IT-TT-Report-2003
February 2004

Technology Transfer in the IT Department

Report for the year 2003

IT-TT-Report-2003
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The objective of this report is twofold:

a) *To present the main channels through which the Department implements CERN 's technology transfer policy*
b) *To provide an exhaustive compilation of IT activities and achievements that have contributed to technology transfer in 2003*

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1 Executive Summary

The objective of Technology Transfer (TT) at CERN is "*to make known and available to third parties under agreed conditions, technical developments achieved in fulfilling the laboratory's mission in fundamental research*". The IT Department contributes to this objective by the transfer of technology, expertise and know-how to industry, universities, public institutions and the society at large.

IT Department activities focus on fast changing Information and Communications Technologies (ICTs), which often require that the necessary developments are conducted in collaboration with external partners. As a result, the main channels for TT in the Department are *collaborations* and *partnering* with external organizations, rather than the classical patenting and licensing approach. The other main channel for TT is the transfer of software technologies via *collaboration agreements* or, more frequently, via *open source* mechanisms.

In IT, collaborations and partnering bring direct additional funding (from funding agencies such as EC-funded projects, as well as funding from industry such as the openlab). The open-source approach for software also brings direct benefits by sharing and lowering the cost of development and testing, as well as bringing indirect longer term benefits, as exemplified by the World-Wide Web.

Technology Transfer through Software Licensing

In 2003, a study was undertaken within the Department to review existing practices in terms of software licensing, to compare licensing via bilateral agreements to that based on open source principles, and to evaluate the various options for open source licensing (e.g. GPL, LGPL, …).

Bilateral *Collaboration Agreements* may be appropriate for only software developed within CERN. Open source is appropriate in many cases, including, but not only, software developed in collaboration with external partners. In 2003, two new software packages were made available as open source (Print Server Software and SLIC), one new bilateral Collaboration Agreement was signed (Friedrich Miescher Institute for Biomedical Research) and a number of new organizations downloaded the Printing Client Package (programs in binary-only format).

Technology Transfer through R&D collaborations with industry

The openlab for DataGrid Applications - a framework for evaluating and integrating cutting-edge technologies or services in partnership with industry - is the main vehicle for IT Department R&D partnering with industry. In 2003, two new partners (IBM and Oracle) were successful incorporated, bringing to the number of sponsors to five (together with Enterasys, HP and Intel).

The IT Department hosted two meetings of the First Tuesday Suisse Romande series at CERN.

Technology Transfer through European Union collaborative projects

The European DataGrid (EDG) and DataTag, both EC-funded projects, were, in 2003, the major examples of TT through publicly funded projects. The European Grid Industry and Research Forum (IRF) -a framework initiated by the European DataGrid project and joined by the CrossGrid project- is the focal point of contact between research on Grid technologies and the industrial and scientific world. At the end of 2003, the IRF counted 287 members. 2003 was also the key year for the preparation and successful submission of the EGEE (Enabling Grid for eScience in Europe) project. EGEE aims to integrate current national, regional and thematic Grid efforts, in order to create a seamless European Grid infrastructure for the support of the European Research Area.

Technology Transfer through education, outreach and dissemination

CERN organizes the CERN School of Computing (CSC) every year. The 26th CSC took place in Krems an der Donau, Austria. 68 students of 25 different nationalities (a new record for CSCs) and from 39 different institutes attended the school. 73% of them were citizens of a CERN Member State. For the second year running, an examination was offered at the end of school. 60 students registered

for the exam and 53 passed. Each successful candidate received a formal credit certificate from CERN. In 2003, a proposal was made to the European Commission for grants to assist students with living and travel allowance and cover a fraction of the organization costs. The proposal was accepted with a high mark and the contract was signed at the end of 2003.
The IT department (via the EDG and EGEE projects) was also one of the founding members and is still a major contributor to the International School on Grid Computing, organized by the Global Grid Forum. The GGF Grid school 2003 took place in Vico Equense, Italy.

IT was the originator of the RSIS (Role of Science in the Information Society) conference held at CERN in December 2003. IT contributions included the responsibility for organizing the projects into work packages and that of designing and implementing the SIS-forum, an exhibition organized at Palexpo in the framework of the World Summit on Information Society (WSIS). The organization included 32 people from four divisions (ETT, EP, IT, HR). After a Call for Content, 42 projects from 32 organizations world-wide were selected. The culminating event was the inauguration in the presence of Mr. Kofi Annan, United Nations Secretary General. The SIS-forum Web site (http://cern.ch/sis-forum) received more than half a million visits during the month following the event.

Internal activities

The IT DTTO contributed to the work of the Technology Transfer Advisory Board (TAB). Within IT, an inventory of external collaborations was carried out and the results presented via a taxonomy of activities. A web site presenting TT in the IT Department was created.

2 Context

2.1 Background on Technology Transfer at CERN

In 1999, CERN Delegations approved a new, more pro-active Technology Transfer (TT) policy, mainly focusing on protection and active transfer of CERN Technology to Member State industry. In 2002 the pro-active TT policy was confirmed and enhanced to include active transfer, in particular through partnerships activities, not only to industry but to institutions operating in the field of HEP as well as in other areas.

A management and coordination structure was set up, including the appointment of a Director in charge of Technology Transfer, the creation of a CERN-wide advisory body (the *TAB, TT Advisory Board)*, the setting up of a network of contacts in every Member State (called the *External TT Network)*, the creation of the *Departmental TT Officer* (*DTTO*) function (collectively forming what is called the *Internal TT network)* and the establishment of a TT group. A paper on Technology Transfer progress and plans is presented every year to the CERN Finance Committee, usually at the March meeting.

2.2 Technology Transfer structures at CERN

The following describes briefly the structures in place in 2003.

Technology Transfer Advisory Board (TAB)
The TAB advises the CERN Director General for all matters relating to TT. This includes providing recommendations on policies as well as on specific cases (called TT Cases). For the former, the TAB prepares policy documents, proposes procedures and workflows. For the latter, the TAB conducts regular analysis of cases as well as hearings of case proponents. See Appendix 1 for the list of TAB members in 2003.

Departmental Technology Transfer Officers (DTTO)
The DTTO is the focal point for Technology Transfer matters within the Department and for liaison with CERN-wide TT structures. He/she acts as a facilitator, adviser, promoter, monitor and external liaison person for technology transfer. The scope of his/her mission includes transfer towards all potential socio-economic and cultural third parties.
See Appendix 2 for the full mandate of DTTOs (in draft form at the time of writing).

Technology Transfer Group (part of ETT division in 2003)
The TT Group's mandate is to implement the new TT policy through the evaluation, protection and valorisation of CERN Intellectual Property (IP). Its activities are focussed on patenting and licensing.

2.3 Role of IT Department in Technology Transfer

In all structures aiming at strengthening and encouraging Technology Transfer, the Information and Communications Technologies (ICTs) play a key role, in particular due to the short cycles in the chain research -> development -> products and services. At CERN, the IT Department is heavily involved in technology transfer, capitalizing on past actions (such as the invention of the World-Wide Web in the former CN Division, the pioneering role in the European Internet infrastructure, the invention of computer intensive solutions like SHIFT) and current involvement in cutting edge technologies such as GRID.

Before the function of DTTO was extended to all CERN Divisions, it was first prototyped in IT Division (in the person of F.Gagliardi). The present IT DTTO (F.Fluckiger) is a member of the TAB, representing the ICT field in the Advisory Board.

