ÉCOLE **NORMALE**
SUPÉRIEURE
DE **LYON**

Starting with a tiny joke !

- How do you call people speak 3 languages ?
  - Trilingual people !
- How do you call people speak 2 languages ?
  - Bilingual people !
- How do you call people speak 1 language ?
  - French people !

I'm french :

if I twist your eardrums, I apologize...

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Houches 2011 : First cluster in « Les Houches »

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Houches 2012
Material before installation...

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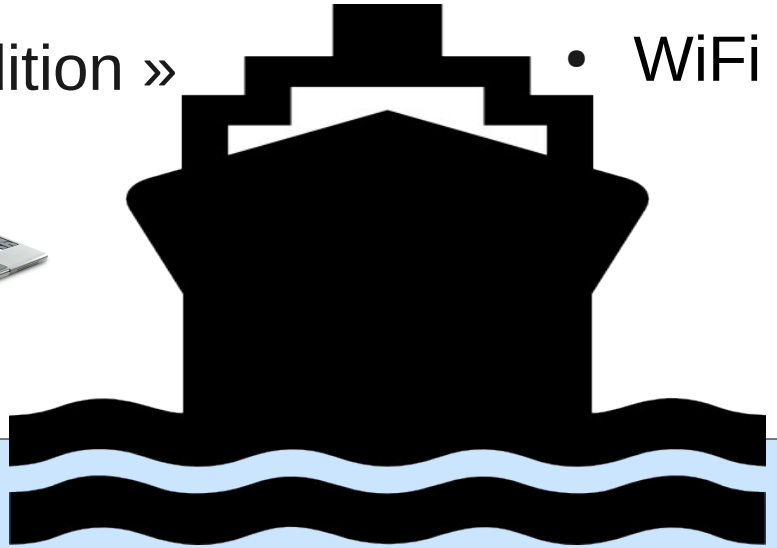
What you will « see »
… you will not necessary…

- VirtualBox
  - « network edition »
  - « standalone edition »
- Laptop Loan



- A 16 nodes cluster
- Forge
- WiFi 3 « hot spots »

- Gateway masquerading
- DNS/DHCP
- Ldap
- TFTP/NFSroot/NFS
- HTTP/HTTPS/FTP/SMB
- OpenVPN
- Shaper
- Switches GE

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What you MUST know about local & distant networks

- Internet connection in « Les Houches » is slow
  - 2 Mb/s for all staff/lecturers/participants : < 100 KB/s
  - Staff need at least 1 Mb/s for financial applications
  - Traffic shaping organized :
    - 1 Mb/s between 8h and 18h
    - 2Mb/s between 18h and 8h
- Local network :
  - Small rooms & poster room : 1Gb/s (936 Mb/s in real)
  - Bibliothèque : 100 Mb/s (85 Mb/s in real)
  - Amphitheater : 100 Mb/s (96 Mb/s in real)

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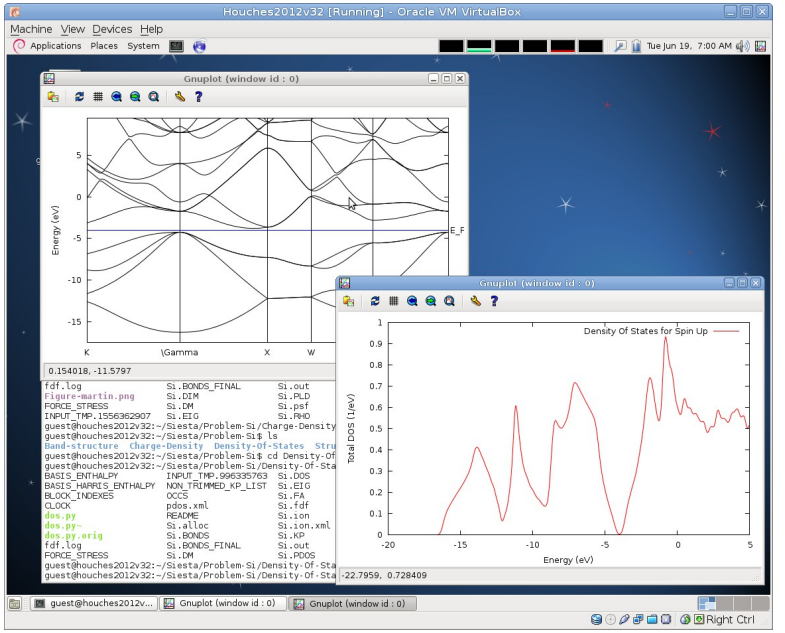
VirtualBox StandAlone Edition What's Inside

