



# Essential Criteria for Selecting Contract Writing COTS Software

June 2019



## **Executive summary**

Commercial Off-the-Shelf or COTS software promises substantial savings and reduced risk for large IT programs, but often falls short in meeting the unique and complex requirements of the Department of Defense (DoD). Success depends on DoD's ability to assess how solution providers can completely address emerging, complex requirements.

Several essential criteria—functionality, flexibility, auditability and sustainability—must be considered to ensure the right solution is selected and implemented successfully. These criteria are highly interrelated and will have a significant impact on the overall cost and risk of the program.

DoD benefits most from a COTS solution that has sophisticated, out-of-the-box capabilities. Additionally, the ability of the COTS product vendor to accommodate, incorporate and maintain DoD's unique requirements as enhancements within the core product substantially impacts sustainment costs. This enables DoD to avoid untenable, costly customizations and workarounds while maintaining core auditing best practices.

Accurately assessing these criteria requires an in-depth fly-off of COTS solutions, requiring each solution provider to demonstrate not only out-of-the-box capabilities, but also detail how they would accommodate complex, unmet requirements.

## Realizing the promise of COTS

DoD has been choosing commercial-off-the-shelf (COTS) software rather than developing custom systems to support its complex, mission-critical functions. With out-of-the-box functionality, pre-defined business processes and management reports, COTS software promises substantial savings and reduced risk for large IT programs. These promised savings are based on the COTS vendor being able to distribute software maintenance costs over its entire customer base. This is in stark contrast to a home-grown system or a customized COTS system where the customer bears the full cost of maintaining its system or customizations.

Unfortunately, many DoD COTS-based programs have experienced significant budget overruns, delayed deployment schedules, and unmet system performance requirements.

For example, DoD's experience with COTS-based enterprise resource planning (ERP) solutions has been reported as particularly troublesome. DoD is committed to applying the lessons learned from these experiences as it embarks on future initiatives.

### KEY CHALLENGES

DoD, as measured by scale, mission, scope, and nature of activity, is unique among global organizations. And while measures have been taken to try to adapt business processes to better leverage out-of-the-box COTS functionality, these often fall short in meeting DoD's unique and complex requirements.

These challenges are particularly true as DoD embarks on the replacement of the Standard Procurement System (SPS). COTS software designed specifically for federal contract writing to meet the legal and regulatory requirements (e.g., the Federal Acquisition Regulations) presents a lower risk and less costly lifecycle. Additional regulations, such as the Defense Federal Acquisition Regulation Supplement (DFARS) and unique business requirements, such as the acquisition of major weapon systems, make DoD's contract writing requirements even more complex.

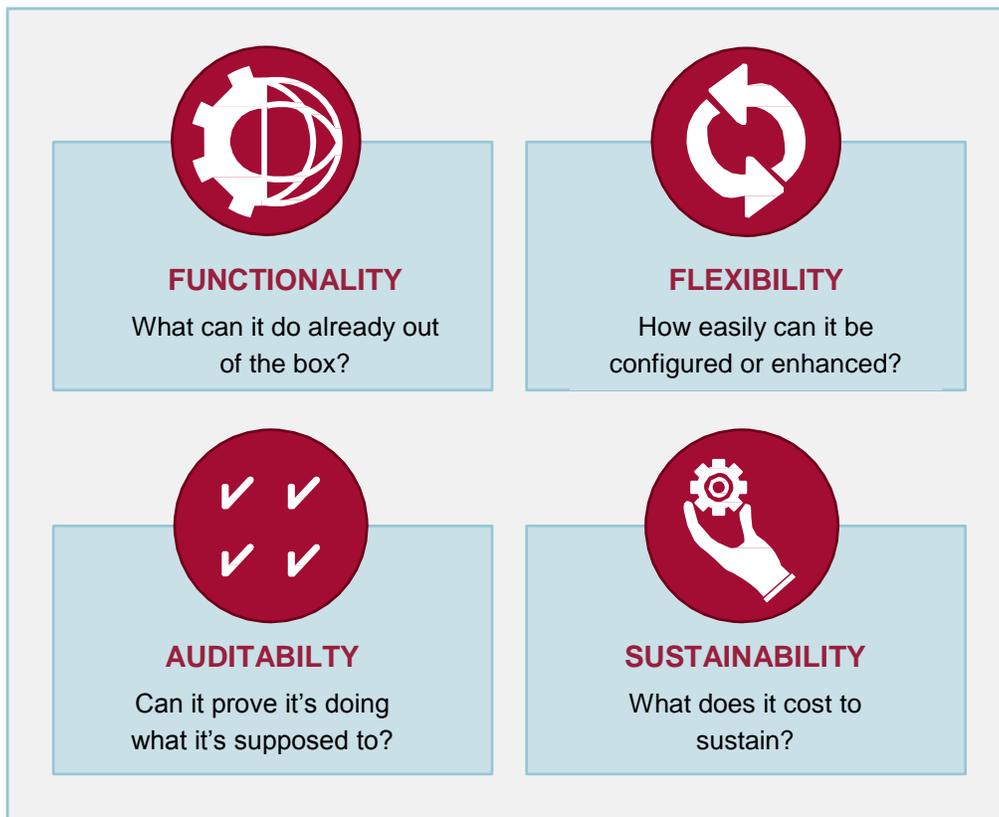
The success of DoD contract writing systems is dependent on the ability of DoD and its partners—including software, systems integration and consulting services providers—to adequately and cost-effectively meet both existing and emerging, complex requirements of the organization. While baseline software provides a strong foundation, there are several other critical considerations to ensure the right solution is selected and implemented successfully.

