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**Towards an Expert Network in Open  
Standards and Open Source Software:  
Research, Expertise and Synergy for Open  
and Libres Standards and Software  
(RESOLL) – Version 2.0**

*Adel El Zaïm, Robert Gérin-Lajoie*

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**Rapport de projet**  
*Project report*

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- . Réseau de centres d'excellence MITACS (Les mathématiques des technologies de l'information et des systèmes complexes)

# Towards an Expert Network in Open Standards and Open Source Software: Research, Expertise and Synergy for Open and Libres Standards and Software (RESOLL) – Version 2.0\*

*Adel El Zaïm<sup>†</sup>, Robert Gérin-Lajoie<sup>‡</sup>*

## *Abstract*

CIRANO and its partners are proposing the creation of an *Expert Network in Open Standards and Open Source Software (Research, Expertise and Synergy for Open and Libres Standards and Software-RESOLL)*, which would be a partnership between information technology research centres, government and private user organizations, and businesses working in the field. The network will conduct studies and pilot projects that integrate computer solutions based on open standards and open source software, mainly in *e-government fields* such as health, education, and scientific research, as well as *municipal and quasi-public services* and *business processes for SMEs*. The knowledge, expertise and tools thus developed will be disseminated in a number of ways in order to Quebec and Canadian expertise in the field. RESOLL will also have economic and strategic benefits in that it will put the new economic model to the test in terms of open standards and open source software as well as the reuse of software components by organizations.

## **Background**

The development of on-line government services and e-business is a priority for governments and businesses of all sizes. It requires considerable spending and significant strategic and organizational changes. Of the many information technology solutions available, the use of open standards and open source software is often brought up by those in the know. Although the

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Internet and many world-renowned software programs were developed largely from open standards and open source software, there is still a need to *study, and above all prove the advantages of this approach for public and quasi-public organizations as well as small to medium-sized businesses*. It is essential to *identify the needs of these organizations, document best practices, experiment with open source software solutions, evaluate the performance of the software and share the knowledge and know-how of Quebec and Canadian research centres and businesses*.

### **RESOLL Goals**

The main goal of the *Expert Network on Open Standards and Open Source Software (RESOLL)* is to give people an understanding of the benefits of open standards and open source software and *suggest an intelligent and advantageous use of them* for public and quasi-public organizations and SMEs. More specifically, the goals are as follows:

- Document and share government and industry policies, strategies, and practices with respect to the use and development of adaptive software and open source software, defining open standards, open source software, adaptive software, and proprietary software;
- Adapt these practices and share the different methods with partners and the IT management and development communities in government and business;
- Establish innovative prototypes and pilot projects in order to test and demonstrate the advantages and features of this approach;
- Develop the expertise of Quebec and Canadian organizations in the field and create synergy between them and their users;
- Publish and share the findings of the work, contribute to the enrichment of a collective software asset base available to public and quasi-public organizations and SMEs while explaining the legal issues involved in the various types of licences and electronic services.

### **Process**

RESOLL is a multilateral partnership founded on the excellence of partners in their respective field. The RESOLL process will be based on the needs of its partners and users. Once these needs have been identified, research will be conducted to identify available solutions, adapt them through an integration process and alpha test them. This would be followed by a pilot project as required by the organizations and businesses. The pilot project will be implemented and evaluated in order to learn from it and ensure that necessary adjustments are made. Solutions thus obtained will be implemented as electronic services either by the client organization's IT department or by a business partner. It is up to each organization to select their service provider. RESOLL will encourage the transfer of developed tools and services to partners for complete autonomy.

Each project will have its own budget, funded by client partners. RESOLL will use part of its operating budget to start projects and develop a start-up asset base for its activities.

### **Expectations and Deliverables**

The expectations of RESOLL partners and the team can be expressed by the achievement of their goals. RESOLL's actions will quickly lead to concrete results. The deliverables will be:

- Policy and position papers to help partners make clear and informed decisions;

- Needs analyses and suggested solutions;
- Software solutions based on open standards and open source software integrated into experimental electronic services;
- Pilot project experiments that combine strategies, plans, software solutions, project support, evaluation and recommendations;
- Studies and interpretation documents for different types of licences and software;
- Collaborative Web site for sharing documents and open source software developed in the context of RESOLL projects or available on the Internet, with comments and explanations;
- Information and knowledge sharing activities for RESOLL and its partners (conferences, workshops, training, etc.).

### **Partners**

RESOLL is a multilateral partnership. The partners that have been asked to become involved are: CIRANO, CRIM, RISQ, the governments of Quebec and Canada, Industry Canada, university researchers, Canadian and Quebec software and information technology companies, and not-for-profit user organizations from the software and information technology fields.

### **Budget**

RESOLL's master infrastructure budget will make it possible to establish a small coordination team involving part-time resources seconded from their parent organizations. We plan to obtain general financing from government and the businesses involved. The individual projects will provide their own financing.

### **Other Benefits**

RESOLL will contribute to Quebec's and Canada's world leadership by sharing the results of its work. It will contribute to the eventual creation of resources that will enable partner companies to commercialize services based on open source software.

**Keywords:** open standard, free software, open software, FOSS, e-government, business process, small and medium enterprises

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## 1 Introduction

This report is the product of many months of work and consultation among Quebec partners: CRIM, CIRANO, RISQ, university researchers, user groups, and Quebec businesses. There is a broad range of experience with open source software in Quebec, and a variety of initiatives have been undertaken as well. These projects and local initiatives, which thus far have focussed on specific problems, a a vastly underestimated resource, with partners working on numerous projects for a number of years in order to construct “free” solutions. This report provides an overview of the situation and is more than anything else a call for coordinated action in Quebec and Canada. Beginning with this observation, our goal is to get partners to work together in an expert network on open standards and open source software.

Our report also includes a study conducted by CIRANO on services provided by businesses working with open source software, entitled “Étude sur l'offre en matière du libre au Québec” [Study of the availability of open source software in Quebec]. Mr. Pierre Lambert conducted the survey under the supervision of Professor Jean Talbot of HEC-Montréal and Robert Gérin-Lajoie. The survey, commissioned by Industry Canada, will be completing another study that was conducted in 2003: “Open Source Software in Canada, The Business Potential of Open Source Software for the Information Technology and Communications Sector in Canada”.

## 2 The Open Standards and Open Source Software Question

In the informatics, and the information technology and software fields in particular, there has been much talk over the last few years about a trend known as “open source software”. One also hears frequent debates in these fields about the importance of sharing open standards as opposed to *de facto* or proprietary standards. The debates become more vocal when they turn to the implementation of these standards into applications and when two standards emerge simultaneously. The Internet was developed on the basis of open standards such as the TCP/IP protocol and HTML, to name only two. Open source software has enabled the deployment and use of the network by the largest possible number. The proof is in server software such as Apache, which, according to Netcraft<sup>1</sup>, is running close to 70% of the world’s Web servers, or in Internet infrastructure management tools such as domain names (DNS), and electronic mail. The debate between open source and proprietary software and open or proprietary standards is not just a technological debate. We would venture so far as to say that it is above all a social and economic debate that reflects a view of a world based on co-operation and equal sharing of assets and responsibilities, rather than a technological debate. This becomes even more pivotal as the consequences associated with each of these points of view have an impact on society, and on organizations and governments in their operations and relations with the citizens and businesses of the country.

### 2.1 The Place of Software Place in the High-Tech Society

Today, software is an indispensable tool for the everyday workings of society and its

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<sup>1</sup> November 2003, analysis of 44,946,965 sites: [http://news.netcraft.com/archives/web\\_server\\_survey.html](http://news.netcraft.com/archives/web_server_survey.html)



institutions. One often hears about the place that computers occupy in our lives. Without the software that makes them work, computers are useless. We should recall, as an example, that the y2k computer problem was above all a software problem that threatened the proper working of computer equipment and consequently all computer controlled equipment. It is, therefore, a tool over which mastery is crucial, and the elimination of flaws essential, especially in the information and knowledge Age that is spreading worldwide.

- **The Distinction Between Software and Data**

To the distinction between software and hardware can be added the distinction between the software used, and the data created with it. This distinction is even more significant in that, when we acquire software, we are in fact purchasing the right to use a tool that the producer will continue to develop and adapt to their own needs, with a view to maximizing returns when it comes to the sale of the product. This remains true for custom software, as the consultant or developer needs to maximize returns and reuse their expertise for themselves or their business. What happens to the data created with that software when a new version is released, or the product is simply pulled from the shelves? We would then be talking about system support for a certain period or data compatibility with the new version, on condition that one buys the new version or pays for system support, of course. The distinction between data and software is significant in that it determines the properties of documents and access to information, as well as the knowledge contained in the documents. To read a document in Word format, one must own Microsoft Word software. There is no alternative, and the field is open to a monopoly. There are, however, open formats and standards that enable document viewing with different software platforms. HTML is a format recognized by different browsers (IE, Netscape, Mozilla, Opera, etc.). Any developer can produce software that recognizes HTML and post data on the Web for everyone. When content producers use HTML, they are certain that their data is available to all, and that it can be retrieved and modified without using specific software. In a case where the data is public property and produced with the public's money, it becomes essential to ensure the sustainability of the data and permanent universal access to it. Unfortunately we are not far from the day when every time a citizen wishes to read a government document, his computer will need to connect to the software supplier's server and ask the supplier to validate the licence. Public authorities and institutions need to be made aware of this fact and given assistance in finding an alternative that frees data from the software. The sustainability of data access is a question of preserving the public good and has social, economic, and cultural benefits.