- Debian Squeeze 32 bits 6.0.4 with Linux 3.2
- Embedded Scientific software :
  - Science-chemistry : 46 packages
  - Science-numerical-computation : 14 packages
  - Science-physics : 23 packages
- Third party software :
  - Siesta
  - ABinit
  - Quantum Expresso
  - BigDFT



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VirtualBox StandAlone Edition Installation & Use

- Choose & Download VirtualBox:
  - http://houches2012.no-ip.org/VirtualBox/software/Downloads.html
- Download Extra Pack from Oracle (not necessary but...)
  - http://houches2012.no-ip.org/VirtualBox/software/Oracle_VM_VirtualBox_Extension_Pack-4.1.16-78094.vbox-extpack
- Download VirtualBox appliance : HTTP/FTP/SMB
  - http://houches2012.no-ip.org/VirtualBox/Houches2012v32.ova
- Launch VirtualBox
- Import Appliance
- Choose only « Reinitialize the MAC address »
- Edit Appliance
- Clic on « Network », check and clic « OK »
- Launch Appliance
- Select your keyboard (default is french)
- Enjoy !

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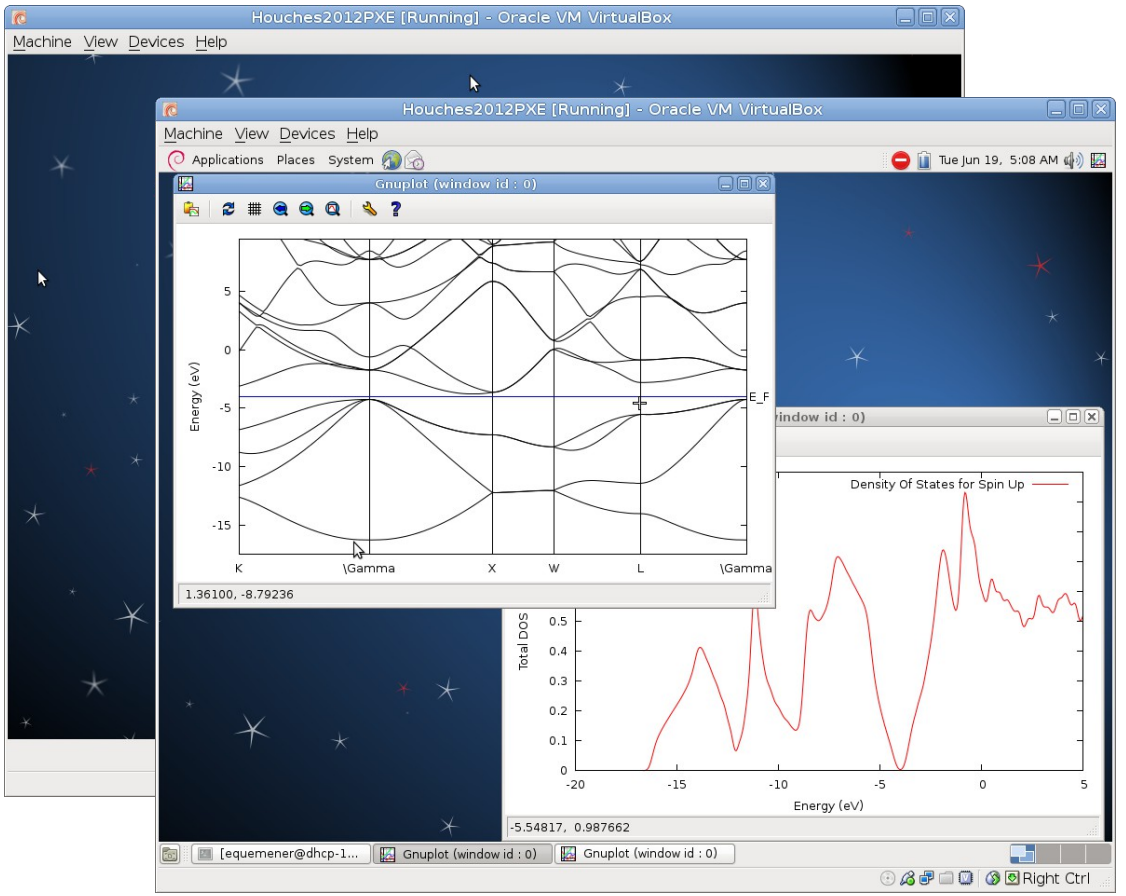
VirtualBox Network Edition What's Inside