3 Scope of TT actions in IT Department

The objective of Technology Transfer has been defined by CERN as follows: "*To make known and available to third parties under agreed conditions, technical developments achieved in fulfilling the laboratory's mission in fundamental research.*"

The scope of TT actions covers technology transfer at large, that is, activities related to the transfer or exchange of expertise, knowledge, ideas and concepts with all socio-economic and cultural third parties. This includes:

a) Industry
b) the Academic world
c) other Public Institutions.

Items a) and c) include collaboration agreements with industrial or institutional partners. Item c) includes International Organizations, the European Commission, Governments, Trade and Industry Departments or Ministries.

4 TT activities and achievements in IT Department in 2003

IT Department contributed to the TT objective of CERN - as defined in section 3 - through the following activities.

4.1 Liaison with, contribution to CERN TT structure

4.1.1 Contribution to the work of the TAB

The TAB met 15 times in 2003. The IT DTTO participated in the evaluation of TT cases, contributed to the review of the TT report 2003 to the Finance Committee, and to the work leading to the formation of the *Internal Network* of DTTOs and the procedures for dealing with TT cases.

4.1.2 Liaison with TT group

The TT group maintains a database of TT projects and activities. A major review of the projects and activities connected to the IT Department and listed in the TT database took place in 2003. A number of outdated information was updated or removed. During this exercise it appeared that the purpose, the classification of items, as well as the user interface to the database needed improvement and clarification. The procedures and respective roles for maintaining the TT database in the future need to be clarified and specified by the TT group, so that the associated workload on the DTTOs remains reasonable.

4.2 Technology Transfer through software licensing in IT

The production of software, in the field of experimental physics and in support of computer services is a part of the IT Department activities. In 2003, a study was undertaken within the Department to:

- Review existing practices in terms of licensing of software
- Better understand the possible modes for making CERN software available to third parties
- Compare licensing via bilateral agreement to licensing based on open source principles
- Evaluate and compare the various options for open source licensing

The results of the study (which gave rise to a presentation within the Department) are summarized below.

4.2.1 Summarized results of IT study on software licensing

4.2.1.1 Forms and modes of software publishing

- **"Internal" and "External" software**
  Software developed by the IT Department may be divided into "***Internal***" (software available only within CERN) and "***External***" software (made available, in some way, and under certain conditions, to third parties - sometimes also called "***published***" software.

- **Form: Binary-only and Source**
  Software made available to external bodies by the IT Department is either in *binary-only* form or in *source* form.

- **Mode: Bilateral Collaboration Agreements**
  Both binary-only and source programs can be made available through ***Bilateral Agreement*** (known at CERN as "***Collaboration Agreements***"). The IT Department uses this mode is several specific cases.

- **Mode: Source code made available as "open source"**
  The most frequent way for IT to make software available to external bodies is based on ***Open Source*** principles (also called "***Free Software***" principles). Under these principles, binary versions are also made available for selected environments

- **Mode: Binary-only code made publicly available**
  In several specific cases, IT binary code is made also made available to third parties, through binary download mechanisms.

These forms and modes are presented in a flow-chart in Appendix 3.

4.2.1.2 Development styles and modes of publishing

Decisions to keep IT software either internal or to have it published, and if so, under which mode, are made on a case-by-case basis. The nature and style of development of the software are key parameters in this decision.

Features	Bilateral Agreements	Publicly Available Source
Main Development style	Software developed mainly within CERN	Software developed in a collaborative manner with external partners
Motivations for external release	• Good relationships with external party • Notoriety • Improvements available to CERN	• Benefits expected from external licensees: testing, improvements • Notoriety • Maximize number of beneficiaries
Scaling	Does not scale	Scales well

4.2.1.3 Intellectual Property Rights (IPR) issues

When discussing forms of software publishing, a frequent mistake, including within CERN, is to confuse *public domain* (which implies relinquishing IPR) and *free software* or *open source* mode where IPRs are retained.

When IT publishes software, it always uses modes where IPRs are retained, i.e. maintaining a CERN ***copyright statement*** in the software (see below). By so doing, CERN protects the rights of the outside users, in particular by preventing third parties to turn *free software* into *proprietary software* and thus deny the users the right to freely use the material.

Appendix 4 contains a list of terms and their definition as used at CERN regarding IPR and more generally Technology Transfer.

4.2.1.4 Statements in Software

The study has identified three components of what we called "***Software Statements***" which appear in published software, and have three very distinct functions. At CERN, these three components are sometimes mixed up and confused when software is published.

The study proposed that in the future CERN considers separately these three necessary components, and adopts the terminology below in order the reduce confusion. They are:

1. **Intellectual Property Statement**
   Also called ***Copyright Statement***, it specifies who owns the copyright

2. **Distribution Conditions**
   Also called "***Distribution License***", they specify what are the rights and obligations of those who receive the software.

3. **Disclaimer**
   It specifies the liability and warranty conditions.

Components 2) and 3) are often covered by what is called ***Publicly Available Licenses*** or ***Open Source Licences.***

4.2.1.5 Publicly available Open Source Licences

Dozens of models of Open Source licenses have been developed by multiple sources (universities and academia such as the MIT; industry such as Sun, AOL or Trolltech**;** not-for-profit organizations such as the *Free Software Foundation*) and are made publicly available for use by organizations wishing to publish their software, whilst retaining the IPR. Appendix 5 gives a few typical examples of open source licenses.

The ***GPL*** and ***LGPL*** licenses developed by the Free Software Foundation (as well as variants of LGPL adapted by CERN to meet special requirements) are the most frequent open source licenses used by IT to publish source software. Choice of public license or a version adapted for CERN is done after agreement by the CERN legal service.

4.2.2 Cases of software licensing in 2003

Appendix 6 provides the list of IT software packages made available in one form or another to third parties at the end of 2003. It also contains the usual conditions which appear in CERN IT Bilateral Agreements.

In 2003, new packages were released and additional bilateral agreements were signed for existing external packages.

New cases in 2003	Software Package	Mode	Detail
New external packages	SLIC	Open Source	GPL
	CERN Print Server Software	Open Source	GPL
New users of existing external packages	Nice 2000	Bilateral Collaboration Agreement	Agreement with Friedrich Miescher Institute for Biomedical Research
	Printing package (Client)	Public Availability of Binary-only code	Eighty new organizations have downloaded the package after agreeing on CERN conditions. The list is available in Appendix 7.

4.3 Technology Transfer through European Union collaborative projects

ICT projects funded by public institutions constitute a major channel for CERN to effectively transfer know-how and expertise, in particular in the field of very large scale computing. In IT, this was exemplified in 2003 by European Union funded projects under the FP5 programme:

4.3.1 EDG, the European DataGrid

The objective of *EDG*, the European DataGrid project funded by European Union, was to build the next generation of computing infrastructure providing intensive computation and analysis of shared large-scale databases, from hundreds of TeraBytes to PetaBytes, across widely distributed scientific communities. The three year project was successfully terminated at the end of 2003.

4.3.2 DataTag

The DataTAG project objective is to create a large-scale intercontinental Grid testbed that focuses upon advanced networking issues and interoperability between these intercontinental Grid domains. The results are disseminated into each of the associated Grid projects. The project ends in 2004. It involves five academic partners in Europe, six in North America as well as a number of collaborating networks and institutes on both sides of the Atlantic.

4.3.3 EGEE

2003 was also the key year for the preparation and successful submission of the EGEE (Enabling Grid for eScience in Europe) project. EGEE aims to integrate current national, regional and thematic Grid efforts, in order to create a seamless European Grid infrastructure for the support of the European Research Area. This infrastructure will be built on the EU Research Network GEANT and exploit Grid expertise that has been generated by projects such as the EU DataGrid project, other EU supported Grid projects and the national Grid initiatives such as UK e-Science, INFN Grid, Nordugrid and the US Trillium (cluster of projects). The project will start the 1st of April 2004.

