Open Source Science

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with the support of the LiquidPub project team

Challenge: doing science in the 21st

- The Web has changed many fields:
  - News (blogs, RSS feeds, …)
  - Music (p2p networks, iTunes, lastFM, …)
  - Travel (Orbiz, Google maps,…)
  - Photos (Flikr, …)
  - …

- Has it changed also scientific knowledge production and dissemination processes ?

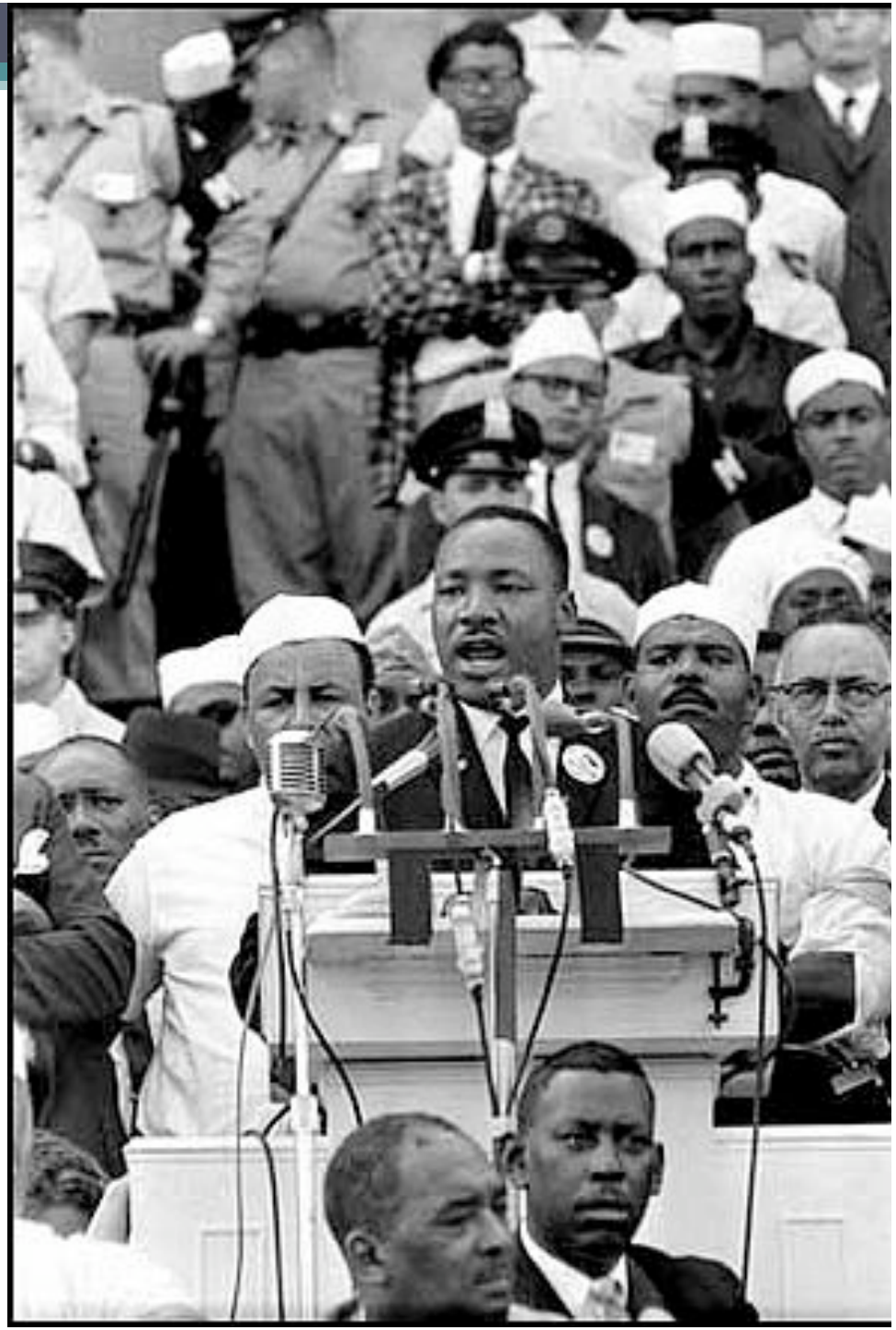
Challenge: doing science in the 21st

- Yes ! But - so far - mainly
  - distributed working environment
  - new and faster access channels
  - …
- Scientific knowledge processes are still based on the traditional notion of "paper" publication and on peer review as quality assessment method
  - *Philosophical Transactions of the Royal Society of London—founded in 1665*
  - *Journal des scavans— 1665*
  - *Royal Society of Edinburgh's Medical Essays and Observations, - 1731, introduces peer review as we would recognise it today*

We have a dream

*Explore a real change of **paradigm**, culture and style of scientific production processes*

*Capture the lessons learned by the Web and open source, agile development to develop concepts, models, metrics, and tools for an efficient (**for people**), effective (**for science**), sustainable (**for publishers and the community**) way of **creating**, **disseminating**, **evaluating**, and **consuming** scientific knowledge.*



From. www.52en.com/img/dream_01.jpg

Open Source Science What is it?

- „Science“ („Research“)
  - Advancing state-of-the-art of human knowledge
  - Vs. Engineering (building a working solution)
  - Vs. Innovation (bringing promising ideas to market)

Open Source Science. What is it?

- „Open“
  - Science as a “Common”
    - scientific results belongs to everybody
    - when results are paid by the whole community, they have to be shared and kept in a common space
    - not limited to Open Access / Open Science
  - Transparent processes
    - Common, agreed agenda – no hidden, private agenda
    - Open evaluation processes

Open Source Science. What is it?

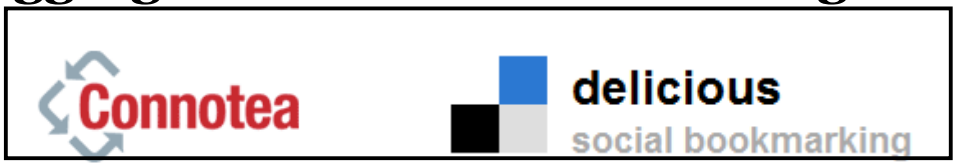
- „Open Source“
