



AberdeenGroup

Enhancing Employee
Productivity with
Services on Demand

An Executive White Paper

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Aberdeen Group, Inc.
One Boston Place
Boston, Massachusetts 02108 USA
Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com



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Preface

In 2000, a major software provider revealed that it had saved more than \$1 billion using Web-based applications and services. Its “e-business transformation” process saved \$200 million in hardware and administration costs from consolidated applications and databases accessed via the Internet; \$550 million in support costs, attributable to Web-based Customer Relationship Management (CRM); \$150 million in supply chain costs, primarily in e-Procurement; and \$100 million in human resources costs — using Web-based applications for expense processing, benefits, travel scheduling, etc. For the short term, the company estimates that it will benefit from another \$1 billion in savings in 2001!

Much of this Internet-enabled savings relates to employee productivity, made possible by new approaches such as Web-based applications, Web services, and “on demand” services. These approaches increase both the speed of employee decision-making and the quality of the decisions being made. Fast, accurate decisions create more efficient production lines, improve throughput, and cut costs. A company’s employees perform specific business tasks, and its Web services respond by engaging the specific applications and resources to accomplish each task. On-demand services dynamically reconfigure and recombine Web services at the moment of a request to take into account the user, resource, and application context surrounding the business process being performed.

This *Executive White Paper* discusses costs and benefits of employee productivity initiatives. It examines the role of the Sun Open Net Environment (Sun ONE) for demand services, which Sun calls “Services on Demand.” This paper also considers the reasons that CEOs, CIOs, and line-of-business (LOB) managers should care about Web services, and how enterprises that deploy a Services on Demand strategy stand to increase both the productivity and effectiveness of their employees. The paper concludes with Aberdeen’s evaluation of the potential effect of the Sun ONE platform on employee productivity.

Employee Productivity: The Power of Services on Demand

The Services on Demand concept recognizes that many different types of services are delivered to end-users — from traditional legacy and Web-based applications evolving to componentized Web services, and, undoubtedly, services of a type currently unimagined. Aberdeen research indicates that Services on Demand can increase not only the *quantity* of work employees perform, but also — perhaps more important — the *quality* of employee productivity.

Services on Demand empower employees to make informed decisions whenever they need to, wherever they are, with the most accurate information possible. In today’s corporations, there is typically no single system that has a consolidated view aligned

with corporate objectives. Rather, individual systems offer partial views of any problem, not a solution. Furthermore, a common rule of thumb is that knowledge workers spend at least 50% of their time simply locating information to make a decision.

Services on Demand deliver services, anywhere, at any time, and on any device, leveraging legacy systems, Web applications, and Web services. As such, Services on Demand can dramatically improve information access. Corporations using Services on Demand can locate information from any database or application across the enterprise to get information presented in a meaningful, role-based context to the decision-maker, at the time and place of the decision.

For example, with Services on Demand, a company can take a global approach to human resources (HR) or maintenance, repair, and operations (MRO) planning. In fact, service-based HR applications are in place today — for benefits administration, expense reporting, and other administrative functions. For MRO, a company can use Services on Demand to take a global view of planning and production in order to gain bargaining leverage with suppliers and contractors, performing operations from the most efficient location. A few leading edge companies are using Services on Demand to proactively link customers with employees who have in-company expertise, thus adding the human touch to online interactions. Predictably, focusing employees' time on sales-producing activities with knowledge commerce results in significant boosts in sales per employee.

Services on Demand: Smart for the Entire Organization

With Services on Demand, employees at any strategic or tactical level of the organization become more productive. Strategically, the CEO gets increased flexibility for ongoing business strategy development, shortening the time necessary to capitalize on new opportunities or to react to changing business conditions. Thus the CTO can deliver innovative products more rapidly, which allows the firm to outpace less responsive competitors, and reduce operating costs by more easily outsourcing business processes not directly related to the organization's mission.