4.3.4 IRF: The Industry and Research Forum

In March 2001, an Industry and Research Forum (IRF) was created in the framework of the DataGrid project, as a result of the merging between the Industry and Research fora of two large European Grid projects (DataGrid and CrossGrid). Since then, a number of IRF events have been held in conjunction with the DataGrid conferences.

One of the main objectives of the European Grid Projects is to transfer the Grid know-how to the industrial environment.

The European Grid Industry and Research Forum is the main point of contact between research on Grid technologies and the industrial and scientific world. The free subscription to the European Grid Industry and Research Forum enables researchers, countries and parties, which otherwise would have difficulties in joining an EU consortium, to receive newsletters, to participate in interesting discussions, to be invited to major Grid events and live demonstrations.

4.4 Technology Transfer through R&D projects with industry

In the field of ICT, R&D projects with industry constitute an important channel for transferring CERN know-how, in particular when industry contributes advanced technologies and CERN brings its integrator expertise in building and exploiting large scale systems based on these technologies.

4.4.1 openlab for DataGrid Applications

In IT, R&D with industry is exemplified by the openlab for DataGrid Applications, a framework for evaluating and integrating cutting-edge technologies or services in partnership with industry, focusing on potential solutions for the LHC Computing Grid (LCG). The openlab invites members of industry to join and contribute systems, resources or services, and to carry out with CERN large-scale highly-performing evaluations of their solutions in an advanced integrated environment.

In a nutshell, the major achievements in 2003 were: the successful incorporation of two new partners: IBM and Oracle; the consolidation and expansion of the opencluster, a powerful compute and storage farm; the start of the "gridification" process of the opencluster; the 10 Gbps challenge where very high transfer rates were achieved over LAN and WAN distances; the organization of three thematic workshops including one on Total Cost of Ownership; the implementation of the openlab student programme, bringing some 11 students to CERN in the summer.

4.4.2 Other collaborations with industry

Other areas where IT collaborated with industry in 2003 include:

In the field of Application Software:
- Collaboration with Autodesk Inc., SUN Microsystems Inc.,

In the field of Internet Services and System Management
- Collaboration with Microsoft Research

In the field of Databases
- Collaboration with Oracle Corporation
-

4.4.3 Other industry-oriented activities

The IT Department hosted at CERN two meetings of the First Tuesday Suisse Romande series, which organize regular events involving hundreds of local companies and institutions in the ICT field.

4.5 Technology Transfer through education, outreach and dissemination activities

4.5.1 CERN School of Computing

IT organizes every year the CERN School of Computing (CSC). The 26th CSC took place at the Donau University, Krems an der Donau, Austria, from 24 August to 06 September 2003.

The programme of the School was organized around three themes: Algorithms, Grid Technologies and Software Technologies and consisted of 30 hours of lectures and 22 hours of hands-on exercises, delivered by 12 lecturers from seven different organizations.

The practical exercises required a substantial computing infrastructure. A Grid server system was installed by CERN and the Institut für Hochenergiephysik (HEPHY), Vienna, and connected to the European Grid. This was the first time an HEP Grid node was set up in Austria.

68 students attended. The students were of 25 different nationalities (a new record for CSCs) from 39 different Institutes. 73% of them were citizens of a CERN member state, and 77% of them said their work was related to Particle Physics.
Attendance rate was very high - above 95% on average - including at optional lectures, and was sustained until the end. The satisfaction questionnaire was, for the first time, fully electronic, and filled out by 46 students. The overall appraisal score, 3.58 (very poor = 0, excellent = 4), was one of the highest in the history of the school.

For the second year running, an examination was offered at the end of school. 60 students registered for the exam and 53 passed. The examination was implemented in the form of computer-based multiple-choice questions. Each successful candidate received a formal credit certificate from CERN.

The major organizational novelty was the systematic use of web-based interfaces for all interactions. A live web site (http://cern.ch/CSC/2003/Live_from_CSC2003/CSC_live.htm) became the main vehicle for communication, with and between the students.

In 2003, a proposal was made to the European Commission FP6 Marie Curie programme for grants to assist up to 25% of the students with living and travel allowances over four years**.** The proposal was accepted with a high mark (93.5 / 100). The contract was signed at the end of 2003. Appendix 8 provides a list of facts and figures on the CERN School of Computing 2003.

IT Department contribution to other schools

The IT department (via the EDG and EGEE projects) was also one of the founding members and is still a major contributor to the International School on Grid Computing, organized by the Global Grid Forum. The GGF Grid School 2003 took place in Vico Equense, Italy.

4.5.2 World Summit on the Information Society

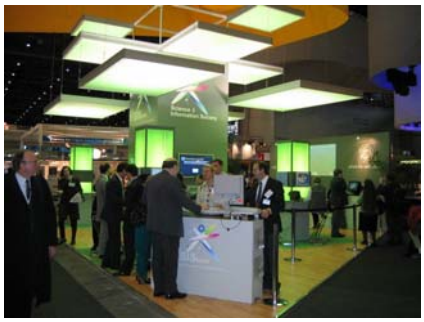
In July 2002, IT Department developed a proposal for CERN to organize a conference in 2003 on the Role of Science in the Information Society (RSIS), in parallel to the World Summit on the Information Society. The proposal was accepted and IT contributed to the conference itself and led a complementary event in the form of an exhibition called the Science and Information Forum (SIS-forum).

4.5.2.1 RSIS conference

IT was the originator of the RSIS conference held at CERN in December 2003. The IT contribution included the responsibility for organizing the project into work packages, the creation of working web sites and the provision of computing facilities for attendees during the conference. IT was also in charge of the "Enabling Technologies" morning, a session which was part of the scientific programme.

4.5.2.2 SIS-forum

In addition IT was responsible for the design and implementation of the SIS-forum, an exhibition organized at Palexpo in the framework of the World Summit on Information Society (WSIS). The Programme committees and the Organizing committee included members from four divisions (ETT, EP, IT, HR); within IT, members of the CS, DB, DI, IS and US groups contributed. After a Call for Content, 42 projects from 32 organizations world-wide were selected and invited to present their activities on the stand.



The culminating event was the inauguration in the presence of Mr. Kofi Annan. The overall WSIS exhibition received about 38,000 visits. The SIS-forum site (http://cern.ch/sis-forum) received more than half a million visits during the month following the event.

More information on the SIS-forum is available in Appendix 9.

4.6 Internal activities

4.6.1 Survey of external collaborative activities

A survey of external collaborative activities in the Department was undertaken in 2003. The major outcome was the creation of a taxonomy of collaboration forms, as well as an inventory of those activities classified according to the taxonomy.

4.6.1.1 Taxonomy of collaborative forms in IT Department

The taxonomy first classifies collaborations according to their *nature*:

- Formal collaboration
- Informal collaboration.

It further splits them according to their *type*:
For *formal* collaboration

- Collaboration via Public Funding (i.e. public funding institutions)
- Collaboration with Industry
- Collaboration with Public Institutions
- Collaboration via Open-Source -type Software
- Collaboration via Binary-type Software
- Collaboration via License-Agreement Software

For *informal* collaboration

- Collaboration with HEP organizations
- Collaboration with Public Institutions
- Collaboration with Industry.

