



⇒ Nouvelles infrastructures numériques pour la recherche à USPC

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PREDON workshop, Dec 02, 2016



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- Context
- USPC "Imageries du Vivant" project
- Illustrative examples of the approaches at USPC

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## ⊕ Promoting large scale platforms

Decision makers ask how, why, when we need to investigate in new technologies:

- ⊕ Guidelines to improve the use of Cloud Computing Technology in Education in Arab Countries ⇒ by ALECSO and ITU (Cairo office) under the supervision of Farouk KAMOUN Coordinator



Final meeting: Oct 5, 6, 2016, Tunis



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- ⊕ Let's talk 'Cloud engineering' first!



## ⊕ USPC

Université Sorbonne Paris Cité (USPC): 120.000 students, 17.000 researchers, teachers, engineers and technicians.

- ⊕ Sorbonne Nouvelle University (Paris 3);
- ⊕ Paris Descartes University (Paris 5);
- ⊕ Paris Diderot University (Paris 7);
- ⊕ Paris 13 University;
- ⊕ Institut de Physique du Globe de Paris (Institute of Earth Physics of Paris - IPGP);
- ⊕ Institut National des Langues et Civilisations Orientales (National Institute of Eastern Languages and Civilizations - INALCO);
- ⊕ Institut d'Études Politiques de Paris (Institute for Political Sciences - Sciences Po);
- ⊕ École des Hautes Études en Sciences Sociales (School for Social Sciences and Public Health - EHESS).



## ⊕ Digital Platform <http://cirrus.uspc.fr>

- ⊕ L'Université Sorbonne Paris Cité (SPC) announced in January 2016 its new shared digital platform called CIRRUS ;
- ⊕ Goals:
  1. Mutualise to prevent the spread and multiplication of small platforms;
  2. To provoke inter-lab collaborations - institutions;
  3. To share expertise;
  4. Better digital services for more researchers (SHS...)
  5. To analyze the business process and expectations - The final report is now available from the Web site



## ⊕ Digital Platform <http://cirrus.uspc.fr>

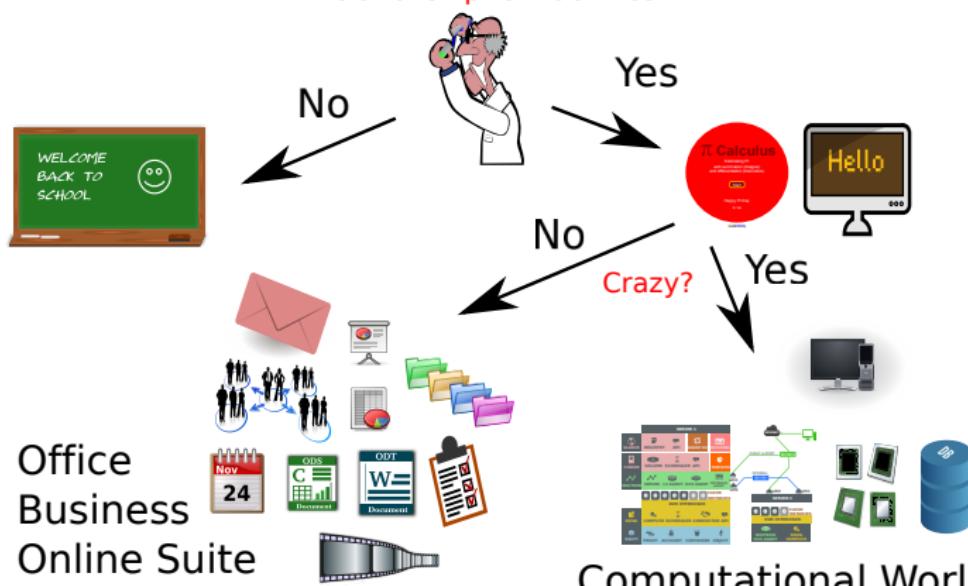
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- ⊕ For research: based on three platforms and an investment of 1M€ to reach a total of 4500 cores, 2000To of storage and 500 virtual machines;
- ⊕ Setup by DSI of the universities;