- **In short, the following questions need to be asked:**

Who has the rights to the software, and who owns the data? How do we ensure the sustainability of data and its social, economic, and cultural value if we can't control the software to read the data (documents)? What is the alternative to proprietary software?

The alternative is to use an approach based on open standards and open source software. It is crucial to understand this alternative, the related issues, what is available from the socio-economic actors that favour this approach, and to understand the need to come up with a development and ownership model based on open standards and open source software.

### **3 Open Standards and Open Source Software**

The purpose of this section is to define the broad terms and concepts used in the open source

software approach. We will define the concepts by reviewing known work and studies on the subject. We will illustrate the explanations with examples and references.

### 3.1 Open Standards

One of the characteristics of open standards is that their specifications are published and registered with a neutral organization (commercially speaking) rather than with a particular developer. Thus, everyone has access to them and as a consequence may develop software based on those specifications without running the risk of violating the developer's intellectual property rights. The deployments of these specifications multiply and can be commercial as well as open. Three characteristics define a good open standard:

- a) The definition is available to all,
- b) There is at least one reference deployment, and lastly,
- c) Testing is possible to determine system compatibility with the standard.

A number of different organizations produce open standards: international standards organizations, industrial consortia and communities of experts. Furthermore, some open standards that are available and well documented can be the product of a single company. Let us illustrate these types of organization with a few examples:

1. The International Organization for Standardization (ISO) is well known. The ISO is a network of national standards institutions from 148 countries, with one member per country, and coordination provided by the Central Secretariat, located in Geneva, Switzerland.
2. The Organization for the Advancement of Structured Information Standards (OASIS), a non-profit consortium that works to develop and adopt electronic business standards, is a collection of businesses and experts in the field. The organization's leadership in the development of new e-business, e-government, and Web services standards is well known. Technical committees<sup>2</sup> are struck to work on, vote on, and submit specifications. The specifications are reviewed and discussed, and if they are approved, become standards. Among the standards registered with OASIS are ebXML, for e-business, SAML for managing shared identities, and DOCBOOK to list XML definitions. The XML format from the OpenOffice productivity suite is also registered with OASIS-Open. There is a Technical Committee for this format called OASIS Open Office XML Format TC. There are close to forty technical committees.
3. The Internet Engineering Task Force (IETF<sup>3</sup>) is an international community of network designers, operators, businesses and researchers concerned about the evolution of Internet architecture and its operation. This community of

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<sup>2</sup> Learn about the process at <http://www.oasis-open.org/committees/process.php>

<sup>3</sup> <http://www.ietf.org>

experts operates by working groups (WG) and distribution lists, and is open to all. It develops specifications and makes them available to the community in order to develop Internet protocols and solutions.

4. The specifications developed by the WWW Consortium (W3C<sup>4</sup>) are available to all. Anyone can use them to develop commercial or not-for-profit software and solutions. The specifications are the result of the work of experts and working groups funded by W3C's membership, organizations and paid or volunteer experts.
5. The Adobe corporation produced the PDF open standard. It is a good example of an open standard developed by a corporation. All of its reference material is available and there are numerous free and proprietary implementations.

Professor François Coallier's work explores the challenges facing standards organizations, lists the most significant of them and places them in the context of information technology.

We can highlight some standardization consortia of interest to our work: The "Free Standard Group", which produces the "Linux Standard Base", among others, the "Organization for the Advancement of Structured Information Standards"(OASIS) that produces industrial standards for "Web Services" and reusable XML components, and last, the "Java Community Process", which provides dozens of standards covering government and business application architecture, in particular.

### 3.2 Adaptive Software and Open Source Software<sup>5</sup>

The difference between adaptive software and open source software depends only on the kind of licence and only becomes significant when the software is redistributed in the community. It is important to remember, however, that separate development movements support these two processes, and it would be wise to understand their respective issues in order to avoid further confusion.

The term "adaptive software"<sup>6</sup> refers to a user's (individuals, businesses, organizations, etc.) freedom to run, copy, distribute, study, modify, and improve the software. More specifically, it refers to four types of freedom for the software user:

- The freedom to run the program for any application (Freedom 0).
- The freedom to study how the program works, and to adapt it to your needs (Freedom 1). Access to the source code is a requirement for this.

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<sup>4</sup> <http://www.w3c.org>

<sup>5</sup> In linguistic terms, it should be noted that the Office québécois de la langue française considers the terms "Adaptive software" and "Open Source" to be interchangeable.

<sup>6</sup> <http://www.fsf.org/philosophy/free-sw.fr.html>

- The freedom to share copies (Freedom 2).
- The freedom to improve the program and publish your improvements for the benefit of the whole community (Freedom 3). Access to the source code is a requirement for this.

The definition of open source software propounded by the *Open Software Initiative* is even broader and is not limited to source code access. The distribution criteria<sup>7</sup> include the freedom to redistribute the code as part of a new commercial or not-for-profit program without any royalties, the obligation to include the source code with any program, the freedom to modify and distribute the code under the same license as the original software, the duty to protect the integrity of the original source code in the new distribution unless one changes the name or the version, and prohibition from discriminating against persons, groups of people, or to restrict use of the source code in any field (trade, genetic research, etc.). This comprehensive definition and the rights thereof apply to all without any need to apply the terms of another license, the license cannot be product specific, cannot prohibit use of other types of software (proprietary, for example), and cannot be linked to a particular technology.

Open source software and adaptive software isn't necessarily freeware.

Adaptive and open source software is ideally, but not always, based on open standards.

In this document, we use the terms open source software and adaptive software without giving preference to either process. For our work, one or the other of these approaches will be adopted on the basis of the needs of the partners and the project parameters. For good definitions of the different categories of software, refer to the document produced by the *Free Software Foundation*, available on-line<sup>8</sup> in many languages.

### 3.3 Open Source Software Licences: Definition and Examples

The licensing question is critical. The licence defines the relationship between the producer and the user. In all cases, the producer remains the owner of his work and decides on its use. In the case of open and adaptive software, the producer assigns a licence to users, enabling them to retain control over their computer technology; they can adapt it to their needs, and switch software packages without losing support from producers or distributors. This way of doing business rapidly creates a local ecosystem of businesses and services.

The development process is also different. Many experts can be working on the same product at the same time, in which case the project manager acts as a gate-keeper, deciding which contributions to accept or reject depending on their merits. The quality of the final product and its adoption by other users are the main criteria that will determine the product's distribution and survival, or reincarnation in other products, in other ideas by other producers. Furthermore, it is possible to develop a commercial use for freely obtained

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<sup>7</sup> <http://www.opensource.org/docs/definition.php>. For a complete French translation by Sébastien Blondeel, <http://www.linux-france.org/article/these/osd/fr-osd-1.html>

<sup>8</sup> <http://www.fsf.org/philosophy/categories.fr.html>

products. Some licences require that any modifications made by users and developers must also remain freely accessible, while other licences leave it up to the developers to release the modifications or keep them proprietary. One needs a good understanding of the nature of the relationship between the original producer, the interim user, and the end-user of these products to understand the various types of licences.

Another aspect of open licences needs to be highlighted. Many organizations, such as the Apache Software Foundation, have a “Contributor License Agreement”, which gives the foundation a standard legal policy.

For a comprehensive explanation and references on the types of open licences, it is appropriate to refer to the document produced by the *Free Software Foundation*, available on-line<sup>9</sup>.

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<sup>9</sup> <http://www.fsf.org/licenses/license-list.fr.html>

### 3.4 Types of Applications and their Use

Most analysts agree that applications fall into three categories:

- Personal computer applications
- Infrastructure applications
- Custom applications

By personal computer applications<sup>10</sup> we mean software like productivity suites (word processing, spreadsheets, presentation software), browsers, email clients, electronic calendars, etc., used by an organization's administrative staff to complete everyday tasks. The software can be stand-alone, and installed on the personal computer, or available as clients requiring server access (such as email clients and browsers).

Infrastructure applications are software that are designated as Web servers, databases, email servers, and all other network management applications such as domain name servers (DNS), file servers, print servers, identity and user management software, etc.

Custom applications encompass all sorts of software that organizations commission to meet specific management needs. Examples include content management applications, employee file management applications, and others that are custom-made or have been adapted significantly to be used within a particular organization.

These applications often use a standard development framework such as Java 2 Enterprise Edition, or on a different scale, Web Services. These reference frameworks define interfaces between the general infrastructure components and the customized application components. They provide an open architecture that integrates application and infrastructure components. These reference frameworks include a vast number of standard components, some of which are available free, and are easily customized based on need. The licensing question is critical. The licence defines the relationship between the producer and the user. In all cases, the producer remains the owner of his work and decides on its use. In the case of open and adaptive software, the producer assigns a licence to users, enabling them to retain control over their computer technology; they can adapt it to their needs, and switch software packages without losing support from producers or distributors. This way of doing business rapidly creates a local ecosystem of businesses and services.

