

200 years of collaborative ownership: from open source steam engines to Wikipedia and Free Software

Wikimania

Harvard Law School, Boston,

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Collaboration in history



James Watt, Lean's Reporter and the Cornish Pumping Engine

James Watt



James Watt

James Watt's improved steam engine... was the key innovation that brought forth the Industrial Revolution. ... it gave us the modern world. A key feature of it was that it brought the engine out of the remote coal fields into factories where many mechanics, engineers, and even **tinkerers** were exposed to its virtues and limitations. **It was a platform for generations of inventive men to improve.**

--Wikipedia

James Watt

Lobbied for an Act of Parliament to extend his patent's lifetime to *thirty-one years*

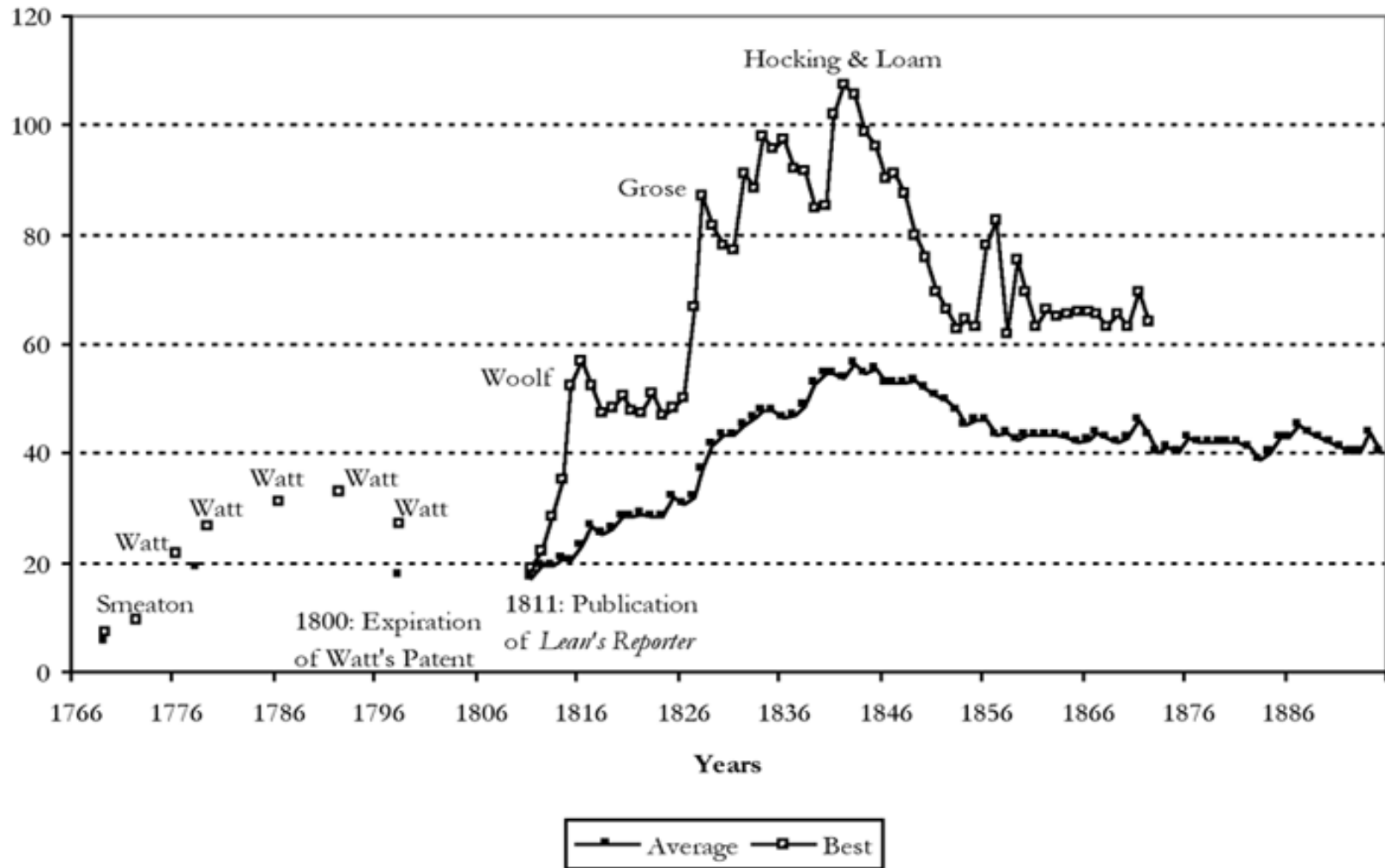
Drove the inventor of a superior engine to bankruptcy (Hornblower)

Blocked innovation in steam engines – and steam engine sales – throughout the life-time of his patent

When his patent ended, Cornwall – one of the biggest markets – boycotted his company, in protest at his former aggressive monopoly... sounds familiar?

James Watt

Nuvolari, A., 2005. "Open source software development: Some historical perspectives". *First Monday*, 10:10



“Duty” or efficiency of steam engines

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1811 *Lean's Reporter*

Monthly journal published by Cornish miners – the main user-developers of steam engines

Published the full specifications of each improved engine, so they could be copied

Improvements, performance skyrocketed

New inventors (Trevithick, Woolf...) avoided patents, releasing specifications publicly

185 years later...

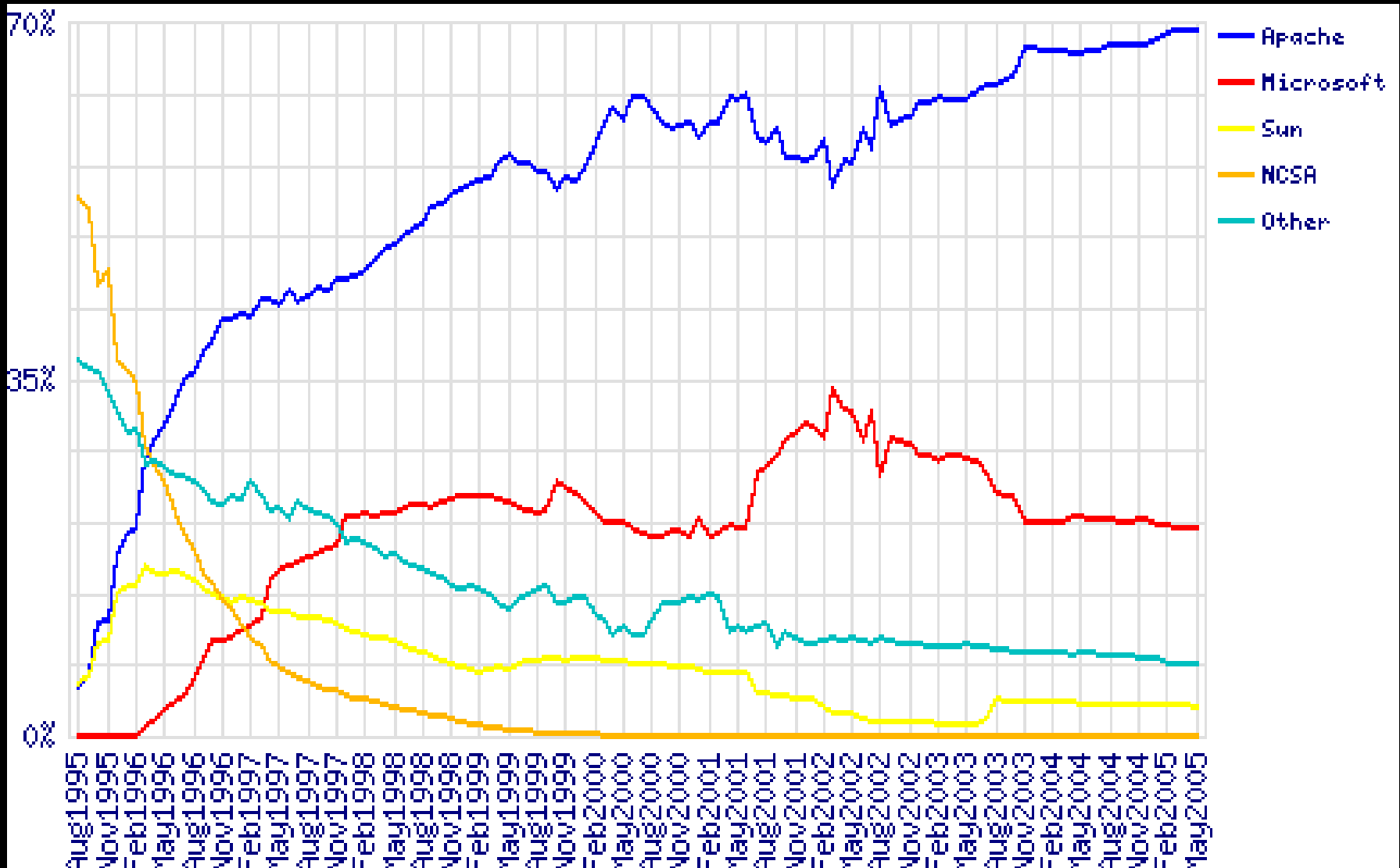
Software published by user-developers of major innovative websites (*Hotwired* etc)

