La grandeur des actions humaines se mesure à l'inspiration qui les fait naître.

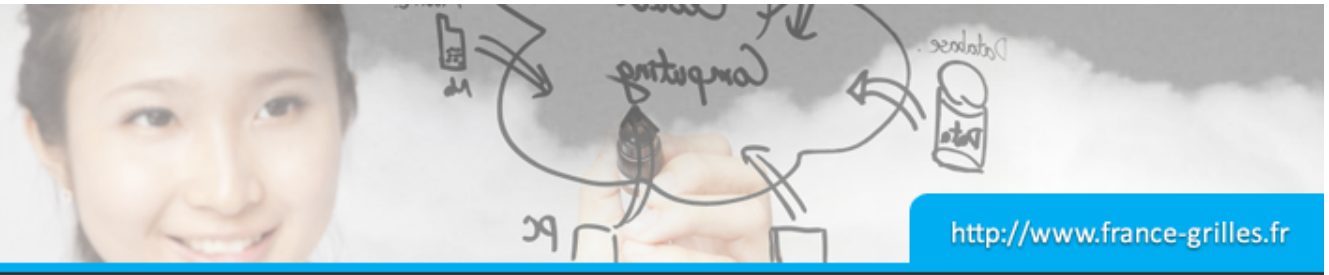
Louis Pasteur

France Grilles

V. Breton

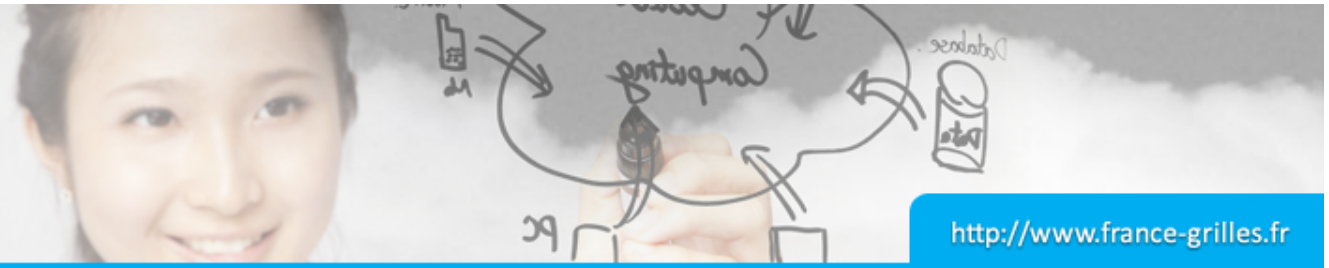
International Advisory Committee Meeting – Paris, April 26-27 2012

- Welcome to Paris
- Thanks to RENATER to host us !
- Meeting agenda
  - This morning: introduction – general presentation
  - This afternoon: focus on user communities and operations
  - Tomorrow morning: focus on cloud computing
  - Tomorrow afternoon: closed session



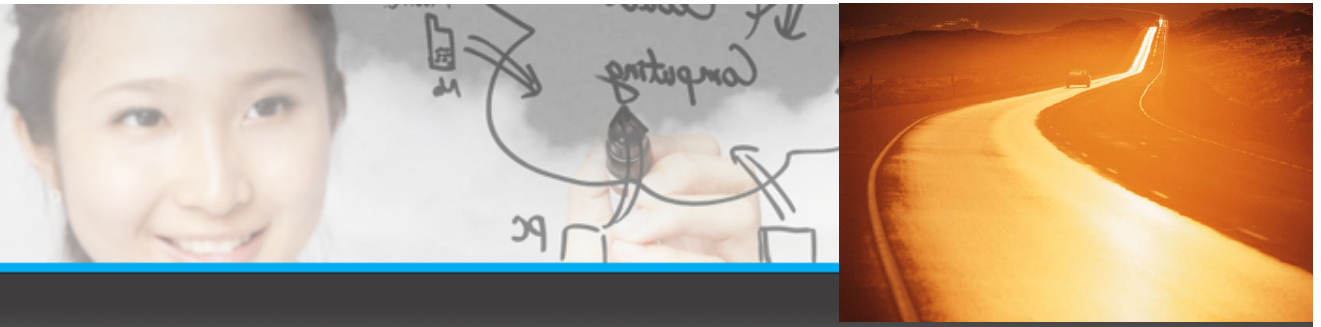
Introduction talk: table of content

- Brief reminder of France Grilles history, vision and organization
- Key metrics and highlights since last IAC
- International activities
- Communication
- Budget
- Response to IAC recommendations



France Grilles brief history

- August 14th 2007: creation of CNRS Institut des grilles (IdG) under Guy Wormser leadership
- 2008: creation of a national steering board on production grids involving CNRS, CEA, INRIA, INRA, CPU, RENATER and Ministry of Research
- 2009 Production grids are labelled « Très Grande Infrastructure de Recherche »
- 2010
  - April - May 2010: End of EGEE-III project & EGI-Inspire Kick-off
  - September 2010: France Grilles Scientific Interest Group Kick-off
    - France Grilles is the French National Grid Initiative (NGI)
    - Partners: CNRS, CEA, INRIA, INRA,INSERM, CPU, RENATER and Ministry of Research
    - CNRS Institut des Grilles represents and acts on behalf of France Grilles
- 2011: CNRS Institut des Grilles becomes Institut des Grilles et du Cloud (IdGC)



