The IBM Reuse Program

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Abstract

This paper briefly describes IBM's reuse program. It covers the support structure put in place to facilitate integration of reuse into the development process, the areas of focus, and results to date.

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1 Introduction

Software reuse is not new, as a matter of fact, it's been practiced in one way or another by every programmer in every company. What is new in software reuse is the recognition that it must be planned for and properly controlled in order to achieve the promised results of improved quality and productivity.

The IBM reuse program aims at institutionalizing reuse across IBM by integrating mature reuse technologies and processes into IBM's culture. This paper discusses what is being done to accomplish this, how it is being done, and the results to date.

2 The Corporate Reuse Council

The Corporate Reuse Council (CRC) is made up of representatives from every line of business within IBM as well as most major sites. The CRC has gone through several iterations since it was created in 1986. In 1989, it was made up of approximately ten members, all interested in making reuse successful. It was at this time that the CRC realized that it needed to make information about reuse available to the software development community at large. The CRC developed a "Reuse Starter Kit" that grouped together information on reuse from the general literature as well as providing guidance on specific issues within IBM.

The next step taken by the CRC was to develop a strategy to guide the reuse effort and to have this strategy accepted and funded by management. The strategy was put in place and a structure developed to implement it. Three goals were identified:

1. Integration of mature reuse technology and processes into IBM's culture:
   - Process
   - Education
   - Standards
   - Measurements
   - Tools
   - Parts
2. . Significant increases in productivity (delivered product per unit of effort) and quality through the application of reuse technology, resulting in reduced product development cycle.
3. Recognized leadership in reuse technology application.

Along with the goals, success indicators were identified and the Reuse Technology Support Center was formed to implement the strategy.

3 The Reuse Technology Support Center

The Reuse Technology Support Center (RTSC) is responsible for implementing the CRC's reuse strategy. It is an organization made up of experts from throughout the corporation addressing specific issues related to software reuse. Among these are:

- Process and technology
- Tools
- Parts
- Education
- Standards and guidelines
- Legal and data rights issues
- Measurements
- Information reuse
- Marketing opportunities

Each of these areas is key to the success of reuse, however, the critical ingredient is continuous management commitment.

Along with this central organization, each site puts in place a "champion" with specific reuse responsibilities. It is this "distributed" organization that actually implements and supports the reuse effort. Some of these items are discussed below.

3.1 Process and Technology

The RTSC coordinates the effort of the "champions". It is these champions who actually drive reuse into the development process at the site. There is no specific "process" for reuse, there is only a need to focus on reuse during the standard development cycle.

The champions typically establish a support structure at the site that makes reuse the path of least resistance for programmers. This structure is usually made up of the following ingredients: [1]

- The champion
- A site-wide and project specific reuse libraries
- A review board to approve candidates for these libraries
- Project reuse leaders with specific reuse responsibilities within their project
- Installation of "corporate" domain independent reuse libraries

The champion is also responsible for coordinating education, ensuring installation of required tools, and establishing appropriate standards for the libraries.

3.2 Tools

Although reuse can easily be done without tools, the need for a tool that allows sharing reusable software is a benefit. Within IBM, a tool exists that allows sharing libraries across sites. This tool provides a faceted taxonomy for classifying the reusable parts.

The corporate libraries are available to all via this tool and individual sites are encouraged to make their site libraries available to others via the tool. The idea here is to capture the expertise available at each site via the reusable software library and make it available to others who may need that expertise. Currently, the libraries are primarily code and related supporting information but several sites are moving toward other reusable resources.

3.3 Parts

As mentioned above, parts are available from several sources:

- Corporate libraries provided by funded "parts centers".
- Sites that build libraries for their domain.
- Projects that build libraries for an even narrower domain.

These parts are all shared via the tool described above. Standard "quality" definitions exist that all parts must adhere to. There are three levels defined: "as-is", "complete", and "certified". The major difference among the three levels is the amount of information provided and, most importantly, the level of support offered for the parts. All corporate libraries are "certified" which implies complete documentation and stringent support agreements.

3.4 Education

Education is a critical issue in software reuse. Programmers have been in school for a long period of time, always taught not to reuse. It doesn't come out as clearly as that, it is more along the lines of being punished for using someone else's work! The type of education that is required has to focus on several audiences:

Managers need to be educated on costs of reuse and expectations.

Programmers need to be educated on how to write reusable software, how to change their existing "process" to maximize reuse, how to exploit specific languages for reuse, etc.

Facilitators that is the champions, project reuse leaders, etc., need to be educated on how to overcome inhibitors, how to identify reusable software, how to identify reuse opportunities, etc.

Courses are currently available or under development to address these topics and audiences.

3.5 Standards and Guidelines

There are many different types of standards and guidelines required to make reuse successful. Some have already been mentioned, e.g., quality definitions. The RTSC is addressing this item by developing standards and guidelines that address a wide range of topics, including:

- Classification of components
- Quality standards
- Development guidelines
- Testing Considerations
- Measurements

3.6 Measurements

Measurements is another topic being addressed by the RTSC. The need for ways to measure reuse and its impact on quality and productivity is well known. The group addressing measurements is moving toward establishing a common set of definitions and metrics to be used throughout IBM. Along with this effort, tool requirements to automate data gathering and analysis are also being developed. The first suggested metric is called the Full Utility Ratio [1] which gives credit for reusing others software as well as making your software reusable.

3.7 Information Reuse

An additional item being investigated by the RTSC is "information reuse", i.e., not code. The RTSC is looking at reuse of documentation, designs, tests, plans, graphics, etc..

4 Conclusion

To date, there are close to thirty sites involved, at different levels of success. They are involved in both reusing parts from "corporate" libraries as well as building their own libraries and sharing them with other sites. One such site, Myers Corners Laboratory, has shown tremendous results in a short period of time. [1]

The CRC meets on a regular basis, typically twice a year. During the meetings, specific topics are covered and inhibitors to further progress are identified. The RTSC is charged with overcoming these inhibitors and ensuring the continued progress toward achieving the CRC's goals.

References

[1] Jesus R. Tirso. Establishing a software reuse support structure. In *Proceedings of the IEEE International Conference on Communications*, June 1991.

5 About the Author

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