Business Process Visibility

Actional

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SOFTWARE

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Introduction

Business Process Visibility

It's About The Process, Not Boxes, Platforms or Software

Over the past couple of years, service-oriented architectures have been used in an increasing number of mission-critical enterprise-wide deployments across a growing number of industry segments. As this movement into the mainstream and away from the days of early adopters continues, what we are seeing within SOA-enabled organizations is that line of business owners and managers are interacting with IT departments and resources in entirely new ways. Or more accurately, there is a growing need—an unmet need—for business and IT to collaborate more effectively, especially for line of business owners to understand the underlying processes and technologies that deliver value to the business. Establishing and maintaining Sarbanes Oxley compliance is a perfect example of a real world driver. The problem is, existing tools have never been centered on managing or understand the process but are in fact infrastructure centric.

If you look at what SOA vendors in the marketplace are producing currently, it is clear that they are still focused on what they've always been focused on: layers and platforms and services and tooling. Traditional management tools are still concerned with stacks and silos and what's going on with hard drives and application servers.

The elephant in the room is that businesspeople don't care and don't want to know about "boxes" and "software" and "silos." Line of business managers, operational executives and marketing teams think in terms of the business processes that provide services and generate revenue, and what is happening to these processes. For instance, when a product manager for a widget vendor sees her sales cut in half in one day, she doesn't necessarily think "this must be an IT problem" – a nebulous glitch that the guys down in database administration can fix. No, she wants answers to a number of questions:

- Has traffic fallen off or is it the same as usual?
- Are buyers dropping out somewhere in the check out process?
- Have orders been placed but not been processed correctly?
- Can we map the entire process—from site visit or phone-in order to merchandise delivery—in order to pinpoint the exact nature of the problem?

Since IT hasn't been organized around the end-to-end business process, there is no easy to way to use the tools at hand to deliver answers to any of these questions. In fact, IT departments have struggled with making decisions about process performance, security, SLAs, and capacity planning because they have lacked visibility and actionable data on what exactly is going on in the system from a business point of view. History has confirmed that application or infrastructure monitoring does not provide good correlation to the actual business being performed by the system.

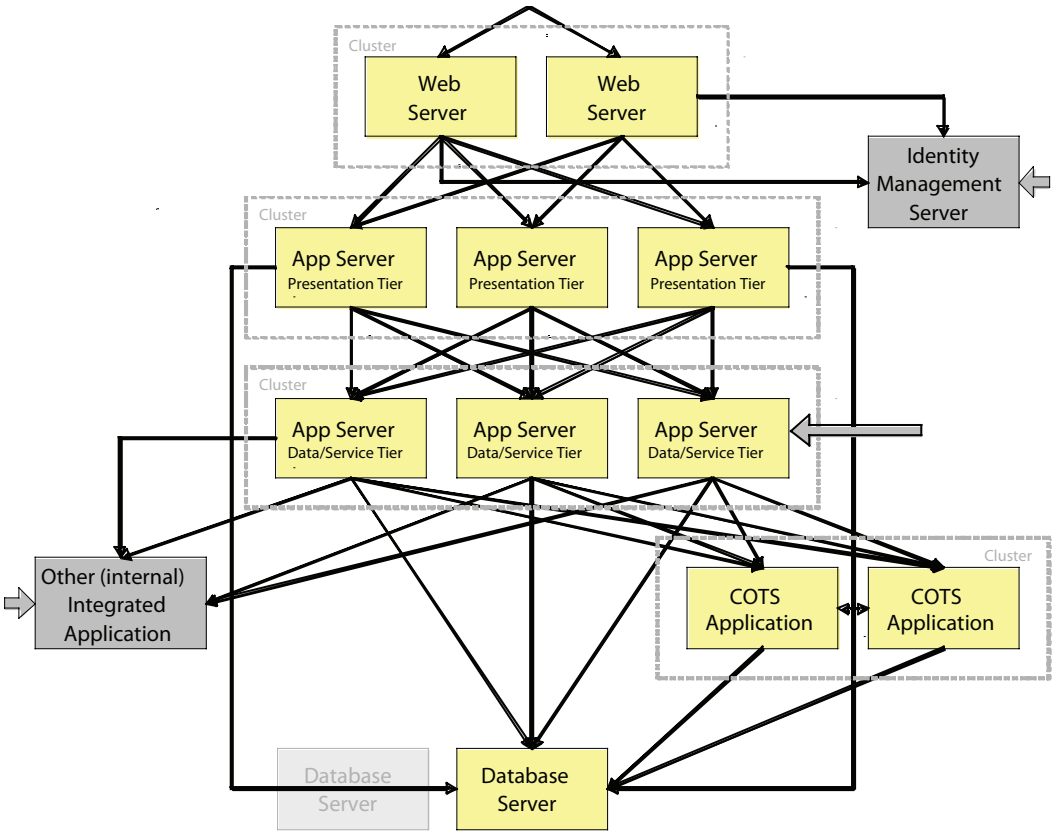
The alternative has been to cobble together ways of getting visibility into and understanding what's happening with the business process, and then applying point policies to it. Of course, manually tying together information on IT functions and process responsibilities across several departments and groups—order fulfillment, inventory, customer service, and so forth—is no easy task. In fact, within most organizations, the capability to get information on and control over critical business processes just isn't there.