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<sup>10</sup> See in particular the report *Open-source software in e-government, Analysis and recommendation drawn up by a working group under the Danish Board of Technology*, Danish Board of Technology, October 2002, available online at [http://www.tekno.dk/pdf/projekter/p03\\_opensource\\_paper\\_english.pdf](http://www.tekno.dk/pdf/projekter/p03_opensource_paper_english.pdf)

	<b>Function</b>	<b>Open Source Software</b>	<b>Standards</b>	<b>Comments</b>
<b>Personal Computer</b>	Browser	Mozilla-Firefox Konqueror	HTTP HTML XHTML FTP	
	Email client	Mozilla-Thunderbird	MIME IMAP POP	
	Calendar and directory	Evolution from Ximian	iCal	
	Word processing	Open Office	Oasis Open Office XML Format PDF	.doc is a proprietary format  PDF is an open format
<b>Infrastructure (basic and advanced applications)</b>	Email server	Sendmail, Cyrus	SMTP, IMAP	Exchange is a proprietary e-mail and calendar server.
	Calendar server and user directories	OpenGroupware	iCalendar	
	Web servers	Apache		Most used on the Internet.
	Database servers	MySQL, PostgreSQL	SQL 93	

	<b>Function</b>	<b>Open Source Software</b>	<b>Standards</b>	<b>Comments</b>
<b>Custom applications (for personal computer or server)</b>	Web server applications software	<ul style="list-style-type: none"> <li>• Tomcat or Jboss in Java</li> <li>• PHP with Apache</li> <li>• Zope in Python or in Perl</li> </ul>	Java 2, Enterprise Edition	
	Web content management system	<ul style="list-style-type: none"> <li>• OpenCMS in Java</li> <li>• Tikiwiki, in PHP</li> </ul>		
	Educational portal	uPortal	Portlet, with WSRP or JSR-168	
	Business management applications	Compiere Open for Business (ofbiz)		

**3.4.1 Table: Functions, Open Source and Standard Software**



#### 4 Issues of the Open Source Development Approach

The open source and adaptive software movement began with the GNU project in 1984. The purpose of the project was to develop a complete operating system similar to UNIX<sup>11</sup>. Since then, the original collective development and sharing philosophy spread to the point that it encompassed all kinds of software and became an alternative to the hegemony and monopoly of big business software producers. Is the open source movement anti-Microsoft? The debate can't be pared down to that level, even though Microsoft's position has enabled it to create a virtual monopoly on operating systems, productivity tools, and Web browsers. For a number of years, we have been part of a massive progression in open standards to meet the needs of governments, businesses, and users. These standards encompass network protocols, business transactions in XML and "Web Services", all types of documents, and everything associated with production, information sharing, and electronic services. Concurrently, we are witnessing another movement that is closely linked to the first, that of the greater availability of more and more adaptive software based on these standards, and their mass use as they are shared. This movement is accompanied by the transformation of software into commodities that fulfil common basic functions: browser, operating system, Web server, word processing, email, comprehensive productivity suites, and others.

Today, the issues related to the software industry and the open source approach exceeds the technological dimension and has economic, social, cultural, and political ramifications.

There are two kinds of benefits: Benefits from using open source technologies (user benefits) and benefits from the creation or expansion of markets.

The following table identifies whether computer technology vendors, buyers, or governments can reap certain kinds of benefits. The following table lists the economic benefits for SMEs.

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<sup>11</sup> <http://www.gnu.org/home.html>

	<i><b>Intra-organization Benefits</b></i>	<i><b>Market Creation Benefits</b></i>
<b>Vendors</b>	<ul style="list-style-type: none"> <li>• Rapid integration of new staff</li> <li>• Reduction in staff training costs</li> <li>• Efficient standards compliance</li> <li>• Avoidance of “over-engineered” computer products</li> </ul>	<ul style="list-style-type: none"> <li>• Create or expand “value-added services” markets</li> <li>• Minimize new business start-up costs (development and core technology environment)</li> <li>• Facilitate entry into domestic and international emerging markets in which buyers are looking for cheaper and/or products adapted to the specific needs of their users (language, cultural differences, business process development...)</li> </ul>
<b>Vendors (continued)</b>	<ul style="list-style-type: none"> <li>• Reduce product “time to market”</li> <li>• Reduce product maintenance and deployment costs</li> <li>• Avoid becoming a “reseller” of others’ technology.                             <ul style="list-style-type: none"> <li>• Make more of the buyer’s budget available to the vendor for the project</li> <li>• Give the vendor more room to manoeuvre in negotiating prices.</li> </ul> </li> <li>• Write down the investment of public organizations by distributing computer products to other public organizations with similar needs</li> </ul>	

	<i>Intra-organization Benefits</i>	<i>Market Creation Benefits</i>
<b>Buyer</b>	<ul style="list-style-type: none"> <li>• Training and skills development opportunities for technical staff through source code access to technologies and applications</li> <li>• Opportunity to adapt products to the business's needs with few delays.</li> <li>• Access to knowledge of user groups from a variety of industries.</li> </ul>	<ul style="list-style-type: none"> <li>• Simplify the standardization of “non-competitive” business processes among businesses from the same sector or industry.</li> <li>• Simplify data exchange and reduce the cost of computer systems.</li> <li>• Share the cost of developing common industry functions.</li> <li>• Minimize the required level of investment to begin a new business (core systems)</li> </ul>
<b>Governments</b>	<ul style="list-style-type: none"> <li>• Write down the investment of public organizations by distributing computer products to other public organizations with similar needs</li> <li>• Reduce the overall cost of computer products across the public sector.</li> <li>• Support local companies by buying domestic.</li> </ul>	<ul style="list-style-type: none"> <li>• Make Canada and Quebec leaders in the use of open source technologies.</li> <li>• Harness international contracts for Canadian and Quebec companies.</li> <li>• Contribute to international development efforts.</li> </ul>

#### 4.1 Issues for the End-User Business

There are three advantages for end-user businesses that stem from the approach based on open architecture, standards, and adaptive software: Control of one's data and infrastructure, thus providing a medium-term return on investment; the possibility of adapting standard and open components to meet one's needs, and finally to create an ecosystem of open source service providers that maintain reasonable prices.

#### 4.2 Issues for the Information Technology Field

For technology businesses, a number of new business models are feasible with adaptive software. They are explained on the “Open Source Initiative” Web site<sup>12</sup>. We find the following elements, in particular:

1. Sale of open software, adaptation, and support

This business model is used by a large number of innovative businesses that have

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<sup>12</sup> [http://www.opensource.org/advocacy/case\\_for\\_business.php](http://www.opensource.org/advocacy/case_for_business.php)

succeeded to penetrate as - consultants - a market dominated by established businesses.

## 2. Loss leader product

Using this business model, the adaptive product is the entry-level line that can build a brand image in order to release a proprietary product or one that is complementary to the adaptive product, or a licensed version of the same. This model is also known as “double licence”.

## 3. Hardware Complement

In this model, the adaptive software makes hardware work and helps to sell it. Computer peripheral drivers provided by the manufacturer are an example of this.

## 4. Sale of Accessories

The goal of this model is to sell products that complement the adaptive software: books, training, certification, or other brand-name merchandise and gadgets created for the adaptive software. The O'Reilly book company is the best example of this.

Furthermore, these business models have other advantages, such as quick development and minimal administrative overhead. The result is an extremely flexible software service and development business.

### 4.3 Economic Issues

The truth is that the information technology business is much broader than just the software market. According to R. Fulton<sup>13</sup> of Gartner Research, as cited in F. Coallier's work, the software market accounts for less than 5% of IT economic activity, far behind custom development projects and operational support. One would expect that business models that favour the latter will be much more advantageous.

Telecommunications equipment	380
Computer systems and peripherals	240
Software licences	70
IT projects and services	250
Semiconductors	150

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<sup>13</sup> Reference: R.Fulton, COM-15-1667, Predicts 2002 –What's Ahead for the IT Industry, Gartner Research, Research Note, 2002-01-08, [http://www.adabasnatural4ever.com/industry\\_news/media/predicts\\_2002\\_whats\\_ahead\\_for\\_the\\_it\\_industry.pdf](http://www.adabasnatural4ever.com/industry_news/media/predicts_2002_whats_ahead_for_the_it_industry.pdf)

IT operational support	350
Total	1 440

**Table: Global information technology market, in billions of US dollars**

A few business producers dominate the global computer software market and position their products and technologies to deny other technologies access to the global market. This makes it difficult to develop young local businesses and their innovations when globalization is dangling business opportunities on a worldwide scale. Users are prisoners of one or two software companies whose priorities do not always coincide with those of small countries and cultures with little international influence, and therefore less economically viable to those big businesses. Adaptive and open software based on open standards enable new businesses to access source codes that they can modify, adapt, translate<sup>14</sup>, and harness as they see fit, redistributing them in their country and around the world thus creating a wealth of local economic benefits. Open source is an opportunity to create computer businesses and develop an economic base grounded in the principle of free market access.

