HEPiX the beginning

Pre–History

First, throughout the 80s, there was HEPVM, a very successful collaboration of the major HEP labs which concentrated on the IBM VM operating system then in common use. In 1988, in a meeting at NIKHEF, there was a first attempt by several European labs to create something similar for UNIX. At CHEP in Oxford later that year, Willem van Leeuwen (NIKHEF) tried to get some user support for the idea. Unfortunately, these were without apparent success.

A History of HEPiX

HEPiX really started at CHEP'91 in Tsukuba, Japan. Representatives from **SLAC (Les Cottrell), FNAL (Judy Nicholls)** and **CERN (Alan Silverman)** recognised the possibilities and advantages of learning and mastering the brave new world of UNIX in partnership with other institutes.

With HEPVM as a model, they proposed to set up a series of regular meetings with invitation to all HEP labs to discuss issues of mutual concern. They started with 2 Chapters, one in North America, one European, plus a common meeting associated with CHEP conferences.

At CHEP Annecy, we decided there was more strength in one world-wide organisation with joint meetings: Meetings to be every 6 months, on opposite sides of the Atlantic plus a meeting associated with CHEP conferences. The very first meetings were actually scheduled alongside those of HEPVM, for example one in NIKHEF in 1993 was called HEPmix.

HEPiX Working Groups

Formed working groups to tackle specific problem areas – AFS, security (even then), X11, user environment, etc. Biggest visible achievement was the set of HEPiX login scripts developed jointly by DESY & CERN to define a standard user environment for UNIX (all UNIX). But behind the scenes, the other working groups also solved problems (how to work with AFS, better Transarc support for AFS) or produced shared code modules (shared development of AFS mgmt tools, X11 environment scripts, etc.).

HEPNT Created

Meanwhile, in 1997, the HTASC sub-committee of HEPCCC created HEPNT, chaired by Dave Kelsey of RAL to look into the use of Windows in HEP sites. Initially, HEPNT was a closed group by invitation only although they held their first open meeting in CERN in December 1998. Since October 1999, their meetings have been associated with, subsequently merged with, those of HEPiX.

Storage

Storage History at the HEPiX Conferences
The high energy physics experiments always produced large amounts of data, that's why storage has been an important topic at HEPiX from the beginning. Many new technologies have been introduced over the years to adapt to the increasing demands of the science community. Some of the introduced technologies have even lasted until today.

2nd HEPiX at CERN 1992 Fall
Alan Silverman: AFS pilot project: at CERN, 2 servers had been set up (a HP 720 and a IBM RS6000, both with 2GB disk space) and clients on machines running HPUX, SunOS, Aix, Domain_OS, Ultrix and NeXT. As the servers have different architectures they can not backup each other (in case of failure), therefore it would be suitable to have servers with the same architecture. It seems that AFS will be intensively used in the future. A lot of people are interested in it, but only few had bought licenses.


Fermi National Accelerator Laboratory Fall 2002

RAL: VTP - Virtual Tape Protocol
RAL have developed a mechanism for remotely accessing tapes using IP over a network. In RAL's case the tapes are held in a StorageTek tape Silo, managed by an IBM 3090.

CEBAF 1993 Fall
Fermi bought for a 1 year evaluation: Transarc AFS for a new project on AIX. Fermi's I/O involves typically terabytes of data; 20,000 tapes; 200 Exabyte tapes per day. Fermi uses xoper tape mount facility.
SSC has for the PDSF 50GB online storage and 250GB tertiary storage.

Nikhef 1993 Spring
FNAL is using IBM RS/6000 with AFS, the port for SGI is not yet ready.
RAL has 40GB disk space for NFS installed. Staging for VMS and UNIX on RS/6000.