Vision

- Build and operate a Distributed Computing Infrastructure
  - Open to all disciplines
  - Open to developing countries
- Make it a place of exchange and collaboration
  - Within disciplines and organizations
  - Across disciplines and organizations

France Grilles organization

France Grilles council

Scientific advisory committee

International Advisory Committee

Director
V. Breton

Executive board:
F. Desprez (INRIA)
JP Meyer (CEA)
J. Montagnat (CNRS)

Users' liaiason
G. Romier
N. Haitas
Y. Legré

Technical coordination
H. Cordier
G. Mathieu

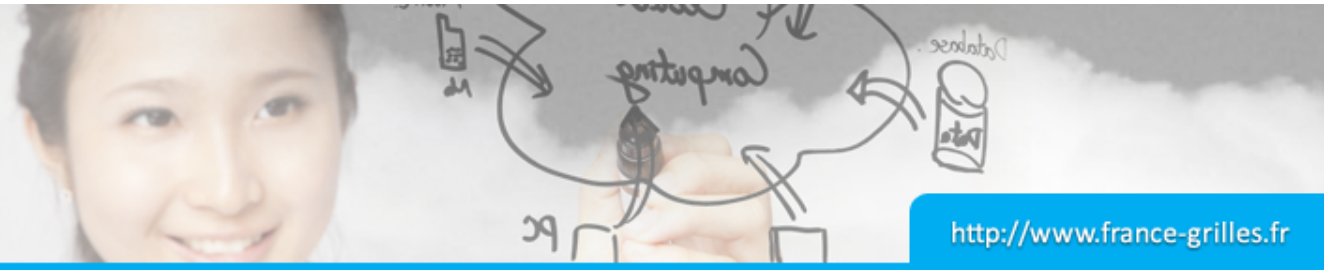
Communication - training
V. Dutruel

Administrator
G. Fettahi

Expert on cloud computing:
F. Suter

Technical committee

Departures: M. Pellen (replaced by G. Fettahi),
D. Fouossong (temporarily replaced by G. Mathieu)



France Grilles production related key figures

- 11-12% of EGI capacity
  - **18** production sites
  - **31,860** logical CPUs
  - **15.7 PB** disk and **22.5 PB** tape storage
- A focus on excellence
  - **98.4%** availability
  - **99.0%** reliability
  - **100.0%** availability/reliability of our central core services (Top-BDII) since September 2011

More details from G. Mathieu's talk

Highlights on operations since last IAC

- National Virtual Organization
  - Second step for new user communities
  - Candidate for an international pool of resources