At the tactical level, developers can focus on features and functions that are core differentiators for their solutions, and acquire prepackaged Web services for non-core functions. IT managers can manage, repair, and extend their infrastructures based on business needs, engaging as many or as few Web services as are required to meet those needs. Simultaneously, managers can cut the cost of supporting large, monolithic applications.

The biggest winners are the communities served by this architecture. All participants — field sales staff, LOB employees, and supply chain partners — receive personalized service over the Internet, with the best possible access to the most accurate information and most useful resources. With Services on Demand, what qualifies as “best” changes in real time to meet the needs of a community and the indi-

viduals within that community. It evolves to capitalize on new hardware, software, and service delivery as they become available. Community members then focus on accomplishing business objectives such as buying goods, designing products, and knowledge transfer — not on the method, mode, or medium that makes it happen.

For example, Services on Demand can greatly affect the productivity of a manufacturing planning team at an automobile manufacturer. The team is a specific community with a particular set of business responsibilities and requirements — i.e., to determine and optimize the models and features (colors, interiors, extras, etc.) produced by the factories. To date, high set-up costs and long lag times in data collection about consumer preferences have prevented the proliferation of build-to-order systems in automobile manufacturing. Current Enterprise Application Integration (EAI) systems only periodically make customer data available.

However, with Services on Demand, the planning team can see in real time what is being ordered, in which region, and by which dealers. It can then adjust its manufacturing planning to respond. Set-up costs can be weighed against potential increased revenues from more closely meeting customer demand. Integrated Web services supply chains can automatically request the materials necessary to accomplish these objectives. And team members can audit and manage these decisions via desktop PCs at the office, from the plant floor via mobile workstations, or during visits to the dealership itself, using handheld wireless devices. Such a system could lead to cost-effective mass customization of manufactured heavy goods.

Benefits of Services on Demand to Employee Productivity

Aberdeen research shows that Services on Demand benefit the following actions, especially applicable in the employee productivity area:

- *Simulate and decide:* Model employee and manager scenarios to support business processes; map solutions to business strategies; and use decision support features to allow data mining, filtering, and targeting by a broader class of employees;
- *Collaborate and coordinate:* Rapidly implement cost-effective features that combine internal and external resources, local and global employees, and data from relevant applications, regardless of location;
- *Support and save:* Cut employee and customer support costs by Web-enabling CRM, HR, and MRO with enterprise or third-party Web services;
- *Globalize and localize:* Tailor data for specific geographic region versus specific, localized use; and
- *Motivate and monitor:* Mesh sales force compensation, LOB production targets, and other management and motivation data to create stronger, more informed management decisions.

Just How Big Is the Opportunity?

Conversations about improving employee productivity generally focus on human capital and employee self-service solutions. The Internet not only provides the opportunity to present critical information “on demand” worldwide, but it also ensures that the information is always current and consistent wherever it is accessed.

However, Aberdeen research indicates that the full potential of Web services is going unrealized even in the leading sphere of HR. Aberdeen research reports confirm that less than 10% of applicable employees presently use Web-based applications for employee self-service, e-Learning, or development chain management software (*Human Capital Management*, March 2001, and *Employee Self-Service*, February 2001). Take, for example, the company cited in the Preface of this paper: There goes over 90% of \$100 million in HR cost savings.

The opportunity for improving employee productivity is massive and goes far beyond HR concerns. At issue is the very real frontier in which every employee in an organization can be equipped to make decisions that will directly support and impact overall corporate goals. Today, distributed systems make for distributed decision-making. Even the smartest, most dedicated employees can make judgments based only on the information at hand and the experience they bring to a situation.

The fact is that decisions are made daily throughout an enterprise by all kinds of employees — from managers to shipping clerks — and no single individual has a comprehensive-enough view to make a corporate-caliber decision. Ideally, such decisions would take into consideration all of the underlying variables and present the data in a way that aligns with corporate goals. Instead, individual employees are left to guess which corporate goal is most important.

