Definition of a COTS Software Component Acquisition Process Framework: The Case of a Telecommunications Company

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Introduction

- Automation, electronics and telecommunication industries as software buyers:
  - Integration of self-developed, subcontracted and COTS software components is an option for buyers.
  - Example: telecommunication equipment developer:
    • Industry structure changing, the role of software increasing
    • Own product-line based CBSE process already established
    • In-house development + subcontracting + COTS buying.
  - Problems:
    • No support from CBSE for COTS software buying
    • Software not bought by the purchasing organization.
Software acquisition goals

- How to organize software buying, in practice?
  - Where to find software component suppliers?
  - How to manage purchasing of the components?
  - How to integrate external and in-house software?, etc.

- Case study performed by the authors:
  - Development of a CSCA process framework:
    - From screening of potential software component suppliers to ending the reuse of some components – a holistic view
    - Initial harmonization with the company’s CBSE process.
  - Focus on COTS rather than MOTS or OSS software components – the case company’s strategic choice.
Driver: industrial change

Context: three software sources

![Diagram showing software development sources]

Figure 1. The case company’s software acquisition alternatives.
Software acquisition basics

http://www.sei.cmu.edu/arm/acq.home.html
Several models for software acquisition exist
  - Reference models - preferred purchasing procedures:
    • IEEE Recommended Practice for Software Acquisition
    • IT Purchasing Guidebook for Small Enterprises, etc.
  - Improvement of the capability of software acquisition:
    • SA-CMM, BOOTSTRAP Acquisition Process, SPICE, etc.
  - Scope of the models varies, no explicit COTS focus.
  - Our view: the 2nd maturity level vs. the IEEE model.
  - Table 1: ideal COTS software acquisition process.
Structure of an ideal view

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<th>Process Models</th>
<th>Maturity Models</th>
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<td><strong>Planning Phase</strong></td>
<td>Software acquisition planning</td>
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<td>- Identify the needs</td>
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<td>- Specify the</td>
<td>Requirements development and management</td>
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<td>- Prepare the RFP</td>
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<td><strong>Contracting Phase</strong></td>
<td>Solicitation</td>
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<td>- Identify suppliers</td>
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<td>- Select two to three best</td>
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<tr>
<td>- Select the best supplier</td>
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<td><strong>Delivery / Use Phase</strong></td>
<td>Contract tracking and oversight</td>
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<td>- Sign the contract</td>
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<td>- Use and maintain the</td>
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<td>- Monitor the supplier after</td>
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<td>- End of use</td>
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Example: SA - CMM

![SA-CMM Key Process Areas](http://www.sei.cmu.edu/arm-SA-CMM.html)
Other sources of information:
DOD Acquisition Deskbook?
Other sources of information: solutions from suppliers?

Address: http://www.compaq.de/service/customer/swacquisition/

Compaq Software Acquisition Service

Other sources of information: related research?
Other sources of information: professional services?

http://www.verbatimreporters.com/meetings/teletraining/realtime/softwarea.html

NCRA's TeleTraining Series

Realtime Software Acquisition
Tuesday, August 21, 2001

8:30-10 p.m. Eastern • 7:30-9 p.m. Central • 6:30-8 p.m. Mountain • 5:30-7 p.m. Pacific • 2:30-4 p.m. Hawaiian

During this seminar, you will gain the knowledge necessary to:

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COTS software acquisition concerns in the case company

- Interviews of some 20 experts of the case company, plus two potential supplier companies.
- Several brainstorming sessions were held.
- Recurring themes in interviews included:
  - Benefits/pitfalls of the use of COTS components?
  - Contracting and COTS supplier ”control” procedures?
  - Cost and reliability of COTS components?
  - Availability of useful up-to-date market information?
  - Availability and scale of use of components?
Identified challenges

- **Contracting and negotiation:**
  - In-house purchasing expertise, importance of the case company as a purchaser, time needed for negotiations, legal aspects, mutual responsibilities, maintenance, bug fixes, pricing and payment strategies.