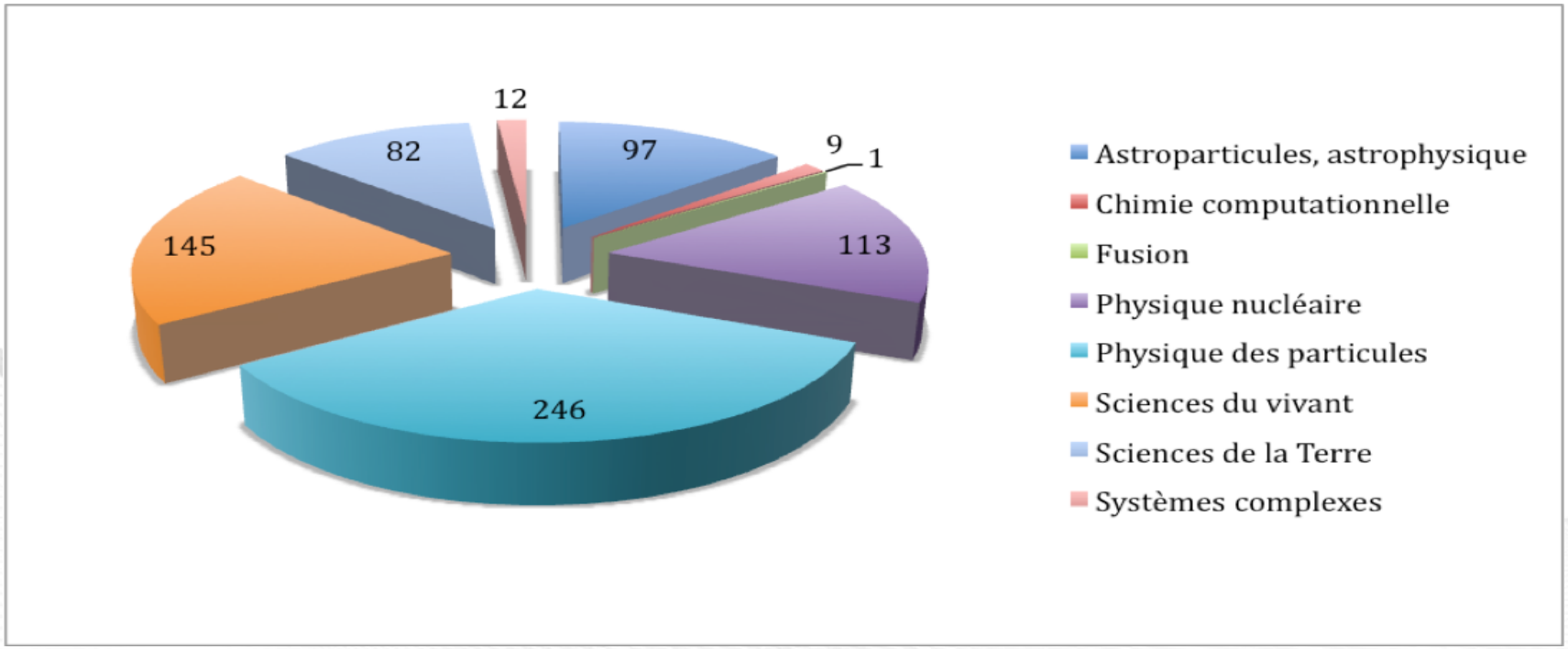
More details from G. Mathieu's talk

- Boost on cloud activities
  - Dedicated workshops
  - First investments in CC-IN2P3 and Toulouse
- New services (DIRAC)

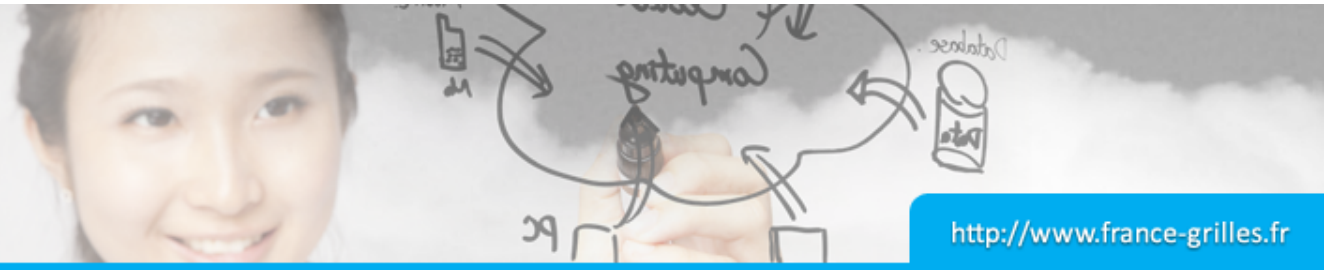
France Grilles key facts on user communities

- About 750 users from many disciplines

More details from G. Romier's talk



- > 100 scientific papers in 2011!
  - LHC papers not included



Highlights on user related activities

- Evaluation of scientific production on the grid
  - Collection of scientific papers using HAL database
- First French Grid Day

- Growing contribution to international efforts
  - Involvement in Virtual Teams

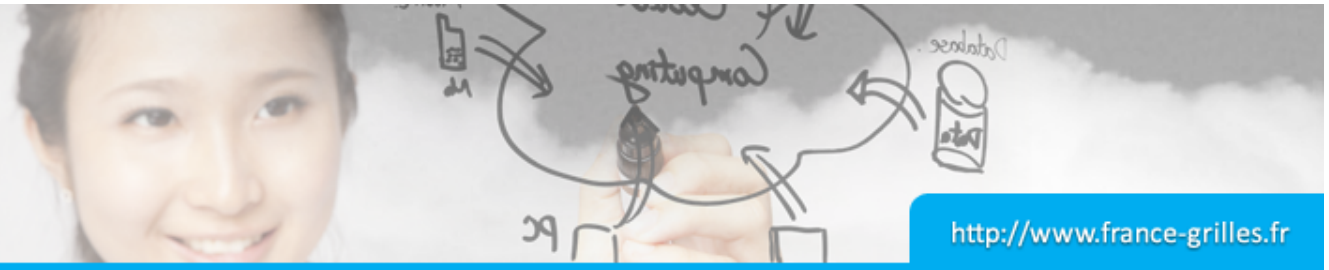
- New active user communities (biodiversity, solid state physics)

Highlights: EGI Technical Forum in Lyon

- Event co-organized by CC-IN2P3, EGI.eu and France Grilles
- A success:
  - > 650 participants to all co-located events
  - Balanced budget
  - First French Grid Day

France Grilles International activities

- France Grilles within EGI
- European projects
- Other international collaborations



France Grilles within EGI

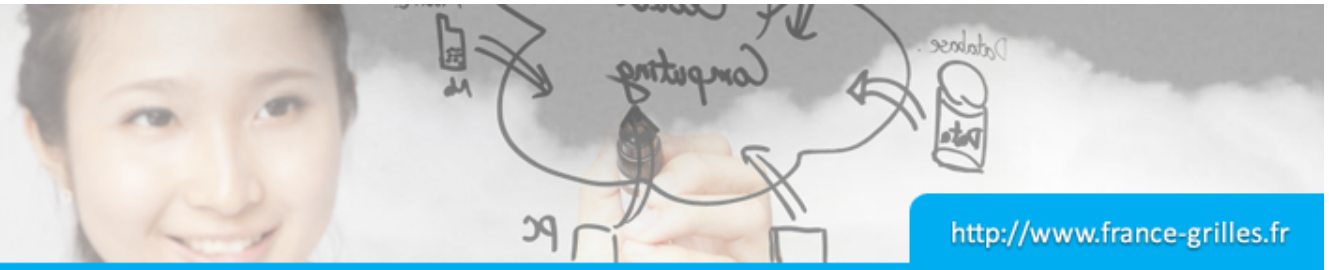
- Management
  - E. Augé replaced M. Spiro as France Grilles representative on EGI council
- Contribution to EGI council task forces
  - Security task force
  - User task force
- Important contributions to EGI-Inspire
  - Operation portal
  - Leadership role in JRA1 (C. L'orphelin) and SA3 (J. Montagnat) activities
  - Growing contribution to NA2 around G. Romier

