



Distributed Computing Infrastructures for Swiss Science

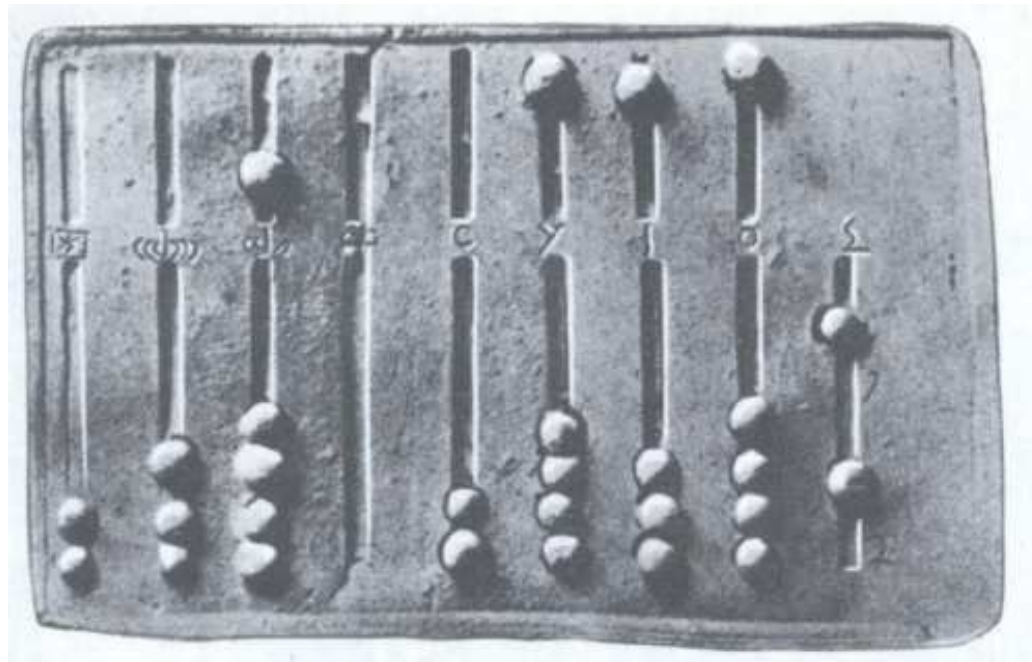
Swiss Distributed Computing Day 2011
Sigve Haug, SwiNG Executive Board
Bern, 2011-11-28
www.swing-grid.ch

Outline

- **Computing and science**
- **Distributed computing infrastructures (DCI) and Swiss science**
- **Current and future funding for Swiss science DCI**

Computing and Science

Astronomy and trajectories



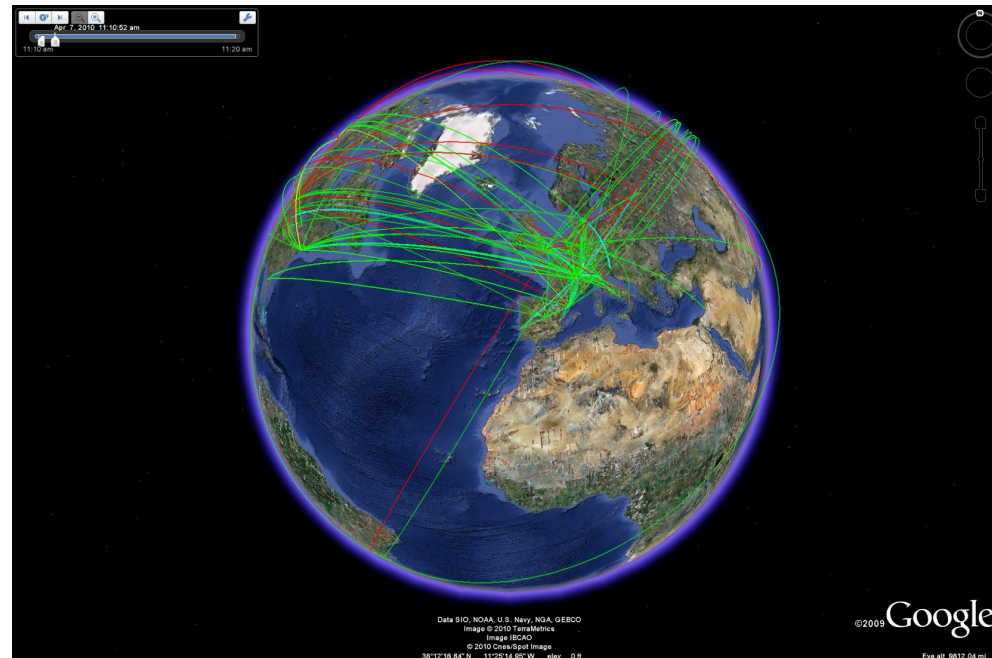
BC mainframe super computer used in ancient Greece

