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Application of an Object-Oriented Metasystem in University Information System Development

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EXECUTIVE SUMMARY

This case presents experience from design and implementation of a university information system at the Brno University of Technology. The newly built system is expected to provide the students and staff with better tools for communication within the university's independent faculties, departments, and central administration. An object-oriented metasystem approach was used by the IT department to describe the services offered by the university information system and to generate needed program code for run-time operation of the system. This approach so far produced good results over the period of two years when the pilot project started, nevertheless there are some shortcomings that still have to be resolved.

BACKGROUND

This case comes from a large and very old organization. The organization was established by a decree of Kaiser Franz Joseph I in 1899, and, since then, it has grown to be the third largest state owned organization of its kind in the Czech lands. Currently with almost 2,000 employees and around 15,000 full-time students, the Brno University of Technology is institution of higher education with eight independent faculties: Faculty of Civil Engineering, Mechanical Engineering, Electrical Engineering and Communication, Architecture,

Business and Management, Fine Arts, Chemistry, and Information Technology-Offered degrees range from bachelor's to master's to PhD's and MBA's.

During their rise, information technologies found increasingly their place in some parts of the school. Some computers were used for research in various departments, some found their place at the central accounting and personnel department. The Internet took the school by storm and the more IT oriented departments slowly started offering some content on the Web. Development of some department level or faculty level information systems started. These systems have been used either by the staff to report research and teaching activities or by students to obtain the class requirements. Apart from the central economic agenda, faculties started attempts to use software to organize the student agenda. Further, the university has been slowly forced to provide electronic reports to the Ministry of Education in order to get desired annual funding.

There was growing need to organize the information systems into one compound information system or into a set of flexibly communicating systems. As opposed to other universities in the area, where faculties are very tightly centrally controlled, the faculties at this university are very independent and the central control is low. Regarding information systems, this might be an advantage for the stronger and more technical faculties, since they have enough strength to bring up their own systems that meet their needs. Nonetheless, the smaller faculties become more dependent on the centrally-offered information technologies. Therefore, the decision to centralize or decentralize IT could not be made, and it is probable that both need to be supported at once.

So who is the one to work on solving these issues? Of course, there is a central IT department that for many years dealt with these issues and took care of the unquestionably central agendas and computer networks. The IT department is placed right under the school's top management, though it has no power to force the faculties to make any particular decisions about their IT. The IT department is there purely to offer services both to the central administration and the diverse faculties.

SETTING THE STAGE

A few years ago in 1999, the university found itself in a situation that "just something had to be done with the university information systems". The amount of paperwork reporting had been increasing and the general acceptance of information technologies, as something available to do something about, grew. Three of the eight faculties managed to develop their own Web-based systems for their staff and students, and were able to provide electronic reports to the central administration. Student agenda was behind, since it was all paperwork, and, at the same time, some data were entered into the faculty instances of student agenda software, which, in turn, did not provide much output to anyone, especially not the students. This was a good time to think about the issues of centrality vs. decentrality of the future solution for the university information system.

There were several players. The IT department, the one expected to do something about it, was the major player. The other players formed during the time. A Committee for University Information System was formed on the "right below top" management level and was the one to make the IT department to act. Later, in order to get individual faculties involved more closely, system integrators were established at individual faculties. These integrators then started meeting with the IT department at regular meetings. Thus, the cooperation was initiated with enough room for debate.

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