⊕ What it is? <http://cirrus.uspc.fr>

## Homo Sapiens Calculus

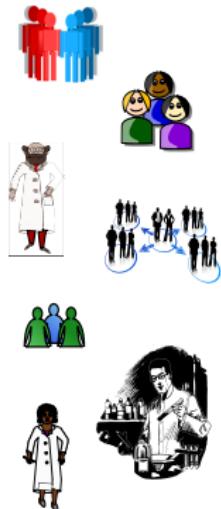
relationship to machines



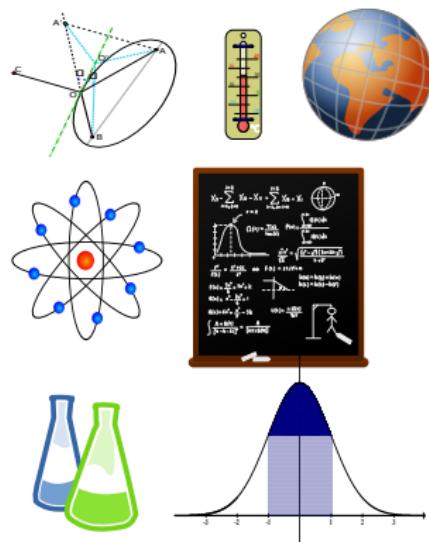


# ⊕ CIRRUS today

YOU&amp;ME



Scientific methods



PLATFORM

MAGI

S-CAPAD

CUMULUS

# CIRRUS TODAY (SaaS)

u<sup>s</sup>-PCUniversité Sorbonne  
Paris Cité



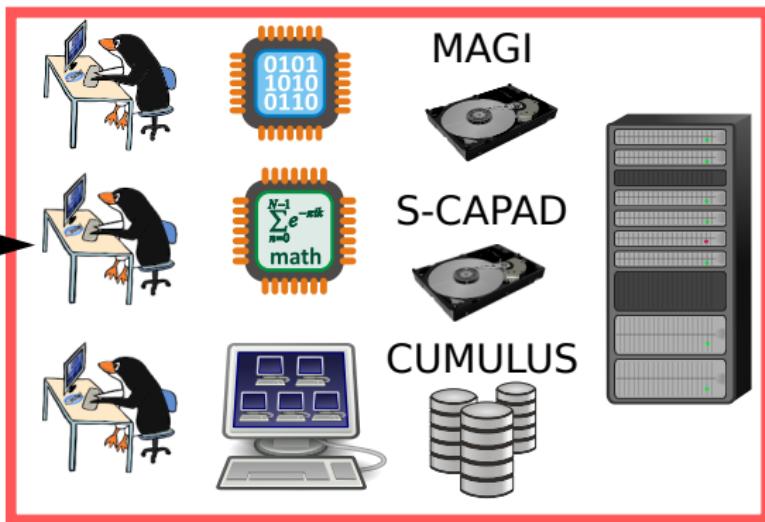
# ⌚ CIRRUS today

- 1) Request Software install
- 2) Reserve nodes
- 3) Send job
- 4) Get results



- 1) VM install
- 2) Software install inside VM
- 3) Use Software
- 4) Network of VMs (soon)

USER ← → SYS ADMIN



## CIRRUS TODAY (SaaS)

u<sup>s</sup>-PC

Université Sorbonne  
Paris Cité





## ⊕ For whom?

### Instruments for scientific experimental approaches

- ⊕ Problem isolation, Modeling, Problem analysis, Rigorous derivation, Coding, **Experiments on a real system**, Evaluation / Return from experiments;



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### Diversity in the communities of potential users

Experimented people versus 'fresh people'



## 1 Engineering of systems

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## 2 Conclusion and future works



## ⊕ Examples of digital platforms used by IDV members

### Issues

1. Paris Descartes:  
<http://piv.parisdescartes.fr>  
(Plateforme Imageries du vivant)
2. FRIM platform:  
[http://www.bichat.inserm.fr/plateformes\\_plateaux.html](http://www.bichat.inserm.fr/plateformes_plateaux.html)  
(Bio-chemistry - in-vivo study of small animal phenotypes)
3. <http://www.ch-sainte-anne.fr/>  
Plateforme-imagerie/Recherche  
(Centre d'Imagerie de Recherche et d'Enseignement en Neurosciences (CIREN))

