deep se
dependable evolvable pervasive software engineering group

European funding for long-term research

Facts and a personal perspective

Carlo Ghezzi
Politecnico di Milano
Deep-SE Group @ DEI
carlo.ghezzi@polimi.it

The EU and research

- Research recognized as key to the competitiveness and growth of Europe: it is an EU initiative that also involves non-member states
- Framework programmes (FPs) are the main financial tools through which the EU supports R&D covering almost all scientific disciplines
  - EUR 50.5 billion for 2007 – 2013
- Lead by EU's Directorate-General for Research
  - now managing FP7 (2007- 2013)

ERC

- Officially launched February 2008
- Part of the 'Ideas Programme' of the FP7
- Previously, long term research was completely delegated to member states
- *The ERC is the first pan- European research funding organisation for frontier research*
- *'Investigator-driven', or 'bottom-up', in nature, the ERC approach allows researchers to identify new opportunities and directions in any field of research, rather than being led by priorities set by politicians*

A unique opportunity

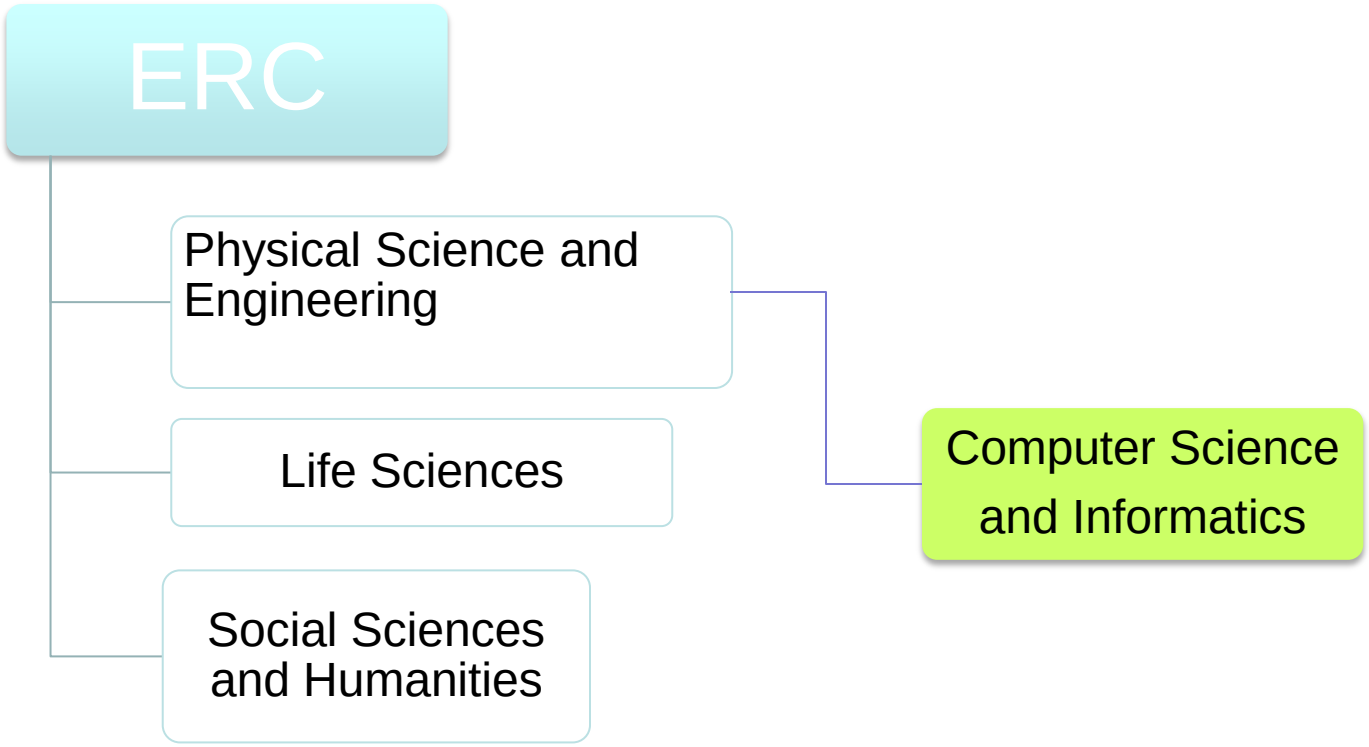
- Other EU programs
  - have short-term goals
  - are driven by predefined objectives
  - require a consortium
  - need an exploitation plan
  - have high overhead

