# TRANSFORMATION, THE OPEN SOURCE WAY

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# TRANSFORMATION, THE OPEN SOURCE WAY

- “We can't solve problems by using the same kind of thinking we used when we created them.” – A. Einstein
- We have quite some problems in IT:
  - $3.4T USD global ICT spending
  - 18% of all IT projects abandoned before production
  - 55% “challenged” (late, lacking, broken, all three)
  - $1T USD is wasted due to “bad software”
- Open Source is a new approach that can radically improve both IT and the businesses that use it
- Open Source adoption requires TRANSFORMATION

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# TRANSFORMATION, THE OPEN SOURCE WAY

- My Background
  - Developed world's first native-code C++ compiler (previously dismissed as impossible and impractical)
  - Founded world's first open source software company (previously dismissed as impossible and impractical)
  - Joined Red Hat as CTO in January 2000
  - Shifted to VP Open Source Affairs in 2004
  - President of Open Source Initiative since 2005
  - Studying, and teaching, open source strategy, technology and policy for private and public sector

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- On the surface, IT-based systems should be exponentially improving
  - Moore's Law
  - Disk Law
  - Fiber Law
- Yet there is no Moore's Law for software
  - software [] becomes more complicated, sometimes more expensive and less reliable, and almost always more difficult to configure and maintain
- Cost of IT is growing 2x-3x faster than GDP
  - IT now a problem itself, not a solution to other problems

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A Predicted Solution—Deming's 14 Principles:

Create constancy of purpose

Adopt new philosophy/change

Build quality in the first place

Build relationships around loyalty and trust, not price

Improve product and service constantly and forever

Improve people w/training

Replace supervision with leadership

Drive out fear so that everybody can participate

Break down barriers between departments; work as team

Eliminate adversarial relationships

Replace quotas, MBO, etc. with leadership

Restore pride of workmanship by rewarding quality, not numbers

Strongly support programs for self-improvement

Transformation is everybody's job

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- Adaptability is important
  - Darwin's theory of natural selection *not* “survival of the fittest” but “survival of the most adaptable”
  - Adaptability now understood as a strategic capability:

To effectively achieve its missions, the Department of Defense must develop and update its software-based capabilities faster than ever, to anticipate new threats and respond to continuously changing requirements. The use of Open Source Software (OSS) can provide advantages in this regard.

*October 16, 2009 Memo from US DoD CIO*

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- Adaptability is important
  - Core to the design/evolution of the Internet
  - Innovation not possible without it
    - Interoperability
    - Modularity
    - Participation
    - Training/Education
- Greater adaptability means less abandonment
  - It also means better re-use

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- Observed results—Quality
  - Typical proprietary software would has 20-30 defects per 1,000 Source Lines of Code (SLOC)
  - Or 114,000 to 171,000 defects per 5.7 MLOC
  - 2004: Coverity finds 985 defects in Linux kernel
    - 627 defects found in critical parts of the kernel
    - **100% of “serious” defects fixed in 6 months**
  - 2005: Defect density down from 0.17 to 0.16
    - Defect density declined 2.2%
    - Code size increased 4.7%

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- Observed results—Quality
  - 2006: Average of 32 OSS programs is 0.434 per KLOC
    - Perl @ 0.186 defects per KLOC
    - GCC @ 0.202 per KLOC
    - Python @ 0.372 per KLOC
  - No correlation between size and defect density
    - No “black holes” in terms of quality
  - LAMP defect density is currently 0.29 per KLOC
    - PHP worst @ 0.474

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- Observed results—Quality
  - 2008: Average of 250 OSS programs is 0.33 per KLOC
    - PHP was “perfect” with zero detectable defects
    - 10 other projects also “perfect”
  - 2009: Average of 280 OSS programs is 0.25 per KLOC
    - 36 projects now “perfect”
- What *justifies* improving quality by double-digits when the starting point is already more than 20x superior to industry's “good enough”?
- What *enables* such quality improvements?
- What *results* from such quality improvements?

