SOLVING PERFORMANCE ISSUES IN WEB ECOSYSTEMS

How to identify and solve performance problems in multi-party Web Ecosystems

Executive Summary

Multi-partner Web Ecosystems have become an important, new platform on which businesses can deliver value, with lower costs and faster implementation times.

Definition of an Ecosystem

An ecosystem exists when one player is critically dependent on the appropriate and timely participation by the player's partners and service providers in the player's business process and value chain.

Ecosystems have become increasingly sophisticated and complex with more participants, more integration points and more points of failure. As service providers respond to a number of technology and commercial trends, these ecosystems have become heavily dependent on real-time execution and depend on the seamless integration of the IT infrastructure of each of the participants. Any performance malfunction, outage or failure can critically disrupt the delivery chain.

The number of business functions that need to be kept up-to-date on delivery performance is increasing too – all those who have customer touch points: from customer support, operations, hosting, IT infrastructure through application development and engineering to sales and marketing, account and partner management.

By monitoring the performance of their own and their partners' IT systems, executives, managers and front line staff can better identify and solve performance and availability problems, resulting in reduced downtime, increased mean time between failure and a reduction in customer support costs and overheads. The end result is improved reliability and quality of service to customers.

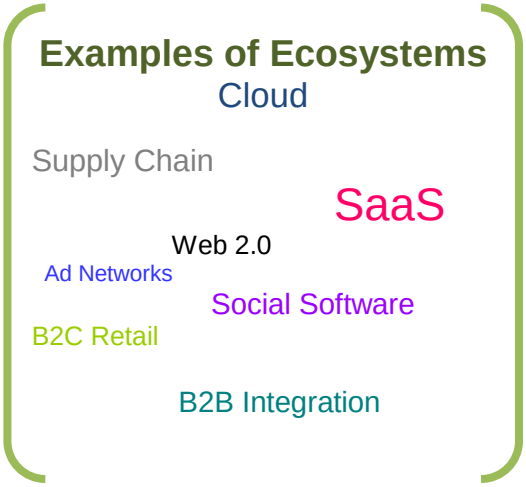
Customers and partners benefit from increased uptime, better performance and higher perceived value. All ecosystem participants share these outcomes and, additionally, benefit from improved operational efficiency, better return on investment (ROI), return on assets (ROA) and the ability to differentiate themselves from their competitors. The ecosystem, as a whole, benefits from greater transparency and efficiency and reduction of over-capacity or under-utilization.

Purpose of This Paper

The purpose of this paper is to educate and inform senior IT executives and those responsible for directly delivering customer value in any value chain or Web Ecosystem about their commercial exposure to ecosystem performance and how they assess, identify and resolve risks to their organizations.

This paper focuses on the unique requirements of monitoring the performance of an ecosystem and how to measure and manage the impact of the ecosystem on a participant's own business practices.

Finally, this paper discusses the requirements of analytical tools that support ecosystem monitoring.



Intended Benefits

- ✓ Ability to identify a multi-partner ecosystem within organizations today
- ✓ An understanding of the issues in an ecosystem
- ✓ How recent market changes have elevated the importance of ecosystems and their benefits
- ✓ How existing analytical tools solve many problems, but lack the requirements to match today's and tomorrow's challenges
- ✓ List the key requirements of tools that helps to solve multi-party performance problems in an ecosystem

Today's Problems

Providers of business to business (B2B) and business to consumer (B2C) internet applications now rely on an increasing number of partners in order to deliver value to their end customers.

These partners are continually providing more and more value to the central value proposition, either because of complexity, required specialization of delivery or due to outsourcing.

Ecosystems are an evolutionary extension of well-established customer-partner relationships. However, recent technology and market changes (discussed later) have lowered the cost and eased their implementation, resulting in an explosion of these relationships, now termed 'Ecosystems'.

Indeed without these partners, end value may not even be achievable without a radical change in business or delivery model. For example, 'mashups'[1] aggregate and combine together data or content from third-party providers to present new information or existing data in new formats.

[1] http://www.ibm.com/developerworks/xml/library/x-mashups.html

Mashups

Mashups are an exciting genre of interactive web applications that draw upon content retrieved from external data sources to create entirely new and innovative services.

One of the first mashups to be widely reported in the press was ChicagoCrime.org. This website takes crime data from the Chicago Police Department's online database and overlays them onto a map provided by Google Maps. Users can query the mashup site for different types of crime (from false fire alarm and burglary to homicide) or by area and display the details and locations of the crimes on a Google's scrollable and zoomable map.

Presentation is simple and the consumption of crime and map data is visually powerful.

As participants increasingly rely on other players to deliver value, their business practices have become intertwined and interdependent. When services provided by one partner slow down or, worse, become unavailable, the effect radiates out to each dependent participant that may, in turn, critically impact other internal or external interfaces or systems.