Take, for example, decision-making on a loading dock: The last truck of the day has room for only one of three boxes that remain on the dock. Which one should get loaded? The shipping clerk will choose the lightest one because it is easiest; the foreman will choose the largest one so he does not have to take a forklift out to return it to staging; and the sales person will choose the box that goes to his biggest account. Each is right, and yet none is right.

Adoption Challenges Today

The reality in most companies is that a simple botched password change can cause users to gripe and groan about how “technology” stops them from getting their real work done. As workers struggle to understand the technology they are using, decisions do not get made, or they are made without adequate information. For example, sales reps wait for applications to download over their dial-up link instead of making customer calls. Or, users queue up in the customer service line as help desk employees re-learn their trouble ticket interface after a major upgrade.

If the goal is to improve the *quality* of business decisions while increasing the *quantity* of work done by each employee involved, then employees need to receive information just-in-time — and have confidence that it is current, consistent, and accurate. Unfortunately, employees are frequently delayed in that process as they hunt down the information required to make a decision.

Currently, several technical hurdles inhibit employee productivity:

- *Locked-down applications:* Many applications are hardwired into the IT environment, using rigid connections to work group locations and fixed point-to-point communications. Minor changes in process often require major retrofitting. For example, a new supply chain partner may take several weeks to be included in the online inventory system.
- *Fixed access points:* Complex applications load large software clients onto employees' PCs or workstations. Therefore, employees must work at fixed, predetermined points in order to gather information or enter decisions into the workflow process. Employees are chained to their computers, and thus cannot work effectively when away from their desks.
- *Poor interoperability:* Applications frequently are isolated systems, not playing well with other applications and requiring separate network and resource requirements to operate correctly. Effort and resources to manage and deliver these applications are duplicated, and an employee may have to search through several wholly separate applications to find the relevant data for a particular business decision.

e-Businesses Embrace Services on Demand

Employee productivity is not the only area suffering from technical and organizational challenges. With the value of worldwide business-to-business (B-to-B) Internet transactions currently hovering just under \$1 trillion annually, e-Business is real business. The fact that the value of these transactions is projected to reach \$5 trillion to \$6 trillion by 2005 makes it even bigger business. The enormity of this revenue potential has galvanized CxOs to pressure IT executives for first-rate Web presences — and, of course, have all the work done yesterday.

Consequently, today's enterprises are engaged in massive efforts to make existing back-end applications and databases Web-accessible. As with the software firm cited at the opening of this paper, organizations can realize significant savings by transforming internal and external applications to an e-Business Web service. For that company, the \$1 billion savings became an 11% increase in operating margins, resulting in a 76% increase in net income and a 15% increase in revenue — all that despite significant cost-cutting.

The problem is that, while succeeding with "Webification," organizations still struggle with negative side effects of Web-based applications, such as poor performance,

lack of robustness, application rigidity, unnecessarily slow implementation, and inadequate security. In an attempt to raise security and limit uncertainty, firms implement tightly controlled, fixed infrastructures for each e-Business application.

Flexible Web Services Make e-Business Sense

Ironically, the exact opposite path is needed. Enterprises instead need an infinitely variable framework, in which applications dynamically reassemble themselves based on the functions requested, the user’s context, the resources required, as well as the processing power and bandwidth available at the moment of the request. To implement such a solution, enterprises must abandon their current concept of applications. Instead of fixed, monolithic programs, enterprises need to develop flexible, discrete services that can combine and recombine to deliver business processes over the Internet.

Web services offer just such an approach. Web services focus application delivery on specific points of service such as a user’s current location rather than on a PC or workstation, using only the application processes required for the task at hand. Developers write Web services as network services, in which all users and resources access a single copy. As Table 1 shows, this approach offers great efficiency and cost-saving advantages over client/server models, in which an enterprise deploys thousands of copies of an application.

