Let's Build an Intranet at ILOG Like the Internet!

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ABSTRACT

This paper presents a two-year project to re-engineer the ILOG intranet. We discuss the business and strategic goals that initiated the launch of the project, the vision held by the project team that was used to guide key decisions, the project methodology that relied on constant two-way feedback with users, the resulting architecture that produced what we think is an innovative and successful *intranet built like the Internet*, and the human factor tests we carried out that enriched our evaluation of results and opened new perspectives for increasing the satisfaction of our intranet users in the near future.

Keywords

Intranet, Design, Human Factors, Architecture, Standardization, Project Management.

1. INTRODUCTION

1.1 A Project Initiated By R&D

Two years ago, ILOG [11] decided to redesign its intranet and move from a set of separate, static department websites towards an integrated, collaborative and usable intranet. This project was initiated by ILOG's Chief Product Officer [12] and hosted within the ILOG Product Division - a division that brings together around 200 scientists, engineers, technical writers, product managers and other staff from the R&D and product marketing departments.

Within the confines of ILOG's Product Division, we wanted to ensure that all information managed and exchanged by ILOG employees be available and kept up to date in the system. To move towards this goal, we identified the following initial objectives for the intranet project:

- reduce time to find information
- facilitate team and cross-team collaboration
- create a trusted repository of information

Achieving these objectives by re-designing an intranet is a long-term project. The project team wanted to rapidly deliver pieces of solutions to show people that things were moving and to make them reconsider their needs in light of these changes. For this reason, we decided to adopt an iterative development methodology:

- understand the requirement
- split the requirement into small projects
- implement and propose a solution to users and analyze their feedback

Since the project launch in July 2003, we have regularly refined our initial objectives by observing intranet usage statistics and gathering user feedback.

1.2 Now what?

ILOG's Product Division represents a somewhat uncommon user environment: a large proportion of users are highly skilled developers, able not only to write their own HTML pages, but also to code their own web applications, if needed. As a result, there was already a considerable number of individual "intranets" up and running. However, most of them suffered from the "one webmaster syndrome"; most users preferred to ask each webmaster for updates rather than try to figure out for themselves how to edit the sites, which could be quite sophisticated, and thus complex. Sites tended to die early as each webmaster became overburdened with content maintenance tasks.

Our aim was therefore to come up with a solution that would offer significant improvements over the existing situation and be "future-proof" enough so that we could be sure it would fulfill the evolving needs of users, which we could not envision totally at the start of the project. The answer was obvious: The Internet! Users were already familiar with it, and fierce Darwinian evolution on the World Wide Web would ensure that, whatever new problems might arise, the Internet community would come up with solutions, and we could safely pick the best one from those that survived.

Just like the Internet, the ILOG Product Division intranet would become the place where everybody could share and find information anywhere, any time.

1.3 The Internet as project baseline

By looking at the state of the Internet, we could see no magic recipe for implementing our vision, although successful tools seemed to follow the "worst is best" paradigm: Simple and dependable tools doing "most of the job" (such as email) tended to be used most widely, instead of more optimal, better designed systems. However, the infrastructure of the Internet is built on top of well defined and enforced Open Standards: the Internet itself, via the IETF [10], and the World Wide Web, via the W3C [24].

We thus decided to go down the same route:

- Enforce a standard, open, and future-proof web infrastructure using only Open Standards like HTTP, HTML, XML, and their associated fundamental principles, notably that each available resource should have a perennial URL [25] [27]
- Install on top of this infrastructure an intranet version of popular Internet applications, selected on their own merits, with no constraints of implementation language or vendor.

- Adapt the user interface of these applications to provide users a more unified experience

Our aim was to be able to introduce new applications and remove obsolete ones if needed, following the trends happening on the Internet. We did not want to become tied into any one application, and wanted to ensure that no application would impose storing data in a proprietary format, for example.

This way of managing an intranet is far from revolutionary. It was already described as far back as 1997 by Nielsen [19] who referred to it as "Managed diversity". We found reports describing how this approach had been adapted to academic intranets but very few examples of its application in a corporate environment on any significant scale.

2. DIVE IN REQUIREMENTS

The first 3 months of the project were dedicated to gathering enough status information for us to be able to understand users' needs and to analyze them to formalize an initial set of requirements. To perform this task, we set up a "task force" of 12 people representing all departments. We wanted to:

- **understand the main problem** - Why this project? Why now? - by interviewing the stakeholders to understand their objectives and formalize them into strategic requirements.
- **understand the current state** - What's the intranet status? How do people currently use it? - by performing an intranet audit to understand the reality of how the existing intranet is used.
- **understand people** - What do they think about it? What do they need? - by organizing a survey sent to 200 people to understand what users think and feel about the intranet and by interviewing selected people to refine interesting answers to the survey.