+ **foster trans-national cooperation**
+ **require industry commitment**
- **unsuitable to building and stabilizing a research environment around new challenging ideas**

One goal, two programs

- *It aims to stimulate scientific excellence in Europe by supporting the very best, creative researchers*
- *Scientific excellence is the only selection criterion in the ERC's peer reviewed grant competitions*
- 3 macro areas
  - Life Sciences, Social Sciences and Humanities, and Physical Science and Engineering
- Directed to individuals
- The ERC funds both
  - early-career researchers **ERC Starting Grants**
  - top senior scientists **ERC Advanced Grants**

Where is our field?



Starting grants

- Principal Investigator
  - candidates can be of any nationality
  - 2 years <PhD (or equivalent) <= 12 years
  - host organization: legally recognized public or private research organization situated in an EU Member State or an Associated Country
    - Albania, Bosnia and Herzegovina, Croatia, Iceland, Israel, Faroe Islands, Liechtenstein, FYR of Macedonia, Norway, Republic of Montenegro, Serbia, Switzerland, Turkey
- Funding: up to € 2.0 M per grant (normally up to € 1.5 M per grant)
- Duration: up to 5 years

Starters and consolidators

- Starting from 2010, indicative budget of each panel divided in proportion to the budgetary demand of the proposals submitted by 2 categories (*starters* and *consolidators*)
- PIs will be assessed by the evaluation panels as being *starters* (2< PhD <=7) or consolidators (7< PhD<=12) at the time of the application

The proposal

- Section 1
  - The PI
    - Scientific Leadership Potential
    - CV
    - Early achievements
  - Extended synopsis (5 pages)
- Section 2
  - The scientific proposal

The evaluation panel

- Step 1: cut down to 3 times the number of fundable proposals
  - Section 1 evaluated by panel members
  - panel meets to establish a ranking list of those proposals meeting the quality threshold
- Step 2: selection within retained proposals
  - Sections 1 and 2
  - final decision of the panel is based upon the interviews and opinions from the individual reviews

Advanced grants

- PI candidate
  - scientifically independent
  - recent research track-record and profile which identifies PIas leader
  - host organization: legally recognized public or private research organization situated in an EU Member State or an Associated Country
    - Albania, Bosnia and Herzegovina, Croatia, Iceland, Israel, Faroe Islands, Liechtenstein, FYR of Macedonia, Norway, Republic of Montenegro, Serbia, Switzerland, and Turkey
- Funding: up to € 3.5 M per grant (normally up to € 2.5 M)
- Duration: up to 5 years

Objective and process

- Projects being highly ambitious, pioneering and unconventional
- For exceptional research leaders only
- Process similar to starting grant (but no interviews)
- Two panels (A and B); active in turns and appointed every year for a maximum of 3 active calls

- Starting Grant
  - calls published in summer, deadline fall
- Advanced Grant
  - calls published in fall, deadline spring

call Id	budget	#received	#grants
Starting Grant 2007	335 M€	9167	299 (3.3%)
Advanced Grant 2008	553 M€	2167	282 (13%)
Starting Grant 2009	325 M€	2503	244 (9.7%)
Advanced Grant 2009	515 M€	1584	244 (15.4%)

Current state

- Starting grant 2011 has an open call
- Advanced grant 2011 will be open early 2011
- Starting and advanced grants 2010 still in evaluation process

PSE
Physical Science and Engineering

call Id	#received	#grants	#PE6 grants
Starting Grant 2007	4406 (48%)	137 (46%)	11 (*)
Advanced Grant 2008	997 (46%)	114 (41.5%)	10
Starting Grant 2009	1112 (44%)	107 (44%)	11
Advanced Grant 2009	736 (47%)	105 (44%)	7

Note(*): this was PE5 Information and Communication

PE6 grants by country

Country	total #grants
IL	8
UK	7
FR	6
CH	4
DE	3
IT	3
SE	3
BE	2
FI	1
NL	1
PL	1

My personal 2 cents

- As a community, we should increase participation
  - helps increasing the share
- To be successful
  - carefully craft your application
    - a strong part 1 is very important
      - PI CV
      - synopsis must be convincing on a long-term vision and commitment
    - phrase part 2 as non-incremental research case that focuses on breakthroughs