Grid/cloud EC-funded projects involving France Grilles partners in 2011

Acronym	Theme	number of participants	duration (mounth)	France Grilles partners	Total eligible costs / project	Total EU contribution	CNRS elligible costs	CNRS EU contribution
EPIKH	exchange program	23	48	CNRS (IdGC)	**1 188 000,00 €**	1 188 000,00 €	43 200,00 €	**43 200,00 €**
EUMEDGRID-Support	infrastructure	14	24	CNRS (IdGC, IPHC, LPSC)	**867 495,00 €**	740 000,00 €	56 160,00 €	**50 076,00 €**
EGI-InSPIRE	infrastructure	53	48	CEA, CNRS (IdGC, LAL, LPC, LPNHE, I3S, CPPM, LAPP, DSI, CC-IN2P3, IPSL, IPGP)	**71 916 867,00 €**	25 000 000,00 €	4 752 000,00 €	**1 635 638,00 €**
StratusLab	infrastructure	6	24	CNRS (LAL, IBCP)	**3 137 221,00 €**	2 300 000,00 €	623 463,00 €	**470 043,00 €**
EDGI	infrastructure	10	24	CNRS (LAL)	**2 436 371,00 €**	2 150 000,00 €	234 000,00 €	**205 300,00 €**
DEGISCO	infrastructure	12	24	CNRS (LAL)	**871 702,00 €**	799 925,00 €	101 400,00 €	**90 415,00 €**
GISELA	infrastructure	19	24	CNRS (CPPM, IPGP)	**2 820 043,00 €**	850 000,00 €	381 930,00 €	**47 810,00 €**
N4U	users	11	42	CNRS (IdGC, CREATIS, I3S)	**4 438 912,00 €**	3 600 000,00 €	515 297,00 €	**337 404,00 €**
CReATIVE-B	users	7	36	CNRS (IdGC)	**761 938,00 €**	700 000,00 €	92 400,00 €	**82 390,00 €**
ENVRI	users	16	36	CNRS (IdGC)	**5 081 514,00 €**	3 700 000,00 €	243 320,00 €	**167 689,00 €**

Other International Collaborations: highlights

- Bilateral collaboration on cloud computing with Spain
- France-Asia Virtual Organization
  - Goal: strengthen scientific collaboration with Asia
  - Significant resources committed by China, Japan, Korea and Vietnam
- Contribution to training schools
  - Algeria, Marocco, Korea and Vietnam



Communication: highlights since last IAC

- New graphical chart
- New web site
- Booth at important events
  - EGI User and Technical fora
  - SuperComputing (November 2011)
  - National Networking Day (JRES) (November 2011)

Budget: who pays for the production infrastructure?

Origin of funding	Use of funding	Organization responsible for using the funds
French Ministry of Research grant to France-Grilles (TGIR): 615 Keuros	Running costs for operation of central services – networking activities – new equipment	France Grilles
EC-funding : about 1MEuros for 10 projects	Salaries of engineers hired on short-mid term contracts - travel money	CEA and other CNRS units receiving EC funds through CNRS IdGC
CEA - CNRS - Universities	Running infrastructure costs (electricity, air conditionning)	CNRS and University laboratories
Regional authorities	New equipment	CNRS and university laboratories

Details on expenditures on TGIR grant

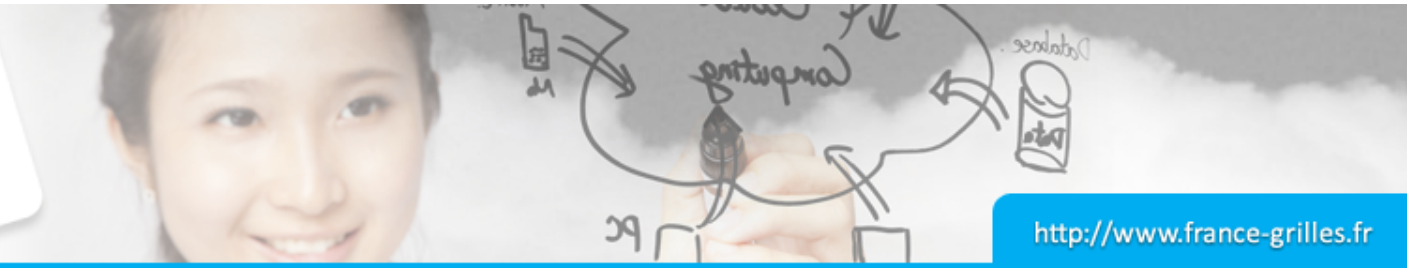
Spending		Income	
		TGIR grant	617000
Communication (booths, web site, documents)	22154,69		
EGI.eu 2011 fee	79880		
EGI.eu 2012 fee (Advanced payment)	56332		
Small equipment	1130		
Reimbursement of 2010 operation costs (LPC)	10000		
IT equipment for 2 academic clouds	154000		
Formation	40000		
Organization of events (IAC, French Grid Day)	16733,35		
FG management travel costs (EGI council, EGI and FG meetings)	11980,67		
Operation related costs (participation to EGI Inspire and small equipment for sites)	97850,35		
Support to European Projects (StratusLab)	12000		
Support to Regional Grids and User Communities (local events, international VOs)	114938,25		
TOTAL	617000	TOTAL	617000