n-Body problems – the universe as a machine



NASA computers distributed over desks and rooms

Distributed computing for the Large Hadron Collider



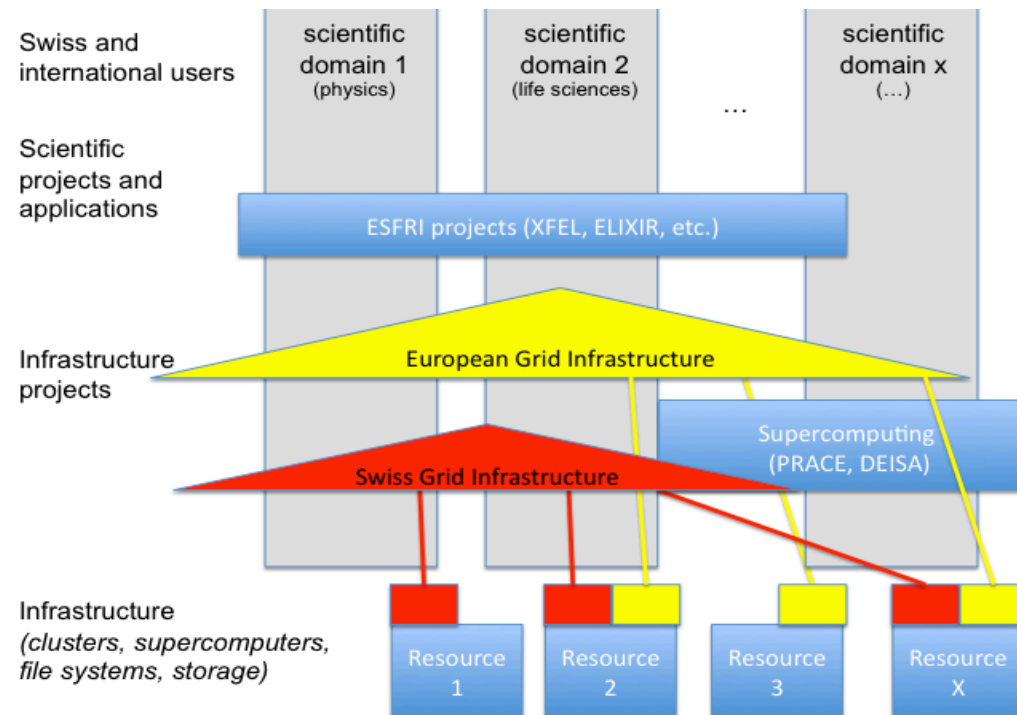
**distributed all over. Modeling in bioinformatics,
computational chemistry, economy, astroparticle
physics ... attacking complexity with toy experiments.**

Distributed computing infrastructures – a requirement for **competitive** sciences

- **Many sciences are close to the mechanistic paradigm. The belief that, in principle, large scale can be explained by small scale behavior ends in the n-body problem. The resulting computational challenge is met with modeling in which human fantasy pushes the sensor, storage and computation capacity as far as possible. It has long gone beyond institutional and national borders. Several examples on today's agenda.**
- **Distribution of sensors, data and computing lead to new inter-organizational and international collaboration layers**

Distributed Computing and Swiss Science

The big picture ...