With the introduction of Actional 6.0, SOA-enabled organizations now have complete business process visibility: across the infrastructure, by specific business criteria, and by individual process. Organizations can now leverage breakthrough technology to automatically discover each and every business process, reveal infrastructure that supports it and then draw a process "flow map." With this knowledge in hand, end-users can then simply label (i.e. order fulfillment) the discovered process and begin applying rules and policies to it, thereby pushing appropriate instructions to the right infrastructure, at the right time and for the right conditions. By making it possible to define and understand all the components, events and systems within a process, we can now define what is supposed to happen as well as what is not supposed to happen. You know immediately when a process goes wrong, or even when a critical event doesn't happen. In this way, your ability to manage and govern, ensure compliance and monitor service level agreements, is greatly enhanced. More to the point, Actional 6.0 enables anyone to view and manage an SOA from the eyes of IT and the eyes of business simultaneously.

SOA Visibility Today

The Shortcomings of Synthetic Transactions

A typical multi-tier distributed application in a production environment, such as the one shown below, contains many moving parts. While many products exist that can report on the health of each individual application or machine in these types of environments, there are few effective approaches to determining the overall health of the business processes that flow through a network of connected systems. The most common approach to understanding the health of the overall system is via synthetic transactions. Synthetic transactions are essentially "fake" or "test" transactions generated by management products. These test transactions, usually submitted as web requests, are intended to mimic the typical actions of end-users and to see whether the results are as expected.



Unfortunately, synthetic transactions have two critical limitations. The first is that often the most important transactions to measure are the hardest to fake. For example, in an ordering system, it's easy to test a "check order status" transaction, because doing so has no adverse effect on the system. However, testing a "submit order" transaction is entirely different. This transaction may perform third-party credit card validation, commit data to databases, and send requests to fulfillment systems. To truly test this kind of order submission process the order submission must essentially be real (including real requests to the third parties to verify that they are also working correctly). Once the test order is submitted and verified, however, all of the actions that were triggered need to be rolled back so that the fake order is removed from all of the relevant systems. Correctly performing this type of compensation is quite complicated and very error prone.

The second critical limitation of synthetic transactions is that they can't provide the end-user's perspective of whether a business process is functioning correctly. In reality, however, most business processes include background activities the end user never sees. And these background activities are typically a vital part of the overall business process. For example, an end user might successfully submit an order but never be billed because asynchronous messages from the ordering system to the billing system are lost in transit. In short, making sure the background billing activities are being processed correctly is a critical element in determining the health of the overall business process.