2.1 Strategic requirements

Based on interviews of main stakeholders, the following strategic requirements were identified:

Improve information sharing within ILOG:
- Present a unified image: unique homepage which presents all teams, all projects and all work themes
- Provide a repository of information where people naturally publish and search information
- Define clearly the communication media: contact mailing-lists, activity information which must be present and up-to-date

Enable collaboration to publish professional level documents:
- Provide a way to work cooperatively on the document content
- Provide document with a good level of presentation
- Take into account people's habits

Provide an infrastructure to install and deploy new tools:
- needs are always changing, new needs appear, provide an extensible functional platform

Create new collaborative work opportunities:
- Provide a way to work within your team or working group online

2.2 Intranet Web Sites Audit

Understand the current state, how people use and maintain it

An audit of the different intranet sites was performed during the summer of 2003. The aim of the audit was to:

- identify the different intranet bricks that should be investigated in more detail
- evaluate the coherence of their navigation
- determine how they are maintained, administrated, edited... with statistics or interviews
- define which technologies were involved in each brick
- evaluate the size of each brick
- validate their conformance with Web standards

The conclusion of the audit (see "Website audit summary" in Table 1) was that the intranet was mainly made up of separate, static websites (one per department) with poor navigation, a constantly declining number of hits, little or no maintenance, and a general lack of conformity with Web standards. Most sites were not taking advantage of the latest web technologies; the majority of sites were using static HTML 3.2 and frames!

A wiki site had also recently and confidentially been set up on the intranet. It immediately attracted a large number of people who were disappointed with the static sites. People suddenly found they had a way to easily publish and cooperate on the intranet and so they just did it, without any official support or organization. This initial advantage soon generated problems of its own, increasing the navigation mess, duplicating data and making it difficult for users to find information.

In short, the intranet was in pretty bad shape.

Table 1. Website audit synthesis

site	nav.	maint.	tech.	size	html	css	wai
RD site1	poor	none	static html 3.2, frames	3000	no	n/a	no
RD site2	medium	none	static html 3.2, 4.01 trans, css	2300	no	yes	no
RD site3	poor	none	static html 3.2, 4.01 trans, css	1500	no	no	no
RD site4	poor	low	static html 3.2, 4.01 trans	800	no	n/a	no
RD site5	poor	none	static html 3.2	2200	no	n/a	no
RD site6	poor	low	static html 3.2	2600	no	n/a	no
RD site7	medium	none	static html 3.2, css	650	no	no	no
PM site1	poor	none	static html 3.2, css	500	no	no	no
PM site2	poor	none	static html 3.2, frames, js, cgi	850	no	n/a	no
PM site3	medium	none	static html 4.01 trans, css	200	no	no	no
PM site4	medium	low	static html 3.2, frames, css	150	no	no	no
wiki site1	good	frequent	dynamic html 3.2, css	500	no	no	yes
wiki site2	good	frequent	dynamic html 3.2, css	350	no	no	yes

- nav., poor: navigation is partially broken and many links are broken - medium: good internal navigation, no navigation to other intranet sites and few links are broken - good: good internal navigation, some links to the other intranet sites and very few links are broken
- maint., none: site not updated for more than a year, low: few pages updated in the last year, frequent: all pages updated in the last year
- tech., static or dynamic HTML, CSS, frames...
- size, number of web documents in the site
- html/css/wai, conformance with W3C standards: HTML, CSS, WAI were tested

Note: site names have been removed for confidentiality reasons.

2.3 Intranet Survey
Understand how people use and feel about it

The questionnaire covered four main themes: searching, reading, writing and collaborating on the intranet. It was sent to 210 people in the ILOG Product Division and 52% responded. Some interesting outcomes of the survey were as follows:

Searching: 1/3 of people spend more than 30 minutes per day on this activity: So searching information is a major issue. If we tried to evaluate the amount of money Product Division loses in searching for information, we get: 30min = 1/14 (30min/day/person) * 70 (1/3*210 people in Product Division) * 100K\$ (cost/person) = 1/14*70*100 = 500 K\$/year. Two complementary for lowering this cost might be to (1) provide a global intranet search engine with an efficient relevance rating (2) provide a way to directly access frequently used information without searching.

Reading & Writing: 97% of people read email often, 100% publish information using email. 70% of people read wiki often, 98% publish information using wiki. "Only" 62% of people said they were satisfied writing with wiki: So wiki is a success! After email, it's the most widely read media. Nearly everybody has published information on Wiki. However, writing with wiki does not satisfy everyone. So we have to improve its editing functionalities.

