

Management Issues in a Web Services Environment



Jim Metzler
Ashton, Metzler & Associates
jim@ashtonmetzler.com



In the last IT Impact Brief we highlighted the growing importance of Web services based applications. Because of that importance, the last IT Impact Brief discussed what is meant by the phrase Web services and also described what is motivating so many companies to adopt them. This IT Impact Brief will discuss the management impact of deploying Web services based applications.

As was the case with the last IT Impact Brief, the research that went into creating this brief included surveying the NetScout community relative to their company's use of Web services. Throughout this brief the respondents to that survey will be referred to as The Survey Respondents.

Computing Trends

In the not too distant past, all applications were monolithic in nature. By monolithic, it is meant that the application performed all of the necessary functions, such as providing the user interface, the application logic, as well as the access to data.

In the late 1980s a new application architecture began to be deployed. This application architecture was referred to as client-server and was structured around the use of a PC that accessed an off-the-shelf database product using a language such as Structured Query Language (SQL).

In a client-server application, the client process initiates the interaction by issuing a request to the server process. Upon receipt of a request, the server performs a service and returns a response to the client. An example of a client - server applications would be traditional e-mail applications.

A client-server application architecture is sometimes referred to as a 2-tier architecture because the intelligence required to run the application resides on two separate computing devices. Within a few years of the initial deployment of a 2-tier application architecture the industry began to deploy an n-tier application architecture. The phrase n-tier application architecture refers to an architecture in which the intelligence to run the application typically resides on three or four separate computing devices ("n" separate computing devices). For example, in a 3-tier application architecture the application intelligence is split between a Web browser, a Web server and a database server. An example of an n-tier application is the shopping cart application on retail web sites.

As was the case with client-server applications, in order to evaluate the performance of an n-tier application there needed to be a management system to monitor all of the processes and the interactions between the processes. However, as "n" gets larger, managing the application becomes increasingly more complicated. For example, it is notably more complicated to monitor all of the processes that are running on four separate computing devices than it is to monitor all of the processes that are running on two separate computing devices.

Challenges of Web Services Management

Web services should be thought of as the next step in the evolution of n-tier applications. In particular, in a Web services-based approach to developing applications, an application is made up of any number of Web services. While there is no standard for how many Web services will comprise a given application, it is reasonable to believe that it will be more than 4. Hence, given that managing a 4-tier application was notably more complex than managing a 2-tier application, managing a Web services based application will be notably more complex than managing a typical 4-tier application.

In addition to just an increase in the number of processes that must be managed, there are other factors that also increase the complexity that is associated with managing a Web services application. For example, the servers that run the Web services may be housed within:

- A given data center owned by an enterprise
- Multiple data centers owned by a given organization
- Multiple data centers owned by different entities

Survey Results

In order to identify how companies are deploying Web services based applications, The Survey Respondents were asked two questions. The first question asked them to indicate the percentage of their company's current use of Web services that is for applications that are entirely contained within their company vs. for applications that extend out to other companies; i.e., customers, suppliers and distributors. Their responses are contained in Figure 1. Note that The Survey Respondents were asked to check the percentage closest to their situation.

As shown in Figure 1, only 7% of the time are Web services based applications used entirely within a company. At first it seemed a little surprising that such a large percentage of Web services based applications extend out to customers, suppliers, and distributors. However, as reported in the last IT Impact Brief, large numbers of companies are acquiring Web services-based software from companies such as Oracle and SAP, both of which have a focus on Supply Chain Management (SCM). SCM by its very definition connects companies with their customers, suppliers, and distributors.

The second question asked The Survey Respondents to indicate the percentage of their company's current use of Web services deployed for applications that are entirely contained within one data center vs. for applications that are spread out over multiple data centers. Their responses are contained in Figure 2. As was the case with the previous question, The Survey Respondents were asked to check the percentage closest to their situation.

The data in Figure 2 indicates that the times a Web services based application resides entirely within a single data center is in the minority.

