What is Research Impact?
How to Assess it?

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Where Does Software Technology Come From?

• Who should get the credit?
  – What credit should they get?
• How to award credit?
  – What measures?
  – How to determine them?
• Does this really matter?
  – To whom?
  – For what reasons?
Facile answers are misleading

- It comes from:
  - Sun, Microsoft, IBM, Rational, the web,
- Yes, but!
  - Where did they get it from? And how?
- It comes from Dr. X’s research
  - Published a seminal paper
- Yes, but!
  - Someone else cleaned it up, crafted code
- It was “in the air”
  - How did it get there? Who nurtured it?
Why should we care? (as users, beneficiaries)

- Some technology isn’t great
  - Why are we stuck with it?
  - Why isn’t it better?
- Some technology seems useful
  - How can we get more of same?
  - How can we speed its appearance?
  - Are there institutions that need to be
    - Strengthened
    - Demolished
Why Should We Care? (As Researchers)

• Altruistic reasons
  – More effective tech transfer
  – Better technologies in use
• More self-serving reasons
  – Self-image
  – Academic status
  – Positive Attitude
  – Funding prospects
The Impact Project: Tracing the Source(s) of Technology to its Origins

- Focus is on Software Technology
- Start with technologies in widespread use
- Trace back to how they came into widespread use
- Document and analyze
  - What facilitates/inhibits technology flow?
  - How to make more good things happen more easily and more often
Credit is due to:

- Commercializers
- Researchers
- Tech Transfer agents
- Early adopters
- Scientific and Technical Communities
- Students with new degrees
- New Hires
- ETC.

What are the natures of their contributions? How to value them?
Contributions Differ

- Initial conceptualization of idea
- Evangelism
- Prototype demonstration
- Public promulgation
- Nurturing by community activities
- Indoctrination and training (students)
- Product commercialization
How to Evaluate These?

- Qualitatively
- Quantitatively
- Different perceptions by different parties
- Difficulties in assessing contributions
Addressing These Difficulties

- History is hard
  - Especially for non-historians
Our Panel

• Mike Mahoney, Historian (!)
  – A historian views the Impact Project
• Dieter Rombach
  – Assessing Impact in Reviews/Walkthroughs
• Jacky Estublier
  – Assessing Impact in Config. Management
• Barbara Ryder
  – Assessing Impact on Modern Programming Languages
Some Broader Lessons

• Vendors tend to see value (impact) in
  – algorithms (e.g., differencing)
  – pieces of reusable code (e.g., RCS)

• But not in
  – concepts (e.g., hierarchical workspaces)
  – architectures (peer-to-peer repositories)
  – Which are often seen as “engineering common sense”
  – “Research had very little influence …”
  – “We do not sell ideas, but tools. We (re)invented everything we needed…”
More Lessons

- Researchers tend to see impact in
  - Precedence
  - Concepts
  - Prototypes

- But tend to devalue importance of
  - Efficiency
  - Usability
  - Reliability
  - seeing as “engineering common sense”
  - “We invented almost everything …”
  - “Tools are only an engineering issue …”
Still More Lessons

- Both are right, both are wrong
- A good idea is had more than once
- Vendors have disincentives for distributing credit for ideas
- Researchers have incentives for claiming credit for ideas
- Research and productization both require *engineered creativity*
“Those who refuse to study history are doomed to relive it”
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“History teaches us that History teaches us nothing”