Software piracy is also a world phenomenon. In some countries it is easier to get your hands on a pirated copy than it is to hunt down the official software. Even in Canada, the high cost of official software is one of the obstacles encountered by organizations, schools, and individuals in their information technology purchasing process. Adaptive software is therefore an alternative that enables poor countries to equip its organizations and educational institutions, for instance, with legal and functioning software adapted to their needs and in line with the rights accorded by the software creators. In developed countries, it allows for the formulation of legislation to cover realistic and workable software licences, while at the same time generating huge savings nationally. Finally, the use of adaptive software by governments promotes economic development and enables SMEs to benefit from equal access to open markets on the basis of competition and merit.

Another economic issue, in our opinion, is the possibility of sharing and reusing components as open source software. The source code thus made available can be adapted and reused from one application to another. It can be shared with other private, public, or quasi-public users in order to reduce the cost of other projects and standardize tools and data.

#### **4.4 Social Issues**

The information society is developing in a world of contradictions. On the one hand, we benefit from the cultural, linguistic, and social diversity of societies while on the other hand, worldwide monopoly brings us – if there is nothing to check it – to a sort of sterile harmonization that kills innovation and homogenizes the world.

We have already mentioned the need to separate data from the software used to produce it. Open document formats would contribute to the conservation of cultural, artistic, and even

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<sup>14</sup> As an example, software such as SPIP, “système de publication sur Internet” is offered under a GPL license in 11 languages, and the number of translations and adaptations continues to grow.

administrative heritage of digital societies. Why, for example, should we have to pay software user fees to read electronic mail from a public institution or from the school your children attend? And yet that is the situation we are in for now, unless the correspondence is written in an open format such as HTML or, to a lesser extent, PDF.

The future of electronic formats and their development has societal ramifications as it relates to universal and permanent access to data and digital heritage.

#### 4.5 Technology Issues

On the software production side, monopoly and hegemony are limiting technological innovation by closing off market access to new technologies. Open source software, on the other hand, relies on creativity and increased community contributions to the industry and to products. According to the Open Source Initiative formula, “When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, and people fix bugs. And this can happen at a speed that seems astonishing, if one is used to the slow pace of conventional software development.”<sup>15</sup> On the side of information technology purchases by businesses and organizations, open source software is the SME access card to the world of technology. Simpler to modify and adapt, cheaper, enhanced by a development community that continually adds to it, open source software is often used by businesses to build their information systems, host their Web site, and manage their network infrastructure as well as acting as a core computer development base for businesses in the software, e-commerce, and IT service sectors.

#### 4.6 National and Political Issues with Respect to On-Line Government Services

The world political landscape is experiencing major upheavals and permanent tensions in diplomatic and military relations that consequently affect the economy. Boycotting policies and import/export restrictions can block some countries’ access to information technologies. Open source software makes these technologies available and enables these countries to help build the information society.

To conclude this section, it might be helpful to cite the response of a Peruvian congressman to a letter from Microsoft that objected to a Peruvian statute known as **Bill Number 1609, Free Software in Public Administration**:

*The basic principles which inspire the Bill [Bill #1609] are linked to the basic guarantees of a democratic and lawful state, such as*

- *Free access by citizens to public information*
- *Permanence of public data*
- *Security of the State and citizens.*

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<sup>15</sup> See <http://www.opensource.org/>

*To guarantee the free access of citizens to public information, it is essential that the encoding of data is not tied to a single provider. The use of standard and open formats gives a guarantee of this free access, if necessary through the creation of compatible free software.*

*To guarantee the permanence of public data, it is necessary that the usability and maintenance of the software not depend on the goodwill of suppliers, or on monopoly conditions imposed by them. For this reason the State needs systems the development of which can be guaranteed due to the availability of the source code.*

*To guarantee national security or the security of the State, it is indispensable to be able to rely on systems without elements which allow control from a distance or the undesired transmission of information to third parties. Systems with source code freely accessible to the public are required to allow their inspection by the State itself, by the citizens, and by a large number of independent experts throughout the world. Our proposal brings further security, since the knowledge of the source code will eliminate the growing number of programs with *\*spy code\**.*

*In the same way, our proposal strengthens the security of the citizens, both in their role as legitimate owners of information managed by the state, and in their role as consumers. In this second case, by allowing the growth of a widespread availability of free software not containing *\*spy code\** able to put at risk privacy and individual freedoms<sup>16</sup>.*

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<sup>16</sup> Dr. Edgar David Villanueva Nuñez, Congressman, Republic of Peru. The complete English text can be found at: [http://linuxtoday.com/news\\_story.php3?tsn=2002-05-06-012-26-OS-SM-LL](http://linuxtoday.com/news_story.php3?tsn=2002-05-06-012-26-OS-SM-LL)

## **5 Conversion Strategy Proposal and Open Source Software Development Approach for the Public Sector and SMEs: RESOLL**

### **5.1 The Need for an Active Approach Based on Partnership (PPP)**

On the basis of our observations mentioned above, we propose the creation of an Expert Network on Open Standards and Open Source Software: “Research, Expertise and Synergy for Open and Libres Standards and Software” (RESOLL)

RESOLL, that will work in partnership with research centres, public organizations, partner businesses and non-profit organizations to create a body of work pursuant to the mandate laid out in this document.

This would consist of a network that would dedicate itself to:

- Identifying the best available open source and adaptive software products in the partners’ fields of endeavour;
- The adaptation of these products;
- Their integration;
- Their use in experimental and pilot projects to meet the needs of partners and the community.

An information and training component will transfer knowledge and best practices to partners and the public. A legal component will assist partners in understanding and using the different kinds of licences associated with open source and adaptive software. The use of open standards and participation in the development and marketing of these standards will be an integral part of the RESOLL mandate.

### **5.2 Networking Expertise Rather than Creating a Company**

The model suggested for this initiative is a network that calls on the collective knowledge of the research, development, user, and service administration communities, as well as organization and business partners. This collectivization of skills and experience for common goals, following an established scientific process, can only produce positive and beneficial results for the partners and society in general. The model emulates the open source and open standards movement, which possesses a coherent work process and a structure that ensures robustness and seriousness. It is imperative to secure impeccable methodologies for the development and acquisition of open source computer solutions.

We are betting on the pooling of knowledge and skills in a flexible virtual network taking shape around initiatives and projects, driven by a core group that ensures its cohesiveness. Partners will have the opportunity to move RESOLL in a different direction as opportunities arise in the future.



### 5.3 Why RESOLL Now?

For those who are new to open source software, the development and distribution process may seem chaotic. On the contrary, this ecosystem has seen the birth of new structures and organizations that need to be properly understood if they are to be effective. It is a model with an infinite number of variations, of which we are seeing more and more in both government and industry.

Thus, a number of governments<sup>17</sup> have chosen to guide their computer development toward open source and adaptive solutions. In France, government agencies<sup>18</sup> are training technicians in, and working in open source in order to share resources, maximize product use, benefits, and life while acquiring the most possible experience and knowledge for developers.

In the United States, the National Science Foundation (NSF) encourages, and sometimes demands that open standards and open source or adaptive software be used – if available – in research projects that they fund, although they don't ban the use of relevant commercial solutions.

In a US Army study conducted in 2001 to determine the usefulness of open source software, MITRE<sup>19</sup> reached the following conclusion:

*“...Open source methods and products are well worth considering seriously in a wide range of government applications, particularly if they are applied with care and a solid understanding of the risks they entail. OSS [Open Source software] encourages significant software development and code re-use, can provide important economic benefits, and has potential for especially large direct and indirect cost savings for military systems that require large deployments of costly software products”<sup>20</sup>.*

In Canada, Industry Canada and Public Works and Government Services Canada have led a national consultation on open source software and the ways in which the government might make use of it. An action research<sup>21</sup> study was carried out in order to identify options and challenges related to commercial models of open source production for the Canadian information technology and communication sector, as well as the possible public policy ramifications of such a plan. This study highlights the importance of pilot projects and experiments in order to better understand the pros and cons of open source software.

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<sup>17</sup> See the examples in section 5.a. for a comprehensive list of government initiatives around the world, see <http://www.webmaestro.gouv.qc.ca/ress/libre/gouvernements.html>

<sup>18</sup> Such as ATICA, now ADAE, the Agence pour le développement de l'administration électronique: <http://www.adae.pm.gouv.fr/>

<sup>19</sup> MITRE, founded in July 1958, is a private not-for-profit organization whose mandate is to provide technical and engineering services to the US federal government. The Massachusetts Institute of Technology's Digital Computer Laboratory created MITRE.

<sup>20</sup> [http://www.mitre.org/work/tech\\_papers/tech\\_papers\\_01/kenwood\\_software/kenwood\\_software.pdf](http://www.mitre.org/work/tech_papers/tech_papers_01/kenwood_software/kenwood_software.pdf), Page XXV.

<sup>21</sup> <http://www.opensourcescenarios.org/index.html>

The Government of Quebec is very interested in this method of developing and acquiring software. The Government of Quebec has invested considerably in development contracts for certain integrated management systems, and many departments are doing the same. As these products are not based on open standards and open source software, there is a need to ensure that products developed for one group will work for others or even to make sure that these products can be reused - by the same organization that paid for its development – in other internal projects.

