



Practical Advice to Advance Cloud Adoption

ACT-IAC Cloud Computing Working Group

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SYNOPSIS

The Cloud-First mandate was released February 2011 with great fanfare, while adoption has proceeded much slower than expected. The ACT-IAC Cloud Computing Working Group was chartered to investigate the barriers to cloud adoption. By engaging a broad cross-section of technology, financial, and acquisition leaders from government and industry, the group identified typical challenges that slow many agencies down and developed practical advice for navigating these challenges:

- Eliminate false choices: know your real mission needs.
- Seek to standardize: special requirements mean higher costs.
- Fit for the FAR: pick your contract vehicle to match your needs.

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Advancing Government through Collaboration, Education and Action

American Council for Technology-Industry Advisory Council (ACT-IAC)

The American Council for Technology (ACT) is a non-profit educational organization established in 1979 to improve government through the efficient and innovative application of information technology. In 1989 ACT established the Industry Advisory Council (IAC) to bring industry and government executives together to collaborate on IT issues of interest to the government.

ACT-IAC is a unique, public-private partnership dedicated to helping government use technology to serve the public. The purposes of the organization are to communicate, educate, inform, and collaborate. ACT-IAC also works to promote the profession of public IT management. ACT-IAC offers a wide range of programs to accomplish these purposes.

ACT-IAC welcomes the participation of all public and private organizations committed to improving the delivery of public services through the effective and efficient use of IT. For membership and other information, visit the ACT-IAC website at www.actiac.org.

Cloud Computing Working Group

The Cloud Computing Working Group was formed to leverage the expertise of ACT-IAC's Shared Interest Groups to support the government's cloud computing initiatives. Our primary focuses are:

- Coordinate ACT-IAC related activities on cloud computing,
- Eliminate duplicative efforts across ACT-IAC program areas and promote cross-pollination of ideas and activities,
- Align the efforts of ACT-IAC on cloud computing with the needs and requirements of government, and
- Provide a mechanism and platform for members to collaborate and communicate effectively on the topic of cloud computing.

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This document has been prepared to provide information regarding a specific issue. This document does not – nor is it intended to – take a position on any specific course of action or proposal. This document does not – nor is it intended to – endorse or recommend any specific technology, product or vendor. The views expressed in this document do not necessarily represent the official views of the individuals and organizations that participated in its development. Every effort has been made to present accurate and reliable information in this report. However, ACT-IAC assumes no responsibility for consequences resulting from the use of the information herein.

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Further Information

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Executive Summary

The ACT-IAC Cloud Computing Working Group was asked to investigate the barriers to cloud adoption in government. We started by surveying government and industry leaders, and quickly learned that their biggest roadblock was security, followed by the acquisition process itself. With this information in hand, the working group assembled over 40 technology, procurement, and financial leaders from government and industry to dig into the topic of improving cloud acquisition. What emerged were three areas of recommendations:

- Eliminate false choices: know your real mission needs.
- Seek to standardize: special requirements mean higher costs. Avoid custom solutions.
- Fit for the FAR: pick your contract vehicle to match the most flexible seamless adoption path available.

Eliminate False Choices

In many cases, the benefits of cloud computing are not fully realized because agencies subscribe to “false choices” as they transition from existing or legacy IT to cloud environments. In doing so, agencies aspire to unnecessarily high performance and security requirements, although their current benchmarks often fall short. Agencies typically make choices by stating what they *believe* they need rather than evaluating the *reality* of what their current services deliver.

How can you avoid these false choices?

- Assess the business mission and security requirements based on the current system function and data.
- Capture performance metrics based on true mission needs.
- Establish cost baselines to effectively benchmark pricing.

Rigorously evaluating your actual business requirements and not adopting “what we’ve always done” is the most effective way of accurately capturing your requirements and avoiding the potential pitfalls of inflating your needs.

