Fiorano ESB Value Proposition

Applicability beyond EAI Applications

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FIORANO ESB VALUE PROPOSITION
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Executive Summary

As organizations build out their networks, enabling applications and data to leverage these distributed infrastructures is still a daunting task. In the 'irrational exuberance' era, large applications infrastructures were built on traditional hub and spoke, publish/subscribe architectures with expensive customization of adapters and applications. However, in the current reality of doing 'more with less', the complexity of current applications infrastructures becomes a barrier to success.

Ironically, while customers are demanding simplicity, scalability and affordability, most EAI vendors have responded by integrating even more point-products into their *solutions*. In a recent paper - *Reducing Integrations Cost, December 2001* - Forrester reports that Global 3500 firms will spend an average of $6.4-Million in 2003 on EAI budgets, and less than 35% of the EAI projects come in on time and on budget - a testament to the inefficiencies and limitations of incumbent EAI solutions.

Fiorano has been working on addressing the fundamental architectural limitations of distributed applications since 1995. Fiorano ESB (Fiorano Enterprise Service Bus) is an industry-first, peer-to-peer, standards-based Services Integration Platform that is being used by enterprises to build manageable, scalable and affordable EAI solutions. Fiorano ESB built on FioranoMQ - the world's fastest, most scalable JMS server, has addressed some key customer requirements such as:

- Is the EAI solution a patchwork of point-products or a seamless unified platform
- Can you simplify specifying business processes and workflow creation?
- Do you include a high-performance, scalable and reliable messaging platform?
- Can you support corporate security policies easily?
- Can you provide the best benefits of centralized and distributed architectures?
- Is it easy to create services which form the foundation of the workflow?
- How do you support industry standards, built-in adapters and third-party tools?
- Is it possible to insert services that require manual intervention in the workflow?
- Can you provide enterprise-wide visibility down to each node and service levels?
- How do you help minimize monitoring and enterprise-wide debugging?
- How easily can users modify their business processes themselves?

Enterprise Application Integration (EAI) Requirements

Integrating applications is usually the result of a process consisting of the following steps:

- **Business Process Specification**: Enterprise users define their Business Process requirements as a visual representation of the intended integration of services. Any application or data transformation engine that has been integrated into the workflow is termed a "service" as used in this document.
- **Prototype Workflow Deployment**: Design engineers implement Workflows from the Business Process specifications. The resulting workflow may have more services than visually represented as a business process. The workflow prototype is deployed, monitored and debugged to ensure a smooth enterprise-wide production deployment.
- **Production Deployment**: The prototype workflow is deployed across all machines (termed nodes) with a valid IP address. Fault-isolation and rapid debugging are critical success factors. Any delays in finding and fixing bugs during this phase directly affect enterprise productivity and capability to transact business.
- **Business Process Extensions**: Ongoing monitoring and management are necessary to ensure high availability of the solution. Additionally, new applications and user requests need to be integrated seamlessly into the EAI solution with minimal downtime penalties. Requirements at each stage vary depending on unique business requirements. Fiorano ESB offers some unique value-propositions at each stage as discussed in this document.

Business Process Specification

Almost all business users consider security, high availability, performance, scalability and simplicity as the key requirements of any EAI solution at its specification stage. Often, the first question asked of EAI architects by their executives considering any solution is

Is your solution a patchwork of point-products or a seamless unified platform?

