Software Reuse: Customer vs. Contractor Point-Counterpoint

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Abstract

Software reuse promises significant benefits to the software engineering profession, and is therefore an avowed goal of both organizations that contract for software ("customers") and those that develop it ("contractors"). Customer and contractor organizations are actively pursuing reuse programs, researching the technology and establishing libraries of reusable assets.

There are many technical challenges in achieving software reuse, but there are perhaps even more non-technical challenges. Software reuse will require fundamental changes in business and contractual practices, organizational procedures, and the day-to-day activities of software engineers. Organizations naturally resist change; overcoming this resistance is a major consideration in moving toward an increased practice of reuse.

Many of the non-technical issues related to reuse deal with the customer/contractor relationship. Reuse raises issues about financial incentives, software ownership, responsibility and liability, etc. that must be addressed in software development contracts. It also requires modifications to the software development process that must be recognized in program management procedures. A successful reuse program cannot be established without customer/contractor cooperation.

Unfortunately, such cooperation can be difficult to achieve. The customer and contractor necessarily have different perspectives and concerns in software contracting, and the contractual and program management processes are the formal mechanisms for managing these differences. There is a tendency for each "side" to view the other as an adversary, or an impediment in achieving its own goals. In particular, this conflict in viewpoints can appear when considering software reuse. Contractors believe the customer does not understand their concerns about reuse costs, risks, and liabilities; customers believe contractors do not support their goal of reducing software costs through reuse.

In fact, customers and contractors share the goal of reducing software cost and improving quality
through reuse. Their differing perspectives, however, can obscure this basic agreement. To understand, and eventually to resolve, these differences, it is important that each side understand and appreciate the other's perspective. This paper seeks to further this understanding by examining some of these differences in perspective and suggesting common ground.

Common Goals, Different Perspectives
Software reuse is widely recognized as a key way to reduce software costs and improve software quality. Both customers and contractors are motivated by these benefits. Customers are clearly motivated to reduce costs -- to be able to obtain the best product available at the least possible expenditure of corporate or taxpayer money. As representatives of the end users, they are also vitally interested in quality.

It is less widely believed that contractors are motivated by cost reduction and quality. Cynical observers sometimes argue that contractors are opposed to cost-saving measures because they will make less money, and that there is not a financial incentive for the contractor to take an undue interest in quality. However, usual contracting systems create ample incentives for both cost reduction and quality. Contractors who can perform cost effectively can bid more competitively, thus increasing win percentage, and can achieve greater profit on development efforts. Contractors known to produce high-quality software have a distinct advantage in bidding on future programs. The incentives for reuse are there; the problem is to remove conflicting disincentives -- concerns about hidden costs, risk, and loss of competitive advantage.

A key understanding behind this problem is that customers and contractors have fundamentally different views of what "reuse" really means. The customer is primarily interested in getting more than one contractor to share software. The contractor, on the other hand, is primarily interested in reusing his own software for multiple customers. Both of these desires conflict with some of the standard practices in the customer/contractor relationship, and both threaten some of the accepted practices of the other side. The contractor is not eager to use other companies' software unless he can be guaranteed someone else (usually the customer) will absorb the risk of its failure. He is usually even less eager to allow other contractors to have his software, as this is perceived as giving up a competitive advantage. The customer, on the other hand, often questions the use of the contractor's existing software on his system. He gives up the opportunity to monitor its development, to have it built to his standards, to hold the exclusive right to its use, and perhaps to obtain the detailed documentation he wants. He may also fear having to compromise his system's functionality in order to conform to the existing software.

These are non-trivial issues -- important to the parties involved and sometimes difficult to resolve. However, they are clearly fundamental to achieving a significant practice of software reuse. They are not unsolvable problems, but they involve changes to accepted and institutionalized practice.

Reuse Opportunities
In considering the dimensions of software reuse, it is important to identify the kinds of assets that...