Another example of the limitations of current monitoring technologies: Imagine being informed that over the last hour 5% of "buy transactions" failed or missed SLA. This is important information, but tells only part of the story. Consider a few of the real business issues that this kind of reporting does not address:

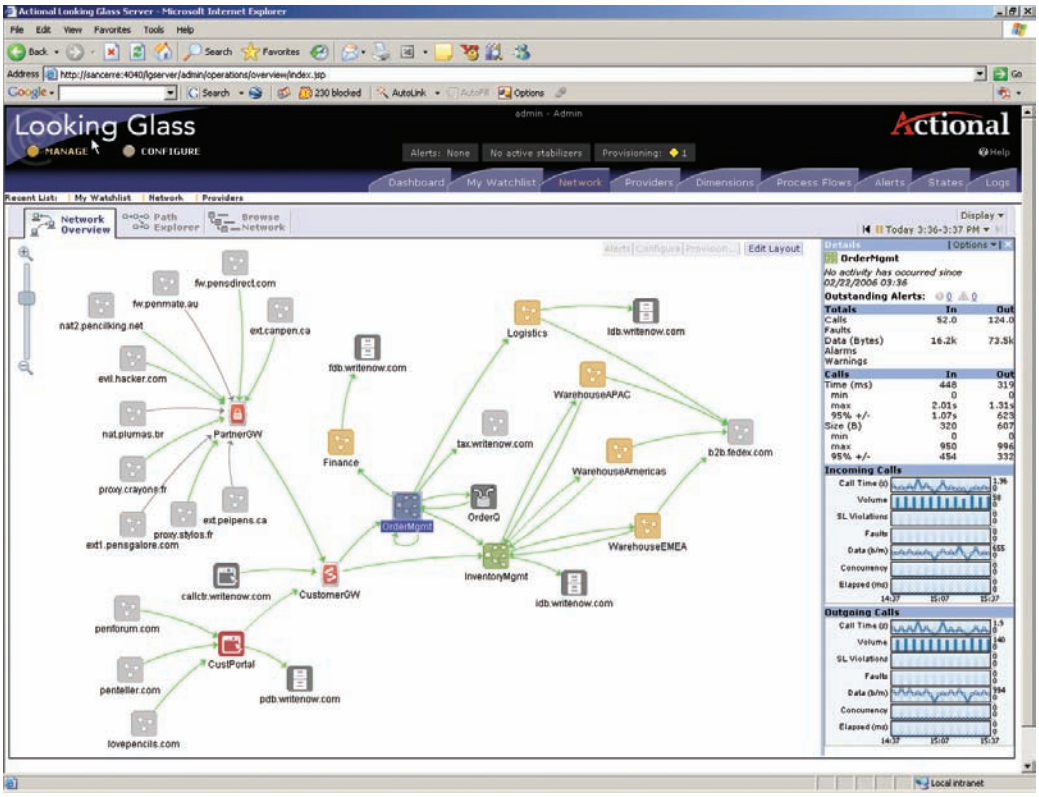
- Which real users specifically were affected?
- How much money was lost because of the failure?
- Were any of the real users gold customers?
- Where in the process did the issues occur?
- What servers exactly were these transactions flowing through?
- When will the issue be resolved?

Getting clear answers to these kinds of questions is the only way for both the business and IT sides of the organization to address the impact of a failure and provide the information for a speedy fix.

Actional 6.0 is designed to address the shortcomings of traditional approaches, to provide true business process visibility, with:

- *Visibility into each and every occurrence of a real business processes*, not just into synthetically created transactions. The visibility provided by Actional Looking Glass enables organizations to measure and report on actual service levels, broken down either by business process or by configurable business criteria, such as customer, region, or business unit.
- *Visibility into every activity that is part of the business processes*, not just the "foreground" transactions. This capability enables Actional Looking Glass to determine if the entire business process, end to end, is operating as expected. If not, Looking Glass can automatically perform triage to determine exactly where the process is failing in its flow across the many connected tiers and applications within the architecture.
- *Visibility when something doesn't happen, is becoming a key concern*, but traditional monitoring can only report when something does happen. Only when you understand the business process can you know and predict what should happen. We should get a response from the inventory system with in X seconds, if not the purchase transaction is hung, waiting for it.

- *Visibility into shared, dynamic, and loosely coupled systems* that will become more and more common as SOA becomes widely adopted. This drives the need to automatically map out the exact set of application-level infrastructure that supports a given business process. Especially when multiple business processes overlap and share some of the same systems, services or applications.



Actional's Looking Glass automatically discovers services and maps their dependencies for the entire SOA infrastructure.