  - *“I consider that the golden rule requires that if I like a program I must share its code with other people who like it and want to use it (Richard Stallman, 1983)”*
  - Not only „papers“
    - **sharing** artifacts (raw data, images, maps, videos, benchmarks, methods, toolkits, prototypes, infrastructures, …)
  - Collaborative, community-driven approach
    - **e-Science** initiatives
    - new way of creating, extracting and evaluating scientific work that mixes the expertise of the few with the “wisdom of the many”
  - New ownership and credit attribution models

A large number of technologies are out there

Blogs

Wikis

Collaborative tagging and social bookmarking



Scientific Search Services

Journals with collaborative peer review processs

Complex Systems

But how they can be effectively used ?

Let's explore some dimensions of the issue

- Notion of "scientific contribution" and unit of dissemination
- Agile and Open Source "scientific" processes
- "Virtuous" metrics and efficient evaluation

Notion of “scientific contribution” and unit of dissemination

- In the past: papers
- What has been the function of the scientific paper?
  - The minimal scientific unit in which an idea or a result can be intelligibly expressed and evaluated
  - A rhetoric device that serves communication and pedagogical functions

Notion of “scientific contribution” and unit of dissemination

- However, many new things can be considered as contributions
  - Reviews, Comments, Blogs
  - Experiments, data
  - Prototyes, artifacts

- So the challenge is how to make them first class citizens in science (measure, search, disseminate….)
  - Define the new rethorical models
  - How to reference them
  - How to evolve them

Agile and Open Source Development

- Scientific content generation and dissemination has mainly followed a “waterfall model”

Today we have new possibilities:

- Evolving, always in beta (liquid documents), with snapshots (solid documents)
- Incremental works are ok but should be recognized as such
- Errors and error corrections are also ok.
- Collaborative model : share early – in controlled fashion
- Continuous dissemination

