dec 20, 2010 12:05 PM	Find...
6.	back end system, file IO and underline database	Sat, Dec 18, 2010 2:19 PM	Find...
7.	Any layer can be the source latency, but none of them are the cause of latency.	Fri, Dec 17, 2010 12:23 PM	Find...
8.	it depends on ...	Wed, Dec 15, 2010 5:14 PM	Find...
9.	Realistically, it can be all of the above. If not configured and tuned properly, any of these can cause performance issues. Assuming all else is equal though, latency problems tend to increase as applications become more distributed. ESBs and other service-oriented middleware, then, can be major culprits.	Wed, Dec 15, 2010 5:07 PM	Find...
10.	Custom services, cdm, adapters	Wed, Dec 15, 2010 4:39 PM	Find...
11.	The worst area we found for performance hits was in data transformation. Either avoid transformations (especially XML ones) or get a product that specializes in transformations and offload to that. The ESB tools (like xquery or xslt) just don't hold up to high load	Wed, Dec 15, 2010 4:20 PM	Find...
12.	Jargon again. We see significant latency in a polling component of our middleware. It could be called the ESB, MOM or EAI. Other latency is caused by back end adapters over which we have no control.	Wed, Dec 15, 2010 4:17 PM	Find...
13.	Again, depends on products.	Wed, Dec 15, 2010 1:18 PM	Find...
14.	Microsoft BizTalk. Any tool can be made to cause delay, and almost any can be configured to not cause delay.	Wed, Dec 15, 2010 3:32 AM	Find...
15.	This is more an architecture problem than a tool issue	Wed, Dec 8, 2010 12:42 PM	Find...
16.	JMS/MQ	Tue, Dec 7, 2010 4:32 AM	Find...
17.	In my opinion there are other factors attributed to Latency within each of the components listed above	Fri, Dec 3, 2010 6:45 AM	Find...
18.	usually most of the latency comes from back-end systems performance, rather than ESB.	Fri, Dec 3, 2010 2:43 AM	Find...
19.	Depends on how the system is designed and what goals you want to achieve	Wed, Nov 24, 2010 9:19 PM	Find...
20.	Depends on design and implementation.	Wed, Nov 24, 2010 9:05 PM	Find...
21.	ALL can cause the problem if the tuning is not done correctly specially with centric architure (surch as EAI, centralized MOM).	Wed, Nov 24, 2010 4:43 AM	Find...
22.	Depends how they are used. You do e.g. XLST transformation on ESB or Application server or somewhere else.	Wed, Nov 24, 2010 4:20 AM	Find...

50 responses per page

answered question 204
skipped question 96

4. In your experience, which middleware component(s) listed below CAUSE (S) significant latency (i.e. DELAY) in end-to-end transaction throughput? (Please check all that apply.) [Create Chart](#) [Download](#)

23.	The ERP components. The term Web Services framework shouldn't appear as a separated item since it should be integrated in ESB, or Application Servers.	Sun, Nov 21, 2010 6:34 AM	Find...
24.	My experience is that custom (inefficient) code is usually the culprit	Thu, Nov 18, 2010 8:52 PM	Find...
25.	It really depends on the volume. The persistency of the data. And complexity. An ESB could give delays with complex structures where request are fulfilled by different back end systems.	Thu, Nov 18, 2010 4:50 PM	Find...
26.	Database	Thu, Nov 18, 2010 6:06 AM	Find...
27.	Well designed (market leading) middle products are built to scale with the hardwares I/O bandwidth. In my experience, the complete system architecture is most culpable for performance, or the lack thereof.	Wed, Nov 17, 2010 5:06 PM	Find...
28.	The architecture, or what you do with the transaction, will cause the delay. In general, if the middleware component is causing the delay, you can tune the component.	Wed, Nov 17, 2010 8:36 AM	Find...
29.	it depends on the architecture, design and the products chosen.	Tue, Nov 16, 2010 3:43 PM	Find...
30.	Latency is only caused by the tech stack. AI thought since an ESB should be messaging only, low latency is not really an issue. But the questions rasied, concerns me. are you sure you know what an ESB is ?	Tue, Nov 16, 2010 1:57 AM	Find...
31.	1) Adding QoS capabilities such as persistence. 2) Any form of thread switching -- especially when jumping between processes in a clustered environment.	Mon, Nov 15, 2010 11:31 PM	Find...
32.	My answer is: There is no component in the infrastructure that have to cause significant delays.	Sat, Nov 13, 2010 1:55 AM	Find...
33.	Differs per project.	Fri, Nov 12, 2010 4:15 AM	Find...
34.	Bad design	Thu, Nov 11, 2010 6:09 PM	Find...
35.	Question not relevant. It depends upon the design and effeciency of the code wherever it is deployed.	Thu, Nov 11, 2010 5:03 PM	Find...
36.	None of the above: the database is where I've experienced most significant latency due to high contention.	Thu, Nov 11, 2010 2:00 PM	Find...

50 responses per page

answered question 204
skipped question 96

5. An organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. Should an ESB be considered here? [Create Chart](#) [Download](#)

Response Percent Respons Count

answered question 224
skipped question 76

5. An organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. Should an ESB be considered here? [Create Chart](#) [Download](#)

YES. The implementation of an ESB is not dependent upon an organization having a solid SOA strategy.	48.7%	109
YES. But only if an SOA strategy is planned.	43.8%	98
NO. An ESB should be used only within an organization with a solid SOA in place.	7.6%	17
Optional Comment Field Hide Responses		29
1. Why bother, if not moving to SOA? But the bigger question is, if doing distributed computing, why not move to SOA?	Thu, Dec 23, 2010 10:23 AM	Find...
2. Sometimes an ESB can reduce the chaos in an environment with poor governance. Don't think that an ESB can substitute for governance, though!	Wed, Dec 22, 2010 3:26 PM	Find...
3. SOA is an architectural style that aims at fundamental business-IT alignment and benefits. At the heart it is all about service-orientation of the services by applying the design principles. With an ESB one can apply patterns such as reliable messaging, asynchronous queuing and event driven messaging that forms basis for service-orientation !	Wed, Dec 22, 2010 3:22 PM	Find...
4. Possibly. SOA strategy and governance is always preferred, but if the alternative is to hack together a substitute, an ESB is preferable.	Mon, Dec 20, 2010 4:19 PM	Find...
5. roadmap required. governance required	Sat, Dec 18, 2010 2:19 PM	Find...
6. None of the above.... Complete your SOA strategy and use it to determine if you need an ESB or not.	Fri, Dec 17, 2010 12:23 PM	Find...
7. Start small! Do it together with the "business" to define business services and keep processes outside business services (unless explicated wanted) and focus in core tasks services must perform. Use strict layering to get optimal decoupling between business & technology & infrastructure	Thu, Dec 16, 2010 12:14 AM	Find...
8. ESBs have value whether or not they are applied explicitly within an SOA context.	Wed, Dec 15, 2010 5:07 PM	Find...
9. An ESB can be beneficial without an SOA strategy, but won't realise its potential without one.	Wed, Dec 15, 2010 3:32 AM	Find...
10. ESB should not be used at all if an organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. An organisation usually has middleware components and application servers already.	Wed, Dec 8, 2010 2:56 PM	Find...
11. I feel ESB is an enterprise SOA. You do need a basic SOA strategy at the least	Tue, Dec 7, 2010 12:12 PM	Find...
12. But, you can't go too long without getting to the strategy.	Sat, Dec 4, 2010 1:12 AM	Find...
13. ESB can be used just as a configuration-driven integration tool. It facilitates SOA. Having an ESB does not mean you have SOA.	Fri, Dec 3, 2010 2:43 AM	Find...
50 responses per page		
answered question		224
skipped question		76

5. An organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. Should an ESB be considered here?

[Create Chart](#)[Download](#)