Publish full specifications – source code – of each improved version

Improvements, performance – and market share – skyrockets

Many new inventors avoid patenting (proprietary copyrighting), releasing source code as free software

Web server market share



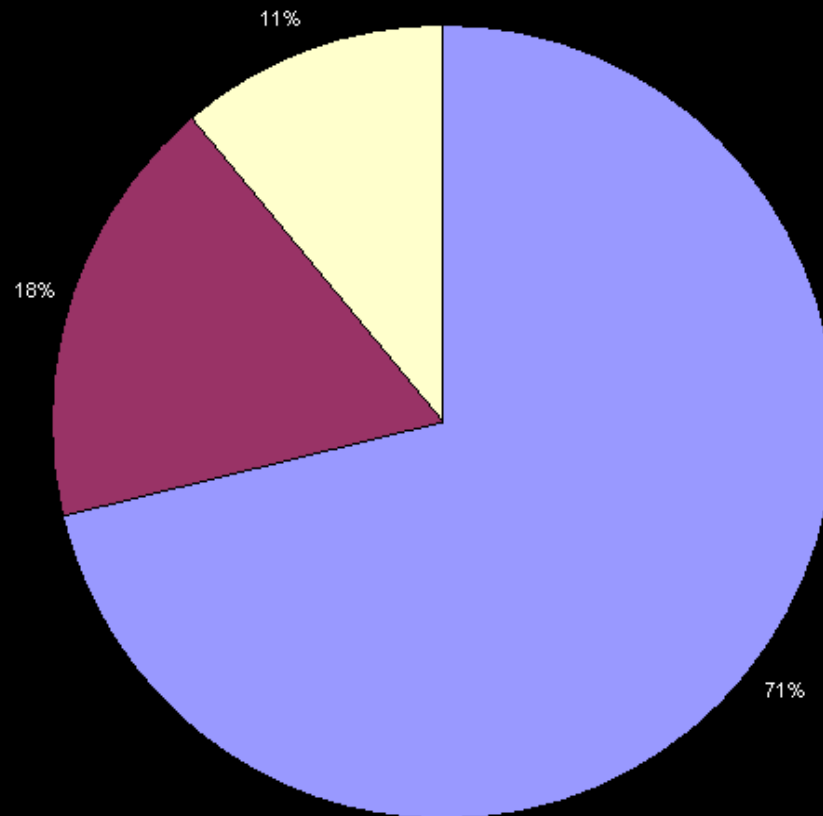
Source: Netcraft Web Server Survey, May 2005 - www.netcraft.com

195 years later...

And IBM, Sun, etc release free software

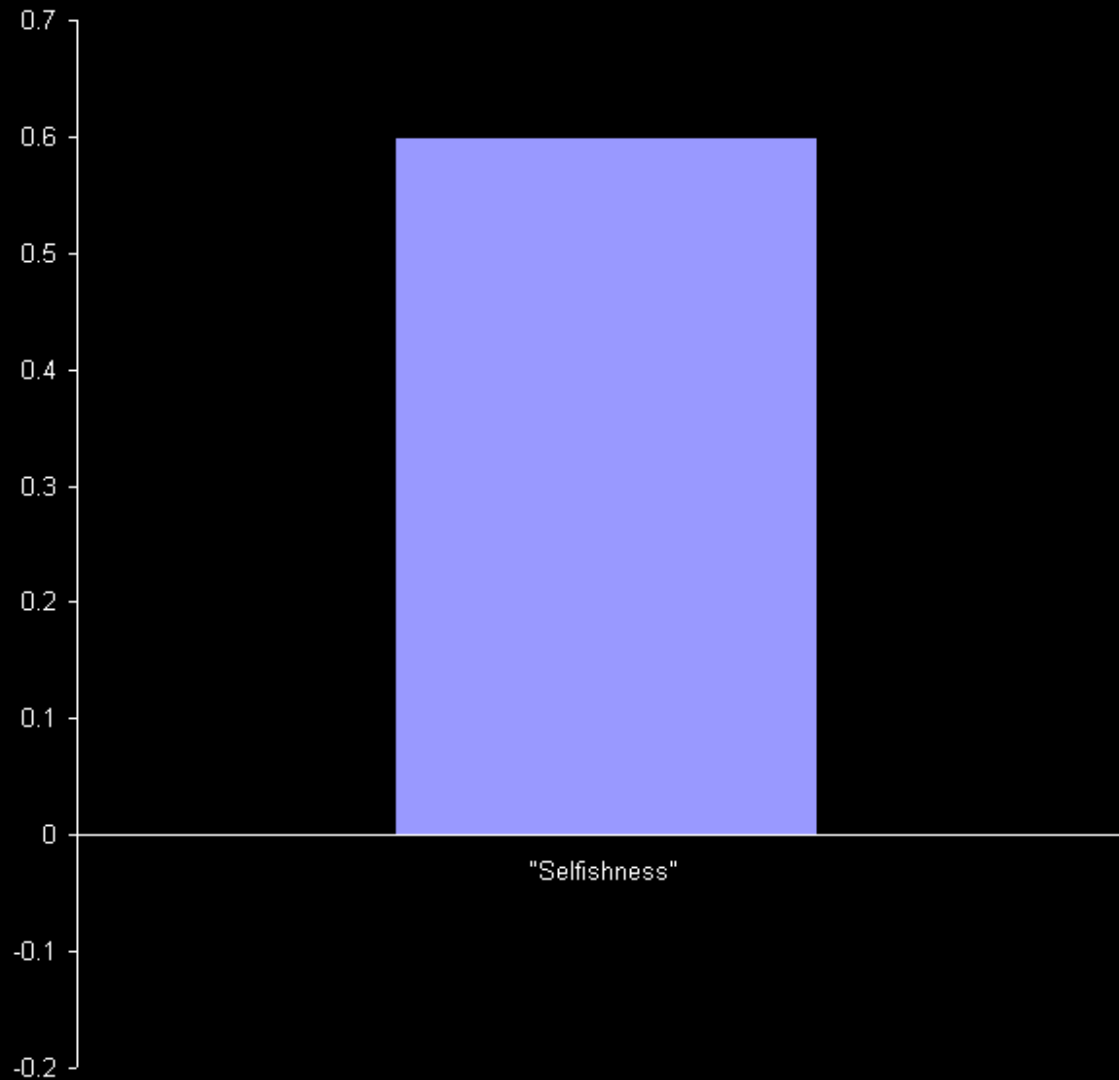
*(Sadly, some never learn,
and monopolistic practices still exist)*

Altruism or self-interest?