Collaborating: 90% cooperate in 2 or more working groups - 98% within Department, 81% cross Department, 47% outside ILOG: So the amount of working groups is potentially huge and they extend even outside of ILOG. We must offer simple tools and multiple ways to facilitate collaboration.

2.4 Requirement interviews
We gathered 12 people representing the various ILOG profiles in a Requirements Task Force. During a two-month period, they were charged with interviewing their colleagues and gathering their needs in term of the intranet. These needs where compiled and then prioritized by the task force. At the end of the two months, we ended up with a set of requirements, summarized in the following list:

- Search - Provide a search engine "à la Google" that covers all the ILOG worldwide intranet data
- Intranet Structure - Classify information and define a hierarchy at the ILOG level to make the structure clear, make it easier to find information, trace where information appears, make internal communication processes clear, and avoid redundancy
- Document management - Improve document management so that new documents can be created with minimal coding, define document workflow, identify ownership and responsibilities, implement versioning and archiving capabilities...
- Mailing lists - Provide a Web tool to enable direct creation, deletion and administration of mailing lists without intervention from system administrators, including automatic archiving, access filtering, digests, moderation... Provide Web accessible archives in HTML for all these mailing lists.
- People Directory - Provide a Web-accessible, unique and up-to-date list of ILOG people with all information: phone, photo, office location, profile, roles... It should be accessible at every organization level. It should offer organizational chart views. It should be searchable. It should automatically update tools and resource access.
- Communication - Clarify the communication media by clearly identifying the places and ways to communicate with various groups.
- Homogeneity - Homogenize the look and feel, provide templates and guidelines.
- Login - A single password for all tools through the intranet.
- Wiki Editing - Improve editing features in wiki.
- Webmastering - Provide a webmastering team to ensure the usability and interoperability of the intranet.
- Flexibility - Build a highly available, flexible and robust infrastructure to make sure each service can be rapidly duplicated in case of emergency, to make sure data is accessible from various systems and protected from corruption, to make sure organizational changes are low cost...

3. INTERNET VISION IN ACTION
For the first version, we wanted to:

- **cover the needs**, by providing solutions for all the "ecological niches" that exist on the Internet:
  - **searching**, as defined in the mind of our users by Google. We chose Aspseek [1], a Google-like engine, keeping in mind that we could at any time replace it by another, such as Google, Nutch, ...
  - **reading & writing** web pages. Many solutions were possible (traditional Web sites, CMSes, Blogs, Forums, ...) we decided to use a Wiki (via the TWiki engine [23]) which seemed the most flexible system.
  - **publishing** documents: we used the "attachment" features of TWiki
  - **contacting**: email was the medium of choice, with the addition of web archiving of all mailing lists (enabling each mail to have its own URL).
  - **discussing**, via Instant Messaging, we chose IRC [21] with, again, web archiving of discussions (enabling each phrase to have its own URL).
- **start simple**, by first providing simple working solutions, and afterwards, based on actual usage, change individual solutions based on user feedback. We went for instance from a simple wiki bug tracking solution to a commercial dedicated product, Jira, and from simple email web archiving based on Mhonarc to the full-featured SYMPA system [22], etc...
- **tune usability**, by both seeking user feedback, and "practicing what we preach". We built our own intranet solutions based on the same tools available to other users. We developed a common look & feel for the individual applications, and used a common authentication scheme to help users overcome the usability problems inherent with using many different applications
- **develop a community**, by always choosing solutions that entice users to contribute content: following the philosophy of wiki, we discouraged people from using any kind of access control, relying on the simple protection offered by our company firewalls. Instead, we tried to ensure that all operations were undoable to remove the fear of breaking things while updating contents, and we tried to go for a post-change monitoring of edits, rather than a pre-change

authorization scheme. We tried to avoid workflows and roles. Our philosophy was to grant full access by default

3.1 Overall Architecture

Following the vision that we should *build our intranet like the Internet* we set up an eco-system where we would be able to continuously introduce new tools that we would select out of the big "gene pool" of the Internet, using a Darwinian-style selection process to determine which ones were actually used. In the following schema, the tools are called "bricks" that we lay upon the mortar of the "data layer" of Internet standards: The IETF and W3C standards such as HTTP, HTML, CSS, XML, SMTP, RSS, IRC, and all the other open protocols that made possible the Internet as we know it today. The fact that these bricks are tightly coupled, reflecting the situation on the Internet (where each brick comes from a different vendor, interoperating only by the data layer), will ensure the resilience of the system, as we will be able to change bricks with better ones as they appear, with as little negative impact on the rest of the system as possible.