Appendix 10 provides details on the taxonomy

4.6.1.2 Inventory of external activities

The survey covered five groups in 2003 (ADC, DB, IS, PS and DI). Results are available in Appendix 11.

4.6.2 Creation of a web site for Technology Transfer in IT

A web site dedicated to Technology Transfer in the IT Department was created in 2003. It is intended to inform and create awareness on TT within IT, but also to inform readers within and outside CERN of TT activities in the Department.

Link: http://cern.ch/it-div-tt

5 Appendixes

5.1 Members of the Technology Transfer Advisory Board (TAB) in 2003

5.1.1 Membership

"The Director-General appoints the Technology Advisory Board (TAB). Its membership includes senior experts from the Laboratory in areas such as: computing, cryogenics, electronics, magnets, material technology, sensors, vacuum, etc. Ex officio members include: the Director in charge of Technology Transfer, the Head of the ETT Division, the CERN - EU link person, a member of the Legal Service and a member of the Purchasing Service and appropriate staff from the TT Services. In addition, a few senior, external experts are invited by the Director-General in order to contribute to the advice given by the TAB.

The Chairman of TAB is appointed by the Director General from among the members.."

5.1.2 Members in 2003

Cristoforo Benvenuti	CERN TAB member
Enrico Chiaveri	CERN TAB member / Divisional Technology Transfer Officer (AB)
Manjit Dosanjh	TT Service: TAB member (Secretary)
Francois Fluckiger	CERN TAB member / Divisional Technology Transfer Officer (IT)
Adolfo Fucci	CERN Tab Member / Divisional Technology Transfer Officer (EP)
Angela Goehring-Crinon	Ex Officio TAB member
Hans Falk Hoffmann	Ex Officio TAB member
Per K. Jacobsen	External TAB member, External Transfer Technology contact for Norway.
Jean-Marie Le Goff	TT Service: TAB member (Leader of the TT Service group)
Robin Miege	External TAB member
Juan Antonio Rubio	Ex Officio TAB member
Anders Unnervik	Ex Officio TAB member, Divisional Technology Transfer Officer (SPL)
Peter Weilhammer	CERN TAB member
Horst Wenninger	The Chairman of TAB
David Owen Williams	CERN TAB member

5.2 Mandate of the DTTOs

From TAB document, 19 June 2003 TAB Meeting (Draft status):

The Divisional TT Officer (DTTO) is nominated by, and reports to, his/her Division Leader.

The DTTO is the focal point for TT matters within his/her Division, and the liaison between the Division and the TT Group.

The DTTO would, for the Division:

In general:

- *Keep an updated account of the Division's scientific and technical assets;*
- *Promote technologies with potential for TT actions at the earliest possible stage;*
- *Raise awareness within the Division of the possibilities of integrated & collaborative projects, with other institutions & industry;*
- *Participate in the TT Internal Network.*

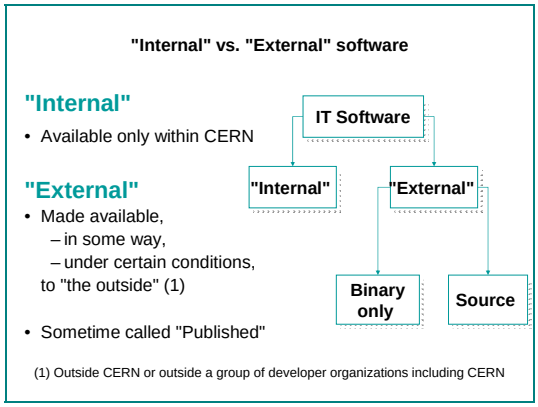
With regard to the TT Workflow in particular:

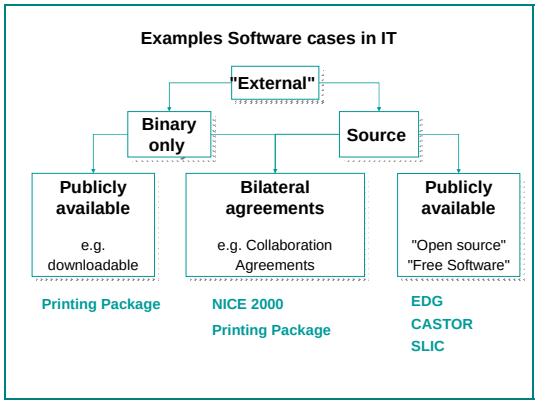
- *Act as the main point of contact for inventors within the Division, from the very beginning of the file;*
- *Advise inventors on the initial steps that need to be taken in protecting IP and establish contacts with the TT Group;*
- *Call for the formation of a Project team for the IP;*
- *Inform the Divisional hierarchy, at the appropriate time, of potential TT actions.*
-

In relation to the TT Group

- *Be the first point of contact for its Division for action and implementation of the TT policy;*
- *Maintain regular contact with the TT Group, and have good knowledge of TT practices & procedures;*
- *Act as the regular provider of information and updates thereto on the Division's technical assets for the TT database;*
- *Act, together with the TT Group, as a channel for opportunities announced via the TT External Network for requests from the Member States for contacts concerning specific CERN technologies.*

5.3 Making IT software available to third parties





5.4 Definition of TT terms as used at CERN

Constructed from TAB document presented at TAB Meeting, 19 June 2003:

Intellectual Property (IP)	**Intellectual Property (IP)** is a general name for property which is the product of invention or creativity, and which does not exist in a tangible, physical form' (Oxford English Dictionary). As such it can be opposed to material property such as buildings, machines etc. Both kinds of property are assets of the Organisation
'Author of IP'	The term **'author of IP'** shall designate the person having generated, developed or invented IP. Such IP can come in the form of know-how, software, designs, patentable IP and so on
"Inventor"	The term '**Inventor'** designates at CERN the author of a patented CERN Technology.
Copyright	A **'Copyright' (©)** is a legal protection covering literary works (e.g. publications), artistic works, technical drawings, plans, photography audio-visual creations and software. It does not protect an idea itself but rather the way the idea is expressed. Copyright comes into force automatically as a creation takes place (although it is advised to make explicit reference to it where applicable as soon as possible). It gives the author the right to control in particular the copying, reproduction and sale of the protected works.
'Technology'	The term '**Technology'** is used in it is very widest sense, encompassing all IP
'Inventor'	The term '**Inventor**' shall designate the author of a patented Technology.
'Invention'	The term '**Invention**' designates a product or a process that provides a new way of doing something, or offers a new technical solution to a problem
Patent	A **'Patent'** is a legal title granting its holder the exclusive right to produce, use, offer, import or export a new technical solution in the area covered by the patent thus stopping others from doing so without authorisation of the holder. Confidentiality is an important pre-requisite for patentability. The disclosure (even oral) of a Technology may prevent it from being patented because the essential criterion of novelty may no longer be considered fulfilled.
'Know-how'	'**Know-how'** covers all technical information, which is or cannot be patented (but may include that information necessary for obtaining a patented product or for carrying out the patented process). It may cover the details of a manufacturing process, which although not inventive, are essential for a commercial product to be obtained
License	A **'License'** is an agreement which sets out the conditions under which the owner of a Technology gives permission to another party to use it
Trademark	A **'Trademark'** is a legal protection covering the manner in which goods and services are identified and recognised. Its purpose is to distinguish goods from one company from those of another. CERN may consider applying for a trademark where the same would provide publicity for, or make a statement as to, the work carried out on its site (for example CERN's trademark: 'CERN – Where the World Wide Web was born'.) It is possible to register a word, a logo, or indeed any other mark, which can be described or shown on a trademark application form.
Non-Disclosure Agreement (NDA)	A **'Non-Disclosure Agreement' (NDA)** is an agreement setting out the terms under which two parties will exchange information which they deem confidential. By signing the NDA a party or both parties oblige(s) himself (themselves) not to disclose such information to any third parties

