The Next Really Big Thing

Michael Tiemann
VP Open Source Affairs, Red Hat
We can't solve problems by using the same kind of thinking we used when we created them - Albert Einstein

We have quite some problems in IT:
- Global Enterprise IT Spend = $1.5T/year
- 18% of projects abandoned before production
- 55% "challenged" (late, broken, missing functions)
- ~ $500B/year wasted due to "bad software"

http://opensource.com/business/10/6/integral-innovation
Paradigm Lost

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Global Enterprise IT Spend = $1.5T/year
18% of projects abandoned before production
55% "challenged" (late, broken, missing functions)
~ $500B/year wasted due to "bad software"
~ $3.5T anticipated value not delivered

http://opensource.com/business/10/6/integral-innovation
The Innovation Game

The payoff of innovation is simple:

\[(P_{\text{success}} \times B_{\text{success}}) - (P_{\text{failure}} \times C_{\text{failure}}) - C_{\text{implementation}}\]

Unfortunately, \(P_{\text{failure}} \geq 73\%\), \(C_{\text{failure}}\) could be your job, and 50\% of the time the expected outcome is worse not better. No rational incentive to innovate!?

http://opensource.com/business/10/6/radically-simple-it-dr-david-upton
Paradigms Regained?

In order to be commanded, Nature must first be obeyed - Francis Bacon
"Classical" Economic Analogies

**Law**: free to everybody, but hire an expert to help (Cygnus Support charged $300/hour)

**Medicine**: science is published and vetted; patients choose doctors and hospitals
Paradigms Regained?

In order to be commanded,
Nature must first be obeyed - Francis Bacon

He set his mind to work on unknown arts,
thereby changing the laws of nature - Ovid
"Novel" Economic Analogies

**Banking:** except instead of paying interest only on your code, interest paid on sum total of all code deposited. Forking = move to new bank

**Loyalty and Trust:** organize business relationships around continuity of contractual relationships rather than simple prices (Commons, 1932 and Deming, 1982)
Paradigms Regained?

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*Whatever you do will be insignificant, but it is very important that you do it* - Gandhi
Open Source Groundwork

1983: GNU Project founded
1985: GNU Manifesto
1987: GNU C and GNU C++ Compilers
1989: Cygnus Support founded
1991: Linus creates Linux
1994: Red Hat founded
1998: "Open Source" and OSCON
1999: Red Hat IPO
2000: Linux wins "Product of the Year" (4x)
2001: Linux 2.4 kernel released
2002: First long-term Enterprise Linux released
Open Source Game-Changers

Game Theory Predicts (Baldwin & Clark 2005): Modularity + increased Option Value + (Involuntary) Altruism = Architecture of Participation

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Positive Feedback Loops

Ever-increasing participation
+ Ever-increasing functionality
+ Ever-increasing quality
+ Ever-decreasing cycle-time
= Ever-increasing utility
Positive Feedback Loops

- Ever-increasing participation
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- + Ever-decreasing cycle-time
- = Ever-increasing utility

User-driven innovation creates whole new ruleset for mgmt, investment, culture, and customers
Open Source Successes

2003: 8 of top 10 investment banks run Linux
2004: Red Hat #1 in Vendor Value survey
2005: 95% of Top 500 supercomputers run Linux
2006: 50x-200x lower defect rate than prop sw
2007: #1 in Value
   (Japan, World 4x)
2008: Obama 1st
   "Open Source President"
2009: RHT joins S&P 500
2010: Quality >> Cost
2011-2012: RHT $1B rev
But what about the Cloud?

Hypothesis 1: Macroeconomics of cloud makes the microeconomics of open source insignificant and therefore irrelevant

Hypothesis 2: Open Source and the architecture of participation functions like the nanotechnology of Cloud Computing, and therefore crucial to all innovation going forward
Hypothesis 1: OSS insignificant

The argument is that the game is fixed, and that only the players and the tokens change

Cloud platform replaces OS
Cloud apps replace traditional apps
Cloud protocols and modules replace software APIs and libraries

If true, prepare for the Blue Cloud of Death
Hypothesis 2: New game

Q: Who is going to be the next Microsoft?
A: Who cares?!

Open source changes the rules in the cloud:

- Architecture of participation
- + unrestricted replication & innovation
- + operational modularity
= REAL Cloud Computing
Game-theory Game Changers

Old school open source evolved conventionally

- Developers create new features / fix bugs
- Maintainers merge fixes and features
- Zero-like cost of replication makes distribution cheap
- Forks were expensive and frowned upon
- Operating platforms were expensive (one per box)

Meritocracy worked, but overly centralized

- Thin-skinned developers need not apply
New school open source evolves radically
  Distribution still cheap, but git makes forking "free"
  Virtualization means unconstrained platform choice
  Applications become momentary sync points
  Modularity extends beyond software and data

Polyinstantiated meritocracy dramatically improves incentives for user-innovators
  Better for would-be entrepreneurs
  Better for would-be intrapreneurs
Evolutionary Game Theory

Evolutionary game theory (EGT) studies behavior of *populations* of agents repeatedly engaging in strategic interactions. Behavior changes in populations are driven either by natural selection via differences in birth and death rates, or by the application of myopic decision rules by individual agents.

git & cloud computing shift economic analysis of OSS to EGT
Population Dynamics of the Cloud

Applications are composed of, and represent, populations

Studying economics of Cloud Computing without understanding its underlying software development model is like studying the evolution of a species without understanding anything about its DNA.
Cloud Winners & Losers

Up to the starting line...

financial capital (& willingness to invest)
knowledge capital (& willingness to educate)
user-innovator population
internet quality / capacity
enabled business value
trust capital
Thoughts from Kerala

Environmental Contingencies, Organizational Transformation and their Impact on Failure (Inman 1995)

How can travel industry change to protect the resources that are its lifeblood for the future? Is eco-tourism possible, or a myth?
Thoughts from Kerala

Environmental Contingencies, Organizational Transformation and their Impact on Failure (Inman 1995)

See the change
Write the change
Do the change
Be the change