- Debian Squeeze 32 bits 6.0.4 with Linux 3.2
- All Debian Scientific software: 15 Gb of archives
- Third party software:
  - Siesta
  - ABinit
  - Quantum Expresso
  - BigDFT



ÉCOLE NORMALE SUPÉRIEURE DE LYON

VirtualBox Network Edition Installation & Use

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- Download Extra Pack from Oracle (not necessary but...)
  - http://houches2012.no-ip.org/VirtualBox/software/Oracle_VM_VirtualBox_Extension_Pack-4.1.16-78094.vbox-extpack
- Download VirtualBox appliance : HTTP/FTP/SMB
  - houches2012.no-ip.org/VirtualBox/Houches2012PXE.ova
- Launch VirtualBox
- Import Appliance
- Choose only « Reinitialize the MAC address »
- Edit Appliance
- Select « Network », check and clic « OK »
- Connect by **wire** your machine on network (switch provided)
- Launch Appliance
- Connect with login & password provided
- Enjoy !

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Laptop Loan Use

- Informations about Hardware & Software
  - Laptop are very old and well used : 2005 buyed !
    - Pentium 4M@1.3GHz, 1 GB of RAM, diskless
  - Same configuration as VirtualBox Network Edition
    - All Debian Science & Third party DFT software
- Operations
  - Connect power supply (batteries are dead!)
  - Connect by **wire** your machine on network
  - Launch Laptop
  - Connect with login & password provided
  - Enjoy !

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Wifi access

- Our own WiFi infrastructure
- Three new ESSID
  - H2012AMPHI in Amphitheater
    - Bad news : injector seems to be dead
  - H2012SALLES in Poster Room
  - H2012BIBLI in Bibliotheque
- Shared Key
  - HOUCHE2012DFT
- Why : being in same well controlled network...