14.	ESB complements SOA. Even if you don't have a SOA strategy ESB can help a lot in integrating the applications.	Tue, Nov 23, 2010 11:42 PM	Find...
15.	Put the organization in place first, with the right people in charge of tearing down the silos in your IT organization. Then, consider acquiring a technology.	Sun, Nov 21, 2010 6:34 AM	Find...
16.	-Planning of strategy for SOA in an org will give more insight for what integration services required in align with business.Eventually planing for SOA would be the right step subsequently implement with ESB	Sat, Nov 20, 2010 7:06 PM	Find...
17.	An ESB is a pattern that is distributed to solve integration and interoperability problems not a SOA component	Sat, Nov 20, 2010 9:52 AM	Find...
18.	ESB is much more than SoA	Thu, Nov 18, 2010 8:52 PM	Find...
19.	To consider is whether a fully SOA implementation is helping the organisation. If you determine the responsibility's the several applications have and maintains those responsibilities, I don't see a reason for fully SOA environments. Just do what needs to be done.	Thu, Nov 18, 2010 4:50 PM	Find...
20.	SOA is an architecture style, and does not require an ESB. SOA seeks inherent interoperability (read the SOA Manifesto), and if components / services are inherently interoperable, you don't need an ESB. With that said, an ESB can provide benefit, as long as it does not become a crutch, or the focus of a "SOA" program.	Thu, Nov 18, 2010 8:47 AM	Find...
21.	ESB can be used for integration that does not need any SOA strategy	Thu, Nov 18, 2010 6:06 AM	Find...
22.	Standardization of integration is a good thing regardless of how little. And decoupling provided by the ESB, outways any policy shortfalls	Wed, Nov 17, 2010 5:06 PM	Find...
23.	The ESB concept is not dependant on SOA. Use an ESB if you need to do the things that an ESB is good at; asynchronous messaging, message routing, message normalization, legacy integration, etc. These things are useful in a SOA and can be useful outside of a SOA.	Wed, Nov 17, 2010 8:36 AM	Find...
24.	I can be build from the bottom up, in a practical Middle out fashion. Even as a SOA facilitator on various levels. The important question is. Is an ESB required, or are "they" looking for an integration engine, service bus, integration bus, other bus usages in general. Enterprise Services Bus' requires some very skilled and experienced enterprise architects.	Tue, Nov 16, 2010 1:57 AM	Find...
25.	The SOA strategy can evolve incrementally by selecting a reference architecture and building toward that architecture, first with pilots, and then in the broader organization. The approach of putting in place governance before evolving some organizational experience with SOA is backward and likely to fail.	Mon, Nov 15, 2010 11:31 PM	Find...
26.	The ESB must be used only for service virtualisation and service exposition and not as a backbone. The ESB is a peripheral component.	Fri, Nov 12, 2010 6:41 PM	Find...
27.	An ESB is also very well suited for legacy integration. A SOA architecture does not have to be in place.	Fri, Nov 12, 2010 4:15 AM	Find...
28.	SOA should be considered depending upon the organisation and the business and the amount of data processing that ESB has to achieve	Thu, Nov 11, 2010 5:03 PM	Find...
29.	Its better to have SOA strategy in order to have service based model	Thu, Nov 11, 2010 2:05 PM	Find...

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answered question

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skipped question

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5. An organization has no formal Service Oriented Architecture (SOA) infrastructure in place and no formal SOA governance established. Should an ESB be considered here?

[Create Chart](#)[Download](#)

answered question 224
skipped question 76

6. What disadvantages have you seen in implementing a middleware component such as an ESB? (Please check all that apply.)

[Create Chart](#)[Download](#)

	Response Percent	Response Count
The ESB becomes a single point of failure.	25.3%	57
Increased latency, extra processing overhead	28.0%	63
More complex analysis skill set required for implementations	50.2%	113
More complex skill set required for support	45.8%	103
More hardware required than for point to point connections	14.7%	33
Unless many applications or services are being integrated, the ESB is unnecessary	50.7%	114
No comment	4.0%	9
Other (please specify) Hide Responses	13.8%	31

1. Although most of these factors are potential disadvantages, there are solutions to all of them. These would provide benefits that far outweigh any disadvantages. Thu, Dec 23, 2010 4:00 AM [Find...](#)
2. I wouldn't say "More complex skill set is required..." it is just that the marketing saying "No Sql skill is required to setup an integration" is wrong. SQL (and other) skills are still required and all these "magic" tools do the magic in the hands of a professional only. They are just tools ;-)) Wed, Dec 22, 2010 4:07 PM [Find...](#)
3. Depending on certain implementations of ESBs, more hardware might be required than for P2P connections. Wed, Dec 22, 2010 3:22 PM [Find...](#)
4. When a team focuses on an ESB (even if it's truly necessary), they forget that SOA is about the Services. Focus first on the business need, and design services that cover a particular Line Of Business. Then, think about integration. Wed, Dec 22, 2010 12:51 PM [Find...](#)

A technical focus first by an IT team will usually lead to an IT-centric solution that

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answered question 225
skipped question 75

6. What disadvantages have you seen in implementing a middleware component such as an ESB? (Please check all that apply.)

[Create Chart](#)
[Download](#)

	has nothing to do with the needs of the business. Remember that the business funds projects. :-)		
5.	Very little additional latency	Mon, Dec 20, 2010 11:54 AM	Find...
6.	We have heard from the Developer community that they have lost some of their freedom of creativity, so they are not as happy working within our SOA framework. We understood this negative and see the positives out weigh the negative.	Fri, Dec 17, 2010 12:23 PM	Find...
7.	These are just potential downsides to implementing an ESB that must be managed well.	Wed, Dec 15, 2010 5:07 PM	Find...
8.	Not sure if you'll ask about the advantages. We balance all the above against the better resiliency to change, manageability and comprehensibility of the middleware-based integration.	Wed, Dec 15, 2010 4:17 PM	Find...
9.	its being used as a replacement off FTP for moving batch files	Wed, Dec 15, 2010 2:49 PM	Find...
10.	Company's think with a ESB they implemented SOA	Wed, Dec 15, 2010 1:18 PM	Find...
11.	Bizarrely, the ESB shows up failures inherent in the connected systems, and then gets blamed for the failures.	Wed, Dec 15, 2010 3:32 AM	Find...
12.	Understanding the long-term architectural and strategic implications of implementing ESB versus other technologies.	Wed, Dec 8, 2010 9:47 PM	Find...
13.	ESB product violate the basis principle of interaction between service consumer and service is they used for anything but message routing. If ESB does anything else, it must carry business responsibilities in the business transactions between service and its consumers. Otherwise, it either should not be used at all or it must belong to the service or to the consumer, not to IT in between.	Wed, Dec 8, 2010 2:56 PM	Find...
14.	Depends on the technology you choose	Wed, Dec 8, 2010 12:42 PM	Find...
15.	The pros far weigh against the cons...	Tue, Dec 7, 2010 12:12 PM	Find...
16.	Not everybody needs to integrate	Sat, Dec 4, 2010 1:12 AM	Find...
17.	This is a vague question.	Fri, Dec 3, 2010 2:43 AM	Find...
18.	It depends on your design and implementation. Each of the above can contribute as disadvantages subject to your development process, design and implementation.	Fri, Nov 26, 2010 6:03 AM	Find...
19.	understanding that data relationship is a service and not an object. Also, that services take on different forms , as some are supporting services , such as security, performance, etc, while others are business related services , such as billing, ticketing, provisioning, while other are adminstartive services , such as data synchronization, data mirroring, etc.	Wed, Nov 24, 2010 12:38 PM	Find...
20.	Without proper governance introducing ESB may lead to architectural misused, when e.g. instaed of exposing properly built web services teams may put all complex logic to ESB which would be bad design in many cases (there are cases when it's ok e.g. for legacy applications). Also, there's ownership problem to be solved here - who will take care of and maintain ESB especially if some application logic is put there (like e.g. XSLT transformations)	Wed, Nov 24, 2010 4:20 AM	Find...

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answered question

225

skipped question

75

6. What disadvantages have you seen in implementing a middleware component such as an ESB? (Please check all that apply.)

[Create Chart](#)
[Download](#)

21.	single point of failure can be overcome with extra resources (that means extra cost)	Tue, Nov 23, 2010 11:42 PM	Find...
22.	Lack of a Common Model. If you don't have a Common Data Model, please DON'T integrate applications using an ESB. You will waste your time and money. Maintaining an ESB is not very complex, but can't usually be done by people who used to maintain applications as they don't understand the concept of processes & services that spans multiple systems, and its implications.	Sun, Nov 21, 2010 6:34 AM	Find...
23.	For simple applications, the cost of ESB in many cases may not be justified, although, from an operational aspect, it works with a long term viewpoint	Thu, Nov 18, 2010 8:52 PM	Find...
24.	The biggest change/challenge I've seen is the awareness of a chain. Especially with existing applications. You can create functionality with is divided in several application. You need people to beware and willing to see the big picture.	Thu, Nov 18, 2010 4:50 PM	Find...
25.	Implementing ESB involved a big effort from Business analyst who are not able to think processes through services. This is the main difficulties we face in our company	Thu, Nov 18, 2010 6:06 AM	Find...
26.	If the ESB is based on proprietary technology an organization is tied down to a particular technology. The ESB should be technology agnostic	Wed, Nov 17, 2010 10:30 PM	Find...
27.	It's not a common skill and can make it hard for people that know it. You should find a good administrator and at least one good Developer. The most difficult thing about learning a new technology is finding out what you should and should not use it for. Finding a couple of knowledgeable people from the start will prevent the 'We should have never done that' projects.	Wed, Nov 17, 2010 8:36 AM	Find...
28.	Latency can be increased. But from customer experience, this is a minor delay compared to the overall delay. If you want very high performances, don't use SOA/ESB, it implies lots of overheads (the ESB middleware, use of descriptive XML...)	Wed, Nov 17, 2010 4:11 AM	Find...
29.	It's not a middleware component. My concern has just been raised. you should re-analyze what an ESB is.	Tue, Nov 16, 2010 1:57 AM	Find...
30.	To elaborate -- if the organization has already implemented web services that realize industry-standard interfaces, there is little to be gained by adding an ESB layer on top of this. An ESB has the most value when there is a need to modernize (or SOA-enable) a collection of applications / services that are implemented with either a heterogeneous technology stack, or a technology stack that will be deprecated and replaced within the organization.	Mon, Nov 15, 2010 11:31 PM	Find...
31.	Most organizations implement an ESB at project level, and fail to implement the necessary organizational changes to fully benefit from the ESB as a generic, multi-project capability.	Sat, Nov 13, 2010 1:55 AM	Find...