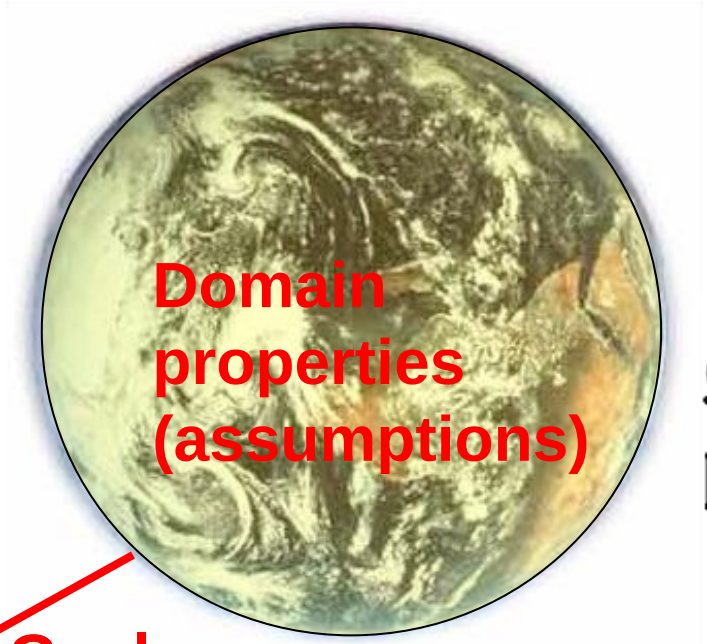
SMScom: a successful case

- Self-Managing Situational Computing—C. Ghezzi PI
- A 5 years research program; 2.5 M€
- Started Dec. 2008
- Enabler of
  - long term planning
  - blue-sky explorations
  - internal cooperation
  - PhD and post doc support

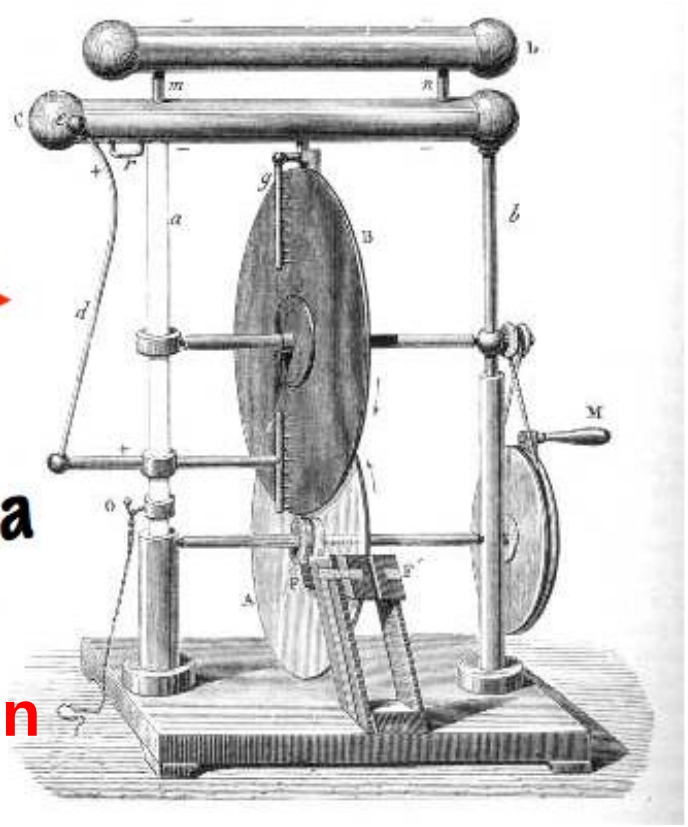
The *machine* and the *world*

World (the environment)

Machine



Shared
phenomena



Goals
Requirements

Specification

What changes in the environment?

