



Requirements for a Successful Cloud

A Checklist for Your Cloud Journey

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EXECUTIVE SUMMARY

Businesses are racing to the cloud, whether in response to the giant market shift to cloud-based services or to meet their own day-to-day needs for business services. For many organizations, however, this transition to the cloud represents a tremendous investment of both time and financial resources — without clear instructions for reaching their goals. In fact, many find themselves facing a steep learning curve as they move into the cloud.

BMC has identified several universal requirements that can serve as a road map to the cloud. This road map takes into consideration the ultimate needs of the business, the efficiency and effectiveness of IT, best practices, and future needs. The criteria listed in the following pages can help you design a cloud that will fit the needs of your organization — for today and tomorrow.

THE PUSH TO THE CLOUD

As Tom looked over the architecture diagrams and datasheets on his cluttered desk, his gaze settled on his cup of coffee. The office coffee machine was on the fritz this morning, so he reached for the comforting goodness of his pricey coffee shop drink.

There's hardware, software, network, storage — not to mention a list of requests from the business. How will I ever get through this and understand what I really need to build this cloud? He pulled out a pencil and a clean sheet of paper. Let's start at the top, he thought.

According to numerous enterprises, service providers, analysts, and bloggers, companies want their own cloud now. They do not want to be left behind, so they have allocated considerable human and financial resources to cloud initiatives. Yet why is everyone looking to the cloud?

People and organizations must respond to a giant market shift by either joining the movement or by explaining why they are the exception. Moving to the cloud makes sense in a wide variety of businesses and industries, so the vast majority of enterprises are joining in. Those that are resisting most likely have to answer a lot of questions from their management — or even their boards.

People and organizations are also looking less and less to IT for answers. Business unit stakeholders are buying public cloud services and circumventing IT to do so — creating so-called “shadow IT” in the process. Marketing people who buy software as a service (SaaS) for social media, research and development (R&D) people who need to run massive calculations, and developers who need testing environments are all looking to the public cloud for answers.

IT departments recognize that these individuals are circumventing their departments and thus lessening IT's value to the company. To keep their own jobs, IT professionals understand that they need to be a step ahead of the changing needs of their organizations.

“This bypass, known as shadow IT, is proving rampant in larger enterprises; according to our surveys and inquiries, as many as 25% of developers claim to use cloud services despite only 10% of I&O respondents stating knowledge of this consumption.”

“TechRadar™ for Infrastructure & Operations Professionals: Cloud Computing, Q4 2011,” by James Staten and Galen Schreck, Forrester Research, Inc., November 18, 2011.

Business users have several reasons for pursuing cloud on their own:

- » **IT is not selling what users are buying.** IT does not have the offerings that meet their needs or, in some cases, the business users do not know what offerings IT does have.
- » **The IT process is cumbersome.** It takes more time to get access to resources than the relative ease of the public cloud.
- » **IT pricing does not work.** Either the IT service is too pricey, involves internal IT budget processes, or involves finance, approvals, and online procurement systems. Obtaining public cloud services is often as simple as entering a credit card number.

IT is aware that several risks are associated with haphazard external cloud usage, not the least of which are compliance, disaster recovery, data loss, and high expenses. Often, however, business buyers are either unaware of these considerations or underestimate their relevance when choosing external services.

Given this conundrum, IT has two choices:

- » Supply the cloud to users, either as a broker of external resources or as a provider of private cloud, to meet their users' needs
- » Ignore this increasing population of cloud users and focus on enterprise data center applications

Valuing its strategic role in the organization, IT is often opting for the former, and in doing so, embarking on its own path to the cloud.

CRITERIA FOR A SUCCESSFUL CLOUD

When beginning such a strategic and visible initiative, it is natural to look for guideposts and travel logs of those who have passed before you. With the cloud being a relatively new IT model, the road is not well traveled or described.

BMC has implemented clouds around the world for several years, and we've seen the challenges, stumbling blocks, and ultimate triumphs. Based on our experience, we've created the following "checklist" of key criteria to consider when embarking on your cloud journey. Think of it as your guidebook. We hope you find it useful.

GIVE THE PEOPLE WHAT THEY WANT

Criteria 1: Design flexible, fast, appealing business services.

In an effort to avoid being increasingly relegated to "legacy" functions, most IT groups are choosing to address the evolving needs of their users. However, they must find the balance between the needs of the two groups that the cloud serves. The first group is IT itself, by supporting existing data center applications in virtual and physical environments, which could benefit from consolidation and flexibility. The second group is informal business unit buyers, by satisfying their growing need for computing power. These are two very different groups.

