

HISinOne - Development and Early Adoption Partnerships

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1. EXECUTIVE SUMMARY

The project **HISinOne** is aimed at the creation of an integrated management system "from universities for universities". This includes all processes of the "student life cycle" and the management of human/financial resources (ERP). In this contribution we will present the partnership arrangements, current practical results and some lessons learned.

The coordination of the community and core development is done by HIS. There are designated "**development and early adoption partners**" with a number of tasks. They provide input in terms of business processes and requirements, organize preproduction/production operation for implemented parts and subsystems and give reliable feedback. Another task is the implementation of components for the overall solution.

The first "development and early adoption partners" and their respective specific contributions illustrate these points:

- **Humboldt University Berlin**: process designs, ideas for identity management
- **University of Duisburg-Essen**: migration scenario from previous HIS systems, student mobility and federation scenarios ("Ruhrallianz")
- **University of Mannheim**: management of identities, structures and building facilities, migration scenario from other systems

A number of additional partnership arrangements are in existence. Another variety is called "**competence partners**", where the emphasis is on input and feedback in certain fields of competence (e.g. study rule sets, performance monitoring).

Important components of HISinOne have been implemented already. This includes the portal module with universal SSO, management of identities, and core components for the student life cycle (application ... alumni). Migration support from previous HIS systems is carried out on the basis of test cases close to reality, i.e. using anonymized databases of small and large universities. A set of quality criteria and conventions ensures, that the whole system is dependable and maintainable.

One of the "**lessons learned**" is the significance of a modern, but solid and very well documented technological basis (J2EE with open source components JSF, Spring, Hibernate ...). The requirements in terms of project planning (milestones, deliverables ...) are more challenging than for non-distributed projects. An infrastructure for communication and "project knowledge management" is important. A (managed) wiki, an issue tracer, a solution repository (everything with secure remote access) proved as absolutely essential. Nevertheless a certain amount of face-to-face communication in working situations is still very helpful.

2. Background

Many universities especially in Germany experience dynamic changes, they start to deal with new management structures, define business processes (and their change) and set more strict rules for the individual student. Many of these activities are externally induced, the funding bodies and the (now) paying students demand more quality and efficiency (both difficult to measure) and a shorter duration of studies. This should be combined with a traditionally very high flexibility, individual plans for each student, many optional offers to choose from. On the other side many universities experience shrinking budgets, at least for administrative staff, but more things to manage and organize.

Often "the solution" to these challenges is seen in well defined and organized processes with good IT support. This calls for the flexibility of software tailored to the individual needs (or to historical processes) of the university. On the other side the low operating and maintenance costs of standardized solutions are attractive and desirable.

In this area of tension HIS (Hochschul Informations System GmbH) is acting as a nonprofit provider of IT solutions, consulting and expertise for universities and decision makers in the field. Current HIS solutions combine domain specific rich clients (finances, human resources, admission, students, examinations ...) with a unified web application, which caters for students, teaching and administrative staff.

In 2006 a roadmap to a new generation **HISinOne** was established. The new generation, as the name suggests, will have closer enterprise wide integration and a strong orientation towards standardized reference processes. It includes all processes of the "student life cycle" and the management of human/financial resources (ERP).

There is no obligation for German universities, to use these solutions, but despite of this over 70% of the German universities use HIS solutions. The main reasons being positive community effects from a large and open community, minimal vendor lock-in, open design, open interfaces and community open source (no formal open source licence, but source and all documentation is available to community).

3. Development model

A development process similar to successful open source projects is used. While open source is gaining acceptance and momentum in many areas, there are some pitfalls of open source development models. Open source is not a guarantee of success, there are probably more "not so successful" projects than the well published success stories.

Lead developers may loose interest or become unavailable otherwise. Forks (development in different directions with no common code base) are sometimes "melting away" a community. Few big projects afford an development plan with fixed release dates, an example being Ubuntu with usable releases every 6 month. This example also shows the importance of a stable core team equipped with infrastructure and quality management.