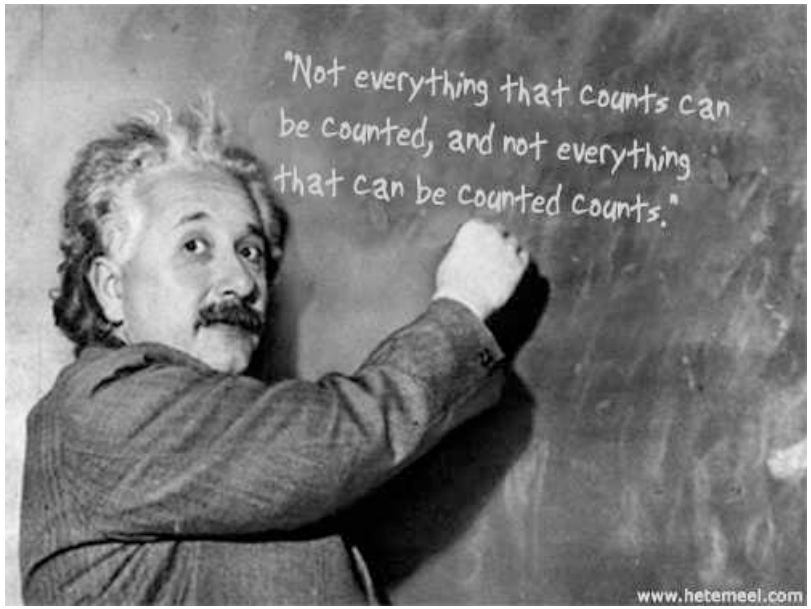
Agile and Open Source Development

What do we need ?

- Support definition and creation of "liquid" scientific contribution and their lifecycles
- Support tracing, support ownership, licensing, access right models
- Distributed and efficient search and navigation
- Challenges:
  - **Usability, Light overhead**

“virtuous” metrics and efficient evaluation

- metrics that take into account all different kinds of contributions.
  - bookmarking, forwarding,
  - Liquid Journals
- More fair and efficient peer review process
- Transparent metrics

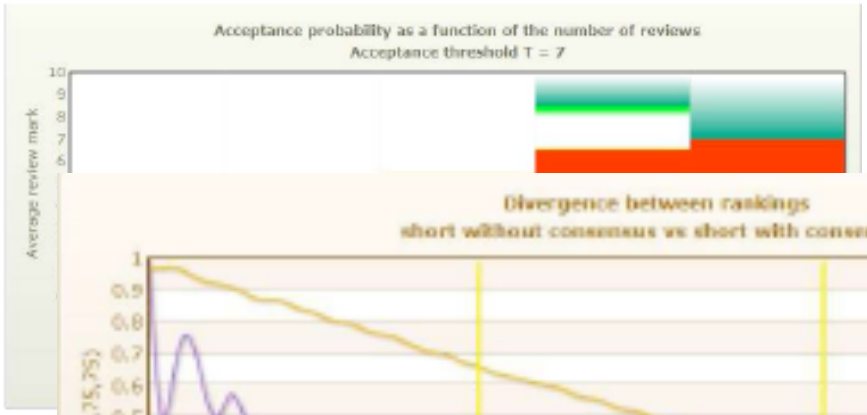


“Not everything that can be counted counts, and not everything that counts can be counted.” -- Albert Einstein