Actional 6.0 Overview

Actional Business Process Visibility is designed to give IT teams a real-time view into the actual path taken by business transactions and business processes within a service-oriented architecture. This ability to dynamically map transactions and processes to the actual infrastructure allows teams to measure availability and reliability and service level agreements (SLA) relevant to actual transactions, triage problems more rapidly, and accurately manage services and applications based on process, not just a series of independent services with rules applied in a point-by-point fashion.

Our technology provides visibility from transaction origination, through SOA-enabled services, through web and application servers, and into packaged applications, databases and legacy systems. This visibility is represented in an intuitive graphical layout with drill-down functionality that is granular enough to distinguish within a cluster exactly what machine and application instance a particular unique transaction went through. So, the infrastructure view that your IT people are familiar with is tied into business process metrics and data that your line of business managers will understand intuitively. Through this dashboard, all stakeholders get the information they need to answer critical questions about SOA performance:

Business

- How is my business doing?
- Are customer experiencing problems?
- Am I keeping up with demand?
- Am I meeting my commitments?

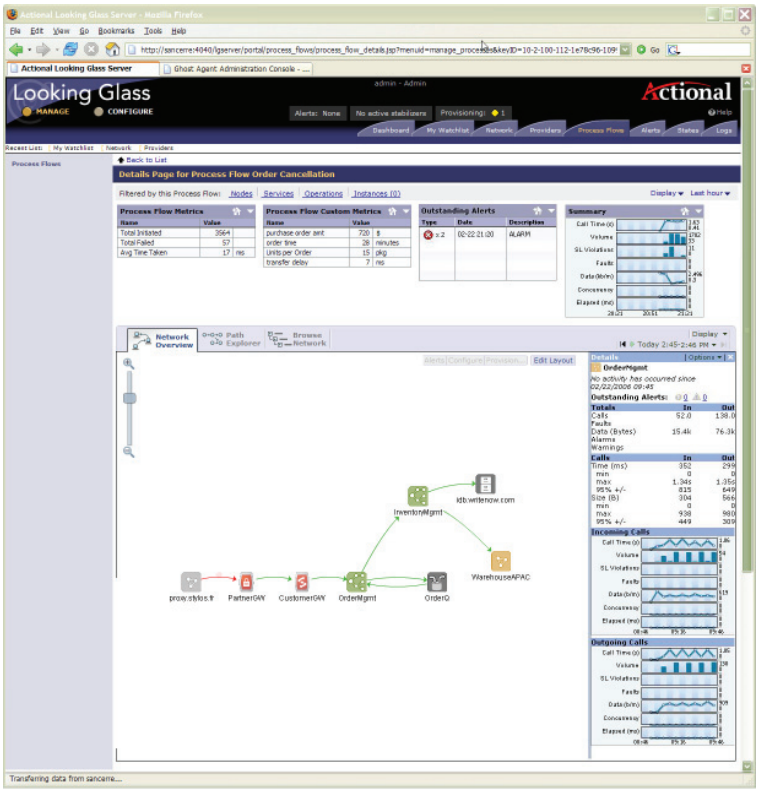
Process

- What really occurs in ordering?
- How many are in production?
- How long from order to delivery?
- Why has purchasing stalled?

Infrastructure

- Which services are where?
- Who uses what services?
- Where are the bottlenecks?
- What's the impact of change?

Even in cases where the organization has lots of infrastructure shared across multiple business processes, Actional makes it possible to understand the underlying interdependencies that support a particular business process. For instance, a customer information system might support 5, 10, 20 or 30 business processes. Actional allows you to look at each individual business processes separate from one another so you understand how the business process ties into the IT infrastructure. We do this by observing real business transactions, not synthetic transactions.



This view has isolated a single business process and the exact infrastructure that supports IT. Notice the correlated data from deep IT operational info (bottom right corner), process level information (middle left) custom business metric (middle).

In previous releases, Actional introduced groundbreaking technology that provided the ability to automatically discover individual transaction paths and automatically discover interdependencies around services and applications. Actional 6.0 expands on that technology to now make it possible to automatically discover the business processes themselves. The result is that each process can be viewed through the business perspective or the IT perspective, but the two views are directly connected. The business owners may be concerned only about the dashboards and metrics that drill down into their line of business. The IT staff may be more concerned about the IT level metrics under their direct control. No matter. The user has the flexibility to start in either direction: start with business metrics, go down to business process level view and see the IT infrastructure supporting it, or the reverse way around.

