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Korba, Larry; Cullins, Melanie; Song, Ronggong; Kenny, Stephen



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L. Korba, M. Cullins, S. Ronggong, S. Kenny
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# Canadian and European Union Joint Projects:
## Experience from Canadian and European Perspectives[1]

**Larry Korba, Melanie Cullins,**
**Ronggong Song**
**Institute for Information Technology**
**National Research Council of Canada**
*{Larry.Korba, Melanie.Cullins, Ronggong.Song}*
*@nrc.ca*

**Stephen Kenny**
**Netherlands Data Protection Authority**
Steve.Kenny@hetnet.nl

**Abstract**

There are a number of advantages and disadvantages to non-European Union (EU) researchers to become involved in EU projects. Involvement in such international collaborations requires careful consideration. In this paper we explore and analyze an example of Canadian involvement in an EU Fifth Framework research project.

### 1. Introduction

The EU devotes just 1.9% of its GDP to research. This is a dramatic contrast to the 2.7% dedicated in the US and 3.1% in Japan. Against this background the Union saw its call to arms and set up the Fifth Framework Program [1]. The Program sets out the priorities for research, development and demonstration activities from 1998 to 2002 within the Europe. For the Fifth Framework, the program involves activities in the following thematic areas:

- Quality of life and management of living resources
- User-Friendly information society (IST)
- Competitive and sustainable growth (GROWTH)
- Energy, environment and sustainable development (EESD)

In setting these objectives, the EU is focussing its attention on increasing the industrial competitiveness and the quality of life for EU citizens. There is a set of common criteria that has been used to set the program. It includes the following:

- Value added criteria: selecting those projects that establish a critical mass of effort among member states, significant contribution to one or more of the community policies, etc.
- Social objectives criteria: improving employment, promoting quality of life and/or health, preserving the environment
- Scientific and technological economic development criteria: targeting ideas that will expand or create good growth, targeting areas for more competitiveness among community businesses, areas for significant scientific and technological progress. For the latter case, it is important that the project offers possibilities for broad dissemination and exploitation of results.

In addition to the four thematic areas listed above there are also horizontal programs that involve the following activities:

- Promotion of cooperation with countries outside of the EU and international organizations. This confirms the international role of EU Community research.
- Dissemination and optimization of the results of activities in the project. The objective here is to promote innovation and participation of small and medium-sized enterprises.
- Stimulation of training and mobility of researchers in the EU Community. The underlying goal is to improve and replenish the supply of skilled researchers and the socio-economic knowledge base.

The average Community contribution to each project was about E1.7 million over a duration of 3 years. Searching through the Fifth Framework database of current projects reveals projects in an extraordinary

[1] NRC Paper number 44889

range of endeavors. Within the IST program, for instance, there are 829 listings. While international collaboration is considered an important element for EU projects, Canadian involvement has not been high. Within the Fifth Framework IST program, for instance, only eight projects include Canadian participation. This paper concerns one of those projects: the Privacy Incorporated Software Agent (PISA).

The remainder of this paper is organized as follows. The next section describes the PISA project. We follow this with some detail as to the level of Canadian involvement and the challenges we have found working on the project. We also discuss our approaches to mitigate those challenges, indicating the potential benefits we are finding through our involvement.

## 2. The PISA Project

The Privacy Incorporated Software Agent (PISA) project consortium will develop example cases of privacy relevant electronic commerce applications using intelligent agents [2]. Intelligent software agents are autonomous pieces of software that may be able to move across networks representing the interests of their users. They react to the information or conditions they meet to best meet their goals. The technology is considered to be an important new paradigm for future of electronic business. Since the intelligent agents must have access to personal information regarding credentials, preferences, life desires, etc., and since the agents may move about the Internet in the course of completing their mission, there is a considerable concern over the protection of the private information. In effect the PISA project targets the creation of privacy enhancing technologies for next generation electronic business applications.

The overall funding contribution from the EU to the project is E1.7 million over 3 years. Combined with the matching contribution from the partners, the value of the project is E3.2 million. Partners in the project include researchers and developers from the Netherlands, Belgium, Italy and Canada. The Institute for Information Technology leads the Canadian contribution for the project.