Learning from these experiences the coordination of the community and core development is done by HIS. There are designated "development and early adoption partners" with a number of tasks:

- provide input in terms of business processes and requirements
- organize preproduction/production operation for parts and subsystems
- give reliable feedback for various aspects (operation, usability ...)
- implement components of the overall solution.

The development model (Fig. 1) contains established phases and activities with feedback iterations providing the desired agility.

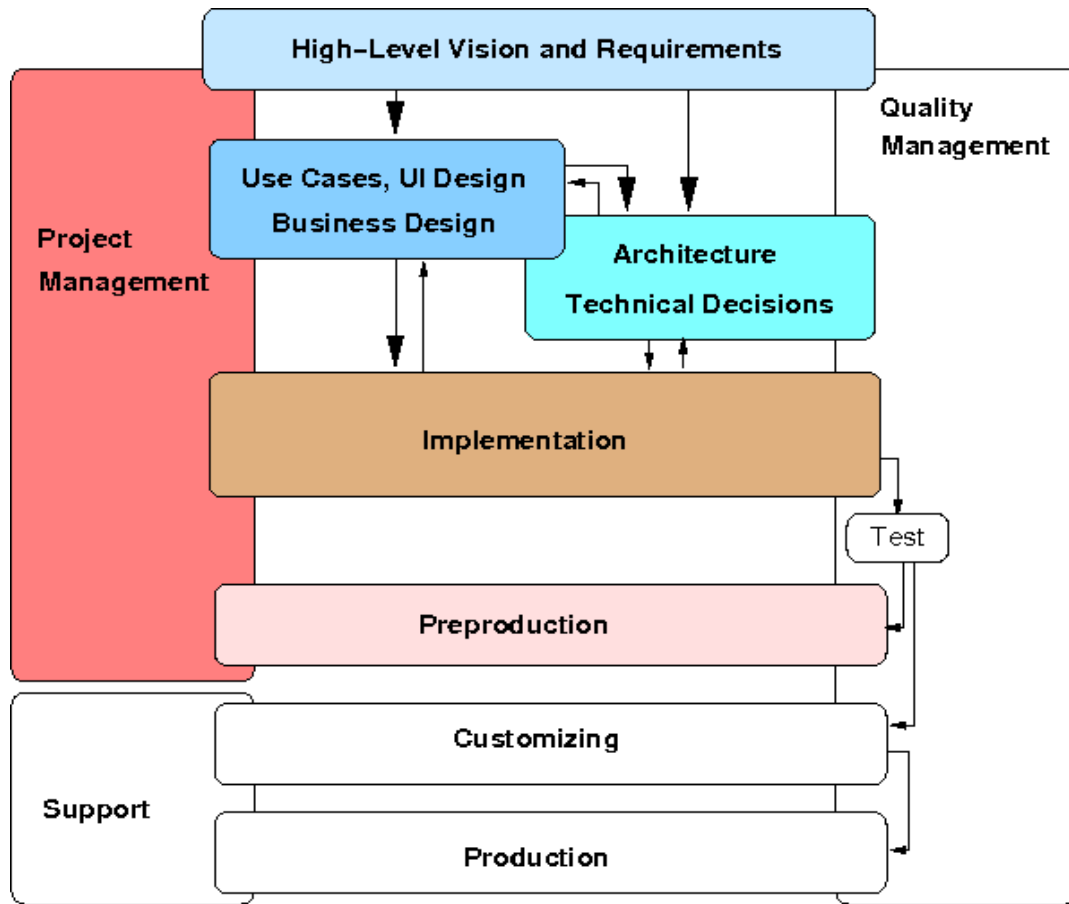


Figure 1: Development model

4. Partnerships constructs

Current "**development and early adoption partners**" include the Humboldt University Berlin, Universities of Duisburg-Essen, Freiburg, Karlsruhe, Mannheim, University of applied sciences Flensburg and a Consortium of higher education institutions in Arts and Music.

The partnership agreements set the general framework, responsible working contacts on each side, rules for using the project infrastructure and obligation to honor an agreed upon set of regulation and rules. The partners agree on the usage of the development infrastructure (described below). Working plans are established with steps, milestones, budgets (mostly in the form of person-month). These plans are regular updated depending on work progress. At the beginning of a partnership a joined workshop is conducted. It includes a "guided tour" of the project. This workshop should communicate the current state, the "rules" section, but most important the "culture" of the project.

