

# Software system architecture for corporate user support

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**Abstract.** In this article, several existing ready-to-use solutions for the HelpDesk are reviewed. Advantages and disadvantages of these systems are identified. Architecture of software solution for a corporate user support system is presented in a form of the use case, state, and component diagrams described by using a unified modeling language (UML).

## 1. Introduction

A technical support system (HelpDesk or Service Desk) is an information system allowing for quick and efficient solving the questions regarding the work of information systems and applications, organizing effective interaction between specialists and users, updating status of solving the problem, and providing information on the responsible personnel and on the execution times of the queries. Technical support systems provide: a united point of access to the Service Desk; templated approach for allocation of tasks to specialists; control over the flow of execution of assigned works and over the resources spent; assignment of priorities to queries depending on their type, particular user, or other circumstances; accumulation and analysis of queries/incidents and their solutions; storage of the knowledge base of previously processed requests; reports on the time and resources expenses spent for completion of queries [1].

Service Desk consists of a module for registration of queries and incidents, queries database, a system for tracking a query status and notification, a knowledge base, an administration panel, and a report module [2].

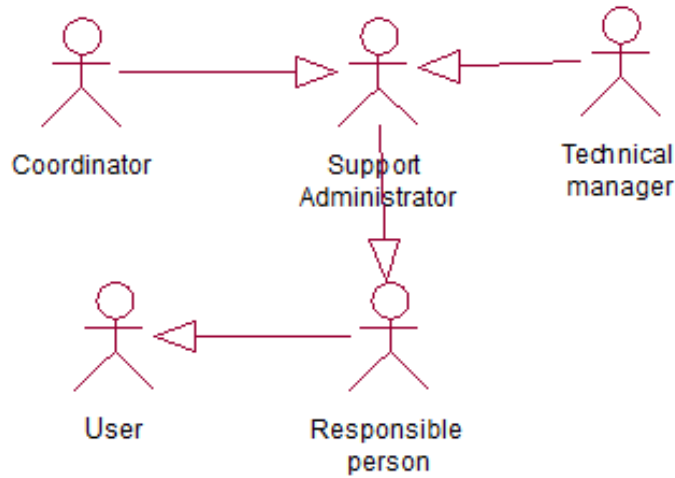
On the market of software products, there are many systems of technical support, for example, Kayako Resolve, Bitrix, Cerberus HelpDesk, etc.

Despite all advantages of the systems described above, a decision is often made to develop one's own systems of the user technical support. Series of causes contribute to this. The key factor among these causes is high labour efforts for integration of these systems into the corporate portal. In any corporate portal, an access to all applications is implemented by means of the Single Sign On (SSO) technology. SSO is a technology where a user passes an authentication procedure for various systems and business services, included in the portal, only once, namely, at the moment of a sign in to the portal [3].

## 2. Software complex architecture

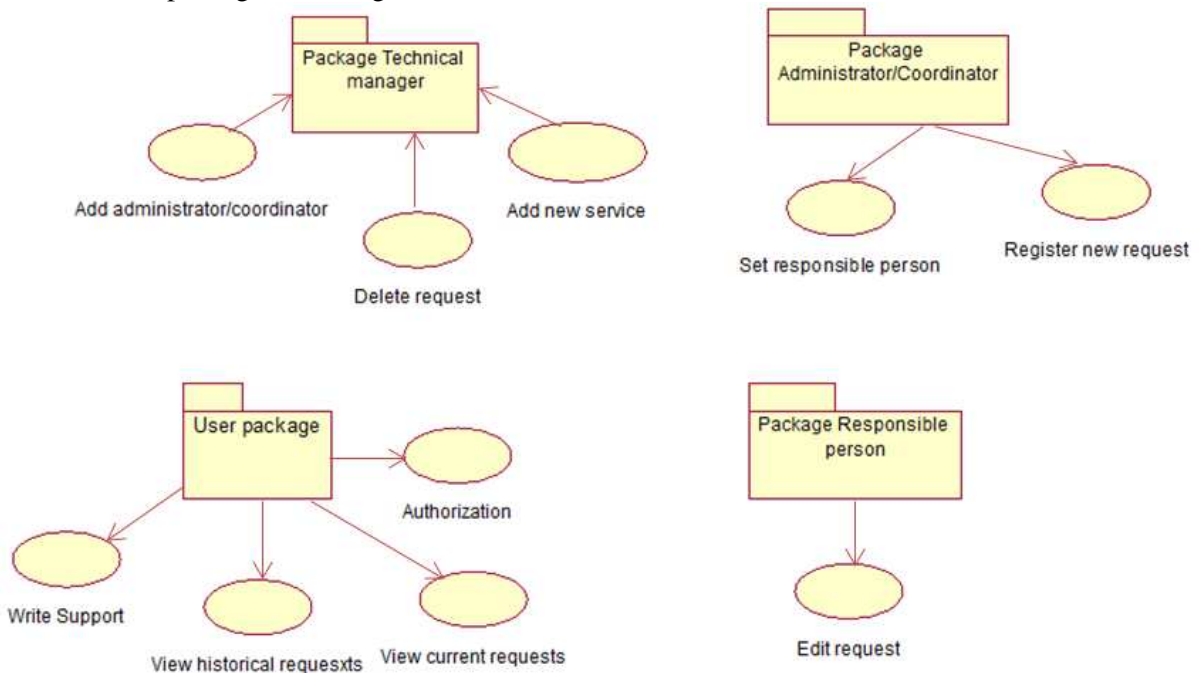
Let us consider the architecture which may be used for implementation of a corporate user Service Desk. Figure 1 presents the UML diagram for system actors [4].