### 2.1 Project objectives

The project exists in an advanced development environment given the consortium's experimental terms of reference. Its functionality includes mobility, artificial intelligence, inter-agent communication and usability in a setting that encompasses legacy systems, knowledge representation, and novel approaches for inter-agent communication. Regarding privacy, there may be company policies and indeed laws indicating how personal information from citizens must be handled. Our approach is to develop PET: Privacy Enhancing Technologies to deal with the multifaceted privacy and confidentiality issues associated with privacy and business applications. PET may be defined as the creative fusion of security technology & system design, biased by the requirements derived from European standard privacy legislation and the growing concern for privacy in e-business applications.

The objectives of PISA are:

- Demonstration of PET as a technical solution for the protection of the privacy of the citizen when using Intelligent Agents according to the EC-Directive on Privacy (95/46/EC)
- Interaction with industry and governments to launch new privacy protected services. The PISA-project will produce a handbook on Privacy and PET for ISAT and a PISA-agent as shareware.
- Influence standards bodies on their consideration of privacy, PET and ISAT.

### 2.2 Work organization

The work in PISA is organized into 6 work packages (WPs).

- WP1 is responsible for agent platform implementation. The work involves TNO- TPD Institute of Applied Physics (Netherlands) [3] and Finsa Consulting (Italy) [4] as the commercial software developer.
- WP2 is responsible for integrating legal boundary conditions into all issues associated with implementation. The work involves The Netherlands Data Protection Authority [5].
- WP3 involves Delft University of Technology [6] and GlobalSign (Belgium) [7]. Its task is the cryptographic design and architecture for the agent-based applications developed during the program.

- WP4 involves Sentient Machine Research [8] and Finsa Consulting in the area of data mining & matching for privacy enforcement and management.
- WP5 involves the National Research Council Canada (Ottawa) [9] and Zero Knowledge Systems (Montreal) [10]. It is responsible for Network privacy, system scalability and trustworthy user interfaces for e-business.
- WP6, The Netherlands Data Protection Authority is responsible for responsible for disseminating the the value of the project.

**2.3 Expected outcomes**

PISA will demonstrate that it is possible to delegate an intelligent software agent to perform complicated actions on behalf of a person, without compromising the personal data that may be entrusted to the agent. A demonstration of PISA privacy enhancing technologies will be applied to a labour market environment. The demonstration will incorporate several advanced technologies in one product:

- Agent technology, for intelligent search and matching,
- Data mining or comparable techniques to construct profiles and make predictions,
- Cryptography for the protection of personal data and confidentiality of transactions,
- Appropriate network level protocols and systems to support privacy protection,
- Approaches for scalable operation for PET,
- User interfaces that affirm within the user the security and privacy offered by the PET.

All implementation activities occur through a controlled and evolving Design Embedded Privacy Risk Management process ensuring PISA achieves 'Privacy by Design' as opposed to privacy via inefficient, reactive compliance procedures.

There will also be reports on the progress of the work, viewable on the website [2], providing the required background and the details involved in the development of the technology demonstrator.

**3. Canadian/EU Project involvement**

In terms of technical involvement in the project, the Canadian team is involved with the following initiatives in work package 5:

- Assessment of network-based techniques for privacy. This work examines developments to date in the area of network approaches for anonymity and pseudonymity on the Internet and matches the PET requirements against what these approaches deliver.
- Development of models for PET scalability. Here we develop models for PET in order to assess and to improve the scalability of the PET and architectures and implementations we will develop in PISA
- Development of trustworthy user interfaces. This work entails the research, design and development of approaches for the user interface for PET and the Agent demonstrator in order to increase the level of trust the user has in the agent application in terms of how the agent system handles privacy and security matters.

**3.1 Getting the work done**

Our work in this project is considerable. When we developed our work plan for the proposal, we targeted an effort of 0.5 person years per year. Clearly the level of effort required to fully explore and develop all of these topics would require at least 3 person years per year. In addition to the research and development work, there is also the overhead of management, and outreach associated with the work, as well as the financial overhead of travel and other arrangements for meetings. The approximate operational costs for the project are about $10,000 per year for the travel alone.

