Leveraging Cloud for Non-Production Environments

Moving to the cloud not only enables application development and testing organizations to reduce capital outlays; it can also reduce IT cycle times while improving quality.
Executive Summary
Organizations are operating in a tough business environment marked by stiff competition, increasing regulations and dynamic consumer behavior. Given the escalating dependence on IT for competitive advantage, technology projects are growing in number, scope and complexity, even while cycle times are narrowing. This puts pressure on development and testing teams, many of which are struggling with insufficient in-house infrastructures and budget constraints.

The cloud addresses the traditional limitations of in-house IT environments, including the huge costs associated with buying, building, running and maintaining IT infrastructure, as well as the time delays in provisioning IT services.

Cloud architectures also provide immediate and cost-effective access to a vast pool of computing resources, resulting in reduced cycle times. Cloud facilitates real-time collaboration among developers, testing teams and other stakeholders, who can more readily test and share feedback to positively impact application behavior at the end-user level.

Additionally, the cloud’s pay-per-use model provides financial flexibility by reducing Op-Ex and eliminating the need for upfront Cap-Ex, allowing teams to create sophisticated labs, which are not always feasible in-house.

While there are many success stories of early adopters, several factors have caused some IT organizations to tread cautiously or avoid cloud altogether. These issues include security, lack of control over data and infrastructure, the complexity of seamless integration of internal legacy systems and cloud management. However, most challenges can be overcome by:

- Basing your evaluation of moving to the cloud on clearly identified business requirements.
- Understanding the cultural and process changes that must be overcome to effectively embrace cloud computing.
- Utilizing IT and non-production teams to ascertain the overall organization’s preparedness to move to the cloud, manage legacy systems, and ensure that development and test environments match business requirements.
- Establishing processes and proper administration to manage cloud utilization and costs.
- Carefully evaluating vendors and their terms and conditions. Organizations would do well to partner with providers capable of assessing their cloud needs and delivering managed services to leverage the true power of the cloud.

Forces Driving Cloud Testing
Because of the growing reliance on software to enhance productivity and gain competitive advantage, development and testing (or “non-production”) teams are now required to quickly and nimbly deliver a greater number of core run-the-business applications. The truth is, IT departments are challenged to keep up. Roughly 94% of IT executives surveyed by IDG Research for Delphix, a provider of agile data management services, said it is difficult to deliver projects on time and budget, with 76% saying the level of difficulty is either increasingly aggravated or staying the same. The level of difficulty is greater during development (48%), followed by testing (38%), according to the 108 executives surveyed.

We believe the time has come to think beyond the manual creation of in-house testing environments and utilize cloud computing for testing, especially with the following pressures that IT organizations face:

Time-to-Market Pressure
Due to stiff competition, businesses are increasingly releasing and updating customer-facing and internal applications to retain existing customers and attract new ones. This places enormous pressure on non-production teams to quickly turn around projects. However, procuring computing and storage resources for application development and testing is no easy task. It involves seeking permission and budget sanctions from IT teams, which typically takes several weeks. Improper scheduling of projects and sharing of resources among multiple teams sometimes lead to non-availability of resources, resulting in unwarranted delays. Further, this approach is not suitable for handling sudden spikes in demand for non-production activity.

Challenges with In-house Environments
Software applications are becoming large and complex as IT touches more business functions and grows in importance, particularly in the consumer products and services industry. For instance, a hundred million lines of software code...
are built into today’s high-end cars; meanwhile, the U.S. government’s healthcare Web site (www.healthcare.gov) has 500 million lines of code, and Facebook runs on more than 60 million lines of code.

Many times, the infrastructure provided for non-production environments is obsolete and does not scale. Poorly built environments cannot support the rigorous needs of application development and do not facilitate full test coverage, resulting in defects creeping into production. Unscheduled infrastructure maintenance that causes environment unavailability and downtime at inopportune times is not uncommon. With development projects becoming increasingly distributed, traditional approaches can no longer guarantee continuous communication and high-level collaboration among geographically dispersed non-production teams. Moreover, in addition to their core activities, non-production teams are sometimes required to manage environments due to a lack of resources.

Cost Pressure
Despite the economic rebound, IT budgets have been flat to negative since the dot-com bust of 2002 and were projected to be slightly down this year, with a weighted global average decline of 0.5%, according to the Gartner Executive Programs survey of 2,053 global CIOs in the fourth quarter of 2012. Non-production projects require large Cap-Ex budgets to purchase application development and testing tools, hardware, etc. and maintain them. Working with limited budgets may prohibit teams from fully and reliably executing projects that meet business objectives. This increases project risk and may require organizations to incur additional expenditures to deploy resources in order to purge software of defects, contend with application roll-out delays and manage customer frustration.

