

Predicts 2010: Agile and Cloud Impact Application Development Directions

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As organizations seek to improve productivity and reduce application operating and maintenance costs, we will continue to see an evolution of software development tools, platforms and practices. To take advantage of this, organizations must shift structures and practices while embracing new technologies — a challenging proposition.

Key Findings

- Development organizations have been making a shift toward agile methods, but this is still slow to move beyond development, and often is a mixture of waterfall practices utilizing an agile or iterative project cycle.
- Cloud-computing will impact both the tools put to use in application development and the applications that are delivered to an organization.
- The combination of more-frequent releases and more-complex application architecture will create a development crisis for organizations that don't invest in training and improved tool integration.

Recommendations

- Look for opportunities to utilize agile development practices, but recognize that it requires changes and commitment on the part of business and IT.
- Investigate the growing number of licensing options including use of software-as-a-service (SaaS) contract models and use of hosted tools and compute power to provide greater flexibility and reduced license costs.
- Invest in training and improved requirements and design skills to deliver solutions faster and meet needs for improved user interfaces.

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STRATEGIC PLANNING ASSUMPTION(S)

By 2012, agile development methods will be utilized in 80% of all software development projects.

By 2015, the use of cloud-delivered development tools will be involved in 25% of new projects.

By 2015, 25% of all Fortune 500 companies will have integrated discrete design teams into their application development processes.

Through 2015, the shift toward cloud architecture will create demand for new skills, practices and objectives for software quality.

ANALYSIS

1.0 What You Need to Know

The application development research topic looks at the tools and practices utilized to develop and deliver software solutions. This includes major themes around application life cycle management (ALM), requirements management, software change and configuration management, and quality management, as well as core task tools like integrated development environments and testing tools for custom and packaged applications. Also covered is research on practices including methodology, organizational structure, metrics, certifications and training. This group also looks at programming languages and platforms.

Several key trends have been shaping the development market and will continue in play during the next five years. The newest of these has been the development of cloud-based tools and platforms. The market has also been strongly influenced by agile development practices (e.g., scrum, DSDM, kanban and extreme programming). This has driven, and has been aided by, the evolution of improved integration across the life cycle.

2.0 Strategic Planning Assumptions

Strategic Planning Assumption: By 2012, agile development methods will be utilized in 80% of all software development projects.

Analysis By: Thomas Murphy and David Norton

Key Findings: We will see the uptake of scrum in a wider usage pattern, but this will ultimately fail for organizations that can't/don't make the required cultural changes to adopt agile for the long term and across teams. The impediment is the shift to a more team-focused culture, rather than tribal silos. Dedicated resources are also a challenge, as is the appropriateness of agile for upcoming projects.

Development teams have been proactively adapted by development teams. Currently, the most broadly adopted "method" is scrum; however, most organizations have a mixture of waterfall and agile practices in use across projects. This is caused by several issues:

- Scrum provides a comfortable project planning and tracking format.
- Agile practices are less detailed outside of core development tasks.
- True adoption of agile requires organizational and behavioral changes.

A growing number of tools provide support for agile practices, especially project-planning tools. However, tools only provide support; they cannot drive the cultural changes.

Much of the initial adoption of agile has been facilitated by a variety of support in both open-source and commercial tools, along with a desire by developers to come out from under the burden of heavyweight processes. This can lead to agile adaptations that are really "cowboy coding," rather than being disciplined agile development. And it is important for organizations to recognize that agile principles such as "we value working code over comprehensive documentation" (Agile Manifesto Principle 2) doesn't mean there is no need for written documentation.

Another challenge for organizations adopting agile practices is that they rely heavily on collaboration. With the continued rise in globally distributed teams, this can present challenges. This is being answered somewhat by the inclusion of improved collaboration support in development tools. However, tools alone cannot solve all problems, and must be augmented by the careful parceling of tasks and by utilizing activities that will foster improved collaboration.

Teams that have made a successful transition to agile have found improved productivity, but this requires a strong commitment to utilizing core practices designed to speed the detection of defects, thus reducing project rework time. More readily available to most organizations is an improvement in the flexibility of the development team to respond to shifting requirements. Agile also fits well with the continued evolution in Web-based applications, where new functionality can be released to users without the need to update individual machines. We believe that, as end users continue to increase their use of cloud-based application and mobile-computing platforms, they will place increased demands on IT organizations to drop new improvements into production in a similar fashion.

Market Implications: Organizations that do not make use of key agile practices and do not invest in training and supportive tools' infrastructure will find that a shift to pseudoagile, while potentially delivering a short-term productivity bump, will end in long-term declines in quality and productivity. While Gartner believes that most organizations will adopt some form of agile, those that truly benefit will be limited because of the resistance to changing behavior patterns. However the promise of four times the improvements in overall productivity has been and will be achieved by select organizations.