5.5 Major existing Open Source Public Licences

Source		License name
Universities Academia	MIT	MIT License
	Berkeley	BSD License
Industry	SUN	Sun Public License
	IBM	IBM Public License (IBM PL)
	AOL	Mozilla Public License (MPL)
	Trolltech	Qt Public License (QPL)
Not-for-profit organizations	Free Software Foundation	GPL LGPL

5.6 External IT software

5.6.1 List of IT software made available to external organizations

Software name	Form	Mode	License
Printing Package (Cient)	Binary-only	Publicly available	Specific license
	Source (1)	Bilateral Agreement	Specific license: CIEMAT Madrid
NICE 2000	Source (1)	Bilateral Agreement	Specific license ISO Friedrich Miescher Institute
CERN Print Server Software	Source (1)	Publicly available (Open source)	GPL
CASTOR	Source (1)	Publicly available (Open source)	GPL
SLIC	Source (1)	Publicly available (Open source)	GPL
EDG	Source (1)	Publicly available (Open source)	Specific license (close to BSD)

(1) In general, binary programmes are also made available for selected environments in addition to source

5.6.2 Usual conditions part of the CERN Bilateral Collaboration Agreements

- CERN Copyright is to be perpetuated
- Royalty free license granted to licensee to use, copy, modify the software (case of source)
- Modification to be notified to CERN
- CERN must be granted by the licensee free license to use modified versions
- Software is only for internal use by the licensee.
- In general, no commercial use (case by case basis).
- No military use.

5.7 Organizations having downloaded the Printing Package

All organizations having downloaded the Client Side Printing Package since 1999.

	Organization	City	Country
1	Abaco	Lima	United States (USA)
2	ABC Computing	Houston	United States (USA)
3	ACS	Fairfax	United States (USA)
4	Alectryon AG	Bielefeld	Germany
5	Allied Services	Clarks Summit	United States (USA)
6	Also Comsyt S.A	Renens	Switzerland
7	Argus Group	Hamilton	Bermuda
8	ATS	Arlington	United States (USA)
9	AUTH	Thessaloniki	Greece
10	Barbara Silver-Smith Attorney at Law	Greensboro	United States (USA)
11	Barnard College	New York	United States (USA)
12	Bayer	Ulm	Germany
13	BNL	Upton	United States (USA)
14	Boeing	San Antonio	United States (USA)
15	Box Hill Institute	Box Hill	Australia
16	Brookhaven National Laboratory - BNL	Upton	United States (USA)
17	Buchanan Auto Park	Waynesboro	United States (USA)
18	Caltech	Pasadena	United States (USA)
19	Carleton University	Ottawa	Canada
20	CCI	Mamaroenck	United States (USA)
21	CCIP	Paris	France
22	CCPM	Marseille	France
23	CEA	Gif sur Yvette	France
24	CIEMAT	Madrid	Spain
25	CIT	Woodbury	United States (USA)
26	CNRS-IN2P3	Annecy-le-Vieux	France
27	Compaq	Geneva	Switzerland
28	Concepta Consulting GmbH	Wuppertal	Germany
29	Corporate Montage	North Sydney	Australia
30	Cosworth Racing Ltd	Northampton	United Kingdom
31	CPPM	Marseille	France
32	CRM Tech	Puchon City	Korea
33	CSC/Sytex Access	Fairfax	United States (USA)
34	CUE	Copenhagen	Denmark
35	Dalsoft	Brussels	Belgium
36	Data Recoverylink	Englewood	United States (USA)
37	DOKIT	Herning	Denmark
38	Dongshin University	Kwangju	Korea
39	Dubai Womens College	Dubai	United Arab Emirates
40	Duke University	Durham	United States (USA)
41	DVPRINT	Cordoba	Argentina
42	EDS Australia	Adelaide	Australia
43	Ernst & Young AG	Freiburg	Germany
44	ETHZ	Zurich	Switzerland
45	Experimental Physics Inst.	Gyongyos	Hungary
46	Expert-IT Limited	Auckland	New Zealand

47	FBG Services Corp.	Omaha	United States (USA)
48	FCUL	Lisboa	Portugal
49	Fermi National Laboratory - FNAL	Batavia	United States (USA)
50	Feusi + Partner AG	Pfäffikon	Switzerland
51	FIAT	Betim	Brazil
52	Forest Ave School	West Babylon	United States (USA)
53	FPNT	Krakow	Poland
54	FRSB	Yuba City	United States (USA)
55	Gemeente Tilburg	Tilburg	Netherlands
56	Genesis	Hsinchu	Taiwan
57	Helsinki Institute of Physics	Helsinki	Finland
58	HEPHY	Vienna	Austria
59	HiB	Bergen	Norway
60	Highcliffe School	Christchurch	United Kingdom
61	Home Care	Schoolcraft	United States (USA)
62	HP	Hancock	United States (USA)
63	IFAE	Bellaterra	Spain
64	IFCA	Santander	Spain
65	IFIC	Valencia	Spain
66	IHEP	Beijing	China (People's Republic)
67	IHEP	Protvino	Russia
68	IMDB, Inc.	San Jose	United States (USA)
69	Imperial College	London	United Kingdom
70	IN2P3 - CCPM	Villeurbanne	France
71	IN2P3 - IReS	Strasbourg	France
72	Indiana University	Bloomington	United States (USA)
73	INFN - Bari	Bari	Italy
74	INFN - Bologna	Bologna	Italy
75	INFN - Catania	Catania	Italy
76	INFN - CNAF	Bologna	Italy
77	INFN - Cosenza	Castrolibero	Italy
78	INFN - Genova	Genova	Italy
79	INFN - Legnaro	Legnaro	Italy
80	INFN - LNF	Frascati	Italy
81	INFN - Naples	Naples	Italy
82	INFN - Padova	Padova	Italy
83	INFN - Pisa	San Piero a Grado	Italy
84	INFN - Roma	Rome	Italy
85	InfOmar	Maringa	Brazil
86	Institute of Nuclear Physics	Krakow	Poland
87	ITShastra India Pvt. Ltd	-	India
88	Joint Institute for Nuclear Research -JINR	Dubna	Russia
89	K.U. Leuven	Leuven	Belgium
90	Kaleida Health	Buffalo	United States (USA)
91	KASB	Topeka	United States (USA)
92	KEK	Tsukuba	Japan
93	Kinetics	Auckland	New Zealand
94	Kinko's, Inc.	Ventura	United States (USA)
95	Klinikum Ingolstadt	Ingolstadt	Germany
96	LAL	Orsay	France
97	Lancaster University	Lancaster	United Kingdom

