

The Economics of Open Source Software - or - “Show Me the Money!!”

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Microsoft takes on the free world

Microsoft claims that free software like Linux, which runs a big chunk of corporate America, violates 235 of its patents. It wants royalties from distributors and users. Users like you, maybe. Fortune's Roger Parloff reports.

By Roger Parloff, Fortune senior editor

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(Fortune Magazine) -- Free software is great, and corporate America loves it. It's often high-quality stuff that can be downloaded free off the Internet and then copied at will. It's versatile - it can be customized to perform almost any large-scale computing task - and it's blessedly crash-resistant.

A broad community of developers, from individuals to large companies like IBM, is constantly working to improve it and introduce new features. No wonder the business world has embraced it so enthusiastically: More than half the companies in the *Fortune* 500 are thought to be using the free operating system Linux in their data centers.

But now there's a shadow hanging over Linux and other free software, and it's being cast by Microsoft ([Charts, Fortune 500](#)). The Redmond behemoth asserts that one reason free software is of such high quality is that it violates more than 200 of Microsoft's patents. And as a mature company facing unfavorable market trends and fearsome competitors like Google ([Charts, Fortune 500](#)), Microsoft is pulling no punches: It wants royalties. If the company gets its way, free software won't be free anymore.

The conflict pits Microsoft and its dogged CEO, Steve Ballmer, against the "free world" - people who believe



PHOTO: EVAN VUCCI/AF

**The patent owner: Microsoft
CEO Steve Ballmer;**

Preface

- Microsoft's executives and lawyers are so worried about Open Source Software that they have made public threats of lawsuits toward their own best customers (remember SCO?)
- There has to be substantial economic activity (or solid potential for substantial economic activity) in Open Source Software, but where?
- Economics: “Show Me the Money!!”

Outline

- Micro-Economics
 - Economics of Scarcity
 - Economics of Free Copying
 - Is using OSS a rational economic decision?
- Macro-Economics
 - The three ages of software development
 - Supply side vs. demand side
- Conclusions

Econ 101

- Ms. K invests $\$C$ in a widget factory. Her fixed costs are $\$F$ per month, her production is P widgets per month, and her variable costs are $\$V$ per widget. What is her break-even price $\$G$ as a function of monthly factory volume? Derive an expression for her monthly profit $\$P$ if she can charge more than the break-even price.
- Mr. L invests $\$D$ in a widget factory in direct competition with Ms. K, etc...

Econ 101

- Ms. K



- Mr. L



Econ 101

- Ms. K
 - Initial capital, $\$C$: \$10,000,000
 - Fixed costs, $\$F$: \$100,000 per month
 - Production, P : 50,000 per month
 - Variable costs, $\$V$: \$1.50 per unit
 - Break-even price, $\$G$: \$5.15 per unit
 - Monthly profit, $\$P$: (actual price - \$5.15) X 50,000
- Mr. L invests \$5,000,000 in a widget factory in direct competition with Ms. K., etc...

Econ 101 Breaks Down

- Ms. K's OSS programming company
 - Initial capital, C : \$0
 - Fixed costs, F : \$100,000 per month
 - Production, P : nobody really knows
 - Variable costs, V : \$0 per unit
 - Price: \$0
 - Break even volume: infinite
 - Monthly profit, P : always a monthly loss

Econ 101 Breaks Down

- Substitute OSS for widgets
 - Every quantity associated with Ms. K, except for her fixed cost (monthly loss), is either zero or infinite
 - *Every* quantity associated with Mr. L is either zero or infinite
 - Conventional widget factory analysis can be thought of as the “*economics of scarcity*”.
 - The widget factory equations are simply the wrong equations for the “*economics of free copying*”

Economics of Scarcity

- Capital-intensive factories are the only significant sources of widgets (>150 years)
 - IP protection is used to attract capital investment
 - Producers: higher volume is usually better
 - Variable costs \gg \$0
 - Transportation costs \gg \$0
 - Supply-side and demand-side are distinct entities
 - Shrink-wrapped software business looks good in this model (low variable and transportation costs)

Economics of Free Copying

- The internet provides free copies of all available digital products
 - Producers have positive fixed costs, zero variable costs, zero price, => negative profit
 - The shrink-wrapped software business doesn't look so great in this environment
 - This environment “*should*” destroy the innovation, productivity, and economic value of software
 - Actually, OSS is a source of innovation, productivity, and rapidly increasing economic value

Shrink-Wrapped OSS

- Shrink-wrapped OSS (one-size-fits-all)
 - Charge for convenience
 - Charge for documentation
 - Charge for support
 - Charge for brand aura
 - Charge for patent-infringement indemnification
 - Loss-leader for customizing/consulting work
- Shrink-wrapped software is highly visible, but a small fraction (~10%) of the software economy

Shrink-Wrapped OSS (Cont.)

