

Hype Cycle for Web and User Interaction Technologies, 2011

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The Web continues to evolve along multiple dimensions — social, mobile, programmable and real time — not just outside the enterprise, but also within it. These trends reinforce each other, and the resulting impact on the enterprise and on society as a whole is unprecedented.

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ANALYSIS

What You Need to Know

The Web is pervasive in our personal and professional lives — not just in the daily activities of knowledge workers and technical professionals in industrialized countries, but also increasingly across diverse demographics and global geographies.

The Web channel is the preferred mode of communication with enterprises and organizations, chosen by customers, prospects, business partners, potential employees, investors, regulators and other interested parties. Within the walls of the organization, intranets and enterprise portals offer new modes of collaboration based on aggregated corporate knowledge.

The Web will continue to evolve. Some pundits have been attempting to define Web 3.0 for years. Rather than get caught up in silly numbering schemes, Gartner prefers to think of the future as "the modern Web" (see "HTML5 and the Modern Web"), and that it is all part of "just the Web." There will surely be new, breakthrough technologies, methodologies, approaches and models. Like Web 2.0, these will fall into technology/architecture, community/social and business/process aspects.

The future Web will become pervasive. Not only available via Web browsers, the future Web will be accessible by a broad spectrum of devices, including automobiles, consumer electronics and more mobile devices (see "The (Not So) Future Web").

Consumerization will become an even greater influence in the future, as the worlds of personal technology and content, and enterprise technology and content blend even further, to the point where the boundaries will disappear in many cases.

The future Web is many things, including:

- Contextual
- Mobile
- Rich experiences, driven by HTML5 and the modern Web
- Running on the user experience platform (UXP)
- Social
- Cloud-centric
- Real time
- An architecture
- Running in parallel with native and OS-specific approaches
- In the midst of a new era of browser wars
- Running on a webOS/cloud OS for certain classes of users
- Enabling and being influenced by a growing wave of consumerization
- Infused with commerce

- Driving disruptive changes in governments, economies and social norms in many regions of the world

The Web continues to be the mainstay of most enterprise user experience (UX) strategies. The ubiquity and increasing utility of the Web makes it the most appropriate tool for interacting with customers, trading partners and employees. The Web enjoys a significant presence in enterprises, but there are still many opportunities for improvement, including better processes and tools for content management, deployment, and the management of international, decentralized and multilingual websites, as well as accessible websites for users with disabilities. Infusing traditional Web architectures with rich Internet application (RIA) approaches and technologies, including Ajax, Flash, Silverlight and Java, is becoming increasingly common for employee-facing Web environments, and has been a best practice for improving the usability of customer-facing environments for years, especially when applied in the context of a user-centered design process and methodology.

Browser technology is improving through the emerging set of standards around HTML5 and CSS3 (see "HTML5 and the Modern Web"). However, there is still progress to be made in enterprises in terms of awareness and adoption of user-centered design processes and methodologies (e.g., split A/B testing, multivariate testing, usability testing, persona and interaction patterns) that make effective use of new user interface technologies. Enterprise Web developers need to balance two complementary disciplines: tracking the evolving technologies around UX, and adhering to a design process and methodology that can deliver effective UX (see "A Value-Driven, User-Centered Design Process for Web Sites and Applications").

The mobile Web experience, as first delivered by the iPhone, points the way to a new generation of user interfaces and services on mobile clients. A new level of expectations has been set among consumers. Powerful, yet easy-to-use interfaces, coupled with applications that leverage smartphone/tablet features (such as GPS, compass, camera, accelerometer and altimeter) are enabling enterprises to enjoy compelling interaction with a wide variety of users. Online strategies must increasingly take into account not just a mobile Web experience, but also a mobile app experience, as more applications are offered via mobile platform app stores and other distribution mechanisms.

Customer-facing websites continue to see significant investment. This was true during the recent economic downturn, and remains true today. Successful high-end, consumer-oriented sites (e.g., Amazon, Expedia, Facebook and Google) have long used the principles of user-centered design based on objective data about user behavior, gravitating around core usage scenarios linked to business value. These proven principles for success are starting to migrate into enterprise development scenarios. Enterprises are becoming aware of the need to extend their traditional customer websites beyond the basic and typically offered marketing and e-commerce functionalities into areas such as social software, mobility and social media. Leveraging the wisdom of crowds, and the ability to access those crowds in whatever chosen medium, are important elements of customer satisfaction and customer loyalty.

Web technologies continue to have a profound impact on application development (AD) and operations, and they are some of the drivers behind the move to agile practices, the use of application life cycle management (ALM) and an increase in collaborative technology in development. The use of dynamic languages, such as JavaScript, Ruby, Python, PHP and Perl, have seen broader enterprise adoption, along with Web frameworks, such as Spring MVC, Struts and JSF. Open-source software is playing a key role in many different categories related to AD. Hype Cycle technology analyses related to Web AD include cloud/Web platforms, Web-oriented architecture (WOA) and composite applications.

Recent trends in user demand and independent software vendor (ISV) behavior indicate a shift in the technologies used to deliver the UX. Enterprises have complained for years about the multitude of technologies and tools they must use to deliver the variety of UXs necessary. Enterprises have also come to the realization that, no matter how technically complete a website or portal is, a poor UX will, more often than not, cause it to fail. In addition, convergence of several UX-related technologies is definitely visible: content, collaboration, context, portal, mashup, RIA and analytics. This is leading to an emerging market: UXP. A UXP is an integrated collection of technologies and methodologies that provides the ability to design and deliver user interface/presentation capabilities for a variety of interaction channels. The UXP will subsume traditional portal and mashup technologies, and will overlap significantly with others.

The hype around Web 2.0 in past years has been translated into business value, albeit within the constraints of organizational structure and legacy corporate culture. Web 2.0 technologies, such as blogs, wikis and social networks, are now used by many mainstream businesses. Use of Web 2.0 community approaches is growing in certain areas, such as the use of user-generated reviews and ratings, and crowdsourcing for product designs. New Web 2.0 business models continue to emerge (for example, the exploitation of product information for mashup purposes by exposing the data via representational state transfer [REST]ful APIs). These can be seen in Hype Cycle technology analyses of activity-specific social applications, distributed social Web, social software suites, corporate blogging and content syndication in the enterprise.

Consumerization is a real force in many enterprises. Enterprises that ignore this trend may be setting themselves up to be marginalized, or worse, users may actively circumvent IT controls if IT is perceived to be out-of-touch or draconian.

A major way in which the Web is impacting the enterprise is by providing the context for cloud computing. The shift of IT resources from on-premises to cloud-based, although well under way, has a lot more to offer. What has been seen thus far is only a small portion of what has yet to unfold (see "Global Class: The Inspiration for Cloud Computing" and "Gartner Reference Architecture for Cloud-Enabled Application Platforms").

A common question is, "What's beyond Web 2.0?" We already know it isn't Web 3.0, as the step-function change that got us to Web 2.0 is not likely to recur. However, new, innovative technologies and approaches are launched every day (see "Facebook Tries to Paint the Entire Web With Social Context"). Cutting across all these technologies and trends is the large scale of operations. Data centers of major Web players are growing, and the reach is broadened to every geography. Mammoth scale is an aspect of the many evolutionary changes to the Web, and is itself a trend.

The Hype Cycle

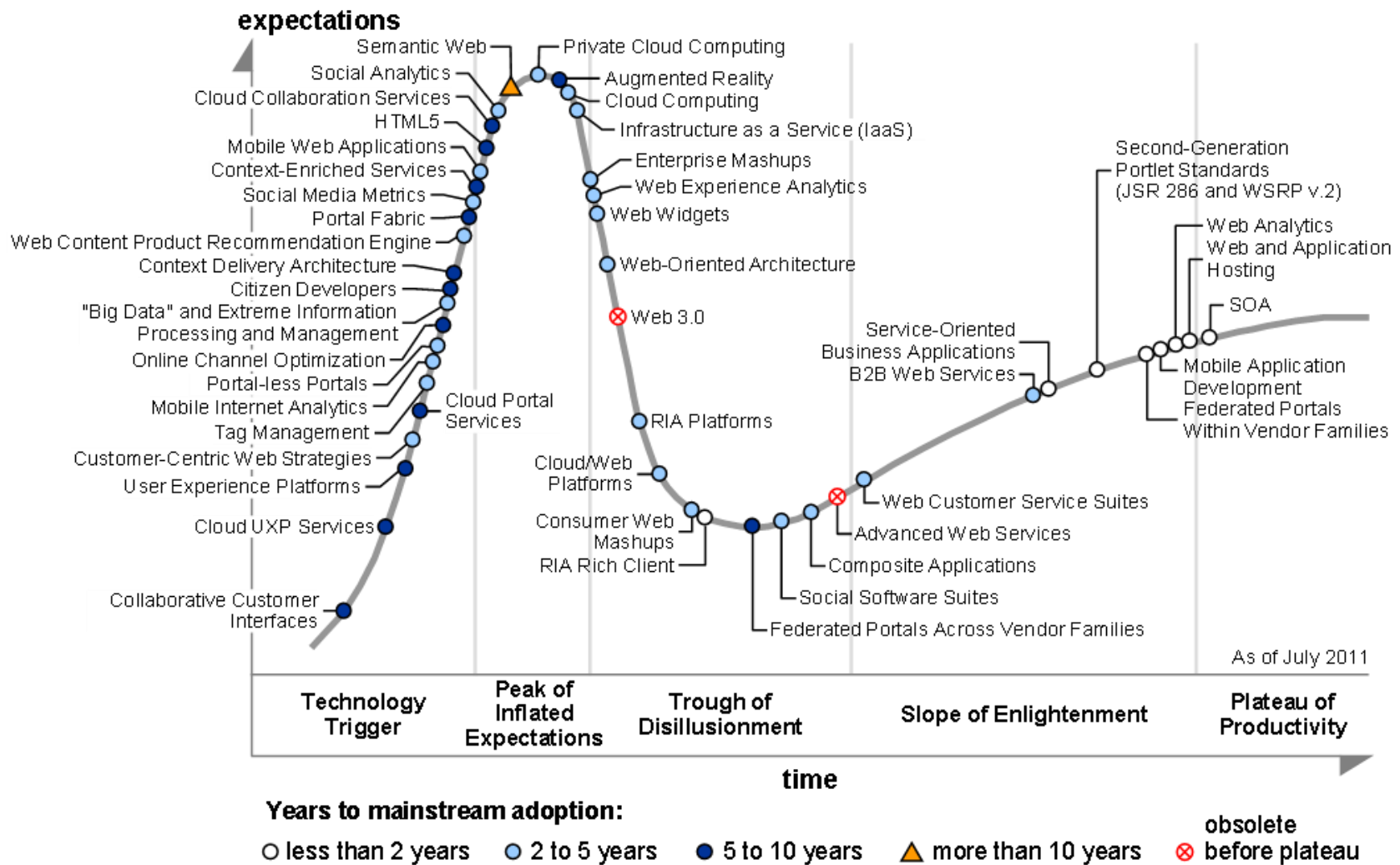
This Hype Cycle covers a broad collection of Web-oriented technologies and methodologies. It is an update of the 2010 Hype Cycle. Some technology analyses that are of particular interest include:

- **Context-aware computing** — Gartner introduced this term in 2007, and has described the set of related concepts in research and in detailed technology analyses. Some of the high-level profiles are included in this Hype Cycle. Although context-aware computing is an emerging approach, successful high-end, consumer-oriented sites, such as Facebook, Amazon and Google, have put some of these principles into production (see "Fundamentals of Context Delivery Architecture: Introduction and Definitions, 2010 Update").
- **UXPs** — A UXP is an integrated set of technologies that provides, supports, manages and delivers user interaction across applications, processes, content and other users.

This is an emerging concept, first described by Gartner in 2009, and it debuts in this year's Hype Cycle for Web and User Interaction Technologies (also see "Generation 7 Portals: Unifying the User Experience").

- **HTML5** — The browser must evolve to meet escalating requirements for rich, responsive interaction, posed by Web applications that are no longer content-centric, but engagement-oriented. Gartner covered this topic extensively in published research earlier in 2011 (see "HTML5 and the Modern Web"), and HTML5 will take an ever-increasing role in websites of all kinds in the near future.
- **Mobile Web applications** — As the mobile sector becomes more fragmented due to many competing platforms (from Apple, Google, Microsoft, Nokia, Research In Motion [RIM] and HP-Palm), developers are turning to cross-platform Web applications that use HTML5 and mobile-enabled browser engines that support GPS, tilt, proximity and other sensors.
- **Cloud computing** — Gartner has covered the cloud computing wave in a great deal of research during the past couple of years, and devotes an entire Hype Cycle to this phenomenon. In this 2011 Hype Cycle for Web and User Interaction Technologies, there are selected technology profiles representing the major aspects of cloud computing (e.g., platform as service, infrastructure as service, etc.).
- **Social Web** — The social Web is becoming pervasive both in the consumer sector and, more recently, in enterprises. There is an entire Hype Cycle on this topic. Here, we include some key technology analyses relating to this transformational trend, including social data portability and social network payments.

Figure 1. Hype Cycle for Web and User Interaction Technologies, 2011



Source: Gartner (July 2011)

The Priority Matrix

Many Web-oriented technologies and methodologies have seen mainstream adoption. Some of the more impactful items include enterprise portals, Web 2.0 and mashup applications. These deserve attention, as they provide significant value to the enterprise and can be a competitive weapon.

Other items on the Hype Cycle are highly impactful, but will see mainstream adoption further out (such as cloud/Web platforms, social applications, WOA and cloud computing). Although the mainstream adoption of some of these technologies is still a few years away, there will be a significant value stream for many years into the future.

Figure 2. Priority Matrix for Web and User Interaction Technologies, 2011

benefit	years to mainstream adoption			
	less than 2 years	2 to 5 years	5 to 10 years	more than 10 years
transformational	SOA	"Big Data" and Extreme Information Processing and Management Cloud Computing Composite Applications	Citizen Developers Context Delivery Architecture Context-Enriched Services	
high	Mobile Application Development Web and Application Hosting	Cloud/Web Platforms Customer-Centric Web Strategies Infrastructure as a Service (IaaS) Mobile Web Applications Portal-less Portals Private Cloud Computing Social Analytics Social Software Suites Web Customer Service Suites Web-Oriented Architecture	Augmented Reality Cloud UXP Services Collaborative Customer Interfaces Federated Portals Across Vendor Families HTML5 Online Channel Optimization Portal Fabric User Experience Platforms	Semantic Web
moderate	Federated Portals Within Vendor Families RIA Rich Client Second-Generation Portlet Standards (JSR 286 and WSRP v.2) Service-Oriented Business Applications Web Analytics	B2B Web Services Enterprise Mashups Mobile Internet Analytics RIA Platforms Social Media Metrics Tag Management Web Content Product Recommendation Engine Web Experience Analytics Web Widgets	Cloud Collaboration Services Cloud Portal Services	
low		Consumer Web Mashups		

As of July 2011

Source: Gartner (July 2011)

Off the Hype Cycle

Enterprise portals have become commonplace in large and many midsize enterprises. They have reached a position of fruitful use in these enterprises, and are now a standard part of successful Web and user interaction strategies.

Portlets have followed the same path as enterprise portals. Portlets have reached a level of maturity and are now a standard part of portal deployment. Web widgets, on the other hand, are growing as an alternative to portlets, but are not yet widely accepted, and are traversing toward the Trough of Disillusionment.

Cloud services integration has been dropped in lieu of several other technology profiles, including integration platform as a service (iPaaS), integration brokerage and cloud services brokerage.

On the Rise

Collaborative Customer Interfaces

Analysis By: Michael Maoz

Definition: A collaborative customer interface enables a customer service agent and a customer to share, simultaneously, the live version of the same business application. This requires the enterprise to redesign the graphical user interface (GUI) and the underlying technologies to dynamically generate personalized interfaces.

Position and Adoption Speed Justification: The current crop of CRM applications can only support collaborative browsing, where a customer can be shown an image of an application. With collaborative customer service interfaces, an organization can dynamically generate GUIs that enable the customer to view and share the same information in the same format, in the same position. In 2011, this technology is still in its infancy: Most customer service organizations have neither the technology nor the business process expertise to build such interfaces, and the enterprise business application providers are doing little to create such interfaces.

User Advice: Look at the ways in which social media and personalization tools would be applied to your next-generation customer service desktops, and create a plan to investigate how a collaborative (or shared) interface could enhance the customer experience.

Business Impact: In industries such as financial services, travel and B2B customer support, businesses will be able to offer highly personalized customer experiences, as well as a feeling of participation by the customer in the resolution of their issues.

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Embryonic

Sample Vendors: salesforce.com; SAP

Cloud UXP Services

Analysis By: Gene Phiifer

Definition: The user experience platform (UXP) is an emerging technology, delivering an integrated set of technologies that supports the user experience. With a portal product at its core, the UXP includes content management, collaboration, social, analytics, search, commerce, development and management capabilities.

Cloud UXP services are the cloud variant of the UXP. Cloud UXP services are a shared, multitenant cloud services offering, running within a platform as a service (PaaS). Some UXP products will transition easily into cloud UXP services, because they have been architected for shared multitenancy; however, some UXP products will have to be completely rearchitected to run effectively in the cloud.

Position and Adoption Speed Justification: Like the UXP, cloud UXP services is a concept that is in its infancy. Cloud UXP services will follow the UXP up the Hype Cycle curve, and are likely to stay in this trailing position throughout their life cycle. However, cloud UXP services could accelerate, because many vendors have now become more customer-centric with their UXP

offerings, and marketing- or sales-driven decisions on customer initiatives may focus on cloud alternatives, rather than on IT-driven decisions.

User Advice: Allow cloud UXP services to mature before engaging in mission-critical use of such offerings. The UXP is immature, so cloud UXP services are quite immature. Allow them to grow up, then engage with them in a year or more.

Business Impact: Traditional deployment cycles for portal products are two to four months. Cloud UXP services can be deployed in a fraction of that time. Other benefits are the same as with other cloud computing alternatives to traditional on-premises deployments.

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: Covisint; IBM; Microsoft; Oracle

User Experience Platforms

Analysis By: Gene Phiifer

Definition: A user experience platform (UXP) is an integrated set of technologies used to provide interaction between a user and a set of applications, processes, content, services or other users. A UXP is composed of several components, including portal products, mashup tools, content management, rich Internet application (RIA) tools and mobile tools. It may be delivered as an integrated set of technologies from one or more vendors, as a suite of products from a single vendor or as a single product. A UXP may also be self-assembled by the enterprise (historically called the "roll your own" approach). However, lack of standards and typical software product configuration challenges will likely require significant integration effort. Many enterprises will prefer to buy their UXP, rather than build one. The UXP represents the convergence and evolution of many user interaction/presentation layer technologies and is a critical competitive platform for the world's most influential technology providers.

The UXP addresses the enterprise need for a consistent, integrated, versatile and optimized approach to user interactions across a wide range of scenarios and devices. Traditionally, user interface/user experience tools have been stovepiped, with little to no integration, and different approaches and languages for providing similar functionality across platforms. The UXP attempts to solve that problem with integration and cross-platform capabilities.

However, the UXP is not just about technologies. A UXP also supports the methodologies used to create a best-in-class website, such as user-centered design and usability testing. Understanding the success of a website requires good analytics, and a UXP also includes these capabilities.

Position and Adoption Speed Justification: The UXP that emerged in 2009 is a relatively new concept. There have been early instantiations (e.g., Microsoft SharePoint, Oracle WebCenter Suite, IBM Customer Experience Suite, Adobe Digital Experience Platform, Cisco Quad); however, the UXP is in the early phases of its life cycle. There isn't even a formal UXP market yet. Although the demand for the UXP is visible, vendors have not met this demand en masse. The UXP market should emerge during the 2012 through 2013 time frame.

User Advice: Conduct an inventory of the various tools used for presentation management and presentation-layer composition across all supported devices and channels. Determine synergies where common vendors are identified. Demand plans from your vendors for these products and

determine where integration will occur. Explore UXP options for many of these tools, then build a road map and plan to adopt a UXP during the next few years.

Business Impact: Tools and methodologies for delivering the user experience are expensive — i.e., for software licenses, as well as developer training and duplicative/overlapping work. However, the biggest downside is the impact on the users who have to deal with inconsistent user experiences and different look/feel/behavior across different sites and devices. A UXP provides significant efficiencies in developing and maintaining the user experience, and provides a consistent user experience across sites, channels and devices. The UXP will save organizations money, but the main benefit is the ability to more effectively engage users and customers.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Adobe; Cisco; edge IPK; IBM; Microsoft; Oracle; SAP; TandemSeven

Customer-Centric Web Strategies

Analysis By: Michael Maoz; Gene Phifer

Definition: A customer-centric Web strategy (technology/business strategy) is a cohesive approach to ensuring that a website is intuitive to visitors to that site, placing the customer at the center of the relationship. It focuses on tying the customer, prospect or partner deeply into the enterprise or organization, and harmonizes the interaction channels. It starts with improvements to the website, but extends beyond it to other related interaction channels and external services, such as social networking and other forms of social media. The technologies, integrations, analysis, content, communication and business applications are designed and deployed through a collaborative effort between the business and the external customer to achieve the goal of serving customers' needs consistently with business goals. It will be used to optimize advertising via email, search or other online approaches.

Position and Adoption Speed Justification: A customer-centric Web is still an immature concept and strategy for most businesses outside online retail, where the concept is maturing. The challenge (beyond the process synchronization required) is that the technologies are not available as a suite, but rather are cobbled together. There have been good reasons for this: the need to rapidly innovate because of the evolving nature of user interaction patterns; emerging technologies, such as real-time analytics, social networking and recommendation/reputation engines; and highly fragmented reporting structures for the people tasked with building Web capabilities. Creating a Web presence that draws customers in, because it is engaging, responsive, reliable and intuitive to their needs, will be a strong business differentiator.

User Advice: The rapid growth of social media and crowdsourcing techniques could lead corporate websites toward extinction. Create an inventory of tools, technologies and applications required to deliver a customer-centric Web. Appoint a project leader who has the approval of the board or CEO to run a customer-centric Web effort. Tap the community of customers, prospective customers, partners and employees as a way of uncovering the true impact and effectiveness of your website. Look for redundancies in systems, and overlapping organizational responsibilities. Test ideas by measuring the impact before deploying fully.

Business Impact: The business impact is high, because businesses waste a tremendous amount of money on marketing, sales and technical support as a way of overcoming the

weaknesses in their websites. The desire to better control and optimize spending, and measure costs and Web effectiveness, will drive customer-centric Web programs.

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: Accenture; Deloitte; IBM

Recommended Reading: "Key Issues for Customer-Centric Web Strategies, 2010"

Cloud Portal Services

Analysis By: Jim Murphy; Gene Phifer

Definition: Enterprise portal frameworks will embrace the cloud in one of five forms (see "Portals in the Cloud Will Take Five Forms"):

- Cloud-friendly portals
- Portal platform as a service (PaaS)
- Public cloud deployable
- Private cloud internal use
- Private cloud external use

Cloud portal services include portal administration and development, as well as such key functions as personalization, content management and integration, based entirely on a hosted, elastic and scalable platform.

To be a service, a cloud portal service has to be offered as a one-to-many service with some degree of self-service. To be a cloud service, it has to also support shared multitenancy or at least automatic and elastic horizontal scaling. Some portal providers offer cloud-enabled portal products to independent software vendors and IT organization. However, cloud-enabled portal products are the equivalent of cloud portal services, because they are sold as products and are not made available as services.

Position and Adoption Speed Justification: Enterprises continually express interest in cloud portal services, but their adoption has been slow, compared with infrastructure as a service (IaaS), software as a service (SaaS) and other types of PaaS offerings. Organizations have been slow to adopt cloud portal services for several reasons. One is the dearth of vendors that offers full-featured, extensible, integratable and horizontal portal solutions as a service. Many of the vendors argue that there isn't enough demand to push forward with more-thorough portal PaaS strategies, instead preferring to feel out the market slowly. In large part, the apparent lack of demand is due to two factors:

- Horizontal portals require integration with enterprise information sources and applications, most of which sit on-premises. Although there may someday be value in employing cloud-based platforms to provide interoperability between cloud-based and on-premises information and applications, an on-premises portal is more likely to support most interoperability needs today. When enterprises adopt real hybrid topology — part on-premises and part in the cloud in more or less equal measure — doing portal

work in the cloud will not be as illogical, because a significant portion of resource access will be from the cloud anyway.

- Horizontal portals are also typically highly customized and, in many cases, serve as a foundation for building, deploying and delivering Web-based applications and composites. Organizations that have dealt with portal migration know that such customization can be troublesome when it's time to upgrade or replace their portal platforms. Cloud portal services providers haven't instilled enough assurance that portal customizations and applications will survive when they make upgrades to their IaaS or PaaS offerings, which serve as the foundation for their portal services. Until the offerings have nonintrusive version control and customization, comprehensive portal cloud services will not take off.

However, cloud portal services isn't a doomed idea. PaaS will enable organizations to address portal initiatives without the unpredictably high costs of supporting data and networking infrastructure. More-intense requirements to support mobile devices and more-bandwidth-intensive content, such as video, will further incite organizations to look for portal PaaS assistance. Furthermore, some of the essential elements of Generation 7 portals, including Web analytics and context awareness, have their footing in the cloud already. Still organizations may have to wait for PaaS underpinnings, such as integration PaaS and development PaaS, to mature before cloud portal services become more feasible as a comprehensive portal alternative.

