

OpenQuasar

Development of Open Source Components

With The Aid of Quasar

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Abstract: Quasar (Quality Software Architecture) is the name of a reference architecture developed by sd&m for use in building business information systems. Based on this architecture, sd&m research developers reusable technical software components. These are available as open source components (OpenQuasar), which have already been successfully proven in numerous projects. Open source components are developed in a similar way as software products. This has to be taken into account in the project processes, e.g. the release process, and in the project organization. To take care, that the use of OpenQuasar is successful, a support team, independent from the development offers the knowledge on the optimal use of the components to interested project groups.

1 Introduction

A prerequisite for reliable and efficient development of high-quality software solutions is a good software architecture. At sd&m, we have packed our knowledge of software architecture for business information systems into the Quasar (Quality Software Architecture, [DS00], [Sie00], [Sie01]) reference architecture. The main Quasar concepts include component creation and the separation of functionality from technology. Due to this strict separation of the functional and technical aspects, Quasar forms the ideal basis for the development of reusable technical components irrespective of the customers and their processes. Use of these components makes projects proceed faster and more reliably, and projects can also be designed to be more economical right from the start.

2 OpenQuasar

2.1 The idea behind OpenQuasar

The use of non-commercial software has become widespread, even in the development of business-critical applications. Open source software is used at sd&m in many projects, sometimes as a development tool and sometimes as component of the software delivered to the customer. The use and development of freely available software in open source projects has also become an important factor in the field of industrial software development.

In 2002, components have been developed for a technical framework in close cooperation with the customer. In order to let the customer benefit from future developments for free, sd&m was asked to make the components open source. Driven by this request and to show that Quasar was not only theory, sd&m started the initiative OpenQuasar. The concepts as well as the components were given to the open source community. The first component was the *QuasarPersistence*, others will follow at the end of 2004.

2.2 Quasar as the basis for reusable components

First of all, Quasar is a *concept*. Quasar is the *standard architecture at sd&m*. Quasar formulates universally applicable rules and templates for information systems for tasks such as dividing up areas of authority and interface programming, and for thinking in terms of components. Quasar then applies these principles to specific architectural aspects such as persistence and the user interfaces. Quasar is also executable *software*, though. Quasar is a *set of software components* that can serve as a sound basis for projects. These components are designed according to the Quasar principles and implement the architectural concept in the real world. They are not a framework, at least not in the conventional, monolithic sense. The components are designed independently and can be used separately from each other. The components only access the services they depend on through interfaces, without making any assumptions about how the interfaces are implemented. In this fashion, they become building blocks you can use to build Java frameworks covering all aspects of a client/server architecture, from the database to the GUI. The Quasar components are especially easy to integrate together since they are all based on a set of common ideas (e.g. the universal use of models), but they are also open to interoperation with other components.

3 The development process of OpenQuasar components

3.1 Project Organization

The internal organization for the development of open source components at sd&m

differs only slightly from that of an individual project. In customer projects, we develop one-off, functional components. The senior designer ensures that the component fulfills the functional and technical design requirements and that the resulting components are Quasar-compliant.

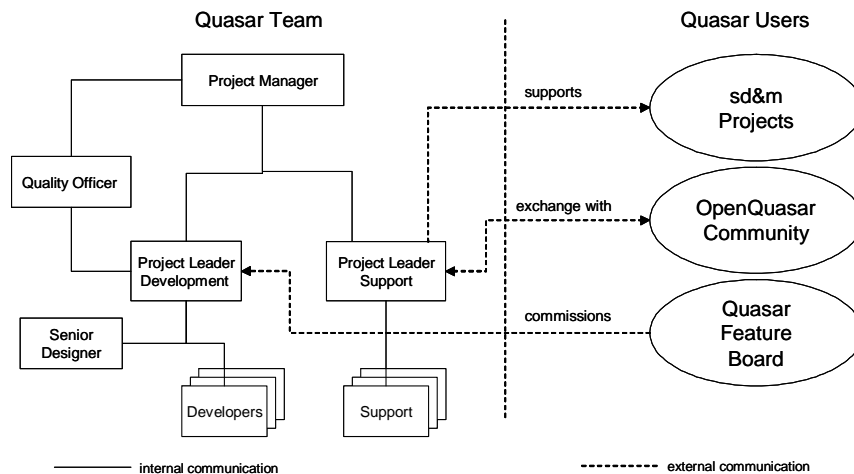


Figure 1: Project organization and paths of communication

The application is developed individually for the customer and is the ideal solution for this customer only. Reusable components, however, need to be ready-made for many customers, most of which are yet unknown. When developing such components, we ensure that additional quality and compatibility requirements with respect to separate releases are met and that modifications are possible during the project to implement customizations. To meet these requirements, a support team and a release process specially developed for product development was added to the project organization. In the release process, an independent committee, the Quasar Feature Board (QFB), regularly checks whether the extensions (features) required in the projects have taken into account the demands of the market and the open source community during implementation.