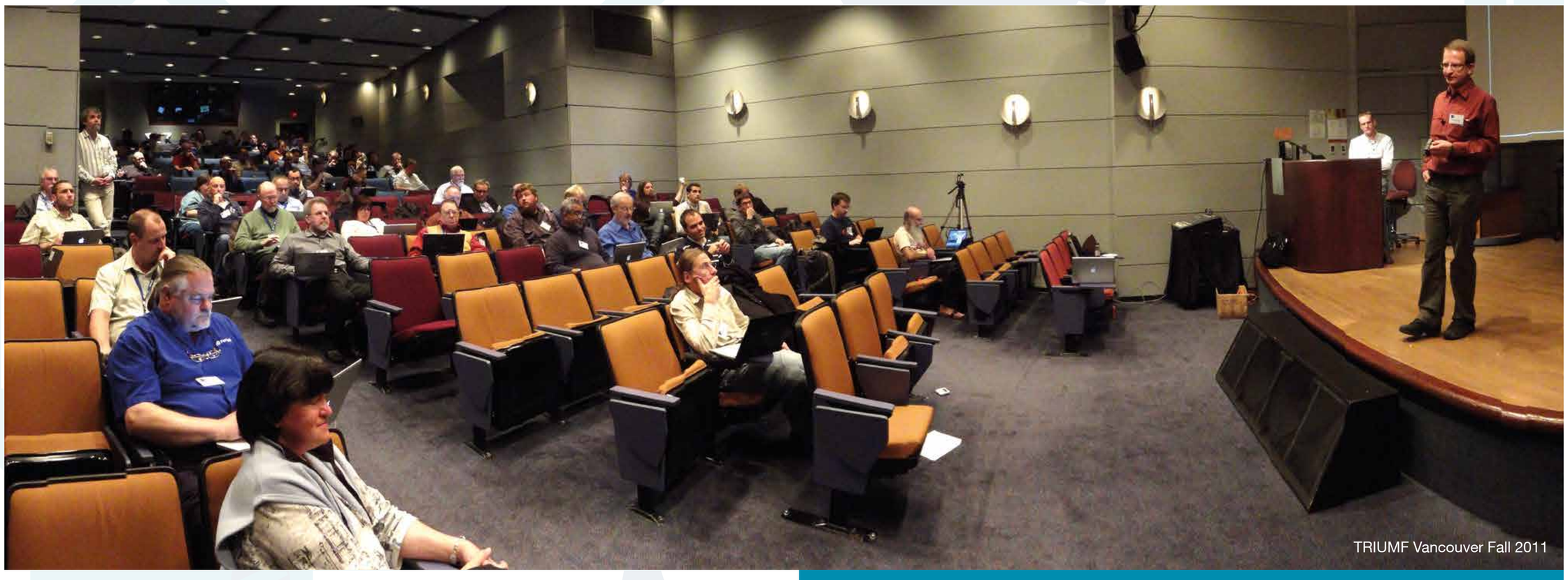
Pisa 1993 Fall
CERN: AFS is used for home directories.
RAL: the virtual tape stores 6.5 TB of data.

FNAL 1994 Fall
FNAL: Transarc's AFS implementation has problems on SGI. CERN's AFS was expanded to 6 servers, 220 GB disk space, backup on DLT tape, serving 750 users. SLAC is using STK tape robots, 1995 will see the production use of AFS.

Paris 1995 Spring
CASPUR has 3 AFS servers, serving clients in Rome and Naples, planned a single AFS domain for Italy. CERN did the first tests with DFS as AFS follow-on.

OpenAFS lustre dCache

Storage


TRIUMF Vancouver Fall 2011

SLAC 2001 Spring
CERN introduced CASTOR: Cern Advanced STORage manager for LHC data handling for both NT and UNIX independent of media technology.

LAL 2001 Spring
Introduction of dCache, joint Fermi/DESY project for tape access using disk caching, also supports standard NFSv2 protocol.

FNAL 2002 Fall
The LHC Computing Grid project (LCG) is now making plans for deploying a phase-1 grid next year.

NERSC 2004 Spring
FZK introduced dCache for GridKA, 2PB tape storage by 2007, LTO tapes and a dCache to TSM driver.

SLAC 2005 Fall
NERSC: Lustre 1.2.4 has some problems, as it is still a little green.

CASPUR 2006 Fall
CASPUR introduces the AFS/OSD project to extend AFS with object-based file management.

DESY 2007 Spring
ZFS is used at DESY and IN2P3 on Sun Thumpers as cheap storage.

Genome Sequencing Center 2007 Fall
There was a meeting with the OpenAFS gurus, discussing the features on a wishlist to be funded by the HEP community.

Cornell 2010 Fall
STFC-RAL introduced cvmfs – a caching filesystem for software distribution.

Triumf 2011 Spring
CERN EOS storage was introduced at Fermi with considerable success.

Prague 2012 Spring
DESY has replaced Lustre in Hamburg with IBM Sonas.

BNL 2015 Fall
CERN implemented an ownCloud backend for EOS to allow direct access to the highly scalable storage on the clients.

