

Peer-production and social sharing in the digitally networked environment

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Overview

- **Free software & peer production**
- **Distributed computing, other physical resources**
- **What is the motivation?**
- **What are the enabling conditions?**
- **Why is it efficient or sustainable to use social relations as an alternative transactional framework to markets and firms?**
- **Organization: solutions to the problems of commons-based coordination and cooperation**

Free Software

- **Getting harder to ignore success**
- **[insert here netcraft websurvey]**

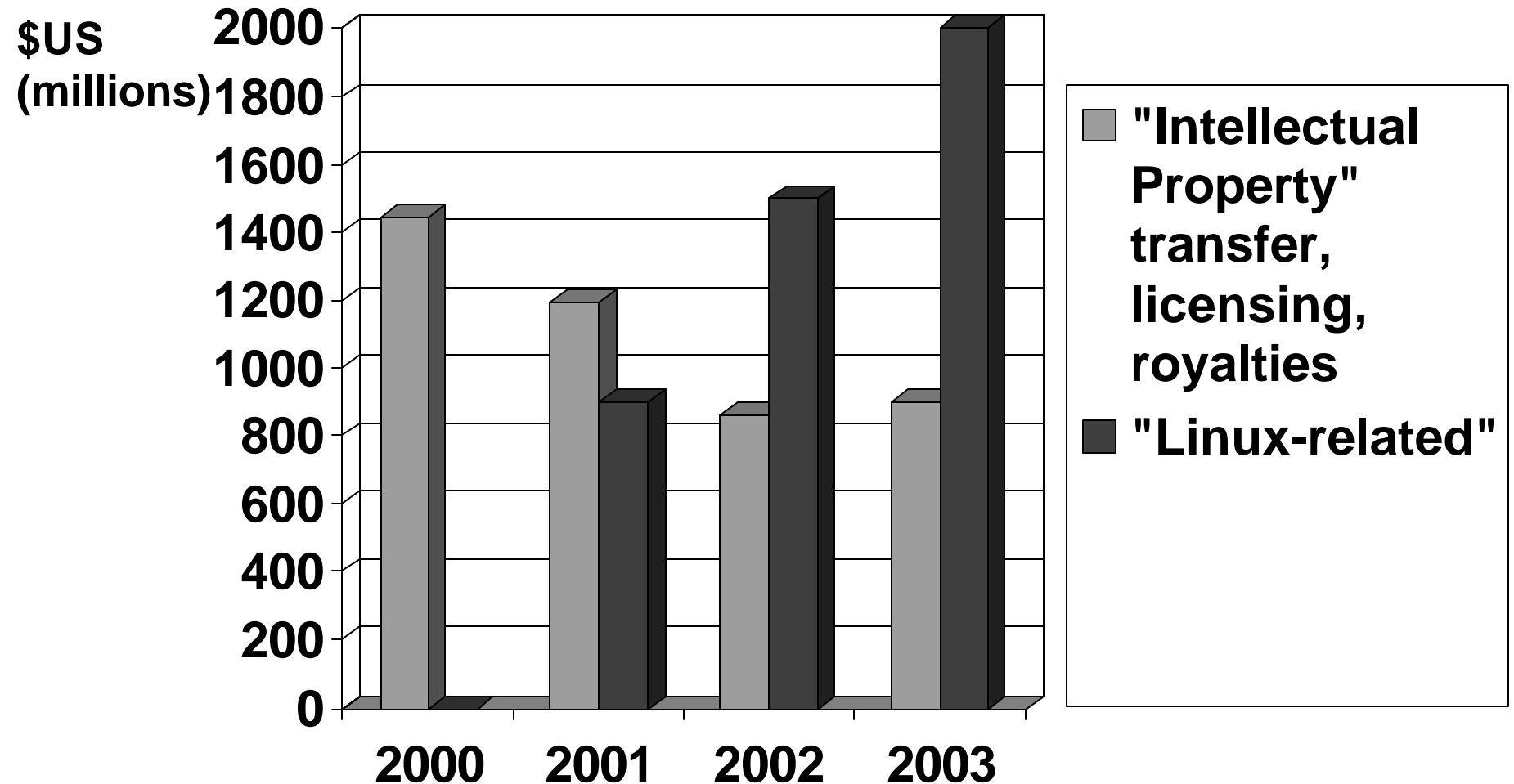
Free Software

- **Getting harder to ignore success**
- **Insert here linux**
- **market share pie chart**

Source:
Netcraft Survey
Sept. 2001

**BUT: counts difficult
to sustain, estimates
range from 20+ to
40%**
e.g., HP reports
**\$2.4B in linux-related
sales**

Selected IBM revenues



Sources: IP income: IBM annual reports

"Linux-related":

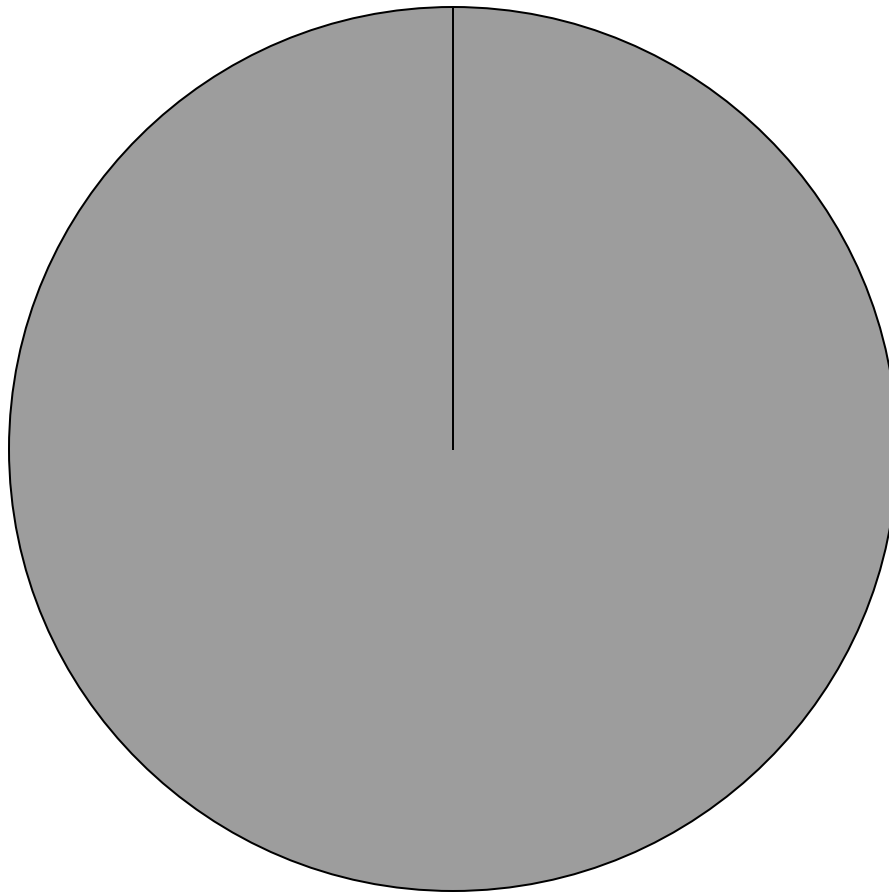
2003 Forbes Magazine, http://www.forbes.com/forbes/2004/0607/086_print.html

2002 CNET News <http://news.com.com/2100-1001-981633.html>

2001 CNET

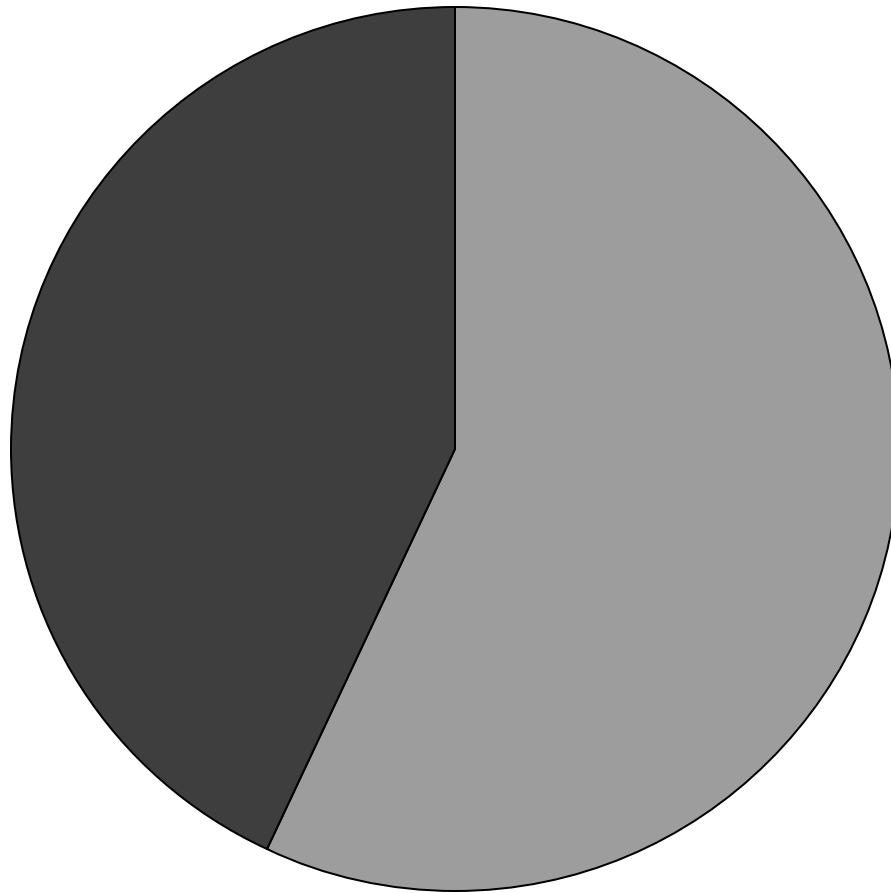
http://news.com.com/IBM%3A+Linux+investment+nearly+recouped/2100-1001_3-825723.html?tag=nl

