PROCESSING REQUIREMENTS
or "How to Build Your Conference Toolbox"

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Abstract

In the last years the way the Proceedings of many Scientific Conferences are being produced has radically changed: from optical copy of manuscripts, we are going to use only the new "electronic model", currently based essentially on the Adobe PostScript language [1] and the Adobe Portable Document Format (PDF) [2].

The general computing requirements needed for the organization of an accelerator conference and for the electronic processing of the author contributions in particular are described. The experience gained with the organization of ICALEPCS'99[1], held in Trieste in October 1999, is also presented.

1 GENERAL COMPUTING REQUIREMENTS FOR AN ACCELERATOR CONFERENCE

The organization of an accelerator conference is a very complex task: there are so many things to plan, build and test, so many people to manage involved into the various aspects of the conference. In general, we can think of a conference as a place where important information is shared or, in other terms, a place where information should flow from person to person.

This information needs to be managed very well *during* the event, to be sure that no data will get lost or misunderstood so that the conference will continue even *after* its end through the proceedings. The planning for the whole preparation of the proceedings must therefore be one of the priorities from the very beginning of the conference organization.

In particular, we can see that there are different kinds of data that we have to manage:

- **information for the inside**: this is all the knowledge that the Local Organizing Committee has to share among its components (documentation, plannings, proposals, contacts etc.). There will be different people managing different aspects of the conference, but this people need to work in a collaborative way. Due to this, we must set up a framework to store, arrange and furnish all of this information to the Local Organizing Committee;
- **information for the outside**: conference information has to be published from the beginning, in order to create interest in potential attendees, give logistical information, motivate, give speakers all the details that they must know to prepare their presentation (themes, topics, possible connections with other presentations, scheduling, available equipment and so on);
- **tools for the outside**: there are many programs or, in general, *computer tools* that authors may need to prepare and submit their contributions. It is important to make them available directly from the conference's site or, at least, give their (web) references. A web page for software download together with an FTP server may suit for this task;
- **information from the outside**: interaction with the speakers, sponsors and potential attendees is crucial: we are just organizing an event where people from anywhere in the world will share experiences and knowledge. So we must be able to receive information about registrations, about session organization (from the chairmen) and from authors (contributions). Then, it results fundamental to have a framework built on e-mail, on web forms (with a good database behind) and on a Remote File Service (FTP).

In addition to this, there are some further services to furnish:

- **Distilling Service**: it is very useful, both for organizers and for authors of contributions, to have a remote PDF creation capability, here called Distilling Service[2]. With such a tool, each author can test in advance his PostScript file quickly getting the corresponding PDF file and see if it works well and if the Editorial Rules are respected. This results in final papers with better quality in a shorter time;
- **Processing of Contributions**: to get the final Proceeding files we must be able to process the papers from their source files (if needed) to the PostScript file and then to PDF. To do this, it is important to support several hardware platforms (Windows PC's, Macintoshes, Unices and so on) and software (LaTeX, Microsoft Word, Microsoft Excel, Adobe FrameMaker and so on) versions (e.g., Word 6.0, Word 97, Word 98).

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[1] http://www.elettra.trieste.it/ICALEPCS99

[2] From the name of the utility that creates the PDF files, Adobe Acrobat Distiller, commonly refered to just as 'Distiller'

2 BEFORE THE CONFERENCE: THE SERVER SIDE

2.1 Considerations on features and platforms

There are some fundamental services that the Conference Organization has to set up. Among them are a World Wide Web site, (e-)mailing capabilities, file service (both local — within the LAN — and remote).

We assume that there exists an electronic mail server usable by the Local Organizing Committee: in this case, all we have to do is to set up and manage an "official" e-mail address (*Conference e-mail Address*) for general communications (as a sender for the Announcements, for example, and as an addressee — published on WWW — for information requests) together with a number of mailing lists.