More Effective Support Policies & SLAs

Actional 6.0 enables SOA-powered organizations to deal with policy and compliance processes as a whole. If you look at some of the mission-critical processes businesses deal with today—just in time inventory management, for example—it is not about optimizing inventory by itself or optimizing manufacturing by itself. It's about optimizing the end-in chain of integrating inventory with manufacturing.

With Actional 6.0, organizations can apply policies that not only deal with those individual elements, but that stretch across the inventory/manufacturing environment. In this way, you have visibility and control over individual processes that drive your business, you know when your processes are functioning correctly, and you know when your processes aren't doing what they are supposed to be doing. The benefits for the SOA-enabled enterprise is that your IT infrastructure is effectively aligned with your business operations and objectives. With the ability to auto-discover a "process flow map" showing each process step tied to the underlying services, applications, and infrastructure, you can now author, apply and enforce policy at the process level rather than at the application layer, the database layer, etc. In addition, compliance and governance rules can be monitored everywhere in the process.

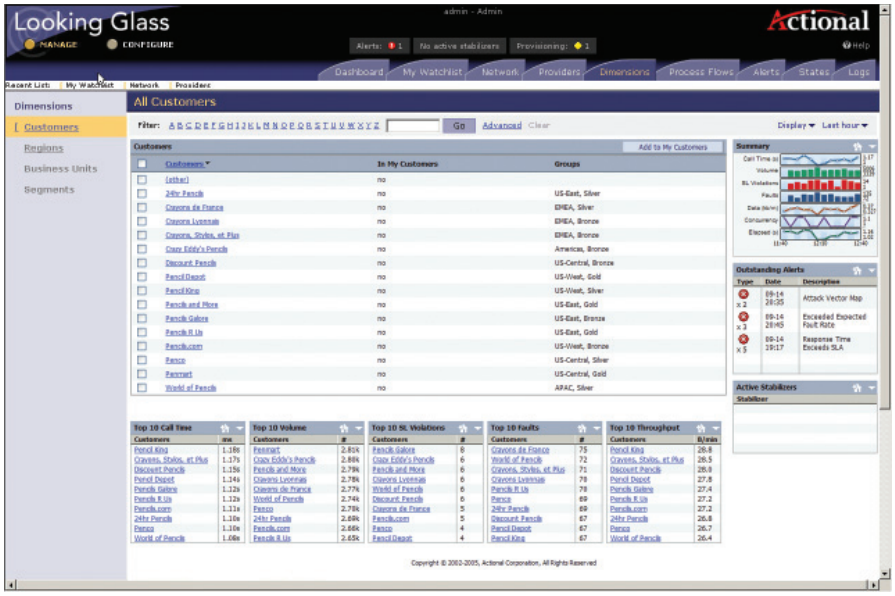
The importance of this capability can be seen in the context of Sarbanes-Oxley compliance. Under this legislation, organizations have to audit everything related to a financial process, and not just isolated actions specific to this piece of infrastructure or that service. Actional 6.0 allows you to define a process across multiple systems and applications, apply a policy, and then monitor performance based on that policy on an ongoing basis. Regardless of the underlying databases, reporting applications or messaging middleware, the correlation between the IT view and business view of the same process is seamless every step of the way because the Actional interface offers distinct configurations for different users:

- Business (BAM) View with key business indicators (KPIs) for the business process
- Process View with process-wide metrics and status
- IT view with details of underlying services, applications, and infrastructure

In fact, with Actional 6.0, IT and business managers for the first time have a context within which to discuss issues based on mutual understanding. So when business concerns conflict with or are impacted by IT functions, you can quickly determine the nature of the problem and optimize IT to resolve the problem and improve business performance. Your IT teams can drilldown from a process view to find the source of issues. Problems are resolved faster. Business efficiency improves overall. Not only does it become possible to apply policy and rules at a process level, but you can also:

- Cut out the noise of unrelated activities
- See and manage only the infrastructure supporting selected process
- See only the process's usage of shared services

With Actional's Looking Glass you gain unparalleled visibility and insight into how your IT infrastructure is serving your business.



Actional's configurable Dashboard showing expanded data for this process including service levels broken down by customers and classes in this view.