So when organizations expect the ESB to become that generic capability, they need to implement it in such a way that multiple integrations can co-exist side by side in such a way that there is no conflict.

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skipped question	75

7. Which commercial ESB offers the lowest Total Cost of Ownership (TCO)?

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Biztalk (Microsoft)	7.9%	18
IBM Websphere ESB	5.7%	13
IONA Artix	0.4%	1
Oracle Service Bus	7.5%	17
Sonic ESB	7.9%	18
TIBCO ActiveMatrix	5.7%	13
WebMethods (Software AG)	3.5%	8
x I don't know	51.8%	118
Other (please specify) Hide Responses	9.6%	22

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. Definitely NOT IBM or Oracle | Thu, Dec 23, 2010 10:23 AM | Find... |
| 2. I do not care at the moment, as am busy with something else | Wed, Dec 22, 2010 4:07 PM | Find... |
| 3. Fiorano ESB / SOA Suite - http://www.fiorano.com | Wed, Dec 22, 2010 3:22 PM | Find... |
| 4. Cordys ESB | Wed, Dec 22, 2010 2:57 PM | Find... |
| 5. Of us it was Tibco. That's because it fit the best into our SOA strategy. | Fri, Dec 17, 2010 12:23 PM | Find... |
| 6. GreenVulcano ESB | Fri, Dec 17, 2010 10:25 AM | Find... |
| 7. TCO is a function of how the technology is used, not whose name is on the label. | Wed, Dec 15, 2010 5:07 PM | Find... |
| 8. we see webMethods and TIBCO being well integrated into major business processes which helps increase TCO. Others may appear to be more lightweight (Sonic, Oracle Service Bus - btw, what about WebLogic) or standard (IBM WS) but you really have to match your application lifecycle and SOA strategy to determine best fit. If you want the combination of Gov and BPM today, that will dictate different choices than ESB alone. | Mon, Dec 13, 2010 2:10 PM | Find... |
| 9. Difficult call too many variables | Sat, Dec 4, 2010 1:12 AM | Find... |
| 10. This is a very subjective question, as TCO is dependent on a lot of factors. Probably an ESB that will allow you to re-use existing skills and resources will help lower TCO. | Wed, Nov 24, 2010 9:05 PM | Find... |
| 11. Stupid question | Sun, Nov 21, 2010 3:42 PM | Find... |
| 12. IONA Artix has been integrated into Sonic ESB and no longer exists. Please remove it. Biztalk is not considered as an ESB. Sonic ESB and Tibco Active | Sun, Nov 21, 2010 6:34 AM | Find... |

25 responses per page

answered question

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skipped question

72

7. Which commercial ESB offers the lowest Total Cost of Ownership (TCO)?[Create Chart](#)[Download](#)

Matrix would be the 2 candidates. It depends how much you put on the table upfront as well. IBM has 2 different ESBs. I suggest you refine your questions.

13.	I don't have this analysis of comparison realized	Sat, Nov 20, 2010 4:51 PM	Find...
14.	light weight ESB with Application Server (Mule, Camel, WS02, etc)	Sat, Nov 20, 2010 9:52 AM	Find...
15.	Apache Fuse	Sat, Nov 20, 2010 12:27 AM	Find...
16.	Chainbuilder (Bostech) - Low cost and easy to deploy	Wed, Nov 17, 2010 10:30 PM	Find...
17.	Don't use IONA Artix, it's dead ! I'll would give the standard response: it depends on your needs and your competencies.	Wed, Nov 17, 2010 4:11 AM	Find...
18.	Fuse ESB based on Apache Service Mix	Tue, Nov 16, 2010 7:04 PM	Find...
19.	Neuron ESB	Tue, Nov 16, 2010 1:57 AM	Find...
20.	Camel or Mule integrated in an Application Server	Fri, Nov 12, 2010 6:41 PM	Find...
21.	Again depends upon the type of business and the total throughput.	Thu, Nov 11, 2010 5:03 PM	Find...
22.	I think its close between WM and Biztalk as the overheads for installation and setup is pretty low.	Tue, Nov 9, 2010 1:00 PM	Find...

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answered question 228
skipped question 72

8. Which Open Source ESB offers the lowest Total Cost of Ownership (TCO)?[Create Chart](#)[Download](#)

	Response Percent	Response Count
WSO2	2.7%	6
Petals	0.4%	1
Fuse	4.9%	11
Glassfish	4.0%	9
JBoss ESB	9.8%	22
ServiceMix	5.8%	13
Mule	7.6%	17
OpenESB	5.8%	13

answered question 225
skipped question 75

8. Which Open Source ESB offers the lowest Total Cost of Ownership (TCO)?

[Create Chart](#)[Download](#)

x I don't know	52.4%	118
Other (please specify) Hide Responses	6.7%	15

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. the same as 9 | Wed, Dec 22, 2010 4:07 PM | Find... |
| 2. We are moving away Mule and moving to Tibco. Our Mule support contracts are costing us more than the Tibco TCO... | Fri, Dec 17, 2010 12:23 PM | Find... |
| 3. GreenVulcano ESB | Fri, Dec 17, 2010 10:25 AM | Find... |
| 4. See #7. | Wed, Dec 15, 2010 5:07 PM | Find... |
| 5. Consider using Camel without the overhead of ServiceMix. Do not use JBI. | Wed, Dec 15, 2010 3:32 AM | Find... |
| 6. Difficult call too many variables | Sat, Dec 4, 2010 1:12 AM | Find... |
| 7. This is a very subjective question, as TCO is dependent on a lot of factors. Probably and ESB that will allow you to re-use existing skills and resources will help lower TCO. | Wed, Nov 24, 2010 9:05 PM | Find... |
| 8. I don't know, I used only ServiceMix and it requires a lot of work. Support from Progress Software is not bad for that but anyway significant amount of work is needed when dealing with it (especially SMX4 because of OSGi related issues) | Wed, Nov 24, 2010 4:20 AM | Find... |
| 9. Another stupid question | Sun, Nov 21, 2010 3:42 PM | Find... |
| 10. ServiceMix is a subset of FUSE, and can't be considered as ESB as a whole. Once again, the lowest TCO is provided my the tool that YOUR organization is able to manage. It really depends on the skillsets of your organization. | Sun, Nov 21, 2010 6:34 AM | Find... |
| 11. I don't have this analysis of comparison realized | Sat, Nov 20, 2010 4:51 PM | Find... |
| 12. Camel (ASF License) | Sat, Nov 20, 2010 9:52 AM | Find... |
| 13. Petals, cause I'm the vendor ! FUSE/Glassfish/OpenESB support is very expensive, because it comes from big companies editing proprietary softwares. You'll need support for servicemix (means FUSE, means expensive). I read several negative feed-back about Jboss ESB. It might be interesting if you have all Jboss, otherwise go somewhere else. Remains: Mule, Petals, WSO2. Each is technically very different, with very different organization. TCO will depend on your needs and competencies. | Wed, Nov 17, 2010 4:11 AM | Find... |
| 14. JBOSS commercial version is better with a small License cost | Sun, Nov 14, 2010 11:14 AM | Find... |
| 15. WSo2 | Thu, Nov 11, 2010 6:09 PM | Find... |

25 responses per page

answered question

225

skipped question

75

9. It has been commented that Open Source ESB's generally require more programming support than commercial ESB's and therefore a more technical support staff is required – do you agree? [Create Chart](#) [Download](#)

	Response Percent	Response Count
Yes	53.0%	116
No	27.9%	61
No opinion	19.2%	42
Optional Comment Field Hide Responses		30

- | | | | |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. | The required support is freely available from an active Developer community. | Thu, Dec 23, 2010 10:23 AM | Find... |
| 2. | Good to go with commercial ESB Vendor | Wed, Dec 22, 2010 6:04 PM | Find... |
| 3. | WSO2 for example makes it easier with web based console for high level abstracted management and control. | Wed, Dec 22, 2010 3:22 PM | Find... |
| 4. | It's the classic case of knowing what is going on inside the black box. In the end, not being able to change the black box cause more programming workarounds and support. | Wed, Dec 22, 2010 1:10 PM | Find... |
| 5. | I agree that they do tend to require more to get going. But I think over the long term it mostly evens out. | Tue, Dec 21, 2010 10:32 AM | Find... |
| 6. | Commercial products facilitate simplistic solutions better -- but I think they are about equal for "real" solutions. | Mon, Dec 20, 2010 4:19 PM | Find... |
| 7. | This is definitely the case with Mule and Tibco. Tibco as well as other commercial ESB centralize administration, where Mule's administration is decentralized. We then have all of our Developers doing administrative tasks on Mule and having to do administration conflict resolution, where Tibco administration is all done by one resources (and one back-up). | Fri, Dec 17, 2010 12:23 PM | Find... |
| 8. | Commercial ESB's offer more adapters, ready to use services out of the box | Thu, Dec 16, 2010 12:14 AM | Find... |
| 9. | It depends on which product and what you want to do. We have BEA ALSB and it has taken a lot of programmers to get it right. BAs are not suited to this work | Wed, Dec 15, 2010 4:20 PM | Find... |
| 10. | Do not fall into the trap of thinking that configuration is inherently better than programming - if the configuration is more complex than (well known) programming paradigms then it is worthless.
Also, configurations must be protected in the same way as source code (i.e. within an SCM) which increases their complexity.
So I do think that Open Source ESB's generally require more programming support, but I think that reduces the requirement for specialised support. | Wed, Dec 15, 2010 3:32 AM | Find... |
| 11. | In general there are less people on the market to support and enhance ESBs, thus more costly | Wed, Dec 15, 2010 1:31 AM | Find... |
| 12. | Again, this will depend on the design and implementation. Although commercial packages would some advantage in terms of additional functions and features, or | Wed, Nov 24, 2010 9:05 PM | Find... |