It is also important to have tools to assist in *classical postal mailing*, in particular for the generation of printed announcements, brochures, envelope labels. It is then important to have a database to manage at least, by now, information about the attendees (like addresses etc.). We will see that the database will play a fundamental role in the whole organization, so it is useful to start thinking of it from the very beginning of the organization.

When coming to the *file server* for the LAN side, it is useful to set up a machine dedicated to the event. In fact, even if there might already be such a facility at the organizing site/laboratory, an independent machine is needed for the specific requirements of the conference and a total control of it at any time is mandatory. This file server must be usable by etherogeneous client platforms, in particular by Windows PC's, Macintoshes and Unices. The choice of the server platform is a crucial point: it has to be very reliable, easy to configure, to maintain and, not less important, not too expensive. We think that both Windows NT Server 4.0 and Linux satisfy our requirements, even if in different manners. For what concerns the file service, both NT and Linux can export volumes to other Windows machines (Linux using the Samba[3] daemons) and to Macintoshes (both using the AppleTalk protocol — AFP), and support FTP (File Transfer Protocol). Linux is also capable to export volumes to legacy Unices or other platforms supporting the NFS (Network FileSystem) protocol, in spite of NT that do needs additional (commercial) software.

Also for the *FTP server* accessible from the Internet the use of an independent machine is a good solution: it may be the same PC that we introduced in the previous paragraph, configured to share one or more disk areas with the outside via FTP.

The *Web Server* could also be a facility already existing in the organizers' site: anyway, the conference may need some "web applications" that might request a stricter integration within the existing web server, and this could imply to have more control on the Web Server itself. A typical example is the database, for which a web access is essential (e.g., for conference registrations or contributions submis-

sion), or the Distilling Service, for which a web interface is very much appreciated. For these reasons, it may be useful to use one more time an independent machine hosting a web server just for the web facilities that must be directly and hardly managed by the organizators.

A particular dissertation must be made on the *Distilling Service*. This facility can be easily furnished using Acrobat Distiller, by setting up one or more "*watched folders*" [3]. Acrobat Distiller 4.0 is now available only for Windows and Macintosh, dispite previous versions ran on Unix machines too (even if with many problems that made it unusable for our requirements). The Distiller, however, seems to work better on Windows PC's then on Macintoshes (see Section 3.3)[4].

After all these considerations, it comes out that at least one dedicated server must be set up for the conference. The selection of the platform for this server is a very critical decision to be taken. Some factors to consider are:

- simplicity of administration;
- possibility to have a 'remote' administration;
- high reliability;
- high network security;
- low cost.

One great solution for a Network Server is undoubtedly a Linux system, due to its 'Network Concept'. Even if not so simple to administer it has complete support for administration through the Internet (telnet, ftp, various web administration utilities...) and, when accordingly configured, high reliability and security (ssh, totally configurable tcp wrappers...). Moreover, Linux is a free software, also based on standard low-cost PC architecture.

Choosing NT may also be a good solution, even if not at the Linux' level. NT is very simple to administer, but it offers poor remote administration possibilities. Some additional tools are essential (BackOffice suite, Option Pack, Resource Kit...), but they do not add all of the features needed for such a server (in particular for remote administration, security and reliability).

2.2 The ICALEPCS'99 Experience

At ICALEPCS'99 a Windows NT 4.0 Server was set up for the event. It was configured to serve as a file server both for the Elettra LAN (via AppleTalk and the Microsoft Network — AFP and SMB protocols — together with FTP and HTTP) and for the outside (via FTP), as a database server and as a Distilling Server.

In addition, it was used for the conference web site development, with Microsoft Internet Information Server 4.0 (IIS4) as the web server (the *static* web pages where daily mirrored on the Elettra and ICALEPCS'99 official web server). The *dynamic* pages (e.g., DB access) where installed on the dedicated NT server only (Figure 1).