Compuware Covisint, which was founded as a trading exchange focused on the automotive industry, offers a true horizontal cloud portal service. The company's experience and its foothold have led it toward B2B scenarios for manufacturing, and then healthcare, financial services and public-sector organizations.

In the meantime, the larger vendors are slowly moving forward. Microsoft is offering a cloud-based portal PaaS in SharePoint Online (now in beta) and its broader Microsoft Office 365 (formerly Microsoft Business Productivity Online Standard Suite). Although SharePoint Online and Office 365 don't constitute full-featured horizontal portal platforms, they offer relatively simple support for document collaboration scenarios. By 2014, they will incorporate more-comprehensive portal development and integration capabilities.

IBM is inching forward with its cloud-based portal approach. It is offering WebSphere Portal Server and Lotus Web Content Management Standard Edition on Amazon EC2, but these are not multitenant or elastic offerings. IBM's LotusLive messaging, collaboration and social software products, which are true cloud services, may suit some portal scenarios focusing on collaboration, but the company doesn't offer a horizontal portal PaaS for large organizations. As with Microsoft, by 2014, customers are likely to see a more-comprehensive and cohesive cloud portal service, likely entering the market under the auspices of collaboration and social business.

Oracle's WebCenter offering is also available, running on top of Amazon EC2 and using the IaaS model; however, it's not a multitenant offering. Oracle WebCenter is cloud-deployable and provides portal features for Oracle's Siebel OnDemand offering.

The open-source portal leader, Liferay, is a cloud-enabled portal platform that is used as enabling technology for cloud portal services from other providers, including Compuware Covisint and vertically focused CampusEAI. However, Liferay does not offer a cloud portal services on its own.

Other possibilities loom, some coming from already established cloud positions. Salesforce.com continues to broaden its portfolio in portal-adjacent areas, such as content management and collaboration, while extending salesforce.com into a more-feasible PaaS platform. Google Apps for Business continues to attract potential portal customers with its cloud proposition, Sites

capability, iGoogle consumer offering and Gadget framework. However, neither Google nor salesforce.com has put a concerted effort into addressing the portal market as yet.

User Advice: Organizations should be cautious about adopting cloud portal services. Integration and customization could prove difficult and costly during upgrades, and providers may effectively insulate such customizations from changes to underlying PaaS offerings. Ensure that offerings support portal interoperability standards, such as JSR 286 and WSRP, to help mitigate the risk.

Organizations should accordingly limit customization and integration in most cloud portal services initiatives. Although they can be useful, especially for situations requiring portals as mechanisms for team and B2B integration, organizations should use out-of-the-box capabilities, including prepackaged portlets, whenever possible.

Business Impact: Despite the cautions, cloud portal services will emerge as a competitive option during the next five years. Organizations will find value in cloud portal services, whether as go-to platforms for portals or as part of a comprehensive hybrid portal strategy that includes on-premises and cloud-based portals and components.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Recommended Reading: "Portals in the Cloud Will Take Five Forms"

Tag Management

Analysis By: Bill Gassman

Definition: Tag management tools simplify the task of deploying and maintaining the JavaScript tags that are used on websites to interface with external applications, such as Web analytics, testing, targeting, recommendation engines and advertising. With a tag management solution, a single JavaScript tag is placed on every Web page. When the single tag is executed, a call is made to the tagging application, which returns the appropriate tags for that page, set of circumstances or visitor. The advantages of tag management are that control and maintenance are done from a configuration panel, decoupled from the life cycle of other content. This improves the speed of changes and the quality of tags, provides an audit trail of changes, and offers business rules that control when specific tags will fire. In addition, the custom variable values inserted into tags can be driven from a common data model.

Position and Adoption Speed Justification: Tag management solutions have been available since 2007, but are not widely deployed. We estimate that there are currently fewer than 500 customers for these products in operation at enterprises. Adoption by the target market will take at least two to five years to mature. Although the products are still expensive and most of the vendors delivering them are small, tagging is used extensively, and manual tagging presents challenges in terms of scale, agility and control, which tag management addresses. As market awareness increases — and the feature gets added to Web content management and data management platforms — so will adoption. Adobe's entry into the market will help this.

There are two distinct markets for tag management solutions. First is the digital marketing practitioner, struggling to manage tags for multiple Web analytics products, surveys, A/B testing and recommendation engines. The second market for tag management systems is advertising publishers and buyers. Here, numerous tags, dozens in some cases, are placed into Web content so that cross-site user profiles can be maintained and campaign attribution can be tracked.

For both target markets, the value of using a tag management system is a central way to create, edit and publish tags, no matter where or how the content that contains the master tag is published. Tag quality is improved, due to better control of the management process. This means fewer duplicate or outdated tags. Business rules permit control of the situations when tags fire, which is useful for context-aware situations based on time and visitor profile, or to control when third parties get access to user behavior data. Control also helps to protect user privacy, by enforcing policy and user opt-in choices. Additional value includes better page-load performance for the Web visitor, because the tags will be delivered in an optimized way and can be delivered from specialized content delivery networks.

User Advice: Tag management is most useful when multiple tags are being deployed, when custom variables are added to tags, when there are a lot of changes, or when control of delivery to third parties is required. Users of tag management will include those involved with Web analytics, marketing campaigns and Web content management, along with advertising publishers and buyers. In 2011, the yearly subscription fees for these products is typically \$100,000 and up, so a purchase should be balanced against the cost of a full-time employee, the tag deployment fees paid to external resources, and the value of linking business rules to tag invocation. Start asking vendors of Web content or data management platforms for road maps for adding tag management features.

Business Impact: The impact to business will be more and better use of tags for analysis, advertising and optimization of customer-facing content and applications, leading to better business results from digital channels. Quality problems and bottlenecks in effecting changes are inhibiting the use of optimization products today, and excessive tag volume is slowing page load time, leading to higher abandonment rates. Where government regulations require better privacy protection for users, tag management offers a foundation to control what is captured.

Benefit Rating: Moderate

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: Adobe; BrightTag; Ensignten; TagMan; Tealium; UberTags

Recommended Reading: "Cool Vendors in Web Computing, 2011"

Mobile Internet Analytics

Analysis By: Bill Gassman

Definition: Mobile Internet analytics are applications which provide information to business users and operations on the mobile device usage of an enterprise's Internet content, or mobile device resident applications. This information is used to improve the user experience and business results through the mobile channel. While the techniques used are similar to those in Web analytics, there are differences in measurement techniques and the scope of what is measured.

For browser use on mobile devices, well known information such as page views, browser type, screen size and so forth is usually captured. The quality of information from some mobile browsers is reduced, because not all support common instrumentation techniques such as cookies and JavaScript. Server-side data capture is often used as a work-around for these limitations. Native mobile applications can be measured when instrumentation code is deployed as part of an application. Some instrumentation toolkits support saving offline application usage and uploading it when the device is online again. Analytic applications may take advantage of sensors found on mobile devices such as location, orientation and acceleration.

Position and Adoption Speed Justification: This is the first time that mobile Internet analytics appears on the Hype Cycle and it enters at the mid-point between the Technology Trigger and the Peak of Inflated Expectations. There have been attempts at mobile Internet analytics during the past five years, but the sophistication of mobile devices has presented too many challenges to warrant much effort. All the major Web analytics offerings support mobile devices and offer toolkits for mobile application development; however, there are also vendors focused exclusively on the mobile space. In addition, advertising networks measure mobile behavior, to better target users with mobile ads; also, mobile surveillance systems run within the mobile carriers to help them to understand their customers better.

The justification of two to five years to the Plateau of Productivity is based on the many pure-play vendors providing innovation, and a rapid increase in mobile device use. The leading Web analytics firms will acquire the mobile technology needed. However, violations of privacy will continue to be an issue and may inhibit what is ethical to analyze, especially with the new types of information that native applications can gather.

User Advice: A mobile Internet analytics strategy should be based on the nature of the activity in the mobile arena:

- If mobile is an extension of the Web channel, use a leading Web analytics product so that mobile usage can be easily contrasted with that of traditional users.
- If building new business on mobile applications, look at Web analytics firms for toolkits, but also evaluate the analytics provided by the pure-plays or mobile application development vendors. They will be the first to exploit the additional functionality that mobile applications can provide.
- When the mobile audience is composed of devices which poorly support instrumentation, understand the limitations and effort required to produce quality data — before heavy investment.
- In many markets, mobile technology will quickly catch up with what is currently leading edge. Review your user privacy policy, to ensure that it addresses the new concerns that mobile users have, especially when tying identity to location.

Business Impact: Where mobile users are an extension of the Web channel, the value of mobile analytics will mirror the value achieved with traditional Web analytics. The benefits come from improving the customer experience by segmenting the mobile users, subsetting by phones and tablets, understanding the patterns of behavior and adapting the Web channel to meet mobile user needs. Where mobile applications are being built, analytics are the eyes into what is being done with those applications — so that improvements can be made.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: AdMob; Adobe; Bango; Google; Neuralitic; Webtrends

Recommended Reading: "Using Web Analytics When Defining a Mobile Internet Strategy"

Portal-less Portals

Analysis By: Jim Murphy; Gene Phifer

Definition: Portal-less portals are mechanisms that provide portal platform capabilities — a personalized interface with relevant information from multiple sources — without using traditional portal server software. Approaches to portal-less portals vary and include rich Internet applications (RIAs), mashup platforms, Web content management systems and social software platforms. Most portal-less portals exploit modern Web-oriented architectures (WOAs), representational state transfer (REST)-based interfaces and widgets to offer a simple, yet flexible, path to interoperability.

Position and Adoption Speed Justification: Although enterprise portal frameworks and platforms constitute the established approach to building websites and Web applications across a range of scenarios, portals are becoming easier to build without traditional portal products. The portal goal of a single, personalized point of access to enterprise information, processes and people is no longer the sole domain of the established horizontal portal vendors and technologies. RIA platforms and Ajax technologies, enterprise mashup assembly platforms, Web content management systems, open-source frameworks and components, and social networking approaches are offering new means toward the same ends, and often without the complexity and long implementation times of traditional portal products.

The attraction toward portal-less portals (see "Get Ready for the 'Portal-Less' Portal") is largely the result of frustration with stagnant or failed portal projects and initiatives. Too many portal projects have fallen short of their initial value propositions, scarcely meeting user needs and delivering few measurable business results. Business units and end users in many organizations have come to view established portal products as restrictive, requiring heavy IT involvement and intervention whenever they want to add an application or make a change. Rather than a facility for delegating administration and putting control into the hands of business units and users, too many portal projects have come to represent an IT bureaucracy. In the meantime, business users and consumers have not only seen the alternatives, but also sometimes use them more often than any enterprise-deployed portal. Although iGoogle, Facebook and RIAs too numerous to mention are not readily aligned, secured or applied to business purposes, they're brimming with potential.

There are few other weaknesses with portal-less portals, compared with longer-standing traditional portal products and platforms. Portal-less portals will rely more heavily on service-oriented architecture (SOA) and WOA than many traditional portal platforms, which tend to offer a great variety of front-, middle- and back-end means of integration. Thus, SOA and WOA are often a prerequisite for effective and extensible portal-less portals. While Widgets are decidedly more simple today than standards-based portlets or Web parts, without firmly established standards, they may also be less capable and sophisticated when it comes to features like interportlet communication, supporting granular levels of security and advanced personalization.

User Advice: Of course, alternatives to long-established portal architectures, although undeniable in their appeal to end users, raise challenges. First, organizations must ensure that new efforts are aligned with business goals and existing systems, while mitigating risk. Second, organizations must prevent alternative approaches from creating yet more information and process silos. Third, organizations must avoid subverting value propositions ingrained in portal initiatives, such as delegated administration, portlet standards implementations, directory integration and ready-to-use portlets for common applications. Organizations should consider portal-less portals part of their portal and broader user experience platform (UXP) strategy.

While independent vendors, such as Backbase and edge IPK, are making progress in the market, the portal-less portal idea is not entirely lost on the more established portal providers. Even the largest and most established portal vendors, like Microsoft, Oracle, SAP and IBM, have portal-less portal qualities, if not direct capabilities, although they're often underplayed in light of the

more traditional portal approaches. In addition to seeking portal alternatives, organizations should, therefore, dig deeper toward understanding their providers' portal-less portal capabilities.

Business Impact: Given the right conditions, some companies can benefit greatly from portal-less portals. Organizations with relatively simple access to many disparate systems and resources, and that have a thorough SOA or WOA foundation in place, can use portal-less portals to provide useful user interfaces far more quickly than traditional portal approaches. Given the right conditions and scenarios, portal-less portals can bring faster time to market and more direct business value than traditional portal platforms.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Adobe; Backbase; edge IPK; FatWire Software; JackBe

Recommended Reading: "Generation 7 Portals: Unifying the User"

"The Emerging User Experience Platform"

"Get Ready for the Portal-Less Portal":

Online Channel Optimization

Analysis By: Mick MacComascaigh; Gene Phifer

Definition: Online channel optimization (OCO) is the discipline of maximizing the effect and impact of the engagement with target personae achieved over a variety of communications media. The phrase "online channel" refers, therefore, to a channel of "communication" and is a collective term that includes emails, IPTV, multiple websites, various social media, search and mobile applications. Initially, OCO entails the careful collection of information about the particular persona from the first point of interaction, and will typically combine this with historical and/or modeled data or business intelligence — to derive the intelligence required to decide on follow-up actions. This information is used to establish the context in which the interaction is taking place and to gain an understanding of the needs of the individual persona. The delivery of an experience that resonates with that understanding is the next crucial step. The term "optimization" pertains to the practice of modeling and measuring this interaction in terms of its intended effect, and allowing for progressive improvement of that measurement through incremental, interactive and sometimes experimental steps. Optimization also refers to the extent to which you may wish to use the online channel for communications, as opposed to other media such as print or telecommunications. Critical to this discipline, is the correlation and optimization of communications across multiple channels; for example, in the context of a single dialogue.

OCO overlaps with multiple markets and disciplines. While the precepts of context-aware computing are core to the "understanding" paradigm of OCO, the development of a user experience platform will be critical to the delivery of the experience — considered in real time to be most relevant and therefore impactful for the target persona. Other adjacent technologies will include CRM, sales force automation, recommendations engines, search and information access — along with multivariate testing and multiple forms of analytics.

OCO is not currently a market, although areas such as "customer experience management" or "Web experience (engagement) management" are marching in this direction. This means that buyers will need a two-step approach to progressing with their strategy:

Apply a best-practice approach to identify the kind of impact they wish to exact from their online presence (see "Tactical Guidelines for Narrowing Your Choices When Evaluating WCM Vendors").

Assess what are the most appropriate solutions components (typically from different suppliers) to build the necessary solution architecture over time.

However, as the importance of the online channel grows — along with the ambitions of higher-level executives to have a more cohesive, holistic online strategy — the demands of more focused buyers will become more consolidated, as will the drive for vendors to make the necessary offerings available. OCO is also not a single technology. In fact, it is the next evolution of Web content management (WCM) and this market will be completely subsumed by OCO before it reaches its plateau as a discipline. It is also highly likely that areas such as Web analytics and recommendation engines will be subsumed into OCO, because this field is an absolute requirement for the ultimate success of such a discipline.

Position and Adoption Speed Justification: The promise of this level of capability in understanding/response has been the battle cry of WCM since the end of the last century. However, implicit personalization always presented a challenge in terms of cost-benefit, not to mention technology and know-how. Also, the behavior and attitude of end users sometimes created a negative backlash against such "creepy" attempts by companies to get to know them better, and this will require an opt-in approach in some cases and contexts.

The individual components of OCO are, therefore, not necessarily all new. In adjacent disciplines, such as analytics, multivariate testing and recommendations, progress has been made toward improving the performance of a given website. However, OCO as a coherent discipline has only emerged during the past 12 to 18 months. Therefore, while the term will appear fresh, the precepts of this discipline will be understood by organizations of all verticals — along with the associated benefits. Adoption rates will vary greatly and will depend primarily on vertical and region, and on legal or cultural barriers to the perceptions surrounding the associated techniques.

User Advice: There is absolutely no requirement for a "Big Bang" approach when it comes to OCO; however, your initial steps will need to be made in the next six to 12 months, or sooner, depending on the extent to which your online strategy is linked to the overall success of your organization.

The first step is to consider the effect that you want to have on your online channel, rather than concentrating only on the additional internal efficiencies you are likely to achieve.

You will then need to assess whether your online strategy supports those organizational goals that have already been laid out.

Once you have made these initial considerations, you are in a better position to assess what components in your broader solution architecture will be needed in order to start on the path toward optimizing the effect of your online channel.

Business Impact: The business impact will be transformational for some organizations, and very high for many others. Since optimization requires quantitative transparency with regard to the desired effect, a new era of "causality" will emerge. Marketers, for example, will have greater evidence of which actions worked, and which didn't. Authors will be provided with automatic feedback on whether or not specific pages are having the desired effect, or what might be required to improve the overall impact.

OCO will also mean that decision making will, necessarily, involve those leaders that have a more holistic perspective in terms of client interactions. OCO transcends a website or a customer

service point. The positive impact of OCO will, therefore, rely as much on the people driving the initiative as the processes and technologies supporting the ongoing optimization process.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: Adobe; Autonomy; Bridgeline Digital; CoreMedia; Ektron; Endeca; IBM; SDL; Sitecore

Recommended Reading: "Context-Aware Computing Will Increase the Impact of Your Online Strategy"

"The Emerging User Experience Platform"

"Magic Quadrant for Web Content Management"

"Incorporating the Web Into Cross-Channel Customer Analysis"

"Tactical Guidelines for Narrowing Your Choices When Evaluating WCM Vendors"

Citizen Developers

Analysis By: Ian Finley

Definition: Gartner defines a citizen developer as a user who creates new business applications for consumption by others using development and runtime environments sanctioned by corporate IT. In the past, end-user application development has typically been limited to single-user or workgroup solutions built with tools like Microsoft Excel and Access. However, today, end users can build departmental, enterprise and even public applications using shared services, fourth-generation-language (4GL)-style development platforms and cloud computing services. This shift enables organizations to unlock the tacit knowledge of end users and releases IT resources to do what each does best; however, it requires a new style of IT support — helping end users be good citizen developers.

Position and Adoption Speed Justification: In an era of shoestring IT budgets, end users are looking outside the IT organization for application development. Enterprises need a wide range of applications to function optimally, but resource constraints are forcing IT organizations to focus on fewer high-priority applications. The long tail of applications needing development continues to get longer. Further, even with priority applications that IT does build, today's rapidly changing business climate demands greater application agility. Although agile development techniques help IT respond to business needs more rapidly, a lack of dedicated resources often impedes a rapid IT response. Finally, the tacit knowledge locked into business areas is often difficult to translate into project requirements, making IT projects slow and time-consuming for end users. End-user development is one of the key ways enterprises address these issues.

These issues have existed for some time, but new, simple-to-use, application development options are empowering end users to build more-ambitious applications. End-user developers are empowered by new forces, including mass customization, the industrialization of infrastructure through cloud computing, the evolution of developer tools and changing workforce demographics. These emerging trends — which have been heartily endorsed by vendors such as Microsoft, Oracle, VMware and Zoho — not only make it easier for end users to develop their own applications, but also enable end users to create applications that extend into the traditional realm of IT application development. As a result, the number of end-user developers and the applications they've developed are surging.

User Advice: Although end-user application development has operated under the radar for years, IT now needs to engage with end-user developers more actively to enable them to be good citizen developers. The new, more powerful applications end users are building have the same risks and rewards as some IT-developed applications, and they need an appropriate level of quality, security, performance and availability. IT's role in end-user application development needs to expand to include formal citizen developer support in order to capitalize on the opportunity and minimize the risks associated with expanding end-user development. Ignoring or attempting to prevent end-user development carries high risks. Instead, IT should manage the risks by helping end users be good citizen developers and offer platforms with the "sharp edges" removed:

- Be proactive, and engage with the business about requirements for citizen developer tools, tool selection, tool support and criteria for creating safe, manageable applications.
- Offer a sanctioned private or public cloud development platform suited for citizen developers such as VMware WaveMaker, LongJump or Oracle Application Express (Oracle APEX).
- Provide sandbox environments that enable citizen developers to create and test solutions before they share them with a broader community. Provide just enough governance for citizen developers so IT can review of the quality, security, performance and availability of their applications before they are deployed.
- Implement monitoring on production servers to detect resource-draining citizen developer applications, and develop procedures to handle them.
- Create a mechanism to transition popular, opportunistic applications to IT-managed, systematic applications.

Business Impact: A citizen developer support program that includes IT guidance, sanctioned platforms, access to enterprise services and just enough governance can create a safe environment for end users to unleash their innovative potential. By engaging with end users and helping them help themselves, IT can accelerate the exploitation of new technology, help end users create competitive advantage and build closer links with their business peers, while reducing the risks of end-user development.

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Sample Vendors: LongJump; Oracle; TrackVia; VMware; Zoho

Recommended Reading: "Citizen Developers Are Poised to Grow"

Context Delivery Architecture

Analysis By: William Clark; Gene Phifer

Definition: Context-aware computing is about improving the user experience for customers, business partners and employees by using the information about a person's or object's environment, activities, connections and preferences to anticipate the user's needs and proactively serve up the appropriate content, product or service. Enterprises can leverage context-aware computing to better target prospects, increase customer intimacy, and enhance associate productivity and collaboration. From a software perspective, context is information that

is relevant to the functioning of a software process, but is not essential to it. In the absence of this additional information, the software is still operational, although the results of the software's actions are not as targeted or refined.

Most context-enriched services are implemented in siloed systems, where a particular person, group or business process profits from being situationally aware. To replicate, scale and integrate such systems, certain repeatable patterns emerge that will require a new enterprise solution architecture, known as context delivery architecture (CoDA). In the latter half of 2010 and 2011 to date, Apple and Google are the only vendors that have addressed many of the principles of CoDA.

Gartner defines CoDA as an architectural style that builds on service-oriented architecture (SOA) and event-driven architecture (EDA) interaction and partitioning styles, and adds formal mechanisms for the software elements that discover and apply the user's context in real time. CoDA provides a framework for solution architects that allows them to define and implement the technology, information and process components that enable services to use context information to improve the quality of the interactions with the user. The technologies may include context brokers, state monitors, sensors, analytic engines and cloud-based transaction processing engines. Context-aware computing is maturing relatively slowly, compared with mobile and Web design. This is natural, as CoDA will rely on those sets of technologies to provide a stable base upon which context-enriched services can be built. CoDA should also define data formats, metadata schemas, interaction and discovery protocols, programming interfaces, and other formalities. As an emerging best practice, CoDA will enable enterprises to create and tie together the siloed context-aware applications with increased agility and flexibility. In the enterprise for employee-facing apps, as with SOA, much of the pull for CoDA will come from packaged-application and software vendors expanding to integrate communication and collaboration capabilities, unified communications vendors and mobile device manufacturers, Web megavendors (e.g., Google), social-networking vendors (e.g., Facebook) and service providers that expand their roles to become providers and processors of context information. However, for consumer-facing apps, the pace is much faster.

The CoDA architecture style considers information, business and technology domain viewpoints. The technology domains are application infrastructure, communications infrastructure, network services and endpoints (devices). Thus, CoDA provides a framework for architects to discover gaps and overlap among system components that provide, process and analyze contextual information. A key challenge for CoDA will be information-driven, not technology-driven. This key challenge will revolve around what information sources can provide context, then what technologies will enable that information to be provided in a secure, timely and usable manner, and how this information can be folded into processes.

Position and Adoption Speed Justification: Gartner introduced the term CoDA in 2007, based on developments in areas such as mobile communications and cloud computing. Through year-end 2011, we expect that aggressive enterprise architects and project managers will weave elements of CoDA into their plans to orchestrate and build context-enriched services that rely not only on federated information models, but also on federated delivery services. CoDA relies on SOA as a foundation and is related to EDA, because enterprise architectures need to be agile and scalable to support context-aware computing. SOA and EDA have not yet reached the Plateau of Productivity. We expect CoDA to evolve into a new, lighter weight style of architecture, leveraging the progress of the main context providers, and that it will reach the Plateau of Productivity gradually, after 2014.

User Advice: Although CoDA is an emerging architectural style, Type A organizations can benefit in the short term by applying its principles as they experiment with use of context information to improve user experiences in customer-facing services and enterprise productivity.

Leading-edge organizations need to begin to incorporate CoDA constructs into infrastructure and services to gain competitive advantages with the early use of context-aware computing. Type A organizations should now be identifying which information sources, internal to the enterprise and external to it (e.g., from social-software sites), will provide context information to a range of applications. Build competencies in CoDA's technology domains, particularly in communications, because the migration of voice from silos to general applications will be a key transformation, opening up further opportunities to create applications enhanced by context-enriched services. Understanding mobile development will also be key. The refinement of your enterprise architecture to include CoDA constructs assumes prior investment in SOA. Most mainstream, risk-averse organizations should not invest in building a CoDA capability, but instead should explore the acquisition of context-enriched services through third parties.

Business Impact: Context awareness is a distinguishing characteristic of some leading software solutions and advertising services, particularly personalized advertising targeting mobile users from Apple, Microsoft and Google, including Amazon e-commerce, Google Search, Facebook, Apple and others. During the next three to five years, context-aware computing will have a high impact on Type A businesses in two areas: (1) extending e-commerce and mobile commerce initiatives toward consumers, and (2) increasing the efficiency and productivity of the businesses' knowledge workers and business partners. Context-aware computing will evolve incrementally, and will gain momentum as more information sources become available and cloud-based, context-enriched services emerge. However, these will be siloed and will not use a standard or shared CoDA model. The emergence of formal CoDA protocols and principles will translate into a new technology category and feature set, affecting all application infrastructure and business application providers.