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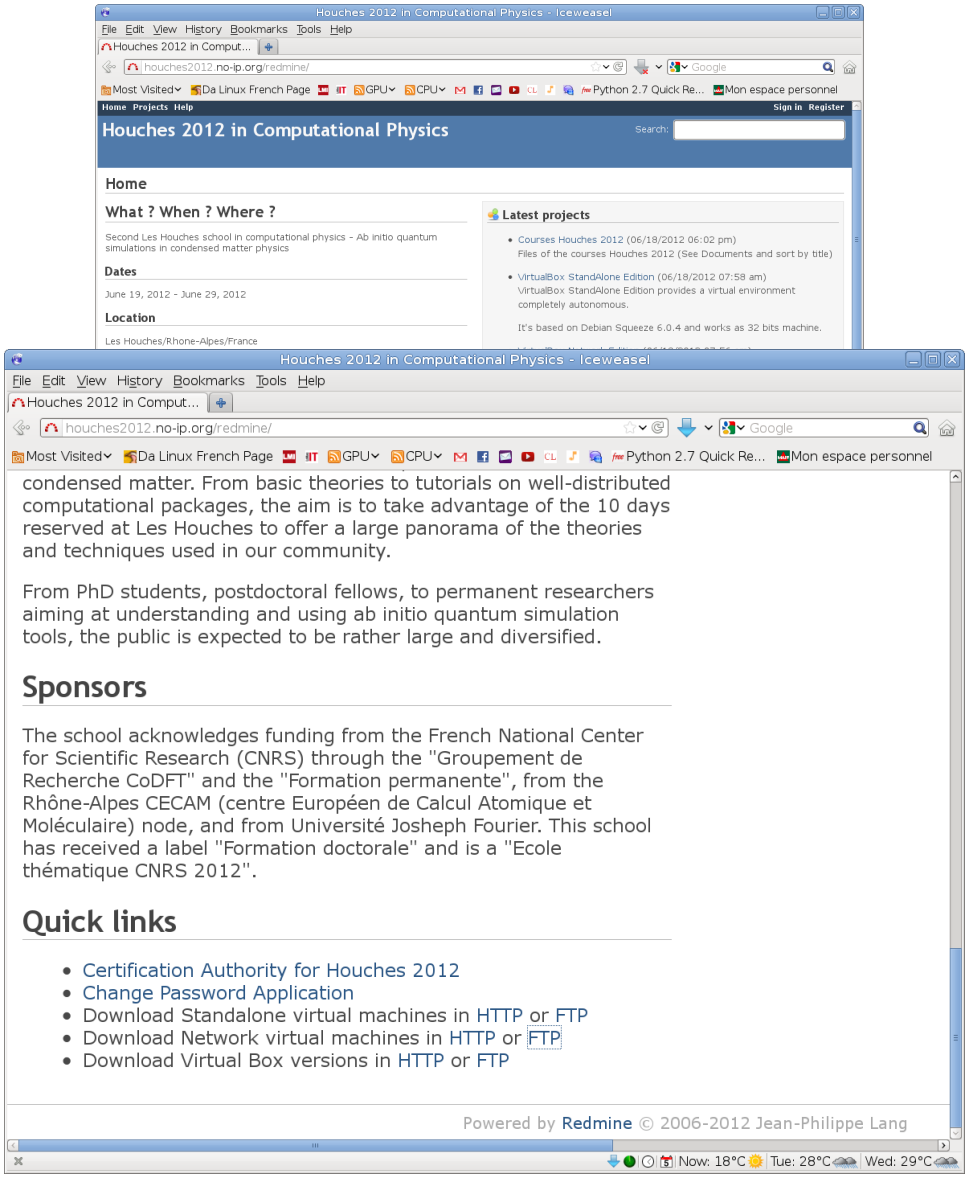
Specific Forge Provided ! http://houches2012.no-ip.org

- A forge with courses
- Direct access to
  - VirtualBox software
  - VirtualBox appliances
    - Standalone Edition
    - Network Edition
  - Change your password
  - Download AC for HTTPS



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Tiny Cluster provided

- A cluster in ENS-Lyon
  - Located in PSMN
  - Administrated by CBP
- 16 nodes with 8 cores
- Direct access to nodes
  - x41-1 to x41-16

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Questions ?

- Who needs a laptop ?
- Who has 10 Gb for standalone edition ?
- Who has 12 Kb for network edition ?
- Who has any extra questions ?

I'm french : if questions, speak slowly !