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[3]http://www.samba.org

[4]Adobe announced to be working on a true *Distiller Server*, working on NT, Sun SPARC Solaris and, finally, Linux. More information is available at http://www.adobe.com/products

www.elettra.trieste.it
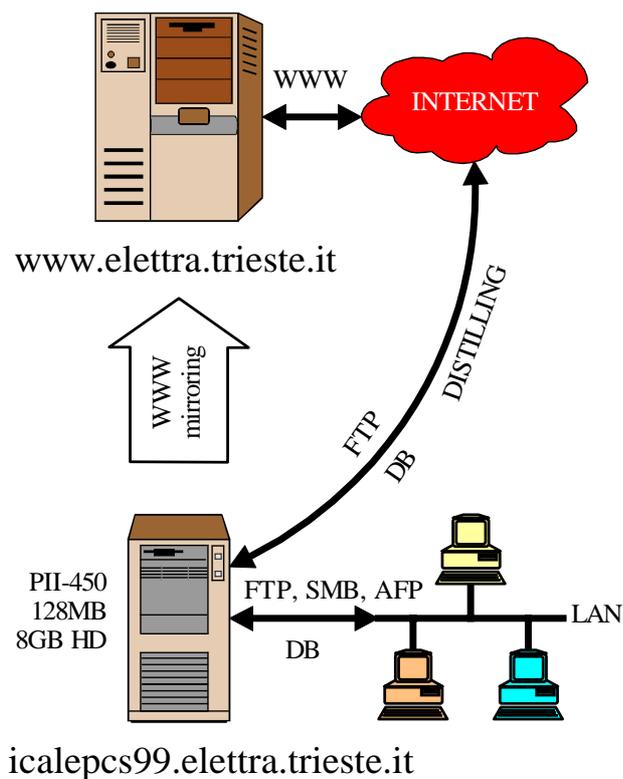
PII-450
128MB
8GB HD

icalepcs99.elettra.trieste.it

Figure 1: ICALEPCS'99 Servers configuration.

A subtle security problem we found with the standard IIS remote administration convinced us to disable the IIS4 web administration tools. Remote administration was dealt with a "remote display system" called VNC (Virtual Network Computing)[5]: VNC "redirects" the screen, the keyboard and the mouse to a remote host, called the *VNC client*. It is an Open Source project, multiplatform (runs on Macintosh, Win32 systems, Windows CE, various Unices, Java) and can be used together with ssh, getting a high-security connection.

2.3 Database

The database plays a very central role in the whole organization, since it stores accounting data, information about the conference programme, information on the contributions, names and addresses of attendees, abstracts and so on. For all these reasons the database must be a solid pillar on which we'll build the conference. It is also important for the database to be *standard*, *open* and *programmable* to automate many tasks: all these considerations bring us towards a standard SQL database [4].

In addition to this, the database must be accessible from the Internet, both for the organizers and for the conference participants (for pre-registrations, registrations, abstract and paper submission, abstract and paper consultation — this access may be restricted to the Scientific Committee only — and so on). This fact enforces the choice of a standard and open database. It is important to stick that there are many free databases available, in particular for the Linux platform. Many of them are programmable for web interfacing, for instance using Perl[6] or PHP[7].

Having a good database some tasks that usually take time to the organizers can also be automatized. For example, we can think of using a LaTeX-like grammar to write complex formulæ in text-only abstracts directly from the web. This circumvents many limitations of the text-only format usually requested in the abstracts submission, and permits to use symbols like "α" just by writing "\alpha", or formulæ like

$$x^2 + y_i^3 = z$$

just by writing "\[x^{2}+y_{i}^{3}=z\]" [5].

In this manner, it could also be possible to export the abstracts from the database, process them with LaTeX together with the Acrobat Distiller (or with ps2pdf, or with pdflatex), and get the PDF file to be automatically published on the web: this could only be done with a robust high-performance database, using some advanced features like SQL procedures, triggers and the possibility to have a programmable interface with the operating system (typically, using a superset of the standard SQL).