Selected IBM revenues 2000



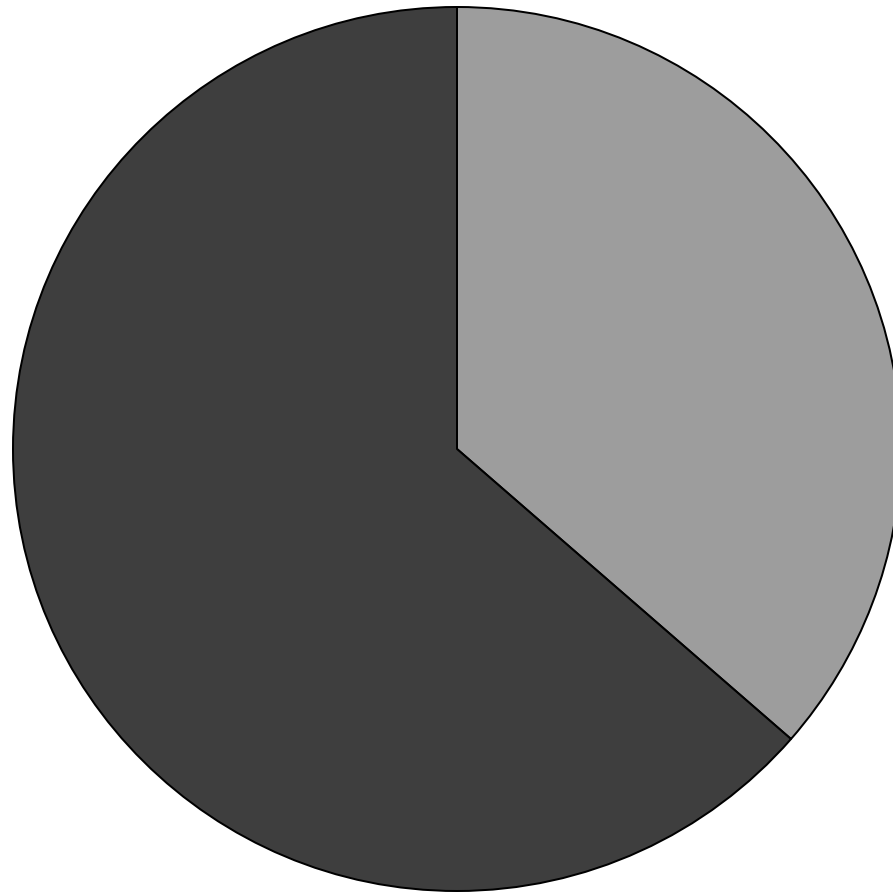
- IPR sales, licensing royalties
- Linux-related revenues

Selected IBM revenues 2001



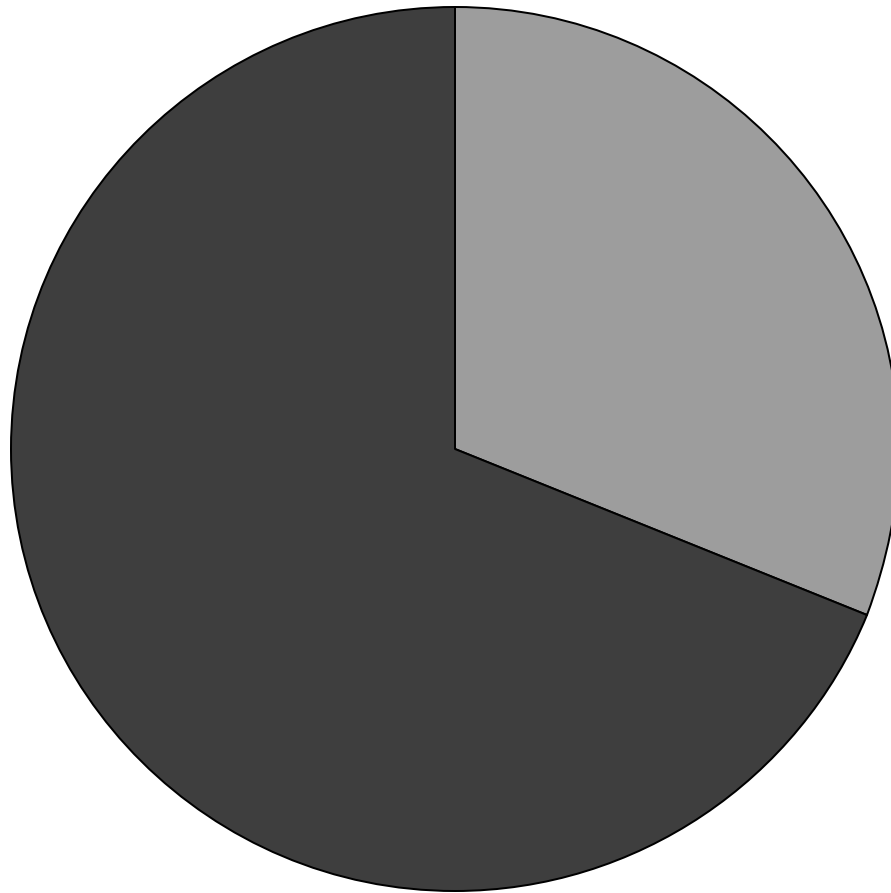
- IPR sales, licensing royalties
- Linux-related revenues

Selected IBM revenues 2002



- IPR sales, licensing royalties
- Linux-related revenues

Selected IBM revenues 2003



- IPR sales, licensing royalties
- Linux-related revenues

Peer Production All Around

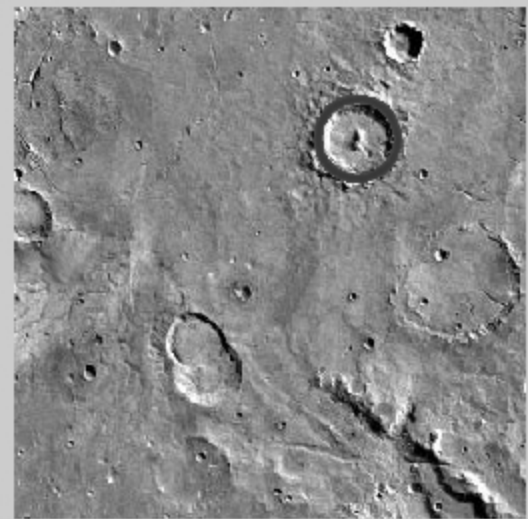
- **Peer production**
 - various sized collections of individuals
 - effectively produce information goods
 - without price signals or managerial commands
- **Sharing material resources**
 - Large scale practices of effective productive sharing
 - Components are material resources, including private economic goods
 - Outputs not necessarily public goods

Peer Production

- **Academic research**
- **The Web**
- **Content (Clickworkers, K-5, Wikipedia MMOGs)**
- **Relevance/accreditation**
 - **commercial utilization--Amazon, Google**
 - **volunteer--open directory project, slashdot, Kuro5hin**
- **Distribution**
 - **value added--Distributed Proofreading**



Your task:
Mark all craters
(training -- [click here to do a real one](#))




Pretty good.

See the circle you've drawn around your first crater.

Hint

Show me

Your task, should you choose to accept it: Click on four points around the rim of each crater. You may ignore craters that are smaller than this: 



Has Saddam stopped beating his wife? (Op-Ed)

By [Rogerborg](#)

Fri Nov 8th, 2002 at 03:00:08 PM EST

That's the question we need to ask ourselves after the full United Nations Security Council today passed an [unanimous resolution](#) to (literally) force Iraq to disclose its weapons of mass destruction programs, and comply fully with weapons inspectors on a strict timetable.



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And here's a catch for Saddam: what if he *has* no WMD programs that we don't already know about? How can we find the black cat in the dark room, if the cat isn't there?

You'll recall that a previous head of the UN weapons inspection program, Scott Ritter, changed his view on Iraq's WMD program. When his inspectors were in Iraq, they inspected all the sites that Iraq disclosed and confirmed that they had been decommissioned. But Scott was initially convinced that there must be more sites, because the CIA kept telling him it was so. He chased CIA leads all over the country for years, never finding a *single site* that Iraq had not disclosed. With time and bitter experience, he concluded that Iraq was *not* hiding any more programs, and that he was being used as a CIA stooge, a US spy wearing a UN badge.