Furthermore, the Quebec Treasury Board Secretariat is preparing to state its position on open source software. This position will be accompanied by a document entitled “Cadre Commun d’interopérabilité” as well as a process to test specific open source software<sup>22</sup>. A group of a hundred or so leading computer analysts working for the Quebec government have created the “Communauté de logiciels libres” which has a stated objective to “promote, discuss, and inform members of the presence and relevance of using open source software.”<sup>23</sup>

In developing countries, United Nations branches such as the UNDP are encouraging the creation of “Open Source Centres” and support the development and use of open source software in order to reduce costs, simplify software updating, and above all to enable computer analysts and management in these countries to acquire IT by mastering their development and deployment. The *United Nations Information and Communication Technologies (ICT) Task Force*, a group of experts established by the United Nations Secretary General, has developed a plan of action in which they identify, among other things, open source technologies as a national development tool. Open source software is considered suitable for the transfer of technology to these countries in order to facilitate development projects based on ICT use<sup>24</sup>.

The *Agence de la Francophonie* also puts great stock in the use of open source software in projects they fund.

When using a process based on adaptive or open source and resource sharing, there is the potential to raise fears and cause confusion. What is public domain and what isn’t? Doesn’t open source software go against private enterprise, entrepreneurs, and fair compensation to creators? Isn’t a standard a lowest common denominator that creates uniformity and stifles innovation? How and what should we share<sup>25</sup>? With whom, and under what conditions? We might even think (erroneously) that there is nothing to share or reuse as everything is the property of the purchaser, or is available on the Internet anyway.

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<sup>22</sup> <http://www.webmaestro.gouv.qc.ca/ress/bulletin/bulletin37/bulletin37.html>

<sup>23</sup> <http://www.webmaestro.gouv.qc.ca/ress/libre/communaute.html>

<sup>24</sup> See the plan of action at <http://www.unicttaskforce.org/about/planofaction.asp>

<sup>25</sup> ADAE has a Web directory in which a number of components are hosted and made available to the various levels of government in France. These components come from different departments and organizations. DTDs are an example of this, and are developed and shared regularly. For an example, search the administration’s XML template directory (PDF):

[http://www.adae.pm.gouv.fr/upload/documents/repertoire\\_schemas\\_xml.pdf](http://www.adae.pm.gouv.fr/upload/documents/repertoire_schemas_xml.pdf)

It is a good idea to explain the concept and above all professional practices as they relate to open source software. It should also be stressed that open standards and open source software are conducive to an open market in which small, medium, and big businesses can be innovative. Canadian and Quebec businesses already offer high-end products and services that make them profits in the millions, thanks to these open technologies.

Today, open source software and open standards are present in nearly all innovative tools and services in the technology sectors. Proven open architecture software rests on two pillars: open standards and open and adaptive software.

It will be necessary to document these practices and study them to identify the best and share them in the field by adapting them to our needs and realities. Afterward we can make sure that they are used by our developers, by innovative IT sector businesses, as well as by users and managers of public and private sector organizations.

The goals of the conversion are to:

- Maximize the benefits of computer technology development;
- Build a network of experts in open source software at the core of businesses an public and quasi-public organizations;
- Promote Quebec and Canadian expertise in the field;
- Finally, increase the viability and reproducibility of developed software and computer technology solutions.

Implementing the above could lead us to expect economic benefits from innovations produced thanks to participation in a world ecosystem, and the reduction of costs and project start-up times through a strategy to reuse existing software components. The components created by our organizations and businesses could even be exported to other provinces or countries with which we share needs and cooperative relations, such as the rest of the Francophonie.

That is the role that the Expert Network in Open Standards and Open Source Software (RESOLL) expects to play for partner businesses and organizations.

## **6 Mandate**

The RESOLL mandate can be summarized as follows:

- To assist government organization and business partners in developing a clear strategy and position on open standards and open source software, and to test it with pilot projects.
- To enhance Quebec and Canadian expertise in the subject and facilitate the exchange of ideas and reuse of assets.

## **7 Goals**

- Document and disseminate government and industry strategies and policies on

adaptive open source software development approaches, defining open standards, open source software, publicly available adaptive software, and commercial software.

- Document and share government and industry practices on the use of adaptive and open source software;
- Adapt the practices and share them with partners as well as the development community and IT managers in government and business. Sharing will be over the Web, through training sessions, as executive summaries and backgrounders;
- Produce innovative prototypes and pilot projects through an open standards and open source approach in order to test and demonstrate them;
- Establish links with other actors working in the same field in order to learn from their experiences and promote ours;
- Create a co-operative Web site that includes information and training sections, as well as a stock pile of open source software components for the use of partners, implicitly promoting the know-how of the open source software community in Quebec;
- Provide incentives for organizations and businesses to use open standards and open source software in their computer technology and electronic service development projects;
- Explain the legal issues related to different types of licences and provide advice to partners on these issues;
- Advocate the sharing of computer technology resources, based on open standards and open source software, at the national and international level.

## 8 Thrust Areas

Open source software is becoming a viable alternative to commercial software in a number of fields. It is no longer true to say that there are few applications available for operating systems other than Windows. We can easily reference the list<sup>26</sup>, which continues to grow, of existing alternative software. RESOLL should, however, concentrate on a few specific fields in order to avoid diluting the effort and to achieve tangible results. We would expect RESOLL to focus on the following fields<sup>27</sup>:

- E-government (On-line electronic services and management tools -AEG);
- Health management services;

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<sup>26</sup>List of software that runs under an operating system other than Windows: <http://linuxshop.ru/linuxbegin/win-lin-soft-en/table.shtml>

<sup>27</sup> Partners will be asked to validate these action areas and to suggest others.

- Municipal and related electronic services;
- Open business processes for small to medium-sized enterprises;
- Universities, colleges, schools, and school environments, in partnership with existing Quebec and Canadian initiatives such as EduLinux, MILLE, and others.<sup>28</sup>

## 8.1 E-Government

“E-government” usually means the collection of information and services that governments make available on-line for citizens, businesses, organizations, and other governments. The users of these electronic services and data can be residents or strangers interested in the country in question for business reasons, tourism, or any other reason. The distinction between information and services is key in that the level of interaction is much greater when dealing with services. Resorting to electronic services is equivalent, in many situations, to one or many transactions usually carried out in person with one or many public servants. Confidence, efficiency, and reliability in the process are critical as the user expects reactions from the electronic service to be official and recognized by the government.

E-government is rightly considered the leading application that will enable the government to deliver efficient services at minimal cost. Citizens are expecting more and more to be able to interact with government through electronic means, including the telephone and the Web, just as they can easily do with their bank. This awareness of the importance of ICTs to the delivery of government services to individuals and businesses provides the opportunity for significant investments in computer technology development, organization of services, and training on new computer technology tools.

In this context, open source software is an alternative to some commercial solutions. They guarantee the permanence of developed content (document format issues), the reusability of developed software, server and network security (solves security breach issues prevalent in some commercial solutions), as well as many other benefits, including being more affordable<sup>29</sup>.

With its government partners, RESOLL will identify paths and areas for experimentation enabling the validation of the approach, and to develop strategies and solutions capable of meeting the expectations of government organizations including such as the users of these services.

## 8.2 Health Management Services

Health management and the computerization of patient records are critical areas for controlling future health costs. The solutions will be more efficient if they are built by professionals and

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<sup>28</sup> Linux in the Quebec school system: <http://rtsq.qc.ca/dossiers/linux.htm>; LinuxÉdu Québec: <http://linuxeduquebec.org/>, ÉduLinux: <http://www.edulinux.org>, MILLE Project: <http://www.mille.ca>, Laboratoire Lévinux: <http://www.levinux.org>

<sup>29</sup> The list of governments with open source software initiatives also includes the reasons for which they resorted to this approach. See <http://www.webmaestro.gouv.qc.ca/ress/libre/gouvernements.html>

based on open standards and open source software. As an example, let us use OSCAR software:

*An open source software program developed in Ontario is making a splash in the world of health care. Created in order to improve diagnosis and treatment in clinics and hospitals, the software is winning more and more supporters in Canada and abroad.*

*The brainchild of David Chan, professor of medicine at Ontario's McMaster University, OSCAR (Open Source Clinical Application Resources) open source software is an on-line reference tool that enables the pooling of medical information.*

*For example, a doctor treating a pregnant diabetic patient can access medical data of other patients with the same condition on-line. Thus the doctor can use the information to give patients proven care appropriate to their condition. In addition to managing patient charts, OSCAR is also a decision-making tool.*

*Every medical team that uses OSCAR can adapt it to their specific needs. Because it is open source software, the teams must in return share their source codes with the software developers to help the software evolve. The Office québécois de la langue française defines open source software as software that is shipped with its source code so that it can be copied, modified, thus continually evolving towards an improved version, in a cooperative and community-based development environment (Office québécois de la langue française, 2002). This collaborative, community-based approach ensures the objectivity of the information contained in this on-line tool, as it is divorced from all commercial considerations.*

*In order to protect the confidentiality of personal information, measures have been taken to protect patients' identities. Patients must also give their written consent and are told the specific conditions under which their information will be used. In addition, the medical data is stored in a central data repository (CDR) with procedures in place to protect access and transfer of information.*

*According to doctor Chan, its creator, OSCAR has been downloaded almost 3,000 times to date, by medical teams all over the world, from Vancouver to Brazil.<sup>30</sup>*

### **8.3 Municipal Electronic Services**

Municipalities are the first level of government with which citizens and businesses have a direct relationship. As organizations providing services to citizens and businesses, municipalities have adopted electronic services for some years now. Municipal information, geomatics services, on-line registration services for recreational activities or permit applications – are all well-known and sometimes well implemented applications.