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answered question 219
skipped question 81

9. It has been commented that Open Source ESB's generally require more programming support than commercial ESB's and therefore a more technical support staff is required – do you agree? [Create Chart](#) [Download](#)

	extensions. But the Open Source community has a rich set of resources which may provide similar tools that will help lower the need for brute force programming.		
13.	This is a NO & YES answer as it depends on your IT staff and governance model... If the IT staff or the partnered SI / Developer is mature the answer is NO , but if IT needs to be out-sourced , I'd say it will be a challenge, therefore YES!	Wed, Nov 24, 2010 12:38 PM	Find...
14.	At very Higher Cost	Wed, Nov 24, 2010 9:47 AM	Find...
15.	E.g. WSO2 configurations are one of the most easiest to implement. OpenESB/GlassFishESB is based on BPEL with nice NetBeans IDE. Commercial solutions are quite complex, except Oracle Service Bus which is very user friendly and easy to use.	Wed, Nov 24, 2010 7:23 AM	Find...
16.	I'd like to point out that with commercial ESB if you have problem you can't do anything just wait for the next release which may be not acceptable. So no work will be done with ESB but somewhere else to mitigate. With open source ESBs you have chance to fix problems yourself so it may seem that it requires more support.	Wed, Nov 24, 2010 4:20 AM	Find...
17.	Yes. Often, lack of visual tools and lack of Enterprise Administration tool make Open ESBs more expensive to run.	Sun, Nov 21, 2010 6:34 AM	Find...
18.	It depends. But generally, that is true to some extent, as commercial ESB systems usually come with tools (like IDE) that help tremendously in the over cycle.	Thu, Nov 18, 2010 8:52 PM	Find...
19.	I guess if you can find a company to do the development. I don't see that big a difference.If you want to do it yourself it is likely to be cost effective to hire experienced people regardless of the product.	Thu, Nov 18, 2010 4:50 PM	Find...
20.	Yes, I definately agree. We evalauted Fuse and found this to be true.	Thu, Nov 18, 2010 8:47 AM	Find...
21.	Sometime it is true but our feedback shows that tools like OpenESB overcome many commercial products in term of easiness	Thu, Nov 18, 2010 6:06 AM	Find...
22.	In fact, a commercial ESB has a higher cost of ownership due to high support requirements. The amount of programming required is determined by the Technical Solution and not by the ESB technology	Wed, Nov 17, 2010 10:30 PM	Find...
23.	We are using the Sonic ESB currently. I would recommend looking at Fuse ESB. There is a lot of excellent innovation going on in that project. In my opinion, Sonic is more stable, but Fuse will probably be it's equal in 18 months. After that, the innovation and features will be more important.	Wed, Nov 17, 2010 8:36 AM	Find...
24.	To me, Open ESB competes with big guys ESB. In term of number of features, heaviness, and price. I've heard it was easy to use. I've also heard (many times) that Petals (probably applies to WSO2&ServiceMix) was much more simple and flexible than Websphere, making it easier to use. But those feedbacks came from IT guys.	Wed, Nov 17, 2010 4:11 AM	Find...
25.	No, at least for Open ESB.	Tue, Nov 16, 2010 7:25 AM	Find...
26.	29 west is non commercial and requires a lot of programming and support, Neuron on the other hand is 3-4 lines. So the commercial hybrids are just as varianted as the open source.	Tue, Nov 16, 2010 1:57 AM	Find...

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answered question 219
skipped question 81

9. It has been commented that Open Source ESB's generally require more programming support than commercial ESB's and therefore a more technical support staff is required – do you agree? [Create Chart](#) [Download](#)

- | | | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 27. | Agreed that the implementation team may need to be more technical; however, on balance the more-technical team will be able to work faster (and cheaper) with the open-source ESB. Also, as noted above, the total cost of ownership is much lower with the open source ESB. | Mon, Nov 15, 2010 11:31 PM | Find... |
| 28. | In general with Open Source ESB's, you should expect a larger level technical support. Look for a System Integrator that has done multiple projects with the selected ESB, and make arrangements with them to provide you with the necessary technical support. | Sat, Nov 13, 2010 1:55 AM | Find... |
| 29. | Although the tooling for many of the above mentioned ESB's has improved over the years. Most commercial ESB's have a superior toolsuite, which can drastically cut development time and simplify support. | Fri, Nov 12, 2010 4:15 AM | Find... |
| 30. | We have implmented ESB for much larger integration with serviecemix and since 6 months of deployment there is not even single issue found.performance is also preety good and sometimes only we focus on logs to keep eye everything is fine. | Thu, Nov 11, 2010 2:05 PM | Find... |

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answered question 219
skipped question 81

10. Which ESB is easiest to learn and maintain? [Create Chart](#) [Download](#)

	Response Percent	Response Count
Fuse	2.2%	5
Petals	0.9%	2
Glassfish	1.3%	3
Biztalk (Microsoft)	7.5%	17
IBM Websphere ESB	6.6%	15
IONA Artix	0.4%	1
JBoss ESB (RedHat)	4.4%	10
Mule	4.8%	11
OpenESB	2.6%	6
answered question		227
skipped question		73

10. Which ESB is easiest to learn and maintain?

[Create Chart](#)[Download](#)

Oracle Service Bus	11.0%	25
ServiceMix	1.8%	4
Sonic ESB	5.7%	13
TIBCO ActiveMatrix	7.9%	18
WebMethods (Software AG)	4.8%	11
x I don't know	30.0%	68
Other (please specify) Hide Responses	7.9%	18

- No one can really give a really reliable expectation over modern versions of all the 14, so... Wed, Dec 22, 2010 4:07 PM [Find...](#)
- Fiorano ESB / SOA suite - This is the only ESB I have worked with :-)
- GreenVulcano ESB
- Depends on the people doing the learning.
- BizTalk is what we use. Not sure you're getting meaningful results here since each participant will only know one or a few of these.
- Fiorano
- This is very subjective... I have worked on multiple ESB solutions and have found all equally easy to understand and equally difficult to implement. But a Sr. SOA Achitect finds everything easy owing to his/her vast experience.
- Tibco, WebMethods, WebSphere, Biztalk
- Oracle Service Bus has been easy but not sure about the rest
- Can't compare, as ESB is more of a concept to me. Tools just assist in one or more ways to implement the concept.
- I've only been exposed to a few of those in the list so it would not be safe to favor one of those I'm familiar with.
- WSO2
- It depends...if you already have resources with strong websphere background websphere ESB on the other hand with websphere MQ background then you can go websphere message broker and java/spring Mule/Fuse/ServiceMix etc.,
- Another stupid question
- It depends on the skillsets of your organization. Anybody who provides you an answers is falling into the trap: "here what is good for you without knowing you".

25 responses per page [•](#)

answered question

227

skipped question

73

10. Which ESB is easiest to learn and maintain?

[Create Chart](#)[Download](#)

16.	Well, I don't know all this ESBs, but I like ServiceMix	Sat, Nov 20, 2010 4:51 PM	Find...
17.	Neuron ESB, but the problem here is, that no one knows about many esb.	Tue, Nov 16, 2010 1:57 AM	Find...
18.	Cannot be specified as it depends on individual learning capability.	Wed, Nov 10, 2010 10:05 PM	Find...
25 responses per page			

answered question

227

skipped question

73

[Show this Page On](#)

PAGE: ABOUT YOUR ORGANIZATION'S ESB (ENTERPRISE SERVICE BUS)

11. Which Enterprise Service Bus (ESB) product does your organization currently use? (NOTE: If you are a CONSULTANT or ESB VENDOR and are knowledgeable of multiple ESB implementations, in this survey please refer to the SMALLEST ESB implementation with which you are familiar at a detailed level.)