Fiorano ESB is a Services Integration Platform that is standards-based, and built from the grounds up as a seamless, unified platform as shown in Figure 1.
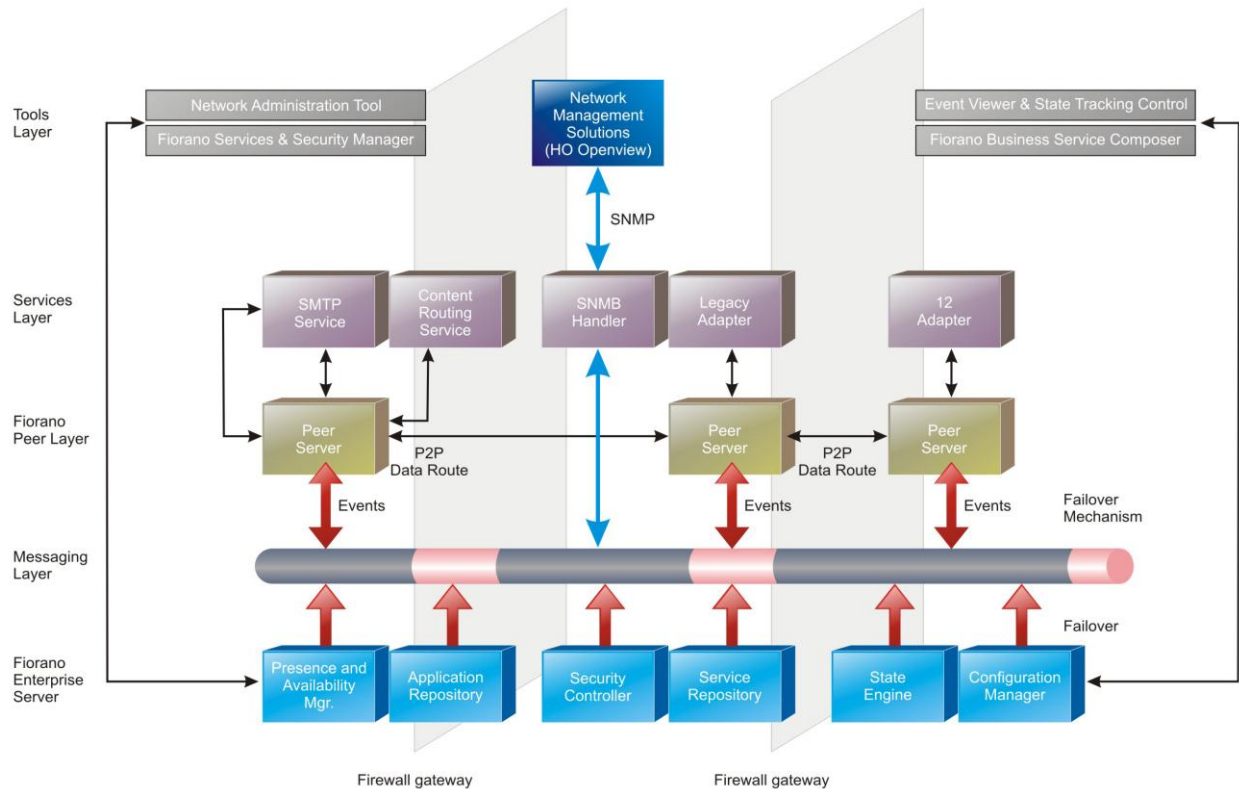

Figure 1: Peer-to-Peer Services Integration Platform

Fiorano ESB consists of the following foundation elements as built-into the basic platform offering:

- **Messaging Server**
  Mission-critical enterprise application deployments built on Fiorano ESB leverage the world's fastest, most reliable and scalable FioranoMQ. Fiorano ESB also supports other JMS servers.
- **Fiorano Peer Servers**
  Each Fiorano peer daemon has an embedded micro-JMS server that offers flexibility in deploying peer-to-peer or hub-and-spoke architectures.
- **Design & Deployment Tools**
  The following tools simplify and shortened deployment cycles:
  Application Composer: Create real-time deployment and monitoring of your workflows as easily as creating spreadsheets for numerical analysis
  Service Registration: Inject each new Fiorano service into the reusable services palette, add to a library of reusable services, and reduce the overall cost of creating workflows
  Security: Ensure robust security with Fiorano's service-level access control based on Java 2 security, and standards-based SSL support
- **Management and Debugging Tools**
  Lower management and debugging costs are achieved by using the following:
  Event Viewer and Monitoring: Get detailed visibility and query each node, as needed, in your enterprise applications network as supported by this tool.

Distributed Debugging: Substantially reduce the amount of time and effort involved in distributed debugging, by setting breakpoints between services running on distributed nodes, inspecting and modifying data using visual tools.

- **Adapters**:
  Extend existing applications infrastructures with pre-packaged adapters and Fiorano certified third-party adapters.

  A seamless integration of key requirements enables Fiorano ESB to offer several unique benefits such as an ability to compose and deploy workflows in a single step. Although incumbent EAI solutions necessitate the separation of business process specification and workflow creation, the following question is increasingly being asked of vendors:

Simplification: Can your solution simplify specifying business processes and workflow creation?
Current solutions provide a web-based GUI that visually represent the business-process, but do not provide for any ability to dynamically change the business processes. Developers need to translate the business process into workflow implementations.

Further, even the simplest of process changes trigger tedious design, prototype and production development cycles. These delays in some cases can render the results obsolete, since the users - driven by dynamic market changes - have changed their initial requirements to match new market realities.

