COTS Usage Risk Evaluation[SM] (CURE[SM])

Discussion Topics for Onsite Evaluation

Version 3.2

Introduction

This document contains the topics that guide the onsite discussion portion of the COTS Usage Risk Evaluation (CURE). The topics are divided into fifteen sections categorized as: General, Business, Infrastructure, and LifeCycle.

Not all topics are applicable to all programs, and the actual selection of which are discussed will be based on the characteristics of the program and system in question. In addition, it will be noted that there is an intentional redundancy in these lists of discussion topics, since this document will be used in a variety of programs. In practice, the evaluators will make every attempt to limit this redundancy for a given evaluation. Also, there may be other topics that arise, and individuals in a particular program may wish to introduce unique topics that are pertinent to their program.

The following are high-level guidelines that indicate the expected nature of the discussions:

- The major focus is expected to be on COTS-related issues. It may not always be possible to keep that focus and, where warranted, we will seek information on issues that have little specificity to a COTS-based program. However, such topics are the exception for this evaluation.
- The purpose of the discussions is to unearth factors that may imply risk to the program. It is **not** the goal to catch the discussants in contradictions, nor any other type of "wrong" answers.
- The discussion topics that focus on experience are aimed at the personal experience of individuals, not that of the organization. Thus, we generally are more interested in details about the specific person who will manage the program than in the corporate management profile of his employer.

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Part I: General Topics

1 System Description

1.1 External operational context

- Other systems with which the system interacts; complexity of the interactions
  - Degree of dependency on other systems
  - COTS products (selected or candidate) known to be affected by this dependence
  - Current status of these systems (e.g., operational, in development)

1.2 Internal complexity

- Approximate size, major functional components, data and control flows, complexity of internal interfaces

1.3 Business/technical processes

- Business or technical processes supported by the system
  - Stated willingness of the user community to accept the processes
- Any reengineering of the processes:
  - Flexibility of the existing processes to be reengineered
  - Stakeholders that were consulted in planning the reengineering

1.4 Site-specific adaptation

- Need for multiple non-identical instances of the system
- Site-specific adaptation needed for the different instances of the system

2 *Use and Characteristics of COTS Products*

2.1 General use of COTS products

- Distribution of system functionality; overall role of COTS products
- Key COTS products and NDI components (anticipated or already chosen)
  - Centrality or importance of the product/component to the system
  - Complexity of interactions with other components of the system
- Factors that determined any choices already made
  - Whether a choice already made is conditional or absolute
- Past and future evolution (e.g., for COTS, known frequency of product update; for NDI, who will control future changes)
  - Expected future capabilities (i.e., of the product or component) that are critical

2.2 Evidence of use

- Factors that indicate COTS maturity (e.g., market share, estimated customer base, quality of documentation, other)
- Existing user groups
- Other operational systems using this software

2.3 Licensing issues

- Types of licenses needed for system's key COTS elements (e.g., standard commercial license, public domain, GNU Copyleft, other)
- Estimated cost for acquiring licenses; basis for this estimate
- Expected license owner (s)
- Estimated costs for future license renewal; basis for this estimate
  - Incorporation of these costs into program plans (28)

3 Management Readiness

3.1 Previous experience by Project Manager

- Experience on projects similar to the project; nature of similarity; Manager's role; relative success of these projects
  - Development projects
  - Reengineering projects
  - Long-term maintenance projects
  - Specific COTS products used

3.2 Anticipated management changes

- Known career changes (e.g., retirements, rotations, others) for any key management personnel
- Known alternate management personnel; nature of their experience (q.v.3.1)

3.3 Decision authority

- Name and location of each entity with decision-making authority (36)
- Types and degrees of authority exercised
  - Authority for resolving disputes concerning COTS product decisions
  - Authority for resolving "product vs. process" decisions
  - Authority to resolve inter-program conflicts

4 *Technical Readiness*

4.1 Previous experience by Lead Engineer/Chief Architect

- Experience on projects similar to the project; nature of similarity; Engineer's role; relative success of these projects
  - Development projects
  - Reengineering projects
  - Long-term maintenance projects
  - Specific COTS products used