Table 1: Benefits of a Web Services Approach

Web Service Feature	Technical Advantages	Business Advantages
<ul style="list-style-type: none"> Publish features and availability through standard schemas 	<ul style="list-style-type: none"> Expose business functionality Hide code-level complexity 	<ul style="list-style-type: none"> Per-process flexibility to adjust to changes in business and regulatory environment on an ongoing basis
<ul style="list-style-type: none"> Dynamically discover and engage other Web services based on runtime requirements 	<ul style="list-style-type: none"> Engage only resources required for each transaction Use existing applications, infrastructure, and hardware without wholesale upgrades 	<ul style="list-style-type: none"> Customize responses to individual requests Decrease development costs Improve user service and satisfaction
<ul style="list-style-type: none"> Element-level, runtime decision-making ability 	<ul style="list-style-type: none"> Flexibly adapt to changing network and resource demands and availability 	<ul style="list-style-type: none"> Decrease operating costs, employing available resources instead of creating new ones
<ul style="list-style-type: none"> Easily reusable 	<ul style="list-style-type: none"> Less complex integration High interoperability 	<ul style="list-style-type: none"> Simplify development Reduce time-to-market for new services
<ul style="list-style-type: none"> Based on open Internet standards (e.g., XML, LDAP, SOAP) 	<ul style="list-style-type: none"> Increase interoperability Per-element upgrade Broaden usable resources 	<ul style="list-style-type: none"> Reduce supplier lock-in Reduce repair and maintenance time and costs

Source: Aberdeen Group, October 2001

Well-designed Web services enable enterprises to attack the multi-trillion-dollar opportunity with the following:

- Flexible service points, allowing multi-location and multi-device access by end-users (home or office, PC or PDA) and dynamic delivery adaptation to changing resource and application requirements;
- Web-browser-based clients that run on devices with limited processing resources (PDAs or cellphones) or over low access (wireless or dialup);
- Customized, context-specific services that integrate changing end-user roles, customer history, application availability, and database functionality.

The beauty of Web services is that many enterprises are already using them because elements of the infrastructure exist today. For example, directory services enable role and identity management independent of the application. Security public key infrastructure (PKI) solutions provide authentication for many e-Business applications. Web portals allow customized end-user services by using standard communication protocols such as the lightweight directory access protocol (LDAP) and PKI. Many enterprises are successfully using one or more Web services today.

How to Move Cost-Effectively to Web Services

For employee productivity, an enterprise's initial process of moving to a Web services architecture should be straightforward. There are two cases:

1. For new applications, identify and standardize on one architecture, portal user interface, infrastructure software, and development process; and
2. For existing Web applications, gradually "encapsulate" functions from each application in the Web services infrastructure.

Implementing Web Services

Before choosing a Web services architecture, the enterprise should evaluate the business process and community to be served by the Web service. Both LOB managers and IT architects should work together in this process to identify the new services that are likely to produce the greatest return on investment (ROI). The LOB manager can point to the most immediately useful applications to translate into Web services. The IT architect can identify the availability of an enterprise's databases, applications, reports, and transactions ("DARTs") involved in the Web service. The emphasis is on the business and service level requirements of the community.

Next, the company should create the foundation on which to build the Web services. This process involves the following actions:

1. *Standardize on standards:* Select the standards that will be used to communicate within and between the elements (e.g., XML, SOAP, LDAP), and the development tools to create and maintain the Web services.

2. *Directory-enable the Web services elements:* Build a schema for registry development, and then move identity information about the community (user profiles, permissions, and policies) and the resources and application elements (configuration, access, and availability) into the directory.
3. *Define a standard portal interface:* Use a portal to separate front-end format issues from back-end feature/function issues. With a portal interface, employees can access services via any device that supports a Web browser. The supporting back-end infrastructure can be integrated, updated, revised, etc., without affecting the service level.
4. *Lay the foundation:* Deploy application servers and other supplementary software and infrastructure elements that support or plan to support critical Web services technologies such as XML, SOAP, UDDI, ebXML, LDAP, and Java 2 Enterprise Edition (J2EE).