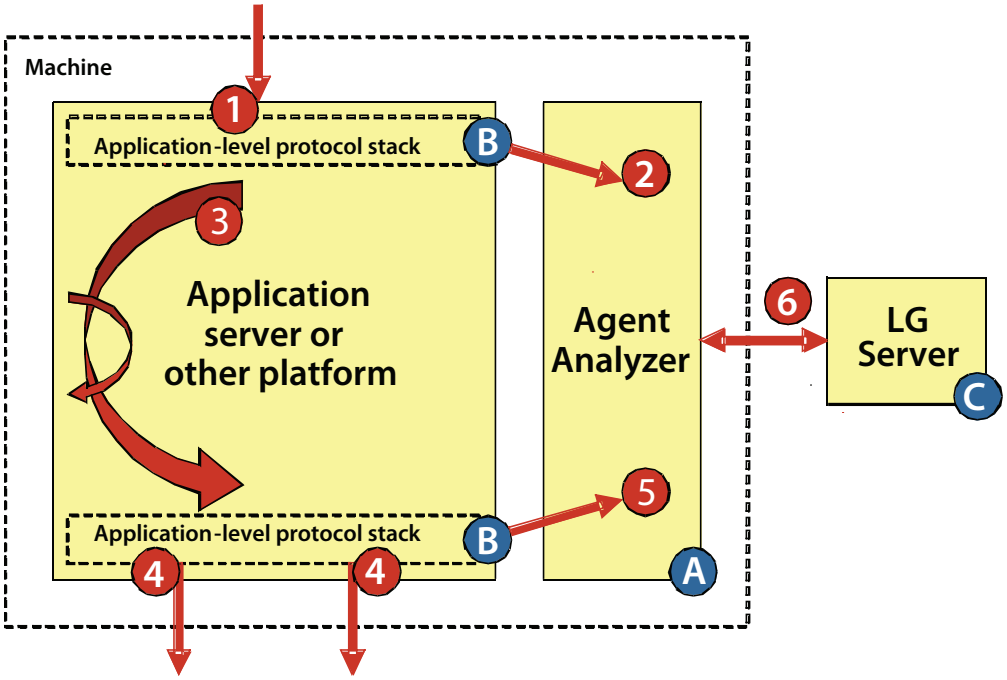
Architecture

To provide optimum business process visibility, Looking Glass uses an extremely low overhead "ghost agent" architecture. Unlike other agent-based approaches, Actional's ghost agents unobtrusively track and automatically correlate the flow of all messages that are occurring between services and applications, and between tiers and processes within an application. An Actional ghost agent consists of two separate components which work together: A single analyzer, which runs as a standalone process on an agented machine (A, in the diagram below), and one or more interceptors (B) in the diagram on page 10 which run within the context of an application server or application platform, residing in the application-level protocol stack where they can gain visibility into all inbound and outbound messages. The interceptors are installed in the application platform itself and, as such, require no configuration or code changes for the applications deployed on the application platform.

The third and final component of the architecture is Actional's Looking Glass Server (C), which serves two roles: it collects and correlates information from the various agents, and it acts as a repository and distributor for policies that are analyzed at the agents. This service flow allows us to define and manage specific flows and business process.

In order to understand the role the agent plays, let's use the diagram above to walk through a transaction as it passes through this machine.

(1) When the message arrives at the application server, the platform first processes the message to perform any necessary security checks and to determine the service that will process the message. At this point, the interceptor reads any correlation information that may have been tagged onto the message (by an upstream interceptor) and inserts correlation data into the application server's internal processing context for later use.



(2) The interceptor queues a record of the received message. This record is delivered to the agent analyzer asynchronously (without adding measurable latency to the application). In the background, the agent analyzer adds the record to its flight data recorder so the record can be retrieved later if the business process encounters a problem. The agent also updates statistics to keep an accurate picture of the aggregate performance of business processes, customers, regions, etc., and evaluates policies associated with the message. These policies may be strictly service level related (e.g. "alert if the response to the user takes longer than 8 seconds, or if the entire business process takes longer than 30 minutes to complete"), or may be related to compliance requirements (e.g. "record an audit record for all requests from foreign customers").