4.2 Experience with modification of COTS products

- Description of any modification that will be necessary; item that will be modified; agency that will perform the modification
- Experience of that agency with modifying any COTS or NDI
- Experience of that agency with modifying <item x>
- Experience with estimating the complexity of modification

4.3 Software development environment

- Software development environment to be used; resources and tools needed for implementing, debugging and integrating the COTS components of the system
- Basis of estimates for needed environment resources and configuration
- Present state of the development environment
- Extent of experience using the software development environment

Part II: Business Topics

5 *Budget, Schedule, & Contractual Issues*

5.1 Contractual relationships

- Contractual relationships with and between all entities that will contribute to the project
  - Contractual relationships between different organizations
  - Contractual relationships between different components of the same organizations
- Expected nature of any other contributions (i.e., non-contractual contributions) that are expected)

5.2 Contract flexibility

- {For any contract that exists:} Provisions in the contract that provide flexibility (e.g., wrt changed costs, extensions of vendor services; increased requirements, etc.).
- Previous contracts with similar COTS-related provisions that served as a contract model

5.3 Contract renegotiation

- {For any contract that exists:} Contract renegotiation that has occurred that was driven by COTS-related issues
- Effects of this renegotiation

5.4 Cost projections and budgeting

- Methods used for cost projections and budgeting for the system; impact of COTS products on these methods
- Resource allocations for specific COTS-related activities (e.g., standards group participation, technology watch))

5.5 Commercialization of modified products

- Contractual provisions concerning commercialization of modified products
- Expectations regarding other customers of the modified products

5.6 Project schedule

- Schedule for the project in terms of major milestones, IOC, interim deliverables, major decision points
- Provisions in overall project schedule for COTS product releases
- Any other COTS-related factors that contribute to or constrain the schedule

6 Vendors and Suppliers

6.1 Vendor profile

- Size of the vendors of each key product (i.e., number of people employed)
- Products' relative market share
- Vendor's financial health
- Vendor's reputation in the software community
- Products of comparable quality from the same vendor

6.2 COTS product support *(also applies to NDI)*

- Organization with responsibility for product support
- Contractual status of product support agreements
- Expected product support process (76)
  - Provisions for expected evolution, end-of-life, and normal upgrades
  - Provisions for emergency upgrades

6.3 Multiple vendor agreements

- Dependence on multiple vendors working jointly (e.g., product integration)
- Comparable joint work performed by these vendors in the past
- Status of any contractual statement about product interoperability

Part III: Infrastructure Topics

7 Standards

7.1 Required standards compliance

- Laws, stipulations, mandates, or requirements concerning standards compliance by any COTS components used in the system
  - For each applicable standard, whether the constraint has any flexibility
- Resources allocated for standards verification, participation in standards groups, committees, conferences, etc.

7.2 Known standards compliance by COTS products

- COTS products (already selected or candidates) known to comply with standards identified above
- How standards compliance has been/will be verified
- Dependencies on vendor extensions to a standard
- Any other extension, subsetting, or modification of standards that will be needed

7.3 DII/COE (NB: Only required for programs expecting to use DII/COE)

- Overall project strategy wrt DII/COE; expected level of DII/COE compliance
- Version of DII/COE currently installed at development site; version of DII/COE expected in the system
- Previous projects by Contractor that made use of DII/COE; Lead Engineer's role in these projects
- Any known conflict between versions of products in DII/COE and planned versions of COTS products for the system

8 Process

8.1 Development process

- Planned development process to be used for the system; manner and detail in which it is recorded
  - Ways that the presence of COTS products will influence the planned development process
- Previous projects by Contractor that made use of any COTS-based development process; Lead Engineer's role in these projects
- Previous projects by Contractor that made use of the planned COTS-based development process; Lead Engineer's role in these projects
  - Relative success (e.g., technical goals, schedule, and budget) of these projects

8.2 Management process

- Planned management process to be used for the system; manner and detail in which it is recorded
  - Ways that the presence of COTS products will influence the planned management process
- Previous projects by organization that made use of any COTS-based management process; Program/Project Manager's role in these projects
- Previous projects by organization that made use of the planned COTS-based management process; Program/Project Manager's role in these projects
  - Relative success (e.g., technical goals, schedule, and budget) of these projects