Seek to Standardize

Cloud service providers (CSPs) are able to offer tremendous cost and performance advantages because they have rigorously standardized, maximized the utilization of all aspects of their architecture, and automated to minimize human intervention. Your special requirements are often sure path to a higher bill.

How can you be sure to buy standard?

- Do your market research.
- Model your requirements with multiple CSP standard offerings.
- Buy the standard whenever possible.
- Be sure to consider how to exit from the cloud service.

Fit for the FAR: Improving Flexibility and Ease

Agencies have found many ways to buy and fit cloud computing under commonly used Federal Acquisition Regulation (FAR) models, but most report sacrificing some key aspect of the cloud business model to conform. They reported a number of concerns such as limitations in adjusting for usage charges based on speed or flexibility, excessive contract modifications, or impacts of fully funded fixed price vehicles under commonly used approaches. In short, there is no agreed-upon model that easily provides all desired aspects of the cloud business model advocating the merits of “cheap, fast, and flexible.”

How to Fit Your Requirements to the FAR?

Agencies should clearly assess the type of cloud project and the planned implementation approach. Strongly consider adopting a requirements contract approach if the cloud project meets the following criteria:

- A standard unified platform approach is required.
- Substantial value from organization-wide adoption of the standard platform or service can be derived.
- Governance of contract scope can be well defined and can meet with substantial success.

In addition, where a project needs a phased approach, this strategy can be primarily driven by operational readiness and not by artificial contract constraints such as timed options or ceilings.

By getting beyond the hype and hyperbole of cloud computing, we believe that these three core guidelines will help you make informed decisions about how to understand your requirements, how to standardize your needs, and how to appropriately use and respond to federal contracting regulations for cloud acquisition.

Practical Advice to Advance Cloud Adoption

Introduction

What happens when technology, procurement, and financial leaders from government and industry come together to examine the challenges of how cloud services are acquired and adopted? Once everyone vents their frustration with the process, stories and themes begin to surface about what works and what does not.

The ACT-IAC Cloud Computing Working Group was asked to investigate the barriers to cloud computing adoption in government. We started by surveying government and industry leaders and quickly learned that their biggest roadblock was security, followed by the acquisition process itself.

With this information in hand, the working group assembled technology, procurement, and financial leaders to dig into the topic of improving the cloud acquisition process. These experts were drawn from the Departments of Labor, Defense, Homeland Security, Interior, Health and Human Services, Housing and Urban Development, and the General Services Administration,

as well as from diverse industry partners including CGI, Censeo Consulting Group, Microsoft, IBM, Amazon Web Services, Unisys, and HP Enterprise Services.

Three recommendations emerged:

- Eliminate false choices: know your real mission needs.
- Seek to standardize: special requirements mean higher costs. Avoid custom solutions.
- Fit for the FAR: pick your contract vehicle to match the most flexible seamless adoption path available.

More than 40 professionals from government and industry contributed to collecting, curating, and documenting this practical advice, actions to take, pitfalls to avoid, and the benefits you can realize. By applying these methods, you can move your agency initiatives forward to achieve the real and lasting benefits of cloud computing.

Eliminate False Choices: Know Your Real Mission Needs

In many cases, the benefits of cloud computing are not fully realized because agencies subscribe to “false choices” as they move from existing or legacy IT to cloud environments. In doing so, agencies aspire to unnecessarily high performance and security requirements, although their current benchmarks often fall short. Agencies typically make choices by stating what they *believe* they need rather than evaluating the *reality* of what their current services deliver.

Some false choices agencies make include:

- All applications moving to the cloud must be designated as FISMA High because they all reside within the internal agency network.
- This system is important to the agency; ergo, it needs 99.9999% availability when moved to the cloud.
- We use Red Hat Enterprise Linux; therefore, our cloud provider must use Red Hat Enterprise Linux.

In order to effectively reap the benefits of cloud services, the agency needs to have a better understanding of what their current baseline of services is and what benchmarks they are meeting. Without such insight, the agency will make false choices and undermine their ability to leverage all of the cloud capabilities to effectively enable agency business needs.