The Sun Model: No Revolution, Just Cost-Effective Evolution

Sun understands that the foundation for Services on Demand already exists in today's IT infrastructure. Therefore, Sun's infrastructure for Services on Demand does not require a wholesale revision and redesign. Instead, it *evolves* from what already exists. The Sun product line tracks Aberdeen's view of the technology requirements necessary for enterprises to build an effective infrastructure to improve employee productivity.

Sun's definition of Services on Demand is the delivery of services anywhere, at any time, and on any device by leveraging and tying together different technologies — including legacy applications, Web applications, and Web services — to address specific business issues. The Sun ONE architecture is Sun's recommended approach for building and deploying Services on Demand. Sun ONE provides a highly scalable and robust foundation for traditional software applications as well as current Web-based applications, while laying the foundation for future methods such as Web services.

Designed to support Services on Demand, Sun ONE comprises four key elements:

1. *Vision* — a Services on Demand model in which an enterprise's software infrastructure is able to provide information, data, and applications to anyone, anywhere, at any time, and on anything;
2. *Architecture* — an open, standards-based, end-to-end software architecture for easy integration today and a solid foundation for future services;
3. *Platform* — an open, easy-to-integrate product portfolio solving immediate business requirements, enabling current and emerging services (including Web Services); and

4. *Expertise* — Sun's 20 years of experience in delivering cost-saving, business-ready networked solutions from Sun Professional Services, iForce partners, and SunTone certification programs is a powerful draw.

Sun's vision articulates the business objective of Services on Demand as the ability to build, maintain, grow, and ultimately monetize communities — be they shareholders, customers, suppliers, partners, or employees. The key challenge is to deliver Services on Demand to any target community. Because today's competitive reality demands that quality of service increase while costs simultaneously decrease, services need to be built from information assets that are already common to all organizations, including all four parts of DART — databases, applications, reports, and transactors (i.e., anything that initiates or acts on transactions).

The Sun ONE platform employs solutions from the Forte, iPlanet, and Solaris product lines to enable the use of enterprise DARTs to deliver Services on Demand (Figure 1). The Sun ONE platform includes:

- *iPlanet Directory Server* — LDAP-based directory servers that enable user management to create a community with defined profiles, permissions, and policies. It provides a high-speed, scalable, self-replicating, self-synchronizing data structure and leverages multi-master capabilities to provide unified directory services across multiple directories.
- *iPlanet Portal Server* — provides next-generation presentation and interaction enabling personalization, custom layout, syndicated content, secure remote access, and wireless remote access.
- *iPlanet Web and Application Servers* — enable the delivery of Services on Demand with a highly scalable platform for business logic written in the Java programming language, with hooks to legacy database and applications. Architected for horizontal scalability, the servers are based on Java technology and Java 2 Enterprise Edition (J2EE).
- *iPlanet Integration Server* — provides service interoperability and application integration with legacy, packaged, or custom systems, as well as new back-office environments. Its workflow-based engine allows a business analyst to pull together workflows from various systems to create services. iPlanet ECXpert allows secure document exchange using EDI and XML. The suite includes EAI Edition, B2B Edition, and iPlanet Message Queue for Java, a message-oriented middleware (MOM) solution.
- *iPlanet Communications Services* — include mail, calendar, and enterprise-class instant messaging.
- *iPlanet Commerce Services Portfolio* — provides services to buy, sell, bill, and trade products and services. Built as Java components running on iPlanet Application Server, they include iPlanet BuyerXpert for

