Open Source Projects

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COSS C02

Agenda

1. Process definition (open source)
2. Project communities
3. Developer-led foundations
4. User-led foundations
5. Labor economics
6. Example governance models
7. Project life-cycle

1. What is an Open Source Project?

The Other Definition of Open Source

“**Open source is a development method** for software that harnesses the power of **distributed peer review** and **transparency of process**. The promise of open source is **better quality, higher reliability, more flexibility, lower cost**, and an **end to predatory vendor lock-in**.” [O10]

The Cathedral and the Bazaar [R99]

- The Cathedral
  - Carefully crafted work
    - Performed by small group
    - Evolves slowly
  - Bugs and problems are tricky, require deep analysis
  - Project is led by command and control approach
  - No early releases nor beta

- The Bazaar
  - Incremental work
    - Performed by large group
    - Evolves rapidly
  - Linus' law: "Given enough eyeballs, all bugs are shallow"
  - Project is lead by convincing people, nudging them on
  - "Release early, release often"

The Linux Kernel and the Linux Foundation

- The Linux kernel
  - Is an operating system kernel
  - Was originally developed by Linus Torvalds
  - Has a hierarchical development model (BDFL)

- The Linux Foundation
  - Is a U.S.-based 501(c)(6) foundation
  - Was founded to protect and stabilize Linux
  - Is now a major home for new open source initiatives

The Apache Way

- Official [A10b]
  - Collaborative software development
  - Commercial-friendly standard license
  - Consistently high quality software
  - Respectful, honest, technical interaction
  - Faithful implementation of standards
  - Security as a mandatory feature

- Curcuru [C17]
  - Charity
  - Community
  - Consensus
  - Merit
  - Open
  - Pragmatic

A “Patchy” Web Server and the ASF

- The Apache Web Server
  - is the most widely used http demon (> 50% market share)
  - gave rise to a new development model, codified as the Apache way
- The Apache Software Foundation
  - Is a 501(c)(3) foundation “in the public interest”
  - Was founded to stabilize and protect the Apache open source software

Open Collaboration [R+09]

- **Open Collaboration**
  - **Egalitarian**
    - Open for contribution
    - Everyone can contribute
  - **Meritocratic**
    - Public discussion process
    - Decisions based on merit
  - **Self-organizing**
    - People find their process
    - People find their project

- Traditional Work
  - Hierarchical
    - Closed and hidden silos
    - Assigned to project
  - Status-based
    - Public + private discussions
    - Hierarchical status decides
  - Assigned tasks
    - Prescribed process
    - Prescribed jobs

Open Source Project (= People + Software)

- An **open source project** is
  - Not a project but rather a piece of software
  - Provided under an open source license
  - **Developed by a community of people**
  - **Using the principles of open collaboration**

- A community of people here is a
  - Group of people independent of each other
  - That relate to and collaborate with each other
  - For a shared common goal of the software

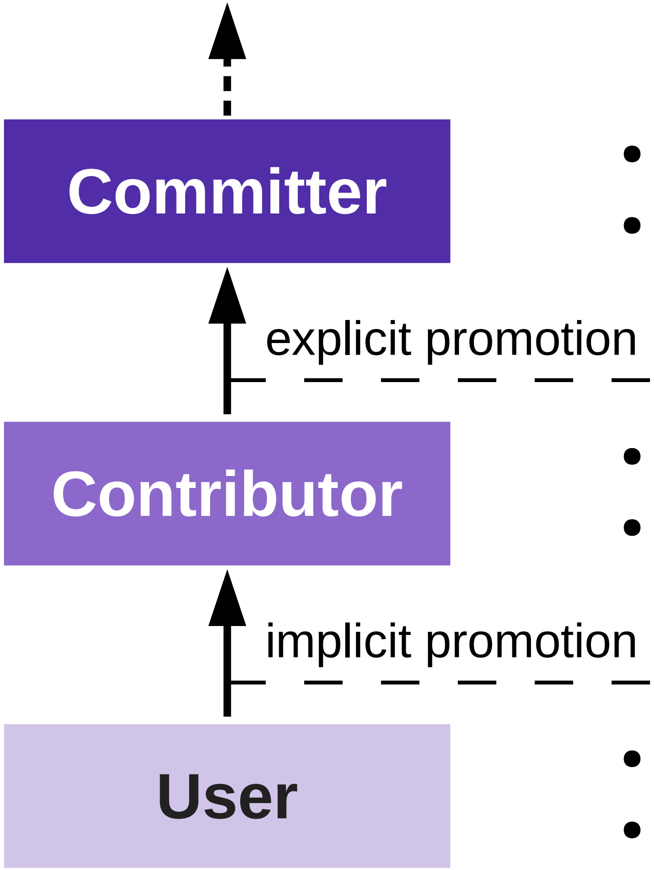
- Apache’s definition of independence
  - At least from three different legal entities
  - Legal entities = {juristic person, natural person}
  - Called committer diversity

2. