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Kronodoc - From CERN Research Project to a Successful Company

Introduction

It was year 2008 and Rainer Puittinen had just become the Managing Director of Kronodoc, a ten-year-old Finnish software company that was originally spun off from CERN, the European Organization for Nuclear Research in Geneva, Switzerland. Rainer Puittinen had started working with a CERN project in 1995 as a technical summer student, and now, in 2008, the devotion to this project had led him to take charge and he was entrusted with the responsibility to run the company. The new MD Puittinen still found it uncomfortable to wear a suit but was nevertheless very proud of the company and himself. Much progress had happened and the biggest pitfalls been avoided, the company existed and made profit. The new MD saw the future bright. Amount of customers was increasing and the business model was being modified to suit the changing business environment.

The origin of the Kronodoc product was a research project at CERN, the world's largest particle physics laboratory. The story begun in 1995 from a project led by Ari-Pekka Hameri, now a professor at Lausanne University and Director of HIP (Helsinki Institute of Physics) Technology Program at CERN. Kronodoc then added to the stream of companies emerging from CERN, and became a successful spin-off. From the time when Kronodoc started, the knowledge transfer from CERN to industry has evolved considerably and steps have been taken to improve the spin-off processes. But regardless of the background processes, what remains the same to this day is the need for bright people. Spinning a company off is always dependent on visionary people that notice the chance and act upon it. The story about a research project at CERN becoming a successful company Kronodoc is a story about these visionary and active people.

How it all started

It was not at all software or business opportunities that were in the mind of professor Ari-Pekka Hameri when in 1995 he had the opportunity to visit CERN. Amazed by the surroundings, Hameri then had the idea to investigate how people communicate and how the engineers use the CERN invention World Wide Web. The complex, multinational, networked environment provided the perfect setting for business processes and workflow research, something that at that point was not so refined at CERN.

The CERN side was equally interested in building on the WWW research that was carried out there during the 80's and 90's. It was also partly luck that Hameri's excitement found the CERN counterpart. In the first meeting with Hameri and CERN, the senior member of the LHC technical coordination team Gerard Bachy was present. And Bachy was everything Hameri's research needed to go forward: Bachy got excited and so the support and back-up of this experienced staff member was secured.

The idea that Hameri and Bachy designed for the research evolved from quality process research to how everything could be furthered with the WWW. Finally they ended up with the idea of developing a comprehensive WWW software package to monitor the data communication between the thousands of computers around the world at the institutes participating in the LHC construction¹. And in spring 1995 the software development work was initiated under the heading *Tuovi*, an acronym for the Finnish translation of *product process visualization*.

LHC, the Large Hadron Collider, is the world's largest and most powerful particle accelerator, used by physicists to study the smallest known particles – the fundamental building blocks of all things. The LHC is contained in a circular tunnel with a circumference of 27 kilometers, where proton beams are accelerated to close to the speed of light and then collided. There are six distinct experiments along the LHC, characterized by their unique particle detector. The total cost of the LHC project is anticipated to be between €3.2 to €6.4 billion.

The research team continued their efforts, but soon found out that there were difficulties with their data not being formal or relevant, and originating from many different systems. But then, in 1996, CERN recognized the need for a CERN-wide Engineering Data Management System (EDMS). The concept was found important to the LHC project and thus an EDMS project was launched the same year. This was perfect for Hameri's research team who had been struggling with the non-formal data. The EDMS applied to the global CERN scale was hoped to make these problems disappear. However, in order to study the communication and workflow in the system they needed a web interface and in the commercial EDMS system there was no such software available. Web-interfaces did not exist and no outside supplier was willing to create one, for the "World Wide Web was not yet considered by the industrial world as a serious future technology in which resources had to be invested²". But the need for CERN and the LHC project was evident. So Hameri and his team set to create the interface themselves building on the development they had started in 1995.

¹ Hameri A.-P. 2000. Technology Transfer from Accelerator Laboratories. Proceedings of EPAC 2000 conference. Vienna, Austria. pp. 163-166.

² EDMS Report 1999

Background

Although the beginning of the Tuovi project and Hameri's team integrating to CERN looks today all smooth and easy at the organizational level, it was only painless because of the background functions working well. The structure and working methods of the Finns at CERN functioned extremely well. It had required lots of innovative policies to be one of the best working collaborations between a member country and CERN. According to Horst Wenninger, former Research-Technical Director of CERN, the Finnish approach and organization became the model for the other new member states such as Portugal, Czech Republic, Hungary, and even for Sweden.

But it was, in fact, only in 1991 that Finland actually became a member state of CERN. And CERN recommended Finland, a small country, to have only one organization to handle the research collaboration with them. As a consequence, Eero Byckling, who was Professor of Technical Physics at Helsinki University of Technology, created the concept of Helsinki Institute of Physics (HIP) that merged the three previous Helsinki-based institutes: SEFT, TFT, and HTI. A special law about the institute was passed by the Finnish Parliament in summer 1996 and Eero Byckling was invited to become the director of the institute. HIP was established as a national research institute governed by host universities and the institute implemented a goal-oriented management structure. It delegated considerable decision-making authority and independence, including an annual budget, to the leaders of the various programs and projects. Initially the new organization had four research programs: Theory, High Energy Physics, LHC and Technology³.