The project organization was chosen specially so that the experience gathered and constantly refined at sd&m in customer projects in terms of organization, procedure model and execution also have an influence on the development of open source components. However, there is one thing that should be taken into account: support and development must be completely independent from each another. In the past, project support was also provided by the developers due to their knowledge of how the components are related internally. The projects placed more and more demands on the developers and as a result the further development of the components according to the release plan fell behind schedule. It becomes more difficult to make reliable statements about planning and development. A change of the components in different projects could not be consolidated and as a consequence the risk increased that their quality decreased more and more.

3.2 The Quasar Feature Board (QFB)

The QFB was established to ensure that components were developed in accordance with requirements and to make sure that our project organization has direct contact with a customer. Members of the QFB are Senior Designer of sd&m, who are experienced in this area. They act as an advocate for the projects and represent the interests of sd&m and the OpenQuasar community. The QFB tasks Development with refining and expanding components and approves new releases of these components. Over time, all extensions are collected from the various input channels and presented to the QFB. The QFB evaluates the desired extensions and commissions the team of developers with implementing the extension(s) selected. A "mentor" is assigned to the project leader as a customer contact during the implementation phase. Once implementation is complete, the mentor approves the release according to a predefined procedure. Once the release is finished and approved, then it is made available to the projects and the open source community.

3.3 The OpenQuasar Community

The members of the OpenQuasar Community are component-users outside sd&m. The components and their source-codes are ready to be downloaded from the internet. Via e-mail and bugzilla [Bug00], they can send errors and change-requests, as well as amended source-code to the support team of sd&m. The QFB takes care about the implementation of the suggestions for improvement in the planning of the next release. Additionally, the support team is in direct contact with the OpenQuasar Community, to exchange their experience right away.

3.4 Component Development

The current Quasar components were developed in specific customer projects. The customers in these cases signed a contract granting permission to release the components as open source components. This formed the foundation for our open source activities. Subsequent development work was performed by a development team at sd&m Research. Open source tools such as CVS, Eclipse, Bugzilla and Ant are used to develop the software. We use open source class libraries like JUnit, log4j, Xalan, Xerces and wingS in the components. The component team consists of sd&m members and they develop on demand of the QFB. The exclusion of the public in developing is necessary to hold up the high quality standard of sd&m software.

3.5 Component Support

Expertise in using the components is one of the main factors in their successful deployment. Our experience has shown that components used without the necessary expertise may be used incorrectly in projects, which leads to unnecessary problems. This is why a separate support team was created to complement the development team. The job of the support team is to help the acquisition and project teams to decide on an

architecture with respect to how these components are used. It provides support to the project teams during installation, configuration and utilization of technical components, and represents the first level of support (hotline) for problems arising when the components are used. The support team is also a contact for the open source community, acting as a repository of knowledge and passing ideas, critique and suggestions for improvement on to the QFB. The project leader of the support team informs others on the various open source sites in the Internet about the current status of development and other activities planned.

4 Conclusion

Open source components must meet stringent requirements in terms of their reusability. In this respect, the components from sd&m profit from Quasar as the reference architecture for business information systems. The architectural knowledge gained from custom software projects at sd&m, in which many thousands of man-years of work were invested, is packed into this architecture. Quasar has been published and is therefore available to the entire computer software community.

An additional factor in the successful use of technical open source components is expertise in use (external view) and, if necessary, the expertise required to adapt the components (internal view) for projects. In order to cover both aspects, a special project organization was set up at sd&m that develops components in the same manner as for customer projects. The strict division between development and support also ensures that the team of developers works quickly and according to the project plan, and that experienced employees can be used in projects as initiators and to transfer knowledge through the support team. Recent large projects at sd&m have proven that success is achieved when the components are used according to these guidelines.

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