Each partner devotes a certain amount of development capacity to the project. Typically these are not "person years" for anything, but specific knowledge and environments as well as good knowledge of local requirements.

Since early 2008 pre-releases of HISinOne are distributed. The current "Head" of the development branch is also accessible to the development partners. Why do we distribute these pre-releases (at the current stage) only to selected development partners? A fairly elaborate and complex enterprise system makes "unsupported" experimentation not as viable as with software of narrower focus. There is personal involvement of members of the (HIS) core team in each of these partnerships, which naturally limits the number of such partners (otherwise the development would slow down too much).

There is one important exception to this rule. The current production version of the HIS web system already contains the **migration preparation** component of HISinOne since October 2007. This production system comes in one new version every year and releases approximately every three month. The migration preparation component checks, if the databases are in a "healthy" state ready for data migration to HISinOne. This is useful, because HISinOne will set some more precise conditions for data constellations and provide new mechanisms for local extensions. The universities have enough time for planning and executing the necessary activities to ensure the required data quality.

Another form of partnership is designated as "**competence partners HISinOne**". This should cater for universities, which have special competencies to be included in the project, but won't do pilot installations right now.

In the next sections three of the "development and early adoption partners" and their respective specific contributions should illustrate these points.

Humboldt University Berlin

The Humboldt University is working towards a swift implementation of the new system to gain efficient support for the ongoing reforms. The participation of the Humboldt University Berlin in HISinOne has the following emphases:

- Definition of reference processes for application and admission, examinations and grading, general student administration (fees, certifications ..). This includes analysis of current processes, generalizations and process changes/optimizations
- stepwise test installations and test usage, starting with application and admission
- stepwise inclusion in production operation (as a replacement of current HIS applications)
- Consolidation of the identity management concepts with those of HISinOne
- Interfaces and relationship to other systems (learning management Moodle, content management Plone ...)
- qualification programs for local staff

Other areas of collaboration include design, testing, internationalization and migration support.

University of Duisburg-Essen

The „**University Alliance Metropolis Ruhr**“ (UAMR) was founded by the rectors of the three universities Duisburg-Essen, Bochum and Dortmund, on March 12th 2007. The purpose of the Ruhr Alliance is to cooperate in order to develop joint key capabilities in research and teaching and to strengthen the profiles and performance of the three partners. Two of the key aspects in the profile of the University of Duisburg-Essen in this context are mobility and campus management systems.

Roaming users of one university are able to access the academic network not only in their own institution but in any of the universities or research institutes participating in the network without any additional log-in. For the UAMR roaming is being introduced on the basis of the roaming services of DFN (Deutsches Forschungsnetz/German Research Network)¹. First of all, it will make possible joint use of the local WLAN infrastructures of the three universities concerned. Furthermore, public workplaces, such as those in the libraries equipped with wired access for notebooks are supplied with a similar authorisation procedure to open their usage to members of the partner universities, too. Consolidated local identities possible with HISinOne will form a solid basis for such a service.

The University of Duisburg-Essen is committed to play an important part in a new **Competence Centre Campus Management HISinOne** to develop and implement jointly technologies for managing the student life cycle and to open perspectives for further

¹ <http://www.dfn.de/>

development of campus management systems. Specifically, it is intended to concentrate competences in the area of Service Oriented Architecture (SOA) to pursue their interconnections with other services such as identity management, e-learning platforms and portals. Access to digital services has to be provided by an integrated portal.

The **Study Portal portal.uni-due.de** at the University of Duisburg-Essen is based on the open source product Liferay. In the process of developing the portal to the specific needs of the university, a number of extensions have been implemented in the current HIS campus management system LSF/POS as well. For example, when entering a new course in LSF, it is now possible to create automatically also a course room in Moodle, a workspace in BSCW (Basic Support for Cooperative Work) or a digital “reserved reading” space. Students signing on to a course get automatically access to these virtual course rooms at the same time. LSF also produces automatically a class schedule for each student showing the courses for which he/she signed on.