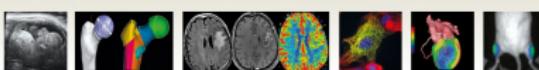
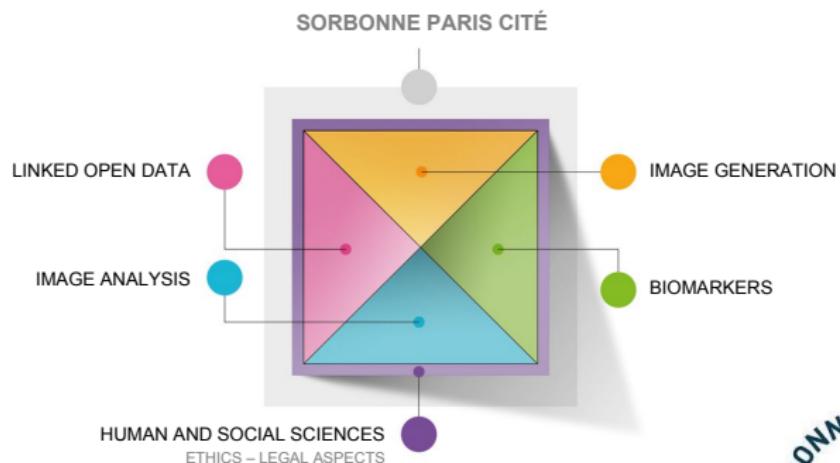
### Illustrations



## ⊕ (1) A nice project

### A suitable case-study for cloud adoption and migration: the **Life Imaging** program (IDV)

Coordinators : C.A. Cuenod (Paris Descartes) - F. Dibos (Paris 13) - D. Le Guludec (Paris Diderot)





## ⊕ (2) A nice analysis of the business processes

### Formats

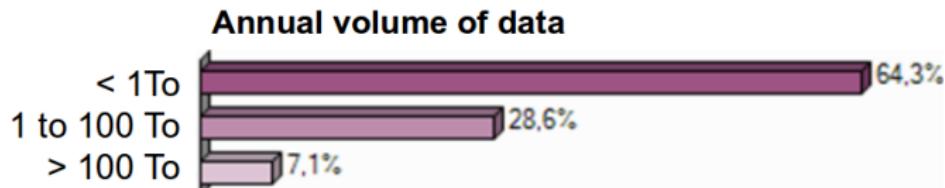
Leica  
Dsc Lif Radiofrequency Signals  
Msr Bruker  
Jpg Raw Philips  
Rdf  
Data  
Dat  
Nifi  
Pgm  
Lsm  
Zeiss  
Jcamp  
Tiff Jpeg  
Spm  
ImageT  
SAGE GULP  
VEVO Myriam  
CPLEX Q  
Topspin  
VueBox  
RacerPro  
Diva Velocity  
Adobe Xnat  
Vinci  
SciPy  
M3Vision  
Flowjow  
Dicom  
Nikon

### Software

InterviewFusion  
Easyspin Philips Hadoop  
Dropbox ROOT Environnement Philips Paradise  
ABINIT CellProfiler ImpaxAgfa winSCP  
Osirix JavaSDK Huygens AutoProgrammation  
SPSS Texrad Spark house  
PhysioD3D Paravision CIC Metamorph CubifyInvent  
Panda LAMMP Igor Python Brainvisa  
Eprime de LASAF Xkpr R In CHI Neurolucida  
Prism Software SAGE GULP Metamorph AxioVision  
Spm ImageT VIVO Myriam RacerPro Labview Imaris PhotoAcquisition  
ImageT Zen  
Topspin VueBox RacerPro Labview Imaris  
Diva Velocity Bruker Fiji Archim  
Adobe Xnat Graphpad Inspector  
Vinci SciPy Origin Photoshop XSophe  
M3Vision Medcalc Metaview Histolab  
Flowjow Gephi Sketchup  
Illustrator



## ⊕ (2) A nice analysis of the business processes





## ⊕ (2) A nice analysis of the business processes

■ Local (hard drive) ■ Network neighbourhood ■ Internet

### Pre-treatment



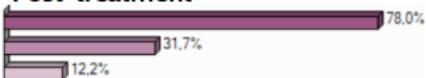
### During treatment



Spatial fragmentation =  
under-exploited data

Hard drive = high-risk location

### Post-treatment





# ⊕ (3) A nice integration

## ☰ OpenNebula

oneadmin OpenNebula

- Dashboard
- System
- Virtual Resources
- Virtual Machines
- Templates
- Images
- Files & Kernels
- Infrastructure
- Marketplace
- OneFlow
- Settings