98	LAPP	Annecy-le-vieux	France
99	LAUSD	Los Angeles	United States (USA)
100	LBNL	Berkeley	United States (USA)
101	LK Steiermark	Graz	Austria
102	lMSS	London	United Kingdom
103	Louisiana State University	Baton Rouge	United States (USA)
104	Minolta Denmark a/s	Rødovre	Denmark
105	Morrison Hershfield	Ottawa	Canada
106	Motorola	Scottsdale	United States (USA)
107	MPI for Physics	Munich	Germany
108	MWCOG	Annapolis	United States (USA)
109	National Centre for Physics	Islamabad	Pakistan
110	New.Media.Options	New Rochelle	United States (USA)
111	NIOZ	Den Hoorn	Netherlands
112	Northeastern University	Boston	United States (USA)
113	Notre Dame Academy	Los Angeles	United States (USA)
114	Observatoire de Geneve	Geneva	Switzerland
115	OCE France	Venissieux	France
116	Ohio State University	Columbus	United States (USA)
117	PCI	Buffalo	United States (USA)
118	PetroSA	Mosselbay	South Africa
119	PNPI	Petersburg	Russia
120	Pomeroy	Raleigh	United States (USA)
121	PSI	Villigen	Switzerland
122	PTFI	Kuala Kencana	Indonesia
123	Purdue University	West Lafayette	United States (USA)
124	PWC	Mumbai	India
125	Realm Technologies	Birmingham	United States (USA)
126	Rechenzentrum der TU Braunschweig	Braunschweig	Germany
127	Royal Hospitals	Belfast	United Kingdom
128	Royal Roads University	Victoria	Canada
129	Rutherford Appleton Lab.	Didcot	United Kingdom
130	Schneider Ingenieure AG	Chur	Switzerland
131	SID	Copenhagen	Denmark
132	Siemens AG	Erlangen	Germany
133	SKYCITY Adelaide	Adelaide	Australia
134	SNS	Pisa	Italy
135	Stadt Frankfurt	Frankfurt	Germany
136	Stony Brook	Stony Brook	United States (USA)
137	Sun Microsystems	Singapore	Singapore
138	Sunnyside Unified School	Tucson	United States (USA)
139	Suomen HyväMieli	Kerava	Finland
140	Télédiffusion de France - TDF	Paris	France
141	Texas Technical University	Lubbock	United States (USA)
142	The Center for High Energy Physics	Daegu	Korea
143	The Holiday Club	Anerley	South Africa
144	The Hong Kong Inst. of Education - HKIEd	Hong Kong	China (People's Republic)
145	Tu-München	Garching	Germany
146	UCLA	Los Angeles	United States (USA)
147	ULB	Brussels	Belgium
148	University College of London - UCL	Louvain-la-Neuve	Belgium

149	University of Bonn	Bonn	Germany
150	University of Boston	Boston	United States (USA)
151	University of Bristol	Bristol	United Kingdom
152	University of Bristol	Geneva	United Kingdom
153	University of Brussels - Academic Hospital	Brussels	Belgium
154	University of California	Merced	United States (USA)
155	University of California	Davis	United States (USA)
156	University of California Riverside	Riverside	United States (USA)
157	University of Catania	Catania	Italy
158	University of Chicago	Chicago	United States (USA)
159	University of Florida	Gainesville	United States (USA)
160	University of Geneva	Geneva	Switzerland
161	University of Giessen	Giessen	Germany
162	University of Hamburg	Hamburg	Germany
163	University of Hiroshima	Higashi-Hiroshima	Japan
164	University of Kaiserslautern	Kaiserslautern	Germany
165	University of Kobe	Kobe	Japan
166	University of Liverpool	Liverpool	United Kingdom
167	University of Mainz	Mainz	Germany
168	University of Mannheim	Mannheim	Germany
169	University of Melbourne	Melbourne	Australia
170	University of Michigan	Novi	United States (USA)
171	University of Milano	Milano	Italy
172	University of Minnesota	Twin Cities	United States (USA)
173	University of Muenster	Muenster	Germany
174	University of Nagoya	Nagoya	Japan
175	University of Nanjing	Nanjing	China (People's Republic)
176	University of Nebraska	Lincoln	United States (USA)
177	University of Oslo	Oslo	Norway
178	University of Oviedo	Oviedo	Spain
179	University of Pittsburgh – Medical Centre	Pittsburgh	United States (USA)
180	University of Santiago	Santiago	Chile
181	University of Tokyo, ICEPP	Bunkyo	Japan
182	University of Toronto	Toronto	Canada
183	University of Vermont	Burlington	United States (USA)
184	University of Victoria	Victoria	Canada
185	University of Warsaw	Warsaw	Poland
186	University of Wuppertal	Wuppertal	Germany
187	University of Yamagata	Yamagata	Japan
188	University of Zurich	Zurich	Switzerland
189	UOI	Geneva	Switzerland
190	Walter Mäder AG	Killwangen	Switzerland
191	Ward Computers	Forstone	United States (USA)
192	Wilmington	London	United Kingdom
193	WL Technologies, Inc	San Jose	United States (USA)
194	Yale University	New Haven	United States (USA)
195	Zadco	Abu Dhabi	United Arab Emirates

New downloads in 2003

08-01-03 4:05	WL Technologies, Inc	San Jose	United States (USA)
13-01-03 14:42	University of Geneva	Geneva	Switzerland
19-01-03 7:19	EDS Australia	Adelaide	Australia
22-01-03 5:43	Genesis	Hsinchu	Taiwan
24-01-03 23:54	Home Care	Schoolcraft	United States (USA)
27-01-03 21:02	Buchanan Auto Park	Waynesboro	United States (USA)
28-01-03 12:04	IFIC	Valencia	Spain
30-01-03 22:19	CIT	Woodbury	United States (USA)
04-02-03 10:18	University of Catania	Catania	Italy
11-02-03 12:02	Stadt Frankfurt	Frankfurt	Germany
13-02-03 10:48	Dalsoft	Brussels	Belgium
15-02-03 9:00	Joint Institute for Nuclear Research -JINR	Dubna	Russia
24-02-03 13:30	University of Bristol	Bristol	United Kingdom
24-02-03 18:44	University College of London - UCL	Louvain-la-Neuve	Belgium
26-02-03 18:07	IMDB, Inc.	San Jose	United States (USA)
28-02-03 8:33	Schneider Ingenieure AG	Chur	Switzerland
11-03-03 13:50	University of Muenster	Muenster	Germany
08-04-03 7:43	CPPM	Marseille	France
29-04-03 16:16	INFN - Genova	Genova	Italy
07-05-03 7:25	University of Oslo	Oslo	Norway
08-05-03 5:55	Corporate Montage	North Sydney	Australia
19-05-03 18:00	University of Warsaw	Warsaw	Poland
26-05-03 18:21	University of Florida	Gainesville	United States (USA)
02-06-03 17:32	INFN - Catania	Catania	Italy
03-06-03 7:22	SNS	Pisa	Italy
03-06-03 23:40	University of Nebraska	Lincoln	United States (USA)
09-06-03 6:45	University of Victoria	Victoria	Canada
11-06-03 12:57	Feusi + Partner AG	Pfäffikon	Switzerland
17-06-03 14:09	PetroSA	Mosselbay	South Africa
24-06-03 21:22	Abaco	Lima	United States (USA)
27-06-03 7:24	CCIP	Paris	France
01-07-03 0:26	FRSB	Yuba City	United States (USA)
02-07-03 2:56	Realm Technologies	Birmingham	United States (USA)
07-07-03 15:43	University of Liverpool	Liverpool	United Kingdom
08-07-03 17:35	University of Nanjing	Nanjing	China (People's Republic)
08-07-03 17:41	Texas Technical University	Lubbock	United States (USA)
26-07-03 12:16	Ward Computers	Forstone	United States (USA)
29-07-03 13:10	Kinetics	Auckland	New Zealand
30-07-03 16:48	New.Media.Options	New Rochelle	United States (USA)
04-08-03 15:31	ABC Computing	Houston	United States (USA)
05-08-03 17:41	INFN - Bari	Bari	Italy
08-08-03 18:02	University of Yamagata	Yamagata	Japan
26-08-03 16:53	University of California	Merced	United States (USA)
08-09-03 14:47	University of Toronto	Toronto	Canada
09-09-03 8:18	Imperial College	London	United Kingdom
14-09-03 14:00	National Centre for Physics	Islamabad	Pakistan
15-09-03 19:32	Bayer	Ulm	Germany
22-09-03 17:59	University of Melbourne	Melbourne	Australia
29-09-03 9:03	The Center for High Energy Physics	Daegu	Korea