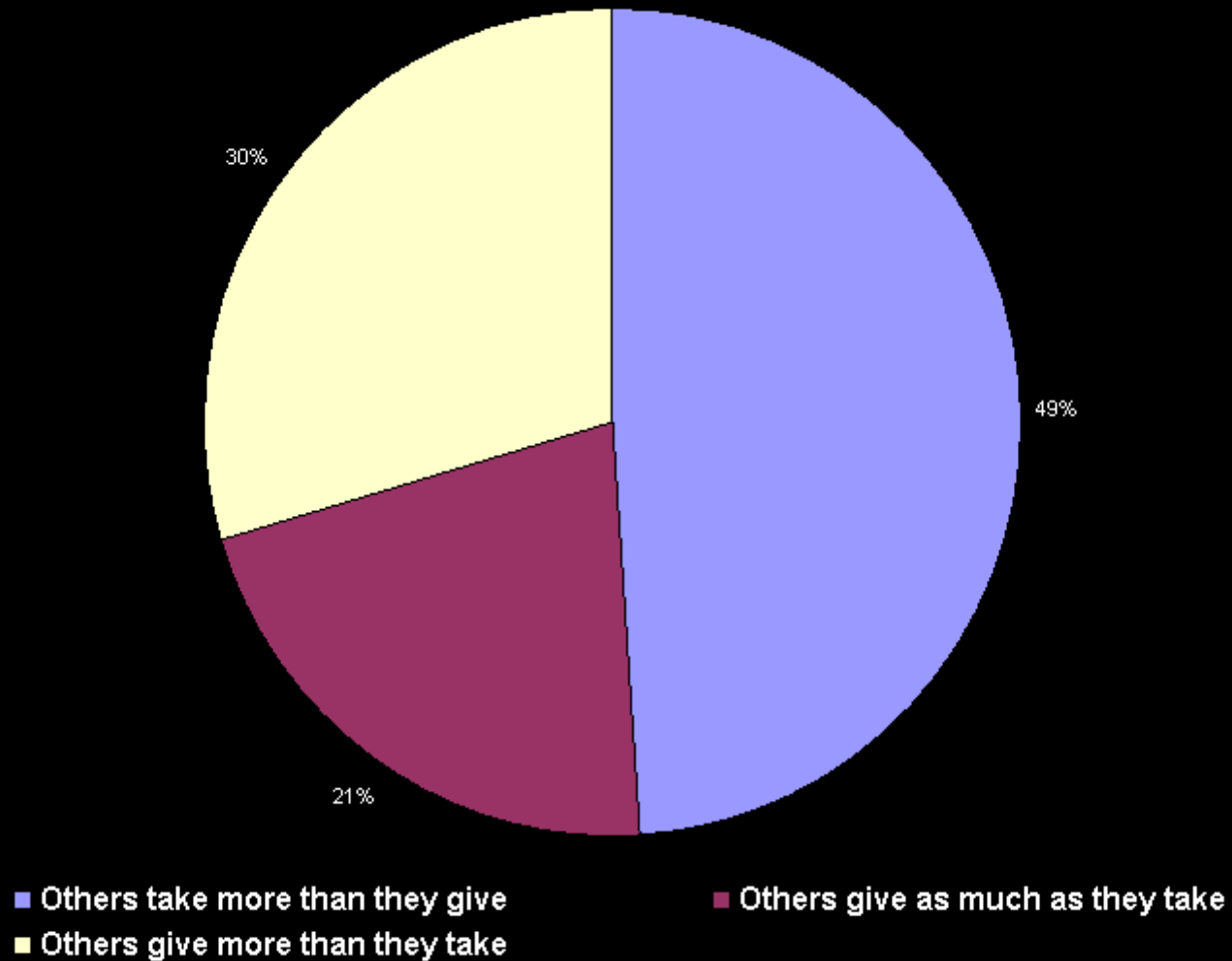


■ I take more than I give ■ I give as much as I take ■ I give more than I take

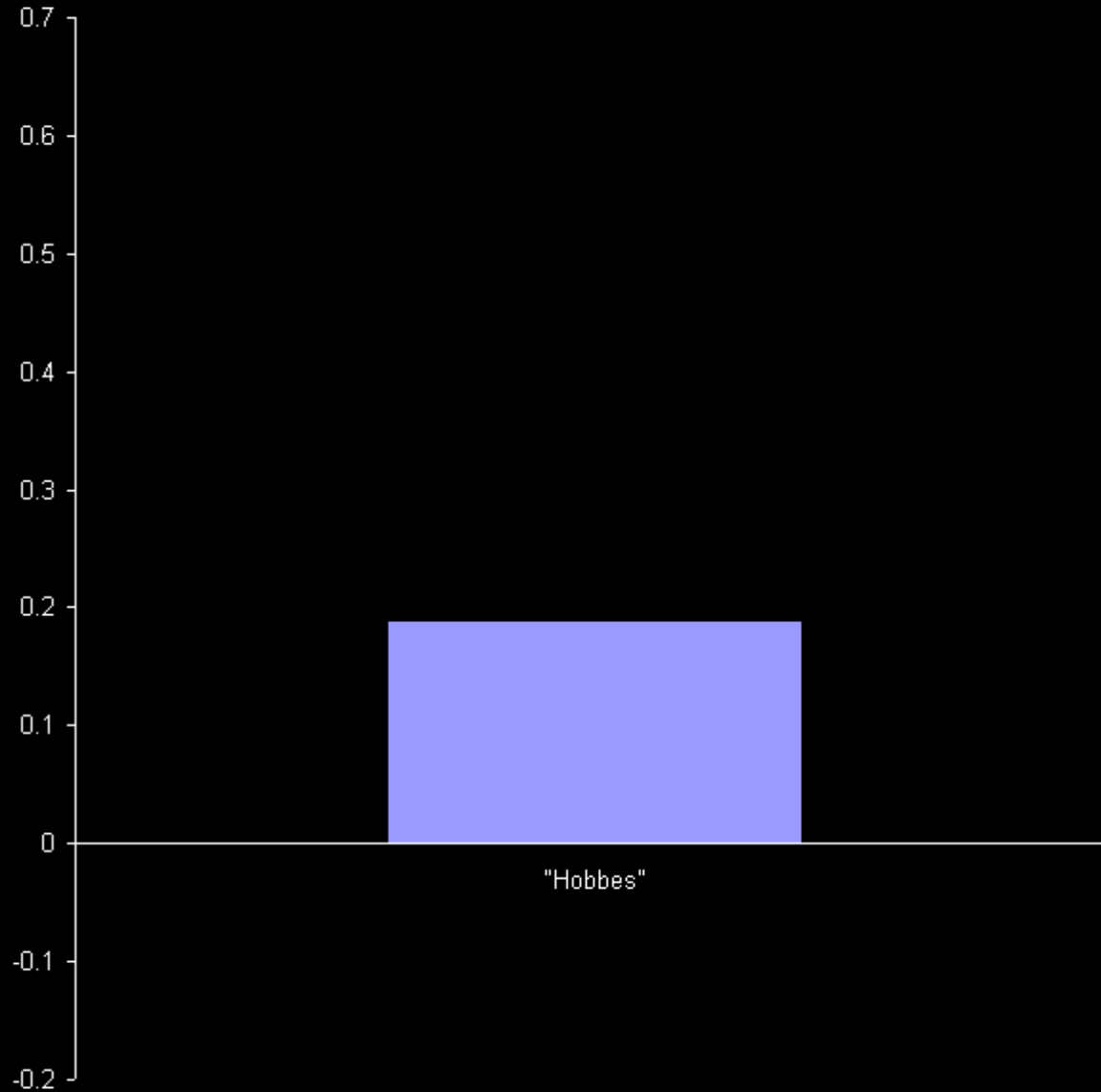
Altruism or self-interest?



A Hobbesian view?

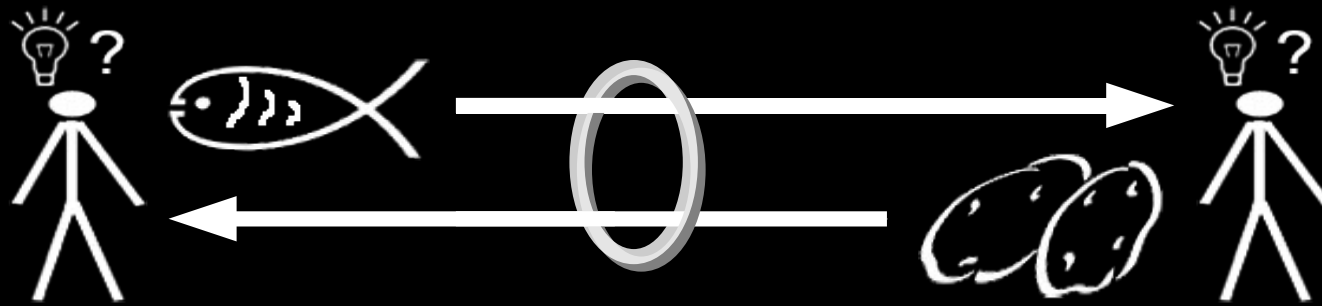


A Hobbesian view?