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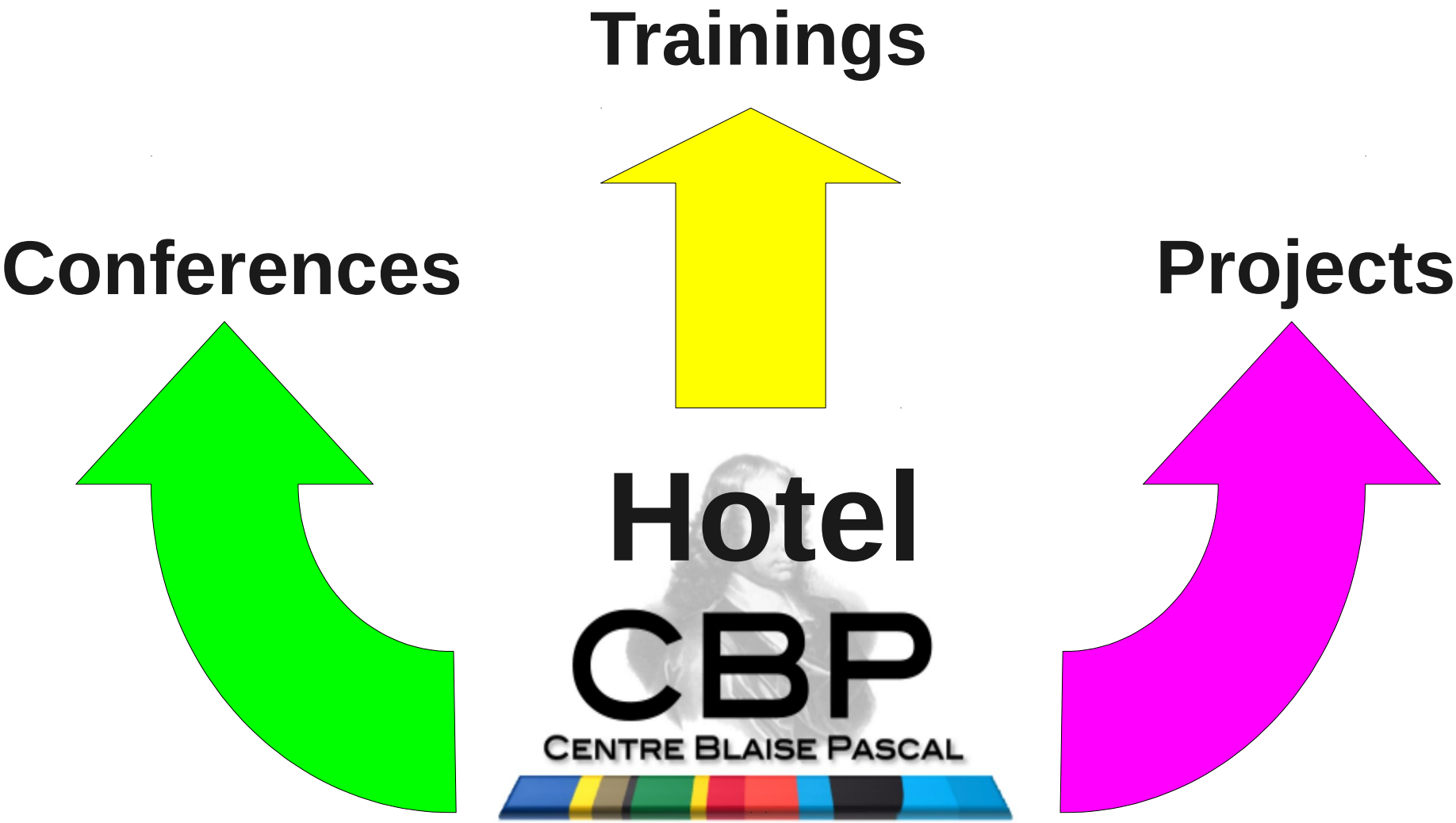
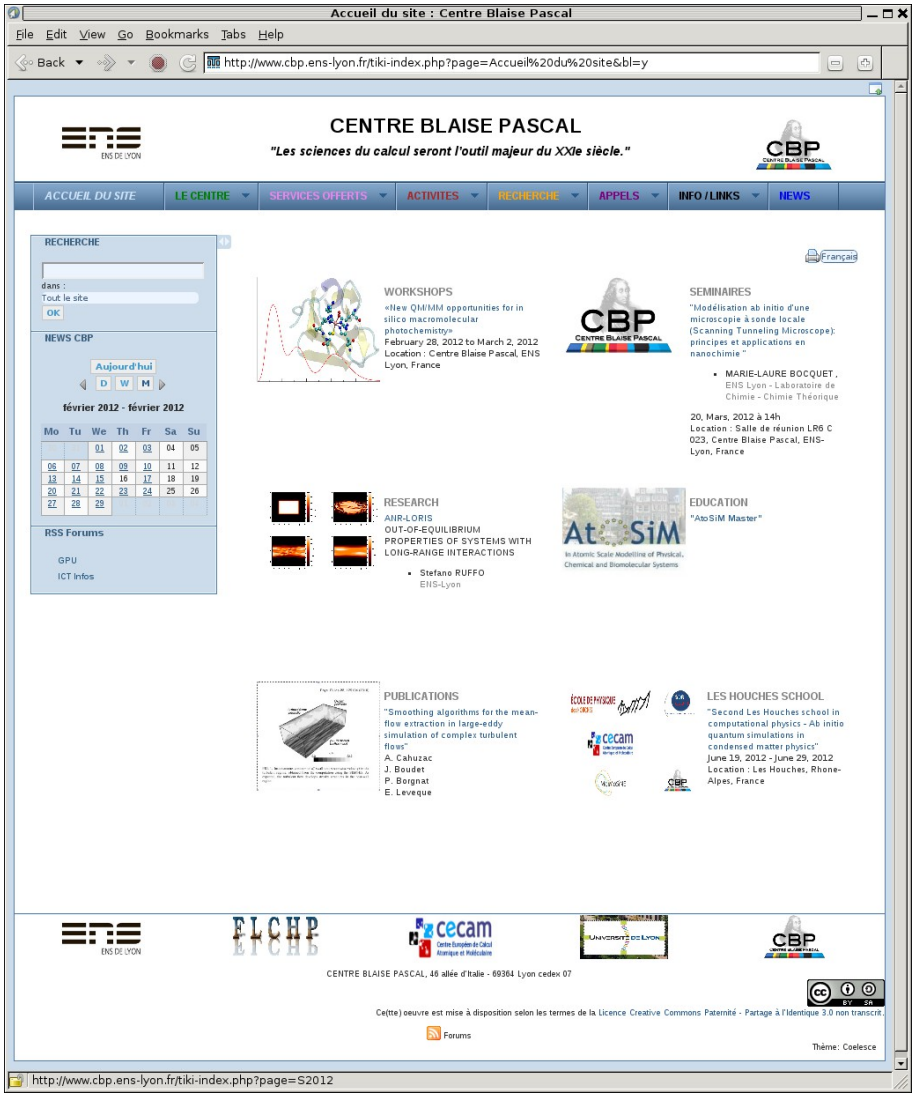
What's CBP ?