From this it becomes evident that in principle HISinOne can also take on the functions of a study portal. However, this requires the same degree of flexibility offered by Liferay in terms of interface design and its ability to integrate portlets, so that additional applications such as library accounts, job market, cafeteria menus etc. can be made accessible from the portal.

University of Mannheim

One important prerequisite for providing IT services in the area of higher education is to initially identify all individuals residing on the campus with the need to access at least one service. At first glance, it was considered to classify users into only two groups, namely *students* and *employees*, to keep the workflow simple and to reduce the substantial effort required for managing users and groups. However, it quickly turned out that dividing users into only two groups is highly unrealistic and consequently, a third group *guests* or *others* has to be established. However, due to the increasing cooperations within other scientific, educational, and public organizations and the emerging ability to provide different services also to external members, the creation of many other user-groups with different privileges had been necessary in the recent years.

The successive structural changes have led to the development of more and more systems and system add-ons. Today, the university's IT staff has to maintain and synchronize over fifteen heterogeneous and distributed databases containing different possible combinations of personal data including a particular set of permissions and privileges, structures and building facilities, e.g. to manage mailing lists, smart card readers in restricted areas, or to provide access to the library system.

One central issue concerning redundant data is inconsistency among different databases, like varying names or different data types for the same attributes. A further problem arises, if someone's status or role changes, e.g. a previous student accepts a job at the university, or even worse, a staff member starts to study.

To improve the current situation the University of Mannheim has decided to consolidate the various databases in cooperation with HIS by implementing the integrated management system HISinOne. As an important part of HISinOne, the central component for “personalized services and directories” offers a unique identity management.

The University of Mannheim participates in testing and possibly extending core functionality of this component. Another task is the definition and implementation of the consolidation processes to and from the various existing applications.

5. Project status

Important components of HISinOne have been implemented already. This includes the portal module with universal SSO, integration of SOA support components and core components for the student life cycle (admission ... alumni).

Migration support from previous HIS systems is an important concern. In many cases the migration from one enterprise system to another requires rather expensive special conversion routines or in some cases even new data acquisition (possibly from detailed reports of the "old" system). This would be rather expensive and/or very error prone. With the deep knowledge of the "old" and "new" data design the construction of an fully automated data migration was possible.

The practical migration is carried out on the basis of test cases close to reality, using anonymized databases of small and large universities. A set of quality criteria and conventions ensures, that the whole system is dependable and maintainable. Realistically the system migration will not always be only the press of a button. In reality new reference processes may be established, some "special" additions or omissions will cause a certain amount of additional work. The development and early access partners acquire and redistribute the experiences with this IT process change.

6. Lessons learned

One of the "lessons learned" is the significance of a modern, but solid and very well documented technological basis (J2EE with open source components JSF, Spring, Hibernate).

The requirements in terms of project planning (milestones, deliverables ...) are more challenging than for non-distributed projects. An infrastructure for communication and "project knowledge management" is important. A (managed) wiki, an issue tracer, a solution repository (everything with secure remote access) proved as absolutely essential. Nevertheless a certain amount of face-to-face communication in working situations is still very helpful.

Large development projects have to resist "feature creep". While we can't prevent changing requirements, the handling of these changes must proceed in a sensible manner and consider associated costs.

Diversification in respect of toolsets is another area of attention. While it may be valuable to introduce new and better tools over the lifetime of a new software generation, there must be an understanding about a common denominator and an active management of dependencies.

In Germany about 230 universities are using current HIS solutions with a wide spectrum of reference models and special configurations and adaptations. Some expressed concerns, that the development partners will steer the project in directions, which are optimal for these early adopters, but which will make it difficult to factor in other special needs and customs.

- select partners with "good standing" in the community, which have led to progressive solutions in the past
- engineer various customizing and extension points, so that even very "special" and unique requirements can be met. It should be understood that this will cause a higher maintenance cost than for installations close to the standard.
- open process ("open" as explained above)

To sum up, the HISinOne development is a good example of an "moderated" community process which contains many challenges, but is successfully "growing" an integrated management system "from universities for universities". For detailed information see <http://hisinone.de>.