03-10-03 15:45	BNL	Upton	United States (USA)
06-10-03 12:28	University of Brussels - Academic Hospital	Brussels	Belgium
07-10-03 9:33	HiB	Bergen	Norway
08-10-03 14:44	Yale University	New Haven	United States (USA)
09-10-03 13:33	Louisiana State University	Baton Rouge	United States (USA)
22-10-03 16:35	LAPP	Annecy-le-vieux	France
23-10-03 7:50	LK Steiermark	Graz	Austria
24-10-03 12:52	Experimental Physics Inst.	Gyongyos	Hungary
30-10-03 22:06	Allied Services	Clarks Summit	United States (USA)
05-11-03 0:59	DVPRINT	Cordoba	Argentina
05-11-03 9:24	University of California	Davis	United States (USA)
11-11-03 12:46	INFN - Roma	Rome	Italy
14-11-03 3:04	The Hong Kong Inst. of Education - HKIEd	Hong Kong	China
15-11-03 13:13	INFN - Cosenza	Castrolibero	Italy
18-11-03 9:44	University of Bristol	Geneva	United Kingdom
18-11-03 10:46	PNPI	Petersburg	Russia
18-11-03 17:08	CSC/Sytex Access	Fairfax	United States (USA)
24-11-03 5:50	SKYCITY Adelaide	Adelaide	Australia
25-11-03 10:31	ETHZ	Zurich	Switzerland
25-11-03 16:38	Forest Ave School	West Babylon	United States (USA)
25-11-03 16:40	ULB	Brussels	Belgium
05-12-03 16:30	Purdue University	West Lafayette	United States (USA)
09-12-03 0:46	HEPHY	Vienna	Austria
10-12-03 14:37	University of Hamburg	Hamburg	Germany
15-12-03 12:56	AUTH	Thessaloniki	Greece
17-12-03 12:19	Duke University	Durham	United States (USA)
19-12-03 15:36	University of Wuppertal	Wuppertal	Germany

5.8 Some facts and figures on the CERN School of Computing 2003

5.8.1 Countries of origin of students attending CSC2003

Austria	Pakistan
Belgium	People's Republic of China
Brazil	Poland
Bulgaria	Portugal
Denmark	Romania
Estonia	Russia
Finland	Spain
France	Sweden
Germany	Taiwan,
Greece	The Netherlands
Hungary	United Kingdom
Italy	USA
Morocco	Pakistan

5.8.2 Student profile

CERN as "Home institute"	20%
Citizen from a CERN Member State	73%
Work related to particle physics	77%
Using the facilities of CERN	61%
In data processing methods for particle physics	50%
In triggering and DAQ for particle physics	39%

5.8.3 Results of satisfaction questionnaire

Topical answers

Language difficulties during the lectures?	Yes	7%
Attend to evening lectures?	Yes	98%
Enough time left for individual study	Yes	57%
Programme of the School too heavy?	Yes	9%
Scientific programme correctly balanced?	Yes	79%
Too much emphasis on one or more topics?	Yes	42%
Overall programme well balanced between Lectures, discussion, study and free time?	Yes	84%
Recreational facilities adequate?	Yes	93%
Place appropriate to hold the School?	Yes	95%

Overall satisfaction

Very Poor	Poor	Fair	Good	Excellent
0	0	0	**41%**	**59%**

5.9 Science and Information Society Forum

The Swiss Agency for Development and Cooperation and the Global Knowledge Partnership organized in Palexpo, during the World Summit on Information Society (WSIS), an exhibition and a series of events collectively called the ICT for Development platform (ICT4D). In this context, they approached CERN in May 2003, offering free floor space to show CERN and more generally scientific projects and achievements which contribute to the information society. CERN accepted the offer and developed a concept called the *Science and Information Society Forum* (SIS-forum), also known as the *Science Tree*.

Neither totally an exhibition nor totally a conference, the SIS-forum capitalized on the conference concept, by inviting projects through a peer-review process, as well as on the principle of exhibitions, where presenters were available during time slots to respond to visitors' questions.

As a result of a call for content issued in July, 42 projects from 32 organizations world-wide were invited, all focusing on science's leading role in driving the development of the information society. They were organized into five themes: Education and Culture; Health; Development, Environment, Risks; Fundamental Sciences and Enabling Technologies; CERN in the Information Society. Presentations and demonstrations of projects were done exclusively in digital format, using a computer infrastructure set up by CERN, formed of 12 computers and 14 screens. The stand represented metaphorically a tree, formed of a trunk - central pillar where CERN achievements were shown - and branches –thematic pillars to host presentations on the four other themes. One tangible outcome of the project was the digitization of hours of existing analog CERN films to create a digital programme now available for further use.

The key messages explicitly conveyed were: "Science is collaborative and transcends borders", "Scientific communities can be the vector for IS deployment is developing regions"; "CERN is playing a central role in the development of the information society".

In total 32 people from four divisions (ETT, IT, HR, HR) as well as four persons from outside CERN contributed to the project.

The SIS-forum was designated by the local press as one of the four best stands of the exhibition. It attracted interest from the press and media, leading to numerous articles and interviews including by the BBC, the national Portuguese and Irish televisions. The inauguration in the presence of Mr. Kofi Annan was a major media event. The stand also received visits from numerous VIPs including the Presidents of Romania, Estonia, the Federal Counsellors Calmy-Rey and Leuenberg. More than 700 visitors were photographed next to the World's first web server, and their picture was displayed on the SIS-forum web site. The web site (cern.ch/sis-forum) has received more than half a million visits at the time of writing.