It's now been over four years since inspectors left Iraq, complaining that the Iraqi regime was blocking their access to sites. "But you're spies! There's nothing to find!" retorted the regime, and it all broke down into hair pulling and name calling.

So its entirely possible that Iraq has developed WMD programs in the meantime. Nobody denies that it *had* them prior to Gulf War 1, least of all the Kurdish civilians that were gassed with them. But we simply don't know if it still has them. That's what the inspectors are going back in to find out.

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2) Has Saddam stopped beating his wife? Section: Op-Ed, Topic: Politics	11/08/2002 03:00:08 PM EST	Rogerborg	vote
3) CIA Killed U.S. Citizen In Yemen Missile Strike Section: MLP, Topic: Politics	11/08/2002 11:13:36 AM EST	waxmop	vote
4) Developing Applications with Java and UML Section: Technology, Topic: Books	11/08/2002 10:35:19 AM EST	bshive	vote
5) Do you vote? Section: Op-Ed, Topic: Politics	11/08/2002 12:07:07 AM EST	wrinkledshirt	vote
6) Nanotechnology Section: MLP, Topic: Hardware	11/07/2002 10:54:58 PM EST	kpaul	vote
7) And in other news... Section: MLP, Topic: News	11/07/2002 05:46:29 PM EST	Arthur Treacher	vote

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But the actual inspection is really irrelevant, it just gives time to prepare the military strike. Tony Blair has already committed it by stating that failure to be honest (i.e. report what we've already decided that Iraq has got) will be treated as seriously as blocking access. So if the list of sites that Saddam provides doesn't exactly match the one that the CIA draws up, then the marines go in. Remember how good the CIA were at directing the inspectors last time? If the CIA add (invent?) one site that Saddam's list doesn't mention, *the marines go in.*

- [More on Politics](#)
- [Also by Rogerborg](#)

All this and a timetable too. The inspectors must be allowed back in within 45 days, and then they have a further 60 days to report back. That gives us a kick off date of around the start of March 2003, depending on how long it takes Bush II to pretend to read Hans Blix's report and declare that it damns Saddam and necessitates an immediate and highly telegenic regime change.

Do I disagree with this final solution for starting Gulf War 2? The mendacity is distasteful, but it has an undeniable elegance and inevitability to it (we've all invested in munitions manufacturers, right?). And whatever your views on Bush II, Saddam is undeniably a stone cold evil son of a bitch, and millions of Kurds and Iraqis will be delighted to see him exit the world stage on a slab.

The only question that's hanging now is this: *has Saddam stopped beating his wife?*

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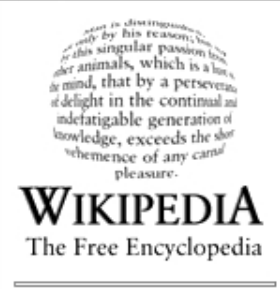
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War and Elections (5.00 / 1) (#16)
by [frankcris](#) on Fri Nov 8th, 2002 at 04:33:01 PM EST
([Email Me](#) [Nips@NOqSaPiApM.com](#)) <http://finiki.qaip.com>

, how many votes that Bush will attempt to embroil the US (and our "allies") into this mess closer to election time? His father screwed up by not logging the conflict on past poll time for his second term--will W. make the same mistake? The first Bush was as bad of a president as this one is with regards to domestic policy (which, IMHO, is the sole duty of the president; all of this foreign policy bs should go to the house committee



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Mathematics

From Wikipedia, the free encyclopedia.

Mathematics (from *Greek mathema*: science, knowledge, learning; *mathematikos*: fond of learning) is the study of patterns of quantity, structure, change and space. In the modern view, it is the investigation of axiomatically defined abstract structures using formal logic as the common framework. The specific structures investigated often have their origin in the natural sciences, most commonly in physics, but mathematicians also define and investigate structures for reasons purely internal to mathematics, for instance because they realize that the structure provides a unifying generalization for several subfields or a helpful tool in common calculations.

Historically, mathematics arose out of the need to do calculations in commerce, to measure land and to predict astronomical events. These three needs can be roughly related to the broad subdivision of mathematics into the study of structure, space and change.

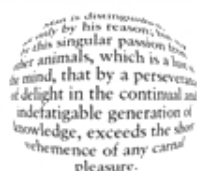
The study of structure starts with numbers, initially the familiar natural numbers and integers. The rules governing arithmetical operations are recorded in elementary algebra, and the deeper properties of whole numbers are studied in number theory. The investigation of methods to solve equations leads to the field of abstract algebra, which, among other things, studies rings and fields, structures that generalize the properties possessed by the familiar numbers. The physically important concept of vector, generalized to vector spaces and studied in linear algebra, belongs to the two branches of structure and space.

The study of space originates with geometry, first the Euclidean geometry and trigonometry of familiar three-dimensional space, but later also generalized to non-Euclidean geometries which play a central role in general relativity. Several long standing questions about ruler and compass constructions were finally settled by Galois theory. The modern fields of differential geometry and algebraic geometry generalize geometry in different directions: differential geometry emphasizes the concepts of coordinate system, smoothness and direction, while in algebraic geometry geometrical objects are described as solution sets of polynomial equations. Group theory investigates the concept of symmetry abstractly and provides a link between the studies of space and structure. Topology connects the study of space and the study of change by focusing on the concept of continuity.

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Satanism

(Difference between revisions)

Revision as of 21:40 Nov 8, 2002

Current revision

Line 5:

* Rebellious Christians, who view Satanism as the opposite of [[Christianity]], who find themselves missing something within Christianity, and who seek that something in what they think is Satanism.

* Rebellious Adolescents, who rebel against modern society for a variety of reasons, who also adopt the Christian ideas concerning Satanism, and who cloak their social rebellion in the mystique of Satanism.

* Philosophical Satanists, also known as Modern Satanists, who do not believe in the existence of any [[Satan]] or demon or devil, but instead who find inspiration in the study of various "dark" gods and spirits and myths. Most are considered to be [[Sutheism|Sutheists]]

* Religious Satanists, also known as Traditional Satanists, who do believe in some Prince of Darkness (a more generic name than Satan), and who worship or otherwise work to fashion their lives based on their ideas concerning the Prince of Darkness.

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* Religious Satanists, also known as Traditional Satanists, who do believe in some Prince of Darkness (a more generic name than Satan), and who worship or otherwise work to fashion their lives based on their ideas concerning the Prince of Darkness.

Current revision

Satanism: religion involving either the worship of Satan or the Prince of Darkness under other name(s), or the directing of one's life based on inspirations gained from study of Satan or the Prince of Darkness.



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Section: **Branches of Mathematics**

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Foundations

The term *foundations* is used to refer to the formulation and analysis of the language, axioms, and logical methods on which all of mathematics rests (see [logic](#) ; [symbolic logic](#)). The scope and complexity of modern mathematics requires a very fine analysis of the formal language in which meaningful mathematical statements may be formulated and perhaps be proved true or false. Most apparent mathematical contradictions have been shown to derive from an imprecise and inconsistent use of language. A basic task is to furnish a set of [axioms](#) effectively free of contradictions and at the same time rich enough to constitute a deductive source for all of modern mathematics. The modern axiom schemes proposed for this purpose are all couched within the theory of [sets](#) , originated by Georg Cantor, which now constitutes a universal mathematical language.

Algebra

Historically, [algebra](#) is the study of solutions of one or several algebraic equations, involving the [polynomial](#) functions of one or several variables. The case where all the polynomials have degree one (systems of linear equations) leads to linear algebra. The case of a single equation, in which one studies the roots of one polynomial, leads to field theory and to the so-called Galois theory. The general case of several equations of high degree leads to algebraic geometry, so named because the sets of solutions of such systems are often studied by geometric methods.

