IT procurement in Research Infrastructures

- Standard Processes
- Needs
- Other considerations

Funding

- National/European/International partnership
- Fundamental Science/Physics
  - Almost all of the budgets are coming from governments
  - Looking for return on National Economies

Procurement processes

International Call for Tender 1/2

- Not subject to public tendering rules
- If estimated cost > 50 K€; then ICT; end if;
- Who ? (closed list)
  - The RI provides an initial list of suppliers
  - Purchasing Advisors propose additional ones
- Deadline between 4 to 8 weeks
  - Possible contacts for technical & administrative questions

International Call for Tender 2/2

- Reception of offers by mail
  - Double envelope system (technical/commercial)
  - Companies can be contacted if inconsistencies or errors are detected (corrective offer could be sent back)

Evaluation

- Single or separate processes
  - Technical evaluation
  - Commercial evaluation
- Full-scale test system on premise / Try & Buy

Journey to the decision

1. Internal purchasing committee

   Did we correctly follow the rules ?

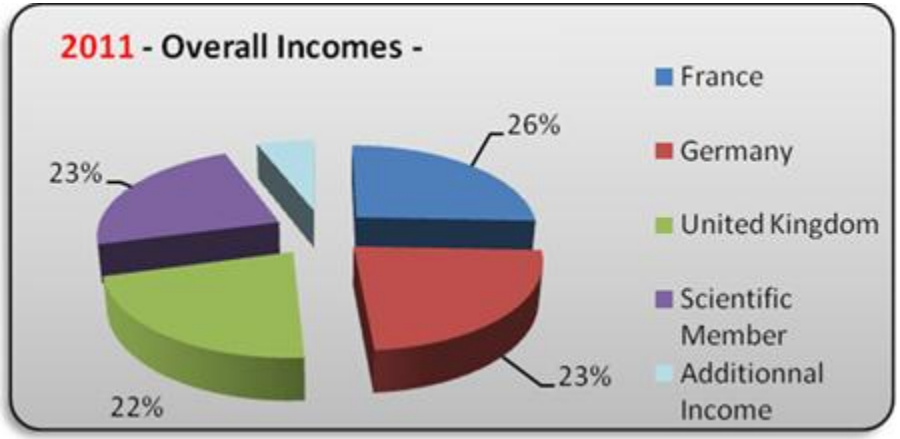
2. > 100 K€ Approval by the DG and Head of Administration
3. > 500 K€ formal approval by the Administrative and Finance Committee
4. > 3M € formal approval by the Council

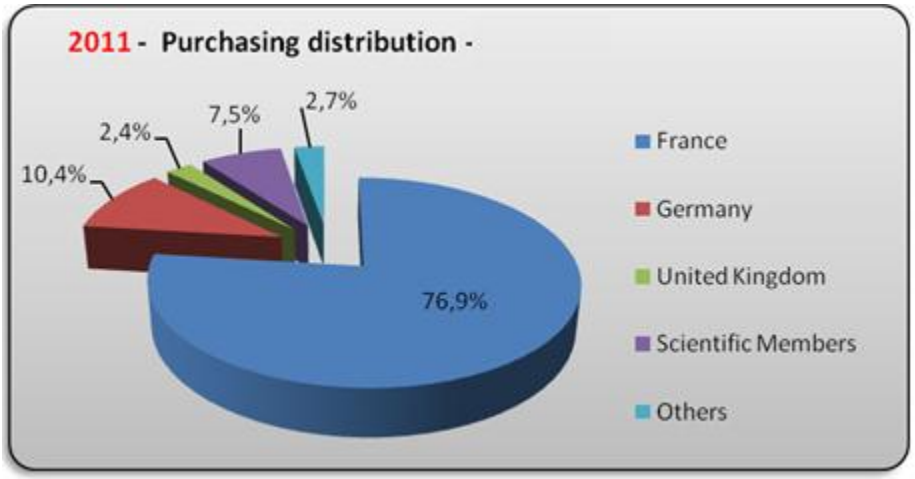
Could easily take 1 to 2 months

“Juste Retour”

More and more, **Provenance** plays an important role.