However, unlike the Internet, we tried to provide users with a smoother, more consistent experience by adapting the look & feel (what we call the "Layout" in the rest of this paper) of each brick to present the user with a similar user interface across all the bricks. Ironically, this was possible because most of the bricks provided the possibility to adapt their layout (via skins, templates, or different front-ends) - since most Internet sites want to be able to change their appearance to differentiate themselves from other sites. We thus used the same means to pursue the opposite goal.

Figure 1. General architecture of the ILOG intranet

These bricks where chosen, bought or built by looking for the following qualities:

- technical considerations: open standards compliance, clear separation of the interface from the logic of the application, customizability of the interface (using a templating system, for example), non-proprietary data format, ability to access data from outside the application, access to the source code to ensure flexibility to support variations of user requirements, and predictable reliability in that the system was simple and understandable enough so we could be confident to be able to repair it if ever disaster were to strike (disk full, network outage, host migration, ...).
- ecological considerations: we wanted to have bricks to cover all possible user needs, but avoid overlapping functionalities: for instance we did not provide a "forum" brick, as we felt that the "ecological niche" of forums was fulfilled by web-archived mailing lists and wikis. And we didn't install a blog brick, as the blog "ecological niche" was already fulfilled by the wiki and RSS bricks.
- budget considerations: we are a small team, and administration and maintenance costs of manpower were to

be kept as low as possible. Basically, we tended to prefer systems with the highest reliability, so that they could be used even in the hands of non-expert maintainers.

One important point we found that is often overlooked was the importance for two users to be able to see use the same URL to access the same resource [27]. If this fundamental principal is not respected, the internet metaphor ceases to be relevant: Users should be able to bookmarks places, send each other URLs via email, instant messaging, wiki pages, and the URLs returned by the search engine should direct the user to what was actually indexed by the engine. This was the most important feature we had to check for in a potential new brick.

3.2 User interface layer

We decided to adopt a common look & feel. Each page would have a common banner composed of horizontal layers, ranging from most generic at the top to the most specific at the bottom.

- The top pulldown menus are the same for all sites
- The "zone" layer depends on the zone you are in, R&D or Corporate, with a different color code. The global search box is here as we have one search engine per zone (see label 1 in Figure 2a & 2b)
- The "brick" layer names which brick we are in, points to similar bricks in other zones, has "brick-global" links, and a link to the online help for the tool (see label 2 in Figure 2a & 2b)
- Additional layers then provide more specific controls for the brick, if required (see label 4 in Figure 2a & 2b)
- The left column contains important shortcuts for the brick (see label 3 in Figure 2a & 2b)
- A "signature" footer provides a way to contact the maintainers of the page or brick (see label 5 in Figure 2a & 2b)
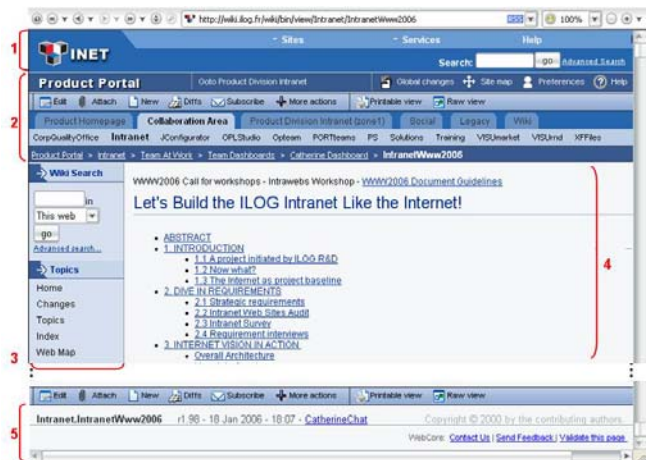

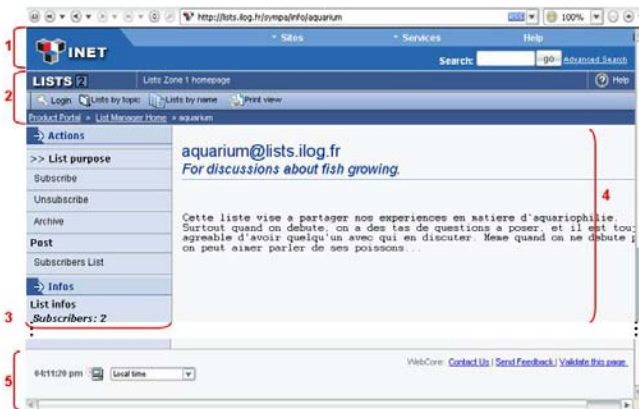**Figure 2a: Interface layers applied to the "wiki" brick**

Figure 2b: Interface layers applied to the "sympa" brick

During the layout conception phase, efforts were made to integrate usability recommendations taken from Jakob Nielsen Group reports on Intranet usability [17], [18]. A set of usability tests (see Section 4.2) were performed on the first prototypes to validate these choices.