Security

History of security topics at HEPiX
Starting from the very first HEPiX meetings security was always a hot topic. As early as 1993 a Security Working Group & Authentication Task Force was proposed, but only much later an intense exchange of security related information was established. With the advent of the grid computing new areas in the field of security research needed to be covered.
Cloud computing and the work for IPv6 readiness opened further areas where coordination, research and information exchange on security related topics had to be organized.

1992
CERN set up KPP (Kerberos Pilot Project).
The motivations were:
1. to stop passwords cross the network in clear
2. to offer one secure login per day and user
The latter was rather considered a dream.

1993
Crack guessed about 27% of the passwords of about 5000 accounts, including 78 accounts without passwords. Crack needs about 40 minutes to go through a password file on a HP9000/710.

2001
„The Grid is Coming – Is Your Infrastructure Ready?“
Different sites have vastly different authentication policies.

1992
The role of password security and clear text protocols was discussed. Kerberos was seen as a candidate to secure passwords and protocols.

1993
Creation of a Security Working Group & Authentication Task Force. AFS and Kerberos were used at least at FNAL and CERN.

1994/1995
Security of X11 was a main topic. Xhost based authentication is regarded bad, to be replaced by xrsh and Magic cookies.

1996
Kerberos is on the rise, adding Kerberos authentication to IMAP (pine). Password policies (expiration etc.) and tools (sniffers, intrusion detection tools) were discussed.

1998/1999
Security BOF, proposal to use ssh and SSL. Discussion of certificates, use of a DMZ to secure sites.

2000
Ban clear text protocols at several sites (telnet, ftp, ...). Discussion of cross site scripting attacks (on web servers).

2001
Windows related security topics and grid security.

2003
AFS with Kerberos5 discussed.

Security

2004
Regular security scans become popular, more and more automated patching of systems.
Attacks become more professional, less script kids.

2006
One time password integration, Single sign on, PKI, Smartcards being discussed.

2008
More sophisticated attacks seen (cross-site scripting, SQL injection).

2009
Security aspects of on-demand virtualisation and grid/cloud integration, CERN does security training for users, courses for coders.

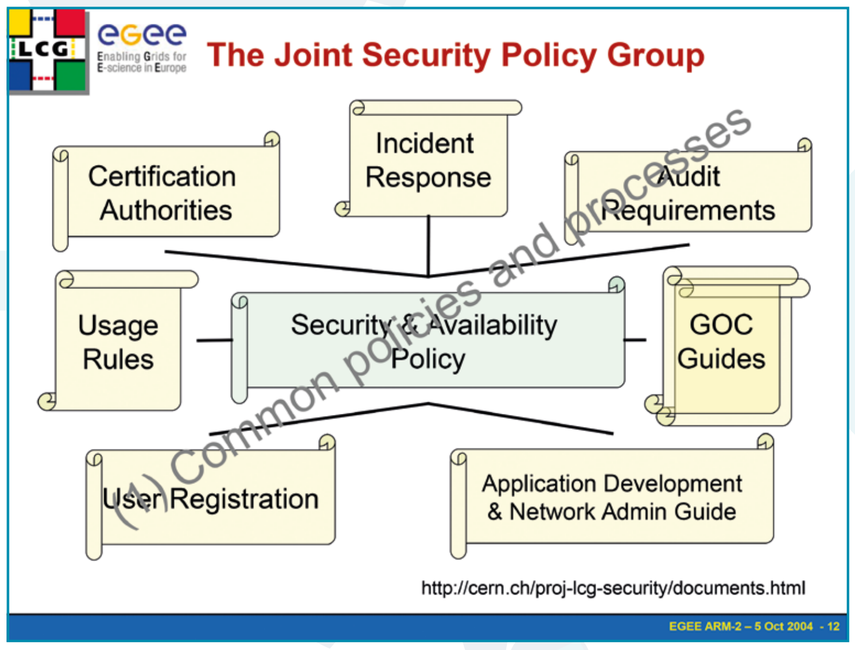
2010
Talk on inherent security features in IPv6.