Open / Trasparent Review Processes

- Monitor and report
  - Fairness
  - Efficiency
  - Quality

ID	N° of reviews	Avg Bias
A84	5	1.33



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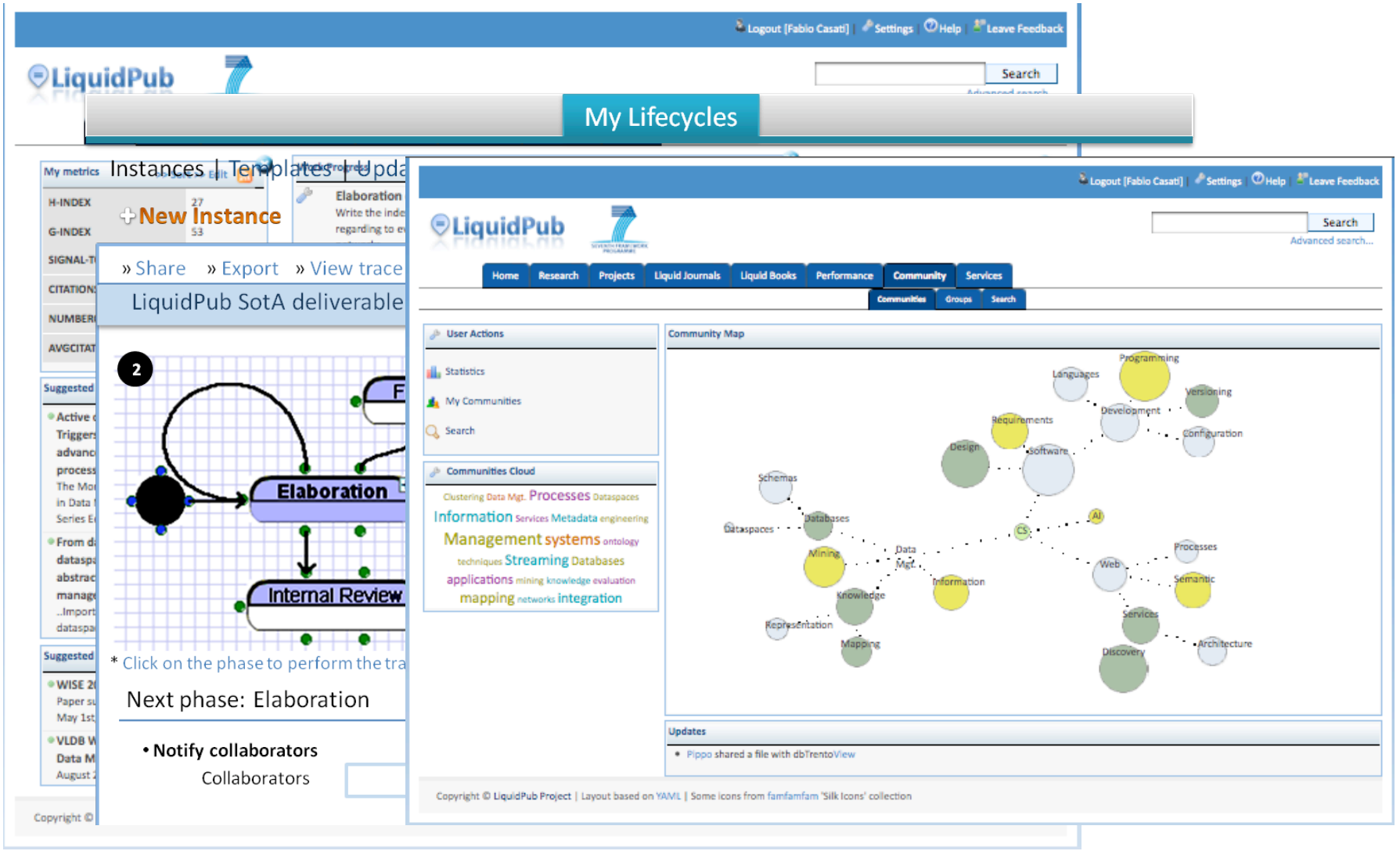

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How to make it happen

- Understand culture first
  - Different disciplines have different (scientific, engineering, innovation) cultures
  - Devise a discipline-specific approach
- Have focused objectives
  - „Controlled experimentation“
  - Mantain an holistic approach: technological, metodological, legal, economic
- The Web matters
  - as technology
  - as (social/scientific) collaboration platform

Thank you

Agile and Open Source Development

Many ICT tools available

- Version Control System
- CSCW Tools
- Web 2.0 Collaboration Tools

In progress

- Software prj mgm -> scientific artifact mgm
- Process workflow –> Scientific processes workflow