ICRI 2018
RESEARCH INFRASTRUCTURES IN 30 YEARS' TIME AND HOW TO GET THERE

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OCDE
DES POLITIQUES MEILLEURES POUR UNE VIE MEILLEURE

1988: 30 Years ago ...

https://www.esrf.eu

Decision to build ESRF on ILL Site

https://home.cern

CERN: LEP Not yet Commissioned

http://iramis.cea.fr

No Petawatt Lasers ...

https://www.xfel.eu

No Free Electron Laser Facilities

Cray 2 : 2 GIGAFLOPS

1988: 30 Years ago

https://www.mobilephonehistory.co.uk/lists/by_year.html

No GSM (*wait for 1991..*)

IBM PC XT, 512 kB RAM, 10 MB hard disk, Core 8088 4.77 MHz

2400 Bits/s Modem

Year	IP Traffic (PB/month)	Fixed Internet traffic (PB/month)	Mobile Internet traffic (PB/month)
1990	0.001	0.001	n/a
2016	96,054	65,942	7,201

https://en.wikipedia.org/wiki/Internet_traffic

30 Years ago none of these existed

Google 1998

amazon 2004

facebook 2004

YouTube 2005

Baidu 百度 2000

WIKIPEDIA The Free Encyclopedia 2001

We have been actors of a technological and societal revolution

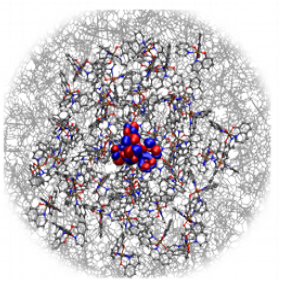
RIs in 30 Years from now ?

- Data sharing and data mining
- Simulations, modelling and “smart” experiments
- Building networks of RIs
- Maximise social impact

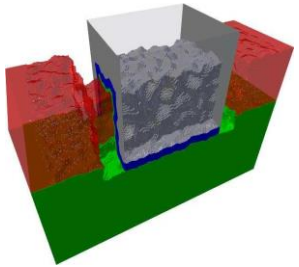
Data sharing and data mining

- Capacity to analyse huge amount of data and compare data-sets
- Have access to data from several different experiments with different techniques and in different domains: need for interoperability of data bases.
- **We need new skills and to assure the sustainability of data repositories.**

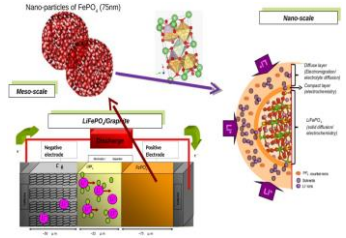
Simulations, modelling and “smart” experiments



Basic mechanisms



Multiphysics simulation



Device Modelling

Courtesy of Thierry Deutsch, CEA/INAC

- Massive use of simulations with coupled model
- Verify static and dynamics results with experiments
- **Need for high resolution dynamic experiments**

Implementing networks of RIs

- Networks of RIs will increase the use of RIs by a broader community of users to address global challenges.
- Going for common call for proposals, evaluation procedures and access.
- Networks of RIs will also help build synergies to save cost (*common procurement policies, wise investment strategies etc.*), and more easily connect to under laying data networks to facilitate access to data.

New GSF-Science Europe activity on optimising the operation and use of national Ris.

Maximise social impact

RIs will increasingly be assessed for their societal value.

- Respond to global challenges.
- Need to be better imbedded into local or regional ecosystems to provide socio-economic benefit beyond their scientific production.
- Greater collaboration between RI management and local ecosystems.

Most of current projects, like ESS, DONES or ITER, are good examples of close interaction with the regional authorities, which have agreed some economic attractiveness and training objectives with the RI management.

GSF activity on socio-economic impact of Ris.

"Whenever you build something that is 2 or 3 order of magnitude better than any existing one, that will lead to new science "

Heinz Maier-Leibnitz

Thank you for your attention