



# The Double-Edged COTS IT Sword

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As government technical teams downsize and budgets shrink in tandem with an increasing demand for more complex systems, there is a rising interest in leveraging the use of commercial-off-the-shelf (COTS) products. In many cases, the use of COTS is mandated. Is it possible to over-emphasize the use of COTS products? For example, what checks would you expect prior to flying on a new aircraft with a software system composed of integrated COTS? Far from the promised panacea, the use of COTS components introduces new trade-offs and issues, especially with risk management, component integration, system reliability, and cost of sustainment.

Is there a limit to what can be defined as COTS? Can all future deliverables of a developed product be considered COTS? If so, what is the implication for Department of Defense (DoD) acquisitions? The new DoD Directive 8000.1 for the Management of DoD Information and Information Technology (IT) (<http://www.cio.hq.af.mil/dodctext.htm>) sharpens the blades of COTS and outsourcing policies by

providing the mechanism for DoD compliance with the Cohen-Clinger Act (also known as the IT Management Reform Act of 1996 (see *CROSSTALK*, September 1997). It applies to all DoD IT, even IT in national security systems (to include embedded, crypto, intelligence, and command and control systems). In other words, the law and the new DoD directive provide an all-encompassing definition of information and IT. DoD Directive 8000.1 requires an assessment of where the IT function could be performed most effectively: within DoD, by another government source, or in the private sector. It also advocates the principal of fee-for-service in governing the provisioning of information services and IT capabilities. Considering the law and the new DoD directive, how far can the use of COTS be applied (and pressure applied by external sources)? Consider space-based capabilities that have been delivered before, especially since they are now covered by the IT umbrella. Why couldn't DoD simply be expected to request an on-orbit COTS (or COTS-based) system with a specified capability, capacity, and availability in a particular orbit by a specified date? Based on the

law and the DoD IT directive, this must be considered a viable alternative.

COTS software offers the ability to quickly adapt to evolving mission and business environments with lower up-front costs; however, many projects are finding that the promise of COTS components does not quite match expectations. The May 1997 issue of *CROSSTALK* offered several articles that tackled the relevant question, "Is COTS worthy of worship?" "The Commandments of COTS: Still in Search of the Promised Land" is worth reviewing and should be provided to senior leaders who believe COTS is the ultimate answer to all their software challenges.

In this issue, "The Opportunities and Complexities of Applying Commercial-Off-the-Shelf Components" (page 4) provides managers with a better understanding of COTS. The COTS mandate challenges system developers to integrate COTS components into systems without compromising the strict reliability and availability required in mission-critical systems. Most COTS components are essentially "black boxes" with no warranty. Systems must maintain their exist-

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Managing Editor

**MEMORANDUM FOR CORRESPONDENTS**No. 228-M  
December 16, 1997

The Office of the Under Secretary of Defense for Acquisition and Technology (OUSD(A&T)) recently recommended that Capability Maturity Model (CMM™) Integration (CMMI) be the number one Software Engineering Institute's (SEI) priority in its process management work. The Software Engineering Institute is located at Carnegie Mellon University in Pittsburgh, Pa. The department has recommended that SEI construct tailored CMMs from both common building blocks and discipline-specific elements. This approach will ensure consistency among all tailored CMMs and will eliminate the need to apply a variety of CMMs to a single organization.

"The Department of Defense vision is that existing and future CMMs will be integrated into one framework which addresses Acquisition Reform, process improvement from an integrated product and process development perspective and contain sound principles of systems development," said Mark Schaeffer, deputy director for systems test, systems engineering and evaluation, OUSD(A&T).

The new approach for CMM integration is different from that of the SEI's first release of the Common CMM Framework. The SEI is pursuing this new strategic approach to meet its sponsor's and customers' needs for integrated CMMs that range from single domain to enterprise-wide within the same framework. The SEI developed the Software Capability Maturity Model (SW-CMM), which has been widely adopted and used throughout both the government and corporate worlds. The SEI's sponsor requested the SEI to delay the release of SW-CMM, Version 2.0 for several months until the CMMI Framework can be defined and approved. This is also intended to reduce confusion among customers as a process improvement framework for multiple disciplines is developed.

Meanwhile, the SEI continues to support SW-CMM, Version 1.1 and its associated products. The information contained in Draft C of SW-CMM, Version 2.0, which is currently available on the SEI Web site, will provide industry partners advanced notice of the changes to Levels IV and V processes, and allow comments to be fed back for incorporation into CMMI. The Department of Defense (DoD) and the SEI encourage all involved in software process improvement to review and provide feedback on Draft C of the SW-CMM, Version 2.0 publication, which is on the SEI Web site at the URL: <http://www.sei.cmu.edu/technology/cmm/cg.html>.

For further information concerning CMMI, please contact Terrence McGillen, Software Engineering Institute, Carnegie Mellon University, 412-268-7394. The DoD Public Affairs point of contact is Lt. Col. Bob Potter, 703-697-3189.

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ing level of performance even when upgraded components are introduced.

A software fault-tolerant architecture is needed to help developers modify existing applications with upgraded COTS software components. The Software Engineering Institute has developed a framework called the "Simplex Architecture" that addresses the challenges of using COTS in high-reliability systems (page 7). The framework integrates high-assurance application-kernel technology, address-space protection mechanisms, real-time scheduling algorithms, and

methods for dynamic communication among modules.

Although COTS products offer challenges, COTS software is a viable means to cost-effectively satisfy mission requirements. To minimize the need to develop unique systems, I continue to advise project teams to consider COTS when defining operational requirements and business processes. Some people advocate disregarding existing products and services when defining requirements and processes so they will not be bound by existing technology, but this can lead to reinventing the wheel. Projects need to have people who are knowledgeable of the plethora of existing COTS products

and services so they can recommend tailoring opportunities when defining requirements and processes. If you do not have at least one COTS-knowledgeable person on your team who can articulate the project realities of using COTS products, you should seek that support.

I suggest you read the new DoD Directive 8000.1 to understand how it applies to your projects. In light of COTS and outsourcing mandates and the new DoD IT directive, project managers need to understand what lawmakers, audit agencies, and senior DoD leaders might be considering in reviewing their programs. ♦