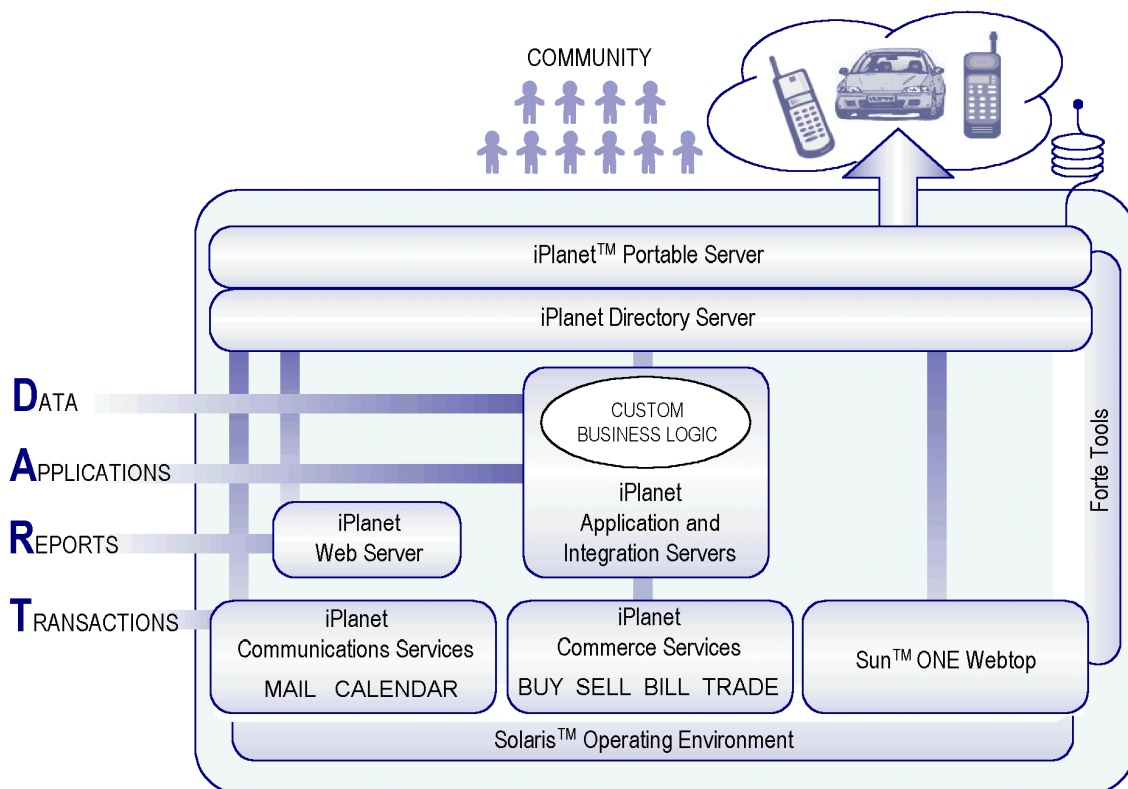
E-Procurement, iPlanet SellerXpert for online selling, iPlanet BillerXpert for Internet bill presentment and payment, and iPlanet Market Maker for auctions and exchange-based services.

- *Forte Tools* — enable developers to design, create, and assemble Services on Demand. They include Forte for Java, Forte Developer, and iPlanet Unified Developer Server.
- *Solaris Platform* — Sun Solaris Operating Environment and Sun Cluster provide a high-reliability foundation on which to build and deploy Services on Demand.

Leveraging Sun’s Services on Demand Expertise

Sun’s extensive installed base with service providers and enterprises has put its services group, its iForce program, and its system integrator partners on the leading edge of experience in Services on Demand development and deployment. Sun experts — in concert with partners such as Accenture, Cap Gemini Ernst & Young, CSC, Deloitte Consulting, EDS, and PricewaterhouseCoopers — assist firms to

Figure 1: The Technologies and Products in the Sun ONE Architecture



Source: Sun Microsystems, October 2001

architect, deploy, and manage an open and scalable Sun ONE product infrastructure for Services on Demand from today's applications and Web services to new kinds of services yet to emerge in the future. These experts are expanding a "best practices" knowledge base to achieve operational cost efficiencies and speed delivery of new applications. The result of their expertise is cost-effective development and verification of skills on products and technologies across the Sun ONE platform offering.