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Appear Networks; Apple; Google; IBM; Interactive Intelligence; Nokia; Pontis; Sense Networks

Recommended Reading: "Fundamentals of Context Delivery Architecture: Introduction and Definitions, 2010 Update"

"The Seven Styles of Context-Aware Computing"

"Context-Enriched Services: From Reactive Location to Rich Anticipation"

"Fundamentals of Context Delivery Architecture: Provisioning Context-Enriched Services, 2010 Update"

"Big Data" and Extreme Information Processing and Management

Analysis By: Mark A. Beyer

Definition: According to Gartner research, information quantification includes issues emerging from the volume, the wide variety of information assets, and the velocity of their arrival (which includes both rapid record creation and highly variable rates of data creation, including suddenly lower velocity forcing the issue of scaling "down"). Within each variety of data types, there are significant variations and standards, creating additional complexity as well as complexity in the processing of these various resources. "Big data" is the term adopted by the market to describe extreme information management and processing issues which exceed the capability of traditional information technology along one or multiple dimensions to support the use of the

information assets. Throughout 2010 and into 2011, big data has focused primarily on the volume issues of extremely large datasets generated from technology practices such as social media, operational technology, Internet logging and streaming sources. A wide array of hardware and software solutions have emerged to address the partial issue of volume. At this point, big data, or extreme information processing and management, is essentially a practice that presents new business opportunities.

Position and Adoption Speed Justification: The larger context of big data refers to the massive data creation venues in the 21st century. It challenges existing practices of selecting which data to integrate with the concept that **all** information can be integrated, and that technology should be developed to support this. As a new issue with requirements that demand an approach, the expansion of traditional boundaries will occur extremely fast because the many sources of new information assets are increasing geometrically (for example, desktops became notebooks and now tablets; portable data is everywhere and in multiple context formats), which is causing exponential increases in data volumes. Additionally, the information assets include the entire spectrum of the information content continuum, from fully undetermined structure ("unstructured") to fully documented and traditionally accessed structures ("structured"). As a result, organizations will seek to address the full spectrum of extreme information management issues, and seek this as differentiation from their competitors, so they can become leaders in their markets in the next two to five years. Big data is thus a current issue (focused on volume and including the velocity and variety of data, or, together, V3) which highlights a much larger extreme information management topic demanding almost immediate solutions. Vendors are almost universally claiming they have a big data strategy or solution. However, Gartner clients have made it clear that big data must include large volumes processed in streams and batch (not just MapReduce), an extensible services framework which can deploy processing to the data or bring data to the process, and which spans more than one variety of asset type (for example, not just tabular, or just streams or just text). Partial solutions are acceptable but should be evaluated for what they do — not the additional claims. Gartner clients are making a very large number of inquiries into this topic; however, this is only evidence of true hype in the market, and, as a result, big data will hit the Peak of Inflated Expectations sometime in 2012, then suffer a long, slow and painful maturation in the Trough of Disillusionment. Importantly, the different aspects and types of big data have been around for more than a decade — it is only recent market hype around legitimate new techniques and solutions which has created this heightened demand.

User Advice:

- Identify existing business processes which are hampered in their use of information because the volume is too large, the variety is too widespread or the velocity creates processing issues. Then identify business processes which are currently attempting to solve these issues with one-off or manual solutions.
- Review existing information assets which were previously beyond existing analytic or processing capabilities, determine if they have untapped value to the business, and make them a first or pilot target of your big data strategy. In particular, look for information use cases which combine extremely diverse information assets into analysis and data mining solutions.
- Plan on utilizing scalable information management resources, whether this is public cloud, private cloud or resource allocation (commissioning and decommissioning of infrastructure), or some other strategy. Do not forget that this is not just a storage and access issue. Complex, multi-level, highly correlated information processing will demand similar elasticity in compute resources as those in storage/persistence needs.

- Extend the metadata management strategies already in place and recognize that more is needed to enable the documentation of these information assets, their pervasiveness of use, and the fidelity or assurance of the assets, tracking how information assets relate to each other and more.

Business Impact: Big data, and addressing all the extreme aspects of 21st-century information management, permits greater analysis of all available data, detecting even the smallest details of the information corpus — a precursor to effective pattern-based strategies and the new type of applications they enable. Big data has multiple use cases. In the case of complex event processing, queries are complex with many different feeds, and the volume may be high or not high, the velocity will vary from high to low, and so on. Volume analytics using approaches such as MapReduce (the Apache Hadoop project, for example) are valid big data use cases. In addition to MapReduce approaches which access data in external Hadoop Distributed File System (HDFS) files, the business intelligence use case can utilize it in-database (for example, Aster Data and Greenplum), or as a service call managed by the database management system (IBM Big Insights, for example), or externally through third-party software (such as Cloudera or MapR). Enterprises using portals as a business delivery channel have the opportunity already to combine geospatial, demographic, economic and engagement preferences data in analyzing their operations, and/or to leverage this type of data in developing new process models. For example, supply chain situations include location tracking through route and time, which can be combined with business process tracking. Life sciences generate enormous volumes of data in clinical trials, genomic research and environmental analysis as contributing factors to health conditions. Gartner estimates that organizations which have introduced the full spectrum of extreme information management issues to their information management strategies by 2015 will begin to outperform their unprepared competitors within their industry sectors by 20% in every available financial metric.

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Cloudera; EMC-Greenplum; IBM; MapR; Teradata-Aster Data

Recommended Reading: "Big Data' Is Only the Beginning of Extreme Information Management"

"Hadoop and MapReduce: Big Data Analytics"

"CEO Advisory: 'Big Data' Equals Big Opportunity"

Web Content Product Recommendation Engine

Analysis By: Bill Gassman

Definition: A Web content product recommendation engine provides an algorithmic derived list of items to be published in a Web page or other online content such as email or display advertising. The algorithm can be configured to provide items that most others have searched for, put into a shopping cart, purchased or recommended to others. Recommendations can be biased by stock-on-hand, brand or price affinity and user profile dimensions, such as geography, time of day or historical behavior. New sources of behavior come from social "likes" and profiles linked to identification. The algorithmic engine can be run as a cloud-based service or on-premises. Recommendations are fed into content management systems or substituted directly into dynamic content formats. Some products can seek new behavior patterns, model responses and adapt content to changes in market interest, within minutes.

Position and Adoption Speed Justification: Recommendation engines for Web content have been adopted in high-end retail sites for some time. Some e-commerce engines have basic recommendation features built in. In addition, manual approaches are used by some organizations. The cost to deploy is still fairly high, keeping it away from low volume or low profit sites, but prices should fall as demand picks up. Evolving uses include service resolution recommendations, greater ties with customer and transaction information from back-office systems and context-aware computing. Placement in the pre-peak hype segment is justified by the relatively low penetration of commercial products but increasing number of vendors coming to market. We estimate a two to five year speed to plateau adoption, based on the narrow target market of retailers.

User Advice: Start with an ROI calculation to see if an uplift of 5% in website revenue will justify the cost. This is a conservative but realistic result. Dedicate at least one full-time resource to learn and operate the tool, and to train others to work with the rules that bias the recommendations. Develop an attribution model with a test control that takes into account how many people would buy an item anyway. Adopt the advanced features such as inventory and margin data integration once the basic skills are mastered. Monitor the recommendations to ensure relevancy.

Business Impact: The potential is high, but most organizations we have spoken with are realizing a 2% to 5% uplift in revenue. As the algorithms improve, along with context-aware computing and integration with back-end systems, so will the customer experience and uplift yield.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Adobe; Baynote; Certona; IBM; Monetate; MyBuys; Oracle; RichRelevance

Recommended Reading: "Tutorial: Web Content Product Recommendation Engines"

"Coremetrics' Intelligent Offer Recommendation Engine"

"Real-Time Customer Offer Engine Vendor Landscape for Retail"

Portal Fabric

Analysis By: Jim Murphy; Gene Phifer

Definition: The portal fabric phenomenon is gradually emerging. The portal fabric is a concept whereby portals and Web resources adapt to users' preferred environments and interaction patterns, rather than forcing them to change their behaviors based on the individual portals. The average user accesses many portals and Web resources, whether for work, banking, travel, government, shopping or news. Each is stovepiped from the others, and interoperability among them is either nonexistent or limited to content syndication via Really Simple Syndication (RSS), Atom, portlet-level syndication through Web Service for Remote Portlets (WSRP) and rapidly emerging representational state transfer (REST)-based approaches. When various portals and Web resources can syndicate content, data and user information with each other, the result is the portal fabric. With the portal fabric, users become the center of their own portal universes. In a sense, portal services come to users in their preferred environment, rather than forcing them to log on to a specific portal. People, rather than specific websites or portals, are most fundamental nodes in the portal fabric.

In the same way that traditional portals provide content aggregation, the portal fabric enables portal aggregation. All the portals and Web resources the user cares about can be aggregated into a single portal shell or other Web-based user interface, taking the form of a personal portal (or MyPortal). With the portal fabric in place, access to any portal is provided by an aggregation feature. Portlets, widgets and gadgets, as well as sections of portal pages, portal pages, Web pages and entire portals, can be aggregated. Front ends will comprise not only traditional portal frameworks, but also mashups, rich Internet applications (RIAs), social environments and apps accessible via any device. The emergence of the portal fabric will enable the "follow me portal," where the portal experience extends beyond the traditional Web browser and follows the user to any network device.

In terms of technology and standards, significant progress will be necessary to realize the portal fabric. Universal, federated identity management that provides key security and personalization data will be an essential enabling factor for the portal fabric. WSRP provides basic portlet-level syndication, but other interoperability standards also must be in place for the portal fabric to progress toward widespread use. The portal fabric will require federation across private and public networks, and it will require trust, especially for highly secure transactions. As context clues like location and social scenarios come more strongly into play, the portal fabric must also include an architecture for context awareness, perhaps as a next-generation of personalization and relevance. Presence awareness, too often underestimated as a mere feature of IM, will emerge as a requirement for the portal fabric and will require more reliable and universal standards. Federation and syndication requirements are further increasing as social objects become a new form of data for which enterprises will seek interoperability.

Position and Adoption Speed Justification: This year, 2011, has brought progress to the portal fabric concept, though the portal fabric's ubiquity, as well as its absence as a distinct product category, makes progress hard to recognize. Horizontal portal vendors that have embraced portal standards are well-positioned to enable users to become nodes in the portal fabric; however, work is required, especially in portal-centric user information and federated identity management. Second-generation portlet standards like WSRP v2 and JSR 286 are providing portlet interoperability and federation, but evolving REST-based integration approaches are growing enormously and will certainly play an important role.

Several of the largest portal providers are employing a portal fabric to bring a single user experience to a widening range of collaboration platforms, content management systems, social networking suites and business applications. Yet, the portal fabric's fundamental requirement for interoperability may be compromised by larger providers with aspirations to sell comprehensive suites. Meanwhile, several more focused portal providers emphasize interoperability, and seek to leverage existing SOA architectures in supporting the portal fabric idea. Some consumer-oriented portals, especially those embracing and enabling mashups and standards like OpenSocial, are also positioned to participate in the portal fabric.

Consumerization, as well as certain vertical markets, are catalyzing the portal fabric's growth sharply. Consumer-centric portals and social platforms, like Facebook and Twitter, are gaining interoperability through standards like OpenSocial, Activity Streams and Salmon Protocol. In vertical industries like healthcare, the portal fabric is an exigency, rather than an option. The entire complex healthcare value chain, among providers, insurers, government organizations, pharmaceuticals and device manufacturers, will only accomplish the goals of universal healthcare, reduced costs of healthcare and better patient outcomes through collaboration and cooperation, rather than competition. As the center of the healthcare universe, patients and their doctors must be able to access medical records and services across a wide range of repositories and systems from various providers.

User Advice: Most companies regard the portal fabric as a fundamental foundation for their user experience platforms and an extension of their SOA and WOA architectures.

Organizations should pay attention to evolving standards for portal interoperability and federation, and be wary of vendors that employ proprietary technologies and protocols to sell comprehensive suites.

Organizations should prepare for the portal fabric by addressing security, identity management and privacy policies upfront. Among other intricacies, the incorporation of consumer-facing portals into the portal fabric is likely to require alternative, single-sign-on approaches, such as OpenID, Facebook Connect and InfoCard. Universal, federated identity management capturing portal-centric user information will be a cornerstone of the portal fabric.

Enterprises should track the evolution of portal interoperability standards, and should leverage federated identity management as business requirements dictate. Press portal product vendors to implement portal fabric features as standards emerge.

Business Impact: Vendors providing aggregation mechanisms for the portal fabric will own the user experience. Early adopters that provide aggregation of relevant nodes of the portal fabric can achieve competitive advantages in their industries. Other providers besides traditional horizontal portal players may seek this role, including consumer Web personal portal providers. Some enterprises will provide aggregation of the portal fabric, while others will expose their content and data for aggregation by others. From a user perspective, the ability to aggregate multiple portals and Web resources will result in the ability to correlate and orchestrate them into on-the-glass composites, including enterprise mashups. Finally, vendors that offer mashup-enabling technologies will serve a valuable role in transitioning enterprises from "walled gardens" to full participants in the portal fabric.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Recommended Reading: "The Portal Fabric Will Enable Each User to Be the Center of the Portal Universe"

Social Media Metrics

Analysis By: Bill Gassman

Definition: Social media metrics is a category of social analytics, focused on external activity. It is used to indicate business and operational attributes of content, people and metadata that interact across Internet-based social applications. Social applications range from blogs to social media sites to social functions within applications to product ratings. While social media metrics may be part of a larger metrics framework, such as Web analytics or performance management, there are unique aspects of measuring social activities and there is a market for tools which narrowly focus on this domain. The unique nature comes from new forms of dialogue between an enterprise and end users, along with autonomous actions of social participants. Social media metrics include dozens of counter attributes, such as comments posted, friends reached, reposts and so on. The real value comes from prime and aggregate social media metrics derived from raw counters, such as sentiment, buzz, rating, influence, exposure and virality.

Position and Adoption Speed Justification: The position for social media metrics at pre-peak is justified by the wide adoption of metrics by those involved with social media, however the breadth of metrics definitions vary by user role, metrics vendor and social application. Products

for social media monitoring are getting better, shifting from finding comments to better linguistic analysis of what is being said. There are, however, some discussions about the lack of value for sentiment analysis, meaning some of the hype shine is already wearing thin. The connection of social metrics to business value is still primitive, and new social applications generate new metrics. It will be two to five years before the productive use of social media metrics is widespread. A driver of adoption is availability of tools via software as a service models. In addition, advertisers will create ad hoc metrics to use as currency within social media advertising efforts. Metrics will not standardize, however, so users within customer support, product marketing and research must learn to calibrate available metrics to their environment and manage to the trends.

User Advice: It is essential to embrace social media metrics as part of a social media strategy. Use the unique metrics to help optimize social media activity, but also merge social media metrics with other metrics already in use. For example, in marketing and advertising, especially on the Web channel, metrics such as unique and repeat visitors, conversations, registrations, value of sale and cost of campaigns are already understood, and measured within Web analytics or campaign analysis tools. Measuring tweets or Facebook page visits alone is as wrong as measuring Web hits. To have long-term value, social metrics must correlate with some business value, such as optimized campaigns, lower cost of sale, greater lifetime customer value or customer satisfaction metrics.

Business Impact: Using social media metrics will improve the yield of social media initiatives by showing what is working and what is not. Social media metrics will have the most impact in vertical industries and departments where social media has impact. Business to consumer, especially in retail, consumer product goods, finance and government are the early adopters. Marketing, advertising, customer support, product management and research are departments where social media, and using metrics, will have the most impact. In some cases, users are new to the proper use of metrics, and will benefit from those within the organization with expertise. The most impact will come to those who tie social media metrics to process and establish a feedback loop of social activity decisions to business value.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: Attensity; IBM; Nielsen Media Research; salesforce.com; SAS

Recommended Reading: "Measuring the Value of Online Social Media Activity"

"Marketing Essentials: How to Integrate Social Media Into Your Marketing Communications Strategy"

"Social Media Makes Marketing Metrics More Meaningful"

"Apply a Comprehensive Planning Framework as Business Gets Social"

At the Peak

Context-Enriched Services

Analysis By: William Clark; Anne Lapkin

Definition: Context-enriched services use information about a person or an object to proactively anticipate the user's need and serve up the content, product or service most appropriate to the

user. The IT industry is beginning to recognize a pattern where augmented reality offerings, mobile location-aware ads, mobile search and social mobile sites fall under the umbrella term "context-aware." Context-enriched services are the fundamental unit of software for improving user experiences through context, and are an implementation foundation for context-aware computing. These terms denote services and APIs that use information about the user to optionally and implicitly fine-tune the software action with better situational awareness. Such services can proactively push content to the user at the moment of need, or suggest products and services that are most attractive to the user at a specific point in time.

Context is relative and describes the environment, history or setting in which a user interaction occurs. From a software perspective, the context for a service is information (data) that can add value to the functioning of the service, but is not essential to it. In the absence of context information, the service is still operational, but may not provide results that are as finely targeted. The currency and quality of the context information will determine the value it adds to the service. Most applications that benefit from context-enriched services will subscribe to them using service-oriented-architecture (SOA) techniques and implementations.

Context-enriched services will also require sophisticated reasoning to determine how software actions should be changed to make them more appropriate for the user's context.

The more current and selective the context information, the more precise the functioning of the service. Context-enriched services are provided by context brokers, which are designed to retrieve, process and stage this information so that subscribing functions can use relevant context in addition to processing incoming data. When an application uses context-enriched services, it is a context-aware application. As a best practice, context-enriched software services have the modularity and accessibility of SOA and use SOA-related standards.

Position and Adoption Speed Justification: Context enrichment refines the output of services and improves their relevance. We observe implementations today in mobile computing, social computing, identity controls, search and e-commerce — the areas in which context is emerging as an element of competitive differentiation. However, the current context-aware solutions are fragmented — they are individually designed, custom-developed and deployed, and because of their competitive importance are often not widely distributed or advertised. The movement in social computing to open and shared social relationship (social graph) information is an early step toward the standardization of context-aware computing APIs; however, most of the required standardization effort has not yet begun. Context-enriched services will require multiple stages of innovation and platform technology evolution before their essential benefit is well-understood in the broad mainstream computing markets.

In 2011, we are seeing specific services aimed at consumers beginning to take shape in the form of services offered by context providers such as Apple that allow advertisers to plug content into certain situations, whereas before all these services were custom-built. Context-enriched services have advanced significantly during the past year, moving from a midpoint post-trigger position toward the Peak of Inflated Expectations. We are seeing an increasing number of applications that, while they may not use the term "context-aware computing," are clearly using context information to improve the user experience. These include Apple's recent developer guidance regarding location-aware advertising, the augmented reality systems that give information on an object shown in the camera lens of a phone, and the ability of Google Android-based phones to augment services based on the user's contacts and behavior, and other components of context information.

In the long term, there will be a shift from reactive to proactive services, so push and subscribe will be more prevalent, and the number and richness of information sources will rise.

User Advice: Context-enriched services will begin with simple scenarios (one category, such as location) and will evolve into compound patterns (e.g., taking into account location, presence and group behavior). Application developers and service providers should take advantage of the wide range of contextual opportunities in their e-commerce, security, social computing and mobile computing systems. Some early context processing can be achieved using event processing and complex-event-processing technologies; enterprises need to plan to incrementally develop or source more context-enriched services in step with their ambition levels of improving the user experience.

Business Impact: Context-enriched services will be transformational for solution providers. Context enrichment is the next frontier for business applications, platforms and development tools. The ability to automate the processing of context information will serve users by increasing the agility, relevance and precision of IT services. New vendors that are likely to emerge will specialize in gathering and injecting contextual information into business applications. New protocols like Real-Time Bidding (RTB) will allow for the mashing up of and delivery of context-enriched services. Most context-aware applications are likely to arrive as incremental enhancements to SOA, without a major disruption to the prior architecture. However, the new kinds of business applications, especially those driven by consumer opportunities, will emerge, as the function of full context awareness may end up being revolutionary and disruptive to established practices.

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Appear Networks; Apple; Google; Microsoft; Nokia; Pontis; Sense Networks

Recommended Reading: "Context-Aware Computing: The Future Is Now"

"Key Issues for Context-Aware Computing, 2010"

"Context-Enriched Services: From Reactive Location to Rich Anticipation"

"Context-Aware Computing: It's Time to Carefully Choose Your Vendors"

"Apple Note Signals Move to Claim Context-Aware Advertising"

Mobile Web Applications

Analysis By: David Mitchell Smith; William Clark

Definition: Mobile Web applications refer to applications for mobile devices that require only a Web browser to be installed on the device. They typically use HTML and Ajax (and, increasingly, HTML5 components), although they may make use of augmented rich Internet application (RIA) technologies, such as Flash, JavaFX and Silverlight, but are not written specifically for the device. Rich, mobile Web applications have roughly equivalent usability to PC-rich Web applications (or RIAs), when designed specifically for smaller form factors. Simple mobile Web applications limit the use of RIA technologies and are designed to present information in a readable, action-oriented format. Mobile Web applications differ from mobile native applications, in that they use Web technologies and are not limited to the underlying platform for deployment.

Position and Adoption Speed Justification: For many years, users have hoped that mobile Web applications would go mainstream. Although acceptance has been higher in some geographies than in others, the experience was less than ideal, until the introduction of the Apple iPhone. Its Safari browser, along with good JavaScript support and overall ease of use, has made

the difference. When the iPhone was introduced, the only way to develop for it was via Web programming. Although, subsequently, Apple has moved emphasis toward native applications (via the Apple App Store), its contribution greatly raised the bar for mobile Web applications. In addition, Apple and other vendors (for example, PhoneGap, WebApp.Net, CiUI and MotherApp) have libraries that allow for a richer-than-expected user experience, using primarily HTML and Web technologies. Often, these are used in conjunction with extensions or native code wrappers for JavaScript that enable mobile Safari applications to access the accelerometer, geolocation, multitouch, and, in the future, camera, sound and vibration functions.

Google's Gmail is a Web application without a wrapper. It uses Safari's HTML5 functions and SQLite offline storage to provide a user experience comparable to the native iPhone Mail application, without any installation or upgrade. Improvements in other platforms and browsers (e.g., Google's Android and Palm's webOS) continue this push. Research In Motion (RIM) has acquired a WebKit-based browser and is in the process of integrating it into its BlackBerry smartphones. The real movement will happen as critical mass for various pieces of HTML5 materializes; however, testing and interoperability issues will remain due to implementation differences. For example, the HTML5 spec leaves some caching implementation details to the browser supplier; thus, there will be differences in how offline modes operate. The proliferation of WebKit-based browsers in mobile will help with this. HTML5 is early in the Hype Cycle, but components of the specification are beginning to see adoption. The hype has not yet peaked (see "HTML5 and the Modern Web" for more details).

User Advice: The mobile Web experience is driven by consumer applications first. It is a result of the direct impact of consumerization on enterprises. Organizations wishing to address mass-scale opportunities through mobile Web adaptation platforms need to consider Netbiscuits, InfoGin, Volantis Systems and Usablenet. The iPhone points the way toward a new consciousness of richer user interfaces and services on mobile clients.

Portability among applications in the mobile world remains a challenge. This is largely due to current and future fragmentation in the mobile market. Gartner recommends Web standard approaches when portability and ease of development are goals. Other issues, such as form factor (small screens are not optimal) and connectivity (intermittent and costly in many cases), also need to be factored into decisions.

HTML5 and Web technologies make the most sense when reach across multiple platforms is a strong requirement. Native approaches make more sense when there is a need to take advantage of the leading-edge device capabilities. Hybrid approaches are increasingly becoming a viable way forward as well.

Business Impact: As a result of the success of the iPhone, mobile presence has become a critical requirement for reaching consumers and, increasingly, business users. The mobile Web, as first delivered in a satisfactory way by the iPhone, has made mobile Web clients feasible. Although many organizations may have started down a mobile Web path with early-generation technologies, such as Wireless Application Protocol, the advent of native applications for the iPhone and other smartphones has recently been the focus. Online strategies must increasingly take into account a native mobile application experience, as well as the need to reach more platforms. A mobile Web experience is a good way to do this.

Two major reasons for going with mobile Web applications are to hedge your bets regarding platforms and to support multiple platforms. Another consideration is security, because direct access to device software introduces additional security concerns. Java has not delivered its promise of cross-platform deployment (Java Platform, Micro Edition does provide some standardization) in the mobile sector. Flash and Silverlight are choices for only a subset of devices, not the iPhone. Mobile Web applications can — in certain scenarios and with careful attention to APIs and extensions — provide a rich user experience that does not equal native

applications, but approximates it at a fraction of the development effort and with greater portability and flexibility.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Apple; Google; Microsoft; Netbiscuits; Nokia; Research In Motion; Sencha; Usablenet

Recommended Reading: "Magic Quadrant for Mobile Consumer Application Platforms"

"HTML5 and the Modern Web"

HTML5

Analysis By: David Mitchell Smith; Gene Phiifer

Definition: HTML5, as the heir apparent to HTML4, is a logical next step in the development of HTML. However, the term HTML5 is often used to mean much more than the formal specification, and much less simultaneously (see "HTML5 and the Modern Web"). HTML5 is the proposed specification for the next generation of HTML. Although the process of creating the specification began in 2004, it was only in the first part of 2010 that HTML5 moved to the foreground of industry conversation and enterprise technology managers' agendas. HTML5 is important, as it brings to the Web much of the rich Internet application (RIA)-like capabilities that have required additional software.