Modern algebraists have increasingly abstracted and axiomatized the structures and patterns of argument encountered not only in the theory of equations, but in mathematics generally. Examples of these

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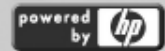
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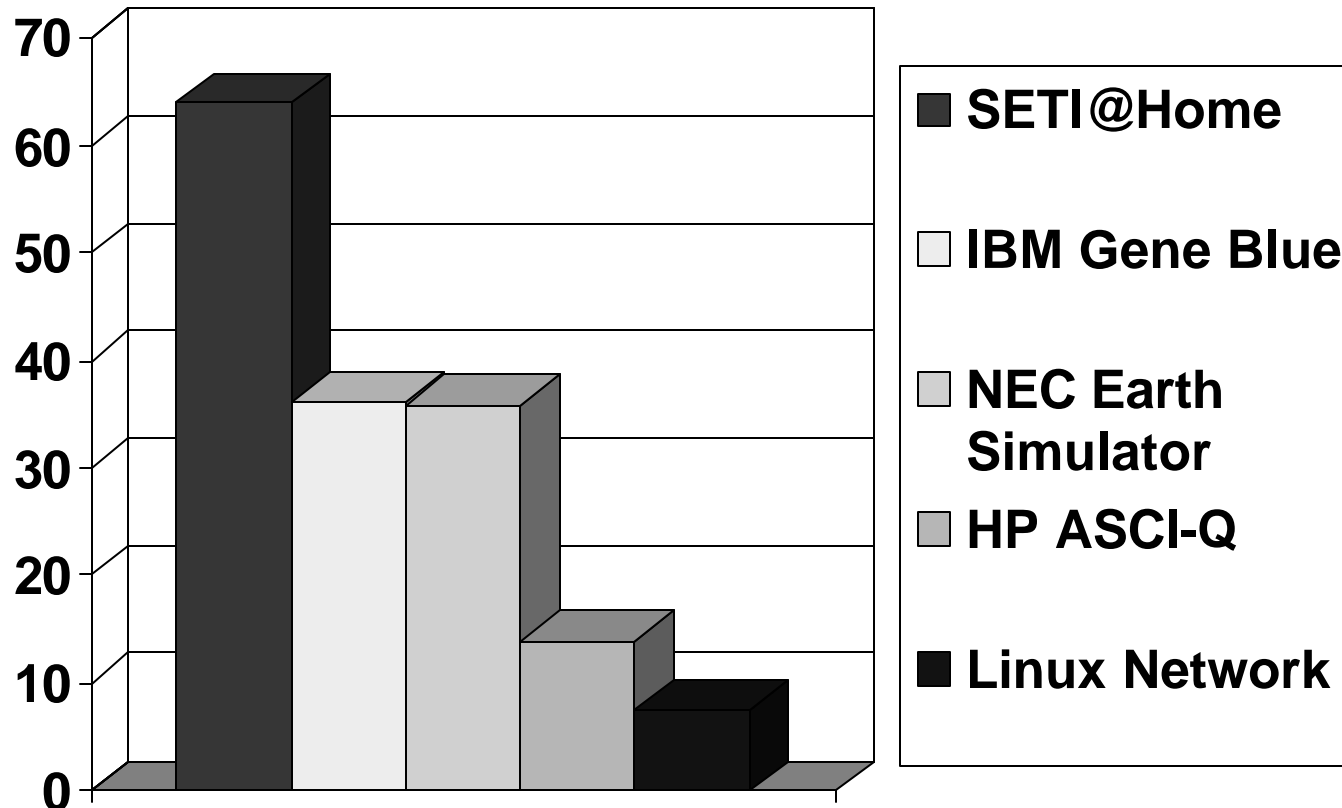
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Material sharing

- **Computation: @Home projects**
- **Physical transport capacity: Open Wireless Networks**
- **Storage: Kazaa, Freenet**
- **Combined mixes: Skype**

SETI@Home

Teraflops



**speed relative to fastest
supercomputers in top 500 list**

@Home

- **SETI@Home: ~4.5 Million users**
 - Download small screensaver
 - Kicks in when user is not using their pc
- **Folding@Home: ~572,000 cpus, 272,000 volunteers; 28,000 teams**

Common Characteristics

- **Widely distributed physical goods with some capacity**
- **Have excess capacity (of transmission, storage, processing)**
- **Are privately owned by many distinct users**
- **Who pool their excess capacity without relying on either prices or managerial commands to motivate and coordinate the pooling**

Economic Questions

- **What are the motivations?**
- **What are the feasibility conditions?**
- **Is it more efficient, and if so when?**

Diverse Motivations

- **OSS economics literature maps the diverse appropriation mechanisms (Lerner & Tirole; Weber; von Hippel)**
 - **Intrinsic**
 - Hedonic
 - Community ethics
 - **Extrinsic**
 - Supply-side--human capital, reputation
 - Demand-side--service contracts, widgets

Diverse Motivations

- **OSS literature**
- **Motivation crowding out theory**
 - **Titmuss-Arrow debate over blood donation**
 - **Different people differ in incentives**
 - **But does money crowd-out giving?**
 - **Frey: social psychology focuses on intrinsic & extrinsic motivations**
 - **People feel rejected and untrusted when offered money to do something a well-adjusted, respectable person would do for free—so reduce their effort**

Diverse Motivations

- **OSS literature**
- **Motivation crowding out theory**
 - **Titmuss-Arrow, Frey**
 - **Benabou & Tirole**
 - **People take cues from others in authority; when offered fine-grained monetary incentives and monitoring they lose confidence in their own abilities**

Diverse Motivations

- **Motivation crowding out theory**
 - Titmuss-Arrow, Frey
 - Benabou & Tirole
 - **Empirics**
 - Frey & Jegen 2001: survey
 - Bewley 1995: survey of managers regarding efficacy of incentive contracts
 - Osterloh & Frey 2000: knowledge transfer within the firm
 - Frey & Oberholzer Gee 1997; Kunreuther & Easterling 1990: NIMBY increases when \$ offered
 - Gneezy & Rustichini: fines increase tardiness of kindergarten pickup

Diverse Motivations

- **Motivation crowding out theory**
- **Social exchange & social capital**
 - **Carpooling, p2p file sharing, includes an instrumental component not accounted for on the psychology-based theories**
 - **Anthropology of gift literature includes heavy emphasis on reciprocity, social hierarchy**
 - **Social capital (Coleman; Granovetter; Porat; Lin) focuses on instrumentalism**
 - **Empirics: Fehr & Gechter 2002: reciprocity crowded out by money**

Diverse Motivations

- **Motivation crowding out theory**
- **Social exchange & social capital**
- **Combined**
 - **Human beings are diversely motivated**
 - **A reward function includes**
 - **Material motivations expressed in money**
 - **Social-psychological motivations**
 - **Which can be instrumental or non-instrumental**
 - **The different motivators have a complex relationship to each other**
 - **Dinner with friends; sex**

Diverse Motivations

- **Motivation crowding out theory**
- **Social exchange & social capital**
- **Combined**
- **Culturally contingent and cross-culturally diverse**

Motivational feedback

- **Information about the amount of work**
 - That each user contributes
 - That the collective effort achieved
- **Information about the scientific context**
 - interfaces that present the process (more-or-less opaquely)

Motivational feedback

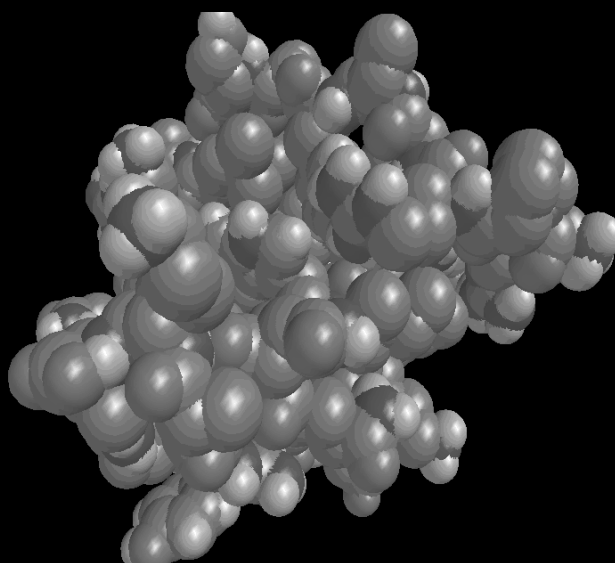
Folding

Username:
anonymous

Working on:
EngHomeodomain

WU progress:
10/100

Finished WUs:
01

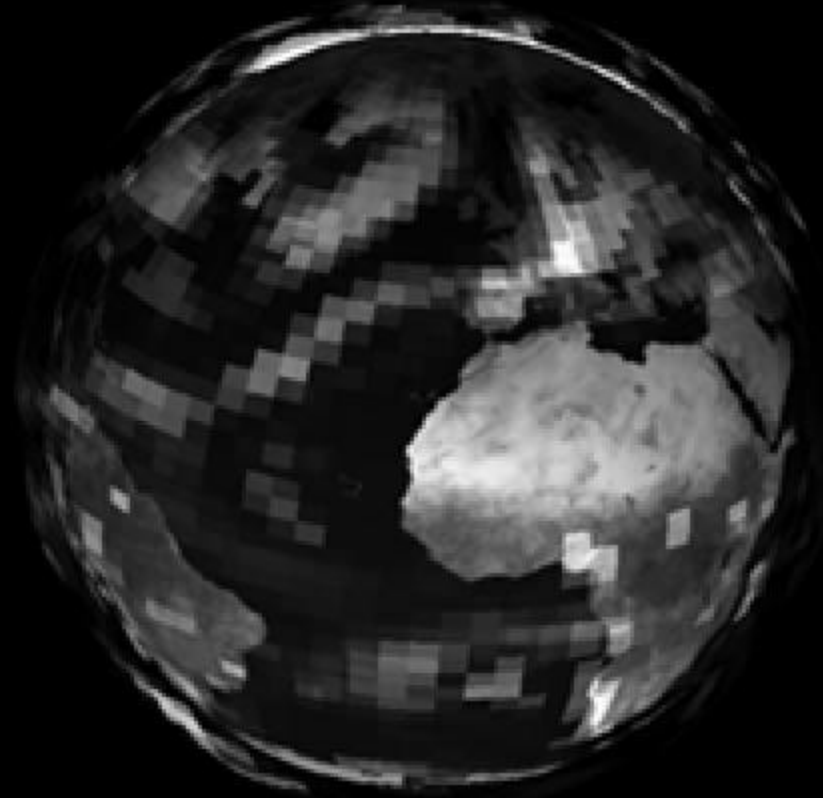


Working ...