- The **requirements** we wish to achieve
  - e.g., because business goals change
- **Domain assumptions**
  - e.g., because the context/situation changes
    - users, user profiles
    - external resources/services/libraries/devices

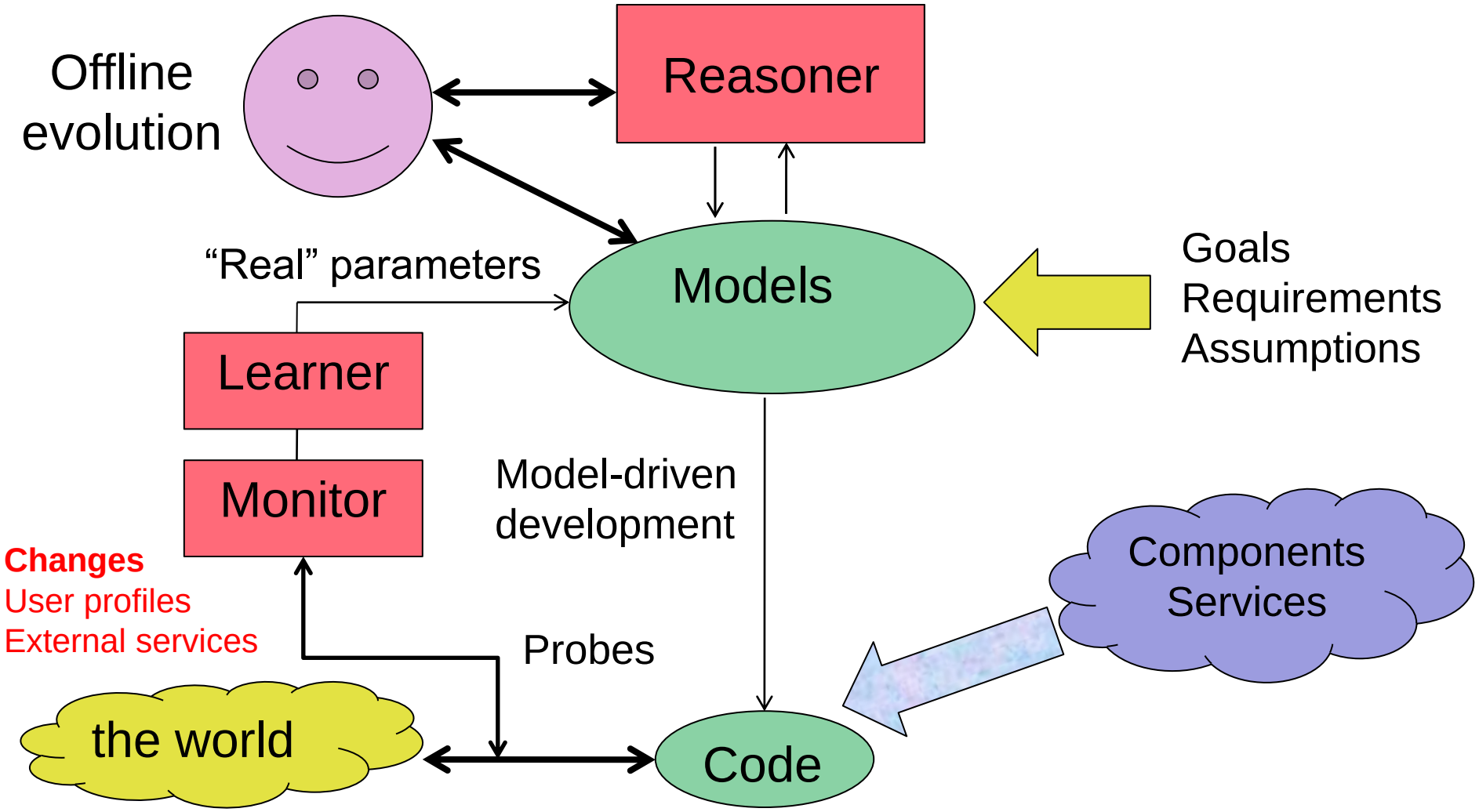
Standpoint and research goals

- Development should be model-driven
  - Emphasis on models to achieve dependability
- Operation must provide feedback data to development, identifying the needed adaptations
- Adaptation should be as autonomous as possible, to support continuous operation
- Quantitative reasoning (and quantitative models) are key to model-driven development and adaptation
- Models are kept alive at run-time
- Continuous verification needed

Further focus

- Distributed architectures
- Decentralized control
- Heterogeneous infrastructures and infrastructure-less solutions
- Dependability, trust

Situational adaptive software



So far...

- We are building the bricks of novel paradigm
- Traditional development-time/run-time strict boundary becomes blurring
- We are understanding what it means to move development-time approaches (formal methods) to run-time
- We are in the process of consolidating a few case-studies as demonstrators that the approach is feasible
- ... at month +18 we collected 66 published peer-reviewed papers (journals, conferences, workshops)

Questions?

If you are interested, contact me for a memory stick with collected papers from the SMScom project