8.3 Program risk management

- Resources allocated to risk management for the program
- Any ongoing continuous risk management strategies
- Extent to which the risk management plan has identified risks stemming from use of COTS products

8.4 Integrated product teams (IPTs)

- {If IPTs are to be used:}Other COTS-based projects on which management participated that made use of IPTs
- Organizational structure of IPTs; geographical distribution; expected composition; any divisions of authority
- Experience by personnel staffing the IPTs with COTS-based projects

Part IV: Lifecycle Topics

9 *Evaluation of Commercial Products and Technology*

9.1 Planning for evaluation

- Overall planning for evaluation (products as well as technologies)
  - Resources (budget, schedule, personnel) to perform evaluations
  - Basis of the resource allocation
- Specific COTS products to be evaluated

9.2 Evaluation methods and techniques

- COTS evaluation methods to be used
  - Rationale for these choices
- Supporting technologies (e.g., test harnesses) needed for these methods
  - Current availability of these supporting technologies

9.3 Experience with COTS product evaluation

- Previous projects by Contractor that required evaluation of COTS products; Lead Engineer's role in those projects
- Specific COTS products that were evaluated
- Methods and techniques used

9.4 Evaluation focus

- Support for the planned business process
- User interface; usability and tailorability
  - Anticipated learning curve for end users

9.5 Evaluation of interoperability

- Interactions of products to be evaluated
- Basis of the expectation that candidate or chosen products will successfully interoperate with other parts of the system.
- Verification of interoperability for heterogeneous groups of COTS products
- Experience with product interaction evaluation

10 Requirements

10.1 Requirements specification

- Characteristics of the requirements specification (e.g., status, detail, and stability); whether the specification describes "what" vs. "how" the system is to be built
- Whether familiarity with the overall COTS marketplace influenced the requirements specification
  - Whether knowledge of specific COTS products influenced the requirements specification

10.2 Prioritization and flexibility of requirements

- Any level of prioritization of the requirements specification (e.g., "must-have" vs. "like-to-have")
  - Person or agency that defined the prioritization of requirements
  - Participation and agreement from all stakeholder communities on prioritization
  - Flexibility of requirements in the requirements specification

10.3 Specific COTS product requirements

- Requirements that mention COTS software, whether in general terms or by specific COTS products
- Any requirement that specifies a particular version of a COTS product

10.4 Functional requirements compliance

- Plans for verification of compliance with functional requirements by specific COTS products
- {For COTS products already selected:} Evidence that products comply with functional requirements
- Fallback plan if functional requirements are not met by any COTS product

10.5 Non-functional requirements compliance

- For any products, either candidate or already chosen, identify any non-functional requirements (e.g., reliability, security, scalability, availability, etc.) that affect it
- Plans for verification of compliance with non-functional requirements by specific COTS products
- {For COTS products already selected:} Evidence that products comply with non-functional requirements

  - If no such evidence is available, how predictions concerning these requirements have been made
- Fallback plan if non-functional requirements are not met by any COTS product

11 System Design

11.1 Design decisions concerning COTS products in general

- Design decisions that have been made that involve specific COTS products; relation of those decisions to specific requirements
  - Recorded rationale for these decisions
- Elements in the design that are absolute, elements that are conditional; flexibility to alter the design
- Backup plans if a product fails to meet design expectations

11.2 Specific COTS products and system design

- Familiarity with candidate or chosen products
- Aspects of the system design that are dependent on unique features or particular versions of specific COTS products
- Sustainment of unique features across future releases

11.3 COTS modification

- Degree to which modification, tailoring, extensions, or enhancements to COTS products is planned
  - Dependence of the system design on these modifications
  - Decision factors that indicate modification is necessary
- Agency that is performing the modifications; relationship to the project's decision authority
- Expected complexity of modifications
  - Basis for estimate on cost, schedule, and complexity of modifications
- Sustainment of modifications across future product releases

12 System Integration

12.1 Planning for system integration

- Overall planning
  - Resources (budget, schedule, personnel) to perform integration
  - Basis of the resource allocation
- Plans for accommodating COTS product releases during integration
- Fallback plans (e.g., late product releases, integration difficulties; unanticipated impact on other system components, etc.)