CBP : Hotel for conferences Material Resources

In « real world »
Rooms

In « virtual world »
Web Site



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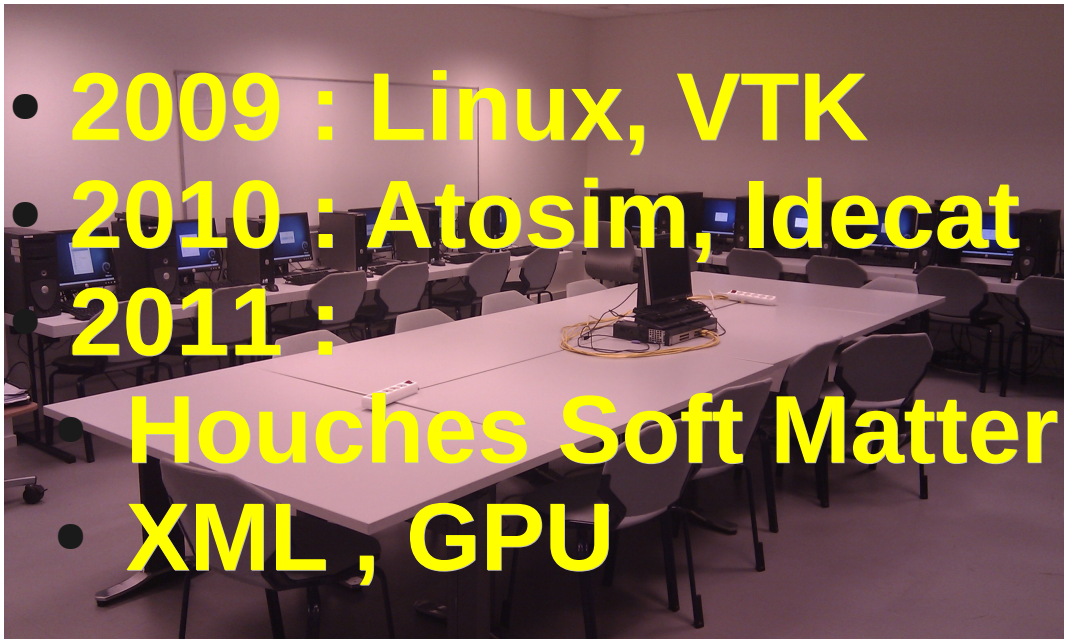
CBP : Hotel for trainings Material Resources