In contrast, Fiorano ESB is the only Services Integration Platform that supports dynamic business process composition, modification and workflow deployment in a single stage. More significantly, these traditionally developer-centric tasks can now be performed by the end-users themselves, thereby obviating long implementation costs and delays associated with current solutions. The application composer in Fiorano ESB is a powerful, intuitive user-interface which can be used to compose, deploy and modify workflows in real-time. As seen below, the composer unifies several design and development benefits into a single comprehensive user interface.
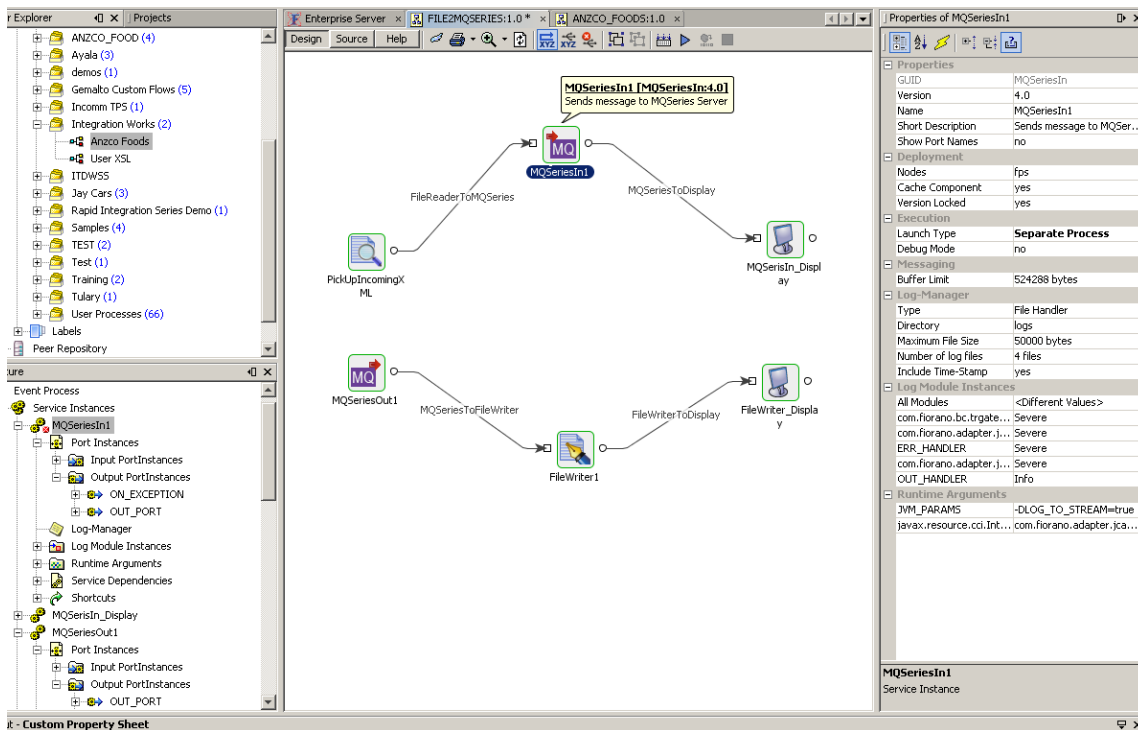

Figure 2: Create, Manage and Modify Business Processes in Real Time

Users can create new business processes such as an order-entry process by selecting existing adapter, transformation, collaboration services on their composer, and drag-and-drop them into a workflow. This workflow is available in real time across the entire enterprise for all authorized users.

Fiorano ESB empowers end-users to rapidly react to market dynamics and thus gain significant competitive advantage while reducing deployment and opportunity costs associated with current EAI solutions. By compressing the traditional business process specification, prototype workflow design and deployment stages into a single drag-and-drop user-friendly stage, Fiorano ESB has created a new paradigm in the EAI industry: The business process is the workflow. Simplicity however, needs to be achieved without compromising reliability.

Does your solution rest on a high-performance, scalable and reliable messaging platform?

To support mission-critical requirements, EAI solutions need a standards-based messaging interconnect layer that must provide performance, scalability and 24x7xforever reliability. Current hub-and-spoke deployments have the hub as a single point of failure. Further, these centralized solutions worsen the loading on the underlying networking bandwidth as the number of EAI services scale with enterprise requirements. Rapid fault-isolation becomes harder with current solutions comprising point-products, and the aggregation worsens the overall applications availability and reliability.

