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COTS-Based Software Systems

First International Conference, ICCBSS 2002
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Foreword

Modern software systems increasingly use commercial-off-the-shelf (COTS) software products as building blocks. In some cases, major software systems are assembled with virtually no custom code in the system.

The use of COTS software products as components offers the promise of rapid delivery to end users, shared development costs with other customers, and an opportunity for expanding mission or business capabilities and performance as improvements are made in the commercial marketplace. Few organizations today can afford the resources and time to replicate market-tested capabilities. Yet, the promise of COTS products is too often not realized in practice. There have been more failures than successes in using COTS software products.

The research and software practitioner communities have been working with COTS-based software systems for a number of years. There is now sufficient documented experience in the community to collect, analyze, and disseminate success stories, common failings, lessons-learned, and research advances. The mounting experience shows that the effective use of COTS software products in major software systems demands new skills, knowledge, and abilities, changed roles and responsibilities, and different techniques and processes.

The International Conference on COTS-Based Software Systems (ICCBSS) focuses on the challenges of building and maintaining systems that incorporate COTS software products. The conference sponsors, the National Research Council Canada, the Software Engineering Institute, and the University of Southern California Center for Software Engineering, aim to bring together managers, developers, maintainers, and researchers to share their expertise and experience. ICCBSS 2002 in Orlando, Florida, USA is the first of an annual series of conferences devoted to the building, fielding, and evolution of COTS-based software systems.

The conference series has made an impressive start. For ICCBSS 2002, papers were submitted from the USA, Canada, Europe, the Middle East, Africa, Australia, and Asia. The standard of the papers was very high, and the program committee found it difficult to reduce the number to fit into the conference schedule. These proceedings provide a broad picture of the state of practice and research in the use of COTS software products.

We look forward to a stimulating first conference, and a successful ICCBSS conference series.

February 2002 Lisa Brownsword

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The Software Engineering Institute (SEI) provides leadership in advancing the state of software engineering practice. We collaborate with industry, academia, and the government to learn about the best technical and management practices and then use what we learn to benefit the software engineering community.

The institute is based at Carnegie Mellon University and is sponsored by the U.S. Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD (AT&L)].

Learn more about the SEI at `http://www.sei.cmu.edu`.

National Research Council Canada

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Learn more about the NRC at `http://www.nrc.ca`.

USC Center for Software Engineering and CeBASEC-CSE

The USC Center for Software Engineering (USC-CSE) focuses its research and teaching efforts toward helping industry and government address multiple new challenges of concern to software system procurers, developers, and users. We work in partnership with the members of our Affiliates' Program, which includes some two dozen organizations representing a mix of commercial industry, aerospace, government, nonprofit FFRDCs, and consortia. The Center for Software Engineering is based at the University of Southern California.

Learn more about USC-CSE at `http://sunset.usc.edu`.

Panels

Building Survivable Systems from COTS Components: An Impossible Dream?

Moderator: Nancy Mead, Software Engineering Institute
Panelists: Joe Besselman, USAF; Nancy Mead and Howard Lipson, Software Engineering Institute; and Jeff Voas, Cigital

Much of the literature on COTS-based systems and the license agreements for COTS products concede that such systems are not suitable for critical applications for business, government, and defense. However, COTS-based systems are already being used in domains where significant economic damage and loss of life are possible. Can we ever build such systems so that the risks associated with using COTS components in critical applications are commensurate with those typically taken in other areas of life and commerce? Building survivable systems using COTS components is a daunting task because the design team typically has little or no access to the artifacts of the software engineering process used to create the components. These artifacts are the primary sources from which assurance evidence for a composite system is derived, and lack of direct access to the artifacts greatly increases the risks of building critical applications. The key question to be addressed is this: Can those who acquire, design, implement, operate, maintain, or evolve systems that use COTS components adequately manage the risks of using these components in critical applications? This panel will debate if, when, and how COTS components can be used to build survivable systems and discuss strategies for risk mitigation.