We implemented the layout as a set of "meta-templates" in the Cheetah python template engine [3]. These meta-templates are compiled via Cheetah into the different templates and skins used by our various bricks (none of which use the same template engine), in as many versions as we have zones. They are deployed onto all our servers (see Figure 3), at the same place in the filesystems and URL space, so that bricks can refer to them in a standardized way. We took special care to enable rebuilding of the layout without stopping the tools. We also adopted a staged deployment system similar to the one used by the Debian Linux distribution [5]: we deploy each version of a layout in its own directory, allowing all the different versions of the layout to always be accessible (we do not replace version 1.7 by version 1.8: we add a 1.8 version besides the 1.7 one). We label our versions "unstable" (used only for test sites) for the current "bleeding-edge" version, "testing" for the version "stable enough" to be used by sites with maintainers aware of the layout development state (basically the sites we directly maintain), and "stable" for the version that we only upgrade after a sufficient warning period, for maintainers not closely following the layout development. This system allows us to introduce new bricks that require changes to the layout system, with as little risk as possible for the other bricks.
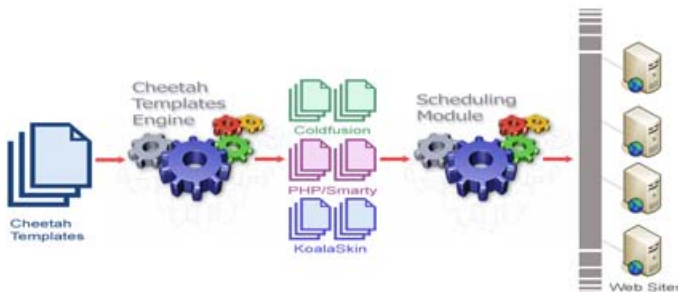

Figure 3: Layout build and deployment schema

3.3 Data Layer

To gain independence from specific applications, we try to access data stored in "black boxes" only through standard protocols, with proper, well defined URLs. For instance, we use a separate DNS name for each service (http://people.ilog.fr for the people directory, http://search.ilog.fr for the search engine, even if these services are actually on the same server) and a documented URL scheme to be able to migrate these services to new technologies somewhat transparently for the user in the future, with HTTP redirections. When defining DNS names, we also try to use the name of the feature, not the tool itself (http://search.ilog.fr but not http://aspseek.ilog.fr).

Wherever possible, data was to be stored in a documented way and in a format that would be easy to reuse, such as XML. At the very least, each application should be able to export in common formats, and we strongly discouraged directly using an application's internal storage. For instance, we tried to make the search engine query a wiki page via an HTTP request rather than directly accessing the wiki page as stored on disk as a text file..

3.4 Intranet Functional Bricks

The current bricks we have installed on our intranet are:

- A search engine, indexing sites only via their public web interface. We thus do not index sites that require authentication or that are not web-standard: we do not directly index the data in a database for instance, only the user web views of them. To provide a better ranking of the pages we decided to have 2 search engines, one in each intranet zone, rather than having a partial view of a common index space, otherwise we were afraid that the ranking of pages would be too dependent on non-accessible pages, and thus be of no significance for the target audience. In order to provide a single place for users to search, we added the following features to the simple, "google-like" aspseek [1] interface:
  - meta-searching: the search engine would also query specialized search engines in addition to its own indexes, and display the results in the form of "sponsored links". It searched the people directory for employee names, and a special "important links" wiki page where anybody could place "advertisements" for what result should be important to present to the user if some keyword was found in the search string. For instance, if someone searched for "bugs", we wanted to provide a link to the official bug-tracking systems used in the company. This was started as an effort to overcome the mediocre page ranking system provided by the search engine (maybe due to the nature of the link graph on an intranet), but it can be seen as a primitive folksonomy system [28].
  - tabbed results: users can filter search results using simple tabs, based on criteria that one is most likely to remember about a document: was it a PDF, Word, Excel file, was it a mail, a wiki page, was it modified in the last week or month?
  - non-web pages: we enhanced the indexing of Office documents, and made it able to recursively index files in ZIP archives, and browse the archived files in the browser
- A wiki, we chose TWiki [23] as it was supported by an important community of users, and specifically targeted towards intranets. This system is really powerful, enables end users to design simple web applications, and is extremely fault tolerant. It relies on simple text files and the RCS version control system rather than a database. The features we found most useful are the locking of pages during editing to avoid overwriting of concurrent editions,

email notification of changes, a simple extension mechanism through the use of plug-ins, an extensive templating system, mandatory authentication for editing, flexible and fine-grained access control (even if we discouraged its use), full version archiving of pages and attached documents, a simple markup syntax complemented by the possibility of using HTML, and a relatively powerful metadata system.

