

# How Prepare for Moving All Universities in the Country to the Next System Generation?

Gunnar Backelin <sup>1</sup>, Ulrika Ringeborn <sup>2</sup>

<sup>1</sup> Ladok Consortium, KTH/Ladokkonsortiet, SE-100 44 Stockholm, [gba@kth.se](mailto:gba@kth.se) <sup>2</sup> Ladok Consortium and Växjö University, Växjö Universitet/IT-strategi, SE-351 95 Växjö, [ulrika.ringeborn@vxu.se](mailto:ulrika.ringeborn@vxu.se)

## 1. EXECUTIVE SUMMARY

### 1.1. Ladok: full-grown - ready for makeover?

Since 15 years practically all Swedish universities join in a national consortium for a common system for administration of student affairs, Ladok - the obvious industry standard (98-99 % of the students). Steps of modernization have been taken: Client/server in the '90s, web services from 2000, open source solutions for operating system (Linux, 2007) and dbms (ongoing) etc.

However, the Consortium Board has decided we have now reached a point where it is adequate to start the process of lifting Ladok to its next generation. The paper deals with issues and challenges.

### 1.2. Why rebuild? Why now?

For technical reasons only, we could use the present system for many years still. This gives us time for reflection, requirement analysis and planning, without the stress of the knife to our throat.

We must identify the actual needs and expectations for next university generation, that motivate a costly change. Some imperative trends outside our control:

- Students are mobile to an extent we could not foresee, with huge expectations for systems service.
- Courses are offered by institutions in cooperation. Distance learning growing. Joint degrees coming.
- IT maturity in the university sector is growing, as is the awareness of what demands can be made.
- Ladok is increasingly used or urged to interact with many other, preferably local applications.
- Governmental ambitions for '24-hour-authority' and other external goals exercise evident stress.
- But above all: The financial situation for universities necessitates more efficient system support, registrars are now inclined to cooperate across institution boundaries more than before.

### 1.3. Starting points; issues and challenges to address

We realize we have to think bigger than, or beyond Ladok. It is *the universities' overall need* for system support and for locally optimized combinations that is the starting point for the analysis.

Ladok must be able to communicate effectively with other applications via standardized interfaces and generalized integration platforms. The international dimension is of crucial importance.

Any major supplier who deals with visions of next university generation must initially answer a heap of comprehensive questions that must be dealt with in the first phases, such as:

- Which are the trigger-factors that will *force* us to leave today's system solution and re-build?
- Which are our primary target groups - for designing and supplying functionality? - For interviews?
- How can we get hold of students' priorities and demands?
- Can we build a coherent system flexible enough: "One size fits all", or design for different sizes?
- We must decide where we should deliver Ladok functionality and where to participate as facilitator.
- Will it be possible to arrange the financing entirely on our own?

### 1.4. Procedure and invitation

Two parallel feasibility studies 2008: *One* handles future scenarios, demands, business process analyses, and *one* the risks with today's technique - and the options that arise with new techniques.

The Ladok consortium is facing one of its most extensive remodelling processes ever, maybe 4-6 years in all. The paper ends up in an invitation to cooperation with similar partners abroad.

## 2. LADOK IN A HISTORIC PERSPECTIVE

This is a paper that focuses on not what we have done, but what we *intend to do* and what we believe lies ahead of us.

In Sweden, common solutions tend to be chosen rather than individual ones. Ladok is no exception.

The first version was initiated by a central governmental authority in the '70s. Thereafter the concept has spread gradually. Thus Ladok has become the obvious industry standard in student administration for Swedish universities. A deep insight that it is time-effective and cost-effective to make efforts - e.g. in systems development - together and coordinated, made this the right way to go.

The concept of one common system is eased also by the fact that Swedish HE has always been surrounded by a very uniform set of rules. Even more so in the '70s - '80s, but from 1993 on Swedish universities have a more independent position. Still, they continued to cooperate on Ladok. Soon universities took over the responsibility for the system and since 15 years practically all Swedish universities join in a national consortium for a common system for administration of student affairs to meet legal demands and local needs for administration, follow-up, degrees and student service. Today the same system is used for 98-99 % of Swedish students in the 1st-3rd cycles.

Through the years Ladok and the model has done its job; universities in association have been able to shape more or less the system they wanted. And the consortium has always been able to deliver, on time, the adaptations called upon when government demands have changed, with new legislation often on short notice.

The primary target groups have changed slightly over time: University-central administration, department staff, students, planning officers etc. And, historically, the system has grown in an organic way, with the functionality at each time regarded as the highest prioritized needs. Therefore, the total shape of the system appears a bit non-uniform, showing the layers laid by history. As a starting point for the client-server generation of Ladok, a thorough demand survey was taken on - but that was 12-15 years ago.