The EU project provides matching funds for the contributions of each of the EU project members. For non-EU members under the Fifth Framework, there is no financial support. Effectively, as the Canadian partner we must be self-funded. Involvement in this work involved careful consideration. Overall, our contributions to the project amount to 3 person years and a minimum of $15,000 in other costs for project duration (three years).

### 3.2 Involvement Rationale

#### *3.2.1 European Rationale*

From the European perspective, there are several reasons for having a Canadian partner involved in the project. Firstly, as indicated in the principles behind the Fifth Framework program, international involvement provides an indication of the importance of the scientific challenges being tackled by the project. Countless studies have shown the importance and challenges of providing privacy and security for e-business operations. Researchers in the domain around the world agree that privacy is an important research aspect of agent-based applications for e-business. Secondly, this involvement potentially offers a bridge for information dissemination and the use of the results from the EU to another continent. In the case of Canada/EU involvement many Community members would find a closer cultural affinity to Canada than to the United States. In addition, the geographical and socio-economical proximity between Canada and the United States offers the potential of easier dissemination of the results to the US. Thirdly, there may be an affinity between the International and Community partner due to cultural, market or legal similarities. In the case of PISA, the legislation for privacy in Canada and the EU is similar. In fact, Canadian privacy bill C-6 has great similarities with EU Directive 95/46/EC. This is a contrast to the United States where legislative provisions for privacy are in a state of flux. The similarity of legislation and enforcement mechanisms between Canada and the EU affords the potential application of results in either domain. As well, PET and design tools developed within PISA may be adapted and adopted by companies in the US wishing to conform to legal requirements for business in the EU or Canada, or to be prepared when the US legislation catches up as driven by consumer demand.

#### *3.2.1 Canadian Rationale*

The vision of the National Research Council is to be a leader in the development of an innovative, knowledge-based economy through science & technology in areas relevant to Canada. To implement this vision researchers must conduct focussed research with industry, university and government partners. Our partners typically include developers (from the information and communications technology (ICT) industry), and users (organizations and companies from many sectors of the economy). Building fundamental e-commerce technology clearly would support the activities across a wide range of industrial, commercial and governmental sectors. Our ICT partners exploit our research and developments to produce products for a variety of sectors. The ICT (information and communications technology) industry represents over 6% of the Canadian GDP[2] and is growing three times faster than the economy as a whole. The development of key information technology that supports the future of the e-business sector would be strategic for Canada, and our partners. The results would potentially benefit business segments worldwide. This approach is highly relevant to the vision of the National Research Council of Canada.

Involvement in an international collaboration only makes sense if it would form part of the strategic direction of the Canadian partner. In our case, even before our initial involvement in PISA we were active in the domain of security and confidentiality for distributed applications. PISA's focus on privacy for distributed systems created a natural progression from our work. Our early development in the PISA project proposal allowed us to develop research directions we see as strategic in the security domain (scalability of privacy applications and trustworthy user interfaces).

Since the EU has focused for considerable time on the development and enforcement of privacy practices, Canadian partners gain from the benefit of an inside view on how the future of privacy enforcement may appear in North America and elsewhere in the world. As well, we can draw upon the expertise of our partners to focus on potential future applications in the privacy domain. This approach provides the Canadian partners with a different perspective on the problem, and a departure from the dependence on the business and cultural focus on the US.

It is to the benefit of all the project participants to find appropriate partners in industry with whom to collaborate. This is especially vital for the Canadian partners since this approach may lower the cost to the project-lead organization in Canada. As well, having an appropriate industrial partner on board offers a potential path for commercialization of technologies developed during the project. In our case, our collaborator is

[2] In the year 2000 as recorded in the Industry Canada ICT statistical Overview [11]

Zeroknowledge Systems (ZKS) of Montreal. ZKS is a recognized world leader in the development of privacy technologies.

We have found that the high profile nature of a Fifth Framework Project, and the challenge PISA is tackling has made finding partners reasonably straightforward. In the case of Zeroknowledge Systems, an important initial issue was finding a source of funding to cover their expenses. In their case generous funding was found through the government of Quebec. Other potential partners include different departments of the federal government where there is an interest in approaches and technology for privacy assurance.