Agile practices will also require organizations to develop new metrics practices structured more around use case points, rather than function points. This will provide the benefit of being more readily understood by the business and of being applicable across different project types. Companies will also have to recalibrate their comparison baselines, as true agile adoption requires more upfront spending on quality tasks (e.g., peer code reviews, test-driven development [TDD]), which, in turn, should reduce downstream costs and maintenance.

Agile practices will also affect how organizations work with outsourcing partners. A core principle in agile is that at the end of each iteration, production-ready code that provides customer value is delivered. This enables the company to potentially see "immediate" value. Agile techniques raise challenges for outsourced projects that are often on fixed-price contracts. These come with serious penalties for change, while agile methods are designed with the idea that change happens. In addition agile projects are characterized by a number of iterations that continue until the work is "done."

Recommendations:

- Recognize the cultural changes that are at the heart of agile.
- Don't allow agile excitement to drive cowboy-coding practices. Agile requires discipline.

- Recognize that scrum is only a partial solution, and focus on a collection of practices.
- Find tools that enable collaboration and help automate repeatable, consistent practices.

Related Research:

"Don't Let Short-Term Agile Create Long-Term Pain"

"The Current State of Agile Method Adoption"

Strategic Planning Assumption: By 2015, the use of cloud-delivered development tools will be involved in 25% of new projects.

Analysis By: Thomas Murphy and Jim Duggan

Key Findings: A number of development tools delivered in SaaS format have already begun to appear on the market and be put to use by Type A companies. With the combination of cloud-enabling platforms and technologies, we expect this to accelerate during the next five years. This adoption will be piecemeal at first, with a focus initially around planning and management tools, but will extend to core task tools as bandwidth and rich-client browser client technologies advance. Software development makes strong use of rich-client behaviors to improve developer productivity (e.g., context-sensitive code highlighting), and most current tools have too much latency to be accepted for use in common or highly repeated activities.

At the same time, cloud-delivered tools offer too many advantages to be readily dismissed:

- Easy to provision new users such as contract employees
- Generally lower-priced, which is use-based
- Seamless upgrade experiences remove current tool upgrade challenges

One of the key ways that cloud-delivered tools will enter the market is via their delivery by application-platform-as-a-service (APaaS) providers. A critical element of platform success is the delivery of a solid set of tools that enables the platform for development. As organizations deliver new platforms, we expect they will include tools that target delivery to the platform.

Initially, the delivery of tools "in the cloud" will be driven by new market entrants to the development arena. Much of the appeal for these organizations will be the ability to disrupt current market leaders. However, many of these early entrants will be acquired, and we are seeing hesitance in organizations when it comes to tools that are only available in public cloud implementations.

New cloud platforms will also enable new development options for organizations that blend current custom and packaged software capabilities and utilize service-oriented architecture (SOA) to enable richer end-user customization and development. This will create a need for improved change management automation and coordination between the IT organization and the business to manage changes.

Market Implications: New market entrants that exploit cloud-based, on-demand delivery of tools will create a disruptive force in the market. Although, long term, we don't expect that existing market leaders will simply be pushed aside, their market shares will be challenged, and some of these companies will struggle with the shift in business models and price points. Many traditional tool vendors will initially respond by creating SaaS-style offerings, but because their business models and sales structures are still attached to traditional license sales, they won't be able to match the pricing strength of new companies that leverage public cloud infrastructure and have simple try-and-subscribe models that are free of the traditional sales cycle.

While development tools and labs running in public cloud infrastructures will appeal to leading-edge organizations, many will hold out for tools that can be readily utilized in private cloud deployments. The challenge or trade off in private cloud deployment will be retaining the cost of operation and management of updates.

ALM tools will be some of the key products that exploit cloud delivery. Since the key value in these tools is around integration, workflow, collaboration, and the sharing of information and delivery of reports they are well-situated to browser delivery and, even without hosted delivery solutions, a number of tools have migrated to Web-based user interfaces.

While we expect cloud-delivered development tools to create an initial market disruption, they will not cause long-term disruption in the market by themselves. Existing market share leaders will develop and deliver their own offerings, or acquire to compete. Those that are positioned to drive revenue from places other than tools will be best-positioned to survive and take advantage of the market. In particular, this will mean that the real action will come as cloud platform providers (an early example is salesforce.com's Force.com platform) seek to dramatically overhaul the development landscape.

Recommendations:

- When evaluating new tool purchases, include hosted options. This will provide pricing leverage and often is a better fit for pilot projects.
- Push tool vendors for support of representational state transfer-based (RESTful) integration interfaces. These will simplify the integration and migration of data across development tools.