How to Avoid False Choices

Assess the business mission and security requirements based on the system function and data. Instead of automatically assuming the high water level for security, agencies should assess function-specific security requirements. For example, general back office functional applications (e.g., billing) obviously require less security controls than a law enforcement application. However, if both were traditionally housed in the same environment, agencies might default to the more stringent law enforcement application. This is a false choice, because the back office application could likely be hosted within a lower security environment.

Capture performance metrics based on true mission needs. Agencies need to understand what their existing downtime and maintenance windows that affect availability are in order to truly understand what the true business needs are, in terms of performance metrics. For example, many assume that all systems need high availability and the more “nines” they have, the better. This is typically because a program office deems something mission critical due to the importance to that program office, without regard for what the specific application does. Mission critical actions are those that are vital to the functioning of an organization and, more specifically, to the organization’s ability to accomplish its goals. Although an agency might be deemed “important,” it is not necessarily the case that each function within that agency requires “six nines” (i.e., 99.9999%). This assumption leads agencies to demand unnecessarily high performance metrics, another false choice. Unless systems support critical mission mandates that truly require no downtime, government would be better served to pursue lower-tier, cost-advantageous service options that may provide higher performance metrics than they currently receive. Agencies can better align performance metrics to business needs by conducting independent assessments, utilizing the knowledge and skill sets of both internal and external experts.

Establish cost baselines to effectively benchmark pricing. When acquiring cloud services, agencies must compare “apples to apples” by determining what their current cost baseline is. The cloud is often perceived as the silver bullet answer for cost savings but agencies need to be informed about what functional areas are being compared, and at what lifecycle stages. For example, a program office might believe that it makes sense to move large-scale data sets to the cloud because the cloud is perfectly designed for such a capability. This choice could indeed be a false one, as the transition and bandwidth costs might outweigh using an existing newly transformed and virtualized data center. Similarly, a program office might determine it is cheaper to continue to host a website internally once they compare the costs associated with website hosting in the cloud. However, this could be a false choice as well, due to a lack of visibility into the cost of servers and technicians from their CIO shop. In both cases, agencies need to have a clear understanding of existing costs and lifecycle stages to pair business needs with cost efficiencies. Moving to the cloud does not always save money; agency leaders should ensure that the business case supports the financial and operational benefits before making the transition.

Pitfalls to Avoid

While determining true security needs is essential for every service and establishing existing performance metrics and cost baselines are important, these requirements should not hinder the cloud acquisition process. At a minimum, agencies should evaluate what the real need is, rather than the perceived need, even if establishing the metrics and baseline is not feasible. In fact, the best-run private sector organizations can still struggle with establishing their financial and cost baseline (ironically, activity-based costing is a very cost-prohibitive exercise). Agencies should more readily identify key data points and establish reasonable baselines that make sense, instead of aiming for perfect visibility into their current state.

Results: Get What You Need by Avoiding Cloud Rhetoric

The pursuit of false choices leads government to pay for services that it does not truly require. By aligning security and performance requirements to real needs and establishing a cost baseline, agencies can transition to a cloud solution that fulfills their performance and security requirements while remaining cost-efficient. In other words, it's often okay to just say no to the "six nines."

Seek to Standardize: Special Requirements Mean Higher Costs

Cloud promises "good, fast, and cheap." What we learned in our government-industry dialogue is that commercial cloud providers can deliver to an established standard of good, at a fast pace, and with unprecedented low prices because:

- New systems are designed around rigorously applied provider-defined standards. No workarounds, customization, or adaptation is allowed.
- Commercial operating models are based on maximizing the capability of all parts of the architecture that will be consumed. Unlike the traditional data center, the cloud can run full throttle at 100%.
- Automation is maximized to reduce the cost and need for human intervention (otherwise known as labor costs).

Just like a utility business model, cloud prices are set to attract the high volumes needed for profitable economies of scale. However, unlike utilities, cloud prices have not been regulated by government or standardized by industry.