The Fiorano ESB architecture, as seen in Figure 1, provides failover at the messaging server, peer server and services layers- thereby enabling a robust, highly available system. Architects can configure clusters of messaging servers to achieve desired levels of fault tolerance. Peer servers can be configured such that if one peer-server were to fail, all the services local to the failed peer can automatically fail over to a designated instance. Service failures are associated with the resident hardware node failures. For each node, local services can be re-launched on secondary nodes.

Additionally, unlike current solutions that provide limited transaction management for established flows, Fiorano ESB provides for service and transport-layer guaranteed delivery, as well as mechanisms to recover failed transactions.

By providing peer-to-peer failover capability at each node, Fiorano ESB enables self-healing application networks ensuring 24x7xforever levels of high availability - a significant affordable advantage over the inherent risks of centralized hub failures in incumbent EAI solutions.

Most messaging architectures are limited to publish/subscribe transport routes. Fiorano ESB supports publish/subscribe and peer-to-peer transport routes - thereby enabling a flexible best of breed architecture. Fiorano ESB with its peer-to-peer routing support enables the greatest efficiencies between the Services Integration Platform and the Networking infrastructure, while ensuring a secure network.

Can your solution support your corporate security policies easily?

Security is an increasingly vital concern for enterprises. Role-based access control to nodes, users and services is essential. Additionally, standards-based security at the infrastructure layer (consisting of messaging, peer servers and transport layers) and at the services layer is mandatory - both inside and outside corporate firewalls. However, most incumbent solutions do not provide security at the infrastructure level. Hence, architects need to provide security at the services level adding cost and risk to the overall solutions.

As seen in Figure 2, the Fiorano ESB architecture enables robust security inside and outside of corporate firewalls using a combination of role-based access control at individual service and node levels using J2EE standards-based security. Standards-based transport layer security is provided with SSL support (HTTP(s) and TCP/IP standards).

Prototype Workflow Deployment

Having selected a solution to translate a business process into a workflow, architects need vendors to provide solutions to the next set of requirements in this phase of the project:

Can the solution provide the best benefits of centralized and distributed architectures?
Architects need to leverage the best of centralized and distributed architectures. For example, application repositories, security policies, state-based workflow control, scheduling and logging are candidates for centralization. However, messaging, workflow compositions, and other user driven functionality can be distributed on a network of nodes across the enterprise network. Fiorano ESB is designed to enable the best of breed solutions on a single platform, unlike most EAI solutions that do not support peer-to-peer distributed architectures. Beyond the flexibility requirements, since a workflow is an integration of various services, it is critical to ensure that each service can be created easily.

Is it easy to generate services which form the foundation of the workflow?
Current solutions impose severe limitations starting from the need to embed data-routing information into applications. Next, all the information related to event monitoring, logging, tracing, and other data pertinent to each node needs to be coded into the application at high costs. These costs scale linearly with each application that is a member of the workflow - quickly leading to prohibitively escalating costs. Solutions that drive innovation at the level of service creation reduce these costs.

As seen in Figure 2, creating workflows with existing services is trivially simple with Fiorano ESB. For new services, Fiorano ESB enables the creation of light-weight services that need just two APIs. Programmers do not need to hard-code the routing information into each service thereby enabling dynamic business process modifications. Built-in wizards help create wrappers around existing legacy services and help them integrate easily into the Fiorano ESB peer-to-peer application networks.

Regardless of its origin, all services registered in the Fiorano ESB services palette form a library of reusable services that enable rapid creation and deployment of new business processes. By delineating routing from the core content of each application, Fiorano ESB has started a new wave in reusable application service components that progressively lower the cost of each new business process - unlike current solutions that mandate customization of each new business process since they do not have the underlying notion of reusable services with minimal APIs.

Is it possible to insert services that require manual intervention in the workflow?
Workflows consist of connecting multiple applications together, and some require manual intervention. Unfortunately, current solutions due to the lack of a local store-and-forward mechanism, mandate customized solutions at the application level adding further costs. Fiorano ESB peer daemons incorporate a local store-and-forward mechanism, and supports manual intervention at any service natively. This powerful benefit obviates the alternative of creating customized store-and forward mechanisms and each node. Increasing customization at the service, applications and node levels leads to a vendor lock-in as a dangerous side-effect.

Preventing vendor lock-in: Does the solution provide native support for industry standards, built-in adapters and support for third-party tools?
Standards-based solutions are an imperative requirement while at the prototype design stage at each layer of the EAI solution. Business modeling (UML), Services Orchestration (WSFL, BPML), Service Discovery (UDDI, LDAP), Service Interface (WSDL, IDL), Transport (HTTP(s), JMS, SOAP), Data Semantics (XML), Data Syntax (XML, CORBA/Java), J2EE security - are some examples of industry standards incorporated within solutions. However, most incumbent solutions at their core have proprietary protocols that result in high interoperability and customization costs.