Some modern databases can even support the storage of multimedia or binary data, and offer many tools to search, index, translate in other formats and publish directly on the Internet all of these data. Oracle 8i, for example, can store PDF files in its databases, furnish an XML or HTML rappresentation and offer them on the web using its internal web server [6].

For ICALEPCS'99 we started using FileMaker Pro 4 (FMP4) as the conference database, modifying the datafiles that our EPAC'98 collegues kindly offered to us. FMP4 is very simple to use, so that it is quickly usable, for example, by a secretary that is starting from scratch. Even more, it has a tool called Web Companion [7] that allows to access its databases through the Internet, being a tiny web server with an interface to FMP4 databases (it is a plug in for FMP4, so the DBMS and the web server are, at last, the same program). We started using this software on a Macintosh PPC G3/350 with MacOS 8, but we encountered some reliability problems, in particular for the FMP4 web server. So we decided to migrate to a server based on a PC with a Pentium II processor at 450 MHz and Windows NT 4.0 Server as the operating system. We thus gained in performance and system administration, and could export data to Unix, Windows and Macintosh systems. Nevertheless we could not solve some bugs we found in FMP4 whose control costed us additional development and special care. Definitely, FMP4 presents many limitations: among them, we'd like to stick on the lack of the concept of primary key for a record, a weak password management (the passwords are always shown in clear in the appropriate dialog box,

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[5]You can find more information and download this software from the VNC website at http://www.uk.research.att.com/vnc/.

[6]http://www.perl.com, http://www.perl.org
[7]http://www.php.net

complex and limited management of web and local access, and so on), poor interactive use of the database (no SQL, only few scripting capabilities), poor data input/output.

2.4 A possible solution for the server architecture

From the previous section it turns out that the server has to provide:

- **Network services;**
- **Application services.**

With the latter we mean, in particular, the Distilling Service and the database applications.

At present, the Distilling Service must be provided by a Windows PC (or by a Macintosh, even if we discourage it) with Acrobat Distiller watching one or more folders. For the network part, however, it is preferrable to use a Unix machine, that could be a very inexpensive solution when choosing a Linux box. After these considerations, it seems that we really need two different machines, and this is not a great deal! However, there is a possible solution based on a PC emulation software called VMWARE[8] that can make us use only one machine. Using VMWARE or a similar tool, we can think of setting up a machine as described in Figure 2: a Linux-based PC takes the Networking and database part of the Job (for example, it can run Apache with PERL or PHP3, a free SQL database, WuFTP for the ftp server, AppleTalk and Samba servers for file sharing within the LAN) and, through VMWARE, hosts a Virtual Windows NT 4 workstation running Acrobat Distiller (for the Distilling Service) and VNC (for the remote administration). In particular, Acrobat Distiller can watch a 'virtual remote folder' on the Linux side of the server, e.g. a directory like /home/distillserv, shared via Samba for the Virtual NT machine and for the NT machines of the LAN, via AppleTalk for the Apple machines of the LAN, and via FTP and HTTP (through a CGI) for both LAN and remote.

Some further considerations apply. First of all, it is better to set up a multiprocessor machine for the server, because the CPU load for such a configuration is quite high: two Pentium II/400, with at least 256 MB of RAM, can do the job.

It is also important to say that Acrobat Distiller is not a true server product. In fact, in certain circumstances the Distiller stops its work giving some interactive notifications and waiting for an acknowledge through the GUI. When Acrobat Distiller Server will be available, we will finally get rid of the Windows part of the server.