- Support
- Not connected

Sign in

### Virtual Machines

ID	Owner	Group	Name	Status	Host	IPs
3	oneadmin	oneadmin	IDV-1	RUNNING	antimoine.dig.univ-paris5.fr	172.17.34.60

Showing 1 to 1 of 1 entries

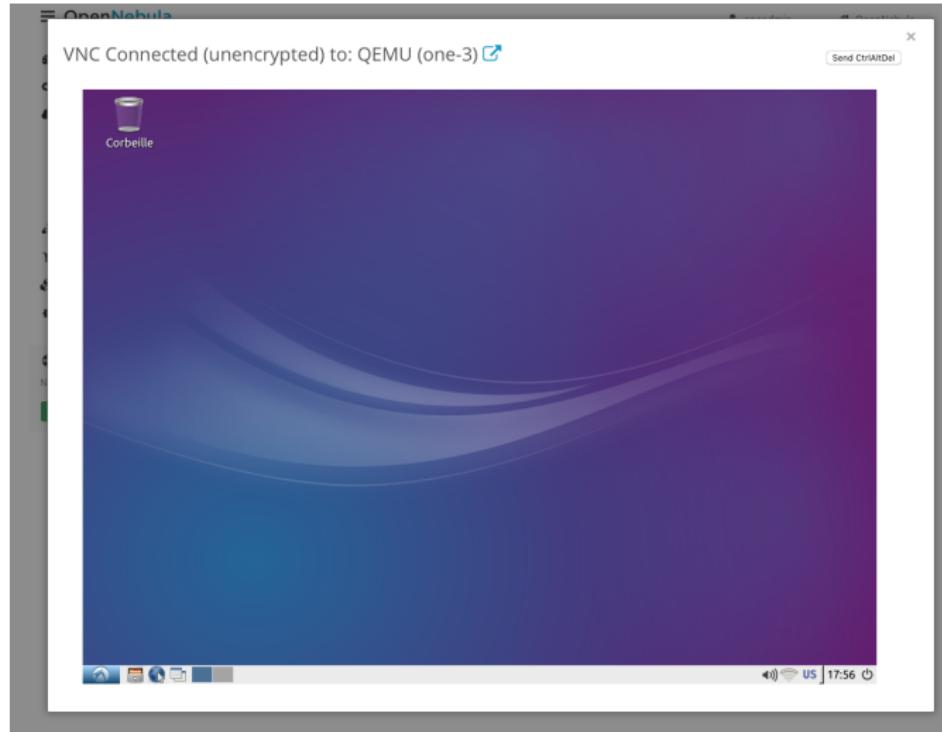
Previous 1 Next 10

1 TOTAL 1 ACTIVE 0 OFF 0 PENDING 0 FAILED

OpenNebula 4.14.0 by OpenNebula Systems.