**... from the proposal for a SwiNG
Kooperation and Innovation Program (SKIP)**

SwiNG is the instrument Swiss science has to coordinate and plan its distributed computing infrastructures

- **Representing Switzerland at international level - EGI council, Nordugrid collaboration board**
- **Community platform – yearly scientific community plenary, yearly Swiss Distributed Computing Day, Swiss grid and distributed computing schools – booths at EGI forums**
- **Provides the web platform to DCI services**
- **Some coordination of DCI projects and working groups**
- **Coordinate national DCI issues (EGI, NGI-CH)**
- **Coordinate funding requests (SER, SUC), now for 2013-2016**

DCI components from various projects

- **Certification authority (authentication) – based on AAA**
- **Virtual organizations authorization - voms.smscg.ch**
- **Informationssystem – giis.smscg.ch**
- **Monitoring – monitoring.smscg.ch**
- **Accounting – sgas.smscg.ch**
- **Ticket system – rt.smscg.ch**
- **Wiki swing-grid.ch**
- **Email lists - swing-grid.ch**
- **Conference system (SWITCH)**
- **NGI-CH Swiss participation in the EGI-InSPIRE project**
- **CPU 12 sites expose resources, uniform access to all these**
- **Storage 4 sites expose large disk pools via SRM**
- **File catalog lfc.smscg.ch**
- **Several teams with state of the art expertise**
- **...**

An example: The SMSCG project www.smsgg.ch

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Processes: ■ Grid ■ Local



Country	Site	CPU	Load (processes: Grid+local)	Queueing
+ Switzerland	arcXWCH at HEPIA, Gen>	84	0+0	0+0
	Bern ATLAS T3	516	298+0	127+0
	Bern UBELIX T3 Cluster	1440	216+732	138+662
	GC3 Grid Cluster	312	209+5	981+13
	Geneva ATLAS T3	323	147+131	93+37
	Gordias at hepia	224	0+0	4+16
	Manno PHOENIX T2	1760	38+1322	343+1139
	Manno PHOENIX T2	1760	27+1333	343+1138
	SMSCG - EPFL	1061	0+80	0+0
	SMSCG - Vital-IT	1188	0+628	0+101
	SWITCH SMSCG TEST	1	0+0	0+0
	USI-ICS Cluster	328	0+273	0+0
	WSL Grid Cluster	408	68+291	7+2861
TOTAL	13 sites	9405	1003 + 4815	2036 + 5967

giis.smsgg.ch

Current and future funding for Swiss science DCI

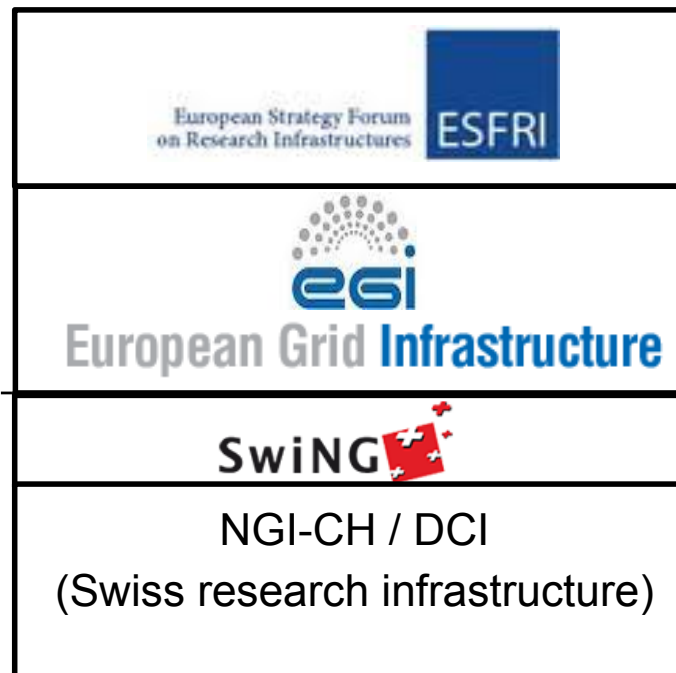
SwiNG's intention is

- **To ensure that existing vital infrastructure is funded and operated**
- **If possible to ensure funding for innovation and extension of infrastructure**
- **Maintaining funding for the Swiss DCI**