HTML5 is not one thing. At one extreme, the hype and aura around the term can lead to using it to mean one particular feature (e.g., video). At the other extreme, treating it as if it is one very large inseparable thing will lead to a "wait until it's done" approach, which will prove to be a bad choice for most companies. HTML5 consists of many components, including video, canvas, audio and offline capabilities. In addition, other modern Web capabilities, such as JavaScript, CSS3 and WebSocket, are closely related and often grouped together.

Position and Adoption Speed Justification: HTML5 has been in the headlines recently and has garnered extremely charged opinions as a result. The extreme opinions abound, ranging from "HTML5 will make everything else (especially Flash) irrelevant" (see "HTML5 and the Future of Adobe Flash") to "It will take over a decade for HTML5 to be ratified, so we don't need to pay attention to it until then." The reality is, as usual, somewhere in between, and is time- and scenario-dependent.

The working subset and de facto standards may be driven by mobile devices. OS fragmentation continues to be a significant issue in mobile. However, the vast majority of mobile browsers for smartphones are, or will be, based on WebKit. OS fragmentation increases the need for a viable cross-platform strategy. The common technology base of WebKit and the evolution of working subsets and the de facto nature of HTML5 pieces may fit this need.

HTML5 usage and stability will appear first in mobile environments, then on the desktop. HTML5 usage and stability will be driven by desktop and mobile use scenarios, and there will be different drivers for both environments.

User Advice: Developers should:

- Familiarize themselves with the components of HTML5, and which ones will be supported in which browsers.

- Exploit available features of HTML5 now, but recognize that they are based on a draft standard and are subject to change.
- Consider HTML5 when designing applications that require the broadest reach across the most browsers and devices.

Business Impact: There is visible momentum around HTML5; however, as with most technologies, especially on the Web, interest is occurring primarily outside the enterprise sector — among progressive Web designers and among mobile application developers. Web developers are starting to design around new elements in HTML5, such as canvas, offline mode and video. Some websites are also starting to abandon support for older browsers, such as Internet Explorer 6 (IE6). Although those browsers still have significant enterprise share, they don't support HTML5. Developers of RIA-based sites that rely on Flash and Silverlight are evaluating HTML5 as a possible alternative, over the long term, to continued reliance on Flash and Silverlight. Mobile developers are interested in HTML5 as a cross-platform technology that avoids reliance on "native" applications; this is especially significant due to recent changes to Apple's developer terms of service (TOS), limiting the use of third-party programming tools for iPhone applications.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Adobe; Apple; Google; Microsoft; Research In Motion

Recommended Reading: "HTML5 and the Modern Web"

"HTML5 and the Future of Adobe Flash"

Cloud Collaboration Services

Analysis By: Jeffrey Mann

Definition: Many collaboration services are particularly suited for cloud-based deployment. These services include email, instant messaging, document repositories, team work spaces, discussion forums, wikis, blogs, Web/audio/video conferencing and many types of social software. They are generally well understood and reasonably mature technologies, require less integration and tailoring than many other software categories, and are most valuable when deployed widely.

While some vendors provide narrow offerings that concentrate on one or two of these technologies, the larger trend is to provide a bundled suite of capabilities across the spectrum of collaboration services. Megavendors like Microsoft (with its Office 365 offering), Google (with Google Apps) and IBM (with LotusLive) provide these cloud-based collaboration suites. At the other end of the market, many social software startups are launching specific collaboration services based on cloud deployment models.

Position and Adoption Speed Justification: Collaboration services in some form have been available from the cloud for some time. In fact, Web conferencing was the first technology to gain widespread acceptance using the cloud deployment model. However, reports of sporadic outages and privacy, confidentiality and security concerns with other cloud collaboration services have limited widespread adoption. Gartner believes many of these attitudes are poised to change. Cloud email in the consumer market from services like Yahoo, Hotmail and Gmail has convinced many that the model works, even though business requirements for availability, confidentiality,

archiving, security and compliance are higher for enterprise users. While cloud email is usually the primary driver for cloud collaboration services, usage will expand into other areas as the services prove their worth.

The highly anticipated release of Microsoft Office 365 in June 2011 is driving a great deal of attention to cloud collaboration services. It is likely to serve as a bellwether for enterprise cloud collaboration services in general. If it succeeds, the space as a whole will grow quickly. If it fails, it is likely to set back the concept of cloud collaboration services for some time.

User Advice: Unless the cloud model is unappealing or impossible due to organizational culture or compliance, privacy and security concerns, most organizations should be considering some form of cloud collaboration services, especially if they are facing some change in their current collaboration infrastructure due to major upgrades or vendor swaps. Those that are happy with their current infrastructure do not need to abandon what they have to move to the cloud, however. Cloud collaboration services are not suited to all organizations. Interenterprise collaboration opportunities not easily addressed with current internal, on-premises technology should be evaluated as an adjunct to current investments.

Business Impact: While the expected growth in movement to the cloud for collaboration services will have wide implications for the industry as a whole, it will have moderate to low impact on individual organizations. They will experience lower costs and more flexibility, as fewer resources will be needed to provide collaboration services to employees. While these benefits will allow companies to provide more employees with access to these services, they will not suddenly enable large shifts in business practices or new capabilities. The potential benefits are real, however. For those organizations comfortable with the idea of cloud deployment, collaboration services will be a natural contender.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: Google; IBM; Microsoft; salesforce.com; Yammer; Zoho

Recommended Reading: "The Cloud E-Mail and Collaboration Services Market"

"Exploit the Differing Business Models of Google and Microsoft for Cloud Office, E-Mail and Collaboration Services"

Social Analytics

Analysis By: Carol Rozwell

Definition: Social analytics describes the process of collecting, measuring, analyzing and interpreting the results of interactions and associations among people, topics and ideas. These interactions may occur on social software applications used in the workplace, in internally or externally facing communities, or on the social Web. Social analytics is an umbrella term that includes a number of specialized analysis techniques, such as social filtering, social network analysis, sentiment analysis and social media analytics.

Position and Adoption Speed Justification: Social software vendors, such as IBM and Microsoft, have added tools for social analytics to their applications that measure adoption and growth to provide an understanding of community dynamics. The data makes individual behaviors, content and interactions visible. Social media monitors look for patterns in the content of conversations across all social media spaces. They extract actionable or predictive information

from social media and, in some cases, offline media. Salesforce.com's acquisition of Radian6 is an example of a social software platform vendor extending its social analytics capability to include social media monitoring.

User Advice: Organizations should ensure that their business intelligence initiatives are positioned to take advantage of social analytics to monitor, discover and predict. Some enterprises will be content to monitor the conversations and interactions going on around them. Enterprises with social software platforms that provide social analysis and reporting can use this information to assess community engagement. They can also easily monitor what is being said about the company, its products and the brand using simple search tools or more sophisticated sentiment analysis applications.

The results of social analytics (for example, discovered patterns and connections) can be made available (possibly in real time) to the participants of the environment from which the data was collected to help them navigate, filter and find relevant information or people. Other enterprises will mine the social analytics data, actively looking to discover new insight using a wide range of business intelligence applications. At this time, the use of social analytics information for predictive purposes is a largely untapped source of value. Using social analytics for prediction supports Pattern-Based Strategy.

In many organizations, social analytics applied to external activity (for example, sentiment analysis across the Web) will be sourced by marketing professionals and others (such as the legal department, product development, customer support). In those cases, IT needs to play a leadership role in orchestrating a coordinated set of activities across departments to, for example, minimize duplication of effort, ensure coordination between efforts and standardize taxonomies.

Business Impact: Social analytics is useful for organizations that want to uncover predictive trends based on the collective intelligence laid open by the Internet. For example, a biopharma researcher could examine medical research databases for the most important researchers, first filtering for the search terms and then generating the social network of the researchers publishing in the biopharma's field of study. Similarly, social analytics could be used by marketers who want to measure the impact of their advertising campaigns or uncover a new target market for their products. They could look for behaviors among current customers or among prospects that could enable them to spot trends (deterioration in customer satisfaction or loyalty) or behaviors (demonstrated interest in specific topics or ideas).

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: Attensity; BuzzLogic; galaxyadvisors; IBM; News Patterns; salesforce.com; SAS; Trampoline Systems; Visible Technologies

Recommended Reading: "Supercharging Context Awareness With the Social Graph and Social Analytics"

"Guide to CRM Analytics for CRM Customer Service, 2011"

"Social BPM: Techniques to Uncover Process Patterns"

Semantic Web

Analysis By: Gene Phifer; Ray Valdes

Definition: The Semantic Web is a grand vision of a Web that is machine-readable (as well as human-readable, as it is today), and a collection of individual technologies to implement that vision. The Semantic Web was first described in detail by Tim Berners-Lee in 2000. It envisions a shift from a "Web of documents" to a "Web of data," where information is richly described by tags or links embedded in documents and Web pages or other data structures. The Semantic Web uses an array of technology standards, formats and languages (for example, XML, Resource Description Framework [RDF] and Web Ontology Language [OWL]) to define information properties and relationships, and to connect Web components to each other.

The World Wide Web Consortium (W3C) Semantic Web standards define how to connect content components without regard for what the components themselves contain or define. Those specifics are developed and maintained by groups with domain expertise, for example, the subgroup for publishing works on branding and digital rights, and a healthcare subgroup works on disease monitoring and linking patients to clinical trials. There's no structural similarity or relationship among the different subgroups or overarching model that's evolving. Domains have their own Semantic models (for example, Systematized Nomenclature of Medicine [SNOMED] for healthcare, and eXtensible Business Reporting Language [XBRL] for finance), which provide specific value, but are not attempts to define syntactic or Semantic models that can cover all information.

A major advance in the vision of the Semantic Web, the one that has pushed it along on the Hype Cycle, has been the explosion of social networking and social tagging with sites such as Facebook, YouTube, Myspace, Flickr, Wikipedia and Twitter. Users directly and indirectly add tags by making comments, adding pointers to other websites and embedding links in everything they communicate about. The "social graph" generated by this tagging is a form of the "Giant Global Graph" as envisioned by Berners-Lee. However, the constrained implementation of this in closed and controlled platforms falls short of Berner-Lee's vision of an open, interoperable Semantic Web. In fact, the Semantic Web has fallen short of many expectations. The startup ventures that arose in the early 2000s have faded or been absorbed into larger initiatives (e.g., Bing absorbed Powerset, and Google absorbed Metaweb) without much user-visible impact.

Position and Adoption Speed Justification: Since its unveiling, the Semantic Web has been full of promise, but largely unfulfilled. In the latter part of the 2000s, this changed, as interest in and awareness of semantic tagging and mining technologies grew, and then subsided as many of the pioneering ventures were acquired or absorbed, and disappeared from the radar. However, interest continues:

- Enterprises are investigating how to mine their huge content corpora to extract intellectual property, prior thinking, research findings and other information that may be relevant for solving today's problems. Some content dates back many years and includes both electronic and nonelectronic records.
- Some enterprises are revisiting their data to see whether they have in the past conducted research or pursued product development relevant to what they're investigating in 2011. This is to learn from the earlier work, but also to avoid pursuits that may lead to failure or suspended projects, as they have in the past.
- A few enterprises are working to make their corporate memory accessible to all who need it. They are looking to Semantic Web technologies to see how they might do this.

The effort to leverage the wisdom of the crowds via analysis of big data is moving forward. There are vast amounts of information buried in data created by the collective. Where tags and relationships are included, this data becomes available for analysis via Semantic Web approaches.

Even with this growing interest in exploiting semantic technologies, it will be a long time before a significant part of the Web is semantically tagged with rich OWL/RDF ontologies. It is social tagging that is preceding formal processes. This informal Semantic Web of linked references lacks the reasoning power afforded by RDF. The tags don't capture the explanation for why the content is linked. The links aren't labeled — with "is," "has" or "happened earlier" — as they are with RDF. This tagging achieves the goal of creating a Web of connected information, but leaves finding and navigating the connections to the users.

Proprietary schemes such as those used by Facebook have superseded open standards like FOAF, and have themselves been challenged by competing initiatives (e.g., Google+), resulting in fragmentation and lack of data portability, as well as limited interoperability.

The formal principles of the Semantic Web are being adopted earlier by some groups, such as life sciences, where there are complex data relationships and the value of highly structured ontologies is high. Web pages are adding semantics via semantic hypertext. Maturing technologies and standards, along with a broader view of the Semantic Web that embraces multiple approaches to creating linked data (for example, tagging schemes using microformats), are generating a renewed interest in semantics. As Semantic Web experiences a resurgence with the social Web, we expect to see it continue to move along the Hype Cycle curve.

Multiple projects exist that are advancing the concepts of the Semantic Web. These include:

- DBpedia — with structured data from Wikipedia
- FOAF — describes social connections
- GoPubMed — provides Semantic search for life sciences
- GoodRelations — for e-commerce; expresses product information for e-commerce applications
- Linking Open Data — links RDF data

User Advice: Identify existing ontologies that are specific to your domain, and use them where there is a need to define extensive formal vocabularies or complex data relationships. If possible, use vocabularies that are specific to a smaller community (for example, business partners or suppliers), but have growing adoption and developing support by vendors. Industries where there is the most activity and that are most likely to be financially valuable include life sciences, healthcare, library sciences, defense, government and financial services.

Business Impact: Delivering information across the Web with machine-readable and -interpretable semantics offers the potential for enhanced application/site interoperability, automation of information discovery, more contextually relevant searches, and search options that are difficult or impossible without rich semantic information. In addition to tagging data elements with basic vocabularies (for example, tagging items to identify personal and organizational information), Semantic Web ontologies enable the creation of more sophisticated concepts, enabling systems to infer relationships across datasets where they have not been explicitly defined, thus improving the quality of content management, information access, system interoperability and database integration.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: Google; IBM; Microsoft; Mondeca; Ontoprise; Oracle; Reuters; SAS; SchemaLogic; Thetus; TopQuadrant

Private Cloud Computing

Analysis By: Thomas J. Bittman

Definition: Cloud computing is a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service to customers using Internet technologies. In the broadest terms, private cloud computing is a form of cloud computing that is used by only one organization, or that ensures that an organization is completely isolated from others. This contrasts with public cloud computing, where access to the service is open to any customer willing to pay (unless the service is subsidized, for example, by advertising). For our purposes here, the focus will be on private cloud computing that is internal to an organization — in other words, the customer has control/ownership of the service, and service access is limited to the internal organization. However, three other variants of private cloud computing (not discussed here) are community cloud computing (in which a third-party provider offers services to a limited set of customers), virtual private cloud computing (in which a third-party provider offers the services, but the customer has some control over the implementation, usually in terms of limiting hardware/software sharing), and hybrid cloud computing (in which a service is delivered by a federation of private and public cloud resources).

Organizations building a private cloud service are trying to emulate public cloud computing providers in order to get similar benefits, but within their control and on-premises. In most cases, this is based on a virtualization foundation, but private cloud computing requires more (see "Private Cloud Computing: An Essential Overview"). This includes standardization, automation, self-service tools and service management, metering and chargeback, to name a few. Many of these technologies are still evolving, and early deployments often require custom tools. Regardless, the biggest challenges with private cloud computing tend to be process-related, cultural, political and organizational.

Unlike public cloud providers, which maintain a small number of offered services, enterprises have many complex and interrelated services to deliver. A private cloud computing service can fit within a broader portfolio of services delivered by a real-time infrastructure.

Position and Adoption Speed Justification: Although some of the technologies required for private cloud computing exist, many do not, or are immature. Many early examples of private cloud computing services are focused on development and test provisioning. However, the private cloud has become a marketing buzzword for most of the largest IT vendors, and many new products shipped in 2010 or will be shipped in 2011 to address technology gaps. Since private cloud computing is a natural evolution of the rapidly growing server virtualization trend, no vendor wants to miss the "next big thing." The hype (both external, from vendors, and internal, from directives "to do something about cloud computing") is already tremendous, and it's going to increase during the next year.

Enterprise interest is already high, with 66% of respondents in a recent poll saying they plan to pursue a private cloud computing strategy (at least for a small set of services) by 2014 (see "Private Cloud Computing Ramps Up in 2011").

User Advice: Let service requirements lead your private cloud computing plans, rather than technologies (see "Getting Started With Private Cloud: Services First").

Create a business case for developing a full private cloud service using public cloud services, or modernizing established architectures.

Consider the long-term road map for your private cloud service (see "The Road Map From Virtualization to Cloud Computing"). Build with the potential to take advantage of hybrid sourcing (using both your private cloud services and public) at some point in the future.

Start slowly with development/test lab provisioning; short-term, low-service-level-agreement computing requests; and simple, non-mission-critical Web services (e.g., self-service requests and dynamic provisioning for Web environments). Pilot a private cloud implementation to gain support for shared services and to build transparency in IT service costing and chargebacks.

Implement change and configuration management processes and tools prior to implementing private cloud services to ensure that you can standardize on the software stacks to be delivered through self-service provisioning, and adequately maintain them.

Business Impact: Most private cloud implementations will evolve from a virtualization foundation. Virtualization reduces capital costs, but private cloud computing will reduce the cost of operations and enable faster service delivery. It's primarily attractive to the business, because it enables agility — self-service ordering of frequently requested services, as well as dynamic provisioning. Test lab provisioning is an early example of a private cloud service that enables testers to improve time-to-market and efficiencies, while labor costs associated with provisioning are reduced.

Private cloud computing also changes the relationship between the business and IT, transforming how IT is consumed. The shift to services (rather than implementation and assets), pay per use and chargeback enables the business to focus on rapidly changing service requirements and consuming IT based on variable costs, while IT can focus on efficient implementation and sourcing (including the potential to leverage public cloud services in the future, without negatively affecting the business).

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Emerging

Sample Vendors: Abiquo; Adaptive Computing; BMC Software; CA Technologies; DynamicOps; Elastra; Eucalyptus; HP; IBM; VMware

Recommended Reading: "Key Issues for Private Cloud Computing, 2011"

"Private Cloud Computing Ramps Up in 2011"

"The Drivers and Challenges of Private Cloud Computing"

"The 10 Fundamentals of Building a Private Cloud Service"

"Private Cloud Computing: An Essential Overview"

"The Architecture of a Private Cloud Service"

Augmented Reality

Analysis By: CK Lu; Tuong Huy Nguyen

Definition: Augmented reality (AR) is a technology that superimposes graphics, audio and other virtual enhancements on a live view of the real world. It is this "real world" element that differentiates AR from virtual reality. AR aims to enhance users' interaction with the environment, rather than separating them from it. The term has existed since the early 1990s, when it originated in aerospace manufacturing.

Position and Adoption Speed Justification: The maturity of a number of mobile technologies — such as GPS, digital cameras, accelerometers, digital compasses, broadband, image processing and face/object recognition software — has made AR a viable technology on mobile devices. As all these technologies converge in maturity, AR has also benefited from a growing number of open OSs (promoting native development), the increasing popularity of application stores (increasing awareness and availability of applications), and the rising availability of overlay data such as databases, online maps and Wikipedia. The combination of these features and technologies also allows AR to be used in a number of different applications, including enhancing user interfaces (UIs), providing consumers with information and education, offering potential for marketing and advertising, and augmenting games and entertainment applications. We also believe that AR will play a role in mobile contextual interactions, and will be particularly powerful for:

- Exploration — Finding things in the vicinity.
- Suggestion — Indicating real-world objects of interest.
- Direction — Indicating where a user should go.

In 2010, AR had reached the peak of its hype, as many vendors exploited this technology to differentiate their products — both services and hardware. For example, AR browser vendor Layar boasts more than 700,000 active users. The vendor is working with LG (to preload its application on new Android devices) and Samsung (to be supported on bada). This year, we observed that the hype surrounding AR has slowed down. Nevertheless, its uses are still being explored. Panasonic provides the Viera AR Setup Simulator (as a promotional tool) to help the consumer feel how their TV will fit into a room. World Lens developed an AR translation application allowing users to translate one language to another; for example, by pointing a camera at a traffic sign. Nintendo 3DS also uses AR as a differentiator to enrich gaming experiences on its 3D display.

Despite the hype and potential, a number of factors will slow adoption of AR:

- Device requirements for AR in mobile devices are rigorous; so, although mobile services provide a great use case for this technology, it will be restricted to higher-end devices. Mobile devices have smaller screens than other consumer electronics devices such as laptops and even handheld gaming consoles, restricting the information that can be conveyed to the end user. The interface (a small handheld device that needs to be held in front of you) limits usage to bursts, rather than continued interaction with the real world. GPS technology also lacks the precision to provide perfect location data, but can be enhanced by hardware such as accelerometers, gyroscopes or magnetometers.
- As with other location-based services (LBSs), privacy is a potential concern and a hindrance to adoption.
- As a newer solution, there are also issues with compatibility: competing AR browsers are using proprietary APIs and data structure, making the AR information from one vendor's browser incompatible with that from other browsers.

User Advice:

- **Communications service providers (CSPs):** Examine whether AR would enhance the user experience of your existing services. Compile a list of AR developers with which you could partner, rather than building your own AR from the ground up. Provide end-to-end professional services for specific vertical markets, including schools, healthcare institutions and real-estate agencies, in which AR could offer significant value. A

controlled hardware and software stack from database to device will ensure a quality user experience for these groups. Educate consumers about the impact of AR on their bandwidth, to avoid being blamed for users going over their data allowance.

- **Mobile device manufacturers:** Recognize that AR provides an innovative interface for your mobile devices. Open discussions with developers about the possibility of preinstalling application clients on your devices, and document how developers can access device features. Build up alliances with AR database owners and game developers to provide exclusive AR applications and services for your devices. Secure preloading agreements and examine how you could integrate AR into your UIs or OSs.
- **AR developers:** Take a close look at whether your business model is sustainable, and consider working with CSPs or device manufacturers to expand your user base; perhaps by offering white-label versions of your products. Integrate AR with existing tools, such as browsers or maps, to provide an uninterrupted user experience. Build up your own databases to provide exclusive services through AR applications. Extend your AR application as a platform that individual users and third-party providers can use to create their own content. Explore how to apply AR, through different applications and services, to improve the user experience — with the aim of predicting what information users need in different contexts.
- **Providers of search engines and other Web services:** Get into AR as an extension of your search business. AR is a natural way to display search results in many contexts.
- **Mapping vendors:** Add AR to your 3D map visualizations.
- **Early adopters:** Examine how AR can bring value to your organization and your customers by offering branded information overlays. For workers who are mobile (including factory, warehousing, maintenance, emergency response, queue-busting or medical staff), identify how AR could deliver context-specific information at the point of need or decision.

Business Impact: AR browsers and applications will be the focus of innovation and differentiation for players in the mobile device market in 2011. There are interesting branding opportunities for companies and businesses. Points of interest can be branded with a "favicon" (that is, a favorites or website icon) that appears when the point of interest is selected. Companies such as Mobilizy are offering white-label solutions that allow core Wikitude functionality to be customized. AR products such as Wikitude can lead to numerous LBS advertising opportunities.

CSPs and their brand partners can leverage AR's ability to enhance the user experience within their LBS offerings. This can provide revenue via set charges, recurring subscription fees or advertising. Handset vendors can incorporate AR to enhance UIs, and use it as a competitive differentiator in their device portfolio. The growing popularity of AR opens up a market opportunity for application developers, Web service providers and mapping vendors to provide value and content to partners in the value chain, as well as an opportunity for CSPs, handset vendors, brands and advertisers.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: GeoVector; Google; Layar; Mobilizy; Tonchidot

Recommended Reading: "Emerging Technology Analysis: Augmented Reality Shows What Mobile Devices Can Do"

"Contextual Smartphone Applications Will Exploit Augmented Reality"

Cloud Computing

Analysis By: David Mitchell Smith; Gene Phifer

Definition: Gartner defines cloud computing as a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies.

Position and Adoption Speed Justification: Cloud computing remains near the Peak of Inflated Expectations. Although there are signs of fatigue and disillusionment (e.g., Amazon's highly visible failure), cloud computing is showing notable staying power as a major force in IT. Users are changing their buying behaviors, and, although it's unlikely they'll completely abandon on-premises models or soon buy complex, mission-critical processes as services through the cloud, there will be a movement toward consuming services in a more cost-effective way.

As expected of technology near the Peak of Inflated Expectations, there is deafening hype around cloud computing. Every IT vendor has a cloud strategy, although many aren't cloud-centric. Variations, such as private cloud computing and hybrid approaches, compound the hype and demonstrate that one dot on a Hype Cycle cannot adequately represent all that is cloud computing. Cloud computing has moved just past the Peak and is likely to spend some time in the Trough of Disillusionment. Subjects that generate this much hype rarely skip through the Trough quickly.

User Advice: Vendor organizations must begin to focus their cloud strategies around more-specific scenarios, and unify them into high-level messages that encompass the breadth of their offerings. User organizations must demand road maps for the cloud from their vendors. Users should look at specific usage scenarios and workloads, and map their view of the cloud to that of potential providers, and focus more on specifics than on general cloud ideas.

Cloud computing involves many components, and some aspects are immature. Care must be taken to assess maturity and assess the risks of deployment. Tools such as cloud services brokerages can help.