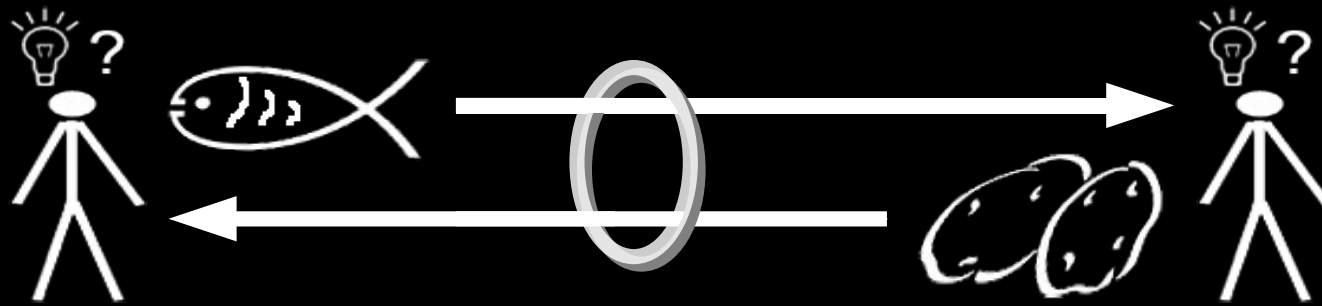
Value-flow and cooking pots

Barter



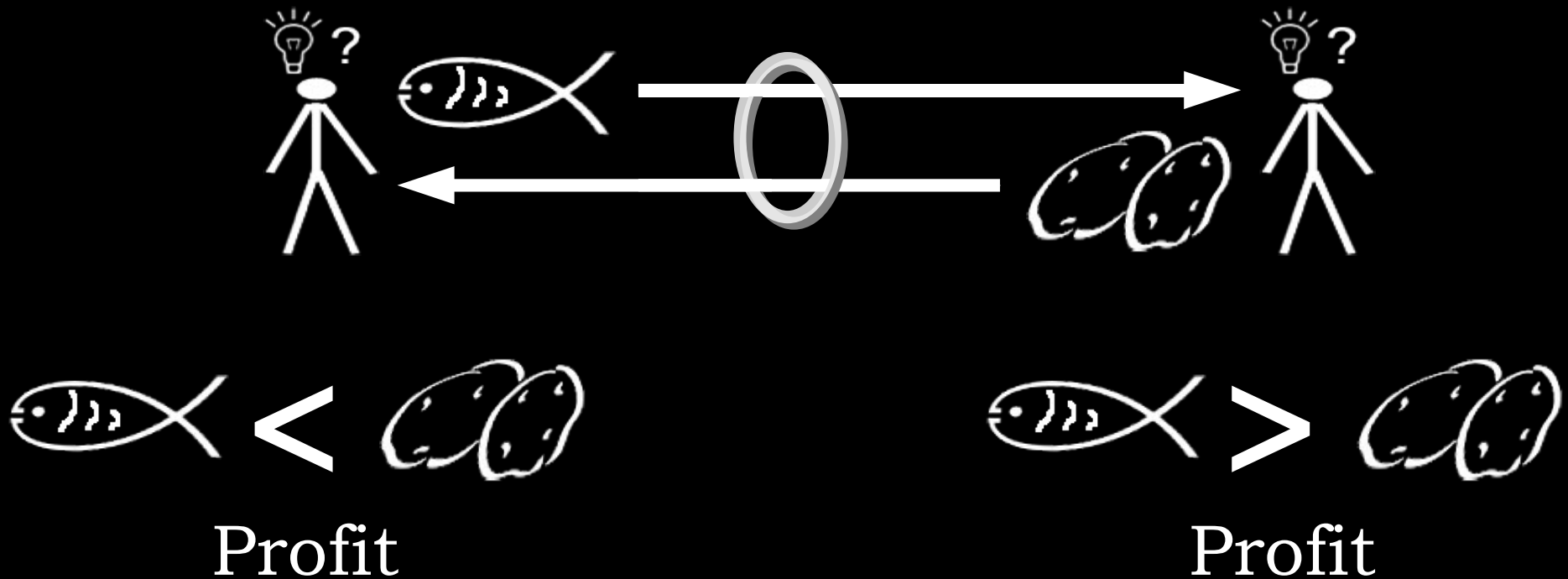
Value-flow and cooking pots

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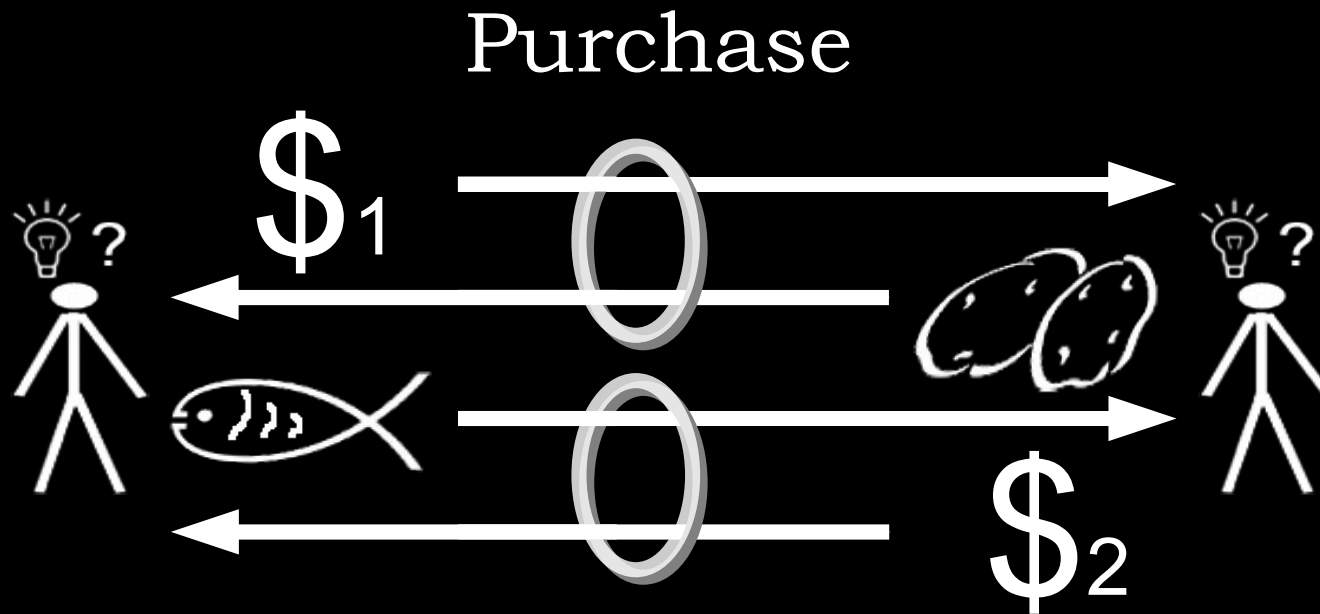


Value-flow and cooking pots

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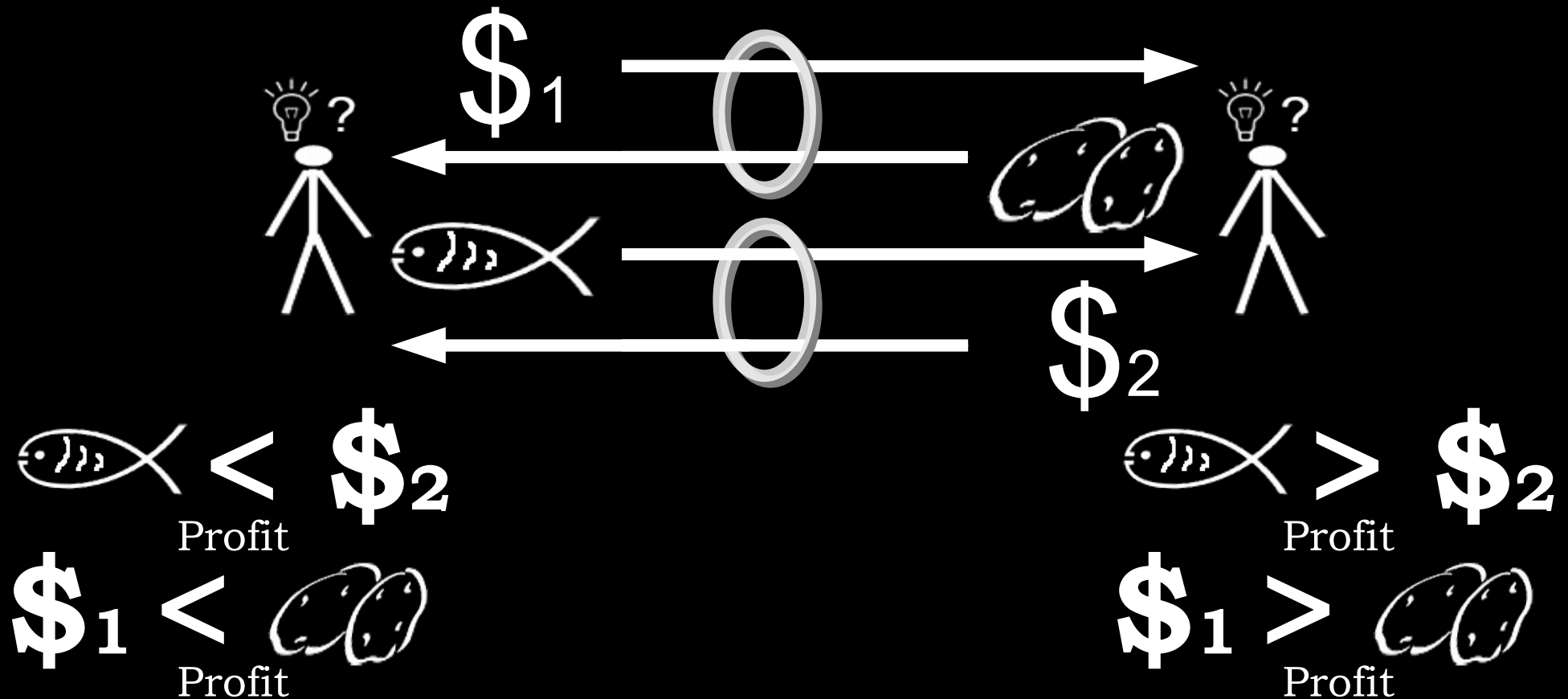