Folding@home
Powered by...
OSCM

Folding@Home

Climateprediction.net



Commercial efforts

- Gomez performance network (capped at \$45 per month)
- Capacity calibration network (\$.30/ hr)
- Hard to compare success: smaller scale, but concerned with topological diversity, control over participation centralized.



The screenshot displays the Poivo PEER user interface. The window title is "Poivo PEER". The main content area is divided into several sections:

- NAVIGATION:** Includes links for Leaderboards, Tell A Friend \$14, Account Info, Community Home, and PEER Details.
- PEER PROFILE:** Shows User Name: jdoe, Machine Name: jdoe, Account Status: ACTIVE, and Current Activity: processing. A progress bar indicates "Next Update In: 0:58".
- ACCOUNT BALANCE:** A table showing online and processing times, earnings, and a total balance.
- Current Rank (online time):** 478
- Total Online Time (min):** 607150
- Received work:** running PeerReview

	TODAY	MONTHLY	LIFETIME
Online Time (min)	1875	67370	607150
Processing Time (min)	00	1000	01000
Earnings	\$0.13	\$0.99	\$46.29
Total Balance	\$0.00	\$0.00	\$0.00

Earnings Closing Date: 10-30-2002

\$6.99

Motivational feedback

- **Information about the amount of work**
 - That each user contributes
 - That the collective effort achieved
- **Information about the scientific context**
 - interfaces that present the process (more-or-less opaquely)
 - papers published using processes
- **Competitions for most cycles contributed**
 - Including teams like national teams, or universities, “linux” etc.
- **Online forums for discussing the topic or project**

Motivational “theory”?

- **Agonistic giving**
 - user of the week/month/year/galaxy
- **Non-agonistic giving**
 - Help humanity
- **Individualist and solidaristic**
 - Solidarism both prefab and new-fangled, or organic and synthetic
- **Reciprocity?**
 - Reciprocity much more of a factor in p2p systems, OWLs
- **Are these projects shooting in the dark, or is there no crowding out among forms of sharing?**

Economic Questions

- **What are the motivations?**
- **What are the feasibility conditions?**
- **Is it more efficient, and if so when?**

Enabling characteristics

- **Human creative labor**
 - **Highly variable**
 - across human beings
 - within every individual over time in short and long term cycles
 - **Personal, specific, non-fungible**
 - intrinsically available to individuals
 - weakly available for fully specified transfer

Enabling characteristics

- **Human creative labor**
- **Networked connectivity of many individuals to diverse projects at diverse times**
- **Task organization: critical for pooling diversely motivated contributions**
 - **Modular components**
 - **Variable granularity**
 - **With an integration platform**

Enabling characteristics

- **Shareable goods**
 - **Lumpy**
 - **Come in discrete packages of functionality-producing resources/goods, that do not align perfectly with demand for the functionality flow**
 - **Mid-grained**
 - **Packages can be provisioned to a substantial segment of a population, given wealth, cost, and demand for functionality flow over the lifetime of the good.**

Enabling characteristics

- **Shareable goods**
 - **Lumpy**
 - **Mid-grained**
 - **=> Large amounts of excess *physical capital* capacity, widely distributed in a population in small chunks**
 - **Enabling greater play for diverse human motivations free of the rationalizing effects of markets and bureaucratic management**
 - **Available for clearance through markets, firms, states, or social sharing systems**

Enabling characteristics

- **The most important inputs, into the core economic activities, of the most advanced economies, are widely distributed in the population**
 - **Human creativity**
 - **Computation and communications resources**
- **We are seeing platforms emerging for harnessing underutilized pools of talent, experience, and physical capacity**

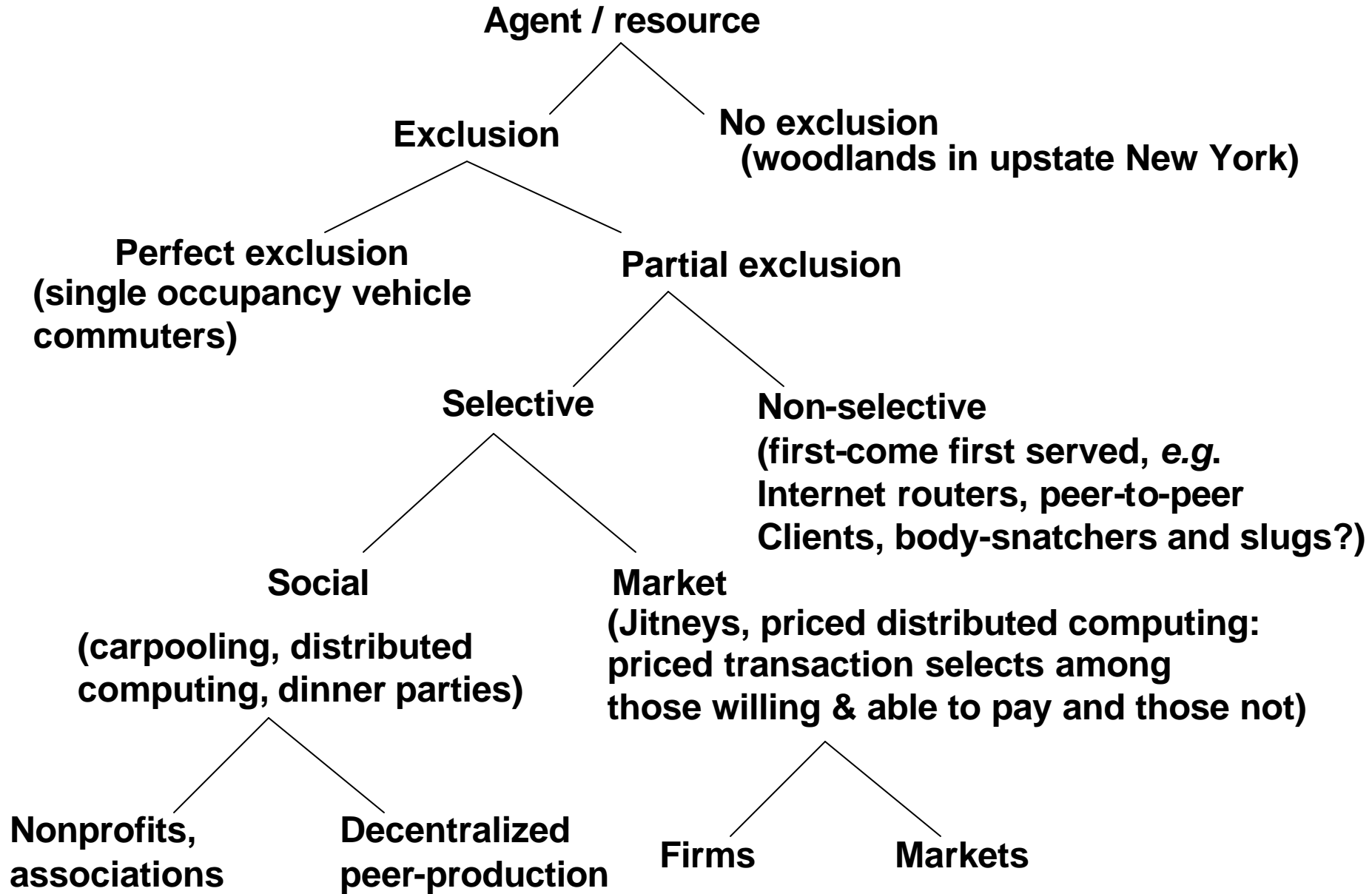
Is it efficient?

- **“Incentives”**
 - **When motivation crowding decreases activity**
 - **If large quantities of excess capacity (human creativity, CPU cycles) are widely distributed in small dollops**
 - **“Incentives” trivial as a matter of macro, long-term sustainability: volunteers, hobbyists, and professionals will combine if modularization is right**

Is it efficient?