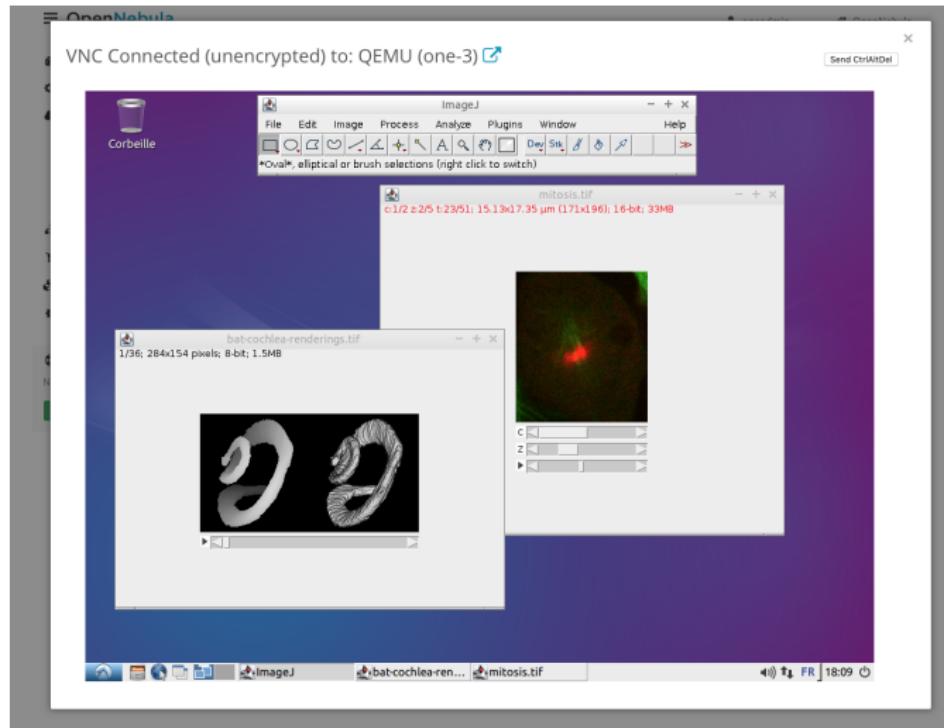


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## ⊕ (3) A nice integration

Ubuntu-IDV-crowdsourcing-442 - Chromium  
Connected (encrypted) to: one-442-Ubuntu-IDV-crowdsourcing-442  
Send CtrlAltDel

Accueil - Mozilla Firefox  
10.20.1.35/sis4web/login.php Rechercher

IDV Image Database

Login  
Password  
Login

IDV IMAGERIES DU VIVANT



## ⊕ Catalog of IDV's VMs (06/20/2016)

- ⊕ Debian 8.2, CentOS 7, Ubuntu 15.10,
- ⊕ Windows 2012 R2 x64 standard english, Windows 2012 R2 x64 standard english avec SQL Server 2012, Windows 2012 R2 x64 standard english avec SQL Server 2014,
- ⊕ Ubuntu with more than 30 pre-installed software,
- ⊕ Ubuntu with Spark,
- ⊕ Ubuntu with ePad (<https://epad.stanford.edu/>) imaging platform,
- ⊕ Teamcenter from Cadesis;
- ⊕ sis4web from SisNCom (Michel Smadja),
- ⊕ A crowdsourcing tool (Soror Sahri)
- ⊕ SOON: request from FRIM (Fédération de Recherche en Imagerie Multimodalité - Bichat-INSERM) platform



## ⊕ Common disciplinary needs

### ⊕ Bag of tasks:

1. FreeSurfer: brain analysis - depth of the cerebral cortex  
(Neuro-sciences at Paris Descartes)
2. MIT Photonic-bands: compute the band diagram of photonic structures (LPL at Paris 13)
3. Graphlab: modeling ecological networks based on theory of graphs (LADYSS Géographie Paris Diderot)



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### ⊕ No need for HPC systems but maybe for cloud?

- ⊕ Access to a catalog of applications (ERP);
- ⊕ Use a deployment model;
- ⊕ Physical nodes;



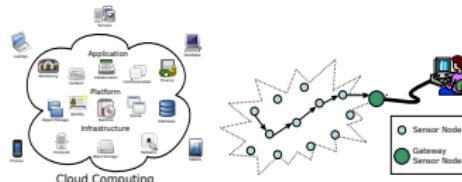
## ⊕ Conclusion: be vigilant!

BE PROACTIVE:  
o convergence of Systems  
o evolutions of Systems  
THROUGH ACTIVE RESEARCHES



**Cray (1980)**  
Centralized

**Grid (1990)**  
Distributed



**Cloud (2000)**  
Centralized

**IoT (2010)**  
Distributed



# ⊕ Where to find related resources?

The screenshot shows a web browser window with the URL [computer.org](https://www.computer.org) in the address bar. The page content is from the IEEE Computer Society's CSDL section, specifically the Hybrid Clouds issue of 2016 vol.3.

The page title is "IEEE computer society". Below it, the tagline "The Community for Technology Leaders" is displayed. The navigation menu includes "CSDL", "Institutions and Libraries", "About", "Resources", and a search bar.

The main content area shows the breadcrumb navigation: "CSDL Home > IEEE Cloud Computing > 2016 vol.3 > Issue No.01 - Jan.-Feb.". Below this, the "CLOUD COMPUTING" logo is displayed. The main article title is "Hybrid Clouds".