The size of municipalities – and their budgets – varies greatly. Small budgets and the inability to take the initiative in the electronic services field can be obstacles to the creation of a wired municipality. Funding programs for innovative communities introduced by Industry Canada have helped them with connectivity. There is still a great need for services and applications, however.

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<sup>30</sup>From the SISTech Bulletin - [16 January 2004 edition](#)

In Quebec, municipal amalgamation has created a need for the development and integration of dozens of municipal government electronic services on the one hand, and services for citizens and businesses on the other.

Open source software and open standards should be considered as an alternative or complementary solution in most new computer technology development solutions and municipal on-line services.

With its partners, RESOLL will study the question in order to confirm expected advantages and assist municipalities in finding better strategies and solutions in this field.

#### **8.4 Open Business Processes for Small and Medium-Sized Enterprises**

Over the last few years, the amount of open source software has grown to the point that a business can build practically all of its technology infrastructure based on this kind of software.

As an example, an SME could buy IBM or Dell computers with a GNU/LINUX operating system, use MySQL as a database server, SendMail as an email server, Apache as a Web server, StarOffice/OpenOffice as a productivity suite, PHP programming language to develop Internet applications, OSCommerce as a retail sales management tool and Compiere as a PRE (integrated software supporting business processes).

All of this software is available for download on the Internet. SME managements need to ask themselves the following question: will the resulting infrastructure perform well and be reliable? The open source software situation has evolved greatly over the last few years, and businesses need to consider it in their technological decision-making for the following reasons:

- 1) Many of these applications, including GNU/Linux, Apache, MySQL, PHP, and SendMAIL have reached the critical mass required to ensure that expertise is available and the project will not collapse from one day to the next. According to an IDC study, 14% of all servers are running LINUX and this number should reach 25% by 2006. It is also estimated that between 50% and 65% of all Web sites are hosted on Apache servers.
- 2) Many business such as Amzon, Yahoo and E\*Trade, whose very survival depends on reliable technology infrastructure have switched to LINUX. This proves that the software is ready to be used in essential corporate applications.
- 3) The LINUX operating system is now supported by major computer manufacturers and software editors. A number of studies have demonstrated that LINUX and APACHE open source software is just as reliable as their commercial equivalents. One of the studies<sup>31</sup>, conducted by David Wheeler, has synthesized a large number of quantitative studies on open source software.
- 4) Last but not least is cost. A number of independent studies have concluded that the cost of technology infrastructure is lower when it is built with open source software. For example,

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<sup>31</sup> [http://www.dwheeler.com/oss\\_fs\\_why.html](http://www.dwheeler.com/oss_fs_why.html)

Cybersource created a model of a 250 user business, and came to the conclusion that a 35% savings was possible if one used a LINUX/open source solution instead of a commercial Microsoft solution.

With SME partners, RESOLL will start projects to develop applications capable of meeting the expectations of businesses and confirming the advantages of an open standards and open source software approach in their business processes.

## **8.5 Universities, Colleges, Schools, and School Environments**

The education sector is rightly considered to be an ideal environment in which to adopt open source software. The shortage of financial resources, the constant need for development and the large number of licences required are among the justifications for this.

Some major initiatives have seen the light of day in Quebec, most recently at the school level, and for a long time in universities. Of particular note are the University of Sherbrooke and EduLinux, the CRIM Montreal MILLE project, and the initiative undertaken by the Laval school board and its partners<sup>32</sup>.

RESOLL recognizes the significance of open source software and its role in the school environment. So as to avoid duplicating initiatives in this field. RESOLL encourages those that are already established and that will be joining with them in crossover partnerships. A RESOLL project representative has been invited to sit on the MILLE project's advisory committee. MILLE and EduLinux project representatives are already participating in RESOLL discussions and are part of the implementation committee.

## **9 Per Project Approach**

In order to clearly define goals and maximize the benefits of RESOLL initiatives, it has been suggested that the initiatives should, to the greatest extent possible, take the form of goal-oriented projects, with clearly established goals and timelines. These projects could include any number of partners based on their scope and the interests of RESOLL members.

The pilot project-based approach allows for experimentation, adjustment, evaluation, and confirmation of the advantages and limitations of open source software. It can also identify and share what has been learned through these experiments to maximize knowledge transfer and make the partners as independent as possible.

Pilot project and open source software evaluation will be a key element of the RESOLL mandate as the need for it in this area is significant<sup>33</sup>.

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<sup>32</sup> See the project site at <http://www.mille.ca/>

<sup>33</sup> See the report "How to evaluate OSS" at [http://www.dwheeler.com/oss\\_fs\\_eval.html](http://www.dwheeler.com/oss_fs_eval.html)



### **9.1 A Demanding Process: Identification, Integration, and Development of Software and Content**

Applications will be identified based on the general requirements of on-line services and the specific needs of RESOLL partners.

There will be general applications, usable by all target groups, and specific applications for each sector (government, municipality, SME, schools).

The RESOLL approach will include the followings stages:

- 1- Research what is available in relevant international open software and standards directories;
- 2- Create specifications for development, integration, and adaptation;
- 3- Integration and development work;
- 4- Alpha testing;
- 5- Partner pilot projects;
- 6- Evaluations and adjustments;
- 7- Deployment and computer technology support;
- 8- Training and information sharing activities.

### **9.2 RESOLL Deliverables**

The creation of an initiative like RESOLL is in itself a deliverable that merits the necessary investment. Nevertheless, RESOLL is not a goal in and of itself and its activities will take many forms.

### **9.3 Pilot Projects**

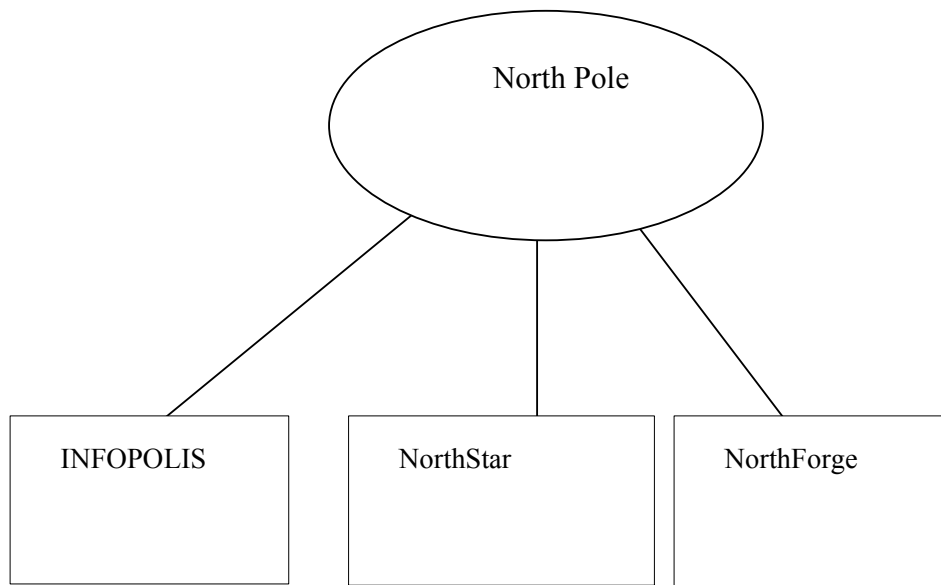
These are projects submitted to partners and developed in association with the partners, as they require their involvement to test and provide resources for their completion. Each project is tendered in a project file that includes an executive summary, goals, expectations and/or benefits, the research team and an estimated budget. Here are some examples of potential pilot projects:

- (a) Content management system to create, update, and manage Internet and Intranet Web sites for government organizations;
- (b) Remote tracking, application, and permit management system for citizens and businesses (e-Permit) regardless of the source of the permit (municipalities, provincial and federal governments);
- (c) Identity Sharing and Identity Authentication applications and components for multiple government Web sites, permitting uninterrupted sessions;

- (d) Personal data exchange protocol and application for government organizations for address changes, birth and death notices, etc.
- (e) Custom government open source software releases for personal computers and servers: Installation kits to have turnkey solutions available as an alternative to commercial solutions;
- (f) Client relations management system (e-CRM) for Canadian SMEs;
- (g) Human resources management system for Canadian SMEs;
- (h) Portal and cooperative tools for key Canadian industry sector SME partners: bid searches, bidding assistance, service delivery sharing and cooperation, etc.
- (i) Integrated conversion project for an administrative service or SME to a computerized environment based on open source software. The purpose of these conversions would be to create a benchmark environment, study the benefits and obstacles, identify success and risk factors, determine the total cost of ownership, and develop an appropriate economic model.