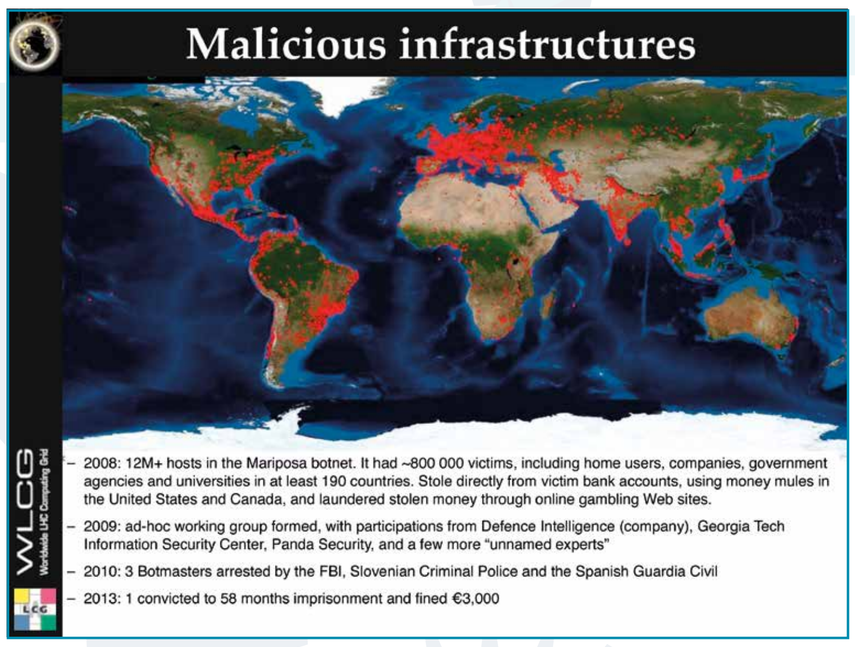
2011
When using virtualisation security of images becomes important.

2012
Security of mobile devices, how to control and update systems.

2014
New exploits (e.g. Heartbleed) and new attacks (e.g Cryptolocker) seen.

2015
Phishing exercise crafted by a CERN colleague for HEPiX attendees at the Oxford spring meeting.
A click rate of 9 percent was observed!

