Exonovation:
Leveraging The Innovation of Others

Michael Tiemann
Vice President, Open Source Affairs
The State of ICT and Software, 2007

- $1T USD global IT spend
  - $500B USD SW+HW, $500B USD Services
  - $386B USD IT spend is wasted:
    - 18% of all IT projects abandoned before production
    - 55% of all IT projects “challenged” (late, broken, or both)

- More than 90% of leading IT vendors fail to achieve “good” rating for value from at least 80% of their top customers
  - Measured 3 years in a row

- Proprietary software model destroys 85% of the global innovation potential

- Average proprietary software has defect density 50x-150x higher than OSS
  - Measured 3 years in a row

- Conclusion: proprietary software is not sustainable

Embracing Change—Forever and Everywhere

- Zero-sum business hypothesis
  - Fixed resources
  - Equilibrium
  - Limited strategic options
  - Focus on core business
  - Self-fulfilling prophesy
    - Corp profits down
    - Tenure on S&P500 shorter
    - Firm working harder to create less value

- Positive-sum business hypothesis
  - Scalable resources
    - Compounding
    - Accelerating
  - Dynamic resource growth
    - Moore's Law (2x / 18 months)
    - Fiber Law (2x / 9 months)
    - Disk Law (2x / 12 months)
  - New strategic options
    - Competition ➔ Complementary
    - Dynamic specialization
    - Connectivity
    - Leveraged Capability
Evidence that the 21st Century is different

- Changes to non-financial S&P 500:
  - Corp profit 18% of US GDP (1950) dropped to 6% (2000)
  - Average corp tenure 75 years (late 1930s) dropped to 15 years (2000)

- Interaction costs between companies have become absurd
  - 70% of non-labor value-add in US and EU
  - 40% of non-labor value-add in India

- Fundamental misunderstanding of outsourcing
  - Best companies do it because it's better, not only because it's cheaper

- Companies like Li & Fung show a path to the future
  - $1M revenue/employee
  - 30%-50% ROE
  - $5B/year revenues and growing
Industrial v. Sustainable

- **Agriculture**
  - fertilizer v. soil
  - genes v. seeds
  - nutrition v. food
  - shelf-life v. season
  - transportation v. community
  - diet v. culture

- **Education**
  - analogy v. science
  - passive v. experiential
  - tests v. knowledge
  - degree v. life-long learning

**Common theme: Externalities define reality**
First they ignore you
Then they laugh at you
Then they fight you
Then you win
— Mohandas Gandhi
Free Software

Free as in Speech, not free as in beer...

- The freedom to run software for any legal purpose
- The freedom to study and adapt source code for personal use
- The freedom to share software with friends
- The freedom to improve and distribute software to the public

— Richard Stallman, founder, Project GNU
World Wide Web

The decision to make the Web an open system was necessary for it to be universal.

You can't propose that something be a universal space and at the same time keep control of it.

— Tim Berners-Lee, Creator of the World Wide Web

See http://www.w3.org/People/Berners-Lee/FAQ.html#What2
Open Source Software

Better licenses make better software

- 10 requirements of the OSD (http://opensource.org/docs/osd)
- 60+ approved licenses (http://opensource.org/licenses/alphabetical)
- 100,000+ projects (http://sourceforge.net)
- 2M+ user-developers (http://flossimpact.eu)
- $1.8B combined revenues, accelerating growth to $5.6B by 2011 (http://www.idc.com/getdoc.jsp?containerId=prUS20711507)
- Runs computers ranging from smartphones to Google-scale supercomputers

“Now that we can do anything, what should we do?” — Bruce Mau, Massive Change
Necessity is the mother of invention...

When failure is not an option...

