Managing Software Reuse, A Comprehensive Guide to Strategically Reengineering the Organization for Reusable Components. Wayne C. Lim. Prentice Hall PTR

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Asset (or workproduct, or component). Assets are the products or byproducts of the software development process. They include both tangible (e.g., code, design, algorithms, test plans, and documentation) and intangible (e.g., knowledge and methodologies) elements.

Reuse. Reuse is the use of existing assets in the development of other software with the goal of improvoving productivity, quality, and other factors (e.g., usability).

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As we discussed earlier, software reuse consisits of more than just code and includes any information that may be needed in the course of developing or monitoring a system. joes describes ten types of assets which may be reused:

Architectures, source ode, data, designs, documentation, estimates, human interfaces, plans, requirements, test cases.

In addition to the above, intelectual capital, such as knowledge and expertise of personnel, may also be reused.

From a software survey of 29 organizations, Frakes and Fox [5] determined the percentage of life cycle assets created by organization and consisting of reusable parts.

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Improved software quality is achieved because the assets have been tested and subjected to multiple users. Productivity increases when reuse requires less input for the same or greated level of output. Time-to-market is shortened when reuse occcurs along the critical path of the development project. When assets are reused among multiple applications, consistent funcionality, e.g., graphical user interfaces, may be achieved. The risk of cost and schedule overruns is reduced when the functionality is already available in the form of easy-to-utilize reusable assets. The availability of reusable assets allow for prototyping and early validation of user requirements. Finally, reuse enables the leveraging of technical skills and knowledge, capturing this expertise in reusable assets, which may be used by less experienced or specialized personnel.

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Experience has shown that sucessful reuse involves more than simply creating a repository, having engineers deposit assets, and hoping that other engineers will reuse those assets. A reuse support infrastructure is also essential. This infrastructure should define a process for reuse.

In the simplest form, the process of reuse consists of four major activities, (managing the reuse infrastructure, producing reusable assets, brokering reusable assets and consuming reusable assets.

These activivies involve three categories of participants. Producers create assets with the specific goal of reusability. Brokers acts as intermediaries, providing a repository support for reusable assets. Consumers use reusable assets to produce software products and/or additional reusable assets.

Brokering reusable assets aids the reuse effort by qualifying or certifying, configuring, maintaning and promoting reusable assets. It also involves classifiying and retrieving assets in the reuse library.

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A reuse repository library is the mechanism to store reusable assets. Libraries range from simple repositories to more elaborate libraries wich provide tiered informatino display schemes (progressively more detailed information is provided at each level), metric collection, and aids to support the consumer in locating a desired reusable asset. Such aidas range from a simple keyword in context mechanism toa taxonomy specifically created for a particular domain.

1. Libraries are less important in organizations where there is a low personnel turnover rate. Information regarding the availability and functionality of reusable assets is generally available from the producers or even the consumers of the assets. Low turnover rates may partiually explain how Japanese companies are able to successfully utilize simple descriptions of their reusable assets.
2. Libraries are less important in organizations which rely more heavily on generative methods. Although generative methods may entail the use of a repository, the selection, adaption, and integration of reusable assets are largely automated and require little or no human intervention.
3. Representation techniques are less important where there is only a small set of reusable assets because searching is relately easy. Frakes informally defines a representation as ~something athat stands for something else~and notes that representations are craeted because some operations may be moer easily perofrmed ont hem than on the items being represented. Large collections are beginning to emerge/ for example, IBM’s library contains more that 1200 components. These large libraries will require more emphasis on representatino techniques.