Steps have of course been taken to modernize the technical system: Client/server for the expert user interface in the '90s, web services from 2000, open source solutions for operating system (Linux, 2007) and dbms (ongoing) etc. The oldest parts of the system, based on Cobol, have now been totally replaced.

## 3. WHY RIGHT NOW?

For technical reasons only, we could use the present system product for many years still; we see no immediate threat to solutions for the production system. This gives us time for reflection, requirement analysis and planning - without the stress of the knife to our throat. And we know for sure: High-quality change *takes* time.

But, to have time is not reason enough to take on a major system makeover.

Surely, the database structure has become increasingly complex. This and other complexity due to more and more dependencies and conditions to take into account is in itself an obstacle for effective further development, testing, and system change. Surely the tool for handling - develop and run - the expert user application has an approaching best-before-date. And surely the Ladok product family of today doesn't feel optimally composed.

But: To get the 'Go!' from our owners we must identify their actual needs and expectations for next university generation, that motivate a costly change.

### 3.1. External changes affect us

What are the foremost imperative trends, outside our control, to affect the use of student administrative systems? Let's list some of them:

- Students are today mobile to an extent we could not foresee when initially designing the system. That is so both between Swedish universities and on an international basis - exchange students as well as free movers. The Bologna process will open up much more student mobility still.

- Students have huge expectations for service from our systems. And they do *not* care at all about our administrative borders and restrictions! This is consistent with their general attitude to all use of system services – public and other web services, communications etc.
- Universities now start to see students as co-actors – but they on their side do not always act the way we anticipate, not really the way our systems are designed.
- An increasing number of study programs are offered by two or more institutions in cooperation, where the constituent courses can move between institutions over time. And distance learning can take many different shapes.
- Joint degrees will come!
- IT maturity in the university sector is growing as is the awareness of what demands can be made.
- We have noticed since many years how the excessive anxiety about personal data integrity has diminished substantially; it is more OK today for a student to have his/her student records distributed as long as it is in his/her best interest – restrictions in this sense were much heavier before.

### 3.2. Implications for the process map

All this will bring about big needs for new functionality, reason enough to consider a rebuilding of our systems.

When we regard a not-too deep process map of universities' long-term rather stable core business processes, we can see that Ladok covers only parts of the coherent process chain, describing pretty much the student's path through HE valley.

We would of course want to be able to link the sub-processes together in a more holistic way. Please note: This does *not* mean that Ladok could or should cover all this by itself! *But* give the proper contributions to a coherent chain. The first step will be to identify boundaries, check-points and points of handover between processes.

Furthermore, we interact to various extents with many more applications than ever! The institution's systems geography has changed for good: pre- and post-systems that use or affect Ladok data, parallel systems as well as systems belonging to superior authorities with the power to demand information from us etc.

This brings along obvious risks for definitions that slide apart, mistakes in data selection, interpretation mistakes etc.

And we see that we do not handle communication between applications in as smart and flexible ways as we would like. Many of our frequent connections to partners in HE admission, statistics, student aid etc are specially designed and have to be maintained individually. A general integration platform is badly needed! (The first steps down that road have already been taken, though.)

### 3.3. Driving forces for change in universities

So, the need for universities to handle more systems in cooperation is urgent. The same goes for demands from new user categories: economists and planning officers, assessment staff, education developers, providers of services to students etc.

Ongoing change in the use of multiple administrative systems indicates that we approach procedures where users regularly work simultaneously with several applications, interacting seamlessly on one screen.

Governmental ambitions for '24-hour-authority', goals set up that by 2010 Sweden should have the simplest and most automated public administration in the world and so on is a strong imperative to rationalization in HE institutions.

But, above all: The financial strains for universities necessitate more efficient system support. After some hard-earned experiences from trying to invent the wheel on its own money, a majority of registrars are now prepared to cooperate on system development projects in more cases than before.

### 3.4. On the threshold

Given the prerequisite that our member institutions want to retain Ladok as their critical system for student records for days to come - a long-term commitment - , the Consortium Board has decided we have now reached a point where it is adequate to start the process of lifting the Ladok system to its next generation.

Two parallel feasibility studies are carried out 2008: One that handles future scenarios, analysis of long-term local demands in broad brushstrokes, establishing of student panels, step 1 of a series of business process analyses as a base for next system architecture etc. The second applies a technical view and points out the risks we run by staying in today's technique as well as the options that arise by the adoption of new techniques and the potential of these techniques. It is important to point out that at this stage the technical study is *not* meant to be very dependent of the parallel business-oriented study.