Collaborative industry standards bodies are trying to catch up. Currently, there is no single set of commercial standards, but rather a collection of evolving market-based ones. Government has taken the lead in establishing security standards through the Federal Risk and Authorization Program (FedRAMP) and the DoD Cloud Computing Security Requirements Guide (SRG). Another example is the Trusted Internet Connections (TIC) initiative that seeks to reduce, consolidate and secure connections to the federal government, including those to the internet.

Given this, how does your agency collect on the promise of "good, fast, and cheap" for cloud? The most straightforward way is to buy standard services from a CSP. What do you need to know to determine if all or some of your needs can be met in this provider-standardized, cost-efficient world? And how do you determine if the cost to meet your non-standard requirements is really worth the investment? Is "special" worth it?

How to Buy Standard

Using the knowledge you gained about the true requirements of your agency, research the market to understand the commercial standards and identify the standard service options that best support your needs. The following table summarizes a representative, point-in-time, range of IaaS standards across a sampling of CSPs that supply services to the public sector market.

Range of Market Standards for IaaS	
Availability	<ul style="list-style-type: none"> • 99.5 – 99.9% availability is the most common range; more is often an additional charge
Response Time	<ul style="list-style-type: none"> • 1 – 4 hours standard; faster is more expensive
Certifications/ Compliance	<ul style="list-style-type: none"> • FIPS 140-2, ITAR, HIPPA, SOC 1/SSAE 16/ISAE 3402, SOC 2, SOC 3, PCI DSS Level 1, ISO 27001, DIACAP, FISMA, CSA, MPAA, FedRAMP, & DoD Impact Levels 1 or 2 most common
Endpoint/Network	<ul style="list-style-type: none"> • Secure access, built-in firewalls, multi-factor authentication, private subnets, dedicated connection option, and security logs typical • Anti-virus, anti-malware, & anti-spam add-ons will be an uplift • Encrypted data storage available but will be an uplift
Technologies Supported	<ul style="list-style-type: none"> • Operating system and management: Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, & HP Operating System Management • Compute: VMware or Hyper-V hypervisor options • Database and apps: Oracle SQL server, Apache web server, JBoss app server, & Tomcat
Help Desk	<ul style="list-style-type: none"> • An area to watch; sometimes included, sometimes an uplift
Exit Terms	<ul style="list-style-type: none"> • Either party may terminate the agreement for cause with 30 days advance notice • Charges may be levied to extract your data from the network

Model your requirements with multiple CSP standard offerings. This competitive comparison can lead to substantial cost and service advantages, providing great insight into the range of available offerings and the baseline needed to form a basis for comparison of the price for your important service requirements. This framework can also avoid expensive mapping from provider to provider.

Buy “standard” from your CSP whenever possible. Rigorously question every requirement deviating from the standard. When non-standard requirements are added, the price will increase and/or the number of viable CSPs may decrease; you may end up paying more than you pay today.

Begin with the end in mind, and consider your exit strategy. It really isn’t a priority for the CSP to help you depart as a customer. So, the responsibility falls to you, the cloud consumer, to plan for an effective transition. Pay close attention to who owns the data and any charges associated with extracting and/or modifying your data prior to migration to another provider.

Pitfalls to Avoid

Each style of “as-a-service” has special considerations. Offerings may be standard, but implementation is not. Do not put off planning for the unique challenges of each style of cloud service you will buy.

- Infrastructure-as-a-service (IaaS): think through how you classify your applications because costs will be affected. Examine the market standards and understand what makes something “high” or “compartmentalized” and if you really need to bear the costs for a particular workload.
- Platform-as-a-service (PaaS): be aware that training will be needed. Your organization will require threshold levels of competency, or even certification, for the mastery needed to gain value from the selected platforms.
- Software-as-a-service (SaaS): don’t forget the integration into existing systems and technologies to achieve the seamless experience you expect.