Fiorano ESB is built in Java and includes the industry's fastest and most scalable JMS messaging server-FioranoMQ built into the platform. Additionally, Fiorano ESB supports all the standards listed above, in addition to being the only Services Integration Platform that natively supports both .NET and Java standards.

Fiorano ESB offers a suite of over 100 adapters as part of its basic package. These adapters satisfy most of the EAI requirements with an out-of-the-box solution. Additionally, Fiorano ESB offers a growing number of Fiorano-certified adapters from third-party vendors to broaden its portfolio of adapters and thus lower the cost and risks of deploying mission-critical EAI solutions.

Unlike current solutions, Fiorano ESB supports all data types (XML, objects, bytes, strings, BLOBs, etc) and data formats (ebXML, cXML, RosettaNet, EDI, etc)

Production Deployment

This is the most critical phase of the EAI implementation and yet, all current EAI solutions require an enterprise-wide applications downtime to deploy the prototype. Prototypes can be inserted into progressively larger parts of the enterprise with no down time penalties. Since each Fiorano peer daemon has a built-in JMS server with localized store-and-forward capabilities, new business processes or services are available across the enterprise in real time.

Risk mitigation is the critical driver for two requirements posed as questions below.

Can you provide enterprise-wide visibility down to each node and service levels?

Enterprise-wide monitoring and logging are critical requirements, with clear visibility down to each node and application - often lacking as a built-in part of the solution. With Fiorano ESB, prototypes can be inserted into progressively larger parts of the enterprise with no down time penalties. Since each Fiorano peer-daemon has a built-in JMS server with localized store-and-forward capabilities, new business processes or services are available across the enterprise in real time.

The event monitoring tool, built into Fiorano ESB, enables a remote monitoring capability of all services on the Fiorano network. Events can be stored as logs at the peer-daemon levels – providing a rich set of data that accelerate distributed debugging and hence further lowering deployment costs.

Does your solution minimize monitoring and enterprise-wide debugging?

Runtime production bugs need rapid fault-isolation and support for distributed debugging. An ability to remotely monitor and insert breakpoints between adjacent applications in a workflow accelerates debugging. The 'problem-node' can then be debugged, error-messages inserted in its error-log and a global team can fix the problem in real time. Distributed debugging includes inspecting and modifying the breakpoints between services using visual tools, and is a powerful aid in ensuring robust production deployments. However, current solutions have architectural limitations in delivering distributed debugging to developers.

During production deployments, runtime errors tend to be a source of long delays. Fiorano ESB automatically performs connectivity and resource checks for each service at each peering node, thereby reducing runtime errors.

Fiorano ESB has addressed the biggest risk factor in this phase of the deployment: Fault-isolation and Distributed Debugging. Real-time service monitoring and monitoring of service-specific properties like a lost connectivity of a database connection is supported and reduces debugging complexities.

Distributed debugging is supported by allowing breakpoints to be set between services running on distributed nodes, and an inspection and modification of data using visual tools.

Business Process Extensions

With a goal of enabling end-users to modify their business processes most of the time, most EAI solutions today have weak answers to the following key requirement:

How easily can users modify their business processes themselves?

Implementing changes in business processes need to be as simple as altering a formula in spreadsheets. A business process integrates several applications in much the same fashion as spreadsheets integrate numbers into an equation. And yet, while users take spreadsheets for granted, current EAI solutions force users to go through a developer-loop for each minor change, quickly leading to the unpredictable nature of EAI implementations that reach staggering costs today.

A Fiorano ESB -powered solution empowers users to easily drag-and-drop services - instead of having to engage developers for every minor change. With Fiorano ESB innovating out most of the drudgery, developers can now focus on integrating their legacy services into the Fiorano network, and seamlessly migrate from the current EAI solutions to a peer-to-peer solution that offers unbounded scalability limited only by networking and compute limitations at each node.

Unlike other agent-based solutions, the Fiorano peer-daemons have packed a lot of innovation into a very portable intelligent agent that consumes only 15 Mbytes of memory. As enterprise compute and communication devices shrink into wireless form factors, Fiorano ESB can be ported to these mobile devices - making it the only EAI solution that can truly extend the enterprise to an 'anytime anywhere' reality.