**Many COTS-based programs in the federal government have failed to live up to the promises of accelerated schedules, cost savings and reduced risk.**

- 6 of 8 DoD ERP implementations exceeded cost estimates by more than 27%
- 100% experienced schedule delays
- Delays ranged from 1.5 to 12.5 years

In this paper, we explore four essential criteria that DoD should use to evaluate any COTS software platform to meet its unique requirements.

## FOUR ESSENTIAL CRITERIA FOR EVALUATING COTS SOFTWARE FOR COMPLEX REQUIREMENTS



### Opportunity

COTS-based programs can deliver promised benefits, even for complex organizations like the DoD.

Assessing potential COTS solutions based on essential criteria of –

- Functionality
- Flexibility
- Auditability
- Sustainability

The four evaluation criteria—functionality, flexibility, auditability and sustainability—are closely interrelated and must be evaluated together to reduce risk to the program's budgeted cost, planned schedule, and to the program's overall performance and affordability over its entire life.

# Four essential criteria for COTS software evaluation

## 1. FUNCTIONALITY: WHAT CAN IT DO ALREADY, OUT OF THE BOX?

A typical evaluation of COTS software includes a significant investment in defining the functional and technical requirements of the mission-critical business function. These requirements are typically folded into matrices (e.g., self-certifications) where vendors evaluate their capabilities against the identified requirements, enabling organizations such as DoD to easily assess the viability of a solution based on the percentage of requirements met out-of-the-box.

This exercise provides a critical set of data from which to compare software products, but fails to provide a complete measure of a software's ability to meet requirements. The inevitable differences in interpretations and the range of complexity of DoD requirements leads to the risk that a requirement may not be fully met by out-of-the-box functionality.

For instance, SPS was estimated to meet 60-75% functionality, but a DoD IG report found that SPS was only meeting 45% of the required functionality. This is largely due to the range of complexity for a single requirement across the different types of contracts. The way in which a COTS system can handle a requirement for commercial items may differ from how it can handle major weapon systems. For example, it might be capable of searching contract documentation out-of-the-box, but be unable to scale to meet that requirement if the documentation runs into the thousands of pages.

## 2. FLEXIBILITY: HOW EASILY CAN IT BE CHANGED?

The percentage of requirements met by out-of-the-box functionality is only one dimension of viability. A solution may satisfy 90% of the requirements out-of-the-box, but how it addresses the remaining 10% is equally, if not more, important. That 10% typically is a primary contributor to delays, budget overruns, and maintenance cost escalation, particularly for sustainment of the system. An important element in a COTS software evaluation is flexibility—how easily can the software accommodate initially unmet and future requirements.

Key considerations to measuring a software product's flexibility are the ease and type of configuration it offers, the lead time required to satisfy new requirements, and the cost of developing and maintaining new capabilities as customizations or as part of the core product code.

### Recommendation

A COTS software evaluation must weigh out-of-the-box functionality against other essential criteria and demonstrate that the solution meets a large share of the identified requirements.

Approaches to pursue:

- Detailed Requirements Traceability Matrix which can run into the thousands of discrete requirements
- Statement of Objectives to describe the operating environment and desired outcomes

There typically are three ways to accommodate requirements that are unmet by out-of-the-box functionality: customizations, workarounds and enhancements.

1. **Code customizations** typically involve unsupported, unique core code changes specific to a single organization's requirements. Since these are custom one-offs, they are inherently costly and risky. They require specialized knowledge to build, tend to complicate upgrades, and also require specific knowledge to maintain throughout the program's lifecycle.
2. **Workarounds** leverage outside applications or require manual activities to address the requirements. Workarounds are equally risky since they must be maintained in perpetuity and evaluated for impact with each future system upgrade—not only adding cost to maintain the solution, but also perpetuating the organization's likely dissatisfaction in having to implement a less-than-ideal business solution.
3. **Enhancements** are core code changes built into the base software product, and thus are incorporated into future product releases. A product vendor's willingness to use product enhancements to address complex requirements saves an organization significant costs and risk in future upgrades.