Related Research:

"MarketScope for Application Life Cycle Management"

Strategic Planning Assumption: By 2015, 25% of all Fortune 500 companies will have integrated discrete design teams into their application development processes.

Analysis By: Brian Prentice

Key Findings: The value of an application has long been associated with the number of its features. However, organizations are slowly recognizing that there is a "functional inflection point" — that is, the point in the ongoing maintenance of an application where the next new feature or capability is of no value to most of its user base. Unfortunately, few organizations have procedures established to identify that point, and, even if it could be identified, fewer organizations would know how to create meaningful boundaries that can constrain the development cycle.

Historically, enterprise IT organizations have been able to avoid a direct showdown with users over the frustration they've felt when confronted with complex, overengineered applications. But growing IT expertise among users and an expanding array of simpler, cloud-based solutions has been giving these users increased confidence and options to look elsewhere for application solutions. Leading enterprise IT organizations that recognize that fighting this trend is futile have begun looking for ways to deliver the simple and elegant solutions their users are demanding.

While a development methodology like agile can help in systematizing simplicity, Gartner believes that enterprise IT organizations will increasingly look to the vendor community for cues on how to achieve these goals. What becomes apparent is that leading vendors integrate dedicated design teams into the initial phases of a product development cycle. The focus of these teams is not just

on the traditional areas of user interface design, but also include conceptual design — a discrete process that focuses on the form and purpose of the solution being developed.

Market Implications: Increasingly, enterprise IT organizations will find their solutions compared with those of external providers. This will require a combination of traditional engineering expertise and new skills in emerging technologies. The most-effective teams will split work between back-end services and user interface design. Development work will need to be focused on achieving design-driven outcomes, rather than on designers trying to create a positive user experience out of features that the engineers built. That simple switch in perspective will require significant organizational and cultural change for many enterprise IT organizations. Application teams will need to cede a certain degree of direct user engagement to design teams.

Recommendations:

- Integrating discrete design teams with traditional application development teams requires a clear focus on cultural change. Designers generally have different perspectives and tend to be more "right brain"-oriented in their work. This runs counter to the highly analytical environment found in most IT organizations.
- IT organizations will need to become less reliant on feature request lists. Instead, they will need to work off of clearly documented design objectives — what Gartner refers to as a "usage scenario."
- IT organizations should expect to spend less time asking users what they want in their applications — a process which leads to functional bloat. Instead, they should expect discrete design teams to craft usage scenarios based on identifying suboptimal approaches applied to specific situations or scenarios.

Related Research

"What CIOs Should Know About Application Simplification"

"Application Consolidation Requires a Focus on How Users Define Simplicity"

"Adapt Development Methodologies To Create Simple Applications"

"How Salesforce.com Manages Functional Complexity"

Strategic Planning Assumption: Through 2015, the shift toward cloud architecture will create demand for new skills, practices and objectives for software quality.

Analysis By: Thomas Murphy

Key Findings: Software quality is often a poor misnomer for the current practice of risk management applied by most companies when it comes to practices and scheduling in software projects. The focus is not to drive quality, but to mitigate risk. While this is a viable approach, it also goes together with a concept that quality equals the absence of defects. Although this is theoretically true, the application is often too narrow to say that from this, quality software is delivered. The International Organization for Standardization (ISO) produced a standard (9126) that is generally ignored, because quality costs, and often is not seen as providing a return on investment.

However, as organizations seek to drive down maintenance costs and adapt to the shorter project life cycles found in agile practices, there is a need to focus efforts on a broader quality definition. In addition, organizations will need to invest in additional tools and skills to deal with increasingly complex distributed applications. Development frameworks may hide some of the complexity of creating these applications, but it won't help with the testing of applications.

We are seeing strong growth now in tools that support a more automated test lab environment. This includes:

- Virtual lab management
- Virtualization of services
- Improved tools for test data management, including subsetting and data masking
- Integration into life cycle tools to improve traceability and automation of workflow, and to close gaps in the common bugs that cannot be reproduced in tester/developer interaction

However, these are all just improvements to business as usual. While ALM tools provide better accountability to requirements, quality software has a variety of attributes not directly connected to normal requirements, including:

- Understandability
- Completeness
- Conciseness
- Portability
- Consistency
- Maintainability
- Testability
- Usability
- Reliability
- Structure
- Efficiency
- Security

The ongoing promise of evolving Web application architectures is to deliver applications and services that are customizable by business analysts and end users. Just as many organizations have moved more than 50% of their "development" budgets into packaged implementations, we believe that this trend will continue with increased capabilities for non-developer-targeted development. However, companies that seek to utilize technology to drive business innovation will evolve a more holistic view of software quality, because without it, they will not be able to support the ever-increasing maintenance burden.