Results: A Lot to Love in Standardization

Throughout this initiative, government and industry CxOs offered a range of perspectives from where they “sit.” Buying and using standard cloud services offer many benefits to both buyers and providers. Used well, commercial standards can encourage transformative benefits. Consumers are incited to well understand their needs and the market in order to collect on the promise of “good, fast, and cheap.” Providers are encouraged to innovate in a large, highly competitive market.

Below are examples of common benefits of standardization from the CxO point of view.

CEO		Procurement		Finance		IT	
Agency Head	Cloud Provider CEO	Agency Chief Acquisition Officer	Cloud Provider Chief Procurement Executive	Agency CFO	Cloud Provider CFO	Agency CIO	Cloud Provider CIO
More mission responsiveness	Gain market share with scalable innovations	More standard acquisitions; shorter time, and fewer contract changes	Well defined supply chain & partners	Well defined costs	Well defined price	Agility in customer response	Focus on standard offering(s)
More funds toward mission	Greater visibility into marketplace	More readily developed requirements	Simplified contracts	Reduced capital investment	Investments recouped quickly from large market	Reduced O&M cost; no technology refresh	Maximized investment in automation

Fit for the FAR: Improving Flexibility and Ease

Agencies have found many ways to buy and fit cloud under commonly used FAR models, but most report sacrificing some key aspect of the cloud business model to conform. They reported a number of concerns such as limitations in adjusting for usage charges based on speed or flexibility, excessive contract modifications, and impacts of fully funded fixed price vehicles under commonly used approaches. In short, there is no agreed-upon model that easily provides all desired aspects of the cloud business model advocating the merits of “cheap, fast, and flexible.”

Agencies report a conflict between the ease and speed of use of pre-competed multiple award vehicles for task orders and the indefinite delivery, indefinite quantity (IDIQ) nature of the cloud business model, especially in complex adoption efforts. The most commonly used approaches to indefinite quantity orders (single award IDIQ or BPA) are not allowed as task orders under an existing pre-competed vehicle. Moreover, a time and materials task order (pay-as-you-go) does not fit the cloud model, which is based on service, not labor. Most agencies will therefore issue a firm-fixed-price task order, often with billing based upon tiers of usage.

There are numerous challenges with this model, including:

- The requirement that it be fully funded at the time of award, leaving the door open to the possibility of budget shortfalls or “stranded” funding at the end of the fiscal year.
- Constructs which require multiple contract modifications to adjust to usage changes, creating excessive paperwork (the consumer equivalent of changing your mobile phone contract every month to match your minutes consumption).
- Single award IDIQs or BPAs, although permitted, are not the preferred contracting approach under the FAR, given the government’s desire for open competition among providers.

But what should an agency do if the very nature of the need is more appropriate for one vendor to accomplish? For cloud, in particular, many implementations, for reasons of scale, speed, and technical compatibility, are best performed by a single cloud vendor in a highly standardized approach over multiple, repeated orders (i.e., using a form of indefinite delivery as specified in FAR Part 16).

One solution is to bring back an older, historically less popular approach. The requirements contract/task order (FAR Part 16.504) is a perfect fit for the intersecting needs of the phased implementation cloud business model, where a single standard platform is required for best economic and technical returns. This model fits an agency unable to order its entire requirement at the initial award. Under a multiple award IDIQ vehicle, the requiring agency can issue a task order designated in this requirements format. This approach satisfies the requirement for issuing a binding task order under the IDIQ contract vehicle, while providing the agency with the flexibility to incrementally order required services from a single source and obligate funding.

However, where the scope of the need is not easily managed to satisfy the “all” requirement of a requirements contract, a single award IDIQ or a single award BPA may be the best approach. Additionally, where the scope and governance issues of a requirements contract mitigates

against its use and a single standard platform is not required to optimize value, the multiple award IDIQ and BPA model can be used. In those cases where different vendors can perform individual cloud requirements, this model allows for robust and fair competition.