Evaluation of costs for operating the infrastructure

		Exécuté		BP	Demande		
DEPENSES liées à la TGIR		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Fonctionnement		2,600	2,600	2,600	2,600	2,600	2,600
Investissement		0,712	0,154	0,300	1,000	1,000	1,000
Personnel	*TGIR Agrégat 1 : Personnel non permanent*	0,265	0,050	0,050	0,050	0,050	0,050
	TGIR Agrégat 1 : Personnel permanent	0,575	0,762	0,780	0,860	0,940	0,940
	TGIR Agrégat 2 : Personnel						
TOTAL DEPENSES		**4,152**	**3,566**	**3,730**	**4,510**	**4,590**	**4,590**

Figure used for 2011:

0.01 € per normalized CPU hour (KSI2K) for electricity, fluids and cluster operation



IAC top 10 recommendations in March 2011

- R1. Integrate the vision and elements of the strategic plan into a consistent
- proposition for all stakeholders.
- R2. Produce and distribute written versions of the strategic plan and technical
- roadmap.
- R3. Promote the vision, strategy and plans for IdG via the website.
- R4. Produce easily understandable and consistent metrics to measure the
- performance and impact of IdG with respect to its objectives and commitments.
- R5. Further develop the fruitful relationship with the computer science community.
- R6. Focus the initial interactions with supercomputer centres by implementing one
- application in cooperation with a single supercomputer centre.
- R7. Consider using a small fraction of the equipment budget to purchase access to
- commercial cloud services for targeted user communities on a trial basis.
- R8. Identify two non-HEP communities to each be supported by a dedicated fulltime
- member of the IdG team.
- R9. Quantitatively analyse the current allocation of resources for user support and
- training.
- R10. Collect users' opinions on a regular basis.

Recommendations R1 and R2: France Grilles Strategic Plan

- Requested for 2 years by IAC

- Why did we wait?
  - We were not ready
  - Our partners were not ready

- FG strategic plan
  - June 13th 2012 dedicated meeting of France Grilles steering board

R1 and R2: strategic plan key concepts

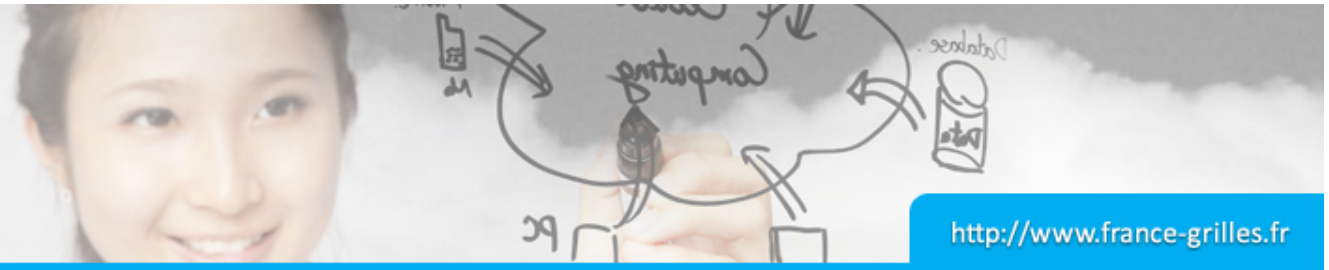
- Rapid migration from grid to cloud technology
  - In phase with EGI and CERN
  - Keeping our current users happy
  - Reaching new users
- Build a federation of academic clouds at a national level
  - Tier-1: CC-IN2P3
  - Other Tier-1's ?
    - Molecular Biology?
  - Tier-2s: academic clouds with regional impact
- Partnership with public clouds

Who own the resources?