- Proprietary software companies
 - Initially dismissed OSS by saying “Free is not a business model”
 - They were nearly correct: almost free is a business model, if your costs are low enough
 - Shrink-wrapped OSS companies can survive because they get software development for free
 - Now realize that the serious threat is the other 90%: platforms and customized software

Attribution

- Rishab Aiyer Ghosh is an economist from the International Institute of Infonomics, UNU-MERIT: a joint research and training center of United Nations University (UNU) and Maastricht University, The Netherlands.
 - Quantifying non-monetary transactions
 - Macro-economic survey of OSS in the EU
 - Cooking-pot analysis (contrast to widget factory)

Cooking Pot Analysis (E of S)

- An angler has a \$20 basket of fish
- A farmer has a \$20 basket of potatoes
- Economics of Scarcity
 - Angler sells \$10 fish and buys \$10 potatoes
 - Farmer sells \$10 potatoes and buys \$10 fish
 - Cash, credit card, direct barter/swap
 - They can even share a common cooking pot
 - Each will have \$20 worth of soup to eat

Cooking Pot Diagram (E of S)



Economic benefit: better soup
(but others can buy for \$20)



\$10



\$10



\$10



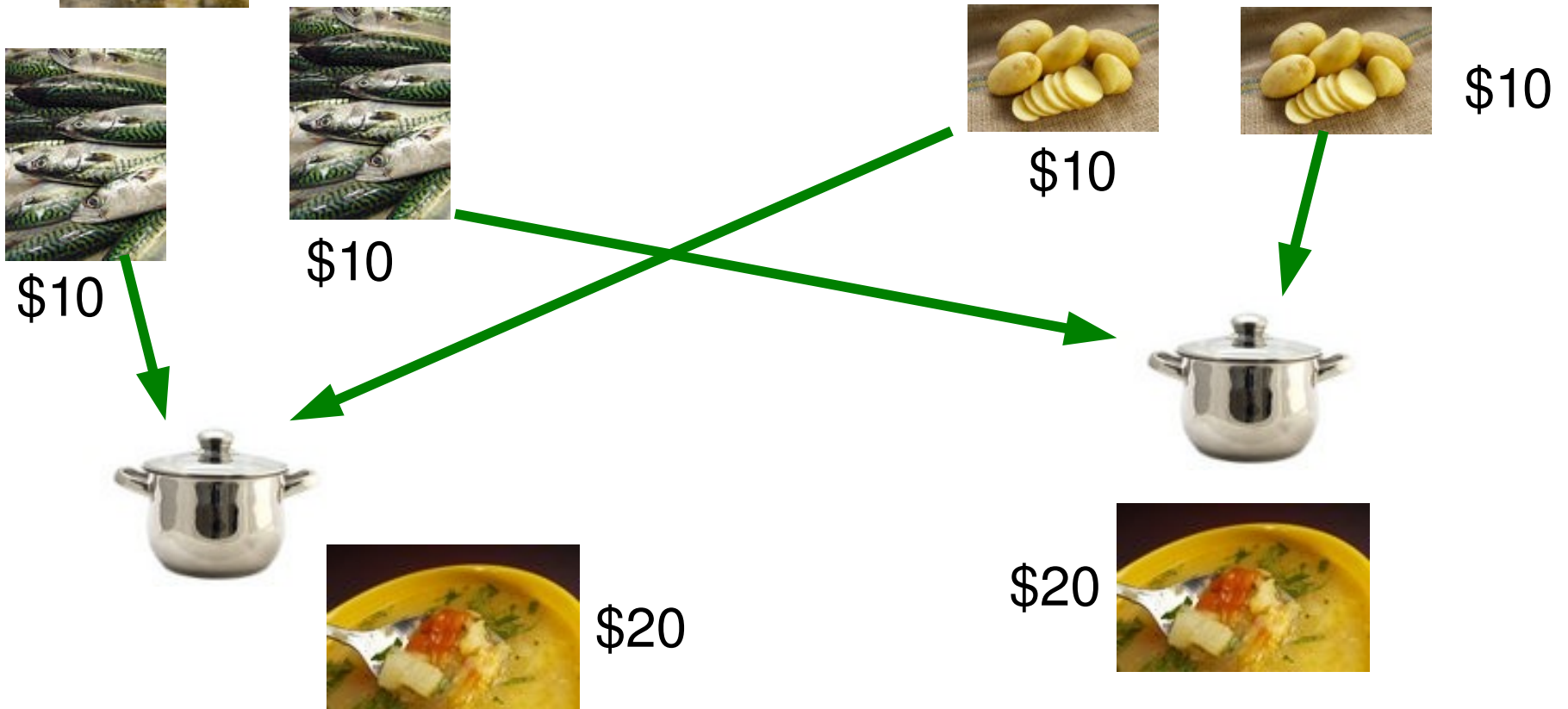
\$10



\$20



\$20



Cooking Pot Analysis (E of FC)