Business Impact: The cloud computing model is changing the way the IT industry looks at user and vendor relationships. As service provisions (a critical aspect of cloud computing) grow, vendors must become, or partner with, service providers to deliver technologies indirectly to users. User organizations will watch portfolios of owned technologies decline as service portfolios grow. The key activity will be to determine which cloud services will be viable, and when.

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Amazon; Google; Microsoft; salesforce.com; VMware

Recommended Reading: "Key Issues for Cloud Computing, 2011"

"The What, Why and When of Cloud Computing"

Infrastructure as a Service (IaaS)

Analysis By: Lydia Leong

Definition: Compute infrastructure services are a type of infrastructure as a service (IaaS) offering. They offer on-demand computing capacity from a service provider. Rather than buying servers and running them within its own data center, a business simply obtains the necessary infrastructure from a service provider in a shared, scalable, "elastic" way, and accesses it via the Internet or a private network.

Position and Adoption Speed Justification: Four main use cases exist for cloud-based compute infrastructure services: Web hosting, high-performance computing, test and development infrastructure, and general production infrastructure.

The most rapidly maturing use case is Web hosting, as it is convergent with the general Web hosting market. Features and capabilities formerly available only on dedicated hardware are now being extended to shared cloud resources.

The use of these services for test and development infrastructure is growing for pilot projects, rapid application development environments and formal lab environments. As test and development-specific features and management tools improve, formal development environments will become more common. Batch-oriented, compute-intensive workloads (such as modeling, simulation, scientific computing and one-time processing needs such as transcoding), are highly cost-effective in the cloud.

However, before cloud computing for general workloads can achieve mainstream adoption, security, risk and compliance issues must be overcome and costs driven down even further.

These services are maturing and being adopted most quickly in the U.S. Although global demand is robust, the growth of the market is slower outside the U.S., due to less competition, less mature offerings, and fragmentation resulting from users' desire to keep data and processing in-country.

User Advice: Cloud providers' capabilities vary significantly, but enterprise-class clouds, with strong service-level agreements backed by financial penalties, high levels of security and solid service and support, have emerged. Businesses can safely adopt these services; the risks are not significantly greater than other outsourced hosting approaches, assuming the cloud service used matches the service-level and security needs of the application.

Businesses should consider pilot projects for test and development, compute capacity augmentation, and Web content and applications. Successful pilots can be expanded into broader production use.

Both public multi-tenant and private single-tenant offerings are available, but the distinction between public and private cloud IaaS is blurring. The most cost-effective clouds are highly standardized, and use a shared capacity pool. Hybrid public-private cloud offerings — enabling "cloud bursting" for on-demand capacity and business continuity — currently exist, but the technology will not be mature until at least 2016.

This market is evolving extremely quickly, so the suitability of these services should be re-evaluated at least once every six months.

Business Impact: Cloud compute infrastructure services will be broadly advantageous to IT organizations. The cost benefits, driven primarily by automation, will be particularly significant for small and midsize businesses. Larger enterprises will benefit primarily from greater flexibility, rather than direct cost reduction.

In the short term, the benefits will be driven primarily by rapid provisioning that requires minimal manual intervention. Over the longer term, more system management tasks will be automated, leading to more efficient infrastructure management.

The metered-by-use attribute of these services will result in more efficient use of capacity. The self-service nature of these services will empower employees outside IT operations, improving developer productivity and making it easier for business buyers to obtain infrastructure.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Amazon; AT&T; GoGrid (previously ServePath); Rackspace; Savvis; Terremark; Verizon Business

Sliding Into the Trough

Enterprise Mashups

Analysis By: Ross Altman

Definition: Mashups are lightweight composite applications that possess the following characteristics:

Mashups source all of their content from existing systems and data sources; they have no native data store or content repository.

To access the resources that they comprise, mashups employ the technologies of the Web, including representational state transfer (REST)-based application programming interfaces (APIs), Really Simple Syndication (RSS) and Ajax "snippets" and "widgets."

Mashups present a mixture of source content and functionality, where the source of each leveraged program or service is readily identifiable.

Their consumer Web origin contributes three additional characteristics for mashups as they are implemented within the enterprise. First, organizations tend to create mashups to deliver short-term, situational, opportunistic solutions, rather than strategic, systematically built, industrial-strength applications. Second, mashups tend to have an end-user appeal, providing support for collaboration, data visualization and ad hoc decision making. Finally, given the graphical, sometimes cloud-based development platforms favored for mashups, citizen developers, power users and knowledge workers can participate in and occasionally even lead mashup design and deployment efforts.

Position and Adoption Speed Justification: The recent economic turmoil has slowed much of the mashup hype, and the proliferation of mashups has similarly slowed. Despite this moderation of mashup hype, large enterprise software vendors, such as IBM, SAP, Oracle and, increasingly, Microsoft, continue to try to capture enterprise mashup opportunities, most often in the context of their portal offerings. However, mashups are independent and fundamentally more pervasive than portals. As a type of composite application, mashups fall under the influence of broader trends in application development and integration. Many enterprises have come to view mashable resources and mashups as an opportunistic front end to their service-oriented architecture (SOA) initiatives, whether delivered in a portal, a Web application or a rich Internet application (RIA).

The most challenging aspect of enterprise mashups, and perhaps the greatest barrier to adoption, is simply making mashable content available. Most enterprise content isn't accessible

via convenient APIs. Thus, much of the enterprise mashup market is geared toward helping organizations make data and functionality accessible as mashable APIs. At the same time, companies as diverse as Best Buy and the New York Times are building Web-facing applications that leverage Web-oriented architecture (WOA) to create mashable resources.

Moreover, the mashup concept is often met with cynicism among enterprise developers and architects. Cultural and organizational barriers, predispositions toward other means of composition, a dearth of enterprise-class examples, a lack of standards and the situational nature of mashups themselves are holding back mashups and the platforms that support them as serious enterprise technology investments. However, there will continue to be a market for focused mashup component and platform providers. In addition to vendors offering mashup assembly capabilities, specialized vendors focus on making legacy assets mashable through feeds and Web-accessible APIs.

Mashup enablement will be fundamental to successful enterprise mashup initiatives, because the value of an enterprise mashup environment is directly related to the quantity and quality of mashable sources. Furthermore, mashup-enabling technologies will extend the usefulness of legacy data beyond mashups. For example, enterprise Web applications may be developed more productively by using the same WOA mechanisms used to create mashable resources.

Mashup standards that ease integration and interoperability among vendors in the cloud and on-premises don't yet exist. Google and OpenSocial's Gadgets, IBM's iWidgets and JackBe's EMMML are candidates; however, nothing yet provides the combination of simplicity and robustness required for enterprise use.

User Advice: Lightweight, situational composite applications offer enterprises multiple opportunities to deliver support for transformational business processes and products. To better address these requirements, IT organizations should equip their IT developers, citizen developers and power users with tools to build and deploy simple operational and situational composite applications. At the same time, IT organizations must ensure that even these simple mashups don't compromise data and process security and integrity.

To strike the best balance between agility and control, IT should follow these best practices:

1. Develop or refine a business case for mashups in the context of related initiatives, including SOAs, composite applications, portals and strategies that make enterprise applications and content Web-accessible.
2. Implement effective governance strategies for mashups and other composite application initiatives.
3. Create a repository of mashable components.
4. Account for the security issues that enterprise mashups raise.

Business Impact: Mashups can deliver significant application agility by quickly addressing data-driven business opportunities. Mashups extend enterprise IT resources and support business unit developers through a potentially highly leveraged repository of mashable assets. Mashups can potentially contain costs by reducing burdens on application development organizations, because non-IT staff can leverage IT investments in WOA-based business services. Successful mashup initiatives will enable business unit developers or business users to develop tactical or opportunistic applications based on mashable component repositories. Finally, mashups will be a key factor in delivering the fruits of SOA efforts, as well as employing cloud services in an enterprise context.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: Apigee; Connotate; Convertigo; Denodo Technologies; Extensio; Google; IBM; JackBe; Kapow Software; Magic Software Enterprises; Microsoft; Netvibes; Nexaweb Technologies; Oracle; Pageflakes; RSSBus; WorkLight; Yahoo

Recommended Reading: "Enterprise Mashups and Mashable Resources"

"End-User Mashups Demand Governance, 2010"

"End-User Mashups: Overpromised, and Barely Delivered"

"The Emerging User Experience Platform"

"Going Forward, Most Transformational Applications Will Be Composite Applications"

"The Five Core Principles of Enterprise Mashups"

"Toolkit: Building a Business Case Justification for Enterprise Mashups"

"Gartner Reference Architecture for Enterprise Mashups, 2009"

"Open WOA APIs: From the Edge of the Web to the Mainstream Enterprise"

"Building a Business Case for Enterprise Mashups: A Gartner Framework"

"Addressing the Seven Primary Challenges to Enterprise Adoption of Mashups"

"A Process for Successfully Selling Mashups to Enterprise Leaders"

Web Experience Analytics

Analysis By: Van L. Baker

Definition: Web experience analytics are analytics tools that measure elements of the retailer's commerce sites, including both websites and mobile sites. These analytics include some more-mature analytics tools, such as page load times and shopping cart abandonment rates, as well as some tools that are newer, such as multivariate A/B testing, interaction sequence and navigation tracking, and sentiment indexes. Overall, these analytics tools are meant to measure consumer engagement and purchase activities in the e-commerce and m-commerce channels. These measures help retailers improve the customer experience on their sites and adjust elements of their commerce sites such as rich-media applications, navigation and flow paths, and shopping aids to suit changing consumer tastes and preferences for e-commerce sites. Multichannel feedback technology, also highlighted in this Hype Cycle, can also provide retailers an assessment of their customers' shopping experiences — especially for cross-channel shopping processes.

Position and Adoption Speed Justification: These tools vary in maturity. The relatively direct measures, such as page load times, are relatively mature, while other measures, such as sentiment indexes, multivariate testing, information clarity measures and customer satisfaction, are just beginning to emerge. To some degree, some of these tools are as much art as they are science, such as neuromarketing, which measures consumer brain activity when consumers are engaged in shopping activities.

User Advice: Deploy the straightforward measurement tools, such as page load times and shopping cart abandonment measures, if you haven't already done so, as these factors can have

a significant impact on your overall revenue. As consumers grow tired of generic offers and retailers run the risk of losing customers, measures such as multivariate testing can be valuable tools to migrate toward a more personalized presentation of their website. The emergence of sentiment analysis and social media monitoring tools can give retailers insight into where changes are needed to ensure customer retention. That said, retailers should proceed with caution and confirm findings over time, rather than make changes that run a greater risk of alienating customers.

Business Impact: Used appropriately, these tools can lead to improvements in the customer experience and engagement for both the e-commerce and m-commerce channels for the retailer. In addition, these tools can help retailers identify the right combination of media elements and applications that lead consumers to purchase more and that attain a higher degree of satisfaction from customers.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Sample Vendors: Coremetrics; Google; iPerceptions; Omniture; Oracle; ResponseTek; SAS; Speed-Trap; Tealeaf; Teradata; Webtrends

Recommended Reading: "E-Commerce Websites: Features That Make Consumers Buy"

"Key Challenges in Web Analytics, 2009"

"Key Issues for Customer Experience Management, 2010"

"Top 10 Mistakes in Web and User Experience Design Projects"

Web Widgets

Analysis By: Jim Murphy; Gene Phifer

Definition: Web widgets are reusable miniature Web applications designed to execute in Web pages without the need for site-specific compiling. Web widgets can be embedded in a site by the site's owner without the need to give any control over the site to the third party providing the widget. Multiple widget models exist on the consumer Web, including Google "gadgets" and Yahoo "widgets." Different widget providers foster third-party development of widgets based on their own approaches, and widget formats aren't interoperable. Standards, primarily OpenSocial and iWidgets, are being promoted by vendor and industry groups. Variants of mobile Web widgets are available on different mobile platforms.

Widgets use representational state transfer (REST)-based APIs to communicate with Web-accessible resources. Web widgets constitute a relatively simple way to create reusable user interface (UI) components, and can also serve as the basis for mashups and other front-end application composites.

The widget proposition resembles the portlet proposition as a simple way to make Web information, applications and services available to more people in more contexts. Unlike portlets, however, widgets rely mostly on client-side processing. Widgets can be easily deployed on a mobile device or PC desktop, while portlets are bound to the server environment for which they're developed.

Position and Adoption Speed Justification: Web widgets have been available on the consumer Web since 2002, and they were almost exclusively a consumer Web phenomenon until

2006. In the 2006 time frame, enterprises started to see value in providing their own Web widgets to extend marketing and sales efforts. Enterprises started to pay serious attention on a wide scale to leveraging Web widgets internally in 2007, and interest has accelerated, partly due to growing interest in enterprise mashups and, increasingly, mobile applications.

Anyone using a personal start page (such as iGoogle or MyYahoo) uses Web widgets. In an enterprise context, Web widget use is frequently provided through a horizontal portal, but horizontal portal infrastructures aren't a prerequisite for Web widget use, and widgets are finding their way into other applications and platforms, including collaboration platforms, business intelligence dashboards and high-performance workplace environments. In some cases, large vendors with comprehensive portal, content management, collaboration and social suites are leveraging widgets to provide a relatively simple, yet powerful means of interoperability.

The widget's current simplicity and lack of standards means sacrificing some of the portlet's sophistication, especially in areas such as interportlet communication and federation. However, raising the sophistication of the widget may only compromise its simplicity, which is part of its appeal, and lead it toward the same frustration that some portlet standards efforts have engendered. Standards such as iWidget, OpenSocial and EMMML are just beginning to gain momentum. Broader Web standards, such as HTML5, are likely to play an important role in the evolution of Web widgets.

User Advice: Organizations should recognize that widgets can be an effective part of an overall user experience platform strategy. In addition to providing a simple mechanism for developers to integrate Web-accessible resources, organizations can delegate widget building and distribution responsibilities to citizen developers and power users.

Still, organizations should be wary of widespread and uncontrolled widget use. Assess and monitor widget use, while paying heed to emerging standards. Organizations must find the appropriate balance of control and flexibility when employing Web widgets. Effective governance can ensure consistency and compliance while providing the flexibility that bring business innovation and agility.

Business Impact: Enterprises are increasingly expressing interest in leveraging widgets for a variety of reasons. Using widgets in employee portals and other internally facing websites could reduce development costs and improve the user experience. Providing the ability to embed widgets in an externally facing Web presence can attract and retain users. Web widgets present an opportunity as a component of a Web projection strategy. In conjunction with providing open APIs or RSS/Atom to expose information to other Web consumers, Web widgets enable enterprises to expose data, functional features and branding to consumers on the public Web. Enterprises can also use Web widgets to expose elements of their Web presence and managed communities to public Web community environments, such as Facebook and Twitter.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: Google; IBM; Microsoft; Netvibes; Pageflakes; Yahoo

Web-Oriented Architecture

Analysis By: Daniel Sholler

Definition: Web-oriented architecture (WOA) is an architectural substyle of service-oriented architecture (SOA) that integrates systems and users via a Web of globally linked hypermedia

based on the architecture of the Web. This architecture emphasizes generality of interfaces (user interfaces and APIs) to achieve global network effects through five fundamental generic interface constraints:

- Identification of resources
- Manipulation of resources through representations
- Self-descriptive messages
- Hypermedia as the engine of application state
- Application neutrality

WOA represents an alternative style to the middleware-oriented styles most commonly associated with WS-* Web services. WOA is the combination of SOA, representational state transfer (REST) architecture, and the technology and standards of the Web. WOA-style services are sometimes referred to as RESTful services or RESTful APIs.

Position and Adoption Speed Justification: WOA has dominated Web user-to-application (U2A) implementations for years. It is frequently used for Internet B2B and has experienced some intraenterprise application-to-application (A2A) implementation successes. Many enterprises are now engaged in implementing or seriously considering WOA in addition to or as an alternative to WS-*. The WOA style has been used by many of the services delivered by major Web services providers (Amazon, Google, etc.), and the popularity of these services is propelling enterprise interest in WOA as a viable architectural approach to SOA. Therefore, WOA is moving up the Hype Cycle as architects and developers explore and employ it for enterprise applications.

Most popular development and integration tools support the development of WOA services and applications that follow the WOA style, and other environments, such as Java, have added WOA-compatible structures and conventions to facilitate this development. The current use is almost entirely for Web-facing applications, and there is still a great deal of resistance to using WOA designs for the core enterprise application functionality, not least because of a lack of WOA design skills. Advanced WOA concepts, such as WOA quality of service (QoS) support and hypermedia-based application state management, are still immature. The understanding of the relationship between WOA and the Web is advancing, and educational materials about Web architecture, RESTfulness and WOA are appearing regularly. In addition, tooling has been added to Java and other popular language environments to support RESTful interface development, which should bring it within reach of more-mainstream developers.

User Advice: Application architects should use the WOA approach for information-centric applications, U2A integration and A2A integration if the system designs can leverage moderated middleware functions. Organizations using Web services should still embrace the architectural principles of WOA as much as possible to gain the shareability and scalability benefits of the Web and enhance Web interoperability.

Business Impact: Significant increases in shareability and extensibility of SOAs due to WOA's emphasis on application neutrality and hypermedia-oriented interface design should result in faster application integration, an overall decrease in the cost and effort to modify applications and systems, and an increase in the planned and serendipitous reuse of services.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Recommended Reading: "SOA Overview and Guide to SOA Research"

"Tutorial: Web-Oriented Architecture: Putting the Web Back in Web Services"

"Reference Architecture for Web-Oriented Architecture"

"Understanding and Applying the Design Differences Between WS-* Based Architecture and Web-Oriented Architecture"

"Key Issues for SOA, EDA and WOA, 2009"

"2008 SOA User Survey: Adoption Trends and Characteristics"

Web 3.0

Analysis By: Gene Phifer

Definition: As Web 2.0 becomes mainstream, the term "Web 3.0" is becoming a contender for labeling the next generation of the Web. The Web is a complex ecosystem, not a product that follows a well-defined road map. The X.0 label is ambiguous and unsuited for the evolution of the Web. The X.0 label is only meaningful when preceded by a well-defined entity, such as a product offering. Placed after a phenomenon such as the Web, it provides no descriptive value and must be further defined. This invariably leads to confusion, because different parties espouse different definitions in the hopes of achieving their own ends. Many people, including vendors, technology proponents, analysts, bloggers and authors, are trying to use the term Web 3.0 to describe their needs and visions. At least five factions are competing to establish the Web 3.0 term for their own benefit, including Semantic Web proponents, virtual world advocates, ubiquitous computing fans, mobility proponents and cloud computing supporters. More are expected, which will lead to significant hype and confusion, followed by potential missteps for IT leaders.

The term Web 2.0 caught on, but it wasn't a planned generational release of the Web, or even a prediction. Web 2.0 was observed and labeled. This is a critical distinction between the genesis of the Web 2.0 designation and the beginnings of Web 3.0.

With its openness, community/participation model and new business opportunities, Web 2.0 was a step-function change from Web 1.0. The Web won't see a similar step-function change in the next few years. Therefore, Web 3.0 will not occur as many would like us to think it will.

Position and Adoption Speed Justification: Although Web 2.0 innovation experienced a relative spike, the Web will evolve steadily during the next five to seven years, making radical shifts more difficult to pinpoint, and minimizing the possibility of another step-function change such as Web 2.0.

The next generation of the Web will focus on the expansion of the social Web, the Semantic Web, the programmable Web, the mobile Web, and the real-time Web. It will also encompass "the Web of things," where there are direct connections between the online world and the physical world. These changes are long-term, multifaceted and infrastructural, and, therefore, will occur in a much longer time frame than the rapid explosion of innovation that occurred with Web 2.0. Additionally, the increasing fragmentation of devices used to interact with the Web will make Web 3.0 unlikely. With the addition of contextual-awareness, it is likely that many people will move from sharing the same Web to favoring their personalized views on specialized devices.

Jockeying for the Web 3.0 position will only increase confusion and hype, decreasing the odds of any one prediction emerging as the successor to Web 2.0. Despite being inappropriate and ineffectual, the Web 3.0 term may persist because of the popularity of the Web 2.0 term, because

Web 2.0 technologies and approaches are seeing broad adoption in enterprises, and because vendors are always looking to sell "the next big thing."

User Advice: IT leaders should not adopt, promote or search for meaning in the term Web 3.0. The term will remain confusing and ineffectual. IT leaders must recognize the shortcomings of the term Web 3.0 and concentrate on extracting business value from existing and emerging Web technologies, practices, products and services. Look for Web 2.0 to develop along an evolutionary path — Web 2.1 and Web 2.2 would be more appropriate to use than Web 3.0.

Business Impact: Danger surrounding the hype of a catchy term, such as Web 3.0, arises from its tendency to consume mind share. Business and IT leaders risk being distracted by "Web 3.0 mania" before realizing the potential benefits of current and emerging Web technologies.

Benefit Rating: Low

Market Penetration: Less than 1% of target audience

Maturity: Emerging

RIA Platforms

Analysis By: Ray Valdes

Definition: Rich Internet application (RIA) platforms enable organizations and software vendors to build applications that provide a richer, more-responsive user experience, compared with older-generation, "plain browser" Web platforms. The term is not consistently used in the industry. Gartner uses the term in the broadest scope. RIA platforms and technologies span three different approaches (a categorization based on runtime aspects):

- Browser-only
- Enhanced browser
- Outside the browser (also called "rich client")

The latter two are considered "heavy RIA" options, because of their larger weight on the client. The browser-only approach leverages JavaScript.

The browser-only RIA (or "pure" browser) approach does not use plug-ins, but leverages the capabilities that are already built into every modern browser (for example, Firefox, Internet Explorer, Opera, Chrome and Safari), such as the JavaScript language engine, Cascading Style Sheets (CSS) and Document Object Model (DOM) support. While a handful of commercial products are still available from vendors like Backbase, Sencha and Strobe, the JavaScript/Ajax approach is dominated by open-source toolkits like jQuery, Prototype, Yahoo User Interface and Dojo. Other vendors, such as Canoo, Google, ICEsoft Technologies and Vaadin, deliver more-encompassing offerings that include hooks to server-side components.

In addition, there are vendors with more-powerful RIA technology that separately offer lightweight choices not directly related to their core commercial offerings (for example, Adobe with the Spry toolkit, and Microsoft with its ASP.NET Ajax toolkit and support for jQuery in its Visual Studio product). While JavaScript frameworks and Ajax toolkits are widely used, most enterprise applications that use these do so in a limited manner, by sprinkling a few Ajax features into a Web application instead of building a complete RIA experience. Growing interest in HTML5, along with a subset of features from the draft standard that have made their way into cutting-edge browsers like Chrome and Firefox, is already accelerating and broadening the adoption of browser-based RIA. This trend will continue through the next five years.

Unlike JavaScript-centric and browser-centric Ajax, which is mostly browser-independent, the enhanced-browser approach begins with a browser and extends it with a plug-in or other browser-specific, machine-executable component. Examples of this approach are Adobe Flash (further enhanced by Flash Catalyst and Adobe Flex server-side technology), Microsoft Silverlight and the Curl RIA platform. The enhanced-browser approach can result in a full rich-client experience that looks nothing like a plain browser, or it can be used to develop "rich islands" within a traditional Web page.

The outside-the-browser or rich-client approach means adding some large-footprint system software to the client operating environment, such as the Java Virtual Machine (JVM) runtime environment, the Microsoft .NET language environment or the Adobe Integrated Runtime (AIR) software stack. On top of this stack, additional layers can add capabilities for client-side data persistence, automatic provisioning, the versioning of platforms and applications, and the migration of server-side component models. Examples of this approach include AIR, IBM Lotus Expeditor, Microsoft Windows Presentation Foundation, Microsoft's out-of-browser technique for Silverlight and Oracle (formerly Sun Microsystems) JavaFX. Typically, this approach is a complete replacement for any existing Web page technology, and users working with an outside-the-browser application need not have any idea that they are, in fact, interacting with a website on the back end. Growing interest in cross-platform mobile application development is also driving inquiries into rich-client technology.

Position and Adoption Speed Justification: Major system vendors, such as IBM and Microsoft, have been talking about a rich-client or smart-client alternative to plain browser-based user interfaces since 2001. During the remainder of that decade, concepts and road maps were mainly driven by a vendor's agenda for maintaining a system software footprint on a user's device (desktop PCs, laptops and PDAs) that was more than a basic browser, which was perceived to be commodity technology.

However, in 2005, Ajax (a pure browser or browser-only technology) appeared on the mainstream scene (after a gestation period that began as far back as 1997) and enjoyed explosive growth, blindsiding vendors' road maps that were based on heavier technologies (for example, Microsoft WinForms with ClickOnce technology). From 2007 to 2010, there were plug-in-based initiatives — such as AIR, Microsoft Silverlight, IBM Lotus Expeditor and Sun JavaFX — that indicated a renewed effort on the part of vendors to go beyond the basic browser. The efforts of the World Wide Web Consortium (W3C) to enhance and expand the role of the browser in the HTML5 specification can be viewed as a direct response to the growth of RIA capabilities. The design goal of HTML5 is to remove the need for plug-in-based supplements to the basic browser by, instead, raising the technology foundation of the browser to include more-sophisticated interactive graphics, offline mode, server-side push, better typography, etc. An HTML5-based browser is still considered part of the broad landscape of RIA choices, and is in ascendancy, while others are stable or in decline.