Figure 1:
Internal vs. External Web Service usage

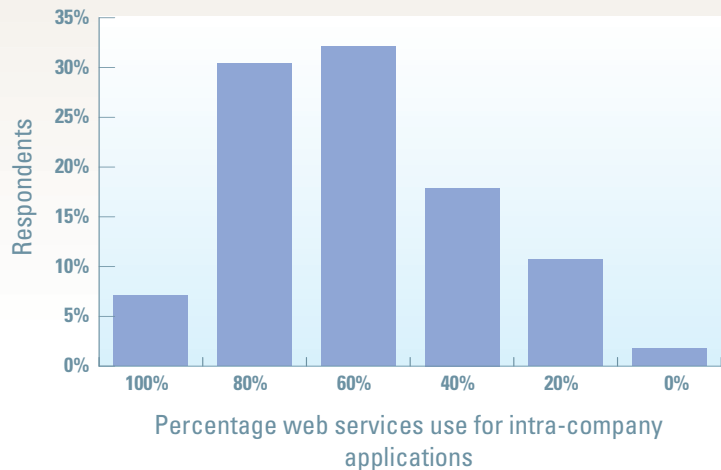
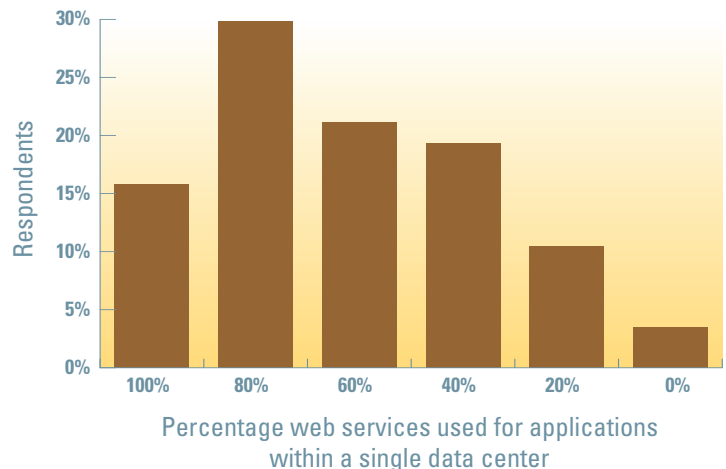


Figure 2:
Web Services usage across data centers



The Survey Respondents were then asked the impact of deploying Web services based applications would have in a number of areas of management, including managing application performance as well as managing Wide Area Network (WAN) performance. For each of these management areas The Survey Respondents were asked to indicate the:

- Level of impact
- Level of their company's preparation
- Likelihood of purchasing new tools for this area

In each case, a response of '1' indicated None, a response of '4' indicated Medium, and a response of '7' indicated High.

The data in Figure 3 indicates that The Survey Respondents think that deploying Web services based applications will have only a modest impact on managing application performance.

Ashton, Metzler & Associates (AM&A) believes that Web services based applications will have only a modest impact on managing application performance for the next year or so, but after that, the impact of these applications will start to increase.

In order to understand the reasoning behind that statement, it is important to remember that Web services are reusable software modules. When a company is first beginning to deploy Web services based applications they do not have any existing Web services that can be reused. However, that situation will change over time and Web services will be used in multiple applications.

For the sake of an example, assume that a given Web service (example: check customer credit) was part of five different applications, one of which was business critical and the other four were not. Also assume that one of the non-critical applications began to make heavy use of that Web service, causing it to experience significant latency. As a result, each of the five applications that use that Web service is likely to experience a notable delay. Given the current technology, it will be very difficult for a company to predict, manage, and protect the performance of those applications, including the one that is business critical. What is needed is functionality similar to Quality of Service for networks, and that will not be standardized any time soon.