- **“Incentives” or motivation**
- **Transactions costs**
 - **Information gains**
 - **Allocation gains**

Transaction costs & choice of production modality



Information gains

- **Human creative labor highly variable**
 - time, task, mood, context, raw information materials, project
- **Difficult to specify completely for either market or hierarchy control**
- **In peer-production agents self-identify for, and self-define tasks**
 - Have best information about ability in time
 - Mechanisms for correcting misperceptions necessary: e.g. “peer review”

Information gains

- **Human creative labor highly variable**
- **Markets and hierarchies (firms or agencies) require**
 - **Crisp definitions of transactional moves—actions, goods, obligations—on a per-transaction basis**
 - **Highly structured data computable within its decision system (price or managerial/bureaucratic report)**

Information gains

- **Human creative labor highly variable**
- **Markets and hierarchies**
 - **Crisp per-transaction information**
 - **Formalized information rendering**
- **Social sharing & exchange**
 - **Loose accounting, contributions into a cloud of social goodwill: lower per-transaction information costs**
 - **Informal, culturally transmitted cues for action, “reading social situations”**

Information gains

- **Tradeoffs**
 - **Social systems have similarly high set-up costs, but lower per-transaction costs**
 - **Particularly important where one “finished” effort/unit requires multiple transactions/contributions**
 - **Trade off formal computability for texture**
 - **Social sharing particularly good where inputs (tacit knowledge) or outputs (help fight AIDS) hard to measure and encode formally**

Information gains

- **Centralized/decentralized systems**
 - **Distance (physical, logical, institutional) between locus of an occurrence of an opportunity for human action in an environment, and the authority for directing whether and how the agent confronted with the opportunity will act on it**
 - **Peer production & distributed sharing systems, but also eBay-like markets**
 - **Firms, bureaucracies, the organized churches?**

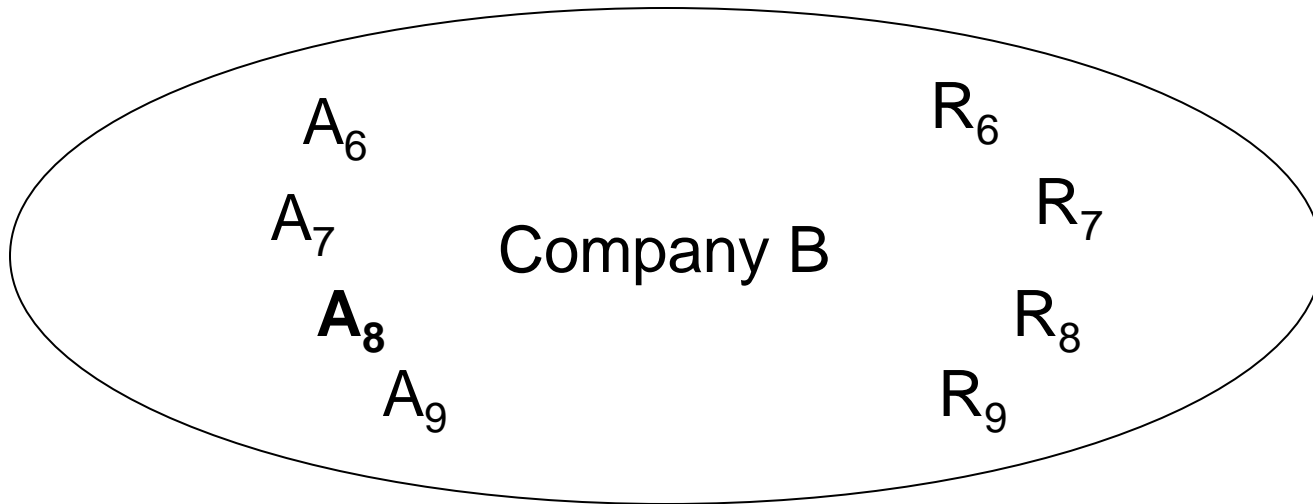
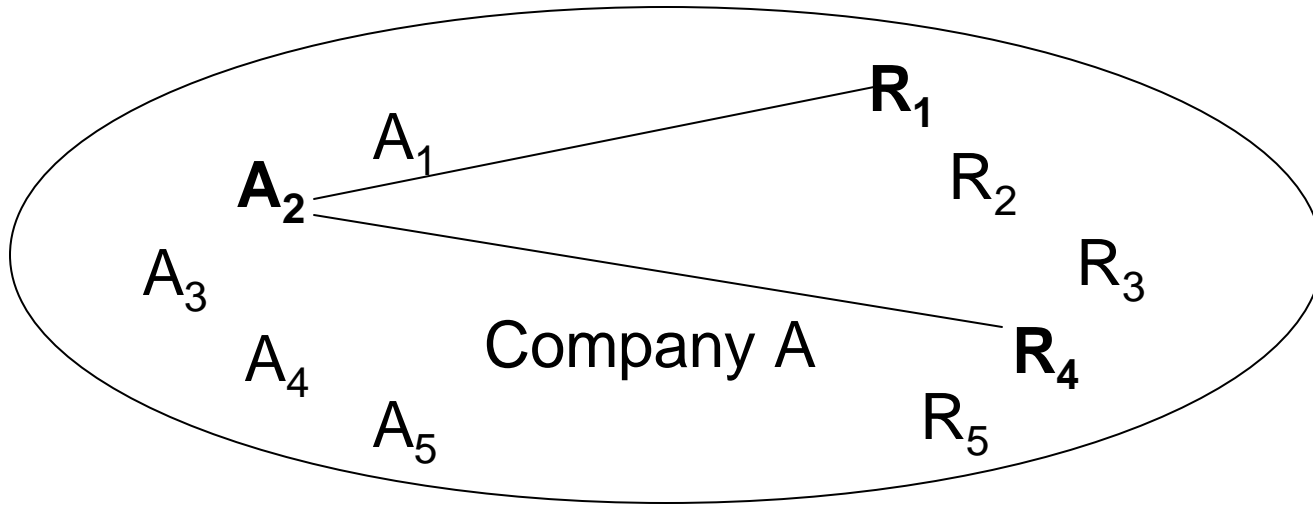
Information gains

- **Centralized/decentralized systems**
- **These systems tradeoff information for control**
 - **Information is lost in the transmission from the locus of opportunity for action to the locus of authority and back**
 - **Centralized systems will be information poor but more controlled, decentralized systems will be information rich and less controlled (though not necessarily less dynamically stable, efficient, etc.)**

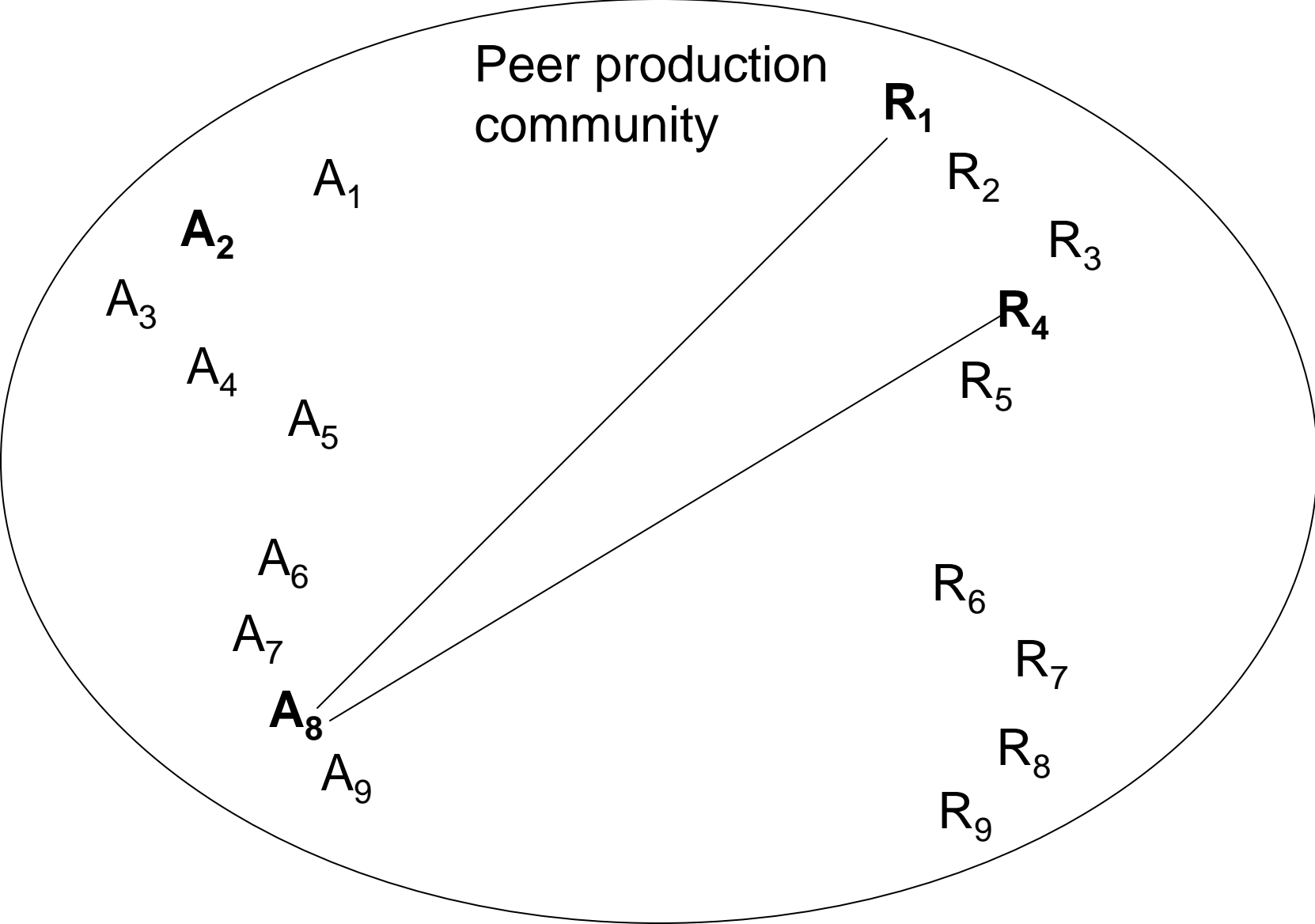
Allocation gains

- **Firms and markets use property & contract to reduce uncertainty of availability of agents & resources**
- **Individuals highly variable in fit to resources, projects, and each other**
- **Substantial increasing returns to size of**
 - **set of agents permitted to act**
 - **set of resources they may act upon**
 - **set of projects they may pursue**