User Advice: To gain real value from RIA technology, invest in an enhanced development process based on objectively measured and empirically proven usability design principles and on continuous improvement before investing in any new user interface technology, RIA or otherwise. Additionally, recognize that Ajax represents an evolution of browser-based technology, and it remains more popular and more widely supported than enhanced-browser or rich-client-based alternatives, which have higher barriers to entry. View HTML5 as the future of the Web, but a future that will arrive unevenly and over several years. In either case, selecting a technology without first understanding usability and user-centric design will prove to be a waste of time. True rich user experiences come first from methodology, then from technology.

If you seek to deploy the richest-possible class of applications in the next 12 to 18 months (for example, streaming video, graphically intensive applications that support rich drag-and-drop

features or robust charting capabilities), you should give primary consideration to "heavy RIA" platforms. However, if you desire the broadest-possible reach, while still retaining significant richness, consider Ajax techniques a stronger play. The latter is an especially important consideration for the development of cross-mobile applications. Building on a widely supported Ajax library or JavaScript framework will let you evolve your applications to accommodate the different parts of HTML5 as they mature and become part of mainstream browsers.

Business Impact: A user experience that is perceptively better than other offerings in a product category can provide sustainable competitive advantage. Consider the flagship examples of the RIA/Ajax genre, such as Google's Gmail, Maps and Calendar applications, which achieved high visibility and strong adoption, despite entering late into a mature and stable product category, or TweetDeck (built with Adobe AIR) which, although not the first Twitter client, for a long time has been among the most popular. However, competitive advantage is not a guaranteed result of RIA technology deployment — it depends on innovations in usability (independent of technology) and on server-side architectures that complement client-side user interface technology. Many organizations do not have the process maturity to deliver a consumer-grade user experience, and will need to acquire talent or consulting resources to achieve a positive business impact.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Adobe; Backbase; Canoo; Dojo; Google; IBM; Infragistics; jQuery; Microsoft; Oracle; Prototype; SmartClient; Vaadin; Yahoo

Recommended Reading: "It's Official: Open-Source JavaScript Has Displaced Closed-Source Offerings"

"Navigating the Ajax vs. 'Heavy RIA' Dilemma"

"MarketScope for Ajax Technologies and Rich Internet Application Platforms"

Cloud/Web Platforms

Analysis By: Gene Phifer; David Mitchell Smith

Definition: "Cloud/Web platforms use Web technologies to provide programmatic access to functionality on the Web, including capabilities enabled not only by technology, but also by community and business aspects. This includes, but is not limited to, storage and computing power. We use the terms "Web platform" and "cloud platform" interchangeably, as well as the merged term "Web/cloud platforms." They have ecosystems similar to traditional platforms, but the concept has emerged as a result of market and technology changes collectively known as "Web 2.0." These platforms will serve as broad, general-purpose platforms, but, more specifically, they will support business flexibility and speed requirements by exploiting new and enhanced forms of application development and delivery. Web platforms reuse many of the capabilities and technologies that have been accessible on websites for more than a decade through browsers by adding programmatic access to the underlying global-class capabilities. Reuse is occurring via Web services, and is being delivered via Web-oriented architecture (WOA) interfaces, such as representational state transfer (REST), plain old XML (POX) and Really Simple Syndication (RSS). In addition to the capabilities of Web 2.0, these platforms provide programmatic access to cloud computing capabilities. The public API phenomenon has taken WOA beyond consumer markets (e.g., Twitter) into enterprise B2B integration.

The cloud/Web platform term is not the same as platform as a service (PaaS). PaaS, according to the National Institute of Standards and Technology (NIST), refers to the middleware layer in cloud architectures. The cloud/Web platform is broader and employs a more accurate use of the term platform (as a relative term, see "NIST and Gartner Cloud Approaches Are More Similar Than Different") and can span all layers of cloud architecture. Our use of the term cloud/Web platform predates the PaaS term and current cloud terminology, but is not inconsistent with it.

Position and Adoption Speed Justification: The use of Web/cloud platforms is happening first in consumer markets. As further adoption of all the cloud service layers increases, use and maturity will evolve. Enterprise use of Web-based capabilities, such as Amazon Simple Storage Service (Amazon S3) and Amazon Elastic Compute Cloud (Amazon EC2), has begun as well.

User Advice: Web platforms and related phenomena have affected consumer markets, but enterprises should evaluate the growing space as an appropriate extension to internal computing capabilities. The use of Web platforms will drive WOA, which enterprises should adopt, where appropriate, along with simple interfaces, such as REST, POX and RSS (wherever possible), to exploit the interoperability, reach and real-time agility of the Internet.

Business Impact: Web platforms can be leveraged as part of business solutions, and will form much of the basis for the next generation of interest in the virtual enterprise. Web platforms can decrease barriers to entry, and can deliver substantial value for small and midsize businesses that cannot afford to build and maintain capabilities and infrastructures. Examples include Amazon Web Services (including S3 and EC2), salesforce.com's Force.com, Google's App Engine and Microsoft Azure Services Platform. Note that the term "Web/cloud platform" is broader than, and includes multiple layers in, cloud computing terminology (e.g., infrastructure as a service [IaaS], PaaS and software as a service [SaaS]), and the use of the term "platform" is different from the term "PaaS."

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Early mainstream

Sample Vendors: Amazon; Google; Microsoft; salesforce.com

Recommended Reading: "Web Platforms Are Coming to an Enterprise Near You"

"NIST and Gartner Cloud Approaches Are More Similar Than Different"

Consumer Web Mashups

Analysis By: Jim Murphy; Gene Phifer

Definition: Consumer Web mashups are lightweight, composite applications built using consumer Web-based mashup infrastructures and consuming publicly available consumer Web resources. Consumer Web mashup infrastructure providers claim to target average Web users, but most active use is by amateur developers and hard-core hobbyists.

Position and Adoption Speed Justification: Although the term "mashup" originated in the music world, in a technology context, mashups originated and gained their initial momentum on the consumer Web. They began as composite Web applications that leveraged Web-based content and functionality from consumer-oriented sites to deliver applications for external audiences using only a thin layer of JavaScript aggregation code on the client. Today, thousands of consumer Web mashable components (or "mashables," often in the form of widgets and gadgets) exist, and users of sites ranging from Google to Yahoo to Amazon leverage them to

create consumer Web mashups. ProgrammableWeb.com and Mashable provide an overview of the range of consumer Web mashups available. Enterprises that are experimenting with consumer Web mashups for enterprise use have largely found that they provide production value without additional work to manage their use in a secure fashion under appropriate governance.

The beginnings of a backlash against consumer Web mashups has started among some Web developers. Also, some of the mashup community resources seem to have lost momentum during the past year. Looking forward, however, there's a distinct possibility that consumer-oriented Web mashups will surge ahead as organizations adopt cloud-based infrastructure, platforms and applications, and look to invoke consumer-oriented services and information sources to contribute to composite applications.

User Advice: Enterprises should look to consumer Web mashups to demonstrate the mashup concept to business leadership (see "A Process for Successfully Selling Mashups to Enterprise Leaders"). However, enterprises looking to leverage consumer Web mashups for enterprise needs should be wary about their limitations and risks. Few consumer Web mashup infrastructures provide security or governance functionality, and consumer Web mashups don't provide connectivity to on-premises applications and content repositories. However, companies that overcome these hurdles may find considerable benefit in employing consumer Web mashups.

Organizations should consider embedding Web mashups in business-to-employee portals, intranet pages and dashboards to provide easy access to information sources for users. But they should choose only safe and reliable sources, and they should not expect or attempt deep integration with enterprise resources. With the same cautions in mind, organizations should consider using consumer Web mashups to augment and enhance the information they provide to customers on their websites. Companies looking to extend their Web presence beyond their websites should consider providing mashables (in the form of gadgets or widgets) or mashups for consumption on sites like iGoogle and myYahoo.

Business Impact: Consumer Web mashups can deliver business value in three areas:

- Consumer Web environments serve as excellent demonstration tools to expose business leaders to the mashup concept. Consumer Web mashups provide a ready catalog to demonstrate several different use cases for mashups.
- Some consumer Web mashups can be used in enterprise settings, with appropriate governance and security. Doing so eliminates the need to rely on traditional application development organizations to develop their own mashups for those use cases, or if a portal framework is deployed, to create some custom portlets.
- Enterprises seeking to extend their services can attract and engage customers by making widgets and gadgets available to consumers using sites like iGoogle and myYahoo.

Benefit Rating: Low

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Sample Vendors: Google; Microsoft; Netvibes; Pageflakes; Yahoo

RIA Rich Client

Analysis By: Ray Valdes; Eric Knipp

Definition: Gartner uses the term "rich client" to refer to a subset of rich Internet application (RIA) platforms — a subset that consists of outside-the-browser, client-side technology that delivers a richer user experience than is possible with lighter-weight, inside-the-browser technologies. Examples of rich client technology include Adobe AIR, Microsoft Windows Presentation Foundation (WPF) and out-of-browser Silverlight, and Eclipse Rich Client Platform (RCP). These benefits include a greater degree of control over the user experience, including the ability to dispense with "chrome" (the standard browser window frame and buttons) with the browser. The term "rich client" has not always been used with a great deal of precision by vendors, occasionally leading to misunderstandings by Gartner clients when making rich- versus fat-client choices.

Rich-client technologies differ from inside-the-browser approaches by providing enhanced support for provisioning, versioning, security sand boxing, offline mode and integration with local devices. Thanks to HTML5, inside-the-browser approaches are evolving to emulate rich-client functionality; for example, there are draft specifications for browser vendors to deliver data persistence and synchronization, scalable vector graphics, 3D graphics, offline support and geolocation services.

Rich-client technology is used in interaction-intensive scenarios where outside-the-browser processing is required, including an offline mode of operations, integration with local devices and connections to back-end Web services. An example application that requires rich-client technology is a real-time trading dashboard. It may also be used in cases where a large amount of stateful data should be persisted on the client to offload work from the server, or in composite applications that consume and aggregate data from a variety of sources for offline processing or storage. Most Web services are included in server-side portals; however, portals and Web services are shifting their focus to include more client-side processing. Finally, RIA "in the cloud"-style applications couple pay-per-use cloud services with rich-client technologies, providing an incentive for the application developer to minimize the use of metered cloud services and delegate more business logic to the client.

Adobe AIR and Microsoft out-of-browser Silverlight have been used for a variety of consumer applications that offer a user experience similar to that of a native application. Examples include social-networking access packages for Twitter, Facebook and LinkedIn; consumer media interfaces for Fox Networks, The New York Times, Time Magazine and the Weather Channel; and rich views into the content from consumer websites, such as eBay.com, Acrobat.com and Nasdaq.com. Microsoft Silverlight and WPF have also been used for a variety of similar consumer applications.

Position and Adoption Speed Justification: Although rich-client technology provides power, this power comes at a cost of complexity of development, deployment and maintenance. These costs are higher than simpler, lighter-weight approaches (browser-only or browser-with-plug-ins), but, at the same time, are lower relative to older approaches — namely, the fat client used in legacy client/server systems.

From the perspective of developers, the added cost and complexity is outweighed by the benefits of a user experience that is richer than what is provided by other approaches. However, this gap is decreasing, as other RIA approaches (pure browser and browser-with-plug-in) gain power. This has narrowed the scope of possible applications that can be targeted by RIA rich-client technology.

User Advice: Consider deploying a rich client for scenarios that require a desktop form factor, a nonbrowser user interface, offline processing, integration with local devices and applications, and a high degree of user interaction, including graphically intense and media-intense requirements. Weigh the power of rich-client capabilities against the cost and complexity of this approach. Recognize that rich-client tools are proprietary and imply a degree of vendor lock-in. Most

importantly, do not embark on a rich-client technology initiative without modifying your design process to include a usability-centered design based on human factors and technology-independent user interaction patterns.

Business Impact: Rich-client technology can enable users to interact more efficiently and productively with enterprise applications that have complex user interface requirements, while enjoying a higher degree of satisfaction and "stickiness" (in the case of consumer-facing applications).

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Early mainstream

Sample Vendors: Adobe Systems; IBM; Microsoft; Oracle

Recommended Reading: "Key Issues in Rich Internet Applications and User Experience, 2010"

"Usability Drives User Experience; User Experience Delivers Business Value"

"A Value-Driven, User-Centered Design Process for Web Sites and Applications"

Federated Portals Across Vendor Families

Analysis By: Jim Murphy; Gene Phifer

Definition: Portal federation allows portal components, applications and content, often in the form of portlets, to be produced in one portal environment, instance or server, and consumed in another portal framework or instance. Portal federation is a means of integrating portals, sharing resources across portal deployments and providing a unified experience for end users. Portal federation across vendor families describes this interoperability among products from various portal vendors.

Position and Adoption Speed Justification: The demand for portal federation across vendor families continues to increase, but large vendor and product expansion into adjacent areas, like content management, collaboration and social computing, are hampering progress and creating new conflict. Customers with internal portal initiatives want federation across vendor families as a result of two overriding factors. First, organizations have portals from many providers, and these portals have undeniable appeal and strength for certain types of processes and interactions. For example, many organizations use one portal centered on business applications and processes (such as SAP NetWeaver or Oracle WebCenter), one portal for general-purpose knowledge and content management (such as Microsoft SharePoint or Oracle WebCenter Interaction), and one portal for customer or citizen engagement (such as OpenText Vignette Portal or Liferay). Second, organizations seek to provide a unified portal experience for employees, customers, partners and citizens across these portals.

Portlet federation is perhaps more pointedly an issue in providing interoperability with external partners, customers and affiliated organizations. Web Service for Remote Portlets (WSRP), often referred to as the go-to standard for portal federation, is, in fact, most useful in scenarios that require maintaining the branding of portal services. Inside organizations, where the branding of portlets is less of an issue, representational state transfer (REST)ful approaches may constitute a more flexible means of ensuring interoperability than federation.

Although WSRP v.2.0 promises to address the challenge of federating portals based on different vendors' technologies, portal federation requires more than just portlet syndication and remains a

daunting challenge. WSRP isn't universally available in all the platforms, and even when it is, its use is often discouraged by vendors whose innovative features rely on proprietary capabilities.

User Advice: Enterprises seeking to federate portals across vendor families should consider WSRP as a means to syndicate and evoke portlets and portal components with branding intact. However, organizations should look more broadly to integration approaches, such as those based on REST/plain old XML (POX), and should consider other emerging standards, such as OpenID and CMIS, for more versatile integration requirements.

Enterprises should also strongly consider federation approaches at the foundational level, rather than solely through portlets and gadgets. Many organizations have effectively used ESBs, business process management (BPM) and more integration-focused approaches to achieve deeper portal integration than federation can accomplish.

Business Impact: Federation across portals from different vendor families will:

- Enable users to access the resources exposed by those portals, without having to log in to multiple portal interfaces.
- Provide complete interoperability across portals, without developing custom integration code and replicating user profiles across multiple portal directories.
- Allow organizations to syndicate or distribute pluggable portal services to customers and partners.

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Sample Vendors: IBM; Liferay; Microsoft; OpenText; Oracle; SAP; Tibco Software

Social Software Suites

Analysis By: Nikos Drakos; Gene Phiher

Definition: Social software refers to tools that encourage, capture and organize open and free-form interactions among employees, customers and partners. This is a socializing technology that enables a social networking approach to communicating and creating or exploiting collective knowledge. It supplements and strengthens existing connections, behaviors and norms (for example, degree of connectedness, social signals, peer recognition and perceptions of impact on others). We see social software as occupying a continuum. At one end, it includes social extensions to conventional collaboration support environments that can provide the means for interaction and information sharing. At the other, it includes social software environments that also enable social patterns to emerge and evolve among larger numbers of loosely connected individuals.

It's evident that the functional boundaries between products are constantly shifting, and that there are few pure products. Most offer a blend of capabilities, and we expect successful products to continue to assimilate new functionality. An increasing number of products claim a broad set of capabilities, which typically includes support for user profiles, shared workspaces, document authoring and sharing, basic content management, discussion forums, wikis, blogs, microblogs, activity feeds, social tags, social bookmarks, social network analysis, social network visualization, content feeds, people search (expertise location), content rating, reputation management, social analytics and alerting.

Some products focus more on internal users, with an emphasis on integration with existing infrastructure, business applications and other enterprise requirements (such as auditability and compliance). Others place more emphasis on extranets, with support for secure information transfer between organizations. Some target closed or open external customers or user communities, with good support for large-scale deployments, consumer engagement and management of untrusted content (such as moderation and spam filtering). Some vendors provide a technology platform, while others provide a full-service approach, including strategy, implementation, administration and content moderation services.

Position and Adoption Speed Justification: Because of the popularity of related consumer social software and the "socialization" of the Web, the awareness of socializing technology is high. Within businesses, there is growing evidence of production deployments. We see pent-up demand from workers who use consumer products for work activities and enthusiasm from business managers who expect these tools to help them boost the performance of their workers. However, we also see some apprehension from those responsible for security, compliance, enterprise architecture and risk management in general.

On the supply side, options available for business use are maturing rapidly, as new vendors establish themselves in the market, and as every enterprise vendor delivers a social software suite. The movement from point tools to integrated suites has brought relief, as well as high expectations. We still see many organizations paying too little attention to the work that needs to be done beyond technology deployment to achieve the expected business results.

User Advice: Early implementations should evaluate the maturity and usability of the technology. Even more importantly, questions about business value and relevance to specific business contexts need to be addressed. IT managers should resist user demands to simply install social software tools without thinking through how they'll be used. Given the broad range of use cases and activities that can be supported by social software suites, prioritize them with respect to business value when it comes to deployment.

Many early deployments have failed, been ignored or slowly withered, because they lacked a clearly defined and appropriate purpose. Deployments should incorporate several elements, including ease of use, identification of the right context, exposure of connections, appeals to self-interest and the achievement of management recognition. Before investing in social software, IT and business managers should understand where it fits in the context of existing workplace applications and practices — for example, in creating documentation, classifying information, improving search relevancy, exploring ideas and making decisions.

Business Impact: Enterprise social software adds persistence — reflecting and revealing structure in otherwise transient informal interactions among workers in an organization. Valuable business information is created, shared and refined through self-selection, social incentives and decentralized control, rather than by top-down resource allocation and mandates. We expect social software to be relevant in connecting individuals to communities of interest and practice, as well as stimulating multidisciplinary collaboration that involves communication, exploration, innovation, creativity, discovery, knowledge capture and training.

The benefits are likely to come from behavioral changes (e.g., information sharing, discovery and capturing informal ideas). Thus, success depends on an outcome-oriented change management program. However, evidence of successful social software deployments is still limited. The risk of organizational culture clashes, privacy issues, and questions about worker productivity and content quality highlight the need for caution.

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: Acquia; Atlassian; blueKiwi Software; Ektron; EPiServer; IBM; Igloo Software; Jive Software; KickApps; Microsoft; MindTouch; Moxie Software; NewsGator; Novell; OpenText; Qontext; salesforce.com; Saba Software; Socialcast; Socialtext; SuccessFactors; Telligent; ThoughtFarmer; Traction Software; TWiki; XWiki; Yammer

Recommended Reading: "Magic Quadrant for Social Software in the Workplace"

Composite Applications

Analysis By: Ross Altman

Definition: A composite application orchestrates existing, independently developed programs, data stores and devices, along with new business logic, to deliver a new solution to a business problem. The solution provided by the composite application is something that none of the previously available applications could deliver on their own (see "Q&A: What Should IT Leaders Know About Composite Applications?").

Each of the applications, data stores and devices that are accessed by a composite application are built around a different data model. In most cases, the composite application supports user interactions beyond the user interface capabilities of the leveraged applications. In other cases, the composite application may act as a service, publishing an interface that other programs can access. Finally, some composite applications are built by leveraging other composite applications.

Examples of the resources that are leveraged by composite applications include packaged and legacy applications, as well as Web-accessible business and information services. Data stores accessed by a composite application may be operational in nature or designed for decision support. Devices that are leveraged by composite applications (e.g., RFID readers, electronic entry systems and smart utility meters) may be accessed via request/reply interactions, or the devices may generate events (conveyed in the form of messages) that are received and processed by the composite application.

Position and Adoption Speed Justification: As the requirements for new applications proliferate, the appeal of leveraging and extending existing applications, rather than implementing new ones, is extremely attractive as a means to reduce development costs and to shorten time to deployment for integrated solutions and services. Organizations in various industries have been exploiting composite application-style development for many years, mostly in conjunction with their implementation of service-oriented architecture (see "Understanding and Measuring the Business Value of SOA").

Leveraging existing applications to build composite applications reduces development costs and frees resources to work on additional pressing projects. Reusing applications and data sources to enable composite applications also helps to improve data and process consistency (see "The Advantages, Economics and Value of Reuse" and "MDM, SOA and BPM: Alphabet Soup or a Toolkit to Address Critical Data Management Issues?").

More importantly, a large percentage of transformational applications delivered today are composite applications, and that percentage will grow during the next four to five years (see "Going Forward, Most Transformational Applications Will Be Composite Applications"). While the costs of building and supporting composite applications are higher than the costs of building monolithic, stand-alone applications, the business benefit of integrating business functionality from multiple parts of the organization (or even from multiple organizations) cannot be matched by building yet another stand-alone, monolithic application (see "How Do Composite Applications Deliver Value to the Enterprise?").

Until recently, composite application development was too complex and technically challenging for all but the more technically proficient IT organizations. A decade's worth of IT investments in SOA now enables developers to leverage functionality in enterprise systems and packaged applications. Public Web services make consumer-oriented functionality readily accessible. The emergence of cloud-based applications and services, as well as the increasing use of SOA to enable B2B integration, has enabled the development of applications that bridge enterprise boundaries.

User Advice: Adopt composite applications to:

- Leverage established application assets.
- Reduce development costs.
- Accelerate application deployment.
- Leverage readily available cloud services.
- View composite applications as the most effective way to realize the intrinsic value of high-level trading-partner collaboration.

Prior to designing a composite application, project leaders should carefully evaluate how to suitably address design challenges, including middleware selection and semantic reconciliation, as well as management, security and governance (see "What Is Composite Application Governance?" and "How Much Should You Invest in the Governance of Your Composite Applications?"). IT and business executives should not expect the IT department's ability to create composite applications to translate into a business user's ability to do the same via mashups (see "End-User Mashups: Overpromised, and Barely Delivered").

Business Impact: The benefits of building composite applications will translate into higher-quality applications and lower costs to develop and maintain them. More significantly, the ability to compose applications that include partner and cloud-based services will represent substantial opportunities for building systems with greater reach, more efficiency and more relevance to users.

Moreover, composite applications support business requirements by enabling organizations to improve the effectiveness of their sales, purchase and support operations by reaching customers, suppliers and employees through a variety of integrated channels (such as the Internet, call centers, digital TV, wireless devices, self-service terminals and kiosks). Also, they make it possible to increase operational and decision-making efficiency by supporting a single integrated view of critical business entities — such as customers, suppliers, products, patients and taxpayers — whose data is typically scattered across databases and applications.

Finally, composite applications can help improve efficiency and customer satisfaction by streamlining and integrating business processes. This capability represents the segue between the functionality of composite applications with the role of business process management and improvement efforts.

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Sample Vendors: Compuware; GT Software; IBM; InterSystems; Kapow Technologies; Magic Software Enterprises; Metastorm; Microgen; Microsoft; ObjectBuilders; Oracle; OutSystems; Progress Software; SAP; Skyway Software; Software AG; SOALogix; Tibco Software

Recommended Reading: "Going Forward, Most Transformational Applications Will Be Composite Applications"

"How Do Composite Applications Deliver Value to the Enterprise?"

"Understanding and Measuring the Business Value of SOA"

"What Is Composite Application Governance?"

"How Much Should You Invest in the Governance of Your Composite Applications?"

"End-User Mashups: Overpromised, and Barely Delivered"

"The Advantages, Economics and Value of Reuse"

"MDM, SOA and BPM: Alphabet Soup or a Toolkit to Address Critical Data Management Issues?"

Advanced Web Services

Analysis By: Daniel Sholler

Definition: Advanced Web services use Web services standard capabilities that go beyond those that have become commonplace. The original definition referred to any Web-services-related standards beyond the basic SOAP, WSDL and UDDI capabilities. However, the advent of the Web Services Interoperability (WS-I) Organization profiles and the common acceptance of standards, such as WS-Security, BPEL and related components, mean that those capabilities, once considered advanced, are now part of the basic Web services bundle.

Basic Web services have reached the Plateau of Productivity, and are in widespread and common use in a variety of situations. The truly advanced Web services capabilities deal with complex security interactions, such as WS-Trust and WS-Federation, as well as asynchronous behavior, such as WS-ReliableMessaging. Web services using these types of advanced standards have been adopted more slowly, in part due to the slow pace of the ratification of the standards and rollout of their behavior (see "That's All for Web Services"), and in part because many of the interactions using Web services don't require these capabilities or use other methods to achieve them.

This definition of advanced Web services is a change from the definition used in earlier Hype Cycles, and more accurately represents the current state of these capabilities. Because of this change, the position and speed of adoption have also shifted.

Position and Adoption Speed Justification: Web Services standardization work has been downgraded by most of the vendors that had been actively contributing. The most obvious sign of this was the decision to stop funding the WS-I, and to roll it under the Organization for the Advancement of Structured Information Standards (OASIS) umbrella. WS-I has been the bellwether for the standards that are considered safe to use, because they have proven interoperability. Although work may continue under the auspices of OASIS, it will be focused on updating the profiles that are already in process. This slowdown is, in part, a reflection of the success of the overall Web services concept, as well as the general-purpose interoperability it provides. Organizations are beginning to use advanced Web services in limited configurations, but they are likely to remain so because the implementations are relatively new, and the interoperability is unproven.