Performance Impacts of Ecosystems

Continual monitoring, identification and resolution of these performance problems in ecosystems can be difficult, time consuming and highly technical for a number of reasons.

Problem Identification is Complex

Discovery of a performance problem or outage may actually be quite difficult. The internet itself was built to be robust, self-healing and able to withstand poor or intermittent connectivity. So much so, that the internet's very design hides performance errors or brief outages.

Inconsistency or difficulty of repetition makes each problem appear unique, random or dependent on ungovernable processes.

However, once suspicion of a problem exists, correctly identifying it is tough. Assimilating all the data is a critical first task and is dependent upon the access to key metrics, historical data, knowledge of working 'norms' and experience of previous issues.

Different Information Leads to Different Conclusions

The data available to one party might imply one problem, but the diagnosis by someone with a different mix of information is likely to be different. For problems that exist at the interfaces between two business processes or across organizational boundaries, there will always be the question of 'Is it them or me?'

Sharing Information is Difficult

Frequently problems may require skills that transcend an organization: is it at the application or infrastructure layer or both? Will more bandwidth help, but will that solve the issue or soothe the symptom? Have critical background processes failed that have resulted in multiple issues?

Once a problem has been identified (that in itself can be a significant step!) then technical complexity, effort, pride and sometimes arrogance prevent two individuals or business functions from sharing a common viewpoint when analyzing problems.

These problems are exacerbated when working with teams from outside one's own organization: they don't have access to the information that one has – and for one to share the information with the other may technically be very difficult (if not impossible) and may break all sorts of protocols or commercial limitations.

Correlation is Key

Without a holistic viewpoint, each party is trying to diagnose these multi-faceted problems with only half the information. The correlation of data between one's own (private) performance data with the information that is available to the partnership / ecosystem is key.

Symptoms Compound Root Cause

Frequently, many symptoms 'fog' the identification of the root cause. These can generate their own knock-on problems in a domino effect. Processing all the symptoms themselves might become a task far more significant than resolving the root cause. Managing all of the issues may necessitate sophisticated support ticketing and issue routing solutions and communication systems.

Unfortunately, the very people that are resolving the root cause also have to analyze each new symptom to assess its importance and impact, exponentially slowing down the resolution.

Multiple Options to Achieve Resolution

"Usually, in an ecosystem environment, low-impact solutions are attempted first – mainly because of the unanticipated consequences on other systems or external partners."

Once the root cause has been identified, the resolution usually has multiple alternatives. Analyzing these impacts can be a time consuming exercise, as implementing the solutions can often generate more problems than they solve.

Usually, in an ecosystem environment, low-impact solutions are attempted first – mainly because of the unanticipated consequences on other systems or external partners, even though the solution is likely to be incomplete.

If the issue remains unresolved, more aggressive solutions are adopted – with increasing levels of risk to the organization and its partners. Indeed, each resolution may require multiple attempts, in order to finally work.

Resolution May Not Work without Collaboration from Others

When more complex resolution procedures are required – for example – when external Web Services or APIs to other partners have to be shut down and restarted, then successful resolution may requires coordination from other members of the ecosystem.

One Member is Likely to Participate in Multiple Ecosystems

Each member of an ecosystem is likely to participate in more than one ecosystem / partner-customer network. Increasingly, with the interconnected nature of web service provisioning, the impact of abnormal performance or downtime may spread in unanticipated ways. Downtime in one ecosystem may ripple across other ecosystems, as one partner spans multiple networks.

Many contracts between suppliers and customers require Service Level Agreements (SLAs). These principally set the minimum performance standard for uptime, although throughput or other performance metrics are increasingly included, rather than simply percentage uptime.

However, when partners collaborate in ecosystems, these SLAs rapidly become diluted or ineffectual, as true fault can be difficult to determine and interdependent on other partners' performance, making fault nearly impossible to determine.

Transparency for Service Providers

Over the course of the last two years, the need for both service transparency and a commitment to a Service Level Agreement (SLA) has risen in importance within the online sector. For example, first-to-market Software as a Service (SaaS) providers would have been happy to launch their services with only a one line mention of service status on their customer support page. As these services grew and gained market traction, the SaaS providers added customer forums to allow customers to serve each other. During outages, customers demanded greater disclosure, more accurate uptime reporting with historical trending.

Some SaaS providers (although not all) provided a commitment to service quality, backed by an SLA. It is now common to see status pages containing the raw details of service performance along with frequent updates and, at times, pointblank admission of disaster and errors. This openness has generated trust and loyalty between SaaS providers and their customers. Customers in turn recognize the commitment to transparency and appreciate the determination for service excellence.