COTS Test Strategy

Moderator: Christina Laiacona, BASF Corporation
Panelists: John Dean, National Research Council; William Perry, Quality Assurance Institute; and Randall Rice, Rice Consulting Services

One of the pressures created by COTS applications is the paradigm shift for new testing strategies. This spirited panel discussion will begin the dialogue on COTS Test Strategy for product evaluation, deployment, and maintenance. The following questions will be addressed during the session:

- What are the testing considerations for a COTS Product Evaluation?
- What are the management processes and people considerations of a testing strategy for COTS applications?
- Are there different approaches to testing COTS applications according to the development risk of the systems' ability to capture, create, store, manage, and archive trustworthy data?
- What are the considerations for surveillance/maintenance of COTS systems in a production environment?

Once Burned - Forever Learned - Vendors Be Warned
Moderator: Will Tracz Ph.D., Lockheed Martin Systems Integration
Panelists: Tom Baker, The Boeing Company; Anthony Earl, Sun Microsystems Inc.; and Ronald J. Kohl, Titan Systems Company

Some people want COTS-based solutions in the worst way. Unfortunately, as we all know, sometimes they get what they want (i.e., an unpleasant experience). COTS venders have a checkered reputation for meeting expectations in terms of component documentation, functionality, quality, and interoperability. The less than successful use of COTS components cannot always be blamed on user inexperience, lack of process, or unrealistic expectations (though all three reasons are applicable more often than not).

Given the market pressures (and maybe a little economic greed), COTS vendors sometimes deliver products with less than perfect documentation, poorly understood feature interaction, and insufficiently tested interoperability with all possible permutations of other components (and versions of those components), presenting the buyer with an impossible task. Besides most vendors have a vested interest in expanding the scope of their products so as to make obsolete the need to integrate other vendor components with theirs. Finally, some vendors have assured their customers that bugs will be fixed in the next release of the system, for free (which is why there are maintenance fees).

The goal of this panel is to identify, based on personal experience, the gaps between the marketing hype and actual reality of using COTS components and to come up with a prioritized list of recommendations for COTS vendors. COTS components are a means to an end and not necessarily an end in themselves. The user community will continue to waste resources, duplicating efforts until these issues are resolved.

Poster Sessions

Title: **"Towards a COTS-Aware Requirements Engineering Process"**
Presenters' Names: Lawrence Chung and Kendra Cooper (University of Texas, Dallas)

Title: **"Software Components – Enabling a Mass Market"**
Presenters' Names: Pearl Brereton, Stephen Linkman, Adel Taweel, and Stuart Thomason (all Keele University, UK); Uwe Anders (Tuev Nord, Germany), Jorgen Boegh (Delta, Denmark), Alberto Pasquini (Enea, Italy), Nigel Thomas (Durham University, UK)

Title: **"Reusing COTS Technology in Embedded Weapons Systems"**
Presenters' Names: Jamie Durbin and James Briggs (Lockheed Martin Co.)

Title: **"The Software Spectrum: A Shopper's Guide to COTS, Open Source and Custom Built Software"**
Presenters' Names: Tricia Oberndorf (SEI) and Ron Kohl (Titan)

Title: **"Extended Component Architecture and Maintenance: A Process for Supporting Component-Based Development"**
Presenters' Names: Gerald Kotonya, Walter Onyino, John Hutchinson, Pete Sawyer (all Lancaster University, UK); Joan Canal Gonfaus, Marcel Ubach Miralda, Francisco Mateo Goma (all CCS, Spain); Domenico Presenza, Luigi Briguglio (all ING, Italy)

Title: **"Layered Architecture for Deployment and Assembly of Commercial Business Components"**
Presenters' Names: Hemant Jain and Tata Professors (University of Wisconsin, Milwaukee)

Title: **"MBASE/CeBASE COTS Integration Framework"**
Presenters' Names: Dan Port and Barry Boehm (University of Southern California)

Title: **"A Software Assurance Paradigm for Commercial Off The Shelf (COTS) Software Products for Mission Critical Systems"**
Presenter's Name: Louis Blazy (NASA)

Title: **"Defining Software Measurements"**
Presenter's Name: Bruce Hofman (Continuous Improvement Methods)

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