- Two models with different strengths and weaknesses

HPC top-down model: resources owned by GENCI	Grid bottom-up model: resources owned by research communities
Resources are easy to optimize at Tier-1 and Tier-0 levels	Higher risk of duplication of efforts and investments in different user communities
Focus on excellence	Everyone can cook !
Purchase of equipment is driven by technology providers	Purchase of equipment is driven by scientific needs
Tier-2 centres have to follow the technological evolution	Tier-2 centers are in the front line of innovative technologies and approaches

The two models can/should coexist

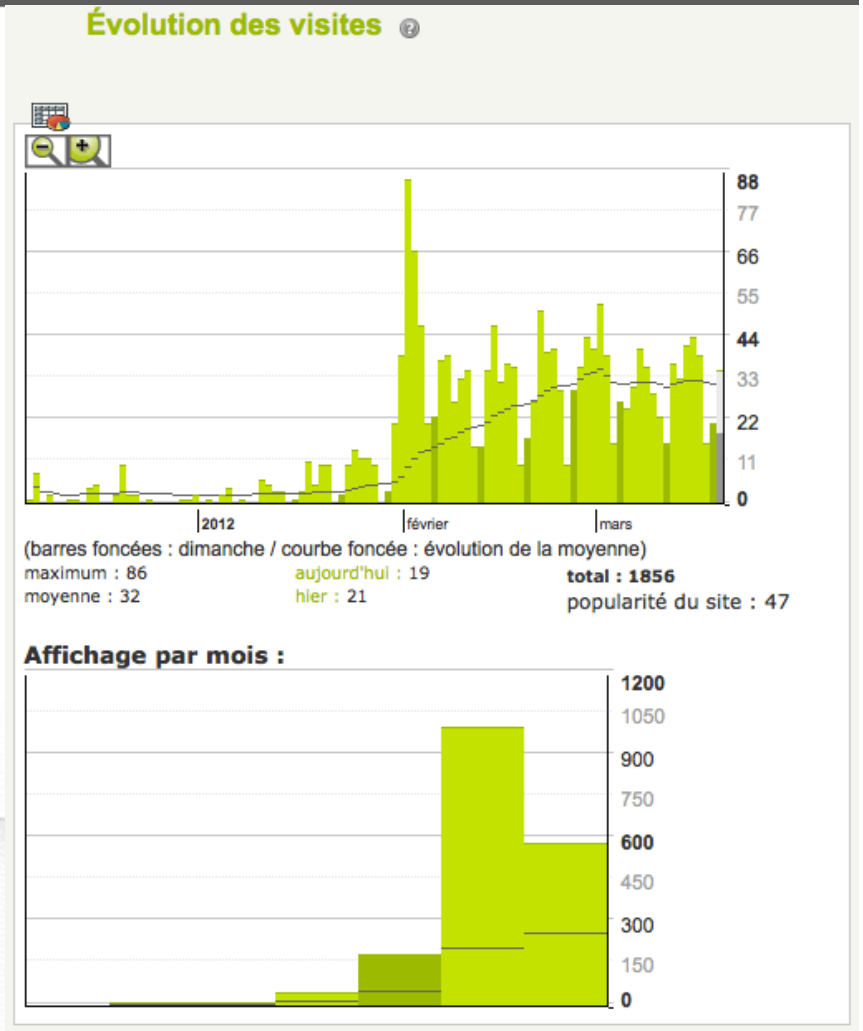


France Grilles strategic priorities in 2012

- Operate a stable infrastructure (G. Mathieu's talk)
- Better support users (G. Romier's talk)
- Start a strategic roadmap for cloud computing (F. Suter's talk)

Recommendation R3: France Grilles new web site

- Simplified and more intuitive content organization
  - In line with the new graphical chart
  - All pages translated in english
- New web site regularly visited and used
  - On line since Jan 31st 2012
- Editorial changes to newsletter
- Ready for promoting FG strategic plan

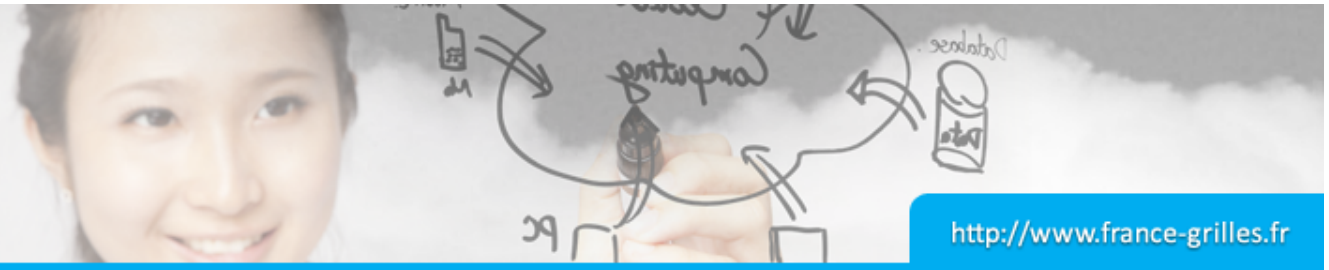


R4: production of metrics

- Effort to provide metrics on operations and user communities
  - Documented in G. Mathieu and G. Romier's talks
- Dedicated effort on metrics collection specifically addressed by G. Mathieu

R5: develop relationship with computer science community

- Today, half of the registered France Grilles publications come from research groups in computer science
- Successful continuation of projects initiated before 2011
  - Grid observatory
  - SimGrid
- Cloud computing, main area of collaboration
  - Dedicated equipment for research (Toulouse)
- Big data, another promising field of collaboration
  - Joint call for projects from CNRS Interdisciplinary Mission



R6: relationship with supercomputer centers

- Top-down: joint initiatives
  - Joint CC-IN2P3 – France Grilles – IDRIS meetings in 2011
  - Joint response to 3rd Call for Projects on Cloud Computing (deadline: July 2012)
- Bottom-up: identify/implement common use cases
  - Joint “Rencontres Scientifiques” with HPC users network (October 1-3rd 2012)
  - Interesting use cases already identified in geosciences and computational chemistry