#### **9.4 Generic Collaborative Web Platform (e-Collaboration)**

The purpose is to operate an on-line collaborative Web site that pools the knowledge of RESOLL members from the outset, shares knowledge and ideas, distributes software tools, applications and components, and allow for collaborative efforts to create projects and monitor projects in progress. This method of working and cooperating is both a means and a goal as it will be available to all and will also be a deliverable. The collaborative platform, which can be accessed from the main *RESOLL.ca* site, will also host documents and software (or software components) developed for our projects or by our partners. Another hosting section will be a dedicated mirror site for open source software tools developed elsewhere but used by the Quebec community. The mirror site will enable member institutions to save on network access costs for these open source software products used by RISQ members. The hosting site will be called *Les Forges du Nord, North Forge*. The collaborative platform should be called *NorthStar*, as it will be an area for technological convergence as well as a workplace for the development of common viewpoints. The information would be called *InfoPolis*. The whole site would be called *North Pole*.



### **9.5 Set-up and Moderation of Participating User-Groups in RESOLL Sectors and their Projects**

Each pilot project or study can involve its user community, which can use the collaborative Web site as a forum for discussion, cooperation, information and training. It will be a means to share skills and knowledge, before, during and after projects and studies, and to share knowledge in the most efficient way possible.

### **9.6 Studies, Position Papers, and Marketing**

RESOLL could entrust its researchers to perform studies on:

- (a) Licences and their applicability to government services, and more specifically those related to source codes developed for government projects.  
Reconciliation of the granting of licences and economic development of new services or new businesses. Which is best for society? How and When?
- (b) Strategies to integrate commercial and open source systems;
- (c) Strategies for migration to open source code solutions;
- (d) Total cost of ownership studies (TCO) for open source code solutions for government and small businesses;
- (e) Economic models for open source software used in Quebec government services and SMEs.

## **9.7 Case Studies**

Specific projects, environments and experimental fields can be the subject of case studies to identify the pros and cons of the experiment or to analyze and share best practices.

## **9.8 Sharing Activities: International Conferences and Workshops**

RESOLL plans to organize a series of strategic positioning conferences to which partners will be invited in order to share their experiences and acquire new knowledge. Experts recognized in Canada and worldwide will also be invited, as well as RESOLL researchers and pilot project experts.

It is also suggested that a symposium on open source software and e-government be organized. This international symposium would take stock of current developments in the field in countries at different stages of development. It would make collaboration between governments and businesses possible, and promote success stories. It could be listed as an activity as part of The World Summit on the Information Society, the second phase of which will be held in Tunis, Tunisia, in November 2005. We believe that the Agence de la Francophonie, the European Commission, UNESCO, and other organizations may wish to be associated with this event. North-South and South-South co-operation (sharing of innovative experiences of countries from the South), sustainable development (the need to free oneself from monopolies and international mega-corporations, to think about production rather than consumption), linguistic and cultural diversity (open source software is often multi-lingual or can be, very quickly, at little cost, as the focus is not on profits; thus, they enable minority cultures to easily express themselves in the world network) should be the main streams of this symposium.

## **10 RESOLL Benefits**

### **10.1 For Partners**

The primary beneficiaries of RESOLL activities are the partners that fund it because RESOLL activities are designed to meet their needs and priorities. As well as being an expert network, one must think of RESOLL as a consortium in which partners invest to reap rapid and direct benefits. RESOLL projects will find answers and solutions to problems experienced or anticipated by government organizations, and the business processes of SMEs that are confronted with growing information technology needs.

### **10.2 For the Community**

As government partners, businesses, and researchers associated with RESOLL also play a significant role in the streamlining of new knowledge and skills, the benefits to the community will take the form of an increase in expertise in open source software and open standards, through dissemination, information sharing and training on the one hand, and the state-of-the-art compilation of adaptive software components and applications on the collaborative Web site, on the other. We expect that the *NorthForge* collaborative platform will have a positive impact in the information technology field and spread beyond the borders of Quebec and Canada.

### **10.3 For the Economy**

Without attempting to come up with specific numbers on the potential economic benefits, we can confidently say that the suggested model will create business opportunities for our partners, industry partners and other groups. Our model aims at creating favourable conditions for business relations. RESOLL will limit its development and integration activities to pilot projects. We hope that the experiments conducted will lead some partners to take advantage of these solutions, and RESOLL business partners will be the first to offer development and computer technology support to other members. RESOLL projects will increase expertise and thus contribute to a well trained workforce.

Increasing this expertise will result in job opportunities as students and developers with partner businesses associated with RESOLL projects will be in demand due to their expertise.

### **10.4 For the Research and Instructional Environment**

In addition to business and government partners, RESOLL is relying on the participation of a dozen multidisciplinary research professors from five Quebec universities. RESOLL will also involve masters and doctoral level students in most of its activities. We thus have all the ingredients to:

- 1) Provide quality training for students participating in the projects;
- 2) Create research themes and action research opportunities promoting scientific, technological, and social innovation; and
- 3) Eventually apply for and obtain significant research grants from Canadian organizations that fund university research.

## **11 Operating Procedures**

### **11.1 Partnership**

In order to set up the expert network in open standards and open source software and direct its activities, we envisage a partnership involving the following organizations:

- Centre interuniversitaire de recherche en analyse des organisations (CIRANO);
- CRIM;
- Réseau d'informations scientifiques du Québec (RISQ) Inc.;
- Quebec and Canadian government organizations represented by the Quebec Treasury Board Secretariat, the Treasury Board of Canada Secretariat and Industry Canada;
- Technology and business partners working in the field;
- The University of Montreal Public Law Research Centre;
- University research professors from a variety of fields such as computer technology, information technology, information systems, social sciences, economics, and engineering;
- Association partners such as PH Québec, Linux-Québec, ISOC-Québec, and the Montreal Association of Java Users.

Partners will contribute to RESOLL activities through:

- Dedicated or per-project financial resources
- Dedicated or seconded human resources
- Project development activities
- Other associated project activities (studies, management, training, dissemination, etc.)

The results of this work will primarily, but not exclusively, benefit partners in that the spirit of the initiative is to foster and implement a philosophy of resource sharing and recycling. Access to the results of the work should therefore be available to all.

### **11.2 Two Funding Methods**

RESOLL is a partnership of organizations from a variety of fields, that wish to share the results of their investment in the form of knowledge, information, training, and prototypes. We suggest

that RESOLL activities, to the greatest extent possible, take the form of projects in which there is involvement by the partners. RESOLL must also develop a relevant set of core competencies based in part on contributions and start-up and opinion studies.

RESOLL funding is structured as follows:

*a) Core Funding*

This funding would be continuous and would cover general activities. We have begun discussions on the subject with Industry Canada, the Government of Quebec, and certain private companies (IBM, CISCO, and CGI among others);

*b) Per-Project Funding*

Funding would be per project, and covered by those involved in them.

### **11.3 Management: Leadership, Science Committee, and Project Committee**

The network would be hosted by one of the partners, CIRANO, and led by a coordinator. An executive committee, made up of representatives of founding partners and backers, will be struck. A science committee would consist of researchers, industry representatives and active members of the community. Each project would be supervised by the project committee, which would provide direction and receive findings.

A number of university researchers have accepted an invitation to join RESOLL. They will make up the RESOLL science committee:

- Michel Dagenais, Software Engineer, École Polytechnique de Montréal
- Jean-Claude Guédon, University of Montreal
- Daniel Pascot, Laval University
- Jean Talbot, HEC-Montréal
- Daniel Poulin, Law-University of Montreal
- Jacques Robert, HEC-Montréal
- Michael Wybo, HEC-Montréal
- François Coallier, Ecole de technologie supérieure de Montréal
- Eric Lefebvre, École de technologie supérieure de Montréal
- Richard Marceau, University of Sherbrooke, to be confirmed

#### 11.4 Potential for Development Into a Canadian Network

As has already been discussed, it will be up to RESOLL members to pick an appropriate time to either maintain the RESOLL structure or transform it into a different organization in order to enable it to become an important player on the Canadian and international scene. After giving the matter some thought, we believe that RESOLL could benefit from a certain amount of independence in order to access sources of funds and establish national and international partnerships.

To that end, we will discuss the possibility and appropriateness of presenting RESOLL to the Canadian Advisory Committee on Information Management and RESOLL's potential as a pan-Canadian project later in this document.