Ex: Countries who have a weak “juste-retour” coefficient may be offered to align to the lowest bid if offers are technically equivalent



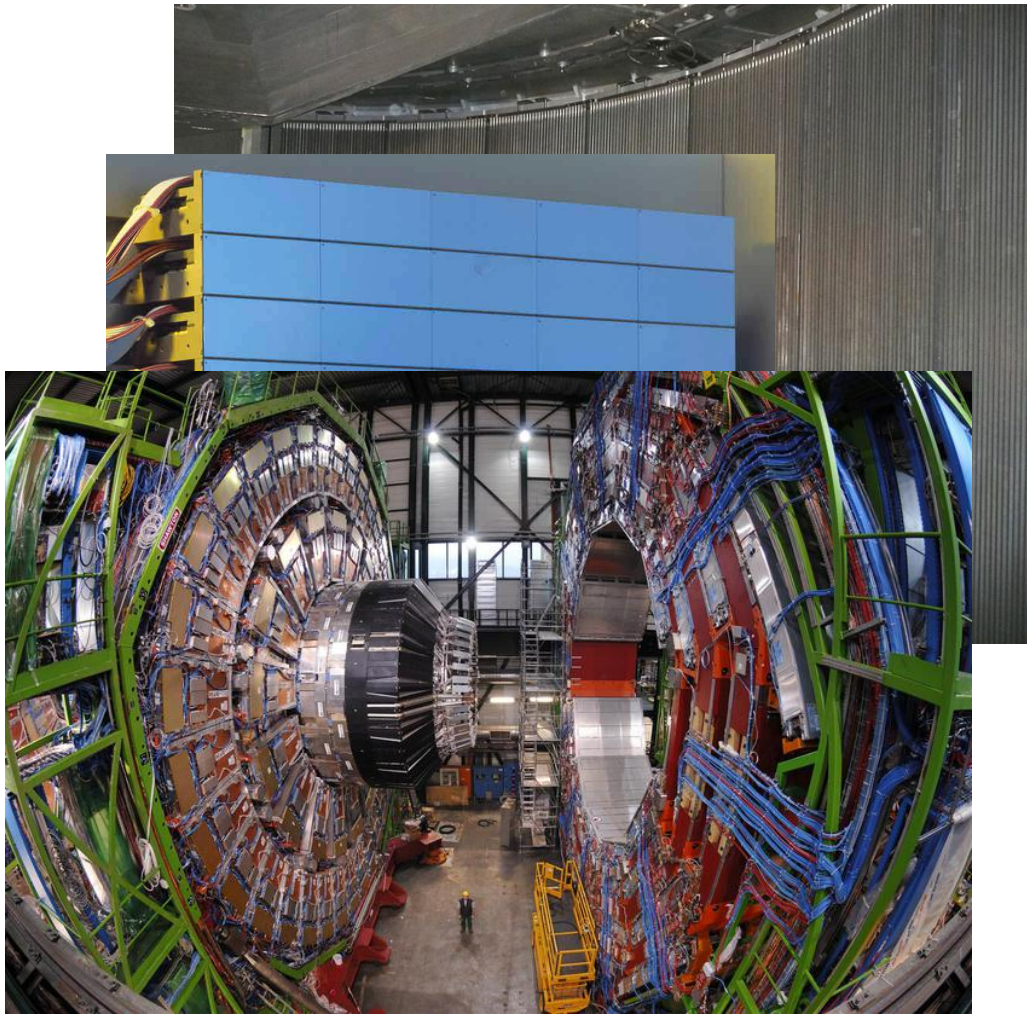


The needs

The IT infrastructure is driven by the data tsunami!

Data Deluge ???

- Neutron
  - $\sum_{1973}^{2010} = 20$ TB
  - 2012: 100 TB
- X-Ray
  - 2011: 300TB
  - 2012: 1PB
- High Energy
  - 2011: 10PB
  - 2012: 20PB



Impacts 1/2

- Capacity
  - Online Storage / Archive
  - Network: Multi 10G links is becoming standard
  - HPC / Computing
- Performance
  - how to make sure that beamlines can write data to disk while others are reading data at full blast with high performance compute clusters.