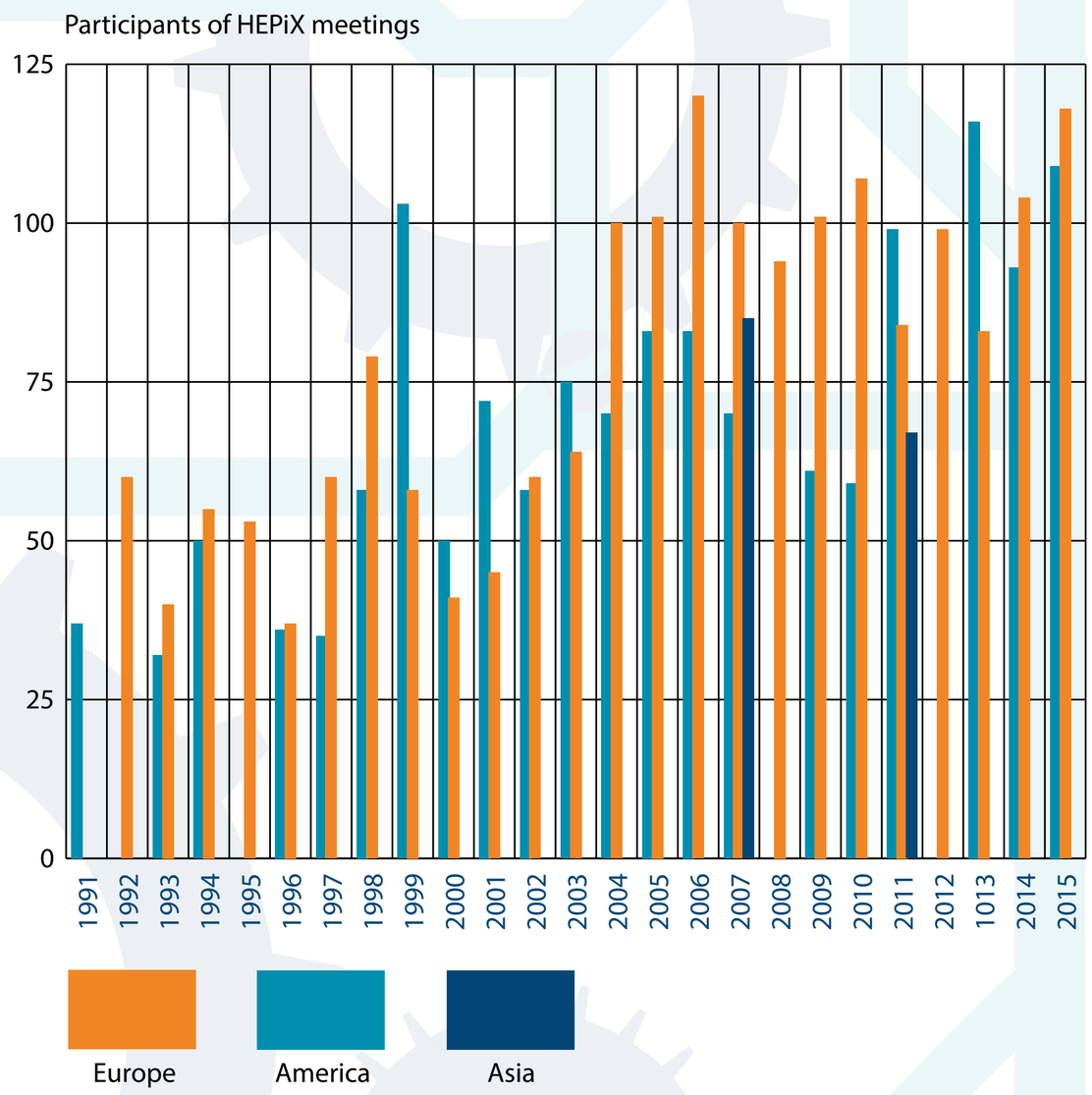




Participants

INFN Rome Spring 2006

Participation in HEPiX meetings
One of the important aspects of HEPiX is the information exchange among scientists in data and computing centers. Therefore one of the aims was always to get more sites involved in the discussions around computing in High Energy Physics. Several meetings were held together with other communities, this helped to spread the ideas behind HEPiX and led to a steady increase in the number of participants in HEPiX meetings.



J. Heyrovsky Institute Prague Spring 2012

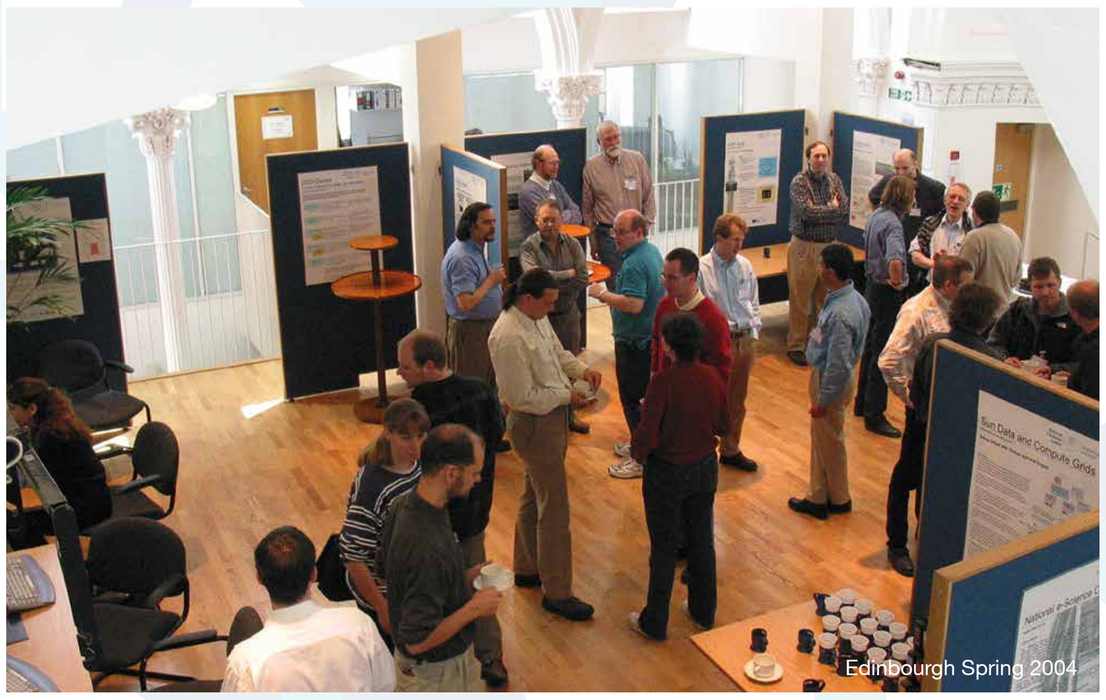
Thomas Jefferson National Accelerator Facility Fall 2006

Talks


TRIUMF Vancouver Fall 2011


SLAC Stanford Fall 2005

Since the first HEPiX meetings the time for talks increased steadily. In the nineties the meetings lasted typically 2 or 3 days while later on more and more talks were given, therefore the meeting was extended to a whole week. To accommodate even more talks without the need of parallel sessions the time for individual talks had to be reduced in recent meetings.


Edinbourgh Spring 2004