Demand Variations
Demand for non-production activity is sporadic, typically involving crests and prolonged troughs. Hence, computing resources procured to meet demand often remain underutilized when demand recedes. Teams also tend to retain non-production environments created for a particular assignment in the event they are needed again due to setup complexity, thus locking up computing resources. It is, therefore, not surprising that 70% of the IT budget is allocated to keeping idle servers turned on, according to CloudTimes.org.

Moving to the Cloud
Nearly half (47%) of 542 organizations in the U.S. and Europe already use the cloud for application development and testing, with another 43% planning to move (see Figure 1), according to a survey by Luth Research and Vanson Bourne, sponsored by CA Technologies.

Existing IT environments in many organizations do not support the growing infrastructural needs and other business requirements...
of non-production teams, as well as quick turn-around objectives. Developers and testers require more flexible and streamlined workflow processes and on-demand access to computing resources to accelerate delivery. Moving non-production activities to the cloud delivers much-needed operational agility, as well as cost advantages, in addition to the following benefits

- **Streamlined application delivery:** Cloud-based environments provide on-demand access to a vast array of computing resources, such as the browsers, servers, operating systems, application builds, etc. required to build and operate sophisticated environments. The self-service model allows teams to easily build, change and scale up and down environments almost instantly, without the involvement of the core IT organization. This reduces wait times and tightens the overall development cycle. As infrastructure is not owned by the company, teams can focus on coding and innovation without worrying about infrastructure maintenance issues.

- **It is not always an option to reproduce and resolve bugs with limited in-house resources, and when it is, these tasks are often time-consuming and challenging to complete. The cloud allows rapid reproduction of bugs without worrying about scale. Moreover,**

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**Quick Take**

**Panasonic’s Venture into the Cloud**

With the amount of software embedded in automobiles growing rapidly and delivery cycles halved over a three-year timeframe, Panasonic Automotive Systems Company of America (PASA) was hard-pressed to deliver software systems quickly.

PASA, which manufactures in-vehicle infotainment (IVI) systems, employed distributed teams across the globe and procured more bandwidth and other resources to meet the tight deadlines. But the company was encountering long build times (running from 10 to 30 minutes and even 117 minutes for one project, due to rapidly increasing source code) and unreliable builds, which slowed delivery and reduced the time for testing. Collaboration was another issue, as development teams in Europe, India and Japan were unable to use the same toolsets in the same ways and operate on the same processes as their counterparts in the Atlanta-based data center even though they were linked.

These integration and coordination issues prolonged the development lifecycle and boosted expenditures on hardware and human resources, which increased project costs; meanwhile, existing IT infrastructure was insufficient to meet demand peaks.

These issues promoted PASA to move development to the cloud. The company used Electric Cloud’s build acceleration and optimization software as a service (SaaS) and CloudOne PaaS. Moving to the cloud helped PASA cut build time across many projects by about 400%, enhancing the overall development velocity by 200%.

The waiting period for developers submitting concurrent build requests was reduced from one hour to 10 minutes. Reduced process cycle times provided more testing opportunities. With development consolidated on the cloud, global teams could share and collaborate, as they had the same experience for authentication, access to the same version and configuration of the development environment.

The pay-per-use option, quick and easy access to tools and simpler resource consumption tracking allowed PASA to handle growing IVI requirements without increasing its infrastructure spending or development costs. Further, PASA was able to realize its ROI within two months of deploying the solution.
the cloud also facilitates secured real-time collaboration among distributed teams through shared access to virtual machines that run test code. Developers and testers can discuss and fix bugs iteratively in real-time, allowing the dispersed team to deliver quality output more quickly.

Cloud platforms reduce overall development time by about 15%, on average, according to a recent survey of more than 400 developers conducted in December 2012. (See sidebar, previous page, for Panasonic’s venture into the cloud).10

• Financial flexibility: Pay-per-use is perhaps the most attractive feature drawing more companies toward the cloud. Using the cloud’s platform-as-a-service (Paas) model, organizations can quickly spin up environments based on requirements and scale down environments when demand ebbs, paying only for what they consume. With cloud computing, teams will have access to the latest development and testing tools, while organizations are liberated from incurring Cap-Ex to buy infrastructure to meet demand peaks and computing resources that often remain idle during periods of low demand.

By not owning the IT infrastructure, organizations also cut infrastructure maintenance and support costs, as well as the number of human resources required to support non-production teams, which reduces Op-Ex. Additional cost benefits stem from factors such as optimal compute, storage and software utilization through virtualization; reduction in support costs through standardization; and reduced manual intervention through automation.