3 AT THE VENUE

A different approach must be taken into consideration when setting up the so-called "Proceedings Office", i.e. the infrastructure that will permit to receive, check, distill and
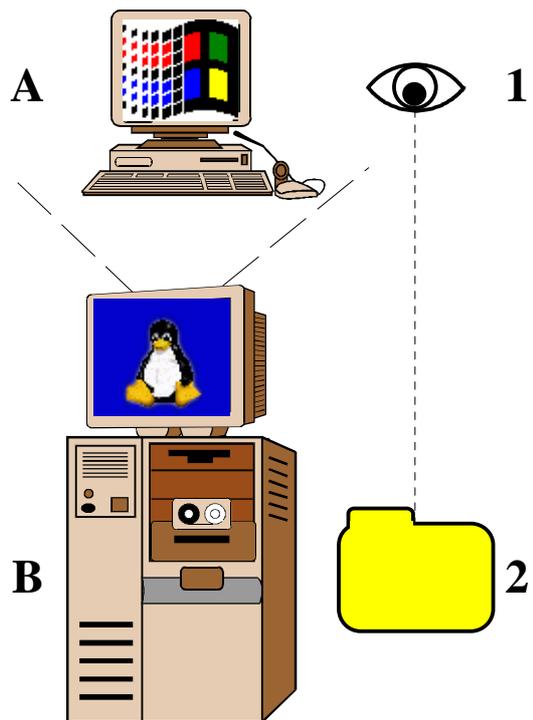
A - A Virtual NT 4 workstation running into VMWARE

B - A Linux-based PC for Networking and database

1 - Acrobat Distiller 4 for Windows watching a folder on the 'real' machine (**2**)

2 - A shared directory (e.g., /home/distillserv)

Figure 2: Windows NT4 on top of a Linux box with VMWARE.

fix (in brief, process) the contributions submitted during the conference. It has been seen that it is preferrable to adopt a per-platform approach when working on the electronic papers: in other terms it is better to process each paper on the same platform that was used for its creation [8].

3.1 Which Platform?

According to the above considerations, it is important to choose the correct number and type of machines to set up in the Proceedings Office. This choice can be made upon the statistics of previous conferences and upon the expected kind of attendees. As an example, Table 1 shows the statistics for the Operating Systems choosen by the authors of the contributions presented at EPAC'96, EPAC'98 and ICALEPCS'99, while Table 2 shows statistics for the software used to write the papers. Figures 3 and 4 give a graphical representation of these tables.

Being the EPAC and ICALEPCS communities quite different from each other, it is difficult to draw uniform conclusions. From the numbers above it is however possible to see that the use of MS Word is actually growing

Table 1: Operating Systems Statistics

	ICALEPCS'99	EPAC'98	EPAC'96
Windows	76%	60%	48%
Mac	8%	22%	31%
Unix	10%	11%	18%
Others / Unknown	6%	7%	3%

Table 2: Paper Software Statistics

	ICALEPCS'99	EPAC'98	EPAC'96
MS Word	81%	72%	66%
LaTeX	12%	28%	30%
Claris-Works	<1%	0%	0%
Frame-Maker	1%	< 1%	2%
Others / Unknown	6%	0%	2%

Figure 3: Operating Systems Statistics - Graphical.

up among the attendees of those Accelerator Conferences, even if LaTeX is still largely used: this could be due to the consolidation of MS Word 97 for Windows and MS Word 98 for Macintosh.

The Windows Operating System is getting rid of the MacOS.

The structure of the ICALEPCS'99 Proceedings Office was planned by extrapolating on the basis of the previous EPAC platform statistics. Figure 5 shows the actual ICALEPCS'99 machine composition: it is possible to see that it is not so far from the final resulting statistics of the contributions preparation platforms. Windows NT 4 Workstation was used for the PC's (based on Intel Pentium III/450), MacOS 8.5 for the Macintoshes (Apple iMac G3/266) and Linux RedHat 6.0 for the Linux boxes (same hardware as the Windows machines).

It was a good choice to set up the Proceedings Office according to two guidelines:

- **Central Management and Storage;**
- **Local Processing.**

Starting from the statistics above it is preferable to set up a Windows NT Domain that allows a good Central Management. The Primary Domain Controller (PDC) of the domain could also manage the Central Storage, publishing some volumes via SMB, FTP and AFP. The Linux boxes could mount these volumes using SAMBA. The Local Processing is important to avoid excessive load on few machines.