The feasibility study is to identify and shed light on important crossroads and to give recommendations concerning choice of strategy.

After an affirmative major decision by the owners this November, the master plan in few words sketches out for 2009 extensive business process analysis, prioritizing and marking off the sub-processes to support, for 2010 further demand specification and establishing of use cases, along with technical architecture activities, and from 2011 on construction of the actual application modules.

## 4. ISSUES TO ADDRESS

### 4.1. Some initial questions arise

Any major supplier who deals with visions of next university generation must initially answer a heap of "seldom-questions", beginning with: What are the most important reasons to start this long project, a costly re-build of an in itself well-functioning system? How identify the imperative "trigger-factors" that force you to migrate from the present system solution? Should we do this because we must or because we want to do it? We must agree on this with our member institutions.

And: What will be the main target groups? Will 'expert users' still be around? Should the system assume responsibility for a wider range of a university's process map? Or rather go for more interaction and communication with other actors? Develop on one's own or together with an international partner? How take into account the wide range in size in universities?

This kind of comprehensive questions must be thoroughly penetrated and decided on in the first stages of the project - some of them are briefly indicated below.

What is equally important about the first stage is not to jump into choice of solutions; some interesting questions must wait. This calls for accurate planning.

### 4.2. Some starting-points

The directives to the project do not mention rebuild or modernizing of Ladok, but preparing for *the next system generation*. This is important. The mental picture of tomorrow that we want to encourage is not one of add-ons, mending or "translating" today's system into a new one, this would be sub-optimizing.

- On the contrary, we have agreed to think *bigger than or beyond Ladok*. It is the universities' *overall* need for system support that should be the starting point for the analysis, the conditions for the university to design its own, locally optimized, whole.

- It is not a matter of *if*, but *when* a new system generation is to be developed. (And, later on, *how*.)

- We state that cooperation, integration, communication and standardization are adequate keywords for the future. Ladok should be able to communicate effectively with other applications via standardized interfaces and generalized integration platforms.

- The international dimension must be of crucial importance for the next system generation. International standardization and integration will come off one step after it has happened on the national level - we are determined to prepare for this, and we are now entering standardization cooperation projects.

- Our hypothesis is that it is not an alternative to *buy* a system product, ready to use, that meet both our functional demands and our demands for influence on further development.
- Building on our own or in cooperation with a partner from the same category are both conceivable scenarios.
- As we have in mind a more modular system product, a combination of build and buy could well be our choice.
- Well-established techniques should be used, and open source-solutions whenever possible and cost-effective.

### 4.3. A number of special issues and challenges identified

Some comprehensive questions that must be dealt with in the first phases of the project - some of them in the feasibility study - deserve a brief comment, together with a hint of how we intend to handle them. - And again, we have just about started!

A minority of the questions is owned by the project's steering committee, but most of them must be decided by the Consortium board. That is, during the planning and design stages - the worked-out proposal must be submitted to the owners = the consortium members.

- We have touched the question of *identifying the trigger-factors* that will force us to leave today's system solution and re-build. This is to be taken care of in the initial technical study. There are in fact two parallel technique studies about to start: one carried out by our development department, starting from their collected experience, and one - with the same task - by an external consultant company, from an outside perspective.

- *Which are our primary target groups* - for designing and supplying functionality? - for interviews? According to the consortium's new strategy document, we shall focus on a) students, b) teachers and guidance officers, c) local administration (incl planners also) and d) national administration (national processes for admission, statistics, student aid and the ministry of Ed & R). Accordingly, representatives of these groups will be included in the interview plans of the feasibility study. You could add Visionaries - we intend to collect scenario descriptions from this category. And of course: They Who Sit on the Cash - interest from financiers (in this case: registrars. We have established a reference group of their kind) is crucial.

- It is not too easy to get hold of *students' priorities and demands*. To take the student collective in to be co-actors for real calls for a special sharpness of the ear - but universities tend to take this seriously. It should be as natural to let students themselves contribute with their input - address info, applications, course registration etc, as it is to let them order and print out certificates of different kinds. We intend to establish a student panel for direct, two-way communication during the project.

- One critical factor for success is *information* - inform constantly and over-explicitly, and see to it that information is reasonably rooted with the receivers. And as information-issuers we must be confident and decided that this is the right way to go. It takes some time to get used to a prospect you have never been exposed to before. - Information plans should be established from day one.

- A challenge that is not really new, but will gain renewed importance, is *the vast range in size* between the biggest university (about 50 000 students) and the smallest specialized institution (less than 500). We like to keep our cooperation model based on the principle of solidarity, built-in in the consortium concept. Everything available for everyone - but you pay in relation to your size.