- **Evaluation of components and suppliers:**
  - Technical component evaluation criteria, business related criteria (future of the supplier; its ownership relations, financial status and links to competitors), cost-benefit analysis of components, own roles and resources needed for component acquisition.
... challenges

- **Management of components and suppliers:**
  - Management of the purchased component’s life cycle (including new releases, corrections, etc.), ending of the use of some component, internal sharing of information regarding components and potential suppliers, finding ways to influence suppliers and the future development of the acquired components, limitation of the number of suppliers but still ensuring second sources, identifications of component needs early enough, criteria for replacing some component.
Key acquisition roles

- All responsible parties involved in the acquisition process would need to be clearly identified!
- At least three different roles to be addressed:
  - someone would need to carry out the process, in practice - this would most likely be a person from the project that needs some specific component;
  - someone should be responsible for guiding the project personnel during the acquisition - for example, a team of specialized software subcontracting managers; and
  - someone must take care of the continuous improvement of the software acquisition process – for example, the company’s software quality team.
Illustration of the process

- A four-phased process framework for COTS software component acquisition and management (CSCA) was defined, Figure 2:
  - the actual process model was documented, too, using the company’s process description principles; plus training material, document templates, checklists, etc.

- Initial harmonization with the CBSE model:
  - use of cross-references in task descriptions
  - definition of COTS-related responsibilities in the CBSE process.
... the process

Figure 2. COTS software component acquisition framework.
... the process

- The CSCA process revolves around the underlying customer value creating principles:
  - “COTS Software Component Acquisition and Management Processes”
  - The outer circle of the framework includes processes through which value is created for the purchaser.
- Phases derived from the ideal acquisition model form the centre of the framework:
... the process

Figure 3. CSCA process areas and base practices.
... the process

- Each of the four process areas is composed of base practices that describe the phases and issues of the areas in more details.
- The process areas do not form any successively ordered phases (cf. the ideal software acquisition process schema, but rather of parallel and overlapping process activities:
  - Many process activities would need to be conducted continuously and concurrently.
Evaluation

- The CSCA process framework was evaluated in one project that aimed at reusing as many external software components as possible:
  - Several kinds of software components were intended to be bought, ranging from system software to application frameworks and middleware solutions.
- The project was in the middle of the “The Acquisition Process” phase wrt. the framework:
  - Comparison of the project’s COTS software component acquisition process with the CSCA framework (document analysis and interviews).
Findings

- Definition of a product strategy would be needed as a starting point for the CSCA process.
- Criteria for preferred COTS software components and acceptable risk levels should be made explicit.
- Even more detailed definition of the roles and responsibilities would be needed, involving especially legal and business expertise.
- The persons involved in the process should be explicitly named (roles are not enough).
Findings ...

- *Owners* of software components and supplier relationships *should be appointed*.

- *Determination of the costs of COTS software components* would concretize value creation:
  - Pricing of internal and subcontracted software development is, in comparison, very straightforward.

- *The supplier relationship continuum* should be more carefully investigated – what kind of relationship to create and how to maintain it:
  - Market place vs. strategic partnership?
Marketplace - example

Strategic partnership - example

Marketing

Alliance Manager

Qualifications:

An upbeat, positive attitude; a "take the hill" mentality with World class communications (oral and written) skills, product, project or program management skills, relevant client/server and implementation experience, large account management experience. You will need the ability to think strategically and long-term, rather than tactically and short-term and an understanding of how a consulting firm operates. Maturity and credibility in dealing with our partner executives must be perceived. You will be responsible for business planning and for making a compelling case for investment/ROI. 3C Software is looking for someone to help us better focus and leverage our alliance potential with key/strategic consulting and software partners. We're looking for an exceptional team player to participate as a key member of the business unit's management.

http://www.3csoftware.com/careersMarket.html
References


IEEE Std 106, 1998 Edition. The Institute of Electrical and Electronics Engineers. USA.

Time’s up - thanks!

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