COTS software that is highly configurable is preferred, as there will be requirements that demand more tailored solutions. Customizations and workarounds increase overall program costs and risks because the organization must build and maintain these new capabilities, acquire additional tools or applications, or fit customizations into future upgrades.

Complex requirements are addressed through product enhancements provide the most benefit to the customer at the lowest cost and risk. As an enhancement, requirements are built into the core product, available in future product releases, and maintained by the product vendor, thus reducing the overall cost, complexity and risk of implementing upgrades and improving the next criteria—auditability.

### Recommendation

Place equal importance on assessing how the percentage of unmet requirements will be addressed, whether through configuration, customizations, workarounds or enhancements.

A product vendor's willingness to build the requirements into its core product drives much of the sustainment cost.

### **3. AUDITABILITY: CAN IT PROVE IT'S DOING WHAT IT'S SUPPOSED TO?**

Each of the Armed Services and Agencies within DoD have dedicated significant time and resources to achieving auditability. The introduction of a new system represents a significant risk to DoD's audit efforts. Therefore, DoD must ensure not only that potential COTS solutions have passed the rigors of an audit, but also that the design, development and integration of the solution support the goal of auditability.

The way in which complex requirements are accommodated in COTS software has a significant impact on auditability. For example, code customizations and workarounds typically are not supported by the COTS software vendor, requiring DoD to maintain a record of the changes, understand and evaluate compatibility each time the solution is upgraded, and pass the knowledge of the customization or workaround from employee to employee to ensure its existence is not lost as time goes on. The guarantee of out-of-the-box auditability is lost when custom code and workarounds are introduced into the solution.

### **4. SUSTAINABILITY: CAN IT BE MAINTAINED AT A REASONABLE COST?**

The first three COTS evaluation criteria are highly interrelated, and have a significant impact on the sustainability of the solution. For example, a solution may have high functionality out-of-the-box, but if it requires significant customizations adversely impacting audit capabilities, the complexity to maintain and upgrade the system increases, as does the cost. As ongoing maintenance or upgrade costs increase, the affordability of implementing new, value-added features and functions decreases, limiting user productivity, and thus increasing costs in the outyears.

## **Bottom Line**

DoD benefits most from COTS solutions that have substantial out-of-the-box capability, but more importantly, solutions that are highly configurable. The ability to incorporate unique, unmet requirements into the core product maintained by the software vendor drives sustainment costs and need to be weighed heavily.

To assess this, DoD should consider in-depth fly-offs of potential COTS solutions, where both out-of-the-box functionality and complex requirements are demonstrated, and assess approaches to addressing unmet requirements.

#### **Recommendation**

Place emphasis on understanding how customizations and audit processes of a solution may impact the ability to upgrade to future releases.

## THE VALUE OF AN IN-DEPTH FLY-OFF

When COTS products are evaluated, it is tempting to assess solutions on the basis of the percentage of existing requirements that are met out of the box. Higher percentages imply better solution fit to the organization's overall requirements. But, selecting the right solution to meet a program's long-term sustainment and affordability requirements demands a rigorous approach where evaluators can observe competing solutions performing across requirements and demonstrating the required characteristics over a significant period of time. It is difficult to assess this in an RFP response or in a few hours of demonstrations and presentations.

Therefore, as the DoD embarks on the evaluation of COTS solutions for its business system replacement initiatives, they should strongly consider a fly-off evaluation where solution providers stand-up their respective solutions to demonstrate out-of-the-box functionality. From there, each provider's solution would be evaluated on the actual coverage of their out-of-the-box capabilities (functionality), the ease and ability of configuring their solution to the organization's needs (flexibility), and the process for addressing unmet or emerging requirements (e.g., customization, workarounds, or product enhancements).

While such an approach may lengthen the evaluation process in the near-term, it will provide DoD with greater insights into each solution's full lifecycle costs and program risk, and ultimately enable the true benefits of a COTS-based solution to be realized and reduce the on-going costs for maintenance and support.

[cgi.com](http://cgi.com)

© 2019 CGI GROUP INC.

---

CGI Federal Inc. is a wholly-owned U.S. operating subsidiary of CGI Inc., dedicated to partnering with federal agencies to provide solutions for defense, civilian, healthcare and intelligence missions. Founded in 1976, CGI is among the largest independent IT and business consulting services firms in the world. With approximately 77,000 consultants and professionals across the globe, CGI delivers an end-to-end portfolio of capabilities, from IT and business consulting to systems integration, outsourcing services and intellectual property solutions. CGI works with clients through a local relationship model complemented by a global delivery network that helps clients digitally transform their organizations and accelerate results. With Fiscal 2018 reported revenue of C\$11.5 billion, CGI shares are listed on the TSX (GIB.A) and the NYSE (GIB). Learn more at [cgi.com](http://cgi.com).