Figure 3:
Effect on Managing Application Performance

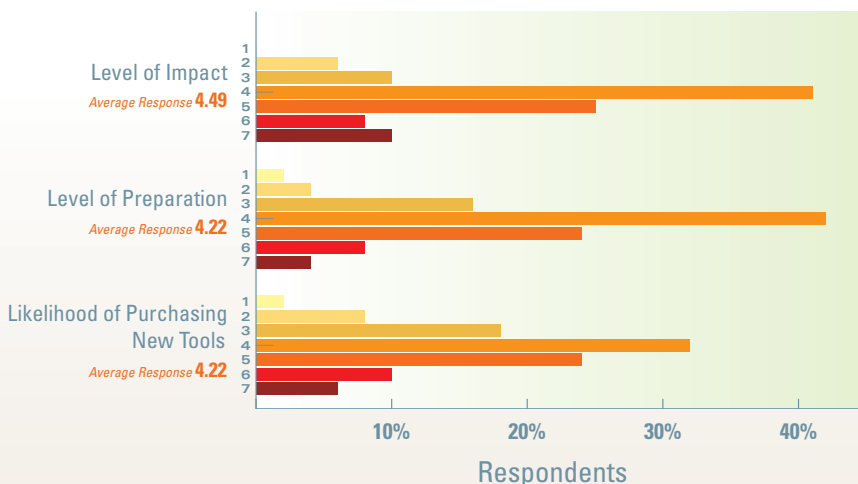
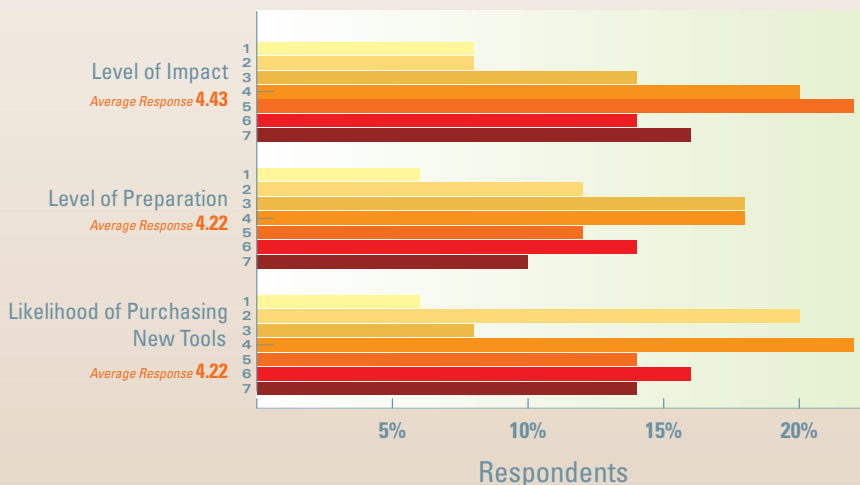


Figure 4:
Effect on WAN Performance



The data in Figure 4 indicates the impact that The Survey Respondents think that deploying Web services based applications will have on managing WAN performance.

The average responses bear an uncanny resemblance to the average responses in Figure 3. However, that is where the resemblance in the responses to the two areas of questions ends. For example, consider the combined percentage of respondents that answered the two sets of questions with a 6 or a 7. In Figure 3, those combined percentages are 18%, 12% and 16%. In Figure 4, those combined percentages are 30%, 24%, and 30%. Hence, while the average responses are virtually identical, a notably higher percentage of The Survey Respondents:

- Have more serious concerns about the impact of Web service on managing WAN performance
- Indicated that their company is well prepared for this impact
- Are more likely to purchase new tools to manage this impact

One explanation for the concern that The Survey Respondents have for the effect that Web based applications will have on managing WAN performance goes back to the data in Figure 2. The data in that figure indicates that a large percentage of Web services based applications will span multiple data centers. Having an application span multiple data centers will require that the WAN be managed in a way to provide very low, predictable delay, as well as to clearly track volume and activity so as to cost-effectively make capacity planning decisions.

Conclusions

There is clearly much hyperbole in the trade magazines about Web services. Looking just at what the media is saying it would be easy to believe that Web services are incredibly complex from a technical perspective, but that they will allow companies to make almost instantaneous changes to their business processes. Cutting through that hyperbole, there is little doubt that Web services will allow companies more flexibility than they currently have to modify their business processes. There is also no doubt that Web services are complex. In particular, this IT Impact Brief demonstrated that managing Web services based applications will be more complex than managing today's n-tier applications.

Successful IT organizations will start now to create a plan for how they will manage Web services based applications in addition to existing legacy applications. In order to avoid implementing one more management stovepipe, this plan has to include a tight integration of Web services management with other aspects of network and application performance management.



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