The server for the Proceedings Office should also be a machine independent from the one referred to in Section 2. It must be connected to the Internet on one side, and to the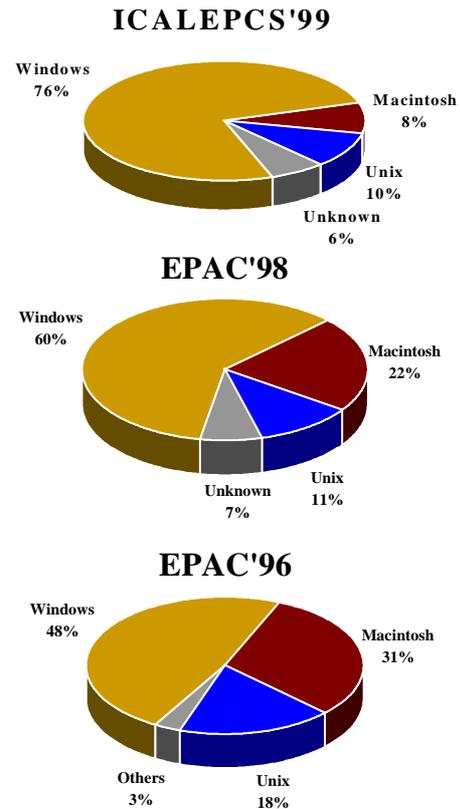 Conference LAN on the other, exporting some volumes through SMB, FTP, AFP. It is important to *backup constantly* all of the data (at ICALEPCS'99 it was made twice a day always on different and new DAT-DDS3 tapes). A crucial matter is also to have an updated antivirus, since it is very common to get one of those popular MS Word Macroviruses. A machine configured as in Section 2.4, even with only one processor, should fit for the job.

For the Windows NT and Linux workstations an hardware based on Pentium II/350 to Pentium III/450, 64/128 MB of RAM, 4 GB HD, 17" screen or more is sufficient, while on the Macintosh side a G3/300 processor, 64 MB of RAM and a 17" screen should do the job: it is important to stick on the presence of floppy drives for the Macintoshes, since the modern ones ("Blue G3's" and iMac's) are sold without them. Some other peripherals are also needed: a few flatbend scanners for critical problems with figures, Iomega ZIP and Jaz drives for possible contributions submitted on those media, one CD-RW drive for local backup/file moving and some quick Network Laser Printers (with automatic size-adapting features or, better, with both A4 and US Letter trays).

3.2 PC's Installation

Setting up a sufficient number of computers for the Proceedings Office of the conference (and for the Terminal Room too) could be a big and hard work, expecially for the long time that it could take. There is however a useful
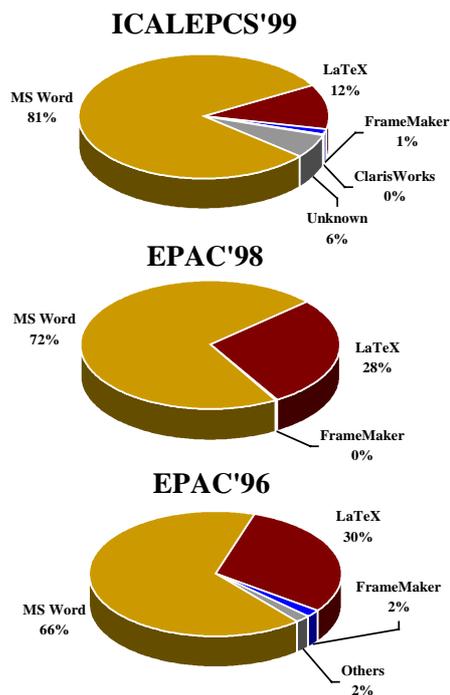
ICALEPCS'99

LaTeX
12%

MS Word
81%

FrameMaker
1%

ClarisWorks
0%

Unknown
6%

EPAC'98

MS Word
72%

LaTeX
28%

FrameMaker
0%

EPAC'96

LaTeX
30%

FrameMaker
2%

MS Word
66%

Others
2%

Figure 4: Paper Software Statistics - Graphical.