- A web-archived mailing list manager, allowing end users to create, manage, moderate and delete mailing lists by themselves. We now use the SYMPA mailing list manager [22] which gives more power to users and has better custom layout options than the brick we used previously, Mailman [14].

- A web-archived instant messaging system [15], with IRC servers and daemons to log discussions to web archives, ensuring that each line of conversation has its own URL. We also provided a simple web client for use by users who had not installed a standalone IRC client.

- A people directory, offering a nice front-end display to graphically browse the employee directory from the multiple sources of information inside the company

- A bug tracking system. We use now Atalassian JIRA [13], which is progressively replacing an older custom-built internal system.

- An HTML validator [26], to provide one-click validation of all intranet pages via a link in the page footer.

- A project management system, Gforge [8]

- A web image repository, Gallery [7]

- A web interface to the version control system. We now use Fisheye [3], after initially using Viewcvs [6]

- Web statistics, via Awstats [2], providing monitoring of our web bricks

- Web access to disk backups, via custom scripts

- Web access to shared disk space, via a simple apache view of a common NAS, but that will surely be replaced by a more elaborate solution, most likely a simple document management system based on Webdav

4. DELIVERING AND EVALUATING RESULTS

It is a never ending job to enhance an intranet. User needs are constantly evolving, "Internet culture" spreads deeper into everyday life and technology continues to develop. We have nevertheless made a significant step forward from where we were in 2003 (see Section 2.1) and from the tools that we first began to deliver in 2004 and that we have continued to enrich since then.

4.1 The Product Intranet

Defining a clear positioning for the intranet makes things easy for communication and training purposes and gives users a clear mental representation of the intranet environment. The new intranet is the Product Intranet, defined as the starting point giving access to all ILOG Product Division online resources and featuring two main areas: The Product Homepage, giving access to all official information on ILOG Products (see Figure 4) and the Collaboration Area enabling users to collaborate with and within ILOG Product Division teams.
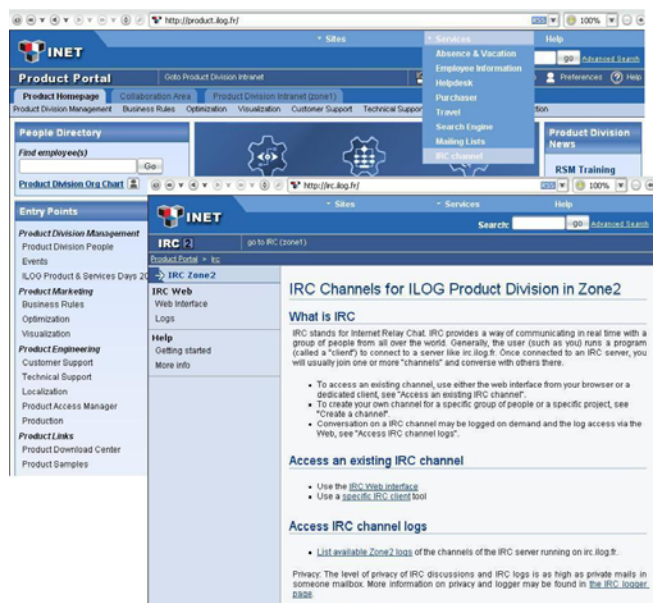

Figure 4: ILOG Product Portal

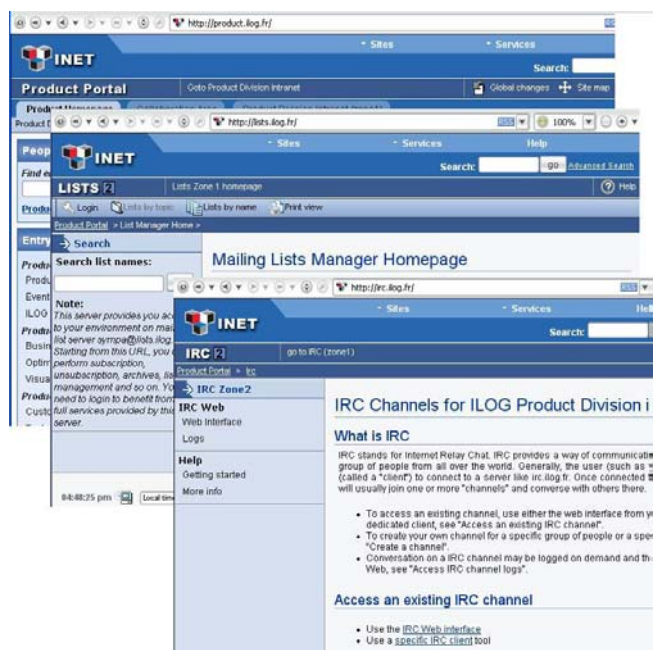**Figure 5: Every tool accessible in two clicks**