When HIP started operations at the beginning of 1997, Ari-Pekka Hameri had already initiated his research and was well established at CERN. Eero Byckling saw the importance of this work and Hameri was appointed as the director of the Technology Program. Overall, the newborn Technology Program was not typical for a physics institute. However, it was found useful and beneficial, not least to enhance the technological feedback to the member country. And on the practical level, the Technology Program gave the development activities of Hameri's team the stability and support it needed to accomplish concrete results.

Besides the newborn and unique Technology Program, also the working methods in HIP were advanced and taken seriously. The now commonly used model that the researchers can work in CERN but get funding from their origin country, was adopted by the Finns at an early stage. This promoted more and more researchers to come work in CERN. The fast reaction to changing the working methods was mainly thanks to the HIP Director Eero Byckling who was also visionary in other fronts: He, among other things, reached an agreement with the Research-Technical Director Horst Wenninger that both parties had rights to the further development and use of the software.

³ HIP Annual Report 1997

The TuoviWDM

Hameri's team was then all set to make the web-interface for the engineering data management system project. The first step was to integrate the Tuovi team with the EDMS team that was led by Thomas Pettersson. HIP's team in charge of the project, they created a version of the web interface that was adopted by several projects at CERN. There were many users for the TuoviWDM and it was developed according to the needs of these users in various CERN experiments. At the end of 1998 the TuoviWDM was used by 12 000 people in more than 30 countries⁴. It was evident that the system was well needed from the CERN side, but also provided good environment for the Hameri research team looking at the data communication in globally distributed projects.

The early development of the project was also when then young technical student, now the Managing Director, Rainer Puittinen came to CERN. He came to do his summer trainee program in the Tuovi project, excelled, and returned the next year (1996) to do his master's thesis for the project. He was excited and impressed on how things worked at CERN. He enjoyed the relaxed, still goal-oriented and hard-working atmosphere where people were truly motivated to work. And if it some time happened that the exploration of the local wine yards took till the early hours, Puittinen might just get a phone call from Hameri at noon, checking that his hard workers were still alive. Puittinen had noticed that it was approximately half of the people who loved the CERN working environment, but then the other half, mainly coming from industry and being used to rules and structures, had some difficulties adapting. It was this first half that most of the Tuovi people belonged to, truly enjoying what they were doing.

Over the years, the number of engineers and students, mostly Finnish, but also from Sweden and Norway, passing through CERN to work on TuoviWDM steadily increased as the project evolved. During the four years altogether 38 people were involved in the research and development activities. The project produced 6 master's theses and contributed to 2 dissertations⁵. Numerous academic papers were also published on distributed project management and engineering data management systems.

Besides the pure TuoviWDM program itself, however, the Tuovi team kept busy with the other projects also. Because of the then new model that HIP used, part of the funding of the project came from outside of CERN and the program was formed of many projects. The Finnish funding agency for technology and innovation, TEKES, also got interested in the research of Hameri's team. And TEKES required the project to have company involvement. Hameri thus called around and found few companies that were interested to be the pilot clients for the software created. The Tuovi project was overall funded by many organizations. Not only Finnish TEKES was interested but also Nordic collaboration was formed to develop the Tuovi software and its use for different purposes. Overall, around 20-30 per cent of the funding came from companies.

⁴ Hameri A.-P. 2000. Technology Transfer from Accelerator Laboratories. Proceedings of EPAC 2000 conference. Vienna, Austria. pp. 163-166.

⁵ Byckling, Hameri, Pettersson, Wennigner. 2000. Spinoffs from CERN and the Case of TuoviWDM. *Technovation*. 20(2), 71-80.

There was a lot going on. Rainer Puittinen, having finished his masters' degree, was in the meanwhile drawn to the projects even more. And the projects with industry presence clearly showed that the needs associated with the document management of CERN mega projects, were exactly the same as with any other massive industrial investment project. The whole team found the possibilities and challenges for the use of the software in the industry sector having a great potential to be developed further. A company SingleSource was founded in 1998 to guarantee some continuity to the companies involved in piloting the system.

The Parting of the Ways

The research and development projects at CERN continued. Tuovi team, still excited about the possibilities the projects and challenges at CERN offered were, however, facing a dilemma. Rainer Puittinen, the young contributor to the project, had many ideas that could be developed in industrial use of the software. CERN, on the other hand, was concerned with the web-interface for their specific use. The Tuovi team, committed to CERN as well as to the projects partly funded by the companies, had then to balance between making the software more generic while developing it for the specific needs of CERN.

At the CERN side, the TuoviWDM software was becoming more and more crucial for the LHC design. It had a big user community and it was commonly used as the web interface for EDMS. Nevertheless, the software was not yet perfect and had many problems that needed to be fixed. The problems really became evident in September 1999. The software was not up-to-date, but instead exported the updated information only every ten minutes. There were also problems with the users: they weren't happy with how the TuoviWDM worked. Something had to be done. This made Rainer Puittinen and the Tuovi team busy. They took care and developed the software as much as they could, but the project funding required them also to take care of the industrial users and their requirements.