[Create Chart](#)[Download](#)

	Response Percent	Response Count
WSO2	0.9%	2
Fuse	3.5%	8
Glassfish	2.6%	6
Petals	0.9%	2
Biztalk (Microsoft)	9.3%	21
IBM Websphere ESB	9.7%	22
IONA Artix	0.0%	0
JBoss ESB (RedHat)	4.0%	9
Mule	3.5%	8
OpenESB	4.0%	9
Oracle Service Bus	15.0%	34
ServiceMix	4.8%	11

answered question

227

skipped question

73

11. Which Enterprise Service Bus (ESB) product does your organization currently use? (NOTE: If you are a CONSULTANT or ESB VENDOR and are knowledgeable of multiple ESB implementations, in this survey please refer to the SMALLEST ESB implementation with which you are familiar at a detailed level.)

[Create Chart](#)
[Download](#)

Sonic ESB	8.4%	19
TIBCO ActiveMatrix	10.6%	24
WebMethods (Software AG)	5.3%	12
x None – My organization does not use an ESB	5.3%	12
x I don't know	1.3%	3
Other (please specify) Hide Responses	11.0%	25

1. Fiorano ESB that is part of the Fiorano SOA Suite - version 9.2.2	Wed, Dec 22, 2010 3:22 PM	Find...
2. Cordys	Wed, Dec 22, 2010 2:58 PM	Find...
3. IBM datapower	Wed, Dec 22, 2010 1:10 PM	Find...
4. We currently use Fuse and webMethods	Mon, Dec 20, 2010 4:20 PM	Find...
5. IBM Datapower	Mon, Dec 20, 2010 8:04 AM	Find...
6. Organization uses multiple ESB for different customers	Mon, Dec 20, 2010 2:45 AM	Find...
7. JCAPS	Sat, Dec 18, 2010 12:41 AM	Find...
8. GreenVulcano ESB	Fri, Dec 17, 2010 10:26 AM	Find...
9. i am part of IT service provider giving solutions to various customer	Thu, Dec 16, 2010 6:50 AM	Find...
10. IBM Websphere Message Broker	Wed, Dec 15, 2010 5:58 PM	Find...
11. Maybe should have allowed for more than one response here?	Wed, Dec 15, 2010 4:17 PM	Find...
12. both Tibco and SAP PI (If you call that an ESB)	Wed, Dec 15, 2010 1:19 PM	Find...
13. Camel and CXF by themselves.	Wed, Dec 15, 2010 3:33 AM	Find...
14. Currently evaluating	Mon, Dec 13, 2010 12:47 PM	Find...
15. Oracle Enterprise Service Bus (not to be confused with Oracle Service Bus)	Wed, Dec 8, 2010 9:49 PM	Find...
16. WMB, Oracle ESB ... Yes we're integrating two organizations	Sat, Dec 4, 2010 1:13 AM	Find...
17. Tibco, WebMethods, Sonic, WebSphere, BizTalk	Fri, Dec 3, 2010 10:23 AM	Find...
18. We have developed our own ESB product that suits our needs	Fri, Dec 3, 2010 2:57 AM	Find...
19. aqualogic bus	Wed, Dec 1, 2010 5:00 PM	Find...

50 responses per page

answered question

227

skipped question

73

11. Which Enterprise Service Bus (ESB) product does your organization currently use? (NOTE: If you are a CONSULTANT or ESB VENDOR and are knowledgeable of multiple ESB implementations, in this survey please refer to the SMALLEST ESB implementation with which you are familiar at a detailed level.)

[Create Chart](#)[Download](#)

20.	SI Vendor - works on multiple ESB	Fri, Nov 26, 2010 9:10 AM	Find...
21.	A proprietary implementation is being used	Wed, Nov 24, 2010 2:27 AM	Find...
22.	Connectivity Factory based on Fuse	Wed, Nov 24, 2010 2:14 AM	Find...
23.	Camel	Sat, Nov 20, 2010 9:53 AM	Find...
24.	JCAPS/ICAN	Wed, Nov 17, 2010 10:30 PM	Find...
25.	Camel integrated in JOnAS application Server	Fri, Nov 12, 2010 6:42 PM	Find...
50 responses per page			

answered question 227
skipped question 73

[Show this Page On](#)**PAGE: ABOUT YOUR ESB**

12. How does your organization use its ESB? (Please check all that apply.)

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Within a Service Oriented Architecture (SOA)	71.6%	141
As next-generation Enterprise Application Integration (EAI) or Message-Oriented Middleware (MOM)	44.2%	87
For Business-To-Business (B2B) integration	44.2%	87
For Web Services	52.3%	103
For general integration	48.2%	95
I don't know	1.0%	2
Other (please specify) Hide Responses	2.5%	5

1. To provide loose coupling between source and client systems. Wed, Dec 15, 2010 5:12 PM [Find...](#)

answered question 197
skipped question 103

12. How does your organization use its ESB? (Please check all that apply.)

[Create Chart](#)[Download](#)

2. A business process management tool	Wed, Nov 17, 2010 10:34 PM	Find...
3. Developing, testing and supporting it.	Wed, Nov 17, 2010 4:18 AM	Find...
4. ESB, as well as Integration bus.	Tue, Nov 16, 2010 2:03 AM	Find...
5. Used at a previous assignment.	Mon, Nov 15, 2010 10:35 PM	Find...

answered question

197

skipped question

103

13. An ESB is the right solution for my organization's needs.

[Create Chart](#)[Download](#)

	Response Percent	Response Count
True	84.3%	167
False	6.1%	12
I don't know	9.6%	19
If "False" please explain below: Hide Responses		12

1. Care should be taken to understand the role of ESB. For each integration requirement, a detailed analysis should be done to identify if that integration requirement can be addressed by the ESB. For ex., commonly shared @master@ data should be moved via the ESB.	Wed, Dec 22, 2010 3:28 PM	Find...
2. Evaluating now based on experiences	Wed, Dec 22, 2010 1:12 PM	Find...
3. It depends on requirements and goals	Sat, Dec 18, 2010 2:23 PM	Find...
4. Need to understand complete requirement only then can recommend	Thu, Dec 16, 2010 6:55 AM	Find...
5. Only when applied properly	Wed, Dec 15, 2010 1:22 PM	Find...
6. Remember to keep it simple, a full blown ESB may add more complexity than you need.	Wed, Dec 15, 2010 3:35 AM	Find...
7. NA	Fri, Nov 26, 2010 9:13 AM	Find...
8. Synchronous v asynchronous	Wed, Nov 24, 2010 7:35 AM	Find...
9. More complex than true or false	Sun, Nov 21, 2010 3:44 PM	Find...
10. Not for all needs.	Tue, Nov 16, 2010 7:28 AM	Find...

25 responses per page

answered question

198

skipped question

102

13. An ESB is the right solution for my organization's needs.[Create Chart](#)[Download](#)

- | | | | |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 11. | It depends. I support a number of clients. Some will benefit from an ESB, while others need a simple MoM solution. | Mon, Nov 15, 2010 11:35 PM | Find... |
| 12. | I believe the ESB is a valuable component, but there are a few reasons why just assuming you need one is not a good idea:
1) There are other components like XML applicances that could fill in a large portion of the role of the ESB
2) Many times other components (e.g. BPMS) provide ESB like functionality
3) You really need a business case for an ESB! | Sat, Nov 13, 2010 2:03 AM | Find... |

25 responses per page

answered question	198
skipped question	102

14. What are the most important characteristics and features of the ESB at your site? (Please check all that apply.)[Create Chart](#)[Download](#)

	Response Percent	Response Count
Service broker	28.5%	55
Loose coupling	57.0%	110
Support of multiple communications protocols	57.5%	111
Real-time throughput of business data	25.9%	50
Protocol conversion (between supported protocols)	44.6%	86
Distributed data transformation and data-based routing	60.1%	116
Composite services support via lightweight orchestration	52.8%	102
Support of multiple standard business file formats	35.2%	68
Security and reliability	40.4%	78
Comprehensive error handling	36.8%	71
Synchronous and asynchronous capabilities	59.1%	114
answered question		193
skipped question		107

14. What are the most important characteristics and features of the ESB at your site? (Please check all that apply.)

[Create Chart](#)[Download](#)

Highly available and scalable infrastructure	50.8%	98
Event-driven SOA and messaging	47.2%	91
Extensibility, especially through layered services	37.3%	72
Other (please specify) or I Don't Know Hide Responses	3.1%	6

1. comment	Sun, Dec 19, 2010 12:13 AM	Find...
2. 80% of the value of ESBs comes from loose coupling alone. The rest are applicable but ancillary.	Wed, Dec 15, 2010 5:12 PM	Find...
3. ability to offer SLA management and profiling of traffic through the bus, ability to throttle traffic, federation.	Fri, Dec 3, 2010 2:50 AM	Find...
4. Support of a Common Information Model, which de-couple teh applications integration. Too many people are doing point to point integration using an ESB because they don't have any Common Information Model in place upfront.	Sun, Nov 21, 2010 6:39 AM	Find...
5. Decrease Dependencies between partners involved in the same process and consequently reduce maintenance and make evolution easier. Ex: openESB provide 2 intermediation level: The Bus and the technical contract (WSDL). This is the key point of ESB	Thu, Nov 18, 2010 6:10 AM	Find...
6. Orchestrations are one way of handling enterprise business coordination, the other is choreography, From a technical perspective it can also be used to handle b2b integrations where it's feasible. But it will never, and should never be used for composite services.	Tue, Nov 16, 2010 2:03 AM	Find...