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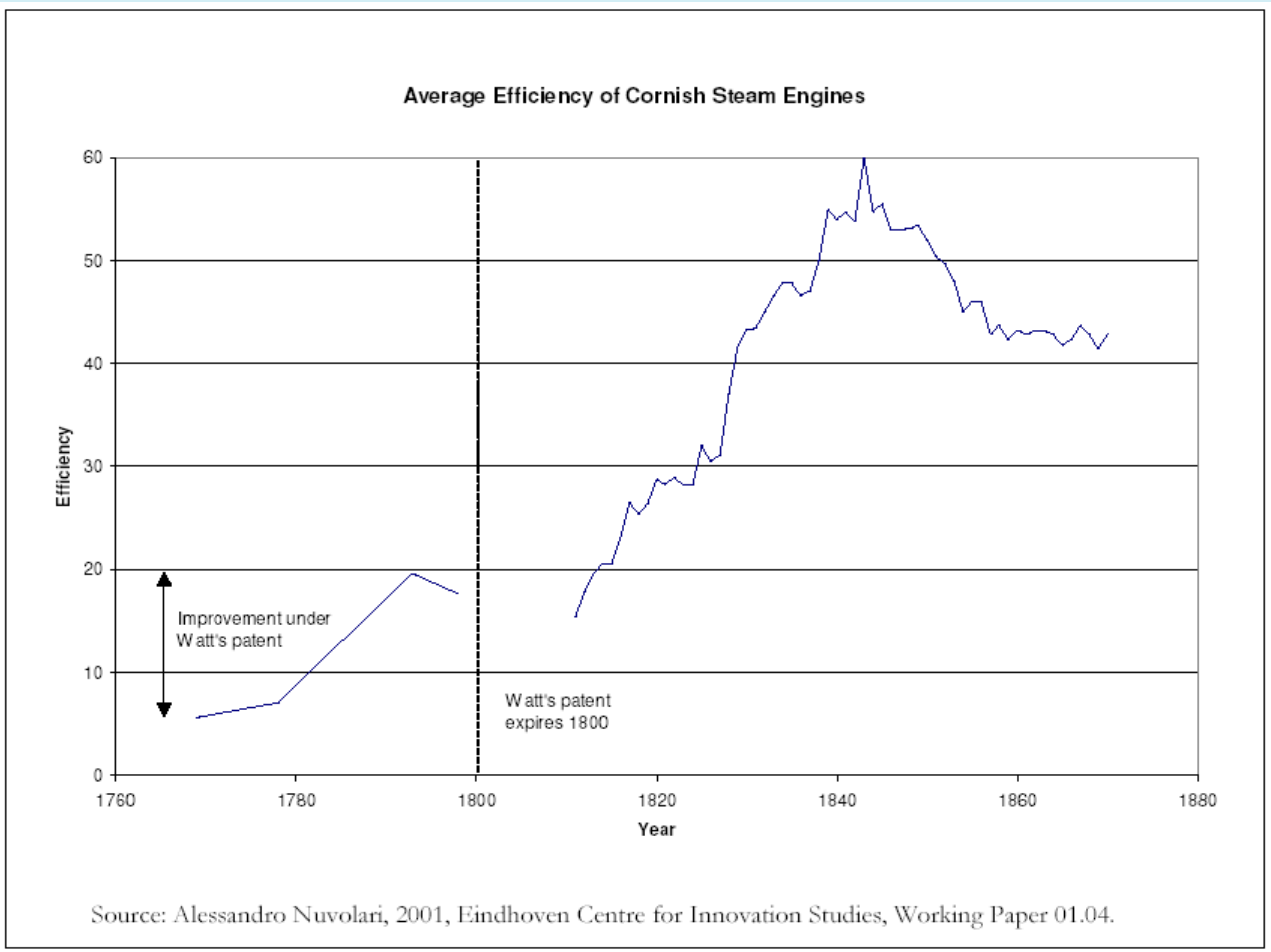
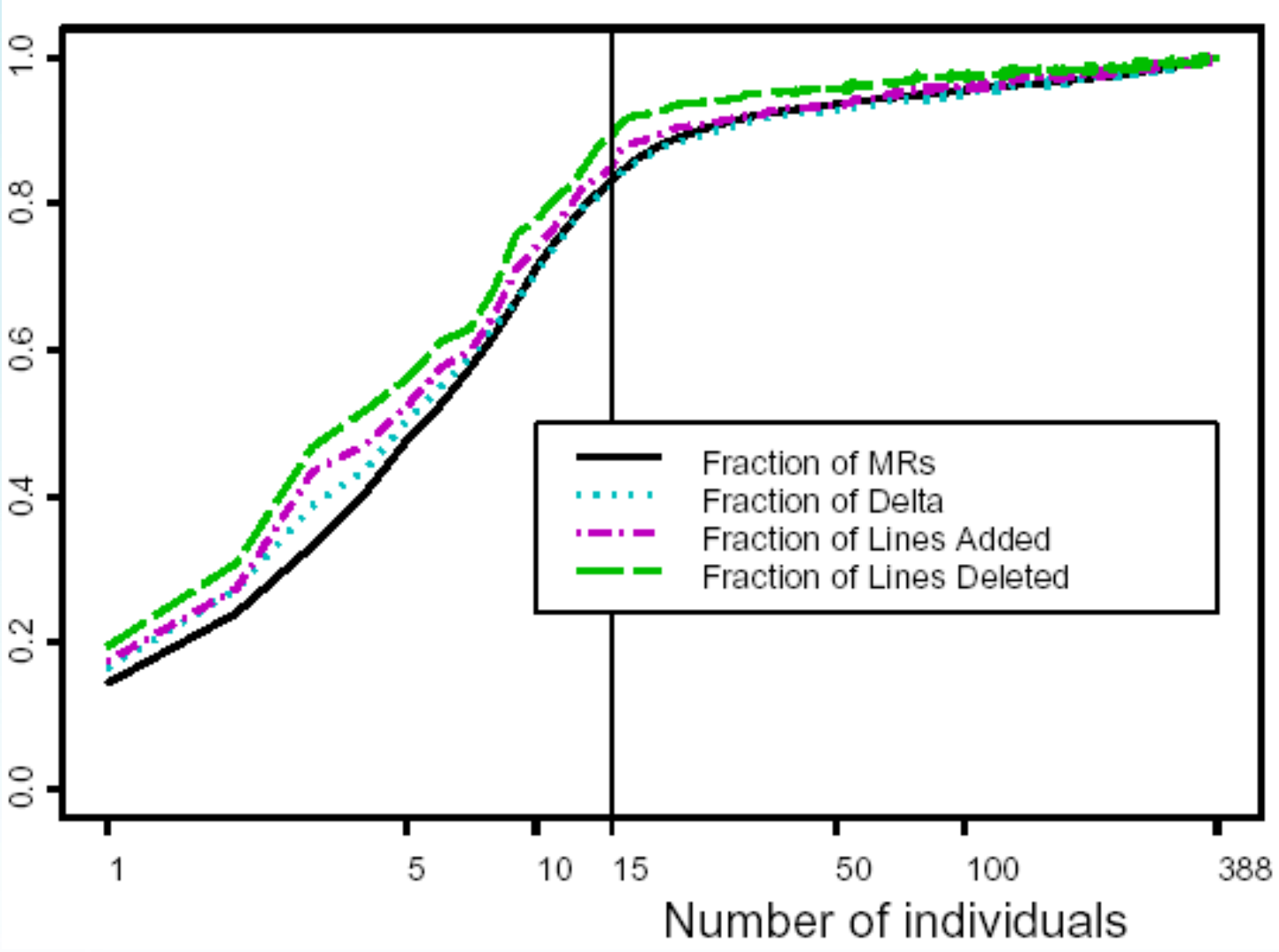
## Improving products and services constantly and forever