Web services will remain the cornerstone of service-oriented-architecture (SOA) concepts in the enterprise. The asynchronous capabilities embodied in the standards are often not leveraged heavily in internal configurations, because these systems usually use enterprise service buses (ESBs) or other middleware that provides equivalent or better functionality. For external

connections, advanced Web services use has begun, but is in its infancy, and is often overshadowed by other models (such as RESTful services), particularly for use in conjunction with mobile applications.

Although we believe these standards will be productively used in some situations, they will not achieve widespread adoption and will remain a niche solution. Because of this, they will exit the Hype Cycle before reaching Plateau of Productivity status.

User Advice: Web services technology was designed for simple, low-cost and ubiquitous access to server-side application software from requesting points on the Web. This context is different from the well-controlled software infrastructure inside the enterprise's walls. Users should not anticipate the same levels of quality of service in both contexts. Users have the option to use advanced Web services models when connecting enterprise systems, but they should avoid their use (and stick with basic Web services, Web-oriented architectures or REST-/POX-type solutions) in B2B scenarios. Focus on the standards that are included in the ratified WS-I profiles. Users can employ the advanced Web services capabilities, but should realize that the interoperability is still unproven; therefore, these implementations should be treated in the same way that proprietary integration is treated.

Business Impact: Advanced Web services were designed to create standardized messaging capabilities within and among enterprises. In reality, they will be used in a limited way in both scenarios, and even that use will be inconsistent. The standardization of interaction can create many new opportunities for automation, which has significant business value, but only a few solutions will use Web services to accomplish this goal.

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Recommended Reading: "SOA Overview and Guide to SOA Research"

Climbing the Slope

Web Customer Service Suites

Analysis By: Johan Jacobs

Definition: Web customer service (WCS) suites are considered a collaborative CRM component and provide customer-enabling technologies via multiple Web and mobile phone channels (excluding voice). They support email response management systems (ERMSs), Web chat, knowledge management for self-service, virtual assistants, multimodal communications, video service, collaborative browsing and social channel interactions. Multichannel self-service is increasingly becoming the driving factor for WCS suite implementations that also focus extensively on reducing operating costs and delivering a consistent service across all channels. WCS assumes that the customer is interested in Web self-service. Once self-service is engaged, the customer could escalate the problem to an assisted contact center channel.

Position and Adoption Speed Justification: Seldom does the introduction of a WCS channel face customer adoption issues. Often, the adoption problems lie within the organization, as the organization is not ready to expose its data and systems to an external audience for self-service or does not have the staff ready to deal with customer issues that might be posted on a social network or other channel. Internal adoption efforts must, therefore, be focused on organizational readiness, data preparation, expanding staff competencies and the development of WCS business processes. Functionality is expanding as WCS vendors' maturity increases, with some

WCS vendors starting to cross over into the telephony and contact center space in an attempt to capture more channels. The technology is mature, and the ROI business case is focusing on moving services to a less-expensive channel.

User Advice: Spend time building your knowledgebase for use across multiple WCS channels (such as self-service, Web chat and ERMS). Best-of-breed, single Web-channel e-customer service solutions (excluding voice) are in the minority, with most vendors' and buyers' spending on multichannel suite-based approaches. When looking at a single-channel business requirement, focus on the ultimate multichannel, multifunction solution, and procure a multichannel product suite that enables a phased channel implementation approach. When looking at a multichannel solution, focus on a solution that can be integrated with your established technology choices. Set realistic expectations, and dedicate staff to only a few channels at a time, because true, fully blended multichannel environments still have a very low adoption rate. Link this to customer-centric Web strategies.

Business Impact: The benefits associated with the deployment of WCS channels are call avoidance, reduced average handle time, increased channel availability and customers helping each other in hosted communities, which all help reduce the cost of service. When procuring a WCS vendor's solution, get access to all the functionality of the suite. If you are only implementing, for example, an ERMS as a first stage, then the additional channels can be implemented from the same vendor at a later stage, alleviating the necessity for costly and difficult integration with point-based solutions. WCS suite technology will affect lead management (marketing), sales automation, customer service and self-service. It will also expose new channels to a new market, enabling the engagement of different clients.

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Sample Vendors: Avaya; eGain; Genesys; Kana; RightNow

Recommended Reading: "Magic Quadrant for Web Customer Service"

"Gartner's Strategic CRM Framework for Web Customer Service, 2011"

"Not All Customer Service Channels Are Created Equal"

B2B Web Services

Analysis By: Daniel Sholler

Definition: B2B Web services refers to the IT usage scenario in which some form of Web services — SOAP, WS-* or Web-native implementation, such as REST or POX — is deployed in B2B (or "multienterprise") integration projects. Examples include:

- The use of B2B Web services as an alternative approach to B2B process and data integration for traditional e-commerce projects, such as retail/consumer-packaged goods and the manufacturing and automotive industries
- Use by providers of integration brokerage (for example, GXS, IBM [via its Cast Iron and Sterling Commerce acquisitions] and Hubspan and Liaison) as a protocol into their networks for process and data integration, as the interface into their customers' systems, and (in some cases) as a Web services interface for automating the provisioning of users on their networks

- The emerging Web-services-based exchange of information and events in support of vendor-managed inventory for complex, high-tech manufacturing supply chains
- B2B Web services used by companies such as Amazon that enable third-party companies to leverage knowledge about buyers' preferences
- Use by software-as-a-service (SaaS) providers — for example, salesforce.com uses B2B Web services to implement its AppExchange Web services APIs
- Use by cloud computing vendors — for example, Google uses B2B Web services to implement its Google App Engine (see "Google App Engine Comes Closer to Enterprise Adoption")
- Use by emerging providers of cloud services brokerage (e.g., Strikelron and NetEDI) for supplying the near-real-time aggregation of business information from various content providers for consumption via Web services among many consumers
- To access business information from internal and external applications (run by external business partners) in support of portal-based applications
- Use by B2B gateway software (BGS) providers (for example, IBM and Software AG) as an increasingly prominent connection protocol supported in their BGS products, and used by companies implementing B2B integration projects

In these and other scenarios, Web services are being used as a multienterprise extension of internal service-oriented architectures (SOAs), or in lieu of more-traditional approaches to multienterprise integration, such as Applicability Statement 2 (AS2), electronic data interchange (EDI) and FTP.

Position and Adoption Speed Justification: Given the wide range of use cases in the definition section above, the position of B2B Web services is a compromise between the different rates of B2B Web services adoption. At one extreme, the rate of B2B Web services adoption for most well-established forms of e-commerce (such as order to cash in retail and manufacturing, and claims adjudication in insurance) is slow, due to the critical nature of the systems involved, and to the fact that most are "systems of record," when considered from a pace layering strategy point of view. However, given the number of e-commerce transactions that occur every year (estimated at more than 100 billion per year), even a small percentage represents a significant uptake, and the pace of adoption for these forms has dramatically increased in the past year. At the other extreme, the rate of B2B Web services adoption for new forms of B2B projects, such as those involving SaaS and cloud computing, is a substantial, fast-growing user base.

Overall, expectations for B2B Web services have climbed up toward the Plateau of Productivity. Although companies increasingly seek to use Web services in opportunistic B2B projects, important factors still conspire to inhibit more-widespread adoption of Web services in systemic multienterprise projects:

- Organizations have accepted the current state of Web services standards and are working with additional products (such as security gateway appliances and ESBs) to implement the desired functionality (see "That's all for Web Services"). Following the lead of cloud-based organizations, some users are shifting their emphasis to Web-oriented-architecture (WOA) and representational state transfer (REST) implementations, whereas most enterprises are still building SOAP-based interfaces. The growth in B2B services will continue, but the implementation style will shift from predominantly SOAP-based to predominantly REST-based over the next two to four years.

- The relatively new solutions that govern multienterprise (and internal) Web services — for example, Software AG, Cisco Systems, Oracle, Sonoma Systems and SOA Software.
- Users' overall immature understanding of the architectural framework, and security and governance requirements necessary to support Web services in scale.
- The lack of business cases in typical e-commerce scenarios for using B2B Web services as alternatives to such well-established approaches as S/FTP and AS2, and industry standards (such as RosettaNet).

Despite these inhibitors, the increasing use of B2B Web services by leading cloud computing providers, and opportunistically by many companies in their own projects, underscores the increasing importance of Web services throughout the IT industry. Solutions to create reliable Web services messaging, coupled with the increased overall adoption of SOA internally, the increased adoption and maturity of SOA governance technologies and the continued adoption of B2B Web services, even in traditional e-commerce projects, will continue to push B2B Web services up higher onto the Plateau of Productivity. This usage will reflect the overall growth in B2B interactions in general. However, the limited interoperability of advanced Web services standards will mean that some of these services will adopt multiple interface models, and RESTful interface designs will become more prevalent over time.

User Advice:

- Implementations of WS-ReliableMessaging and WS-Trust are now entering the marketplace, and the Reliable Secure Profile from WS-I awaiting approval has made SOAP-based Web services into the kind of standard that can be used to propagate messages across systems. These capabilities will be used almost solely to facilitate B2B interactions. In addition, specialized solutions that mimic some of these features (or simplify the mitigation of issues caused by their lack) are coming into widespread use. Cloud computing concepts based on Web architecture are becoming more relevant to users' daily activities, and users should increasingly implement B2B Web services following WOA principles using REST implementation (see "Tutorial: Web-Oriented Architecture: Putting the Web Back in Web Services").
- Look for such Web services standards to be implemented by SOA governance technology vendors (listed above), integration suite vendors (such as Tibco Software and Software AG), BGS vendors (such as Axway and Seeburger), packaged-application vendors (such as Oracle and SAP) and integration service providers (E2open and GXS), and by IT end users that are implementing their own B2B projects in your industry. These are leading indicators that B2B Web services are mature enough for you to adopt them, too.
- Consider using B2B Web services as an alternative to traditional e-commerce protocols, such as AS2 and FTP, in IT projects involving SaaS, cloud computing and other "greenfield" B2B project scenarios in which Web services are a natural extension of and are consistent with the development of Web-services-enabled internal applications and infrastructures.
- When available, leverage the B2B Web services capabilities offered by providers of cloud computing and SaaS (such as Google and salesforce.com) and integration as a service (IaaS; e.g., GXS, IBM and Hubspan). However, be prepared to implement SOA governance technologies, since few such vendors have implemented SOA governance technologies to improve quality of service (QoS).

- When available, leverage suitable security and SOA governance technologies to improve overall B2B Web services QoS, to make the discovery and implementation of Web services easier, and to enable you to audit and manage Web services, as well as to identify dependencies among them.

Business Impact: Web services have been widely adopted by cloud computing/SaaS providers, and will eventually be implemented in all forms of e-commerce, including supply chains and demand chains across all industries. Web services are also increasingly leveraged by companies implementing B2B projects, using all forms of integration middleware and IaaS.

Benefit Rating: Moderate

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Sample Vendors: Amazon; E2open; Google; GXS; Hubspan; IBM; Microsoft; Oracle; salesforce.com; Software AG; SOA Software; Strikelron; Tibco Software

Recommended Reading: "Magic Quadrant for Integrated SOA Governance Technology Sets"

"Taxonomy, Definitions and the Vendor Landscape for Application Integration Solutions, 2011"

Service-Oriented Business Applications

Analysis By: Gene Phifer

Definition: Service-oriented business applications (SOBAs) are delivered as a set of composable services. The technological foundation is typically based on SOAP Web services and other WS-* services, but there are also lighter-weight (i.e., RESTful) and nonstandard approaches. SOBAs are designed for deployment on a wide range of emerging platforms and architectures, such as service-oriented architectures (SOAs), event-driven architectures, business process platforms and Web-oriented architectures (WOAs).

SOBAs can be modifications of legacy applications through service interfaces, which are frequently delivered by wrapping legacy APIs with Web services, newly developed applications, modular suites or composite applications. SOAP-based or REST-based Web services are appropriate for creating services in SOBAs.

Position and Adoption Speed Justification: Since their inception more than 10 years ago, SOBAs have significantly impacted enterprise application strategies, largely because of the stated commitment of such industry giants as Oracle and SAP to the concept. SOA adoption has been a challenge in many enterprises. However, SOBA adoption is driven by enterprise software vendors, as the latest releases of their packaged software are SOA-enabled. The corollary definition of SOBA, software as a service (SaaS), is seeing excellent uptake in SMBs, and will further the concepts of SOBAs as large enterprises start to more fully embrace SaaS.

For example, SAP's on-premises solution, Business Suite, is a collection of SOBAs, but Oracle's on-premises solution, Applications Unlimited (which is made up of technology from Siebel, PeopleSoft, JD Edwards, Retek and others), is mainly non-SOBA. Oracle's foray into SOBAs will come with its upcoming Fusion Applications initiative. As a whole, the industry has plenty of room for SOBA growth.

User Advice: Enterprises should consider adopting SOBAs now. Adoption will occur by default if enterprises use SAP or Oracle family applications, because these two vendors have or will have SOBA capabilities inherent in most of their applications. However, it may take many years before enterprises upgrade to the SOBA versions of these packaged applications. In addition,

technology providers not traditionally associated with the direct marketing of business applications (most notably, IBM) will release offerings in the SOBA space for specific horizontal and vertical domain support through 2011 and beyond.

SOBAs benefit enterprises that have an SOA strategy. Therefore, a complete SOA strategy and plan are necessities.

Also, the decision to upgrade should be based on: (1) the need to access additional functionality; (2) the desire to stay current on vendor support; and (3) the enterprise's ability to support the existing back-level version of the application versus the newer version, and not just the desire to move to a SOBA.

Business Impact: SOBAs enable the business process integration of previously "silo-resident" applications, such as those in CRM, supply chain management and ERP. SOBAs help enterprises reach conventional business goals by using service interfaces for internal and external integration and interoperation. SOBAs also facilitate assembly of composite applications (i.e., mashups) and the creation of portals.

Benefit Rating: Moderate

Market Penetration: 20% to 50% of target audience

Maturity: Mature mainstream

Sample Vendors: IBM; Microsoft; Oracle; SAP

Second-Generation Portlet Standards (JSR 286 and WSRP v.2)

Analysis By: Jim Murphy; Gene Phifer

Definition: Portlets remain the primary components for integrating and building applications in portals. Portlet standards bring value to organizations by reducing the cost of development, facilitating code reuse, offering a simple means of integration for third-party applications, allowing interoperability among various portal software providers and reducing dependency on specific vendors.

The initial portlet standards included Java Specification Request (JSR) 168 and Web Services for Remote Portlets (WSRP). JSR 168 governs the life cycle and deployment of a portlet within a Java-based container. WSRP is a Web services specification and is agnostic as to platform. WSRP proposes to allow interoperability of portlets among Java, .NET and other portal containers. WSRP also proposes to allow portal federation, whereby a portlet can be produced on one portal platform, and consumed in another.

The second-generation portlet standards are JSR 286 and WSRP v.2. JSR 286 updates the standard mechanisms, detailing the invocation of local portlets in a Java portal framework. WSRP v.2 updates the standard mechanism for invoking remote portlets in a portal.

Position and Adoption Speed Justification: The success of the first generation of portlet standards, JSR 168 and WSRP, has been mixed. While most established portal vendors have supported the standards at a base level, advanced features in some portal products have often required a proprietary portlet approach. In addition, some portal providers have used proprietary approaches to exert control over customers and promote easily integrated adjacent products. Meanwhile, many organizations have often found portlet building and deployment overly complex — irrespective of the standards — and falling short of expected results. Thus, almost as soon as the initial standards were deployed, industry groups undertook efforts toward a second generation.

JSR 286 and WSRP v.2 are intended to fill the gaps found in the first generation of portlet standards, including adding support for interportlet communication. WSRP v.1 and JSR 168 are not used widely in portal deployments, but they have demonstrated value in providing code portability and reducing developer efforts in certain scenarios, such as those where interportlet communication isn't required. Portal vendors continue to develop toward JSR 286 and WSRP v.2 specifications, but support isn't universal and often isn't two-way.

While second-generation portlet standards offer some promise, their greatest inhibitor may be the burgeoning interest in widgets as enhancements or alternatives to portlets. Widgets are embeddable applications comprising simple code snippets that can be easily snapped into users' portal pages. As client-side components, widgets can be less taxing on server resources, and, because widgets are less complex than portlets, they are easier to design for cross-platform use. In some cases, widgets will obviate the need for portlets.

However, widgets and portlets will likely coexist in most organizations. Complex forms of integration with sophisticated back-end systems will likely still require portlets. A feature like interportlet communication is not yet part of any widget specification and may be required in many situations. JSR 286 is designed to account for, and accommodate, widgets and other representational state transfer (REST)-based approaches. While second-generation portlet standards are relatively advanced and fairly stable in ensuring portal interoperability, widget standards are only beginning to emerge, with consumer and enterprise approaches, such as OpenSocial and iWidgets, still competing for adoption.

User Advice: Use portlet standards as the default starting points for portal-related custom development to contain portlet development costs, and as a means of federating different portals. However, don't plan on these specifications meeting all portlet development needs, and don't obsess with standards at the cost of business agility and value.

Leverage the JSR 286 standard if you are using a Java-based portal. JSR 286 provides enterprises with flexibility in portal deployment across different vendors' platforms that support the specification. If you want to experiment with portal technology before engaging in a procurement with a commercial vendor, start with a lightweight implementation, using an open-source portal that supports JSR 286. If you use JSR 286 for custom portlet development, then you can transfer those portlets to more heavy-grade enterprise portal deployments, receiving full funding and based on another vendor's offering, if that vendor also supports the specification. JSR 286 supports interportlet communication, a key gap limiting JSR 168 use.

WSRP can be a useful standard, but in relatively rare cases; it is not a cure-all for heterogeneous (i.e., .NET and Java) portlet development. WSRP continues to provide a mechanism for portlet-level federation among different portals. However, WSRP production and consumption capabilities are required to facilitate federation among the different portals, and several vendors support WSRP as a consumer, but not as a producer. When it is desirable to syndicate a user interface (UI), WSRP is a useful standard. When plug-and-play syndication of the interface is not needed, providing well-structured, heterogeneous access to information via RESTful services or XML syndication is a better option for exposing information in a form that is easily accessible by portals, whose developers can recreate the UI of the portlet to meet their needs.

Business Impact: JSR 286 can help reduce the cost of development through ease of integration, reuse of components, and portability or interoperability among portal frameworks from various providers. WSRP v.2 is a useful standard for syndicating or invoking a UI component, but is not suitable as a mechanism for heterogeneous portal development.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Sample Vendors: IBM; JBoss; Liferay; Microsoft; OpenText; Oracle; SAP; Tibco Software

Recommended Reading: "Second-Generation Portlet Standards Should Be Used for Portlet Development but Aren't the Whole Story"

Federated Portals Within Vendor Families

Analysis By: Jim Murphy; Gene Phifer

Definition: Portal federation allows portal components, applications and content, often in the form of portlets, to be produced in one portal environment, instance or server, and consumed in another portal framework or instance. Portal federation is a means of integrating portals, sharing resources across portal deployments and providing a unified experience for end users. Portal federation within vendor families describes this interoperability among products from a single portal vendor or provider.

Position and Adoption Speed Justification: Vendors allow for portal federation within their product portfolios using Web Service for Remote Portlets (WSRP). WSRP enables federation across distinct instances of a portal product that are built on the same vendor's technology.

WSRP-compliant portal components aren't always readily accessible without a good deal of work on the part of customers, system integrators or third-party providers. Federation may require directory entry replication, and is often a function of server and server farm topology and replication, a particular concern for large, multinational and/or multibrand organizations. Such enterprises are particularly hampered by the manual work necessary to replicate content and access rights across multiple instances of the same vendor's portal product. Dependence on multiple, disparate systems and resources often hampers the performance and speed of federated portals.

While portal federation within vendor families is a challenge in itself, organizations face far more complex challenges when federating across vendor families. This is largely because many portal vendors have concentrated on federation capabilities in their own portals and related products, whether their intention is to urge customers to standardize on their portal, to lock out other portal providers or to exploit proprietary technologies to offer more advanced features than the standards currently support. Because certain portal providers are vital, compelling and, in some cases, undeniable, portal federation across vendor families remains a vital concern for organizations pursuing broader portal and user experience initiatives.

Organizations that are after integration, rather than federation, should look to other approaches. Many successful portal implementations employ more-established mechanisms, such as enterprise service buses and SOAP-based Web services. Integration at these more foundational levels, such as in the data layer or process layer, can provide a more cohesive and versatile architecture for creating composite applications.

User Advice: Enterprises that have deployed multiple portals from the same vendor should investigate federation via portlet interoperability mechanisms, including WSRP. However, organizations can't rely on all portal vendors providing full federation among different instances of their software.

Business Impact: Most enterprises have multiple horizontal portal frameworks. Enterprise architectures supporting multiple portals within an enterprise can provide a more unified, cohesive user experience if they can federate these portals, rather than force users to move from portal to portal depending on the business interaction.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Mature mainstream

Sample Vendors: IBM; Microsoft; Oracle; SAP

Mobile Application Development

Analysis By: Michael J. King; William Clark; Nick Jones

Definition: This technology involves mobile application development (AD) in its most generic sense for enterprise end users and customers of any enterprise. The intent is to chart the general development for mobile devices, such as feature phones, smartphones, media tablets and mobile laptops. The architectures covered in this profile relate to mobile AD, but focus primarily on thick-, rich- and thin-client development. In addition, there are technologies and accompanying positions for the platforms used to develop and deploy these applications to end users and customers — mobile enterprise application platforms (MEAPs) and mobile consumer application platforms (MCAPs), respectively — as well as for the client devices or networks used to access them.

As the demands on IT departments have increased, in terms of applications they must support (in a mobile sense) and the number of devices end users are carrying, mobile AD has matured from the single-focus applications (often confined to a single device) to a wider addressable audience of device types, computing styles and application environments. Gartner envisions a world in which many of the applications that an enterprise enables for its mobile users will not be developed or maintained by that enterprise, but rather provisioned through public app stores or added on as part of purchasing ERP, supply chain management or CRM systems. In addition, the applications that are built and owned by that enterprise will be required to run on multiple OSs, across many device types (tablets, smartphone, etc.) and corresponding computing styles.

Position and Adoption Speed Justification: Enterprises are investing in mobile AD at an accelerating pace, driven by such factors as the penetration of smartphones and tablet devices into the consumer and enterprise markets. Given the wide variance of devices and OSs, the growing number of applications and the early stages of the applications themselves, Type B organizations that have not invested in mobile application development resources are increasingly finding themselves looking at outsourcing the development of the second wave of mobile applications. Type C organizations are pressing forward with initial rollouts of off-the-shelf or prebuilt applications.

User Advice: Enterprises need to be aware of the six styles of mobile application architecture: thick, thin, rich, streaming, messaging and no client. Based on the type of mobile application architecture, large enterprises supporting strategic mobile development need to consider MEAPs and MCAPs, as appropriate, and need to link business strategy to each set of platforms by keying off the size of the audience addressed, the range of devices to be supported, total cost of ownership, security and usability. Given the growth and breadth of mobile development demands, enterprises need to plan for the use of specialist tools, including those for testing and the user interface.

Business Impact: The business impact of mobile applications can be significant, whether it is a transformation of the customer relationship via that mobile application, or the enablement of employees to be more impactful, via increased efficiency or better and faster customer relations. Benefits generally fall into three categories for workers: efficiency improvement, greater effectiveness for mobile workers or reductions in errors. For consumer-facing applications, customer loyalty through convenience, targeted marketing and sales scenarios drive benefits. The overall impact can range from 10% of mobile worker payroll to billions of dollars spent on

consumer advertising over mobile phones. The impact on retail sales alone for context-aware mobile applications is estimated to be \$96 billion by 2015.

Benefit Rating: High

Market Penetration: More than 50% of target audience

Maturity: Early mainstream

Sample Vendors: Antenna Software; Apple; Microsoft; Netbiscuits; Nokia; Pyxis Mobile; Research In Motion; Sybase; Syclo

Recommended Reading: "Magic Quadrant for Mobile Consumer Application Platforms"

"Magic Quadrant for Mobile Enterprise Application Platforms"

"Mobile Architectures, 2009 Through 2012: A Trend Toward Thin"

Web Analytics

Analysis By: Bill Gassman

Definition: Web analytics refers to a market of specialized analytic applications used to understand and improve online channel user experience, visitor acquisition and actions, and to optimize digital marketing and advertising campaigns. Commercial products offer reporting, segmentation, analytical and performance management, historical storage and integration with other data sources and processes. The tools are used by marketing professionals, advertisers, content developers and the website's operations team, and increasingly provide input to automated tools that target improved customer experience.

Position and Adoption Speed Justification: More than 90% of the addressable market is using some form of Web analytics tools. Google reports that over 200,000 frequently use its free Google Analytics product, and there are over 20,000 customers of the leading fee-based products. While most organizations have the tools, less than 50% of the addressable market is using advanced functions, such as customer-based segmentation, data warehousing and exporting user activity events into search engine marketing, targeted email, banner advertising and content management engines.