Figure 6: A common layout for every tool.

This new intranet offers a rich set of features, from collaboration tools (wiki, sympa, irc) to resource finding applications (search engine, people directory) and more specific user applications. All tools are just two clicks away from any page (see Figure 5) and all have a common layout and look & feel (see Figure 6), thanks to the shared layout layer (see Section 3.2). All tools share the same way to authenticate users.

This intranet is operated and maintained by a team of 5 people who provide support and training and who also work to spread this intranet culture throughout ILOG.

The new intranet has been welcomed with great success by ILOG Product Division people. To validate this success at multiple levels, we perform usability tests led by a human factor specialist. We also carefully study the evolution of usage statistics for each of our functional bricks and we constantly solicit users for direct feedback.

4.2 Human Factor Tests

A human factor engineer specialized in cognitive psychology joined the intranet team in the early phases of the project. The tests presented here focus on the "Layout" part of the intranet project and more specifically on its implementation for the wiki. This choice was made because the "Layout" is what the user first perceives from the intranet and because wiki, as the main collaboration tool on the intranet, requires a richer set of interactions with the user.

These tests cannot be performed by a developer or through surveys, because only a specialist can ensure that the relevant psychological clues are identified during experiments. These tests where conducted during the conception phase because at this stage it was still possible to validate some interface choices by testing prototypes (paper, screen) against ergonomic principles and to understand goals, abilities, and wishes of the users. Design could then be undertaken, with the benefit of knowing the frequency of user tasks and knowing the sequences of tasks that are required to achieve a goal.

The advantages of performing tests on functional prototypes include the possibility to anticipate and observe users in context, to perform measures on performance, efficiency, and satisfaction. In light of these observations, the project team was able to transform difficulties encountered by users into development issues.

The first round of tests consisted of using the "thinking aloud" method [9], where the people being tested share their thoughts verbally as they progress through the tasks they have to do. A series of tasks was defined to understand how the intranet is used. A set of users was then identified to perform these tests. Testing with just five users commonly enables you to identify 80% of usability problems [16]. During these tests, the person's was recorded, as well as the different actions performed on the site. The human factor specialist observed the way each user navigated the site, their habits, and the most frequently and least frequently used features.

A second round of tests consisted of asking selected users to draw the home page to identify the forgotten elements (invisible elements or elements that are not understood) and invented elements (needed elements). This method also evaluates whether the interface is easy to learn, which gives indications about its usability.

The result of all these tests is the ability to identify the strong and weak points of the layout. The main recommendations proposed were for us to more explicitly identify each functional part of the interface to make sure users could immediately understand the difference between each [20], and for us to simplify the page header. An interesting conclusion was the high level of awareness that users had of the work performed within the various groups and teams: people had ways to learn of their colleagues' activity, the group workspace and group processes are well identified.

However, the tests showed a general concern of users faced with great difficulties in trying to build a mental representation of the intranet, feel comfortable with it and trust the information they find there. The tests we conducted were more qualitative than quantitative, in order to define a future direction for research on the "Usable Intranet" [4] project, but it was difficult to use these tests to know if we objectively made progress in addressing the aforementioned concerns. We must now devise more quantitative tests to measure the progress that we hope to make in moving towards a more "Understandable Intranet".

4.3 Statistics

Looking back at some figures from 2003, before the intranet project got underway, the audit result (see Section 2) shows that consultation of the intranet was constantly declining, that little or no maintenance was being done and that people were losing about 30 minutes of their time each day searching for information without finding it. People had no more confidence in the intranet.

Analysis of the publishing activity on the intranet between October 2004 and October 2005 reveals an average of 700 edits per work day, a total of 23,000 pages and 450 separate publishers (out of ILOG's 650 employees).

Analysis of reading activity over the same period reveals that two separate populations can be identified. The first group consists of engineers & scientists, people with a technical computing background and a R&D culture (population A). The second group consists of people with a sales or administrative background (population B).