**Figure 1.** The actors of the system.

Figure 2 presents the diagram of functional capabilities of the system where every use case belongs to an immediate package according to the role of the user [5].



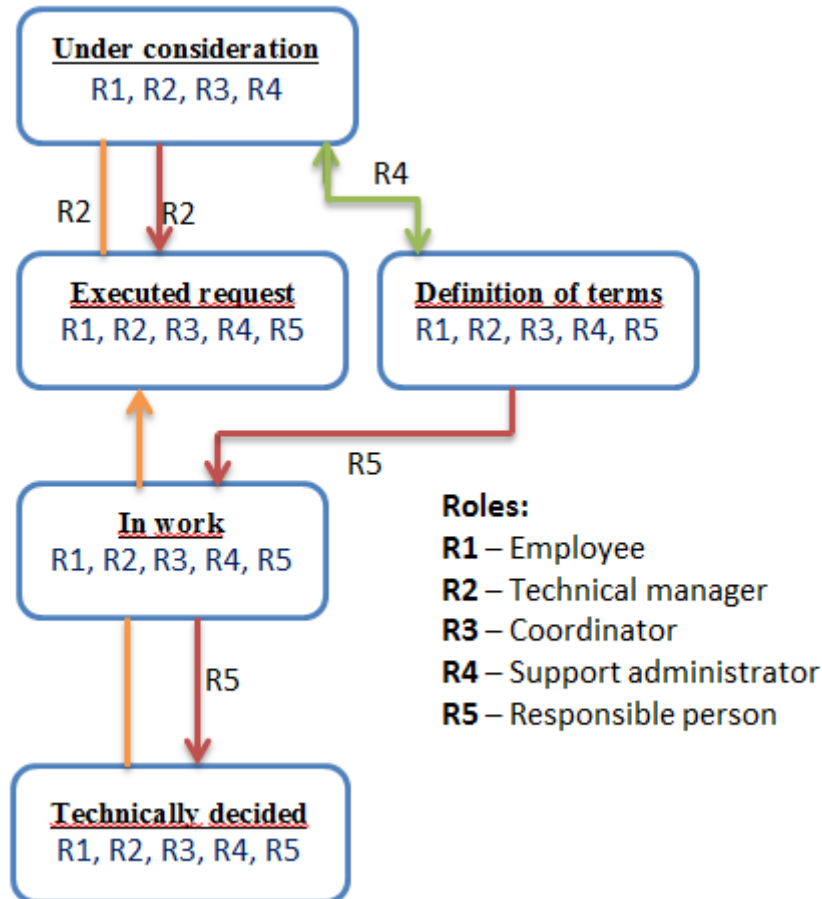
**Figure 2.** The bundles of application features.

In the system that has been developed, there are five user roles each of which executes certain functions. The actors of the system:

- User: an employee who has an access to the functions of “User Package”.
- Responsible for Executing: this role has an access to the functionality of “User Package” and “Responsible-for-Executing Package”.
- Service Desk Administrator: this role has an access to the functionality of “User Package”, “Responsible-for-Executing Package”, and “Administrator/Coordinator Package”. Administrator is responsible for all activities supported by the Service Desk.
- Coordinator: this role is identical to the role of Service Desk Administrator except Coordinator is responsible only for one specific activity of the Service Desk.

- **Technical Manager:** this role has an access to the functionality of “User Package”, “Responsible-for-Executing Package”, “Administrator/Coordinator Package”, and “Technical Manager Package” [6].