The Role of Sun Partners

Sun's open standards framework encourages collaboration with customers and partners. While the Sun ONE platform provides all the tools needed to build Web services, Sun works closely with partners for specific business-level Web services and interoperability support. The SunTone certification program ensures maximum technical interoperability, as well as co-marketing and cross-selling opportunities for SunTone partners. For example, Sun enables an enterprise's employees to leverage content management solutions from best-in-class suppliers such as Vignette and Interwoven. The Sun ONE platform also allows integration with existing infrastructure systems, such as Netegrity's user access control or application servers from other suppliers.

Sun's Differentiation in the Web Services Market

Web services is an industry-wide concept — the clear direction in which the technology industry and business requirements are moving. Services on Demand and the Sun ONE platform are Sun's vision for anytime, anywhere access to the best, most appropriate service based on the user, resource, or application context.

Sun's differentiation can be summed up in three concepts:

1. The Sun ONE platform solution is evolutionary, embracing existing systems and ROI models while affording Services on Demand flexibility.
2. The Sun ONE platform is open — a non-negotiable factor for effective delivery of Services on Demand — built on open interfaces and industry standards such as LDAP, J2EE, IMAP4, SOAP, UDDI, and ebXML with a commitment to embrace other standards as they emerge. This open architecture lays a future-proofed foundation that also leverages the past.
3. The Sun ONE platform is easy to integrate. Architected to consist of well-integrated products, the solution also readily accommodates products from other suppliers who also employ open standards.

Sun starts from a powerful base with its commitment to Java technology — now well accepted as an enterprise-application development platform. The Sun ONE vision builds on this platform with proven hardware and infrastructure software from Sun and iPlanet, for Web Services and for creating, deploying, and maintaining Services on Demand.

Aberdeen Conclusions

Services on Demand offer a major opportunity for enterprises to dramatically improve employee productivity. They empower employees at all levels with decision-making capabilities, regardless of location, device, or access speeds. Access to timely, accurate, consistent information is a significant benefit, affecting everything from HR and MRO applications through workflow management and customer responsiveness. Services on Demand will allow a broad array of actors (CEOs, CIOs, developers, and IT managers) to reduce employee support costs, increase employees' ability to generate revenue, coalesce employees behind business strategies, and connect employees into global, collaborative teams.

With the Sun ONE platform strategy, Sun Microsystems promises to provide the greater agility of Services on Demand to its customers, helping them to adapt quickly to changing market opportunities and competitive conditions. Sun follows the essentials for delivering on this promise with its component architecture — based on standards, openness, and integration — and its commitment to leveraging existing Web applications. The promises of substantial savings from Services on Demand in general and the Sun ONE vision in particular will engage enterprises sooner or later, if for no better reason than to stay competitive.

But Aberdeen recommends enterprises act sooner rather than later. Enterprises seeking to reap the benefits of Web services and Services on Demand should:

1. Inventory existing business processes to assess their use of Web services;
2. Prioritize productivity issues that Web services can address; and
3. Identify, invest in, and standardize on an architecture and software infrastructure that can allow employees to engage Web services effectively.

Enterprises must recognize current Web services for what they are, and to plan future business and architecture investments to bolster this approach. By taking these steps, and by employing partners such as Sun with its Sun ONE platform, enterprises will be well positioned to deliver Services on Demand that can be used to measurably enhance employee productivity.

*Aberdeen Group, Inc.
One Boston Place
Boston, Massachusetts
02108
USA*

*Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com*

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Aberdeen Group is a computer and communications research and consulting organization closely monitoring enterprise-user needs, technological changes and market developments.

Based on a comprehensive analytical framework, Aberdeen provides fresh insights into the future of computing and networking and the implications for users and the industry.

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