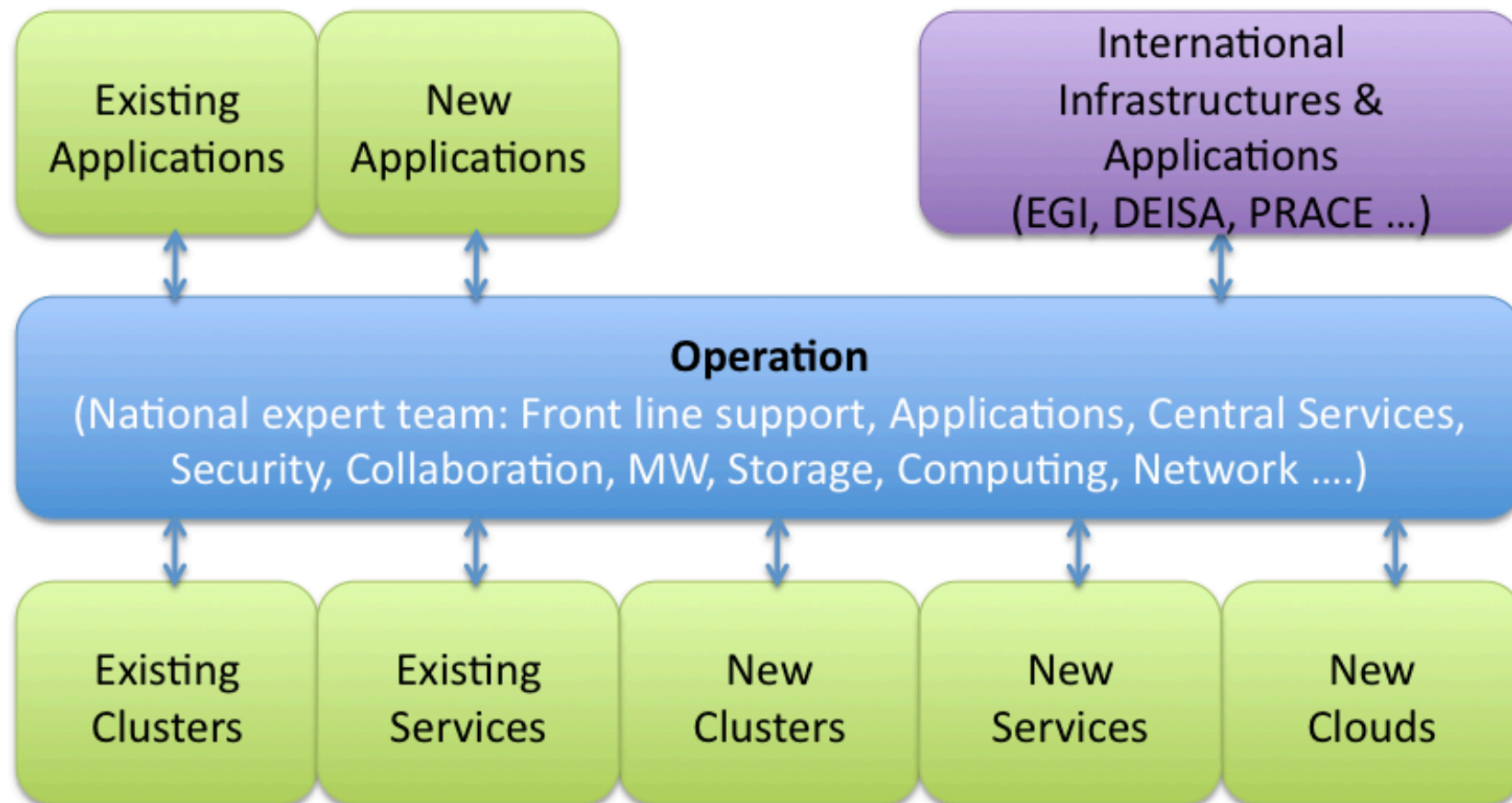
SwiNG positioned Swiss DCI in the Swiss Roadmap for Research Infrastructures 2013-2016