Data center applications are the simpler case. IT organizations know, or can rapidly discover, these applications' requirements, architectures, and configurations. These specifications change relatively infrequently, and typically on a known schedule. A small group of application owners needs the ability to provision and configure these services through a self-service portal. All of these owners are in the IT department — or closely aligned to it. In this scenario, migrating data center applications to the cloud should provide consolidation and financial benefits with minimal effort, because the cloud is improving the current way of doing business, not introducing something completely new.

The informal buyers are more challenging. Each buyer has his or her own set of applications, configuration needs, and service expectations. In addition, these buyers are familiar with circumventing IT entirely. *Working with* rather than *working around* IT will be a change in their standard operating procedure.

Given this audience of buyers, how can IT construct a service these users will want? By doing the following:

- » **Alleviate the pain of configuration.** Public cloud resources still require tremendous upfront configuration and installation to reach an operational state. IT can automate this process and offer a complete cloud service — not just bare infrastructure resources — with the push of a button. Offer SharePoint, not Windows. Offer a development environment, not Linux®. Offer statistical applications, such as SPSS and SAS. Offer a complete Web-hosting environment, fully configured to their needs.
- » **Make it easier to use the service.** A good self-service experience, with great ongoing management tools, is key to success with this population.
- » **Clean up the pricing.** Make sure the costs to the department (whether chargeback or showback) are comparable to the costs of working directly with the external vendors. Make sure the paperwork is easier.
- » **Use public clouds.** IT may have financial or organizational reasons to address its users' needs by provisioning to public clouds on the back end. IT is not precluded from gaining resources from elsewhere — and even exposing them to its users, who may love the external brand.

Given what the user wants, IT must provide solutions through Business Service Management (BSM) and top-down service design — starting with the users' needs, then building back to the technology solution. BSM simplifies and automates IT processes across distributed, mainframe, virtual, and cloud-based environments, allowing IT to prioritize and orchestrate work based on business needs. This approach delivers to the customers and end users what they need — and provides IT with satisfied customers.

DESIGN AND DELIVER WHAT THE PEOPLE WANT

Criteria 2: Leverage a flexible, configurable cloud service design mechanism.

Criteria 3: Utilize a flexible provisioning capability to deliver those configurable services.

Criteria 4: Integrate patch and configuration management.

IT must balance the need to provide great offerings that make its diverse customers happy with the risk of overloading its own department and staff. Users need guidance and typically prefer that IT deliver the full service rather than be forced to sort out the details for themselves. IT needs to meet these users' needs, while not starting from scratch with every new request. In the cloud, this means that IT needs a way to define and provision a very flexible service stack. This can be accomplished by doing the following:

- » Design services with options embedded within, representing the different versions of a service that might be required.
- » Provision the selected service on-demand, with its configuration.
- » Maintain both the service definitions and the active, operational cloud services in an automated way.

Given that users have very specific needs, creating a separate service template for each user requirement would cause IT to build an enormous library of templates, which could quickly turn into an overwhelming cataloging task for the systems administrators. Configurable definitions limit the total number of templates, as they are an exceptional way to get many permutations of service from a single definition.

Of course, to be effective, once a service is configured, it then needs to be provisioned. Therefore, a good automation mechanism is required for building and configuring the cloud service being delivered. This automation should fully streamline the delivery of a service that is tailor-made to the specific selections of the user.

Once IT has started implementing this automation, it should extend the automation to active cloud services as well, leveraging patch management and configuration management. Most cloud services live longer than the fabled few hours or days. By ensuring that they are delivered up to standards and then maintained over time, the environment will remain secure and reliable.

MANAGE WHAT YOU DELIVER

Criteria 5: Monitor performance of the entire business service — and guide action in advance of service degradation.

Once the cloud service is provisioned, the user is given access to the service and goes back to work. Now the real test begins, because users expect their services to run and to run quickly. If a service is perceived to be slow over long periods of time, it will cause complaints, and ultimately, users will find alternate, faster services. The best way to address this is with a proactive approach to monitoring user performance and identifying issues.

- » **Monitor the actual performance a user is receiving** — all the way to the user's end point. This requires monitoring not just infrastructure performance but also application performance.
- » **Check the performance of the underlying resources** — all the way to the source, which can be local or even in a public cloud.
- » **Identify issues** — not simply alerts — requiring action to remedy problems before they occur.

The best kind of help desk call is one that never happens. The second best can be answered with "we're already handling it." The worst way to eliminate help desk calls is by driving users away with poor performance.

ENSURE YOU HAVE ADEQUATE RESOURCES

Criteria 6: Monitor current resource capacity and utilization in business service terms.

Criteria 7: Estimate upcoming changes to utilization and calculate what-if scenarios.

Criteria 8: Establish a set of capacity-growth options, both internal and external.

One surefire path to performance degradation is running out of resources. If IT does not have enough cloud resources in the data center — or access to external alternatives — there will be natural delays fulfilling requests.