Testing in the cloud can initially be more costly than in-house testing, as organizations must design their systems to work with the cloud’s underlying architecture, which can consume both time and money. However, over the long term, this approach can save 30% to 40% of total expenditures, according to IDC.9

• Quality: The cloud allows teams to create production-like environments that were previously not feasible with in-house resources. This allows extensive testing of applications with different network configurations to simulate how they will behave with real end users so that there are no surprises once the application is put into production. Teams can develop prototypes faster, evaluate their performance and gain feedback from users, designers and other stakeholders iteratively. This ensures that the application aligns with user requirements, reduces the need for changes in the development phase, and improves the reliability of the applications.

• Innovation: Moving to the cloud frees teams from maintenance and troubleshooting activities, enabling them to focus more on IT strategies to drive business. Rapid prototyping allows organizations to quickly identify whether a project is worth pursuing so that it can decide early on whether to terminate it or invest further, thus saving time and resources, as well as increasing the pace of innovation.

Operational Challenges
As with any new technology, the cloud presents new challenges, even while addressing the limitations of a traditional non-production development. Among these challenges are:

• Security and control: Safeguarding data and the lack of control over infrastructure are perhaps the biggest reasons many organizations move cautiously when it comes to cloud adoption. Since all services are hosted remotely, the organization often does not know where the data is stored and the servers are located. There is no clarity on what happens to the data if a vendor suddenly exits from the cloud business or the contract expires. Organizations must keep track of all the data stored in the cloud; otherwise, sensitive business data might be left in the public cloud forever.

Recent cloud outages12 at major cloud vendors have fueled doubts about cloud’s efficiency. However, over time, cloud vendors have experienced fewer outages, and they often provide better uptime and use the latest security systems compared with in-house data centers. Organizations must perform due diligence to evaluate security and contingency aspects while choosing a vendor (see sidebar, next page).
• **Integrating legacy systems**: Many organizations still depend on legacy applications and platforms for critical business processes. The complex interdependency of these systems often does not allow for seamless integration with the cloud and creates interoperability issues. More than half (58%) of 300 European IT leaders cited complexity of their IT environments as the biggest impediment to large-scale adoption of the cloud, according to a recent NTT Europe survey.\(^\text{13}\)

• **Cloud management**: The key to realizing cloud computing’s true advantages is to manage its usage through prudent capacity planning and monitoring. Non-production teams must carefully plan infrastructure requirements in advance and turn off cloud resources as soon as the job is complete; otherwise, costs will escalate, making the cloud much more expensive than on-premises labs.

One way to overcome this is to employ software tools such as Cloudyn, Cloudability

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**A Cloud Suitor Checklist**

Attributes of an effective cloud partner include:

• Availability of a vast pool of computing resources with the latest skills.
• Ability to complement the non-production team’s skill set and support requirements.
• Demonstrated level of security and regulatory compliance.
• Documented cloud reliability and high service availability.
• Transparency in pricing and provision of cost calculators.
• Range of technical support provided.

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**Significant Challenges by Cloud Maturity**

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<th>Cloud Explorers</th>
<th>Cloud-Focused</th>
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Source: “RightScale State of the Cloud Report,” 2013

Note:
“Cloud Beginners” are new to cloud computing and seek experience to determine its use in future projects.
“Cloud Explorers” already have multiple projects and applications in the cloud and are focused on expanding their cloud usage.
“Cloud-Focused” are heavy users of cloud infrastructure and are looking to optimize cloud operations and cloud costs.
Response base: 625 business executives

Figure 2
and Newvem to monitor and manage costs. The tools provide usage and cost analytics and allow custom report creation based on metrics such as time, project, application, etc. They provide daily updates and alerts on possible budget overruns to reduce unwanted surprises late in the process.

Fear of vendor lock-in is another worrisome issue. Moving to a new cloud vendor is not an easy process, as a lack of standardization results in poor interoperability among cloud vendors.14

**Embracing Cloud**

The aforementioned challenges, however, should not deter organizations from exploring cloud. That’s because in many cases, existing IT environments have outlived their useful life. As organizations spend more time using cloud computing, they will better understand and experience the benefits and report fewer challenges, according to a recent RightScale survey15 (see Figure 2, previous page).

Organizations can overcome all of these challenges through proper capacity planning, carefully choosing vendors and working closely with them, while establishing processes and controls to monitor and manage cloud usage. Those fearing security and other risks associated with the public cloud can build a private cloud and gain more control, but that requires huge capital expenditures and large-scale adoption to provide a cost advantage.16

Many organizations have started their journey by moving non-production projects to the cloud to reap immediate benefits while giving themselves time to explore other cloud capabilities. Public cloud provides immediate benefits to organizations. Working with an experienced partner that thoroughly understands the business and technological challenges and has an established industry track record offering managed services can provide a smooth transition to the cloud.

As cloud computing matures and standards are established, more organizations will consider using it for non-production activities. By then, smart organizations will have progressed to utilizing the cloud to enable more cost-effective and innovative ways of working.

**Footnotes**


Ibid.


References


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