- A related challenge is to be able to build *a coherent systems support flexible enough*: "One size fits all", *or* should we design for different sizes - S, M, L and XL? We guess that we must be open to supplementary models, where some /groups of/ universities walk a couple of steps ahead and join in the development of a special solution based on special demands. This must also include, of course, supplementary financial models. In fact, it will be important to be able to lodge even such models inside the overall concept, otherwise the national Ladok cooperation itself is put at risk in the long run.

This is very close to the challenge to handle the tension between institutions that are in a hurry, and others that are conservative or hesitant. To handle this, you must intensify the dialogue with every single system owner in order to preserve the substance of consortium democracy.

- The degree of imperialism in the consortium will *decide what we should deliver as Ladok functionality and where we should participate only as a peripheral part*. In the first step we will primarily use scenario techniques, seminars and interviews to establish how our member institutions and other interested parties want to use our systems support. Estimates of the future from key visionaries will be collected. This basic information will be used in a process of conclusion where we apply the recently decreed strategy document for the consortium.

In the next step extensive process work will be carried out. So, in process terms we describe, analyse and mark off relevant fields of HE institutions' activities. The intention is to *establish a primary field of responsibility, in which processes Ladok should deliver needed functionality*, and moreover identify processes, owned by others, where Ladok data is expected to be used and where connections to Ladok should be secured, one way or the other.

- The *interplay with the national system for admission* to HE - NyA - is of special immediate interest. We often refer to Ladok and NyA as "siblings" and they must interact smoothly on a daily basis. This is to a certain extent the case today, but co-planning and choice of solutions etc could improve. NyA is not owned and run by the consortium but of a public authority. For the next generation, interaction should be more seamless.

- We need to describe the implications of intensified national and international cooperation, not least technologically. In the strategy document we express a strong *need for well-defined and standardized - conceptual and technical - interfaces and connection resources*. We intend to take a more active part in existing cooperation projects to this effect, above all nationally but in the next step on an international basis.

- To be able to fully meet mobile students' demands *we need a certain change in legislation* - the right for universities to obtain student records from another university's Ladok register is very limited and for a number of reasons these conditions should be lifted.

- Considering the above questions and others the question *When?* arises. When should the whole new system be up and running? Is it important to follow a stiff time-table? Is it possible? Can we talk about a moment when we are finished?

We believe that we should build and replace module by module, a challenge in itself! The hypothesis is to start out 2011 and continue for 3-4 years. One could regard the ongoing expansion of web services as a first step along the Next Generation Road. And if we are commissioned to develop the national, Ladok-secured course description database this is certainly so, forming the next generation catalogue module.

In any case, it is essential - from a moral point of view - to practice openness and determine a master plan, to communicate it and to follow it up in full view.

- About the money: *Will it be possible to arrange the financing entirely on our own?* Consortium member institutions' contribution is little more than €10 annually per student, equal to one movie ticket; we are not in a position to accumulate any substantial funds. So, will our members accept more or less a moratorium in improvement of existing functionality for a number of years? This takes on some argumentative diplomacy.

Another, supplementary way is to seek government funding for selected parts of the development. We are working on this.

- Still another way to go is to *seek partnership or another form of cooperation with a partner in another country*. At this stage, we do not exclude any construction in this respect. We probably have most in common with our neighbours in the Nordic countries - we are growing a still informal discussion network with this direction -, but we are ready to consider other cooperation as well, certainly on single modules. In many respects it is easy to find resemblance enough for further discussion. A field of innovation that we follow with interest is attempts to create generic legislation-independent student administrative systems - like *Kuali Student* in USA and Canada. A difficult way to go, but maybe navigable.

Just imagine - a student portal, common for all Europe?! Maybe the obstacles are not quite as many as we tend to assume. Adoption of open source solutions should ease such development.

## 5. SO, THIS IS WHERE WE STAND

We end up with the statement that with a high degree of probability we shall start sharp preparations for what we refer to as the next generation of Swedish student administration systems. Thus, the Ladok consortium is probably facing one of its most extensive remodelling processes ever. It will take us maybe 4-6 years in all, but it is worthwhile, provided we find the right ways to interact with the world around. The system will most likely be bilingual (Sw and Eng).

The studies will also address the option of cooperation with other actors. - So, the presentation ends up in an invitation to those who experience a similar situation to enter a dialogue! Cooperation can take place on different levels:

- open discussions as you go
- collaboration on standardization and information exchange
- establishing of common process maps and/or conceptual descriptions and definitions
- sharing of cost with acquiring of common modules
- maybe even go into common projects - this would constitute a test of European generic development...

The least we could do is to share with each other experiences, expectations and plans.