answered question	193
skipped question	107

15. What are the most important secondary features of the ESB at your site? (Please check all that apply.)

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Configuration vs. coding	34.6%	65
Graphical editing tools	24.5%	46
Productivity with IDE support	17.0%	32
answered question		188
skipped question		112

**15. What are the most important secondary features of the ESB at your site?
(Please check all that apply.)**

[Create Chart](#)[Download](#)

Monitoring and operational awareness	41.5%	78
BPEL and other business process support	39.4%	74
Business activity monitoring	40.4%	76
Service life-cycle management	31.4%	59
Dynamic service provisioning	23.9%	45
Complex event processing	21.8%	41
Business rules engine	34.6%	65
Other (please specify) or I Don't Know Hide Responses	5.3%	10

1. dunno	Wed, Dec 22, 2010 3:28 PM	Find...
2. i don't know	Wed, Dec 22, 2010 2:59 PM	Find...
3. IDK	Mon, Dec 20, 2010 8:06 AM	Find...
4. comment	Sun, Dec 19, 2010 12:13 AM	Find...
5. Dynamic rules management and SLA management are key.	Wed, Dec 15, 2010 5:12 PM	Find...
6. we use own build software for monitoring and analysing messaging it called MyESB	Wed, Dec 15, 2010 2:54 PM	Find...
7. Integration with Governance tool	Wed, Dec 8, 2010 12:47 PM	Find...
8. Some of the features mentioned here are not use cases for ESB, even though some vendors push their products as an ESB, even though it is an EAI engine.	Fri, Dec 3, 2010 2:50 AM	Find...
9. I dont' know	Wed, Nov 24, 2010 4:24 AM	Find...
10. These haven't been implemented yet	Wed, Nov 24, 2010 2:31 AM	Find...

answered question	188
skipped question	112

16. How many services and/or applications are available to consumers via your ESB?

[Create Chart](#)[Download](#)

	Response Percent	Response Count
answered question		191
skipped question		109

16. How many services and/or applications are available to consumers via your ESB?

[Create Chart](#)
[Download](#)

1-10	18.8%	36
11-25	22.5%	43
25-100	27.2%	52
101-500	15.2%	29
>500	8.4%	16
I don't know	7.9%	15
Optional Comment Field Hide Responses		5

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. it varies by customer | Tue, Dec 21, 2010 10:34 AM | Find... |
| 2. We have about a 100 SOA and WOA services in our environment. We are moving them all to Tibco's Active Matrix. Not all of them are currently available via Tibco, but will be by the end of 2011. | Fri, Dec 17, 2010 12:39 PM | Find... |
| 3. Still ramping this up. | Wed, Dec 15, 2010 4:20 PM | Find... |
| 4. NA | Fri, Nov 26, 2010 9:13 AM | Find... |
| 5. We started implementation in Oct 2009 | Fri, Nov 26, 2010 6:07 AM | Find... |

answered question **191**
skipped question **109**

17. How many application calls and/or service invocations does your ESB process on a daily basis?

[Create Chart](#)
[Download](#)

	Response Percent	Response Count
1-1,000	14.5%	28
1,001-5,000	13.5%	26
5,001-10,000	12.4%	24
10,001-100,000	22.8%	44
answered question		193
skipped question		107

17. How many application calls and/or service invocations does your ESB process on a daily basis?
[Create Chart](#)
[Download](#)

101,001-1,000,000	11.9%	23
>1,000,000	9.8%	19
I don't know	15.0%	29
Optional Comment Field Hide Responses		5

1. it varies by customer	Tue, Dec 21, 2010 10:34 AM	Find...
2. This is very likely to increase	Thu, Dec 16, 2010 12:19 AM	Find...
3. NA	Fri, Nov 26, 2010 9:13 AM	Find...
4. This is the beginning of ESB deployment	Wed, Nov 24, 2010 4:47 AM	Find...
5. 60,000 messages per hour during business hours	Sat, Nov 13, 2010 2:03 AM	Find...

answered question 193
skipped question 107
18. Please describe the transaction and services growth anticipated OVER THE NEXT THREE YEARS for your ESB:
[Create Chart](#)
[Download](#)

	Response Percent	Response Count
No growth	0.5%	1
0-25% annual growth	24.5%	46
25%-50% annual growth	26.6%	50
50-100% annual growth	19.7%	37
>100% annual growth	11.2%	21
I don't know	17.6%	33
Optional Comment Field Hide Responses		4

answered question 188
skipped question 112

18. Please describe the transaction and services growth anticipated OVER THE NEXT THREE YEARS for your ESB:
[Create Chart](#)[Download](#)

1. it varies by customer	Tue, Dec 21, 2010 10:34 AM	Find...
2. This number does not necessary relate to ESB. Our services use ESB only for legacy resource connectivity	Wed, Dec 8, 2010 3:01 PM	Find...
3. We are currently focusing on improving and extending integrations both between our own products and with external solutions. Also solutions are being developed that use the ESB as a SOA platform on which they're built.	Fri, Dec 3, 2010 3:03 AM	Find...
4. NA	Fri, Nov 26, 2010 9:13 AM	Find...

answered question

188

skipped question

112

19. What are the primary non-functional features of your ESB that differentiate it from other ESB products? (Please check all that apply.)
[Create Chart](#)[Download](#)

	Response Percent	Response Count
Easy to install	37.0%	71
Scalability	42.7%	82
Speed of Execution	34.4%	66
High Service Re-use	37.0%	71
Security	27.6%	53
Flexibility	43.2%	83
Reliability	40.1%	77
Faster Service Implementations	37.5%	72
Easy to support	31.8%	61
Predefined Implementation Templates	12.0%	23
Wide Range of Plug-Ins	18.2%	35
None	2.6%	5
I don't know	6.8%	13

answered question

192

skipped question

108

19. What are the primary non-functional features of your ESB that differentiate it from other ESB products? (Please check all that apply.)

[Create Chart](#)
[Download](#)

Other (please specify)

[Hide Responses](#)

8.9%

17

- | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 1. Zero License Fee | Wed, Dec 22, 2010 7:45 PM | Find... |
| 2. price point | Tue, Dec 21, 2010 10:34 AM | Find... |
| 3. ActiveMatrix include the service container and has tier I containers for Java, .Net (wcf) and C++. It was important to use to be able to create both Java and WCF services. ActiveMatrix also support and enforce the contract first paradigm that is not supported by Mule. That has a dramatic positive impact on the SOA principle of standardized contracts, and improves reuse and deep interoperability. AMX is also a platform that allows us to grow into other advanced middleware capabilities like CEP and BPM, which will be deployed onto the platform instead of requiring there own infrastructure. Also, AMX is following the SCA and osgi specifications, so it has native support of SCA intents like Security, Transactions and QoS functions like reliable messaging. | Fri, Dec 17, 2010 12:39 PM | Find... |
| 4. First-rate administrative tooling and support. | Wed, Dec 15, 2010 5:46 PM | Find... |
| 5. 1 click deployment with Opdion.com tools | Wed, Dec 15, 2010 4:44 PM | Find... |
| 6. It is just a Legacy product | Wed, Dec 15, 2010 1:22 PM | Find... |
| 7. initial cost among commercial products | Wed, Dec 8, 2010 3:01 PM | Find... |
| 8. NA | Fri, Nov 26, 2010 9:13 AM | Find... |
| 9. Not bad vendor support. Good knowlegde about it in the company (since it's open source we're able to fix many problems ourselves) | Wed, Nov 24, 2010 4:24 AM | Find... |
| 10. inbuilt support for special needs our company has | Wed, Nov 24, 2010 2:31 AM | Find... |
| 11. Easy to deploy 10 machines at a time, based on Model driven architecture. | Sun, Nov 21, 2010 6:39 AM | Find... |
| 12. Big company as assurance incase of malfunction.
24*7 Support availability | Thu, Nov 18, 2010 4:55 PM | Find... |
| 13. Markting investment from the product vendor (microsoft) it's never the actual need or the best tools thats chosen. it BizTalk because Microsoft has invested a lot in branding. | Tue, Nov 16, 2010 2:03 AM | Find... |
| 14. Tools utilize in house Microsoft based skillsets | Mon, Nov 15, 2010 4:51 PM | Find... |
| 15. Changes can be made very quickly | Sat, Nov 13, 2010 2:03 AM | Find... |
| 16. Range of additional features and non standard protocol support OOTB | Thu, Nov 11, 2010 6:13 PM | Find... |
| 17. Good support of Developers tools (Eclipse, Maven, SCM). | Thu, Nov 11, 2010 2:03 PM | Find... |

25 responses per page

answered question
192
skipped question
108
[Show this Page On](#)

PAGE: ESB SERVICE IMPLEMENTATIONS AND SUPPORT

20. What are the primary skills required to support your ESB? (Please check all that apply.)

[Create Chart](#)
[Download](#)

	Response Percent	Response Count
Programming (Java, C#, etc.)	56.4%	106
Unix/Linux scripting	18.6%	35
Other standard scripting	12.2%	23
Proprietary scripting	4.8%	9
XML	85.6%	161
Web Services/WSDL	81.9%	154
SOAP	68.6%	129
REST	25.0%	47
TCP/IP Based communications protocols	20.7%	39
Other communications protocols	10.1%	19
Architect	41.0%	77
Product GUI tools	17.0%	32
Senior Level IT Skills primarily	36.7%	69
Junior Level IT Skills primarily	5.3%	10
Business skills primarily	10.1%	19
Detailed understanding of the ESB product	42.6%	80
I don't know	1.1%	2
Other (please specify) Hide Responses	5.3%	10

1. xquery

Wed, Dec 22, 2010 4:19 PM

[Find...](#)

2. programming is not need to support AMX but is needed to develop services for it...