To the end user, the cloud is magic. It is an unlimited spigot of computing power that will never cease to deliver. The end user is not going to consider the IT data center and the boxes within it as that person requests a new service.

Therefore, in order to ensure against a rolling brownout, it is the supply manager's job to understand and manage capacity. It is a nuanced process that requires the following:

- » Understand what IT actually has in place — and how many services it can deliver. Each cloud service requires different resource profiles, so this type of analysis requires not just an understanding of boxes but also an understanding of service options.
- » Estimate the rate at which these services are being requested, consumed, and retired, and, ideally, any factors that might change those rates over time, such as the introduction of a new service or new user group.
- » Have a range of available capacity-growth options, from leveraging public cloud resources to investing in additional internal resources, accounting for such constraints as budgets and floor space.

Organizations investing in the cloud prefer to understand capacity in terms of business services, such as in this scenario: *"Marketing tripled its use of SharePoint. If the Web site traffic doubles next month, we're buying resources to support 25 developers out on the public cloud."* With the technology in place to collect and analyze this information, IT, as the provider of the service, is in a better position to accurately estimate and communicate the capacity of the cloud — and thus drive ongoing investment.

DETERMINE WHO IS PAYING

Criteria 9: Expose transparent showback or chargeback of the cost of delivering business services.

Criteria 10: Seamlessly integrate internal financial transactions — as easily as in the public cloud.

The capacity enabled by the cloud might be cheaper than traditional methods, but it is not free. Clouds lower the total cost per business service because IT has removed the processes and barriers to business use of technology — and that means more services will be requested. More services mean more costs. Still, each service is cheaper — and presumably beneficial to the business — so total costs could stay about the same, while more is achieved.

However, this does not remove the issue of payment. In the past, when a company needed a new server, the business set aside money on Day 1, the server came in on Day 30, and the check was ready to pay an infrastructure vendor. The situation with the cloud is the opposite. The cloud requires IT to pay a hardware and infrastructure vendor on Day 1. Once the systems are on board, IT waits for the business to request a cloud service. Then, if IT has a chargeback or showback model in place, IT gets compensated for what the business used.

That means IT, on its own, has to cut a check well before any business need is established. For this, IT needs to understand what services are being delivered and how it will recoup its costs. IT has become much more of a traditional supplier, building a product before orders come in.

Chargeback is often a difficult topic for internal IT, for the following reasons:

- » The company's financial systems may lack mechanisms for actually implementing chargeback.
- » The business is reluctant to move from a fixed-cost model for IT to a variable one, where their bill could change from month to month, quarter to quarter.
- » The models for chargeback vary wildly by organization and industry.

Showback is an intermediate step to true pay-as-you-go IT. IT can calculate the costs of delivering the business service and share that data with the business. Showback allows transparency — and therefore trust — to increase and boosts the likelihood of progress toward real chargeback.

Many IT organizations have long anticipated the day when their work would be properly valued and rewarded. Following are the keys to achieving proper recognition from the business:

- » Flexibility in the pricing model
- » Transparency in the costing model
- » Seamless, straightforward integration with internal financial systems — making ordering cloud services as easy as a credit card purchase

No single algorithm will work across the board in all companies. While the goal of full chargeback may be out of immediate reach, the first priority should be demonstrating value to ensure the business supports ongoing investment in the cloud.

DO NOT BUILD ISLANDS

Criteria 11: Build integrated change management and other IT processes into the cloud architecture.

Change management integration, or any IT process integration or configuration management database (CMDB) integration, is never on an initial cloud requirements list, but it is critical. Certain functions have value only when they are integrated and centralized. Further, in the world of user self-service, these traditional integrations are a mark of mature IT governance. Automation creates speed and ease, but process integration ensures oversight.

IT processes need not be cumbersome in the cloud. Traditionally, manual approvals, for example, could be automated under appropriate conditions, leaving a mechanical paper trail behind even the most benign of requests. Similarly, when a user requests a quirky exception or an exorbitant amount of resources, these same processes could invoke a manual step that enables a human to determine whether the request should be granted.

The critical, pervasive, continuous requirement of IT process integration often remains unspoken. Making it explicit as a cloud requirement and ensuring it is architecturally addressed will help you guarantee that your cloud will be poised to meet not only initial use cases but also future business needs.

SEPARATE YOUR USERS

Criteria 12: Segregate cloud services in isolated bubbles within the shared environment.

Criteria 13: Ensure that users do not have free access to each other's cloud services.

Every cloud serves multiple users. Some clouds initially serve only developers or only R&D, but over time, the vision includes multiple user groups. Usually, clouds are also designed to serve multiple stages in IT service lifecycles — from development to testing to staging and production. Some clouds even manage different levels of compliant workloads, from very sensitive data to totally innocuous information.