R7: testing of commercial clouds

- Analysis of the experience of groups using commercial clouds
  - High Throughput Sequencing Data Analysis, ENS Biology Institute
    - Deployment on Amazon Web Services
    - Use of MapReduce to increase analysis speed
- Efforts focused on deploying academic clouds

Elastic workflow execution service for medical simulations

Tristan Glatard, Ibrahim Kallel
Creatis, CNRS, INSERM, Université de Lyon, France

Tram Truong Huu, Johan Montagnat
CNRS / UNS, I3S lab, MODALIS team, Sophia-Antipolis, France

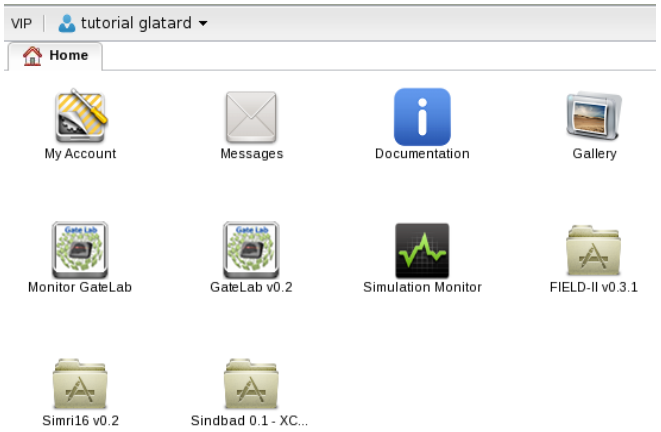
Andrew Harrison, Ian Harvey, David Rogers, Ian Taylor
Cardiff University, UK

Credits

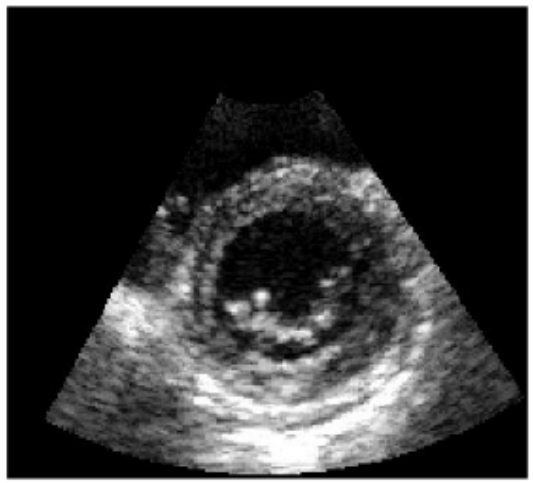
Thanks to

Motivation

- **Virtual Imaging Platform**
  - Portal for medical simulations on grid
  - Approx. 150 registered users
  - Production consumed 32 CPU years on EGI in 2011
  - http://vip.creatis.insa-lyon.fr



- **Problem**
  - Several concurrent workflow instances
  - Single server => scalability issues

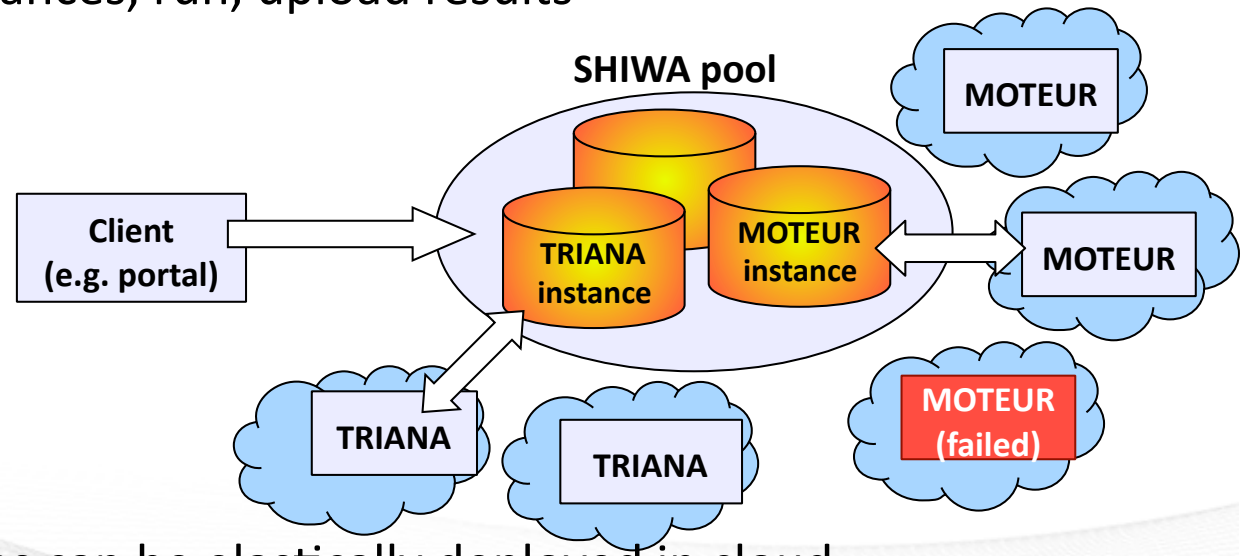


Echocardiographies -- parasternal short axis view

Images courtesy of ANR project US-Tagging
http://www.creatis.insa-lyon.fr/us-tagging/news - O. Bernard, M. Alessandrini