Fri, Dec 17, 2010 12:40 PM

[Find...](#)

answered question

188

skipped question

112

20. What are the primary skills required to support your ESB? (Please check all that apply.)
[Create Chart](#)
[Download](#)

3. We have seen staffs with a wide range of skills. Knowledge of the ESB is a given but beyond that will be a function of how you organize service development and composite application development, as well as what else is in your environment (legacy technologies, 3rd party).	Mon, Dec 13, 2010 2:19 PM	Find...
4. It depends a lot about what you want to do. If you don't have SOAP type integration, why should you need to learn SOAP, even if the ESB provides SOAP support?	Sun, Nov 21, 2010 6:43 AM	Find...
5. Spring based Configuration	Sat, Nov 20, 2010 4:57 PM	Find...
6. Have people available and capable to moitor and steer on resposibilities and structure. It's very tempting to make shortcuts which will result in aplication knowledge over the ESB. When that happens dont use the ESB as the flows won't be reusable.	Thu, Nov 18, 2010 5:01 PM	Find...
7. Deep understanding of what is (or must be a) service	Thu, Nov 18, 2010 6:13 AM	Find...
8. XSL	Wed, Nov 17, 2010 8:43 AM	Find...
9. Depends on your project !	Wed, Nov 17, 2010 4:22 AM	Find...
10. XSL or XQuery	Sat, Nov 13, 2010 2:05 AM	Find...

answered question 188
skipped question 112
21. With your ESB, how many applied DAYS does it take to integrate, test and deploy access to a new service or application?
[Create Chart](#)
[Download](#)

	Response Percent	Responses Count
0-0.5	2.2%	4
1-2	22.7%	42
3-5	23.2%	43
5-10	22.2%	41
>10	19.5%	36
I don't know	10.3%	19
Optional Comment Field Hide Responses		17

answered question 185
skipped question 115

21. With your ESB, how many applied DAYS does it take to integrate, test and deploy access to a new service or application?

[Create Chart](#)
[Download](#)

1.	it varies by customer	Tue, Dec 21, 2010 10:35 AM	Find...
2.	again depends on the complexity of the data flow	Mon, Dec 20, 2010 4:13 AM	Find...
3.	I'm including data model design, which is the largest part. Did you ask about that separately?	Wed, Dec 15, 2010 4:22 PM	Find...
4.	We have 2 week deployment model for most development.	Wed, Dec 15, 2010 2:33 PM	Find...
5.	Depending on service complexity and service composition	Wed, Dec 15, 2010 2:07 PM	Find...
6.	This varies quite a bit from what we see, depending on the testing phase and how automated this is to do not just service testing, but integration and middleware testing (all of which can be automated and the tools available from vendors don't address), as well as governance procedures.	Mon, Dec 13, 2010 2:19 PM	Find...
7.	This depends on the new service, its functional, non-functional requirements, complexity and availability of programmers with appropriate skill sets.	Fri, Dec 3, 2010 7:09 AM	Find...
8.	depends on the complexity of the service/app.	Fri, Dec 3, 2010 2:56 AM	Find...
9.	depending on complexity and how much of our reusable components we can utilize it could be much more or less than this number as well. It is difficult to average.	Wed, Nov 24, 2010 4:04 PM	Find...
10.	Once again, if you don't have the appropriate organization in place, you will not be able to roll out services in a timely fashion.	Sun, Nov 21, 2010 6:43 AM	Find...
11.	Due to the chain testing. Expect longer development cycles. So make sure the flows over the ESB are flexible and when supplying business object. Try to deliver complete object. This will cost more in the beginning but you can bet on it you'll going to use the information soon.	Thu, Nov 18, 2010 5:01 PM	Find...
12.	It is a non accurate question since it is depending on the complexity of the service	Thu, Nov 18, 2010 6:13 AM	Find...
13.	This is due to the extensive level of peer-review and governance requirements inherent in the Health Care/Insurance field	Wed, Nov 17, 2010 10:37 PM	Find...
14.	This depends on the service. Adding a new external service provider can take three months. Adding a new internal service may take two weeks.	Wed, Nov 17, 2010 8:43 AM	Find...
15.	Developer tooling on Petals.	Wed, Nov 17, 2010 4:22 AM	Find...
16.	Totally depends on the service and the environment. Impossible to answer without more detail.	Fri, Nov 12, 2010 4:23 AM	Find...
17.	Depends on complexity and where the service is composed, data or technical	Thu, Nov 11, 2010 6:15 PM	Find...
25 responses per page			

answered question
185
skipped question
115

22. How easy is it for an administrator to manage this ESB?

[Create Chart](#)[Download](#)

	Response Percent	Response Count
Very Easy	2.7%	5
Easy	65.6%	122
Difficult	22.6%	42
Very difficult	2.2%	4
I don't know	7.0%	13
Optional Comment Field Hide Responses		8
1. its a other way of thinking than the regular client server solutions	Wed, Dec 15, 2010 2:55 PM	Find...
2. We don't see the overall management issues	Mon, Dec 13, 2010 2:19 PM	Find...
3. Administrations is a broader subject, and again it differs from person to person and their experience. I have worked with Oracle's middleware offerings and I am in a position to say that it had been easy so far to Administer the systems based on ESB.	Fri, Dec 3, 2010 7:09 AM	Find...
4. my opinion - some people think it is hard	Wed, Nov 24, 2010 4:04 PM	Find...
5. It depends who you think you will put in charge of monitoring the infrastructure (as opposed to monitoring the ESB).	Sun, Nov 21, 2010 6:43 AM	Find...
6. Chain managment is the difficulty.	Thu, Nov 18, 2010 5:01 PM	Find...
7. ESB administration is moderate, but learning about how and which lines of business use the ESB is a much longer task.	Wed, Nov 17, 2010 8:43 AM	Find...
8. Administrator tooling on Petals.	Wed, Nov 17, 2010 4:22 AM	Find...
answered question		186
skipped question		114

23. How many MONTHS does it take to train a new support person to be effective in bringing up a new service on your ESB?

[Create Chart](#)[Download](#)

	Response Percent	Response Count
0-2	44.6%	83
3-6	31.7%	59
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skipped question		114

23. How many MONTHS does it take to train a new support person to be effective in bringing up a new service on your ESB?		Create Chart	Download
7-12	11.8%	22	
> 12	3.8%	7	
I don't know	8.1%	15	
		Optional Comment Field Hide Responses	3
1. Depending on support person background	Wed, Dec 15, 2010 2:07 PM	Find...	
2. Depending on their skillset. Working with my home-made solution requires Java skills.	Wed, Dec 15, 2010 3:37 AM	Find...	
3. If it take a month or more s to train a support person, I suggest you update your organization skills first, before acquiring any technology.	Sun, Nov 21, 2010 6:43 AM	Find...	
		answered question	186
		skipped question	114

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PAGE: THANK YOU FOR COMPLETING THIS SURVEY!

24. Please indicate below any websites, Special Interest Groups (SIG) or other sources where this survey could be circulated to other ESB professionals.		Download
		Response Count
Hide Responses		20
1. www.infoaxon.com	Thu, Dec 23, 2010 3:39 AM	Find...
2. http://soaschool.com	Wed, Dec 22, 2010 3:42 PM	Find...
3. www.wmusers.com	Mon, Dec 20, 2010 12:08 PM	Find...
4. NIL	Sun, Dec 19, 2010 5:54 AM	Find...
5. SOA DATA Integration Group	Thu, Dec 16, 2010 6:58 AM	Find...
6. Enterprise service bus group on linked in http://www.linkedin.com/groups?home=&gid=2270935&trk=anet_ug_hm	Thu, Dec 16, 2010 4:43 AM	Find...
		25 responses per page
		answered question 20
		skipped question 280

24. Please indicate below any websites, Special Interest Groups (SIG) or other sources where this survey could be circulated to other ESB professionals.