Source: Alessandro Nuvolari, 2001, Eindhoven Centre for Innovation Studies, Working Paper 01.04.

# TRANSFORMATION, THE OPEN SOURCE WAY

Improving products and services constantly and forever



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- Open Source is no longer marginal, no longer niche
  - Thomas Friedman declares open source to be “Flattening Force #4” and “the most disruptive of all”
  - Open Source has “flattened” the Top 500 supercomputers—94% run Linux
  - Open Source catalyzed:
    - Web 1.0
    - Creative Commons (estimated 100+ M works)
    - Wikinomics and Crowdsourcing
    - Web 2.0 and Gov 2.0
    - Google's mobile apps and platforms

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- Open Source is trusted:
  - New York Stock Exchange
  - Deutsch Börse
  - Tokyo Stock Exchange
  - London Stock Exchange
  - http://www.whitehouse.gov/
  - US National Institutes of Health (NIH) PubMed Central
  - By 2011, Gartner predicts ≥ 80% of all commercial software solutions will be based on open source
    - Surveys show 49.7% of open source used for mission-critical applications

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- Open Source Security—NSA's SE Linux Project
  - Built on 10 years of NSA's OS security research
  - Application of NSA's Flask security architecture
  - Cleanly separates policy from enforcement using well-defined policy interfaces
  - Allows users to express policies naturally and supports changes
  - Fine-grained controls over kernel services
  - Transparent to applications and users
  - Role-Based Access Control, Type Enforcement
  - *Initially rejected as “impossible”*

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- SE Linux succeeded with “The Open Source Way”
  - 14 initial policies supported in Fedora Core 3
  - 80+ policies supported in Fedora Core 4
  - User-loadable policy management in Fedora Core 5
  - Now thousands of protected apps, services, etc.
- Five years of RHEL4: Zero critical kernel exploits
- Three years of RHEL5: Zero critical kernel exploits
- Cloud computing and virtualization make security *more* important, not less!
- Breaking down barriers helped build better barriers!

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# TRANSFORMATION, THE OPEN SOURCE WAY

- What Makes *IT* Valuable?
  - Helps to *increase revenue*
  - Helps to *decrease costs*
  - *Solves the business problem* paid to solve
  - Delivers a measurable *ROI*
- What makes *Vendors* valuable?
  - Delivers *on time* and *on budget*
  - *Flexible* and *Responsive*
  - Delivers *a quality product*
- *If you had a choice, would you do business again?*

# TRANSFORMATION, THE OPEN SOURCE WAY

- How can Open Source transform your project/company?
  - Drive out proprietary costs—more money for innovation
  - Improve productivity and collaboration with open source best practices
  - Encourage user-driven innovation
    - Make more of the world your R&D lab
    - Make more of the world your customers
- The proprietary software model is simply unsustainable
- Transformation is *everybody's* job

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"Whatever you do will be insignificant. But it is very important that you do it!" – M. Gandhi