12.2 Integration approach

- Integration techniques (e.g., scripts, common database), technologies (e.g., CORBA), and specific products (e.g., Orbix) to be used
- Rationale for using these techniques, technologies, or products

12.3 Experience with integrating COTS products

- Previous projects by Contractor in which integration of COTS products had comparable importance; Lead Engineer's role in these projects
- Specific COTS products that were integrated
  - Methods and technologies used

12.4 Integration with external systems

- Integration plans involving other systems (whether legacy or in development)
  - Quality of information about these systems (e.g., design documents)
  - Experience with interfaces to these systems
  - Authority over the interface to these systems
  - Extent to which external systems will be available (e.g., for inspection, analysis, trial integration, etc.)

12.5 Development or modification of external systems

- {If an external system with which the system must integrate is still under development:} Development organization and its relationships to the system's decision authority
  - Basis for expectation that this system will meet its schedule
- Modifications needed to external systems that interface (directly or indirectly) with the system

  - Organization responsible for modifications; its relationship to the project decision authority
  - Estimated amount of effort required for these modifications
  - Basis for this estimate

12.6 Legacy data conversion

- Conversion of legacy data
  - Organization responsible for the effort; relationship to the project decision authority
  - Expected complexity of the conversion effort
  - Resources (budget, schedule, personnel) allocated to perform data conversion
  - Basis of this resource allocation
- Automated support for data conversion

13 System Testing

13.1 Planning for system testing

- Overall planning (of all testing: unit, acceptance, other)
  - Resources (budget, schedule, personnel) to perform testing
  - Basis of this resource allocation
- Plans for accommodating COTS product release schedules
- Organization that will perform testing
- Organization(s) that will perform IV&V; its relationship to the test organization

13.2 Testing approach

- Testing strategy (e.g., exhaustive, selective) to be used
- Rationale for using this testing strategy
- Degree to which system testing will mimic actual system use (e.g., data size, long transactions, multiple instances, load factors, etc.)

13.3 Experience testing COTS-based systems

- Previous projects by Contractor in which testing of COTS-based systems had comparable importance; Lead Engineer's role in these projects
- Specific products used in those systems

13.4 Test environment

- Present state of the testing environment
- Basis for definition of test environment
- Differences between the test environment and the deployment environment e.g., hardware

14 Fielding

14.1 Planning for fielding

- Overall planning
  - Resources allocated for fielding the system
  - Basis of the resource allocation
- Fielding schedule in terms of sequence, order, and priority
- Rationale for the fielding schedule decisions
- Organization with fielding responsibility
- Planning for COTS product releases during fielding

14.2 Fielding approach

- Operational locations of distributed system components; organization(s) responsible for managing the deployed environment at these locations
- Basis for estimates on resources needed to install site-specific versions
- Anticipated variations in usage patterns for different instances of the system

14.3 Operational environment

- Environment into which the system will be fielded
  - Hardware needed
  - Communication bandwidth needed
  - Software consistency (e.g., versions of products, operating system, etc.)
  - Personnel available to staff the environment

15 Maintenance & Sustainment

15.1 Planning for system maintenance

- Overall planning
  - Resources (budget, schedule, personnel) for system maintenance
  - Basis of the resource allocation
- Plans for harmonizing COTS product release schedules with system upgrade schedules

15.2 System maintenance organization

- Organization that will perform maintenance
  - {If multiple maintenance organizations will exist} Breakdown of individual maintenance responsibilities
- Contract status of the expected maintenance organization(s)
- Degree of organization's contribution to design or development activities
- Experience of that organization in maintaining COTS-based systems

15.3 Maintenance environment

- Infrastructure (e.g., middleware, engineering environment) expected to be needed to perform system maintenance
- Extent to which the maintenance environment will be able to model all deployed configurations
- Degree to which the maintenance environment will duplicate the operational environment of the system (e.g., data size, transactions, volume, loading factors, etc.)

15.4 Maintenance of multiple system configurations

- Number of different configurations to be maintained
- Different configurations involving different versions of COTS products
- Mechanisms available for tracking product releases, versions, updates, skews, etc
- Basis of resource estimates for managing multiple product versions