Our international partners have also helped us to find partners for our work. This networking effect has been mutually beneficial where our contacts have also led to some interesting prospects to explore for exploitation of the technologies developed within PISA. Gratifyingly, these early indications demonstrate that the principles of the Fifth Framework Program appear to be effective.

## Conclusions

While this paper describes a particular instance of a technology-oriented, EU-Canadian collaborative project, there are several lessons that may be learned from it for any group considering similar collaborations in other domains. Becoming involved in such collaborations is a major commitment. Effective participation in such a project requires considerable effort and expenses. These range from preparing the project proposal, to finding partners and other sources of funding, as well as doing the work itself. Depending on the circumstances, finding partners and other funding sources may be made easier because of the attraction and prestige of international involvement. On the other hand, if your Canadian partner has difficulty finding funding to become involved, their actual involvement in the work might be stifled.

Networking with the European partners often can help find appropriate partners for the work. Other interesting opportunities for further, related or unrelated work may stem from these linkages. For instance the Canadian Consulate in the Netherlands were instrumental in contacting us initially regarding involvement in the project and subsequently for press releases on the work and with contacts for potential industrial partners in the work. In our case, so many interesting opportunities have arisen that we are in the position of having to carefully choose from among a number of options.

From the European perspective, the value derived from transatlantic cooperation is fairly symmetrical to that of Canadian colleagues. Additionally, having a Canadian partner provides the vital international component for a project submission, increasing the chances of EU funding. Further, the essence of PISA embodies a long tradition of European Privacy within the context of today's 24*7*365 global networked economy, whereby Canadian involvement provides a potential channel for the output of the project to the North American market.

Clearly involvement in an international collaboration requires a rationalization between the expenses, risks and benefits. Above all, an international collaboration approach should fit in with the strategic plans of your group or organization.

## Acknowledgments

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## References

[1] Cordis Fifth Framework page. http://www.cordis.lu/fp5/home.html.

[2] PISA web site. http://pet-pisa.openspace.nl/

[3] TNO web site http://www.tpd.tno.nl/tpd/smartsite.html

[4] Finsa Consulting http://www.finsa.it/

[5] Dutch Data protection authority http://www.registratiekamer.nl/

[6] Delft University of Technology http://www.tudelft.nl/matrix/home.en.cfm

[7] Globalsign http://www.globalsign.com

[8] Sentient Machine Research http://www.smr.nl/

[9] Institute for Information Technology web site http://iit.nrc.ca/

[10] Zeroknowledge Systems http://www.zeroknowledge.com

[11] Industry Canada http://www.strategis.ic.gc.ca

## Biographies

**Larry Korba** is the group leader of the Network Computing Group of the National Research Council of Canada in the Institute for Information Technology. He is the leader of the Canadian contribution to the PISA project. His research interests include privacy protection, network security, and computer supported collaborative work.

**Ronggong Song** received his B.Sc degree in mathematics in 1992, M.Eng degree in computer science in 1996, Ph.D. in network security from Beijing University of Posts and Telecommunications in 1999. Previously, he was employed as a Network Planning Engineer at Telecommunication Planning Research Institute of MII, P.R.China, and as a Postdoctoral Fellow at University of Ottawa, Canada. Now, he is now a research officer with the NRC of Canada. His research interests are privacy protection, network security, e-commerce, IP mobility and QoS.

**Melanie Cullins** is a business development officer in the Institute of Information Technology of the National Research Council of Canada. Her work involves the development and implementation of collaborations and business opportunities within the Institute of Information Technology, especially with international partners.

**Stephen Kenny** is a technologist with the Dutch Data Protection Authority, working on the PISA project where he is responsible for legal integration, technical co-ordination and business development. Prior to joining this project he attained a Master of Philosophy degree in Computation after spending time in Africa pursuing humanitarian and entrepreneurial interests. His career prior to this included an Associate Directorship at UBS AG in Zurich and training with the European Commission in Brussels as a Stagiere.