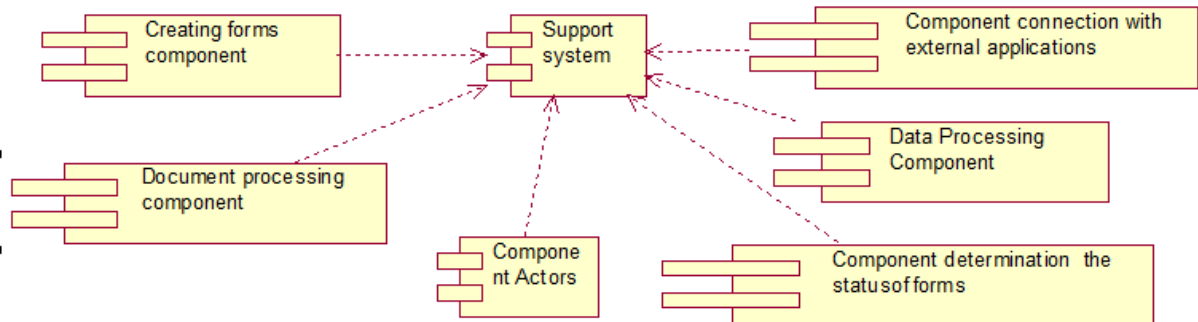
Figure 3 shows the query states diagram. The diagram demonstrates the potential states of a query subject. It also shows the role of a user responsible for a transition from one state to another [7].



**Figure 3.** The diagram of query states.

Initially, the status “Under Consideration” is assigned to the request. As soon as the request has been submitted, Administrator or Coordinator of Service Desk registers it and assigns time for completion and responsible for executing. After that, the status “In Progress” is assigned to the request. If Responsible for Executing has solved the task, then he (or she) gives notice that the request has been “technically completed” and the status “Request Completed” is assigned to the query [8].

Figure 4 presents the system component diagram. The diagram demonstrates major application components.



**Figure 4.** The component diagram.

As an example, let us consider the relationships between the component diagram and the use case diagram [9]. Component of roles implements all features of the application associated with the system actors as well as the capability of adding new user roles, statuses, and privileges.

Component of creating the forms allows for a creation of new and for a change of the already-existing forms in the application.

Component of detecting the status of forms implements the changes in the statuses described above by using the state diagram.

Component of document processing facilitates working with the files attached to queries by users.

Component of communicating with third-party applications provides a direct link from any application to the user support system.

A system built based on this architecture does not require high labour efforts for an upgrade and maintenance which is its key advantage.

An access to the Service Desk is implemented by using a personal account of an employee or by a direct link to the application [10].

### 3. Conclusion

In a framework of this article, the systems such as Kayako Resolve, Bitrix, and Cerberus HelpDesk have been analyzed. The analysis suggested that implementation of these systems would be problematic for using them as a part of a corporate portal. Based on these considerations, we have made a decision favoring the development of own architecture for user technical support system. Description is presented in the form of the UML models, namely: the use case, state, and component diagrams. Based on this architecture, it is possible to develop the information system for corporate user support in any organization.

### References

- [1] *System help desk. OFT group.* (Electronic Materials) - <http://www.oftcomp.ru/automation-of-business/shd/>
- [2] *Helpdesk System (Service Desk). ITSM online URL.* (Electronic Materials) - <http://www.itsmonline.ru/helpdesk/>
- [3] *Enterprise portals. Part 1: Determination of the Web-portal, enterprise portal, CMS / WCM and their purpose. Existing standards for the Portlet API. The main producers of portals.* (Electronic Materials) - <http://habrahabr.ru/post/125568/>
- [4] Booch G, Rumbaugh J, Jacobson I 2007 *The Unified Modeling Language User Guide.* Addison-Wesley. 496
- [5] Souza A J, Cavalcanti A L 2016 *Visual language for Use Case Description. Software practice and experience.* **46** 1239-1261
- [6] Wiegers K, Beatty J 2013 *Software Requirements (3rd Edition).* Microsoft Press. 405
- [7] Lindgren E 2016 *Raising the odds of success: the current state of experimentation in product development. Information and Software Technology.* **82** 80-91

- [8] Fernández-Sáeza A M, Generoa M, Chaudronb M, Caivanoc D, Ramosd I 2015 *Are Forward Designed or Reverse-Engineered UML diagrams more helpful for code maintenance?: A family of experiments. Information and Software Technology.* **57** 644-663
- [9] Génovaa G, Llorensb J, Fragab A, 2014 *Metamodeling generalization and other directed relationships in UML. Information and Software Technology.* **56** 718-726
- [10] Farréa C, Queraltb A, Rulla G, Tenientea E, Urpía T 2013 *Automated reasoning on UML conceptual schemas with derived information and queries. Information and Software Technology.* **55** 1529-1550