Market leaders have responded to Google Analytics with suites of marketing optimization tools to complement their analytics products, high-performance ad hoc query tools for warehoused data and consulting services. They also have an "ecosystem" of Internet-based marketing products and partners tied together with its analytics platform. Partner integration includes data and process, and, in some cases, analytics are tied, in real time, with Web content management systems. Since 2010, IBM acquired Coremetrics and Unica and Comscore acquired European vendor Nedstat. This consolidation is an indication of the market maturity, however there are new entrants gaining minor traction, such as Performable, Kissmetrics and open source offering, Pwik. The lack of standards is an inhibitor to this market, although advertising's Metrics Ratings Council (MRC) has certified Omniture to be used, instead of third-party rating services, to negotiate ad prices. There is no instrumentation or well-adopted metrics standards, and each vendor's approach is unique. Delivery of Web analytics solutions continues to be dominantly software as a service (SaaS) rather than in-house products. More than 80% of total revenue comes from a SaaS subscription model.

The biggest challenges the market faces as it moves into Gartner's Hype Cycle Plateau of Productivity are:

- User maturity

- Smart mobile devices
- Native applications
- Video and audio content
- Context-aware computing
- Social media
- Social networks
- Support of portal
- Packaged applications
- Lack of instrumentation standards
- Government regulation of tracking cookies

Some of these challenges will ease over the next two years, as organizations invest more properly in analytics, but there are big gaps between those who stretch the capability of these products and those who struggle to use them.

User Advice: Most enterprises with a website have a reporting package, but many receive less than the potential value from the tools. The degree to which this should be fixed is related to the strategic and potential value of an enterprise's website. Business users should be the primary users of the tools, with support from the IT organization in the areas of instrumentation, data integration, process management and complex report generation. A business executive champion is important to drive the analytic culture. Ensure there are sufficient skills, create a training program that teaches employees how to use the products in their role, promote success and use consultants (external or from a vendor) to overcome technology hurdles in using the tools. If still using log files rather than JavaScript tags for instrumentation, explore the value of tagging, mindful of user and data privacy issues. If not already doing so, start using the tools to analyze the impact of a/b or multivariate testing. Analyze users by segments, including those using mobile devices and social channels. Find opportunities to try integrating cross-channel data, such as online data with the call center or point of sale. For advanced enterprises, start building a user-experience management ecosystem that blends analytics with search, context, social networking, content management, CRM master files and automated outbound marketing.

Business Impact: Investing in Web analytics is becoming more indispensable, because of the significant implications for marketing or service delivery oriented enterprises, and anywhere the Web channel is strategic. The core process is to collect, analyze and monitor customers' behavioral activities on websites. A view into what is working, or not, helps to optimize the online channel. The impact of search engine advertising, email campaigns, cross-sell or upsell targeting and social media activity can be measured and refined through Web analytics. Customer data can be gathered and incorporated into personalized and context rich content for marketing campaign decisions (such as profitability analysis and segmentation), and leveraged for every interaction channel in a campaign management strategy. Subscriber behavior can be analyzed to identify satisfaction issues and potential churn candidates. It is not uncommon for the business metrics of Web channels to double over baseline benchmarks within six months of starting a Web analytics program.

It takes as long as three years to achieve advanced skills, at which point a continuous improvement process should be in place.

Benefit Rating: Moderate

Market Penetration: More than 50% of target audience

Maturity: Mature mainstream

Sample Vendors: Adobe; AT Internet; comScore; Google; IBM; Webtrends

Recommended Reading: "Predicts 2010: Customer-Centric Web Strategies"

"Incorporating the Web Into Cross-Channel Customer Analysis"

"Customer Experiences With Omniture's Test&Target Website Product"

"Five Best Practices for Web Analytics Initiatives"

"Key Challenges in Web Analytics, 2009"

Web and Application Hosting

Analysis By: Ted Chamberlin; Gene Phifer

Definition: Web hosting, which includes custom and packaged application hosting, is the outsourced management of some or all the infrastructure associated with Web-based content and applications. Customers are provided with Internet data center facilities, bandwidth, computing capacity, security and storage, as well as associated managed services. This infrastructure may be dedicated, virtualized or provisioned on a consumption basis. Typically, the hoster is responsible for the day-to-day operation of the infrastructure. In application hosting, the provider will supply day-to-day application management tasks, in addition to infrastructure management. The transfer of technical and staff assets is relatively rare, with customers tending to provide their own software licenses and hardware.

Position and Adoption Speed Justification: Web and application hosters have automated most of the deployment and management of the network, infrastructure and operational support in dedicated and virtualized environments, and now must look to extend this level of competence to cloud infrastructure-as-a-service (IaaS) environments. Traditionally, customer support was inconsistent, but many have implemented formal customer satisfaction programs and use the output to change workflows (IaaS offerings will challenge customer support improvements as most environments are self- or lightly managed and supported). This movement toward "hybrid" hosting environments, where applications are hosted on a combination of dedicated and virtualized platforms, has begun to separate the leading providers from those that offer only partial solutions. The increased interest in cloud computing and software-as-a-service (SaaS) models continues to force hosting providers to develop additional complimentary service stacks where compute, storage and network are provisioned in an elastic manner, and billing is based on the consumption of resources. These usage-based services, commonly referred to as IaaS, focus heavily on server and storage; commercial enterprise application hosting continues to thrive on dedicated enterprise server platforms, but is starting to incorporate virtualization and utility compute for nonproduction architectures. As hybrid hosting offerings become more user-friendly, enterprises will start to divide applications and workloads between both dedicated and multitenant-based hosting services. This drive toward more hybrid hosting will have financial implications for the hosters in terms of not only capital investments needed to fund virtualized compute and storage estates, but also advanced automation for fabric control and for metering/billing systems.

User Advice: Nearly all enterprises should consider external hosting in their tactical and strategic sourcing decisions, because the services are standardized, and can support the flexibility of

upward and downward scaling. Not every service provider can deliver all levels of support (especially enterprise application management and utility/cloud services); therefore, we recommend defining your required level of service and support prior to engaging in a competitive bid situation.

Business Impact: Web and application hosting provide a greater reliability, scalability and technology expertise than in-house hosting for all but a few enterprises that have complex application integration needs, or whose IT operations are large enough to match the scale of a Web hoster. Web hosters typically also have higher-quality facilities, diverse carrier networks and deeper system support personnel than enterprises. However, the customer is restricted to the technologies supported by the Web hoster, and, as with all outsourcing, there may be some loss of control.

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Mature mainstream

Sample Vendors: AT&T; BlueLock; CenturyLink-Savvis; CSC; Datapipe; Fujitsu Services; GoGrid; HP-EDS; IBM; Interoute; NTT Communications; Rackspace; Secure-24; SunGard Availability Services; T-Systems; TW Cable-Navisite; Verizon Business

Entering the Plateau

SOA

Analysis By: Daniel Sholler

Definition: Service-oriented architecture (SOA) is a design paradigm and discipline that can be used by IT to improve its ability to quickly and efficiently meet business demands. Some organizations have realized significant benefits using SOA, including faster time to market, lower costs, better application consistency and increased agility.

SOA delivers these benefits by reducing redundancy and increasing the usability, maintainability and value of software systems. When applied effectively, the SOA paradigm produces application systems that are intrinsically interoperable and modular. Intrinsic interoperability makes systems easier to use. Modularity makes systems easier to maintain. Improving system maintainability makes it easier and faster to make changes (i.e., it increases agility), and reduces the total cost of ownership (TCO) of the system.

Position and Adoption Speed Justification: SOA has been widely adopted as a means of creating leverage within the software portfolio, and its principles are used to develop integration relationships inside and outside the enterprise. SOA is also the primary model for integrating cloud-based applications into the existing system portfolio.

Vendors of middleware, development tools and packaged applications have delivered SOA capabilities in most of their products, although the implementations are still superficial in some cases. Most user organizations are attempting to use SOA concepts as part of their system designs. However, the usual "technology as a silver bullet" thinking has largely been discredited. The near-term return on investment in some SOA projects has been difficult to quantify, mostly because the results are spread over the lifetime of the solution. Most organizations have been pleased with the improved flexibility and long-term results. Compared with traditional monolithic or client/server applications, SOA applications are more likely to be spread across multiple computers in far-flung locations. They're more likely to be composed of parts that are developed and managed by disparate, semiautonomous IT groups (domains), often controlled by disparate

business units inside and outside the company. They're also more likely to be running on a mix of heterogeneous application servers, programming languages and operating systems; and subject to frequent change, because of volatile business requirements.

SOA is part of the solution to these problems, because it clarifies system design, isolates the modules from each other and increases the interface documentation. Some organizations have been disappointed by the low level of service sharing ("reuse") that they have achieved. In cases where value is being measured, however, this value can be derived even with a modest quantity of shared services. Some SOA projects have encountered problems in governance, testing, configuration management, version control, metadata management, service-level monitoring, security and interoperability. This is to be expected, because changes in the fundamental structure of business processes and application architectures of this magnitude do not happen quickly or easily, and the challenges are based on the heterogeneous and distributed nature of the systems, not on any characteristic of SOA. User migration to SOA began in the late 1990s, and continues today. Most organizations have some commitment to SOA, and we expect that this will be nearly universal by 2013.

User Advice: Use SOA to design large, new business applications, particularly those with life spans projected to be more than three years, and those that will undergo continuous refinement, maintenance or enlargement. SOA is especially well-suited to composite applications in which components are built or managed by separate teams in disparate locations. These components can also leverage pre-SOA applications by wrapping function and data with service interfaces.

When buying packaged applications, rate those that implement SOA more highly than those that don't. Also, use SOA in application integration scenarios that involve composite applications that tie new logic to purchased packages, legacy applications or services offered by other business units — such as those found in software as a service (SaaS) and other types of cloud computing. However, do not discard non-SOA applications in favor of SOA applications solely on the basis of architecture. Discard non-SOA applications only if there are compelling business reasons why they have become unsatisfactory.

Continue to use non-SOA architectures for some new, tactical applications of limited size and complexity, as well as for minor changes to installed, non-SOA applications. There are multiple patterns within SOA — including multichannel applications, composite applications, multistep process flows, REST and event-driven architecture (EDA) — and each pattern has its own best practices for design, deployment and management.

Business Impact: Like the relational data model and the graphical user interface, SOA represents a durable change in application architecture. SOA's main benefit is that it reduces the time and effort required to change application systems to support changes in the business. Business functions are represented in the design of SOA software services, which help align business and technology models. The implementation of the first SOA application in a business domain will generally be as difficult as, or more difficult than, building the same application using non-SOA designs. Subsequent applications and changes to the initial SOA application will be easier, faster and less expensive, because they'll leverage the SOA infrastructure and previously built services.

SOA is an essential ingredient in strategies that look to enhance a company's agility. SOA also reduces the cost of application integration, especially after enough applications have been converted or modernized to support an SOA model. The transition to SOA is a long-term, gradual trend, and it will not lead to a strategic realignment in vendor ranks or an immediate reduction in user companies' IT outlays.

Benefit Rating: Transformational

Market Penetration: More than 50% of target audience

Maturity: Early mainstream

Recommended Reading: "SOA Overview and Guide to SOA Research"

"Q&A: Key Questions to Address Before Your Initial SOA Projects"

"Toolkit: Building a Business Case Justification for SOA Projects"

"Key Issues for SOA, 2010"

"How to Approach Integration in Advanced SOA Projects"

"The 13 Most Common SOA Mistakes and How to Avoid Them"

"SOA and Application Architecture Key Initiative Overview"

Off the Hype Cycle

Corporate Blogging

Analysis By: Jeffrey Mann

Definition: Corporate blogging is the use of online journals by corporate employees, individually or in a group, to further company goals.

Position and Adoption Speed Justification: While still not a totally universal practice, corporate blogging is a well-established phenomenon. It has become so common for many organizations that it has gone off of the Hype Cycle, due to widespread adoption. Outside the Web 2.0 mainstream, many organizations still struggle with how to manage and encourage corporate blogs and most importantly, with deciding who should blog.

The "faceless" company has largely disappeared, as blogs need to have a personal connection to someone real to be credible. Many CEOs have found that, despite their other skills, they are terrible bloggers. Even when blogging for the company, it is important to retain an individual voice.

Disappointments have occurred, primarily by dashing expectations, and being overoptimistic at the outset because of a lack of knowledge of how to work this new communication medium. There have been few spectacular failures, which some feared there would be (such as a massive release of confidential information that had a negative effect on the company that would not have occurred otherwise).

As with personal blogs, the primary failure mode is a "slow fade" — as initial enthusiasm diminishes, the blog content becomes stagnant and the assembled readership dissipates. For a few blogs that enjoy strong growth, a positive feedback loop results, as reader interest spurs the blogger to do more.

User Advice: Consider corporate blogs as part of the standard repertoire of corporate communication tools and the emerging portfolio of social media tools. Blogs do not replace other media, but they can reinforce or redirect messages in other channels. A single blog post on corporate policy can reinforce or reduce emails sent directly with a similar message.

Blogs enable an organization to mount a rapid public response to fast-changing events and depending on the circumstances, can provide important "spin" on messages in the mass media.

The blog medium has immediacy, has a potentially large reach, is low-cost and offers the opportunity for the bidirectional transfer of information (specifically, a conversation with the market). The main risk with corporate blogging is failing to engage in this new medium, in the sense of not knowing what the blogosphere is saying about your organization and not knowing effective ways to communicate a response.

Understand how blogs fit into the repertoire of social media, which includes microblogging (Twitter), videoblogging (Vimeo and YouTube), social networking (Facebook and LinkedIn) and social content aggregators (FriendFeed).

Blogging is an activity that people are either good at and enjoy, or not. Pressuring someone to blog purely because of their position is often counterproductive, because if they are not naturally attracted to the activity, they are unlikely to be very good at it. It is more valuable to find someone anywhere in the organization who is naturally good at and enthusiastic about blogging and to encourage them, than it is to convince high-profile personnel that they really should be blogging.

Organizations that fail to engage in social media can suffer a competitive disadvantage by becoming mute or muffled in an arena where competitors and other opposition forces are loud and clear.

Begin your engagement by listening to the blogosphere to understand players, positions, etiquette and styles of interaction. Reduce expectations because, blogging is easy to get into in terms of initial effort and technical skill requirements, but it is hard to execute effectively as it requires long-term commitment, consistency and authenticity — in addition to skill, talent and experience in this new communication medium.

Ease into blogging by using a hosted service, rather than purchasing or installing software on your servers. View blogs not just as external-facing channels for a single senior manager or an anonymous corporate communications function, but as team blogs clustered around a product or business unit and internal-facing blogs for supporting company initiatives.

Business Impact: Corporate blogging can be invaluable in enabling an organization to reach the broad public and opinion makers and in enabling management and employees to communicate regarding internal corporate initiatives. Additional impact will be in competitive intelligence, customer support and recruiting.

Benefit Rating: Moderate

Market Penetration: More than 50% of target audience

Maturity: Off the Hype Cycle

Sample Vendors: Google; IBM; Microsoft; Nucleus CMS; Six Apart; Telligent; WordPress

Microblogging

Analysis By: Jeffrey Mann

Definition: "Microblogging" is the term given to a narrow-scope mode of social communication pioneered by the social network site Twitter.com and followed by similar services from Plurk, Yammer, Socialcast and Identi.ca. The concept is surprisingly simple: users publish a one-line status message to their contacts, who have chosen to follow their activities on the service. Users can see the collected statuses of all the people they choose to follow. Even those who do not want to follow many people can search through the microblogging stream for topics or tags that they are interested in. Trending topics provide a condensed view of what everyone on the service is talking about. The content of status messages (called "tweets" on Twitter) ranges from the

mundanely trivial ("I am eating eggs") to a random insight ("I think blogging is our online biography in prose, and Twitter is the punctuation") to a reaction to an event ("A passenger plane just landed on the Hudson River!").

Twitter's dominance has led to the practice being called "twittering" or "tweeting," but it is also referred to as microblogging: to broaden the focus from a single vendor and to point out how this style of communication has augmented, and partially replaced, blogging. Even though microblogging superficially resembles instant messaging (IM), tweets are published to a group of interested people — making it more similar to blogging than the person-to-person nature of IM.

The trendsetting Twitter system intentionally constrains messages to 140 characters, which is the limit of an SMS text message on a mobile phone. This simple constraint enhances the user experience of those who consume this information. Tweets are small tidbits of information, easily digested and just as easily ignored — as the moment dictates. Other intentional constraints are designed to provide a high-impact user experience through minimalist design: no categories, no attachments, no scheduled postings. These constraints are a matter of some debate among users, leading Twitter to add more functionality during the past year: groups or lists, trending topics and retweets. Competitors offer more fully-featured alternatives (for example, Plurk and FriendFeed) or open-source approaches (such as Identi.ca, based on StatusNet), but have not been able to challenge the dominance of Twitter in the consumer market. One key factor behind Twitter's success over its competitors, has been its early offering of an API to third-party developers. This has led to dozens of packages that enable users to access the Twitter service and post content, either through a mobile device or a more fully-featured desktop client. Examples include Seesmic, TweetDeck, Twitterrific and TwitterBerry. These third-party packages can provide offline capability, as well as features that fill in the gaps in Twitter's online offering. Twitter recently offered its own BlackBerry client as well.

Twitter's open nature makes it largely unsuitable for internal use within enterprises, or for confidential communications with partners — leaving an opportunity for new offerings. Services such as salesforce.com's Chatter, Yammer, Socialcast and Present.ly provide microblogging services aimed at individual companies, which provide more control and security than public services such as Twitter. Microblogging is also rapidly becoming a standard feature in enterprise social software platforms such as Socialtext, NewsGator, BroadVision Clearvale, IBM Connections and Jive.

Position and Adoption Speed Justification: Microblogging has moved off the Hype Cycle, because it has combined with activity streams — which are essentially microblogs plus alerts automatically generated from events in other systems. This development was predicted in "Twitter for Business: Activity Streams Are the Future of Enterprise Microblogging", and has largely come to pass.

User Advice: Adopt social media sooner rather than later, because the greatest risk lies in a failure to engage and being left mute in a debate in which your voice should be heard.

Before using social media to communicate, listen to the channel, learn the language and become familiar with the social norms; only then should you begin speaking. As with any other language, good results are achieved with regular, consistent practice, rather than with "spotty" participation.

Remind employees that the policies already in place (public blogging policies, protection of intellectual property and confidentiality, for example) apply to microblogging as well. It is not always necessary to issue new guidelines.

Because Twitter is a public forum, employees should understand the limits of what is acceptable and desirable.

Business Impact: Despite its popularity, microblogging will have moderate impact overall on how people in organizations communicate and collaborate. It has earned its place alongside other channels (such as email, blogging and wikis) in enabling new kinds of fast, witty and easy-to-assimilate exchanges, but remains only one of many channels available. Microblogging has greater potential to provide enterprise value than these alternative channels — by coordinating large numbers of people and providing close to real time insights into group activities. These mass-coordination and mass-awareness possibilities are being explored by some early adopters, but have yet to achieve broad adoption.

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Off the Hype Cycle

Sample Vendors: Blogtronix; BroadVision Inc.; Identi.ca; Jaiku; salesforce.com; Seesmic; Socialcast; Socialtext; Tweet Scan; Twitter; Yammer

Recommended Reading: "SWOT: Twitter, Worldwide"

"Four Ways in Which Enterprises Are Using Twitter"

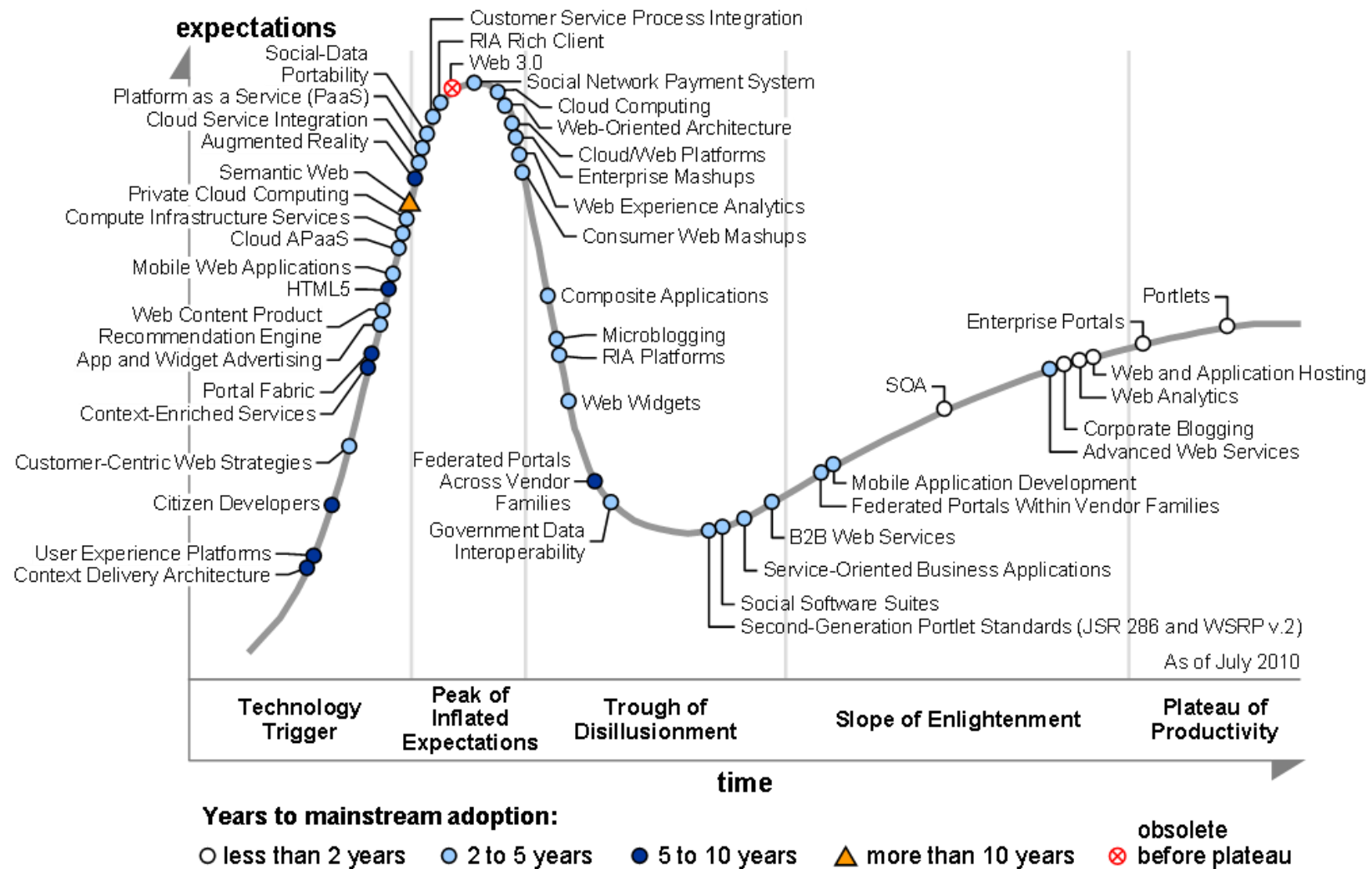
"Twitter for Business: Activity Streams Are the Future of Enterprise Microblogging"

"Case Study: Social Filtering of Real-Time Business Events at Stratus With Salesforce.com's Chatter"

"Should Retailers Use Twitter?"

Appendixes

Figure 3. Hype Cycle for Web and User Interaction Technologies, 2010



Source: Gartner (July 2010)

Hype Cycle Phases, Benefit Ratings and Maturity Levels

Table 1. Hype Cycle Phases

Phase	Definition
<i>Technology Trigger</i>	A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.
<i>Peak of Inflated Expectations</i>	During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The only enterprises making money are conference organizers and magazine publishers.
<i>Trough of Disillusionment</i>	Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.
<i>Slope of Enlightenment</i>	Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.
<i>Plateau of Productivity</i>	The real-world benefits of the technology are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology's target audience has adopted or is adopting the technology as it enters this phase.
<i>Years to Mainstream Adoption</i>	The time required for the technology to reach the Plateau of Productivity.

Source: Gartner (July 2011)

Table 2. Benefit Ratings

Benefit Rating	Definition
<i>Transformational</i>	Enables new ways of doing business across industries that will result in major shifts in industry dynamics
<i>High</i>	Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise
<i>Moderate</i>	Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise

Benefit Rating	Definition
<i>Low</i>	Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings

Source: Gartner (July 2011)

Table 3. Maturity Levels

Maturity Level	Status	Products/Vendors
<i>Embryonic</i>	<ul style="list-style-type: none"> In labs 	<ul style="list-style-type: none"> None
<i>Emerging</i>	<ul style="list-style-type: none"> Commercialization by vendors Pilots and deployments by industry leaders 	<ul style="list-style-type: none"> First generation High price Much customization
<i>Adolescent</i>	<ul style="list-style-type: none"> Maturing technology capabilities and process understanding Uptake beyond early adopters 	<ul style="list-style-type: none"> Second generation Less customization
<i>Early mainstream</i>	<ul style="list-style-type: none"> Proven technology Vendors, technology and adoption rapidly evolving 	<ul style="list-style-type: none"> Third generation More out of box Methodologies
<i>Mature mainstream</i>	<ul style="list-style-type: none"> Robust technology Not much evolution in vendors or technology 	<ul style="list-style-type: none"> Several dominant vendors
<i>Legacy</i>	<ul style="list-style-type: none"> Not appropriate for new developments Cost of migration constrains replacement 	<ul style="list-style-type: none"> Maintenance revenue focus
<i>Obsolete</i>	<ul style="list-style-type: none"> Rarely used 	<ul style="list-style-type: none"> Used/resale market only

Source: Gartner (July 2011)

RECOMMENDED READING

Some documents may not be available as part of your current Gartner subscription.

"Understanding Gartner's Hype Cycles, 2010"

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