Summary

Fiorano ESB is the only standards-based Services Integration Platform that enables reusable web services to be integrated in true peer-to-peer architectures. The key differentiators offered by Fiorano ESB as summarized in Table 1, enable enterprises to reduce costs, increase predictability and regain control over their EAI projects.

"Integrating applications today is like trying to connect marbles - given enough glue, you can make it work. But with Web Services, application integration becomes more like building with Lego bricks"

(Quote from Reducing Integration's Cost, Forrester, December 2001).

Table 1: The Fiorano ESB Value Proposition

Customer Requirement	Leading-edge EAI Solutions	The Fiorano Alternative
Dynamic Business Process Modifications	Not Applicable; Developers needed to implement workflows. Users do not have the power to implement workflows themselves resulting in lost time and productivity	Applications Composer Transaction management, Workflow selection based on exceptions
Flexible transport architectures	Publish/Subscribe transport routes can limit performance and scalability	Peer-to-Peer or publish/subscribe routes to ensure best-of-breed solutions
Workflow prototype	Each service needs to embed data routing customization down to the adapter and application levels preventing reusability of services	Services do not have to carry routing information resulting in rapid service creation and reuse. Built-in adapters and data transformation tools accelerate workflow prototype creation

24x7xforever reliability	Aggregation of point-products undermine overall reliability; hub and spoke messaging architectures worsen it with the hubs being single points of failure	Reliability is built-in at all three layers of the architecture: Messaging, Peer daemons and the services layer; self healing peer-to-peer architectures remove single points of failure
High performance and Scalability	Hub-and-Spoke architectures entail degraded performance and network congestion with increasing number of nodes	Peer-to-Peer architectures enable parallel data flows that can leverage distributed compute points; minimal performance impact with increasing nodes
Transaction Management	Most employ 'best efforts' delivery; no notion of recovering failed transactions	Transaction support at service and transport layers; sub-flows implemented to recover failed transactions
Security, including role based design views and control	Rudimentary security with minimal user-level role-based access control support; security needs to be built in at the service and adapter levels	Centralized administration for all peer servers, Role-based ACLs, SSL; security is built into the infrastructure and services levels
Distributed Architectures	Not applicable; scalability and performance are severely limited as the number of nodes increase	Scalability is unbounded by the number of nodes; Performance does not degrade with increasing number of nodes
Service Creation	Customization required due to the overhead of embedding data routing an all the publish/subscribe overheads into each service	Service Registration Wizard enables rapid integration of legacy services, and the decoupled data-routing implies trivially simple creation of new services
Adapter Support	Mature vendors provide a broad range of adapters	Over 70 pre-packaged adapters and Fiorano-certified third-party adapters as needed.
Multi-platform	Either .NET or Java; not both	.NET & Java platforms
Multi-language		Java, C/C++, Perl, XML, others
Manual Intervention (services in a workflow that require human intervention for process flow completion)	Not applicable; Service nodes have limited local store-and forward capabilities	Fully supported; each peer daemon has a micro-JMS server and local store and forward capability
Tracing, Monitoring and Logging	Real time tracing, monitoring and logging are not extended to the service levels	Service-level real time remote monitoring; accelerates fault isolation and debugging tasks
Distributed Debugging		Runtime connectivity checks, Distributed debugging, Real time monitoring, Versioning and Configuration Management
Solution Extensibility	Customization of each service prevents service-level reusability and added code limits using the 'agents' on mobile devices	Reusable services, Lightweight Fiorano Peer Daemons can reside on mobile devices

Fiorano ESB: Applicability beyond EAI Applications

'Peer-to-Peer' has been the holy grail of computing for over three decades. It is only in recent times that peer-to-peer networks - the foundation layer - have begun to be deployed. Fiorano ESB - as a Services Integration Platform - marks the beginning of an integrated data and applications layer that can utilize the power of peer-to-peer network infrastructures. Fiorano's customers are using Fiorano ESB across a broad spectrum of market segments, including EAI, Collaborative Computing, like Distributed CRM.

About Fiorano Software

Fiorano Software (www.fiorano.com) is a leading provider of enterprise class business process integration and messaging infrastructure technology. Fiorano's network-centric solutions set a new paradigm in ROI, performance, interoperability and scalability. Global leaders including Fortune 500 companies such as Boeing, British Telecom, Credit Agricole Titres, Lockheed Martin, NASA, POSCO, Qwest Communications, Schlumberger and Vodafone among others have used Fiorano technology to deploy their enterprise nervous systems.