In « real world »
A room with 20 WS



- **2009 : Linux, VTK**
- **2010 : Atosim, Idecat**
- **2011 :**
  - **Houches Soft Matter**
  - **XML , GPU**

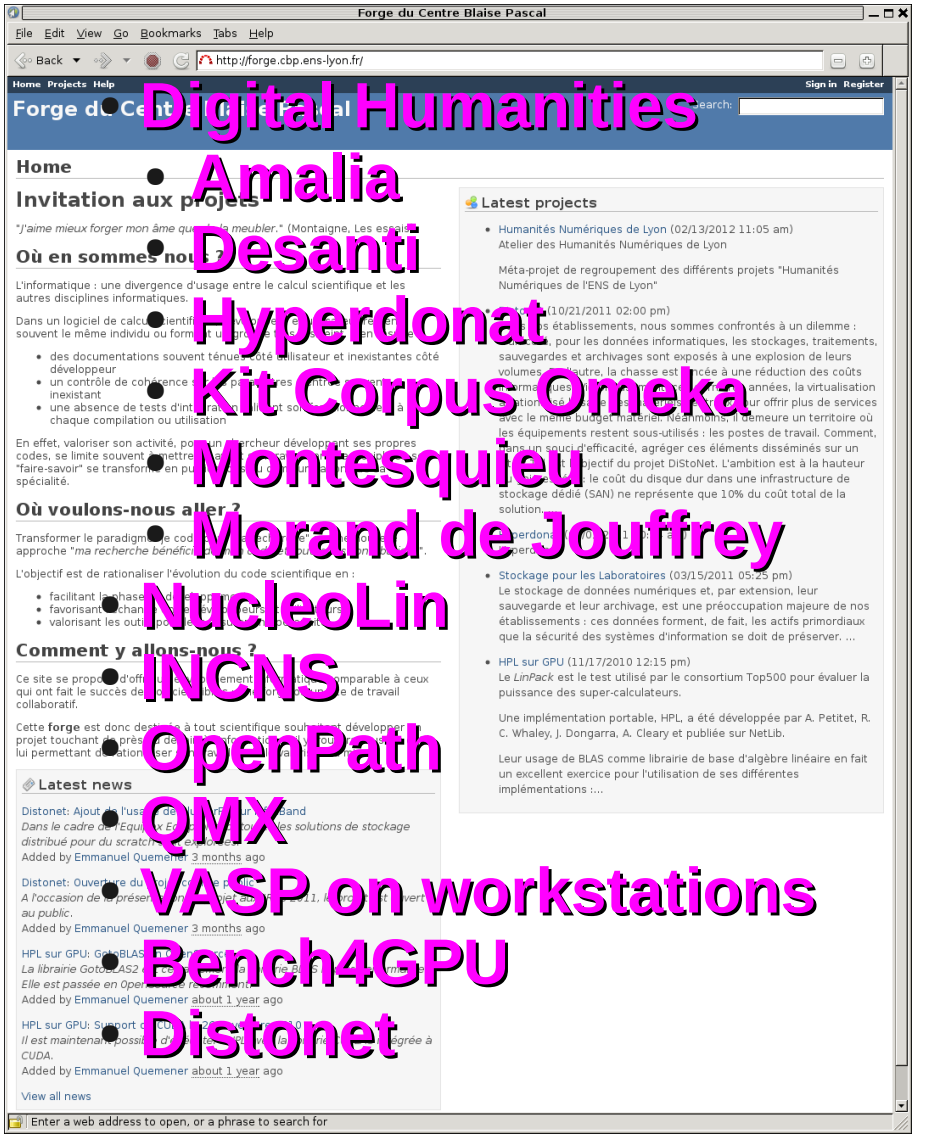
In « virtual world »
Cluster & GPU Workstations