Value-flow and cooking pots



Value-flow and cooking pots

Purchase



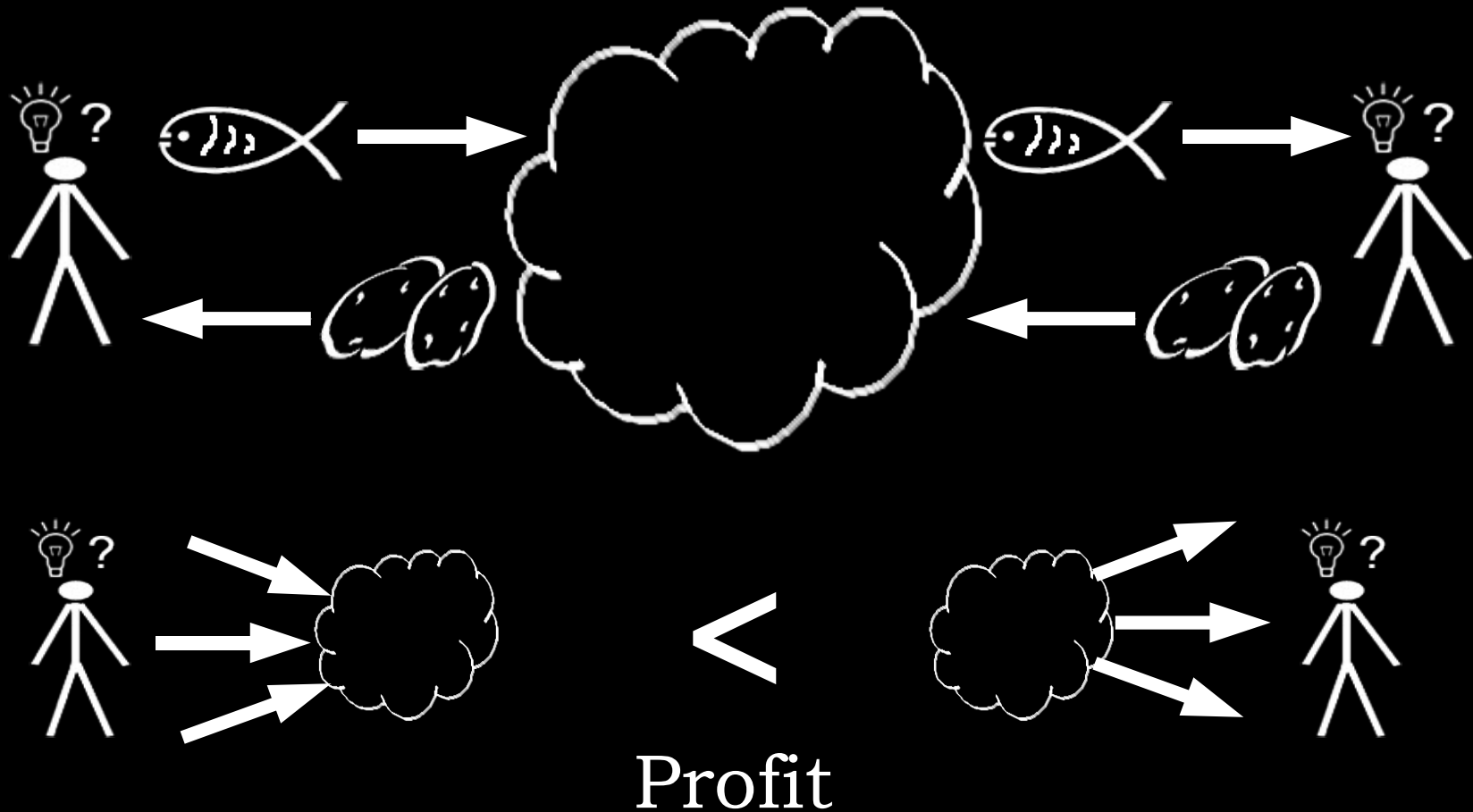
Value-flow and cooking pots

Cooking-pot (easier to draw a cloud)

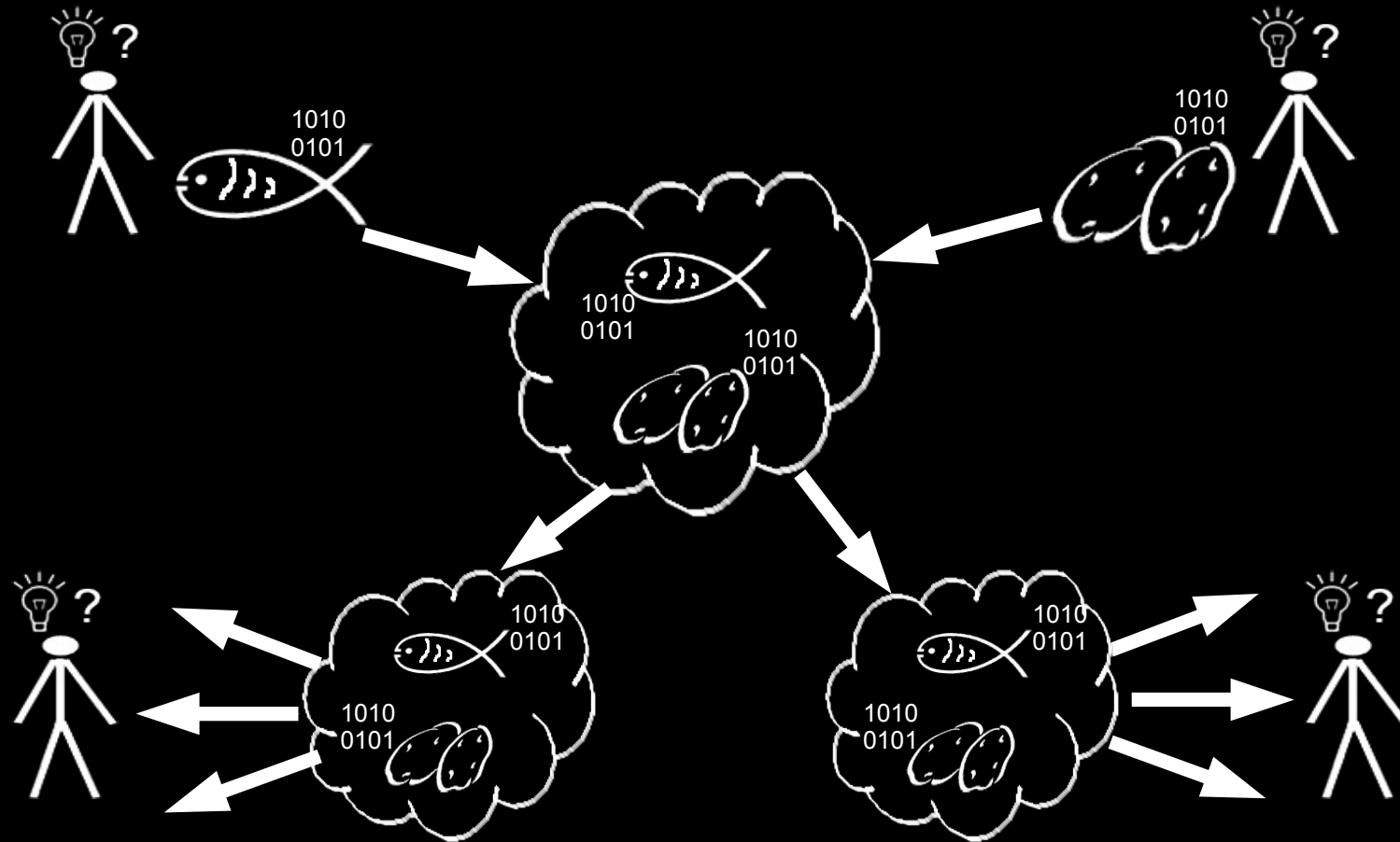


Value-flow and cooking pots

Cooking-pot (easier to draw a cloud)