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7.	www.wmusers.com	Thu, Dec 16, 2010 2:39 AM	Find...
8.	upasana1@gmail.com	Wed, Dec 15, 2010 11:52 PM	Find...
9.	http://www.opdion.com	Wed, Dec 15, 2010 2:59 PM	Find...
10.	www.oracle.com	Wed, Dec 15, 2010 9:10 AM	Find...
11.	EAch of the vendors and their user groups, plus the Architect ones.	Mon, Dec 13, 2010 2:20 PM	Find...
12.	SOA Yahoo! Group	Wed, Dec 8, 2010 3:03 PM	Find...
13.	http://soa-bpm-bi.blogspot.com	Fri, Dec 3, 2010 10:30 AM	Find...
14.	theserverside.com, infoq.org	Tue, Nov 23, 2010 11:46 PM	Find...
15.	w2cog.org	Sun, Nov 21, 2010 11:45 AM	Find...
16.	1.ittoolbox 2. Www.powerlink.emc.com	Sat, Nov 20, 2010 7:23 PM	Find...
17.	http://forum.petalslink.com	Wed, Nov 17, 2010 4:27 AM	Find...
18.	http://products.neudesic.com/ www.nebularit.com	Tue, Nov 16, 2010 2:05 AM	Find...
19.	iCMG LinkedIn SOA Group	Fri, Nov 12, 2010 6:48 PM	Find...
20.	http://publib.boulder.ibm.com/infocenter/dmndhelp/v6rxmx/index.jsp?topic=/com.ibm.websphere.wesb.doc/info/welcome.html	Thu, Nov 11, 2010 5:08 PM	Find...

25 responses per page

answered question	20
skipped question	280

25. Final thoughts? Please comment here.

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Responses
Count

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32

- | | | | |
|----|----------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|
| 1. | Consider the availability and quality of support from a proposed vendor. The TCO can be lower with a good open-source ESB. | Thu, Dec 23, 2010 7:19 AM | Find... |
| 2. | EAB (SOA) are goign to be very mandatory infrastructure solution in any large It enabled compnay.. | Thu, Dec 23, 2010 3:39 AM | Find... |

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answered question	32
skipped question	268

25. Final thoughts? Please comment here.

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3. I guess this is a wonderful exercise as an decision making initiative.
I definitely recommend any large scale organization to have an ESB in place and groom the people into acquiring this skill set as it benefits the organization on the long run from business perspective.

Wed, Dec 22, 2010 6:14 PM

[Find...](#)

The best people to go to will be the business guys who will see the real benefit of having reliable data in real time in front of them, helping them make crucial decisions. The "Power of Now".

You might also come across business guys not happy with a ESB for if there are problems it becomes a big issue. However the Benefits outgrow the problems if we have the right set of people, Implementing, Managing the ESB space in the organization. More importantly a the architectural team of the organization should be consistently flexible to adopt and scale the ESB layer.

4. Very interesting survey.

Wed, Dec 22, 2010 3:57 PM

[Find...](#)

5. Part of the problem is that ESB is not a @standard@. Hence several offerings can vary in the feature set they support. A clear definition of an ESB (as a compound pattern) can be found in the SOA Design Patterns book by Thomas Erl. It could form one vital technical infrastructure in an SOA but it does not mean an SOA must use an ESB. For ex., most modern BPMS solutions offer overlapping features that an ESB offers.

Wed, Dec 22, 2010 3:42 PM

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So, ultimately, choosing an ESB should consider not only the needs of the organization but also its prevailing technical environment and overall IT skill sets!

As an academic environment, I would recommend looking at WSO2 ESB as it provides (1) hosted services - WSO2 Stratos (2) Amazon EC2 ready cloud images to get started easily and do a POC and (3) focus on simplicity, light weight and easy on-prmise/off-site migration.

Good luck.

6. Pls Do Share the Overall results

Sun, Dec 19, 2010 5:54 AM

[Find...](#)

7. This is a step in the right direction.
please provide the results along with the information about the participants relevant experience...

Thu, Dec 16, 2010 4:43 AM

[Find...](#)

8. An ESB is just an expensive and complex tool, find out if your needs justifies this investment. Usually if you decide that an ESB is needed, I guess you'll also have drawn the conclusion that (event driven) SOA is the "right" paradigm for your business' challenges. But start small and acquire experience...

Thu, Dec 16, 2010 12:29 AM

[Find...](#)

9. Although ESBs are a key component of SOA, it is best to evaluate, deploy, and use them based on concrete business cases. Successful ESB implementations are always a function of how much value they deliver to the organization, never a function of how well they fit into a SOA plan.

Wed, Dec 15, 2010 5:17 PM

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10. for managing ESB's it can be very helpful to have the right tools around it for functional management. The most important is to use it with your mind to a SOA mature feature. Take the perspective of the normal human service and ask yourself what do I want to ask to a service these are normally direct things like addresses, user information, financial information of one thing or a group. Sent the question to the ESB and let a mediator tell the message where to collect the data.

Wed, Dec 15, 2010 2:59 PM

[Find...](#)

11. A layer of indirection can solve any problem in IT.

Wed, Dec 15, 2010 1:47 PM

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answered question 32
skipped question 268

25. Final thoughts? Please comment here.

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- | | | | |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|
| 12. | ESB is the way to do integration using standard based protocols and messaging standards. ESB softwares by vendors like Tibco provides better support and user base for common problems and design patterns are already established for integrating heterogenous systems and messaging protocols | Tue, Dec 14, 2010 6:25 PM | Find... |
| 13. | It was visualized that application to application interactions would be automated via the ESB. But that sort of compact automation and dynamism could not be guaranteed by present-day ESB solutions. May be we need to wait for the maturity and stability of semantic technologies to ensure the much-expected true dynamism in service interactions. | Sun, Dec 5, 2010 9:49 PM | Find... |
| 14. | It's good to see some empirical reserach being done. | Sat, Dec 4, 2010 1:16 AM | Find... |
| 15. | Nice Survey.

Can add more points for deeper understanding of ESB. | Wed, Nov 24, 2010 9:24 PM | Find... |
| 16. | I like the Survey | Wed, Nov 24, 2010 9:51 AM | Find... |
| 17. | According to my experience, the main goal of an integration product is to be invisible to end user.
The second goal is to provide a efficient, reliable way to deploy.
With Sonic and SDM you can reach them CAA architecture provide a very strong failover and clustering capabilities (it s better thant HA at the os level) and also a very simple way for deployment.

Regards.
(sorry for my english) | Wed, Nov 24, 2010 4:57 AM | Find... |
| 18. | Good luck! | Wed, Nov 24, 2010 3:59 AM | Find... |
| 19. | Please, don't buy a technology to solve organization and processes problem. Fix the organization / people first, and then acquire a technology that a Services Oriented Organization can support.
Jean-Michel | Sun, Nov 21, 2010 6:45 AM | Find... |
| 20. | Thank you | Sat, Nov 20, 2010 10:04 AM | Find... |
| 21. | I really enjoy working with ESB solution.
My advice do invest in general information and services. When applications use there own user database. Have a service which can translate from user to user. Or other general information. | Thu, Nov 18, 2010 5:04 PM | Find... |
| 22. | If you're truly interested in SOA, study it as an architecture style, and how it relates to the business and lifecycle governance. ESB are a useful integration tool, but largely a technical distraction. | Thu, Nov 18, 2010 8:49 AM | Find... |
| 23. | Could we have the result of the survey. My email address is : paul.perez@pymma.com | Thu, Nov 18, 2010 6:13 AM | Find... |
| 24. | Until you have a clearly defined set of business cases and a well defined SOA Solution/Architecture you should not even be asking what ESB to use.

I fear that you are making the common error of putting the 'cart before the horse' | Wed, Nov 17, 2010 10:38 PM | Find... |
| 25. | Each ESB is best depending on your situation.
There's no One Best ESB.
But there's one most appropriate with your specific situation. | Wed, Nov 17, 2010 4:27 AM | Find... |
| 26. | Very smart questions. I'd like to see the result of the survey and the study as well. | Tue, Nov 16, 2010 7:30 AM | Find... |

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answered question	32
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25. Final thoughts? Please comment here.

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27.	ESB in your list have reliability or/and performance issues. JBI based are not performant by construction (XML serialization)	Fri, Nov 12, 2010 6:48 PM	Find...
28.	Welcome to the world of ESB.	Thu, Nov 11, 2010 5:08 PM	Find...
29.	Enterprise service bus features like content based routing, message filtering etc are really useful for integration. Also protocol conversion logic is being centralized at one place instead of copying it and creatinf dependencies into other systems. Also ESB helps to remove many batch processes in your organization	Thu, Nov 11, 2010 3:11 PM	Find...
30.	ESB is an overhead for smaller projects at the same time it adds scalability and flexibility to integrate newer products to the corporate.	Wed, Nov 10, 2010 10:12 PM	Find...
31.	In my experience, very few organizations have the commitment, patience, and determination to really make programs like this produce enough benefits to offset the cost and disruption to the enterprise before they are supplanted by something "newer and better".	Tue, Nov 9, 2010 5:40 PM	Find...
32.	It took me 15 minutes to fill the survey. You may want to ask what is the infrastructure requirement for each of these ESB's. Also if you want to ask what is the implementation time required to install/configure a certain ESB.	Tue, Nov 9, 2010 1:44 PM	Find...

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