Conclusions to the Analysis of Today's Problems

From Webmetrics' analysis of its customer base, leading ecosystem platform providers and industry experts, the principle problems for participants in an ecosystem are:

- Members are only partially aware of the problems that exist in the ecosystems in which they participate
- They currently have limited mechanisms to asses, identify and resolve issues in multi-partner networks / ecosystems
- Their exposure to these problems is increasing

Assessing the Ecosystem Performance on a Participant

To restate, an ecosystem exists when one or more players is critically dependent on the appropriate and timely contribution from the player's partners and service providers in the player's business process and value chain.

Issues within an Ecosystem

- ✓ **Identification is difficult**
- ✓ **Sharing information is difficult**
- ✓ **Symptoms compound root cause**
- ✓ **Correlation is key**
- ✓ **Multiple solutions are required**
- ✓ **Resolution may not work without collaboration**
- ✓ **Partners are likely to participate in multiple ecosystems**

Implications

Impact of Ecosystem's Weakness on Participants' Strategy

As a result of exposure to the impact of others' poor performance, participants have used a number of ways to mitigate the impact:

Problem	Mitigation Procedure
Redundancy	Fail-over & backup systems, replication of delivery systems and Mechanisms
Overcapacity	Heavy financial investment to acquire excess capacity in storage, processing power, bandwidth, to the extent of provisioning multiple data centers
Queuing Systems	To cope with poor performance or lack of availability of interfaces

Often, the cost and management of implementing and maintaining these additional systems provides a significant overhead in terms of capital expenditure, additional design, build and test time to ensure that these mechanisms work when required.

Testing backup systems, themselves, may require considerable ingenuity to simulate failure, without actually affecting normal production processes. These simulations are, of course, poor reproductions of real failure, in which usually multiple components have themselves failed – a situation much more likely to occur in an ecosystem environment.

The overall result is heavy investment in these mechanisms, but, not infrequently, these back-up systems frequently fail to deliver when called upon. Senior managers inevitably (and should) question the investment decisions and implementation as to their value and ROI.

With increasingly interconnected systems, inherent in an ecosystem, the exposure to poor performance and availability extrapolates. At what point, does ever increasing amounts of money spent on back-up and failure systems appear to be a poor investment in comparison to early warning and fast problem and rapid resolution systems? The latter not only provide daily value, but become invaluable during crises.

Recent Market and Technology Changes

Adoption of Technology Standards

Data sharing and collaboration has been plagued by the limitations of common protocol and data format. Several technology standards have largely solved these problems:

- XML, eXtensible Mark-up Language[1], has made the definition of data streams far more flexible and multi-functional
- Web Services are a standardized form of API (Application Programming Interface) used between two computers[2]
- SOA – Service-Oriented Architecture is an approach to building internet applications, whereby the components that make up the applications are reusable and, when combined, support the end business function[3]

Although these standards have been available for a number of years, B2B transactions are rapidly adopting these technologies as the standard way of communicating and sharing data across organizational boundaries, business functions, underlying technologies and implementation strategies. The underlying protocols are now widely understood and the approaches are recognized as being robust, scalable, flexible and easy to use and apply. Technical and procedural requirements to integrate with other partners have been significantly reduced, and barriers to entry have been eroded.

Explosion of Collaborative Relationships

The number and sophistication of these collaborative relationships has exploded. Commercial Platforms exist acting as a hub or platform providing business applications who have been certified (to differing extents) to be interoperable.

Less Control Means More Flexibility

With the ease of integration, outsourcing critical business functions has become less risky and much easier. No longer do two partners ask each other, ‘How do I technically integrate with you?’, but, ‘Are you the best partner for my needs? Can you prove that every day?’

Customers are now much less likely to suffer from ‘lock-in’ with their partners. Frequently, customers can switch between providers more easily than previous generations of API integration.

[1] http://searchsoa.techtarget.com/sDefinition/0,,sid26_gci213404,00.html
[2] http://en.wikipedia.org/wiki/Web_service
[3] http://searchsoa.techtarget.com/originalContent/0,289142,sid26_gci1044083,00.html

As a result, partners are much more exposed to churn and have to continually demonstrate that they are lowering the cost of doing business or providing new functionality or a higher quality of service.

Real-Time, Sophisticated SLA Reporting

Service Level Agreements (SLAs) traditionally defined minimum operating standards for the supplier to provider to the customer. These were usually defined in terms of uptime – the higher the SLA, the greater confidence the customer had in the partner's capability to perform. If the supplier failed to provide this standard, financial penalties were enacted.

The Customer–Supplier approach to SLAs needs to be rethought for several reasons:

In general, most SLAs have been defined in terms of uptime, not in terms of performance or response times. Letter-of-the-law availability is very different to practical availability and the legalese in SLAs is only just catching up with this concept.

Given the mesh of interconnectivity between customer, partner and supplier, then the cost of downtime affects all participants. The cost of resolving the problem (and all the associated costs mentioned previously) frequently far exceeds the price that any provider charges. Reducing the time to resolution will, if not already, become an important metric by which customer-supplier relationships are gauged.