Proposed architecture

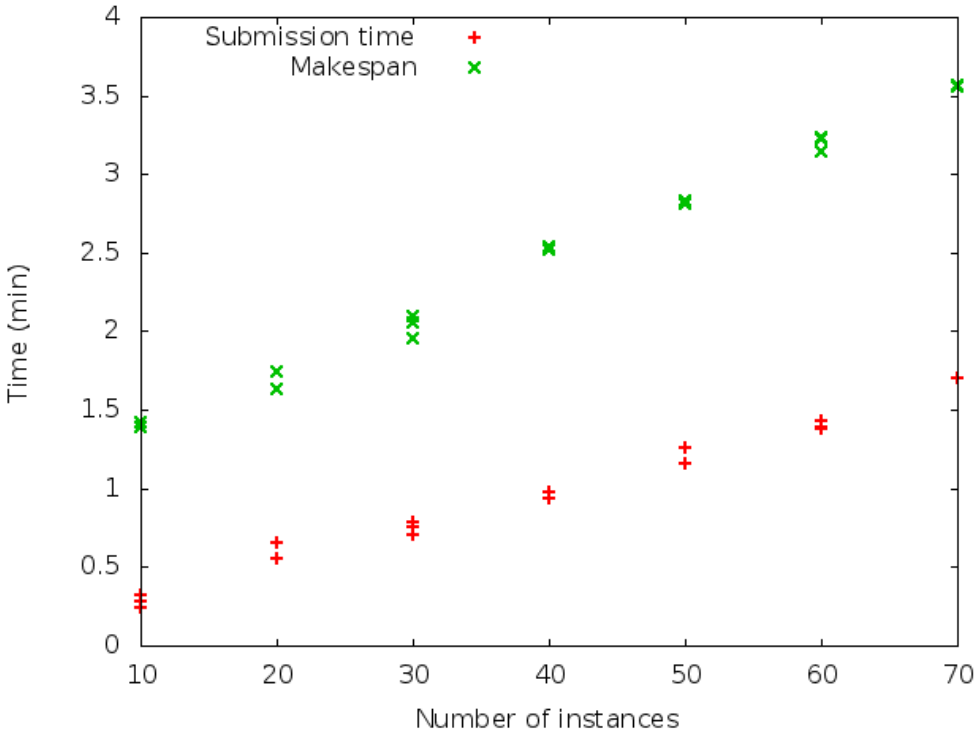
- Workflow execution pool
  - Clients drop workflow instances, monitor status, get results
  - Engines fetch instances, run, upload results



- Properties
  - Scalability: engines can be elastically deployed in cloud
  - Robustness, through engine redundancy
  - Language-independent: engines take instances of their languages

First tests on cloud infrastructure

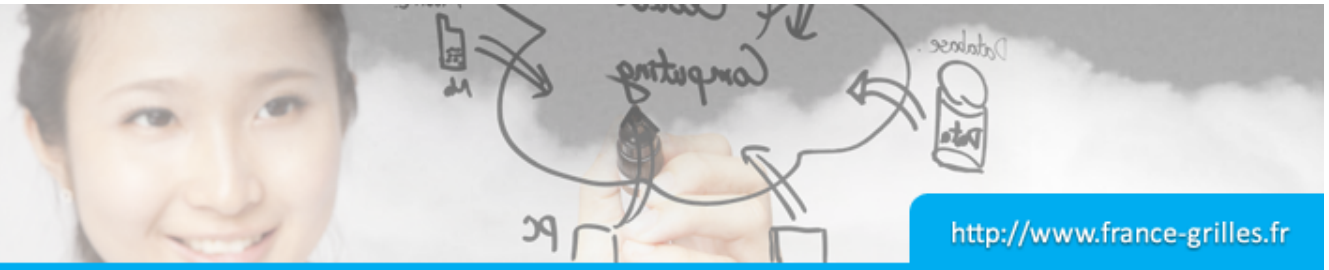
- Goal and conditions
  - Scalability test
  - 1-minute workflow executions
- Cloud testbed
  - StratusLab (LAL's site)
  - Deployed 30 MOTEUR engines to SHIWA pool
  - VM: CentOS v6.2 x86_64
- Results, future work
  - Elastic deployment of engines
  - System scales well
  - In production by end 2012



- Responses to recommendations 8, 9 and 10 are documented by Geneviève Romier in her talk

- Thank you for your attention

Back-up slides



Grid paradigm: all users are equal…

- **Grids are about sharing computing and storage resources**
  - Resources are distributed
  - Access to the resources is distributed
- **Access to grid resources requires**
  - A certificate delivered by a national certificate authority
  - To be registered in a Virtual Organization
  - An account on a User Interface
- **All users on Earth of a Virtual Organization**
  - access the same resources
  - share the same services
  - Only difference: network performances