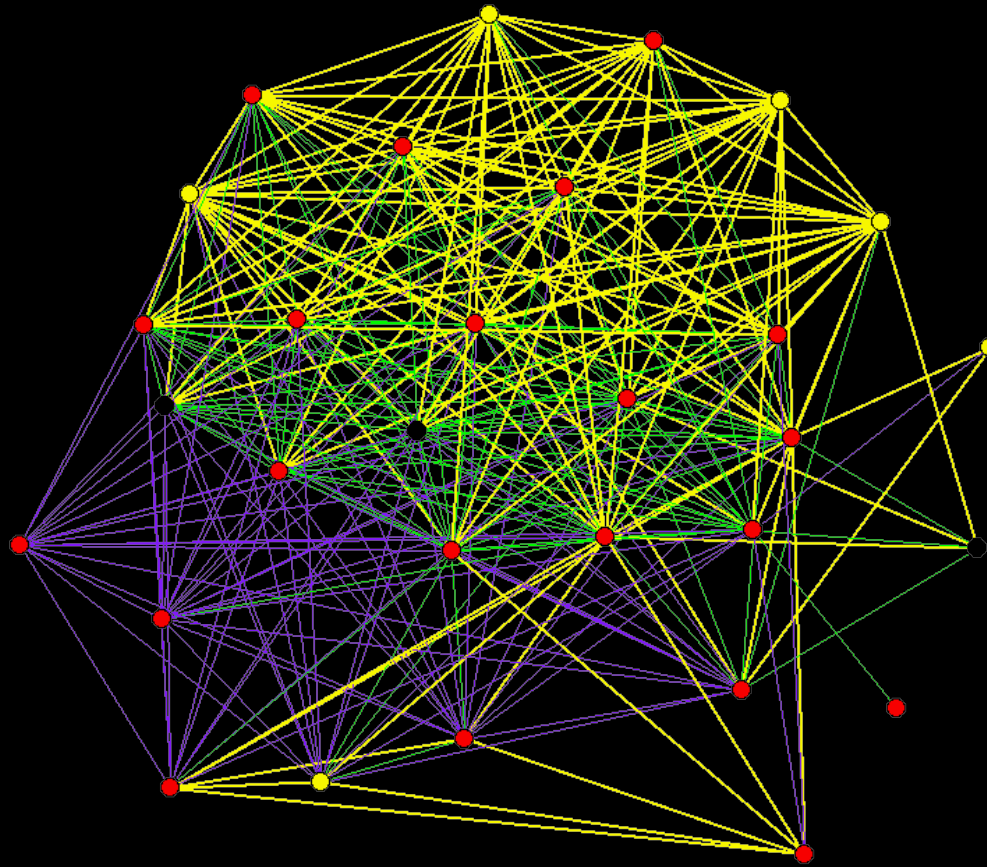


Value-flow and cooking pots



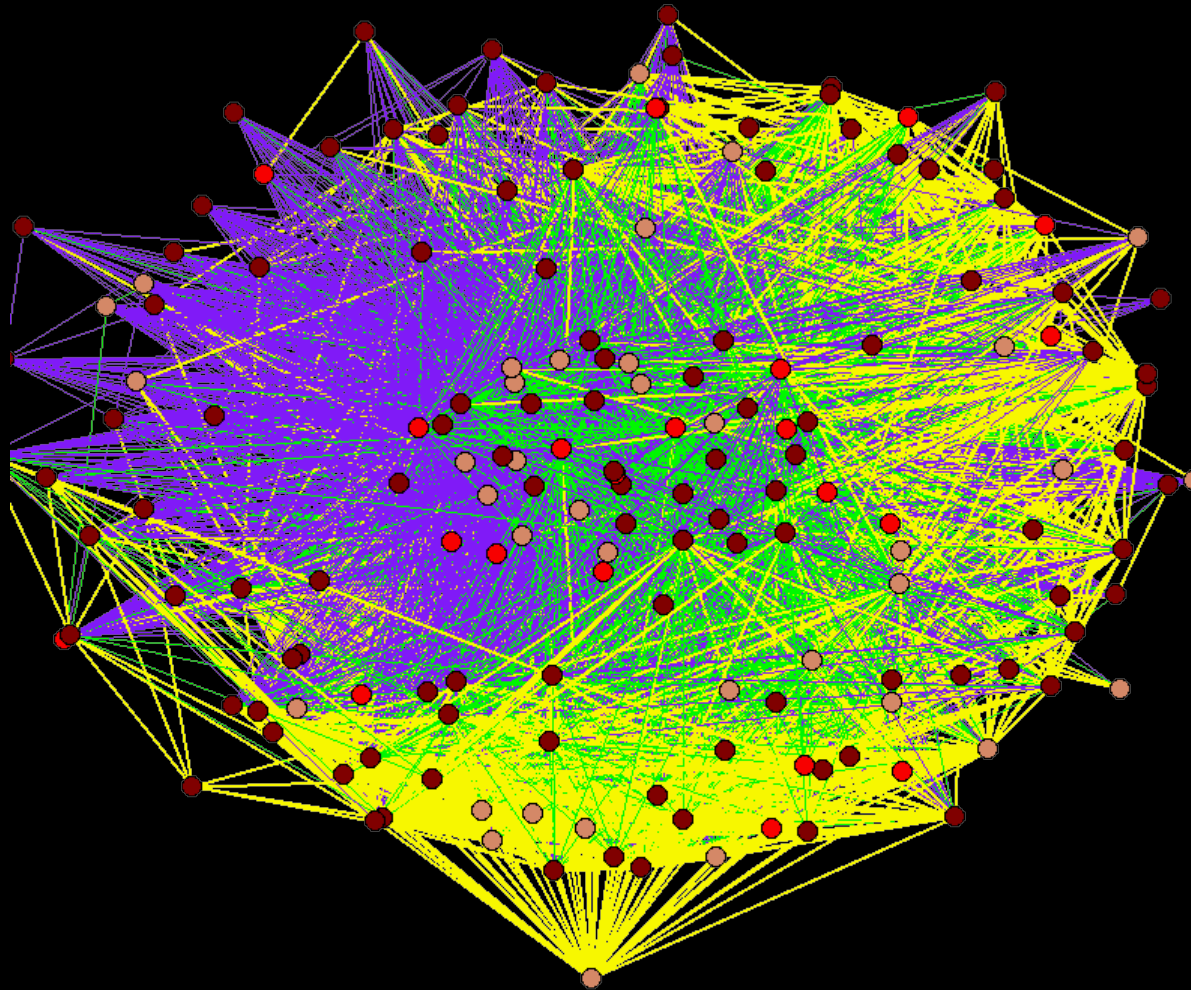
With knowledge goods, everyone gets *a copy of the whole pot*

What a network looks like



Linux kernel v1.0. 1994. 158 authors. Nodes are 30 modules. Arcs represent **common authors**, **code dependencies**, or **both**

What a network looks like



Linux kernel v2.5.25. 2002. 2263 authors. Nodes are 169 modules.
Arcs represent **common authors**, **code dependencies**, or **both**

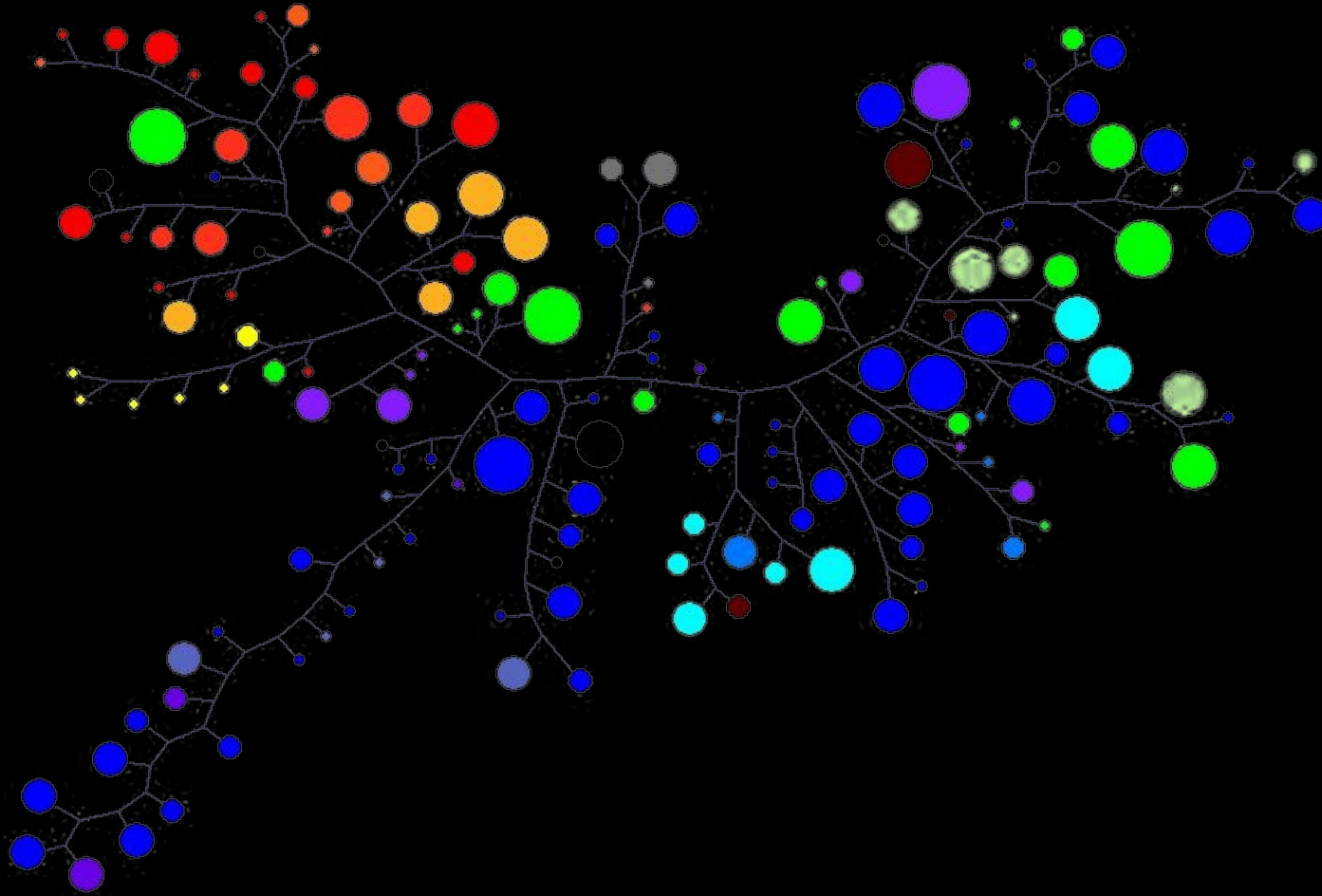
What a network looks like



Locations of Debian GNU/Linux leaders/maintainers

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Yes, there is structure there



Apache web server, 2004. Circles are modules, coloured by type. Cluster tree shows developers' self-organisation into groups.