Article details:

- (HTML)
- Issue No.01 - Jan.-Feb. (2016 vol.3)
- pp: 6-7
- Published by the IEEE Computer Society
- Mazin Yousif, T-Systems International
- DOI Bookmark: <http://doi.ieeecomputersociety.org/10.1109/MCC.2016.9>

## ABSTRACT



## ⌚ Where to find related resources?



## Livre blanc

Approches contemporaines en  
hébergement et gestion de  
données





# ⊕ Where to find related resources?

Accueil   Outils   Document

Cloud Computing for e-Sciences  
at Université Sorbonne Paris Cité

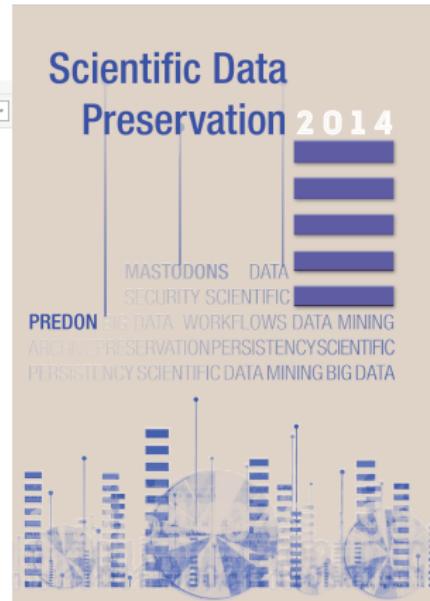
Leïla Abid<sup>1</sup>, Christophe Cérin<sup>1</sup>, Danièle Goldwirth-Fenigé<sup>2</sup>, Marie Lafaille<sup>2</sup>  
Université de Paris 13, LIPN UMR CNRS 7010 – CSPIAT UMR CNRS 7244  
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[{danielle.goldwirth-fenigé, marie.lafaille}@uvsq.fr](mailto:{danielle.goldwirth-fenigé, marie.lafaille}@uvsq.fr)

**Abstract.** This present paper relates the involvement towards migration and adoption of cloud computing at Université Sorbonne Paris Cité (USPC), a major french consortium of universities and higher education and research institutes. Migration to the cloud for a wide and diverse community of actors is nevertheless not straightforward. The ambitious interdisciplinary program "Imageries du Virtuel" (IDV or *Life Imaging*) at USPC, a key project of the French National Research Institute for Life and Molecular Imaging, constitutes one use case. It allows to sketch how cloud computing may change scientific practices and the landscape of computing, and to specify the steps to be followed for such purposes. The outcome of the paper is a methodology for accompanying adequate technological decisions that can be adopted by the different actors involved when they migrate to cloud technologies. In short, we provide useful guidance for cloud adoption based on observations made for the IDV project.

**Keywords:** Cloud computing, inter/multi-disciplinary projects, e-Sciences engineering, methodologies for cloud migration and adoption.

## 1 Introduction

Cloud computing technology potentially offers permanent access to data and services, from any device and anywhere at any time. Basically, it considers everything ‘as a service’: computing, storage, network, and infrastructure. As a generic term, cloud computing also describes a category of sophisticated, on-demand Internet Technology (IT) services, popularized through providers such





## ⊕ Where to find related resources?

- ⊕ <http://lipn.univ-paris13.fr/bigdata> ; <http://www.predon.org>
- ⊕ [https://lipn.univ-paris13.fr/~cerin/Livre\\_blancl\\_data\\_hosting.pdf](https://lipn.univ-paris13.fr/~cerin/Livre_blancl_data_hosting.pdf)
- ⊕ <http://cirrus.uspc.fr> ; (click on 'Survey', upper right corner) ;
- ⊕ <http://www.itu.int/en/ITU-D/Regional-Presence/ArabStates/Pages/Events/2016/CC/Cloud-Computing.aspx>
- ⊕ Next step for PREDON (?): IEEE Computer Society Special Technical Communities (STCs) on <https://www.computer.org/web/stc/>)



## ⊕ Today and Tomorrow

### ⊕ Personal and final remarks about our work at USPC:

1. Bottom-up approach (from **people** and **usages** to Systems) ;
2. Leading change with people from different horizons:  
computer scientists, scientists, experts on legal issues,  
experts on security, librarians, experts in research  
development... .
3. Need for computer scientists and people able to speak to all  
the disciplines and able to be unifying for all.



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