Impacts 2/2

- Cost
  - Finding the best balance between price/performance/ease of operation is more and more difficult.
  - Budget and man power is limited

Needs

- "Scale out" technologies
  - We cannot rebuild from scratch every year
- Legacy problems (legacy protocols)
- Challenge is not only capacity but throughput.

We want to build long-standing relationships with companies since our infrastructures will run for many years.

European XFEL	1)Storage: 15 PB ; CPU 6000 cores; GPU clusters -small number; Tape: 10PB 2) Storage: 40PB ; CPU 40000 cores; 3) Storage: 80PB ; CPU 160000 cores; GPU clusters & FPGA processing farms increase; TapeArchive: depends	1) 2015-2016 2) 2018 3) 2022	buy: Hardware investments, standard IT services build: Integration of services, Data acquisition and analysis software
EuroFEL	Storage & Tape Archive: few PB ; Hi Speed & Cluster/parallel data: ~0.5 PB CPU: 1000; GPU clusters: Small number ; commercial HPC appliances: limited number (FDR or 100Gbit)	Figures given represent constant yearly growth Timeline: Progressive increase Some small-bang jumps once a new facility gets operational	buy: Data and compute infrastructure build: in-house cloud to provide cloud-services, though developments like dCache aim to provide interfaces to commercial cloud services
SPIRAL2	Instrumentation: Data generated 84TBytes/day (raw) ??? o Control Command: 2000 equipments to drive for SPIRAL2 Phase 1 & Phase 2	Instrumentation: under discussion - Phase 1 and Phase 2 ??? Control Command: installation to start during the 1st semester of 2013, in operation in February 2014	Instrumentation: under discussion Control Command: 80% is bought for SPIRAL2 Phase 1 ?????
CERN	Currently installed capacity: 1)Storage: 30 PB 2)CPU Cores: 69000 /9000 servers 3)Tape Archive: ~ 100 PB	Needs: 20% growth a year in CPU performance, tape and disk. Replacement of servers every 4 years (~1200 boxes/year)	buy: All infrastructure it to buy, integration done in house
ESRFUP	1)Storage: 1 PB ; CPU 700-1000 cores; 10 GPUs; Network switches: ~500k€; 200-300 laptops	Figures given represent constant yearly growth starting from 2013. Except for storage where 2PBs are needed in 2014 and growth is faster. Timeline: Starting 2013	buy: All infrastructure is to buy
ILL	1)Storage: 400 TB; Extension of existing HPC cluster of 100 K€. Growth rate ~30% per year from a current base of 200TB 2)Servers: current base 250 Replacement cycle 5 years 3)Networking: Currently under replacement will terminate in 2013	Timeline of call for tenders: Feb/March 2013 for HPC extension May/June 2013 for Storage Purchases split in 2013 and 2014	buy: Storage; buy everything, HPC; buy the nodes, installation & integration done in house
ESS	Unknown at this point in time	Pre-construction: 2012-2016; Operations start in 2019 ramping up to 2025	Unknown at this point in time
SKA	Unknown at this point in time	N/A	Unknown at this point in time
ELI	1)Storage: 1.5 PB 2) CPU Cores: ?? 3)Tape Archive: ?? 4) Networking: ??	Timeline: Phase I: until end of 2015 (57% of total IT budget) Phase II: until end of 2017 (43% of total IT budget)	buy: General IT infrastructure: Office computing, Network, Virtualization, Security Research Infrastructure: Hardware components Build: Research infrastructure software. Software integration including existing SW

Other considerations

- Few software development outsourcing, and definitely not for data analysis.

- Although right now Cloud services are not well adapted to our business case, this could change…

RIs as "show case"

Data generated is generally "exported" to other laboratories all over Europe/World creating a demand for IT infrastructure.
The IT solutions used in our facilities are "show-case" installations.

Number of unique users of Neutron and Photon EU RIs: **35968**

Thanks for your attention

Questions ?

My colleagues will be happy to help me to reply.