If we observe statistically the way these two populations use the intranet, we see that population A visits the site daily (an average of 20 visits per month per visitor) while those people from population B visit the site perhaps once or twice a week (an average of six visits per month per visitor).

If we use time as reference, we observe that 100% of population A visited the intranet in 3 months and that the amount of visits per visitor is steadily increasing (from 14 visits per visitor in January 2005 to 23 in May 2005) and that the percentage of visitors from population B is slowly increasing (from 30% early 2005 to 60% end of 2005) with a constant volume of visits per visitor.

5. ASSESSMENTS AND PERSPECTIVES

In the 2.5 years since it was implemented, the intranet project has been successful within the scope of the ILOG Product Division. Half of team time during this period was spent implementing and maintaining functional intranet bricks and the other half of the time was spent providing services to help users become comfortable with their intranet and leverage its potential. This experience showed us that taking care of an intranet is not

just a matter of technical expertise but also of day-to-day human efforts.

Like a garden that needs constant attention, the success of a cooperative intranet, especially a wiki-based one, seems to rely on regular, consistent care to help users become comfortable and to grow and thrive within the online environment. Periodically, every month or so, the intranet team publishes a newsletter to inform users of the latest developments on the intranet, provide tips on how to use it, share success stories, and generally communicate the vision and Internet culture behind it.

Monthly events called 'Café demos' are also organized, where users are invited to share a coffee with the intranet team and find out more about new feature or tools recently introduced on the intranet. We provide demos and quick training sessions and can answer their questions and listen to their difficulties and successes with using the intranet. For instance, in the first months that followed the introduction of the wiki-based intranet, we saw a noticeable drop in usage when the main wiki "gardener", who monitored page changes on a daily basis and offered help when problems arose, was absent for more than a week. Later on, as the wiki "took root" within a wider user base, we could monitor it less closely.

Spreading the intranet vision at a technical level is also important. This is also one of the most difficult things to do. Two main factors helped us to achieve this goal: The first factor, oddly enough, turned out to be the important turnover within the intranet project team. While this was sometimes hard to manage with regards to project planning, it actually proved to be quite useful, as people leaving the team become "intranet ambassadors" and helped their new teams make better use of the intranet. The second factor was the success of wiki intranet use within the core intranet team itself and the constant efforts made to share Internet & intranet knowledge via the team irc channel, which other users were invited to join and share and participate in the conversation for a while. It provided us with a way to "show by example", so that people could observe how an actual community worked and used the intranet tools in practice, rather than us having to impose a particular interaction model.

As part of the larger ILOG intranet, the Product Division Intranet is based on our vision: it's an intranet like the Internet! But does it represent the ideal solution? We found that it was similar enough for those of us who had grown to rely heavily on the intranet search engine in the same way we relied on Google for finding things out on the Internet, for example, but we discovered that other people didn't use the Internet via Google so much, and that our vision of the Internet was not quite theirs. Some users therefore could not use "our" intranet as intuitively as we had expected. We thus realized that we needed to have a deeper understanding of the way people work and the way they use the intranet, and that we were not able to gain this knowledge ourselves. We therefore started research projects in collaboration with several academic and research institutes - the INRIA/ILOG/Nice University "Usable Intranet" project aims to examine the specific issues around the use of Internet/Web technologies on company intranets [4]. We should invest time in the future to collaborate more with academics on these subjects, to help us improve our knowledge of intranet usage.

Important issues raised during the "Usable Intranet" project proved to be the consequence of limiting the project to the ILOG Product Division. This limitation was a blessing at the beginning because it was strongly sponsored by the division management and the user community shared a common culture with us. There was a common requirement for an intranet that could fulfill our important need to collaborate and publish product sources and documents. This population was always available to discuss their needs, test the prototypes and validate the choices. But this has now become a limiting factor for collaboration with other divisions, whose needs extend beyond these aspects. To get rid of this handicap and ensure intranet stability and coherence, we think we should enlarge the project mission to encompass all of ILOG. Spreading the project throughout ILOG will raise challenging issues, as we will need to address the needs of people from different backgrounds, who are not necessarily so familiar with identifying and expressing their own needs. The Product Division will probably remain the "intranet greenhouse" (to continue the gardening metaphor!), as new intranet needs tend to emerge first within that community. However, the intranet and the team in charge of it will have to cope with passing from highly technical to less technical users, perhaps by complementing the Internet-like organization with more traditional "intranet" features like business-specific portals, official glossaries... We hope to continue seeking guidance from observing the Internet evolution and collaborating with academia to help meet this challenge.

6. ACKNOWLEDGMENTS

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