**Windows
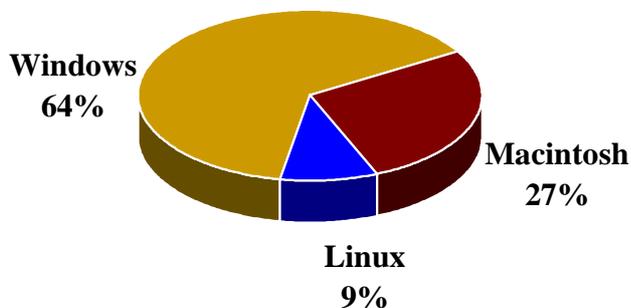64%**

**Macintosh
27%**

**Linux
9%**

Figure 5: ICALEPCS99 Proceedings Office machine composition.

approach that could be taken: the workstations cloning.

The procedure is quite simple: first set up the server and a well-configured client machine, with all of the software installed. Then, clone the Hard Disk of this workstation using any of the softwares available. One of this products is PowerQuest DriveCopy 3[9]. The only negative peculiarity is that you have to phisically attach all the hard drives to the first-installed computer. A solution could be to use PowerQuest DriveImage Pro 3[10], with which it is possible to save the HD image onto a server and then clone the workstations through the network (even concurrently on multiple machines, using a network multicasting system).

3.3 Mac Issues

The Apple planet is currently changing very fast. New machines stand on our desktops, with beautiful colours and new high-performance processors. In some cases this new machines are carrying with them many new problems, that can make a conference organizer's day very long! In fact, the new standards which are replacing the old ones still have stability and reliability problems. The new iMac's and "Blue" G3's (and, now, "Silver" G4's) come without floppy drive: to be able to read the contributions presented at the Proceedings Office frontdesk it is necessary to buy and use external USB[11] floppy drives, that are incredibly slower than the old internal SCSI ones. Due to the USB low-power support, there is no automatic disk expulsion so that the user must drag and drop the diskette onto the Trash (unmount) and then press the expelling button on the floppy drive. We experienced many problems when the user forgot to unmount the floppy before expelling it, getting very frequent losses of data. More than this, there is no further support for old 800KB floppy disks, and in some cases we had to go finding out an "old" Macintosh to read them.

The USB interface (and, maybe, the FireWire[12]) is replacing the SCSI and ADB[13] ones, with the necessity to buy new devices (and use new — often buggy — drivers...) or to use particular interface adapters. This may also be a problem, but we think it will be overtaken pretty soon. For the time being, however, we prefer to use the "good old grey" G3's.

We experienced many crashes on MacOS, and this is a problem in an intensive workplace like a Proceedings Office.

The Windows planet is more supported by the software-houses. As an example, Adobe Acrobat 4.0 has many more features in the Windows version with respect to the Macintosh one, and it behaves really better. In fact, there are many problems with strange font substitutions when Acrobat does not recognise a font that is actually installed in the system: during ICALEPCS'99 we often had to distill a Macintosh-prepared contribution onto a Windows PC to avoid font substitution.

3.4 Software

In this section we will briefly discuss some of the softwares that are necessary in the process of the Proceedings preparation.

Adobe Acrobat   The fourth release of the Acrobat suite really improves the number of possibilities it offers compared to the previous version. The increased integration with MS Office results very useful during the processing. In particular it gives the possibility to maintain all of

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[9]http://www.powerquest.com/drivecopy, $29.95

[10]http://www.powerquest.com/driveimagepro, starting from $220

[11]Universal Serial Bus, http://www.usb.org

[12]FireWire is one peripheral standard developed by Apple, very suitable for use with multimedia peripherals such as video camcorders and other high-speed devices like the latest hard disk drives and printers. Also referred to as IEEE 1394 and i.LINK. http://www.apple.com/firewire

[13]Apple Desktop Bus

the hyperlinks that a Word Document can bring with it, producing a well-formed PDF document (quite indispensible when preparing the indeces, the Table of Contents and so on...).