CBP : Hotel for projects Material Resources

In « real world »
Offices

- Eurosim
- CompPhysSoftBioMat
- Cadenced
- LaBS
- StatOcean
- AMR-LORIS

In « virtual world »
Forge, WS, specific software



- Digital Humanities
- Amalia
- Desanti
- Hyperdonat
- Kit Corpus Omeka
- Montesquieu
- Morand de Jouffrey
- NucleoLin
- INCNS
- OpenPath
- QMX
- VASP on workstations
- Bench4GPU
- Distonet

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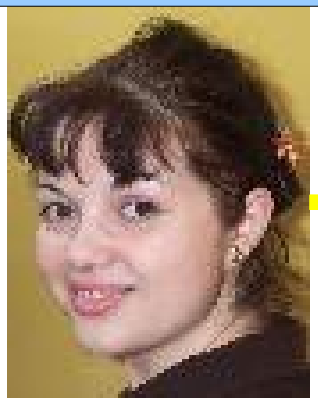
CBP : Hotel Human Resources

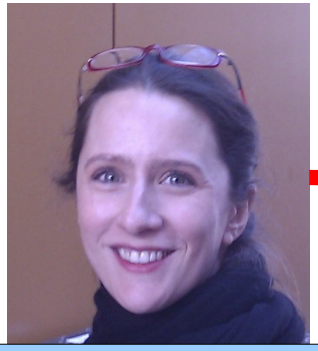
Scientific Computing



Strategy

Director

Web Site	Scientific Dev'
Events Comm'	Forge
Events Org'	Scientific COTS
	Libraries Compilers
Financial Ops'	OS
Logistic Ops'	Hardware



Log'&Com'

BOFH Test pilot

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CBP : a small example

Nasa X-29

- Cell of F-5
- Engine of F-18
- Gear of F-16
- Studies
  - Fwd swept wing
  - Incidence >50°
  - *« Fly-By-Wire »*

Recycle, Re-use and explore new domains

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CBP : from Test Center to Production

- A bridge between research and production
  - From Science (LIP) to Technology (PSMN)
- Scientific Computing Platform Provider
  - For research
  - For learning
  - For experiences, demonstrators, prototypes
- Project engineering : Human resources
  - Assistance for owner
  - Project Manager
  - Exploring new domains : GPU, parallelism, *« cloud »*
  - Code porting (environments, languages)...

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Scientific Platform Provider Examples done by CBP

- Specific scientific computing platform for research
  - Virtualized environment for VASP on MacOSX
- Scientific computing platform for learning
  - « Diskless » environments on heterogeneous plateforms
  - Complete environment for Soft Matter 2011 in Houches
- Scientific computing platform for qualification
  - « Diskless » environment for cluster of 80 nodes (>250 c)
- Advantages :
  - Quicker integration of codes : Gaussian, VASP, ...
  - Availability of documentation for reuse

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CBP & PLatforms
Scientific Computing Examples

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Project Engineering Examples

- Scientific use of GPU (since ending of 2009)
  - 1 seminar in 2010 & 2 formations early november 2011
  - Migration of xHPL under CuBLAS (available on forge)
  - Usage of Par4All (automatic // on OpenMP, CUDA & OpenCL)
- Storage needs of laboratories
  - JRES 2011 publication & free availability of reports & videos
- Use of Python in scientific computing
  - Migration from Mathematica to Python/Numpy
  - //-sation on Multi-(cores|nodes|shaders) : PyPhy-2011
- Use of distributed storage network
  - JRES 2011 publication & free availability to project on forge