- Economics of Free Copying
 - Fish & potatoes are scarce but soup is free to copy
 - Angler contributes \$20 fish to a common pot
 - Farmer contributes \$20 potatoes to a common pot
 - Each will get an exact copy of the *entire* contents
 - Each will have soup that would have cost \$40
 - More contributors are better
 - What's not to like?

Cooking Pot Diagram (E of FC)



Economic benefit: better soup,
and a quantity that would have
cost them \$40 to purchase
(but others can get for \$0)



\$20



\$20



\$40



\$40

Game Theory Rears Its Ugly Head

- Most people will initially turn down a good deal (\$20 => \$40) if accepting it means that another person will get a better deal (\$0 => \$40)
- Is the good deal a rational economic choice? (the details can be tweaked to make it so)
- If convinced it is a rational economic choice, some can grit their teeth and accept the good deal, others are not willing to do so
- Fortunately, only a few contributors are needed

Why Contribute?

- Contributors have a greater voice in deciding how the soup is made (need less salt, etc...)
- Contributors can get help from the group with prepping, cooking, and tasting their contribution
- Non-Contributors may need to do additional cooking on their own to add custom ingredients, which may not be compatible week-to-week
- These advantages may be well worth the \$20 cost to contribute fish, potatoes, etc.

Leave Money Lying on the Table?

- Shouldn't you strive to obtain revenue from all contributions made by every employee?
 - Lowered cost goes directly to the bottom line
 - Need to choose your business model and execute (even GE wants individual business units to focus)
 - Loss of managerial focus due to distraction by minor revenue streams (historical example well known to many of us)

Why Help The Competition?

- Most business software applications are not critical for competitive differentiation in market
- Many precedents for industry-wide collaboration in selected areas (not customer-visible areas)
- Industry-wide cost reduction benefits the entire industry in other competitive venues
 - to attract capital investment
 - to maintain an innovative workforce
 - for a portion of shrinking consumer budgets

Governments and Non-Profits

- No profits to consider, only costs
- Cooperation is accepted, even expected
- OSS is an obviously good fit in this space
- For governments not in the Seattle metro area, the added benefit of directing software spending through local companies that configure/install/maintain OSS (especially appealing to countries outside of the US)

The First Age of Software

- System software is used as a loss-leader to sell hardware
- Most application software is written by or for customers at high cost
- Incompatibilities between hardware platforms create vendor lock-in
- Some software is freely shared (tapes), but only within user groups tied to specific hardware

The Second Age of Software

- IBM-compatible clones (PC's) create a near-universal hardware platform
- The market volume for PC software enables
 - Shrink-wrapped software at a cost so low that companies are willing to tolerate one-size-fits-all
 - Huge profits for shrink-wrapped software firms
- Most programmers are still employed writing custom applications for customers, but now on a less expensive, one-size-fits-all platform

The Third Age of Software

- Inexpensive shrink-wrapped software gives way to freely downloaded software as OSS matures
- Most programmers are still employed writing custom applications for customers, but now they share most elements via OSS, enabling more effective customization over a more sophisticated platform than the one-size-fits-all platform they utilized in the Second Age
- Use of OSS is a rational economic decision

Third Age Example: Google, Inc.

- Google's market cap ~ \$170B (MSFT ~ \$300B)
- Google employs many programmers writing customized internet search algorithms in-house
- Google platform: Linux, MySQL, Python, etc.
 - Ability to customize an OSS platform is an acknowledged key to their success
 - Linux contribution: Andrew Morton on payroll
 - Python contribution: Guido van Rossum on payroll
 - Financial support for Mozilla/Firefox

Demand Side vs. Supply Side

- “Really powerful things happen when the demand side starts to supply itself” - Doc Searls
- OSS is like lumber / building supplies (Searls)
 - Interchangeable commodity parts (no monopoly)
 - Standard building codes are widely adopted
 - Customization and installation by a diverse and competitive group of companies and contractors
 - Largest builders are not even close to the market dominance of Microsoft, Adobe, Oracle, etc.

Conclusions

- A fundamental structural change is underway in the software industry, new options are available, and software budgets are starting to flow through newly available channels
- Microsoft Inc. was channeled, chopped, ported, and polished to take advantage of the *last* structural change in the software industry
- This is why the people who run Microsoft are threatening to sue their own best customers