How to Fit Your Requirements to the FAR

Use a requirements contract/task order for consolidated cloud platform needs. Agencies should clearly assess the type of cloud project and implementation approach. Strongly consider adopting a requirements contract approach if the cloud project meets the following criteria:

- A standard unified platform approach is required.
- Substantial value from organization-wide adoption of the standard platform or service can be derived
- Governance of contract scope can be well defined and can meet with substantial success.

In addition, where a project needs a phased approach, this approach can be primarily driven by operational readiness and not by artificial contract constraints such as timed options or ceilings.

For instance, consider the adoption of a cloud email platform. The scope of the requirement is clearly bounded. The economics and operational needs of the project benefit from and dictate a standard approach, as different email systems in different departments makes no sense.

One of the principal benefits of adopting cloud is the ability to take advantage of new and innovative technologies, a core benefit of cloud computing. One way to take advantage of this fundamental element of cloud computing is through a technical refresh clause, allowing vendors to periodically propose new, updated technologies on their contract vehicles. These clauses can be included in requirements contracts without increasing the risk of expanding the scope of the requirement. For instance, additional components could easily be added to the cloud email system mentioned, such as preparing the system for integration, cultural adoption, or obtaining additional funding.

If an agency determines that the pace of technological change could create a need to add prime contractors on a vehicle, an option for an open season can be included in the contract. In this situation, an agency refreshes their original solicitation with updated FAR clauses and re-solicits the contract, using the original requirement and evaluation language. Existing contractors remain on the contract vehicle, and new offerors are evaluated for award using the normal FAR proposal and evaluation process.

Pitfalls to Avoid

Do not over-scope the commitment. The key difference in requirements and IDIQ contracts is in the commitment. A requirements contract covers the “all” of whatever scope is defined. Describe your scope carefully! Consider definitions by component, buyer, type of work, or product to create a commitment advantageous to the government, both in terms of cost savings and operations. For example, a scope defined as “a platform for all department primary email needs, as provided by the CIO office” is clear, easy to govern, and unambiguous. But if the scope grants exclusivity to that same vendor for all legacy integration work, you may be in

trouble because other vendors may be needed to support the work. Be careful to use the requirements only for those parts where the “all” is intended, governable, and visible. Consider an IDIQ, BPA, or separate awards for mixed needs.

Do not over-reach the scope. While the government must clearly and carefully define its scope, some things cannot be known in advance and the value to all parties to advance cloud computing adoption is clear. Vendors should avoid assumptions that expand the scope in their proposals, and raise known or suspected scope problems as early as possible during the RFI and RFP processes. If the government is unable to employ the requirements approach without significant claims problems, the overall effort to adopt cloud could be impeded.

Results: Living Within the FAR Guidelines

Being able to separate the “all” from the “one” is key to achieving a successful cloud implementation. For instance, consider creating a sustained engagement with a platform provider to harvest the economic value of standardized and unified implementation of discrete projects such CRM, geospatial software, or the email issue as described previously. Ensure that these projects can expand on an as-needed basis without having to recompute the work, resulting in delays, duplicate platform costs, and the need for limited source justified procurements. If you are using an IDIQ contract, create tiers of usage that do not require modifications.

Conclusion: Conquer Cloud Mythology

As government and industry leaders working in the public sector, we all recognize the extraordinary value of cloud as a mechanism to make government more effective, more streamlined and more responsive to the needs of our workforce and citizens. Cloud is that change agent that brings online learning to an impoverished community in Appalachia, telemedicine to an injured soldier in the field, or instant fraud detection to our nation’s financial institutions. To abandon cloud, or to not implement cloud effectively, does a great disservice to our constituents.

By getting beyond the hype and hyperbole of cloud, we believe that these three core guidelines will help you make informed decisions about how to understand your requirements, how to standardize your needs, and how to appropriately use and respond to federal contracting regulations for cloud acquisition.

We would like to thank our government and industry partners for their insight into this complex issue.

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