Market Implications: The shift first toward SOA, then to rich Internet applications has stressed the ability of testing tools to keep up with technology shifts, and for testing teams to keep up with the pace of technology and application changes. The complexity of testing scenarios requires vendors to also deliver a broader spectrum of tools. This is resulting in a number of new companies and products coming to market, and will also result in increased acquisition activity as existing market leaders look to fill out their solutions.

While many organizations will be attracted to the promise of reuse from SOA, success will be limited because of the lack of skills and structure to support reusable assets. Reuse requires a view toward governance, ownership and quality.

Because software quality can't be tested at the end, organizations will need to look at facilities and practices that drive quality through the development life cycle. This will include using practices from agile, such as TDD, and using tools that drive repeatable processes, such as continuous integration (CI). This will also create a continued drive for the use of ALM solutions that provide integration across the life cycle.

A great challenge will be dealing with development that happens outside the traditional IT process. Simplified business process management (BPM) and mashup tools make it easy for business analysts and end users to quickly assemble new solutions. However, this requires that the underlying components are stable, secure and scalable. It also requires that organizations are consistent. These requirements will continue to drive the market for static analysis tools and service registries and repositories.

Recommendations:

- Develop testing practices and expertise in security, scalability and automation.
- Drive practices that drive quality from start to finish on a project. This includes shoring up weak requirements practices.
- Establish quality career path and standard definitions to set expectations and drive consistency.

Related Research:

"Requirements Form the Foundation of Software Quality"

"What Is the Role of Quality Assurance in a SaaS Environment?"

"Standardize Definitions and Expectations for Testing Activities"

3.0 A Look Back

In response to your requests, we are taking a look back at a few key predictions from previous years. We have intentionally selected predictions from opposite ends of the scale — one where we were wholly or largely on target, as well as one we missed.

On Target: 2009 Prediction — By 2010, general, holistic supply-side governance solutions will begin replacing discipline-specific solutions.

As more and more vendors recognize that governance of SOA solutions involves many different aspects of IT delivery (e.g., applications, process, development and services), they have either created or acquired technology to begin delivering on governance of multiple types of artifacts, policies and processes. The specific capabilities are being delivered by policy management and enforcement (from business strategy on down), asset management (from code up to policy and process and portfolio), interleaved with project management (mixing assets from different disciplines). This process will continue as the cross-pollination of disciplines continues in very diverse projects.

Mixed Results: 2009 Prediction — Through 2009, the application skills shortage will persist worldwide.

Although the global economic crisis led to extensive job losses around the globe, hiring managers still report challenges in finding "good" candidates. According to the American Institute of Economic Research, 6.9 million American jobs have been lost since the beginning of 2008. Recent figures show that unemployment in the U.S. has passed 10%, and unemployment in the eurozone is now at the highest level in 10 years, with more than 15 million unemployed, and a total of 22 million unemployed across the European Union.

With so many people out of work, one would expect that CIOs and IT leaders would be having a relatively easy time of filling open positions; however, hiring managers we've met with report very mixed results. Many say that it is increasingly difficult to find good people, and we attribute that challenge to three factors. First, workforce reductions tend to impact lower-performing individuals, and employers work to retain people with deeper expertise and domain knowledge. Second, the economic crisis has decimated personal savings and eroded confidence; therefore, people are reluctant to take a risk by leaving positions to take new, unproven ones. Finally, because the skills mix is shifting (see "What CIOs Need to Know and Do About the Application Skills and Organizational Crisis"), CIOs and IT leaders are raising the bar on what "good" means. Now, in addition to having proven technical skills and experience, candidates are expected to demonstrate business knowledge, and acumen with communication and collaboration. Conversely, we observe two conditions where hiring is less challenging: when the hiring manager hand-selects and recruits people they've previously worked with (thus, mutual respect and trust already exist), or for lower-level or narrower-scope positions.

Note

Recently, Gartner conducted an independent survey of its clients. Your direct feedback is underpinning the activities we have under way to continually improve our research. This year's Predicts report is one example of those changes.

You told us to simplify the number of different terms we use. In the past, we used two different terms to identify our most important statements about the future. We have standardized on one term — "Strategic Planning Assumption" (SPA) — and we continue to use this nomenclature.

You told us that you value our research most when we are direct. Your confidence in our advice comes from the facts and assumptions we provide in supporting our positions.

You told us that you wanted us to be open about tracking the accuracy of our predictions. In this report, we again take a look back and highlight where we were on target — and where we were not — and why.

This research is part of a set of related research pieces. See "Predicts 2010: Revised Expectations for IT Demand, Supply and Oversight" for an overview.

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