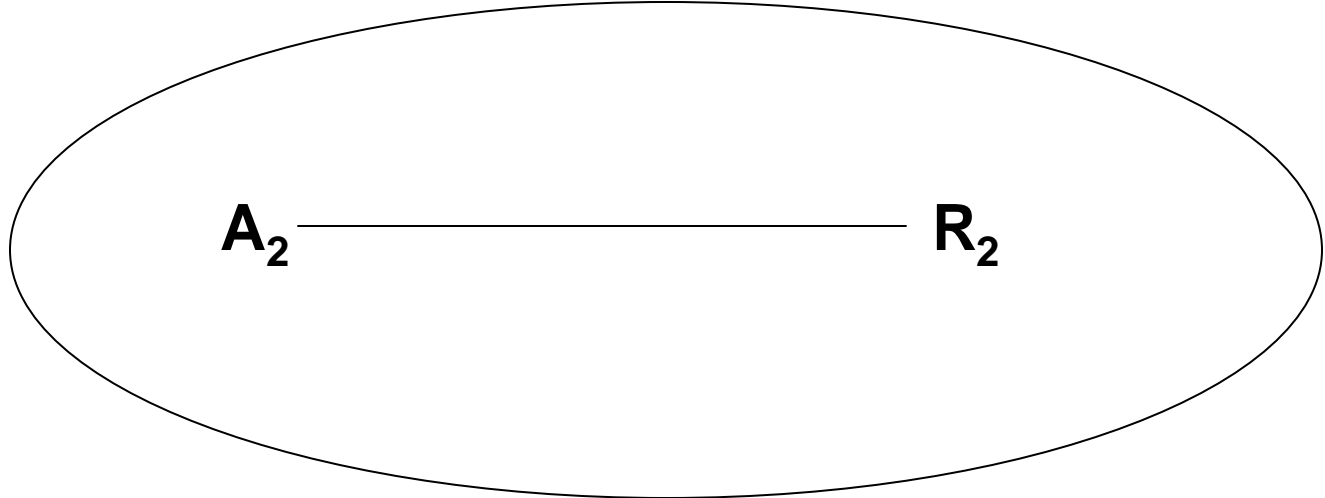
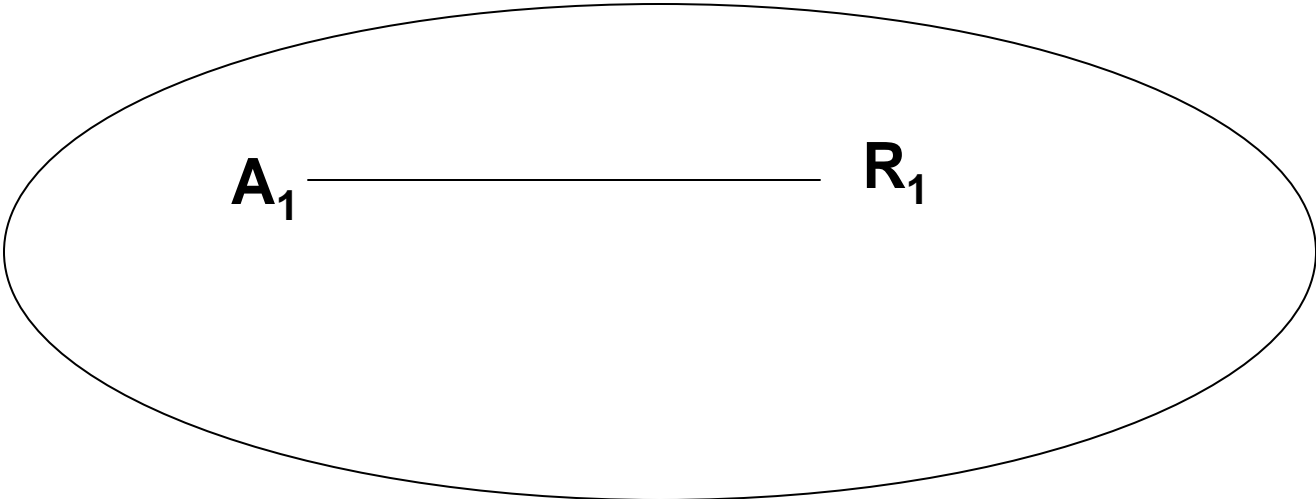
Agents and resources separated into firms



Agents and resources in common enterprise space

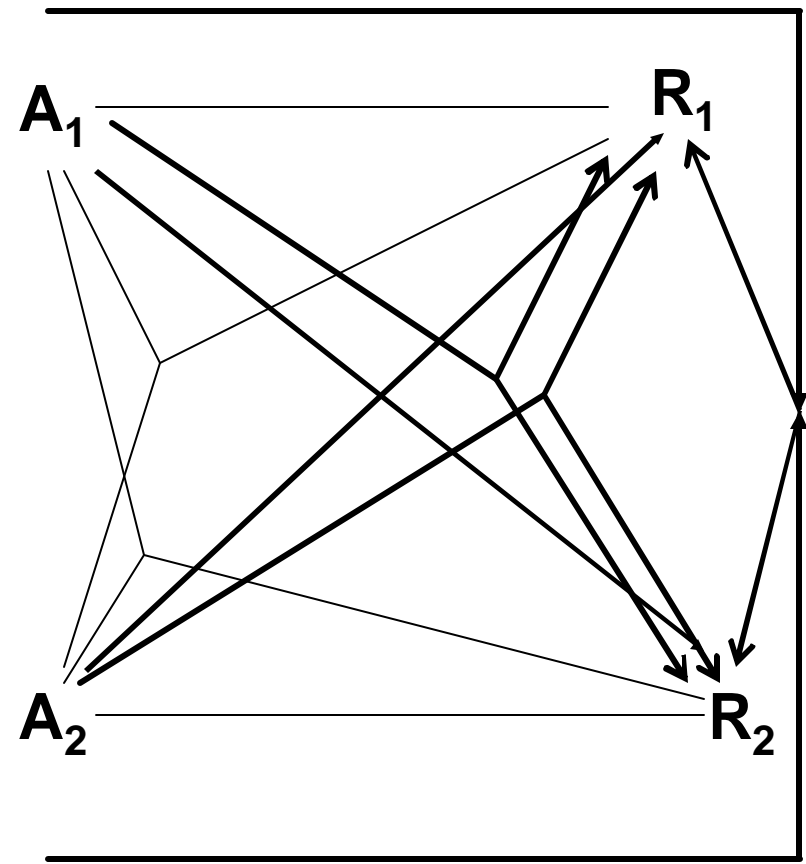


Agents and resources option value when separated in bounded spaces



_____ Option of A to use R

Agents and resources option value when combined



_____ Option of A to use R

The role of culture

- **Technological characteristics create *threshold* barriers to adoption of various modalities of production**
- **Beyond threshold viability, similar activities can be undertaken through different modalities**

The role of culture

- **Prevailing social institutions, practices, motivational interpretations differ among societies, affecting the attractiveness and transition costs to one or another of these forms for a new activity**
 - **Based on relative attractiveness of money and social-psychological rewards**
 - **Trust; experience with cooperative practices**
 - **Although these may be endogenous and dynamic—once you start a practice of sharing, you get better at it, and vice versa**
 - **Presence or absence of formal background institutions supporting, and investments in, one or another system**

Social sharing & exchange as a modality of economic production

- **Under certain technological circumstances practically-feasible opportunities for action are amenable to execution by a class of approaches to organizing production that rely on sharing and social exchange, rather than on a price-system or a firm hierarchy**