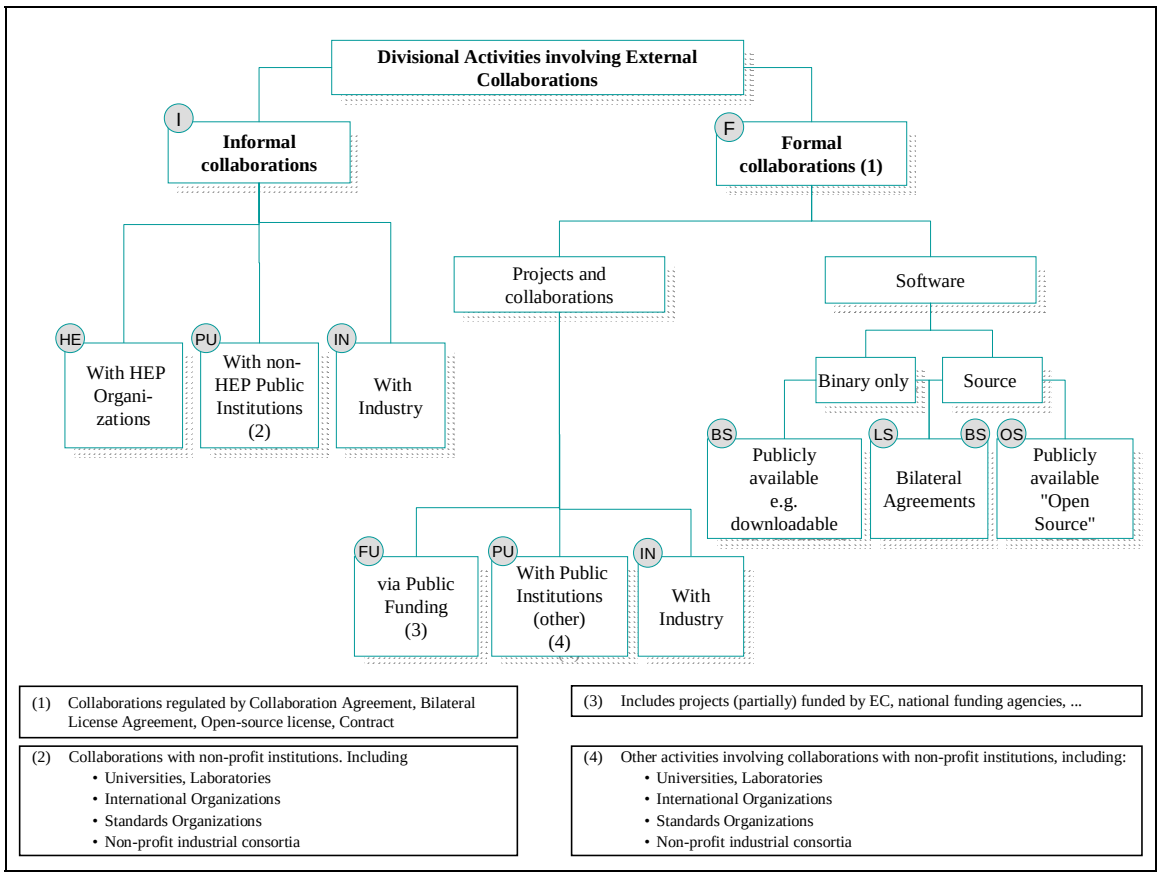
The major difficulty lay in the extremely short period of time, due to the late proposal by the Swiss government. The project was organized and developed is such a way that its entire machinery (structure, people) can be re-activated for further instantiations of the SIS-forum. The physical stand has been acquired by CERN and can be remounted. Two outside organizations expressed interest in hosting the SIS-forum – scientific content and its physical tree - at the occasion of major conferences. The CERN Globe of Innovation is also considering hosting it at the occasion of the 50th Anniversary.

The SIS-forum was complemented by an on-line stand, where live demonstrations took place, in particular over a fast connection to North America.

5.10 Taxonomy of departmental activities involving external collaborations

5.10.1 Flow chart taxonomy

To conduct the 2003 review of External Collaboration in the department, the following taxonomy was used.



5.10.2 Nature and type of external collaborations

Nature of Collaboration		Type of collaboration	
Formal collaboration	F	Collaboration via Public Funding (i.e. public funding institutions)	FU
		Collaboration with Public Institutions	PU
		Collaboration with Industry	IN
		Collaboration via Open-Source -type Software	OS
		Collaboration via Binary-type Software	BS
		Collaboration via License-Agreement Software	LS
Informal collaboration	I	Collaboration with HEP organizations	HE
		Collaboration with Public Institutions	PU
		Collaboration with Industry	IN

5.11 Inventory of external collaborative activities with Public Institutions in 2003

Divisional Activities involving External Collaborations with Public Institutions. **The inventory done in 2003 covered five groups only**. It will be completed in 2004 with the other groups.

5.11.1 Activity list

Type (1)	Technology Domain (2)	Activity Name	Description	Formal agreement (4)	External Org.	Comment
F-HE	Application Software	INTAS Collaboration	Collaboration with Russian HEP institutes on SW development and support	3 years agreement	Russian institutes	Framework agreement. Topics of interest include Grid Middleware, Fabric management
F-HE	General	Collaboration framework with Bulgaria	Collaboration with Bulgarian HEP institutes for training	3 years agreement	Bulgarian institutes	Framework agreement
F-OS	Storage Technologies	CASTOR Software package	Software package developed by IT division for the management of storage systems	Software available under the GPL License	NA	Software available from CERN servers on an open-source spirit.
F-PU	Application Software	Collaboration framework with India	Collaboration with Indian IT institutes on Application Software		Indian institutes	Framework agreement
F-PU	Data Bases	Pool	Pool of persistent objects for LHC		Institute of Advanced Technology Indore, India	Collaboration on Pool part of the Indian contribution to the LHC
F-BS	Internet Services	CERN Printing Package	Software developed by IT division to administrate printers in a local windows environment	Specific license and copyright statement	See list	Software downloadable from CERN server. A list of organizations having downloaded is maintained
F-LS	Internet Services	CERN Printing Package	Software developed by IT division to administrate printers in a local windows environment	License Agreement K804/IT	CIEMAT Spain	Source Software is made available under bi-lateral license agreements
F-LS	Internet Services	"Nice 2000"	CERN Windows Infrastructure Management Software	License Agreement K805/IT	ISO Geneva	Source Software is made available under bi-lateral license agreements
F-LS	Internet Services	"PC-based distributed Computing (NICE)"	CERN Windows Infrastructure Management Software	Cooperation Agreement Renewed 31-10-2002 for 2002-2003	JINR Dubna Russia	
F-HE	Internet Services	VRVS	VRVS video-conferencing service	Agreement between Caltech-CERN	CALTECH USA	Collaboration for the joint development and operation of the VRVS system
F-PU	Application Software	CAD Tools under windows	Collaboration on CAD tools under Windows	Cooperation Agreement	JINR Dubna Russia	
F-PU	Application Software	CAD2000	Collaboration on CAD2000 leading to a CATIA pilot	Cooperation Agreement	JINR Dubna Russia	
F-HE	Application Software	Browser for electronic	Development of browser for electronic components	Cooperation agreement	IN2P3 France	EST division involved
I-HE	Application Software	Workshops on large clusters	Collaboration with FermiLab on sponsoring workshops and seminars on building large clusters	NA	Fermi National Laboratory USA	
F-EU	GRID Middleware Storage Technologies	EDG: European DataGrid	European Union funded project	EU Contract	EDG partners	Completion 31/03/2004
F-EU	GRID	EGEE	European Union funded project	EU Contract	EGEE partners	Project start: 01/04/2004

F-OS	GRID Middleware	EDG Middleware	Software developed in the framework on the EDG project	Software available under specific license	NA	Software available under CERN specific open source license
F-PU	- Storage Technologies - Security - Operating systems and compilers	CASPUR Collaboration	Wide range collaboration on storage, computer security, public domain software	Collab. Agreement	CASPUR Italy	

5.11.2 Acronyms used in the inventory

(1) **Nature of collaboration - Type of collaboration**:
Nature:

F	Formal collaboration
I	Informal collaboration

Type of Formal Collaborations

EU	Collaboration via European Union (**EU**) funded projects
PU	Collaboration with **PU**blic Institutions
IN	Collaboration with **IN**dustry
OS	Collaboration via **O**pen **S**ource-type Software
BS	Collaboration via **B**inary-type **S**oftware
LS	Collaboration via **L**icense-Agreement **S**oftware

Type of Informal Collaborations

HE	Collaboration with **HE**P organizations
PU	Collaboration with **PU**blic Institutions
IN	Collaboration with **IN**dustry

(2) **Technology Domain**
- Application Software
- Computer Architecture
- Computer Security
- Data Bases
- GRID Middleware
- Internet Services
- Networking
- Operating systems and compilers
- Software Engineering
- System Management
- Storage Technologies

(3) **Status:**

P	Potential
O	On-going
C	Closed

(4) Type of formal agreement: License Agreement, Collaboration Agreement, Contract, …