To meet all these different needs, each user and each workload must be isolated. There are two key pieces to this isolation:

- » On the back end — on a shared hypervisor in a shared cluster in a shared data center — the finance workload cannot interact with the Web site workload. They should not even be aware of each other's existence.
- » On the front end, in the self-service environment, the finance user should not see the Web administrator's workloads either. In fact, members of the finance team should not see, or even be aware of, each other's workloads at all.

The first issue is solved by mechanisms that ensure network isolation. These so-called containers create impermeable "bubbles" around single or multiple workloads, according to policy, which prevent those workloads from interacting with anyone outside their bubble.

CRITERIA FOR SUCCESSFUL CLOUD DESIGN

1. Design flexible, fast, appealing business services.
2. Leverage a flexible, configurable cloud service design mechanism.
3. Utilize a flexible provisioning capability to deliver those configurable services.
4. Integrate patch and configuration management.
5. Monitor performance of the entire business service — and guide action in advance of service degradation.
6. Monitor current resource capacity and utilization in business service terms.
7. Estimate upcoming changes to utilization and calculate what-if scenarios.
8. Establish a set of capacity-growth options, both internal and external.
9. Expose transparent showback or chargeback of the cost of delivering business services.
10. Seamlessly integrate internal financial transactions — as easily as in the public cloud.
11. Build integrated change management and other IT processes into the cloud architecture.
12. Segregate cloud services in isolated bubbles within the shared environment.
13. Ensure that users do not have free access to each other's cloud services.
14. Preserve choice and avoid lock-in with heterogeneous platform support.
15. Manage your cloud with an intelligent, policy-based mechanism.

However, just creating the bubble, and building it to span physical and virtual environments, is not enough. Creating nuances within that bubble is also required. In a typical Web application, the Web server needs full Internet access in order to operate properly. The application server should probably be in a neutral zone, and the back-end database should be behind a firewall, all in the Web application's isolated bubble.

The second issue is slightly different. It requires a good organizational model in the cloud management software, understanding that teams of users might have access to the same catalog of available services (i.e., marketing all gets SharePoint), while not having access to see or modify their colleagues' services. That requires a rather obvious, but not trivial, organizational model.

KEEP YOUR OPTIONS OPEN

Criteria 14: Preserve choice and avoid lock-in with heterogeneous platform support.

It is fair to say that nearly all data centers run multiple platforms and have a tangle of legacy environments that are difficult, if not impossible, to port over into new environments. That alone should be a solid argument for a heterogeneous cloud management platform that manages physical, virtual, and public cloud resources.

However, there are forward-looking reasons as well. While a business may have a close relationship with certain vendors today, tomorrow the needs of the business may change, prompting a reexamination of the field of options. A favored vendor also may alter pricing, packaging, development road maps, specifications, and capabilities over time, making that vendor a less appealing option. Freedom to respond to changes in the business — and changes in the vendors' own strategies — makes the strongest case for heterogeneous management.

Heterogeneous management ensures IT is always armed with the option to change vendors and platforms to eschew lock-in. This is insurance against the inevitable need to swap out or add new suppliers to the business.

MANAGE YOUR POLICY ENGINES

Criteria 15: Manage your cloud with an intelligent, policy-based mechanism.

Running a cloud is a complex, multistep process: creating service options, delivering services, managing performance and capacity, isolating users, and working with local and remote resources, as well as multiple data centers, both physical and virtual.

If a single, brilliant, motivated systems administrator were given all of this information, his or her day would be filled with such tasks as monitoring a massive spreadsheet of constantly changing data, assessing new requests, changing services, and adhering to resource constraints and rules. Although these tasks would clearly be impossible even for the most highly motivated person, this sort of task management capability is exactly what a computer was designed to do. A computer could take all the inputs and a whole set of rules and policies and, in real time, determine the best course of action. This computer, of course, is a policy engine.

Policy engines must be flexible, extensible, and agile. If you are going to trust your cloud to a policy engine, it better be at least as flexible and responsive as your brilliant systems administrator, and not just function as a programmatic decision tree. Then, with a policy engine in place, that systems administrator can be freed from the yoke of ever-changing optimization and put his or her brilliance to use in a more productive domain.

If the heart of the cloud is automation — of operations, not just service delivery — then a cloud needs to be able to handle the full range of cloud activities. Some people call this *service governance*. Others call it *policy-based management*. Either way, it is critical.

CLOSING THOUGHTS

As thousands of businesses worldwide embark on their own journeys to the cloud, some universal requirements are emerging. With these in hand, IT organizations can ensure that their efforts meet the needs of their business — and the practicalities of IT. There will be ample adventure on this path to the future. This requirements checklist will ensure that the way there is smooth and enjoyable.

For more information about BMC's Cloud solutions, visit www.bmc.com/cloud.

About the Author

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