Social sharing & exchange as a modality of economic production

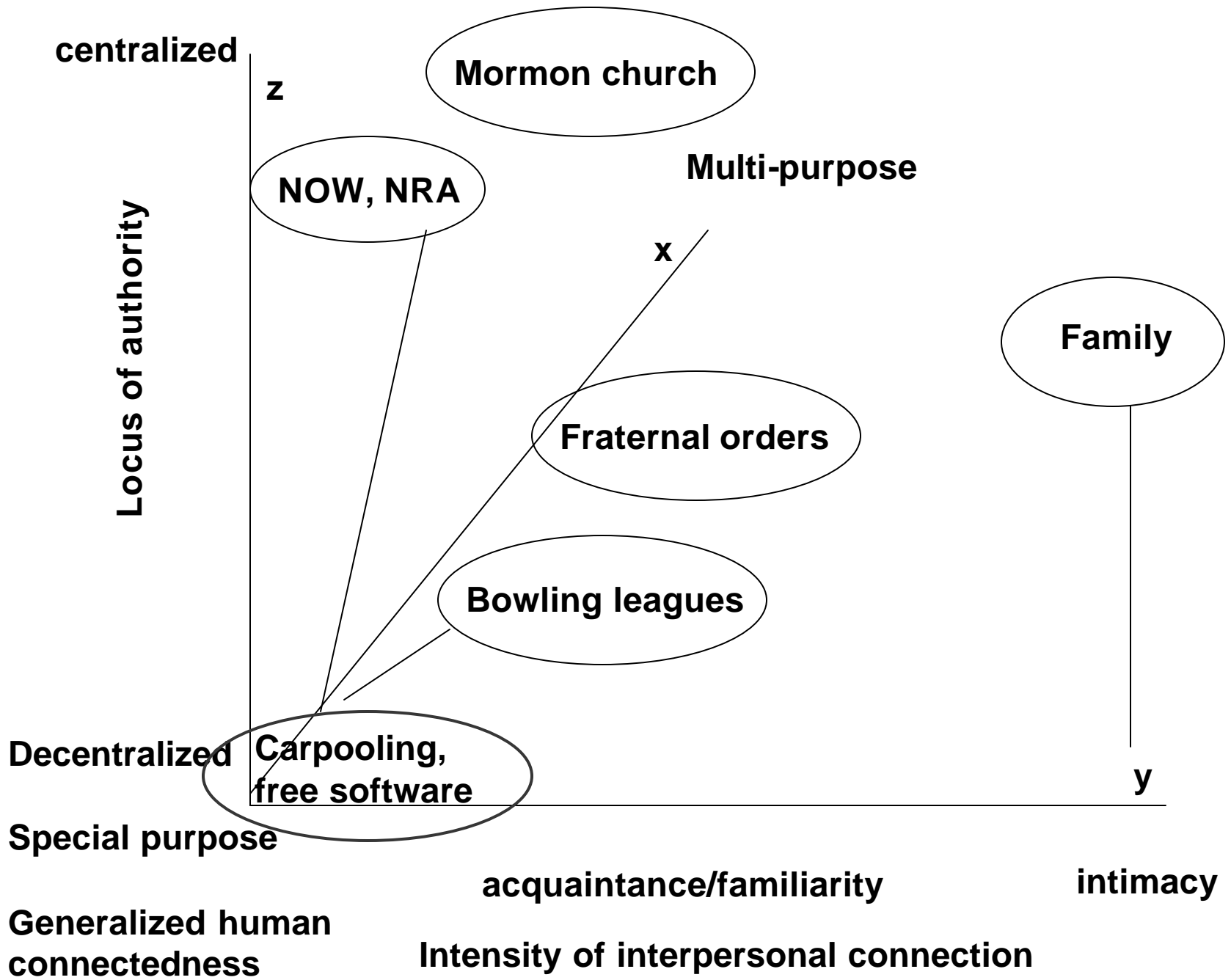
- **Threshold technological conditions enable class of approaches**
- **Typified by**
 - **decentralization of the authority and capacity to contribute to effective action, and**
 - **reliance on social information flows, organizational approaches, and motivation structures, rather than on prices or commands, to motivate and direct productive contributions**

Sharing

- **Gift –production of social relations through flows of material things**
- **Social norms—production of behavioral constraints/institutions**
- **Social capital—increased productivity within the modalities of market/state**
- **Common property regimes/club goods**
 - **Typified by crisp in/out distinctions**
 - **Rely on stable repeat play relationships**

Social production

- **Operating in the domain of production of things and services valued materially, not only or primarily the production of norms or social relations**
- **Inputs and outputs can be private, economic goods, not only public goods, or club goods**
- **Can occur among strangers, not only intimates or longstanding associates**



Four transactional frameworks

Price-system

- where motivation context is resistant to sharing claims (e.g., bank records back-up)

Firm hierarchy

- usable where excess capacity is internally available

Govt Regulation

- “regulatory gain”
- Residual?

Social sharing and exchange

- particularly valuable where lots of small contributions required
- particularly easy where instrumental exchange possible
 - open wireless networks
 - distributed storage
 - processing load balancing harder

The Commons Problem

- **Different kinds of commons have different solutions**
- **Information a provisioning problem, not an allocation problem**
- **Shareable goods do present allocation problems**
 - **Online, solutions have been technical, with proposals for law as to OWLs**
 - **KaZaa participation level**

The Commons Problem

- **Primary concerns**
 - **Defection through unilateral appropriation undermines intrinsic and extrinsic motivations**
 - **Poor judgment of participants**
 - **Providing the integration function**
 - **Initial modularization of tasks**
 - **Managing peer review**
 - **Integrating contributions into a usable whole**

Levers used in commons

- **Formal rules**
 - **Contractual: GPL; cc**
 - **Organizational: standards**

Levers used in commons

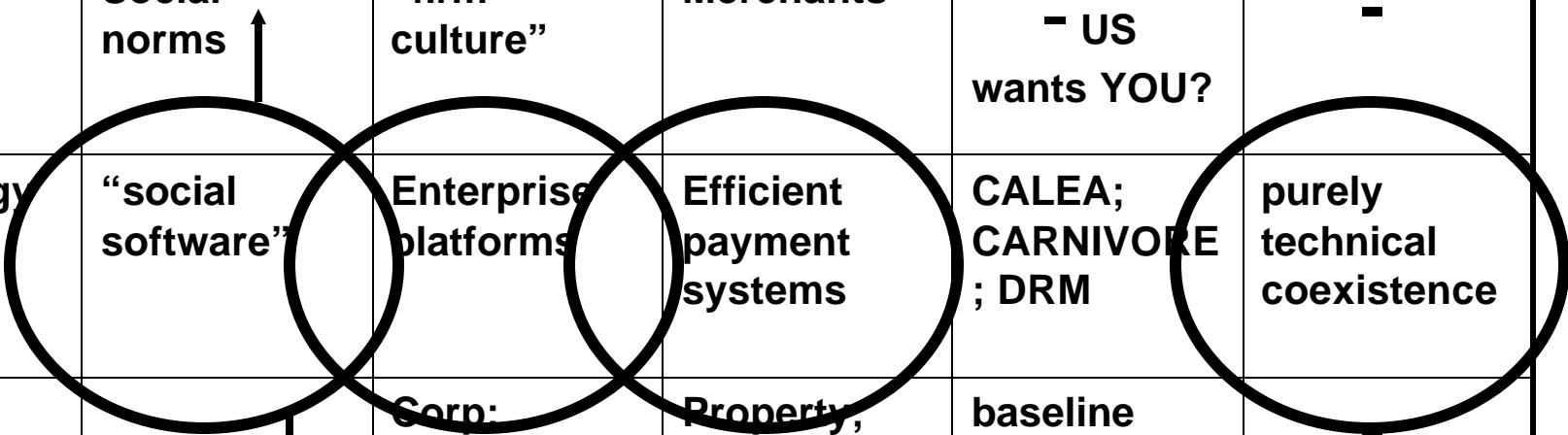
- **Formal rules**
- **Technological mechanisms**
 - **Constraints**
 - **Slash moderation (maximum moderations per period)**
 - **Wireless standards (say, collision avoidance)**
 - **Affordances**
 - **Wiki transparency & revert**
 - **Moderation on Slash**
 - **Collaborative filtering**
 - **Reputation systems (troll filters; eBay)**
 - **Redundancies to overcome failures (clickworkers; BitTorrent)**

Levers used in commons

- **Formal rules**
- **Technological mechanisms**
- **Social mechanisms**
 - **Social norms as behavioral constraints or guides (Wikipedia objectivity)**
 - **Discussion platforms for airing differences (project lists; Wikipedia “talk”; blog comments)**
 - **Quasi-formal, community-enforced mediation or arbitration**

Coordination & cooperation

Trans- actional frameworks/ Levers of constraint & affordance	social sharing & exchange	firms	price system	Govt	parallel existence
contracts	None or vague per transaction	Longer term; emp. & supply	10 widgets for \$1	Regulation; consumer protection	-
norms	Social norms	“firm culture”	Merchants	- US wants YOU?	-
technology	“social software”	Enterprise platforms	Efficient payment systems	CALEA; CARNIVORE ; DRM	purely technical coexistence
law	GPL; cc?	Corp: securities; etc.	Property, contract; NOT per transaction	baseline modality	-



Wrap-up

- **Technological threshold conditions enable individual human agency**
- **Increase the domain of effective action for diverse motivations with complex relationships to money**
- **Peer-production focused on human creativity**
- **Resource sharing for computation and communications resources**
- **Emergence of social sharing & exchange as a substantial modality of economic production**