Carrying out end-of-the-month uptime calculations and consequent financial bonuses or penalties in any ecosystem is simply too slow, as this performance information can help solve the problem in the first place. SLA Reporting needs to be real-time and dynamically shared between customer and supplier and (where appropriate) with other ecosystem participants.

Ecosystems Have the Potential to Set off a Chain Reaction

Given the interconnected nature of ecosystems, it should be clear that it is possible that problems in one relationship with another internal stakeholder or an external partner have the potential to affect the service performance to other partners or stakeholders.

When performance problems do occur, there is the very likelihood of unanticipated consequences and two seemingly disconnected systems become linked. Although the possibility of a domino effect or chain reaction is the worst case scenario, the possibility of significantly damaging the ecosystem is greatly increased.

Conclusion

Technology and market adoption has given rise to complex, multi-party ecosystems. Participants are exposed to the commercial risks of their suppliers', partners' and even customers' performance.

Implementation of Traditional Monitoring Tools

Service health monitoring tools for web servers provide information such as CPU usage, memory disk utilization and a number of concurrent processes have existed for many years. However, these tools historically have been unique to the service or to technology employed. Their results formats have not been standardized or even exportable, making correlation of performance difficult.

External Monitoring solutions assess the perceived performance by interrogating the web application from agents located around the world. These results provide visibility from an end user's perspective.

Traditional External Performance Monitoring Solutions have proved to be very successful for B2C and simple B2B relationship monitoring providing:

- Excellent trend analysis and ad-hoc reporting
- Alerting when error conditions are detected
- Regular daily, monthly, weekly reporting
- Correlation with other performance results along with the ability to export performance data to other applications.
- Comparison against SLA requirements

However, these solutions no longer match the specifications required to identify ecosystem performance issues and to assist in their resolution, collaboratively with their partners.

New Requirements for Ecosystem Monitoring

Monitor All Interfaces

New market requirements demand that a service provider's websites and its applications are monitored from an external perspective. In addition, the interfaces and APIs that the service provider consumes from its partners and vendors need to be monitored as well.

Monitor More – and Be Able to Consume the Information

Traditional monitoring focuses on the end user experience – and most B2B / B2C service providers only provide a limited number of experiences. However, participation in an ecosystem requires a significant increase in the number of monitored services from suppliers, partners and customers.

Effectively correlating this information together to create a meaningful dashboard of performance metrics or to dive deep into the performance impact across multiple systems requires a very different approach to structured and timed reports, to incident alerts, to configuration options, to user and rights management.

To be useful, performance metrics need to be easy to understand and consume, particularly when working with partners from outside a participant's own business function or organization.

Share Performance Information with Internal and External Stakeholders

Clearly internal stakeholders need this information, but when collaborating with partners, timely sharing of this information becomes vital, particularly for Operations and Customer Services teams. This information needs to be selectively shared with partners and customers in a format that is easily appropriate, consumable and timely.

Performance Needs to Be Orientated Around the Recipient

Throwing performance results 'over the wall' is hardly a constructive, proactive mechanism for collaborating with others. The information needs to be orientated around the recipient – they are the center of their own universe – structured and customized according to their requirements. For example, the recipient needs to be able to determine what thresholds represent a warning condition.

Conclusion

Ecosystems and a participant's interaction with them requires a different approach to performance monitoring due to number and complexity of the monitored services and the collaborative requirement to share performance data with internal and external stakeholders.

What to Look for When Investigating Ecosystem Monitoring Solutions

Ecosystem Monitoring is a new sub-sector of the Performance Monitoring market, albeit growing quickly. For those that are new to ecosystems or have realized that their existing solutions do not match the new market requirements, a list of important considerations is provided below.

Key Features

- Global network of monitoring agents to provide external performance validation
- Monitor the latest technology (e.g. sophisticated Web 2.0 transactions)
- Comprehensive platform that can monitor a wide range of web assets: websites, web applications, web services, rich media streams
- 'Internal Agent' monitoring – the ability to provide monitoring from: a defined point in one's ecosystem, any point in the service delivery chain, a key customer location or with an important partner
- Easily and flexibly share performance information with key internal and external stakeholders in a manageable manner
- Correlate performance data from multiple sources together
- Orientate the presentation of the performance data in many flexible formats - in particular the information provided needs to be timely, relevant and appropriate
- Timed (i.e. regular: daily, weekly, etc) reporting that is customizable to each stakeholder requirements
- Ad-hoc reporting to drill down into specific areas of concern
- Run performance checks ad-hoc, outside of the regularly timed monitoring
- Flexible API to export results into other analytical tools to correlate external / internal performance with other KPIs

For further information about Webmetrics products and services, call 1-877-524-8299 or email sales@webmetrics.com.

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