Value – without prices

Example: Debian 2.2 GNU/Linux (2001)

Source lines of code: 55,201,526 (of which the Linux kernel forms under 6%)

If Debian was written in a software company:

Estimated effort: 14,005 person years

Estimated schedule: 6.04 years (team of 2,318!)

Development cost: US\$ 1,891,990,000

Value – without market prices

Debian 2005:

104 001 person-years

(range: 85 977 to 188 988 person-years)

US\$ 14 billion

Non-Debian (eclipse, netbeans, etc)

3 685 person-years

US\$ 500 million

Innovation through networks

Free/Libre/Open Source Software (FLOSS):
Product innovation:

Scripting languages (Perl, Python...)

Dynamic web servers (Apache)

Application development (Zope, Plone)

Multimedia (VideoLAN)

Clustered computing (Beowulf)

Innovation through networks

Free/Libre/Open Source Software (FLOSS):
Process innovation:

Massively distributed development

User-driven development

Rapid prototyping

Quantifiable improvements

Innovation through networks

Free/Libre/Open Source Software (FLOSS)
provides main competing product in:

Web servers (#1 in market share)

Server operating systems (#2)

Network file systems (#2)

Office productivity software (#2)

Web browsers (#2)

Open source businesses

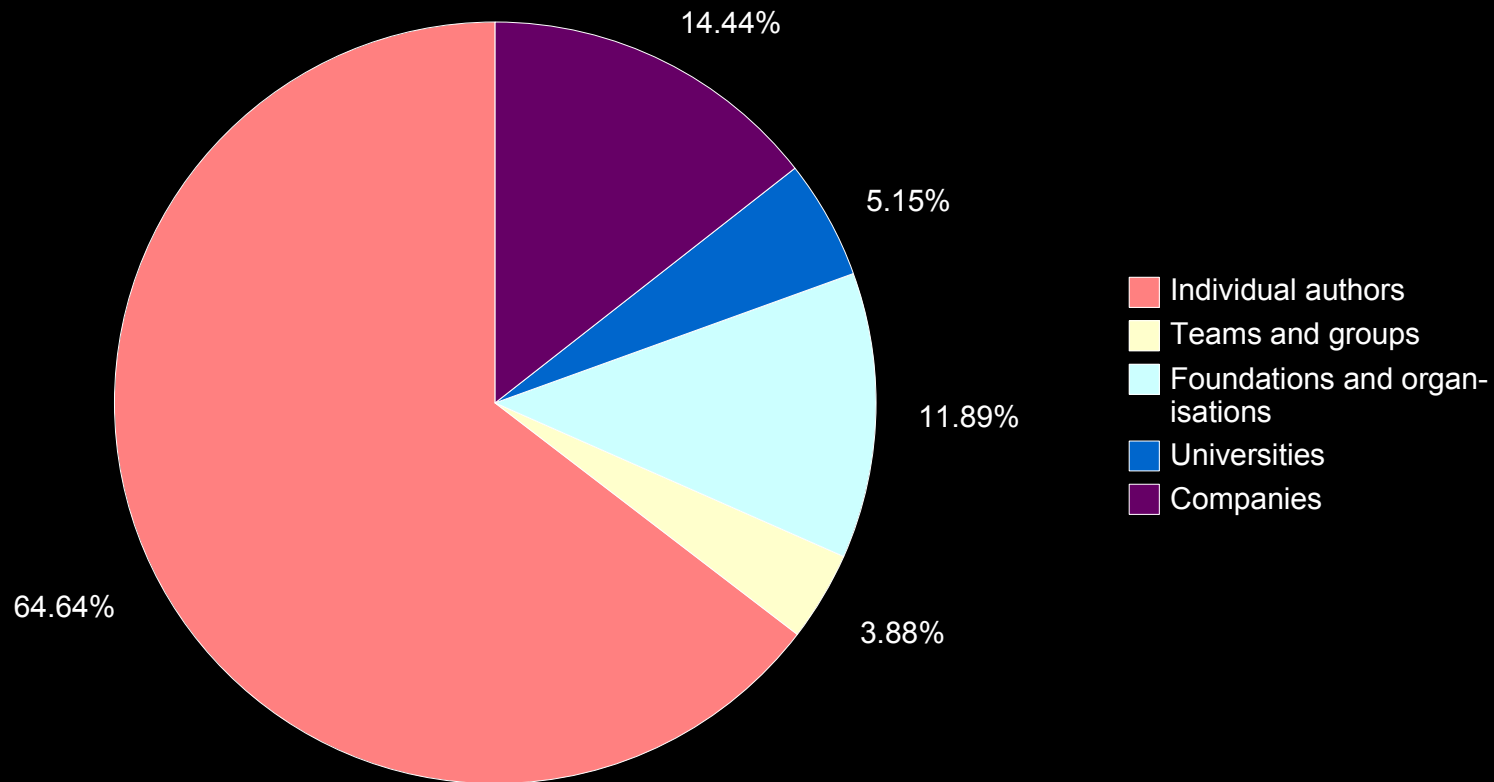
Quality

Business environment

Different strategies

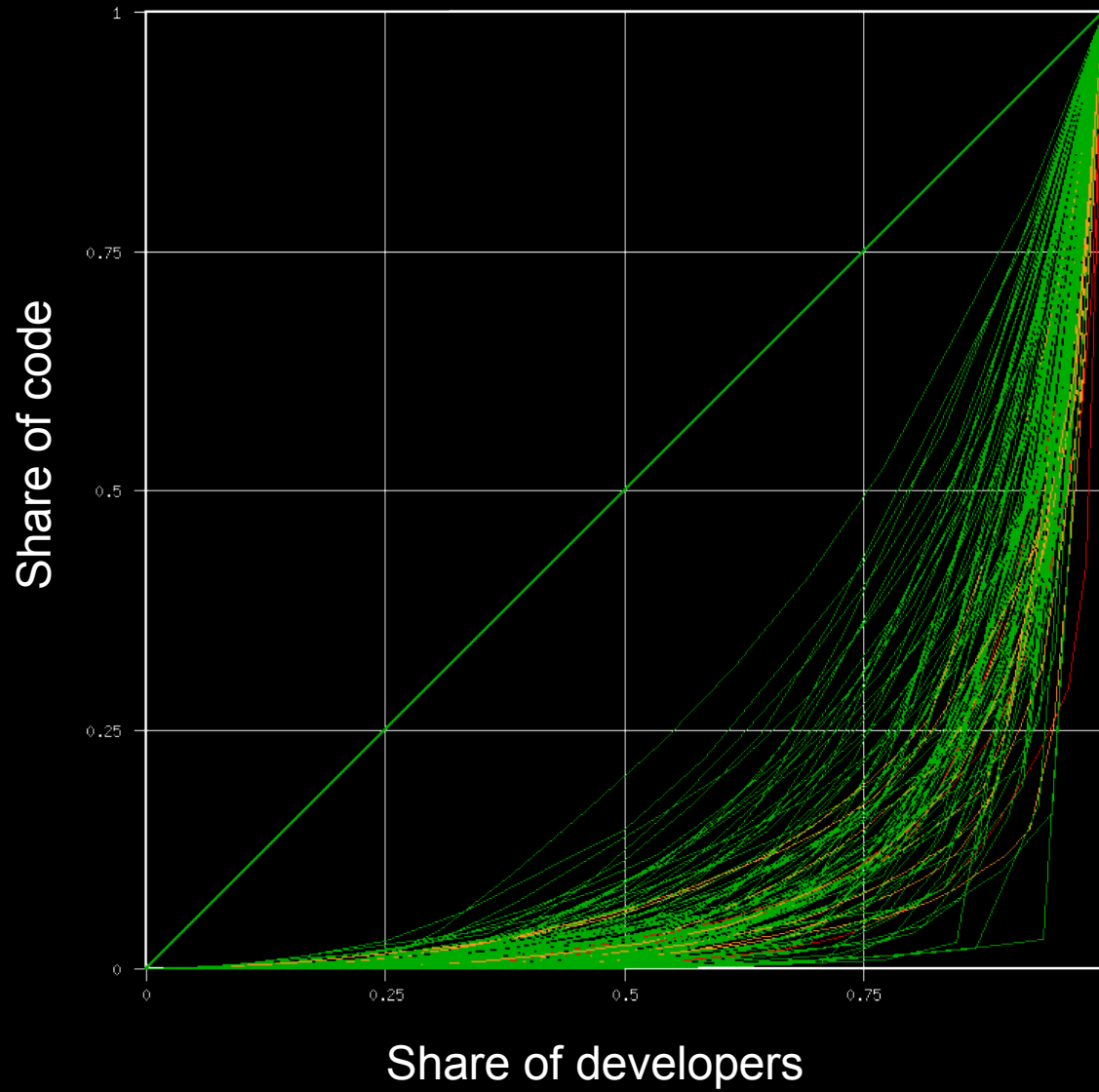
Most large vendors support FLOSS

Still, a network, not firms



FLOSS source code shares by author type

Self-organisation: lead by doing



Leaders are not enough!