It was the EDMS team leader Thomas Pettersson's turn to make a hard decision. Pettersson thought it through profoundly. He started to realize that the Finns wouldn't be able to provide the maintenance and development that the massive CERN user community needed. The problems were already becoming difficult to deal with as Puittinen and the team was busy. And Pettersson's own team didn't have the experience and capabilities with the technologies that the Finns used. He then made up his mind. A new web interface was to be made by his team, all the way from the beginning, with technologies that they mastered. It took Pettersson's team less than one year to make the new web-interface that suited the CERN needs and requirements. It was because the interface had become so critical to the users that it became highest on Pettersson's priority list.

The new interface that Pettersson's team was building wasn't something that the Hameri team, however, was that happy to see. Hameri, Puittinen and the whole team was proud of their product. And to see that it was being replaced by a very similar looking interface did make it easier for them to make their decision. The focus was now put more on the commercialization of the application, and on taking care of the existing industrial users and potential future clients.

Although some human drama was involved, the end result was for the best of all participants. The leader of the EDMS implementation and support group Thomas Petterson saw Hameri's team's efforts as a wonderful thing: "The great miracle of the Tuovi team was to really force us to go ahead, to move forward. They showed us what could be done and the small team managed to provoke enough discussion that we managed to have this started. They opened the door."

Kronodoc

For the Tuovi team to really take off and focus on the company, the financial support was crucial. The first investment, provided by a Finnish Bank OKO, made it possible that the Tuovi team gradually started moving to Helsinki, Finland, where the headquarters of the company were founded. The company also got Corporate Venture Capital, and later an Angel Investment and some pure Venture Capital came along. The ownership base of the company thus formed to be somewhat diverse.

There were five core people of the Tuovi team that now became the product development group of the company. Rainer Puittinen being one of them, the group was struck by the cultural shock when entering "the real life" as Rainer put it. "We had to start concentrating on the customer and not only to what was interesting and nice to do. Second shock came with the working hours, management style... and all the things that had to be taken care of. We hired new people for testing, documenting and quality control, something that at CERN we hadn't really focused on."

SingleSource also hired a CEO, Sales Manager and other administrative staff. During the year 2000, when the company was really launched, the number of staff rose from three to twenty. In year 2001 the company SingleSource changed its name to Kronodoc by which it is still known, and got its first big customer, Wärtsilä. Hameri, who at this point was in Kronodoc's board of directors, pointed out that maybe the most important thing in the survival of this company was the first customer, and clinging to it the best they could. Kronodoc operating in a highly reference dependent market, Wärtsilä was the reference they needed and it was because of this first client that many of the later deals were made.

Many lessons had to be learnt over the years, however. Seven CEOs and company almost being bankrupt, among other things, make the ten official years of Kronodoc somewhat stormy. But the learning process that the company went through was also happening at a personal level. Rainer Puittinen, having started in the company at the product development, eventually made it to the head of development group. The CEO of that time had, however, noticed Puittinen's skills in also selling the product. He went to Puittinen and started: "Rainer, I've been told you're our best sales person. You know the product like your own pockets. What would you say if we'd make you an official sales person?" Puittinen didn't resist. After learning the tricks of selling the product, he then became the Sales Manager of Kronodoc. Finally, in 2007, he realized that "there's no other person that knows the product, markets, and the industry as I do". Luckily also the Board of Directors had noticed this and was convinced that, after not-all-so-successful tries with different CEOs, Puittinen was the person that was

to lead the company. With a vision also for the future, Rainer Puittinen was then, in January 2008, named the new Managing Director of Kronodoc.

The company Kronodoc has now 22 employees and has acquired a reference base wide enough to sell its product to more and more customers. Kronodoc has an impressive number of over 30 000 industrial users, but in addition to the current strong references, it is still the CERN reference that is mentioned every single time when meeting new potential customers. The support, challenges and problematics that the massive CERN environment provided were crucial for the Tuovi team to develop their product to the direction that also the industrial users needed. For CERN, having companies successfully spin off is also something to be proud of. Although the copyrights of the software were never the property of CERN, they benefited from the development and facilitated the success by giving the company the freedom it needed.

Now, having benefited the CERN environment as well as the industry, also HIP Technology Program leader Ari-Pekka Hameri is proud. The technology program had proved to bring useful things to the society. Having moved on to new projects, Hameri still remembers warmly the story of when a little workflow research led to a down-to-earth document management system.

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This story is based on various interviews carried out during June and July 2008. The author wishes to thank all the interviewees, without whom this story would have been impossible to tell as it is. All further enquiries about the case story should be directed to Mr. Antti Heikkilä, (firstname.lastname@finpro.fi, +41-22-7679565), or Dr. Markus Nordberg (firstname.lastname@cern.ch, +41-22-7677377). The company Kronodoc can be contacted according to the information found on the web page www.kronodoc.com.