However, not all of these features are available on the Macintosh OS, showing the priority that Adobe has put on the Windows market. Adobe is putting all of the upcoming features for the Macintosh platform on its website for free downloading. Unfortunatly, as stated before, on the Macintosh there are more problems with fonts translation than on Windows.

Another great source of troubles may be a bad PostScript file. This usually happens when the user prints his document with a bad PostScript printer driver, getting a file that only that printer can read or with custom printer commands in it. To overtake this kind of problems, Adobe (that defined the PostScript language [1]) furnishes a standard PostScript printer driver for both the Windows and Macintosh platforms[14]. The Unix world, as known, does not suffer this kind of problems, the printing process being "PostScript-centric".

Pitstop   Sometimes it is necessary to directly modify the PDF file, in case the only file we have is the PostScript one or because modifying the source file is impossible (lack of the creating program, or MS Word limitations[15]). Acrobat allows to use only basic modification tools (like changing some existing text, but not adding new one, nor moving or scaling figures), so it is fundamental to install an Acrobat plug-in called Pitstop. Pitstop is produced by Enfocus (http://www.enfocus.com), starts from $295 for one license to, for example, $3,540 for 20 users, and is available for both Windows and Macintosh. Another useful tool by Enfocus is Taylor Publish ($369). Taylor, available only for the Mac OS, permits to modify directly the PostScript source.

Microsoft Office   Being the most used word processor, Word is a must in the Proceedings Office. It is important to download the latest service packs from the Microsoft website, to fix some annoying bugs. Furthermore, Word often behaves differently on Windows and on Macintosh (especially for figure management), so it may be good to try changing platform when experiencing problems.

LaTeX   Due to frequently found font problems, it is extremely important to have a *good* LaTeX installation in the Proceedings Office [9] to be able to correctly recompile the troubled-papers from the source file. LaTeX distributions are available for any kind of operating system, but it is undoubt that the Unix ones are the best.

Miscellanea   Other useful tools could be the following:

- **Ghostscript + GhostView** (http://www.cs.wisc.edu/~ghost, free of charge) to display and process PostScript files (e.g., re-write, print...);
- **TransMac** (http://www.asy.com, $64), to read and write Mac-formatted diskettes (and ZIPs, CD-ROMs...) with a Windows PC;
- **TextPad** (http://www.textpad.com, from $27), a very good text editor for Windows, with many useful features (e.g., regular expressions in search/replace);
- **Paint Shop Pro** (http://www.jasc.com, $99), a low-price Photoshop competitor, shareware;
- **CrossFont** (http://www.asy.com, $45) to translate TrueType, Type 1 and Type 3 fonts between Windows and Macintosh.

3.5   Internationalization

International systems must be used (Operating Systems, software, keyboard layout...). However, some problems could arise from asian contributions since asian versions of Office use custom localized fonts (e.g., the Mincho font instead of Times). For this reason it may be useful to have some computers with Asian keyboards, OS's and Office.

4   CONCLUSIONS

Technology is evolving very fast, and this can help us in processing and preparing the Proceedings of a huge conference. Anyway, it must be kept in mind that a good planning must be made before starting the organization of the conference: this implies studying the current standards and the current softwares, with particular attention to the framework of the proceedings production process (abstract and contribution management, participant data management).

The Database plays a primary role during each phase of the organization, so it must be set up well in advance. The hardware and Operating System platforms are also crucial and non-trivial decisions to be taken. However, there are actually several (and often unexpensive) solutions that can help us in this job.

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