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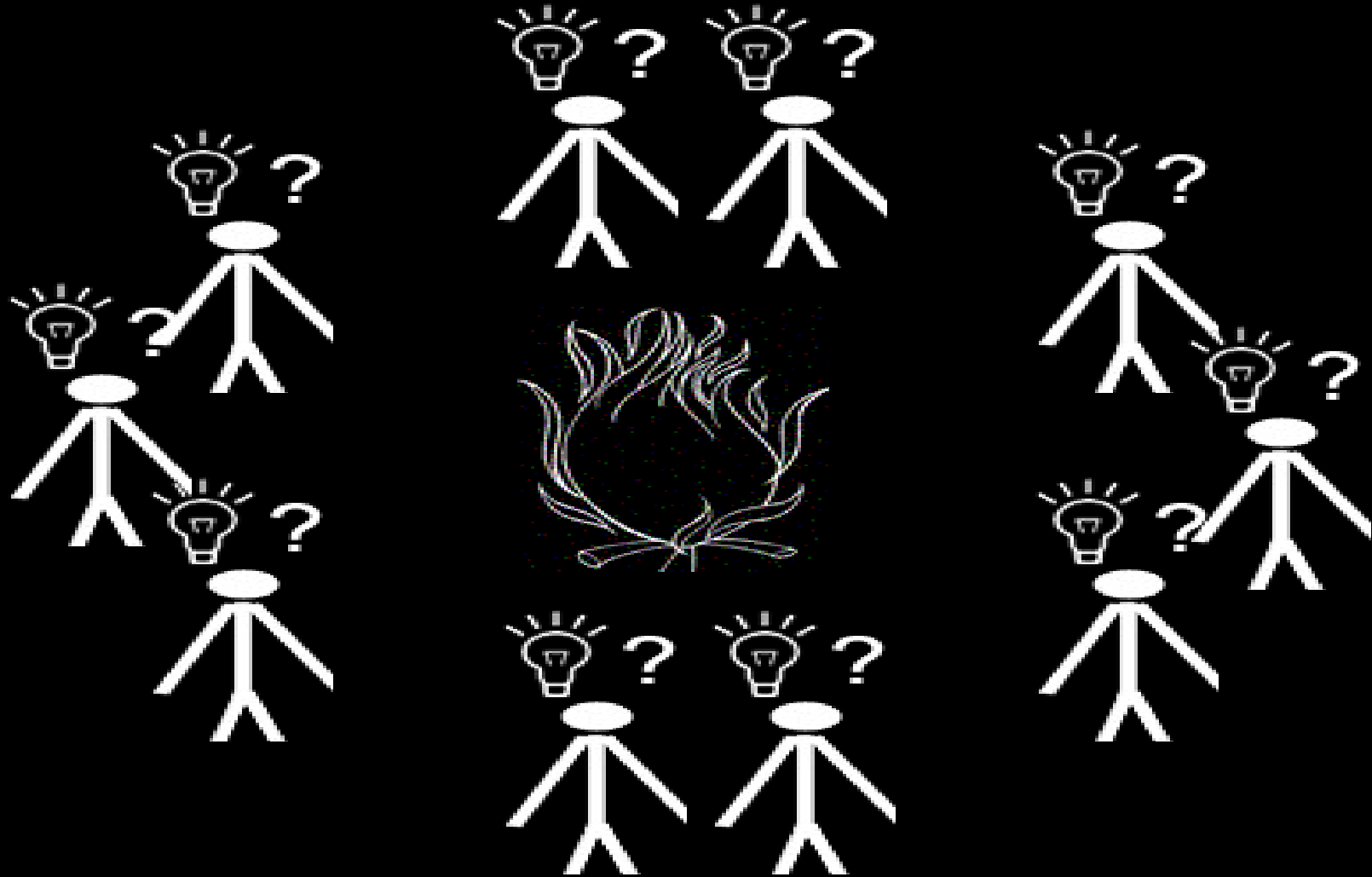
Leaders are not enough!



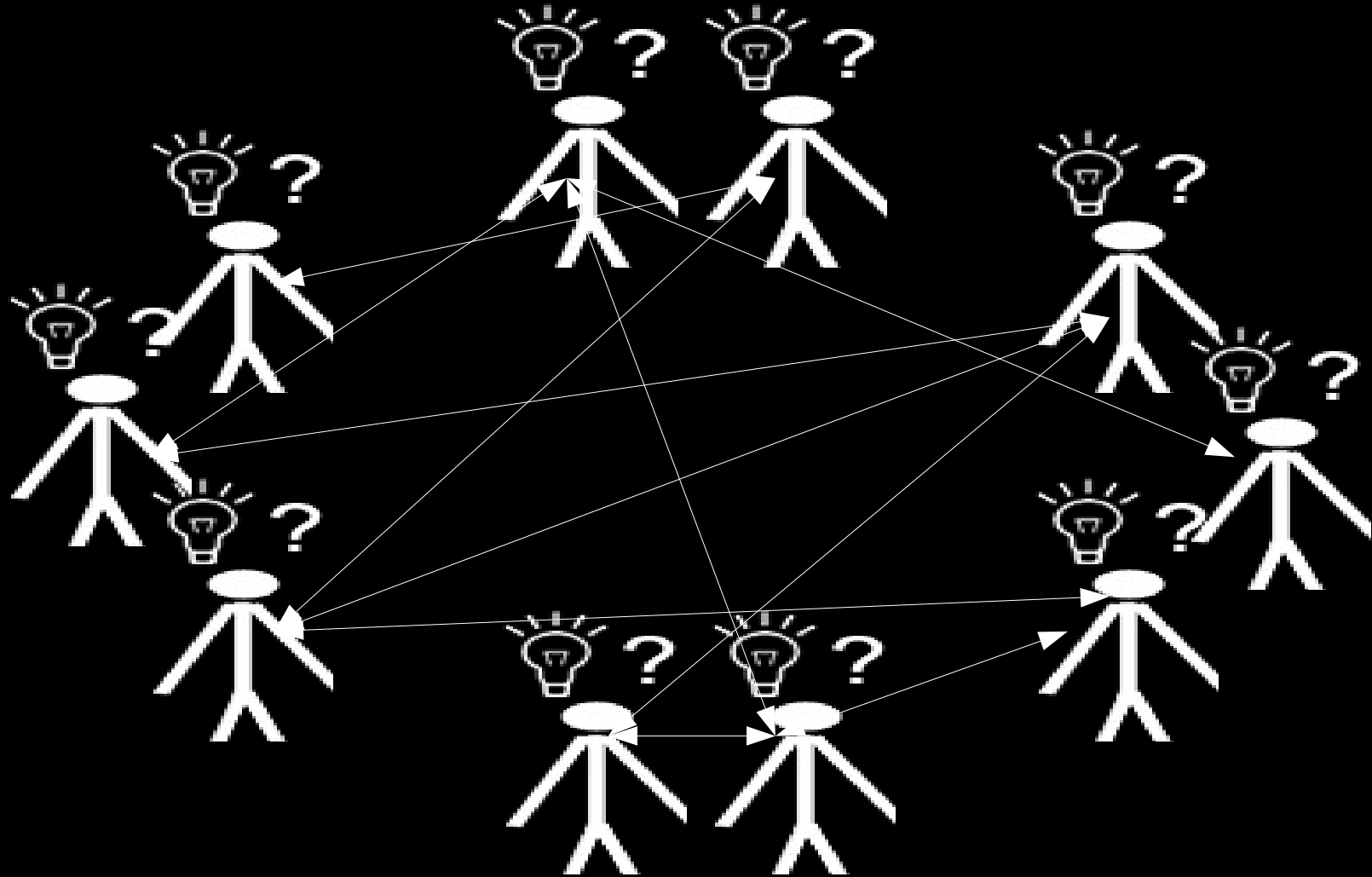
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Without the “long tail” of the bottom 80% of contributors, the leaders create an incomplete, imperfect product, a broken, 3-legged chair

The concept is old...



This scale is new...



Thank you

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FLOSS Project

www.flossworld.org