(3) After the interceptor queues the message record (but before the agent analyzer begins processing it), the message is delivered to the application logic.

(4) If the application logic attempts to send out one or more messages on behalf of this business process, as the application server is processing each of these, the interceptor retrieves the correlation data from the application server's internal processing context, and tags the outgoing message with correlation information (typically as transport headers or properties associated with the message).

(5) The interceptor queues a record of every message that is being sent. This record is delivered to the agent analyzer asynchronously (without adding measurable latency to the application) and the agent analyzer processes the message as in step (2).

(6) In the event a policy violation is detected (e.g. a service level is missed), the agent analyzer immediately communicates this to the central Looking Glass server, which proceeds to perform automatic triage (via information from all relevant flight data recorders for the business process). If no policy violations occur, aggregate statistics are periodically delivered to the central Looking Glass server for analysis, display, and archiving.

The asynchronous nature of the agent architecture allows it to be high performance, introducing on the order of only 25 µseconds of latency per message—essentially immeasurable in a typical distributed system. In times of high system stress, if even 25 µseconds is too much, the interceptors can be disabled with a single click in the central configuration console.

The in-memory flight-data-recorder architecture of the agent analyzer allows it to minimize CPU usage on the machine under normal circumstances, while at the same time preserving all necessary information in case a problem does occur and needs to be analyzed.

Because the interceptors are specific to a given platform (and thus understand how the platform internally handles process, session, security, and other state) there is no need to make any modifications to the applications themselves. Just install the interceptor with the application server or application platform, and all applications (custom or packaged) built on the platform will be managed immediately and automatically.

The small footprint of the interceptors ensures that the reliability of the application is not impacted by the management system. Even if the agent analyzer fails or is terminated, the application will continue to run so that the business is not impacted. Moreover, once a business process is defined, each user type or role has an opportunity to put rules in place, as well as configure the type of real-time data they want reported in a customized portal. It is also possible to define actions or alerts to be executed in the event a rule or policy is broken.

Policies are easily created via a point-and-click set of check boxes. The functionality is very similar to the approach used with Microsoft Outlook. While easy-to-use, these features are very robust and enable granular definitions. For example, a purchase process may warrant the following: no customer transaction should take more 8 seconds, and no gold customer transaction more than 6 seconds, and the average of all purchases should be under 7 seconds.

In other examples, the accounting department may want to enact a rule governing the process that ensures an entire approved sequence of events is observed. Any deviation would trigger an automated audit function in LookingGlass to capture all information regarding the specific transaction. The security team may want to apply rules that apply specifically to the purchase process, with polices that provide for an end-to-end overview of the process as a whole rather than just a series of checkpoints. Actional 6.0 delivers "Trust Zones" that helps address today's security vulnerabilities of "last mile" and "man in the middle." As noted, each team can set up these rules very easily with a rules wizard that is specific to their roles. Equally important is that other users cannot alter the rules of other groups.

Conclusion

For many organizations, the promises of service-oriented architecture—cost savings through service reuse, easier testing, higher availability and better scalability—have been difficult to fully realize because of poor visibility into SOA processes. This lack of visibility has had negative ramifications for policy enforcement as well as ability for IT staff and business mangers to find common ground in understanding each others' needs and priorities. Actional 6.0 provides a comprehensive solution to these problems, and enables the enterprise to realize the full potential of SOA-based systems by:

- Ensuring IT is aligned with the business
- Improving business efficiency
- Optimizing IT to deliver more business
- Enabling quick determination if business issues are IT-related
- Allowing users to gather business information to improve non IT-related issues

Actional has webcasts, presentations, and white papers on key subjects such as; Runtime Governances, SOA Worst Practices and implementing a successful SOA Pilot at http://www.actional.com. These are recommended reading for companies exploring the full capabilities of SOA.

About Actional

Actional provides enterprise-class SOA management and runtime governance solutions to address the critical challenges of securing, governing and managing SOA environments. Leveraging leading technology and services, customers achieve the end-to-end transaction visibility required for performance, web services management and SLA adherence. Actional's proven solutions are designed for each stage of migration from Web services pilots to production SOA. Actional is a wholly-owned subsidiary of Progress Software Corporation/Sonic Software based in Bedford, MA. For more information, visit www.actional.com.