#### 11.5 Team

The expanded team is made up of researchers, students, research professionals, and experts from organizations and businesses that sponsor the project. The small team of research professionals will be responsible for running the RESOLL office. Some of these professionals will be involved in the project part-time. They will be made available by their organization, as funds are available. The initial core of the team will be created as follows:

TITLE	DESCRIPTION
Coordinator	Responsible for management, business development, and new projects
Communications Officer	Responsible for the Web site and for facilitating collaborative community efforts
IT Specialist	IS architecture and business processes specialist
Computer Systems Specialist	Network, Linux, and system administration specialist

#### 11.6 Partners Approached and Status of Negotiations

Government organizations, businesses, experts, and user groups were approached to validate the project. They all welcomed the initiative and expressed their interest in being a part of it. The status of discussions varies from one group to the next. Here is a summary:

##### 11.6.1 i) Government Partners

- a. Industry Canada: The idea has benefited from Industry Canada involvement from the outset. A service contract awarded to CIRANO by the Department made this report possible.
- b. Quebec Treasury Board Secretariat, Office of the Chief Information Officer. The



project was submitted in September 2003. It was very well received, and was matched by a verbal promise of financial and organizational involvement. Willingness to be a part of the steering committee was expressed.

- c. Treasury Board of Canada Secretariat, Office of the Chief Information Officer. The RESOLL concept was presented 8 October 2003. The response was very enthusiastic and encouraging.

#### 11.6.2 *ii) Industry Partners*

- CGI, Quebec: A presentation was made on 1 October 2003. CGI is interested in the field.
- IBM Canada: an initial meeting was held in Ottawa on 8 October 2003, followed by a second in Montreal on 9 October 2003, with Mr. Jim Elliott. He was very confident that IBM Canada would become involved in an initiative such as this one.
- HP: we contacted the VP of HP, Mr. Martin Fink. He referred the file to one of his colleagues, Ms. Stormy Peters with whom we had a telephone conversation.
- Quebec small businesses: we have been in contact with some Quebec companies that have been working with open source and adaptive software for some time now. In addition, during the: “Étude sur l'offre en matière du libre au Québec” inquiry, we organized an initial gathering. During the study we were able to generate interest from businesses and identified their need to expand the open source solutions market.
- LPI, Linux Professional Institute: this company certifies LINUX professionals in a number of countries. We met with representatives in Ottawa. We presented the project and interest in collaboration was evident. LPI could be a good partner when it is time to make RESOLL a pan-Canadian project.

#### 11.6.3 *iii) Association Partners*

- Linux-Québec: the project was presented at a Linux-Québec open meeting. Co-operation with this association would be a good fit as Linux-Québec is an association of professional users, and RESOLL is counting on the mobilization of partners in the workplace as part of its strategy. The organization is now called FACIL, which stands for l'Appropriation Collective de l'Informatique Libre (Collective Ownership of Open Source Computer Technology), since its January 2004 conference. However, it is important to distinguish the roles of each organization. RESOLL plans to experiment in order to draw lessons and knowledge through a scientific method based on solid principles, as well as to share knowledge and assets in well-defined environments. It is a holistic approach with well-defined goals.
- ISOC-Québec: this association, although it does not specialize in open source

software, believes strongly in the approach, especially with respect to simplifying the appropriation of ICTs. The project was presented to the ISOC-Québec BOD by Adel El Zaim, who was President of this organization until the end of November 2003. The nature and type of collaboration has yet to be determined.

- Montreal Java Users Group (GUJM): the project was presented by Robert Gérin-Lajoie, a founding member of the group. We can count on GUJM's participation in the form of a pool of experts and collaborators.

#### 11.6.4 iv) *Research Partners*

1. CIRANO – RESOLL project initiator and host, CIRANO has dedicated resources to its creation and set-up in partnership with the other groups and organizations. Furthermore, CIRANO's experience in developing business models for e-commerce will enable it to contribute to RESOLL expertise in the field of open source e-business software applications.
2. CRIM – As the architect of the MILLE.CA project and a computer technology research organization, CRIM is an excellent choice of partner. They have recently confirmed their involvement. The RESOLL project and CIRANO are also members of the MILLE.CA project advisory committee.
3. The Réseau d'informations scientifiques du Québec (RISQ) - RISQ is a carrier of knowledge, research, and creativity in Quebec. Its 6000 km private optical telecommunications network will enable the sharing of resources and content developed by RESOLL without user fees for all members, the teaching community, as well as the research and creative communities in Quebec (and across Canada on the CA\*net 4 network as well as the rest of the Western world). In addition, RISQ will provide advanced network support for pilot projects and experiments conducted by RESOLL partners.
4. CRDP – The University of Montreal Public Law Research Centre is already conducting a number of projects on open source software, and the licensing issue in particular. They would participate in RESOLL as a partner and service provider.
5. Research Professors – All the research professors and university professionals who were contacted, and whose names are listed in this document, have agreed to participate in RESOLL. If the project goes pan-Canadian, it would be necessary to invite research professors from other universities to participate, the University of British Columbia, for instance, but not to the exclusion of others. No research has been undertaken on this subject to date.

#### 11.6.5 v) *Project Partners*

- MILLE.ca, Modèle d'infrastructure du logiciel libre en éducation (Open source software infrastructure model in education).
- Révolution Linux- Business for the distribution of open source software for the

education sector (ÉduLinux, OSCAR), a branch of the University of Sherbrooke.

## **12 Implementation Strategy**

### **12.1 Partnership**

The preferred approach: a multi-actor partnership, in terms of funding, positioning, and especially in terms of project development and implementation. The strength of the network is the strength of its partners. It combines the momentum of expertise, organizations whose services are in high demand, and organizations that can benefit from them. Supply and demand are combined.

### **12.2 Governments**

Quebec City and Ottawa have expressed interest through the Public Sector CIAO Council, PSCIOC. It is essential that public sector participation not be limited to grants and service contracts. Public administration is an excellent environment in which to develop projects and test new ways of doing business. Such an approach allows the government to respond to political and economic pressures related to its position on open source software and open standards by basing its decisions on concrete experiments and results. Government organizations are therefore active partners in terms of content and services. They will be the first users of these products and RESOLL will facilitate the involvement of public sector applications from the outset.

### **12.3 Businesses**

Big businesses and SMEs involved in RESOLL span a broad range of competencies and services in the field. It is essential to foster a relationship built on trust with businesses in order to avoid competition and ensure the opportunity to develop business relationships between them and government organizations. RESOLL will limit itself to pilot projects, while technical services will remain in the commercial realm.

### **12.4 Scientific Team**

Although RESOLL projects are not theoretical R&D projects, the scientific team will play a critical role. It is responsible for the scientific accuracy and integrity of contributions, the methodology used, and will carry out certain information-sharing activities. RESOLL projects could eventually support university research projects. Research professors will be encouraged to apply for grants in this area to organizations that fund research. RESOLL projects could take the form of action research focussing on technological and social innovation, as they cover both development (technological) and the use of applications (by organizations and society).

### **12.5 Start-Up Projects**

In addition to management activities, the initial RESOLL budget will cover start-up activities for certain projects. They should be thought of as asset-building activities that make it possible to launch other projects. The Web site will definitely be the first product on which the RESOLL team will have to rely to build its name.

## **12.6 Projects with Partners**

RESOLL will initiate projects with its partners. It is important that users be involved from the outset. We will have to make sure that supply is adjusted to demand, and not the other way around.

## **12.7 Communication and Strategic Placement**

The RESOLL Web site and the participation of its team in projects will be the key elements in positioning itself properly. RESOLL is already a member of the MILLE.CA advisory committee. It will be essential to become involved in other initiatives and create opportunities to start a buzz. The importance of the Web site and collaborative tools to take the field and demonstrate its effectiveness cannot be stressed enough.

## **12.8 International Development in la Francophonie**

The RESOLL concept has already been presented to the Institut des nouvelles technologies de l'information et de la formation (INTIF, institute for new information technologies and training) of the Agence intergouvernementale de la francophonie (Francophonie intergovernmental agency).

## APPENDIX 1: References

1. GPL License:
  - a. Unofficial French Translation: <http://www.linux-france.org/article/these/gpl.html>
  - b. Original English version: <http://www.fsf.org/licenses/gpl.txt>
2. <http://www.opensector.org/>
3. <http://www.gnu.org/philosophy/free-sw.fr.html> (user rights according to R.Stallman)
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5. Government of Quebec Open Source Software Community  
<http://www.webmaestro.gouv.qc.ca/ress/libre/communaute.html>
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7. Study on the evaluation of open source software conducted by David Wheeler <http://www.sil-cetril.org/wheeler/traduction-fr.html> for the French translation and [http://www.dwheeler.com/oss\\_fs\\_why.html](http://www.dwheeler.com/oss_fs_why.html) for the original English version.
8. Linux in the Quebec Education Sector: <http://linuxeduquebec.org/>
9. ÉduLinux: <http://www.edulinux.org>
10. Association of Francophone Linux and Open Source Software Users  
<http://www.iful.org/index.html>
11. Association for Promotion and Research in Free Computing <http://www.april.org/>
12. List of institutions using an alternative to Microsoft Office  
<http://www.bureautiquelibre.org/>
13. Free Software Foundation Europe: <http://www.fsfeurope.org/>
14. Oasis-Open: <http://www.oasis-open.org>
15. Agence pour le développement de l'administration électronique:  
<http://www.adae.pm.gouv.fr/>
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17. Lists of available Linux software as compared to available Windows software  
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18. Analysis and list of software alternatives to the Microsoft Office suite:  
<http://www.iful.org/solutions/pdt/rapport-pdt>

APPENDIX 2: Organization and Expert Partner References (See the French section)