Funding Relationship 2013-2016

international components



national components



Summary

- **Swiss science needs distributed computing infrastructures to be competitive**
- **In the last years several projects have been funded to provide needed DCI components, organization and expertise**
- **There is a national infrastructure in operation**
- **The so far required international connections are in place**
- **SwiNG has placed the vital parts of this in the Swiss Roadmap for Research Infrastructures**
- **The funding requests are being placed – stay tuned for the SwiNG SUC project**
- **Long term planning to be addressed**

Announcements

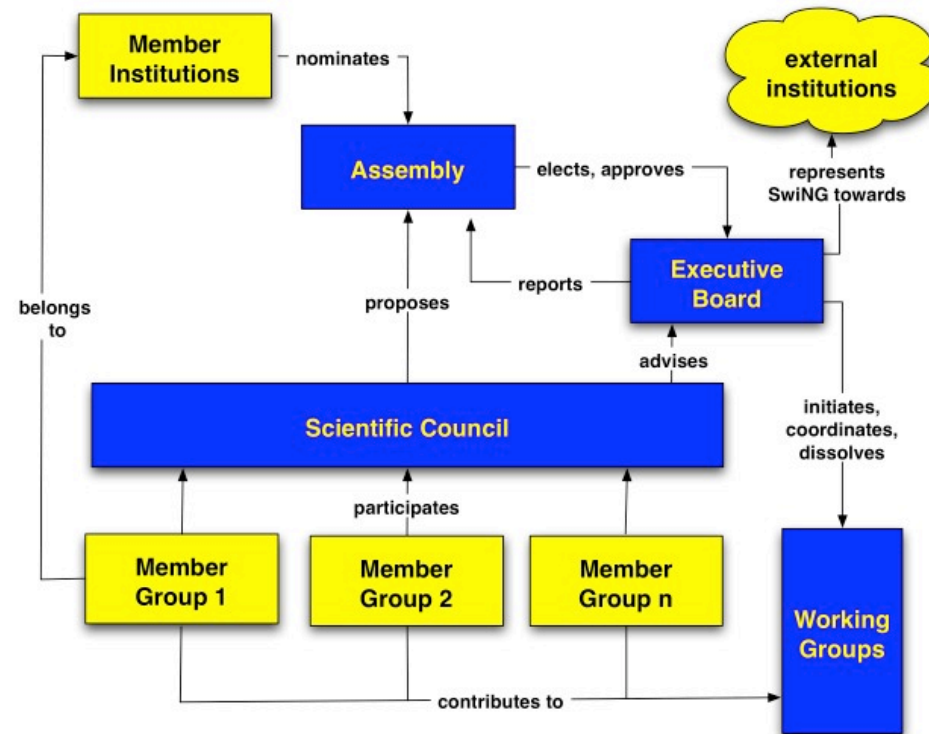
AAA/SWITCH Last competitive bid 2012-03-31

AAA/SWITCH Infoday 2012-01-19

Additional slides follow

- www.swing-grid.ch
- EGI-InSPIRE-Final-Corrected-1.pdf (www.swing-grid.ch -> Documents -> Info Material)
- [SwiNG_Strategy_Roadmap_20081117.pdf](http://www.swing-grid.ch) (www.swing-grid.ch -> Documents)
- http://www.ethrat.ch/download/Strategie20HPCN_e_070920_ETHR.pdf
- <http://www.chipp.ch>
- <http://www.switch.ch/aaa/projects>
- JRU SWITCH MoU, not publically available
- SwiNG Organigram, <http://www.swing-grid.ch>
- The Swiss Multi-Science Computing Grid, www.smscg.ch.
- The Swiss HPC Service Provider Community, www.hpc-ch.ch
- 10. <http://www.cus.ch/wDeutsch/beitraege/2013-2016/index.php?navid=>

Swiss higher education sector reacted by funding the Swiss National Grid Association in 2008



17 member institutions. Coordination of DCI related funding, projects, education and outreach, community representation. Member of NorduGrid CB, NGI-CH (EGI Council).