[On July 20, 2006] the Bill & Melinda Gates Foundation announced that it would require that any researcher who accepts its grant monies for HIV/AIDS research will have to agree to share their scientific findings. The Gates Foundation was apparently frustrated that two decades of secrecy and competition among AIDS researchers have impeded efforts to come up with an AIDS vaccine. [34]

From Software Industry vs. Software Society
The Long Tail of Open Source

- OSS achieved first article sooner...
  - With fewer bugs...
  - That were fixed sooner...
- The trend continues...
  - Xen Virtualization
  - SE Linux
  - GRASS/R/PostgreSQL
  - MySQL
  - JBoss ecosystem
  - Eclipse
  - Blender, Inkscape, GIMP, Audacity, etc.

M100 Galactic Nucleus

Hubble Space Telescope
Wide Field Planetary Camera 2
Protection v. Innovation

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<th>Developer 1</th>
<th>Don't Work</th>
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<td>Work on B</td>
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- Game theory predicts: more modules and more option value leads to more developers

http://www.people.hbs.edu/cbaldwin/DR2/BaldwinArchPartAll.pdf

\[ v: \text{value to developer} \]
\[ c: \text{cost to developer} \]
## Upton's Path-based Model

<table>
<thead>
<tr>
<th>Category</th>
<th>Installation Based</th>
<th>Path Based</th>
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<tr>
<td>Role of IT</td>
<td>Supportive/Peripheral to Operation</td>
<td>Integral part of Operation</td>
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<tr>
<td>Project Size and Number</td>
<td>Large, few, infrequent</td>
<td>Small, many, frequent</td>
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<tr>
<td>Development Approach</td>
<td>Build, then install</td>
<td>Prototype and evolve</td>
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<tr>
<td>Delivery of Value</td>
<td>When a project is complete</td>
<td>On-going</td>
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<tr>
<td>Source of Technology/Software</td>
<td>Heavy use of proprietary interconnection code, proprietary standards</td>
<td>Standards in common use</td>
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<tr>
<td>Primary Funct'l Concerns</td>
<td>Control, efficiency, accommodating all requirements at once</td>
<td>Integration, interconnection, flexibility, progressive delivery of req's</td>
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<tr>
<td>Locus of Technical Control</td>
<td>Vendor/IT group</td>
<td>Operation itself</td>
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<tr>
<td>Experimentation</td>
<td>Limited</td>
<td>Frequent opportunities</td>
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See [http://www.people.hbs.edu/dupton/papers/pathbased-it/PATH.PDF](http://www.people.hbs.edu/dupton/papers/pathbased-it/PATH.PDF)

Revised May 27, 1997
Quantifying the Value of IT Architecture

- Time to market
- Range of new applications
- Effective benefit of new technologies
- Risk and Risk Mitigation

75% HW Cost Savings
60% SW Cost Savings
90% HW Maint Savings
Risk Mitigation of $2M Migration Project

Cumulative Savings ($40M annual spend)

http://www.redhat.com/advice/best_practice_arch.html
Chicago Mercantile Exchange

**2003** (Unix)
- 1800ms latency (vs. 250ms)
- 1M contracts/day (vs. 1B shares traded on NYSE)
- Relative cost of IT orders of magnitude higher

**2005** (Linux)
- Pricing latency to less than 150ms
- Overall IT costs down by 50%
- Trades to more than 2.2M/day
- Revenues grow according to contracts sold...

![Graph](http://finance.yahoo.com)
Creating Intellectual Capital

- Educating the minds of tomorrow...
  - One Laptop Per Child—the experience of discovery
  - Adoption of science-based education
    - See—Do—Teach integrated at all age levels
    - Every child becomes a leader through practice and teaching
The giant 400-pound Resonant pendulum can only be given tiny tugs with weakly attached magnets and strings. A big swing can result if the tugs are timed with the swing of the pendulum.
## Proof:

### ENTERPRISE SOFTWARE 2006 CIO INSIGHT RESEARCH STUDY

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See [http://www.redhat.com/promo/vendor/](http://www.redhat.com/promo/vendor/)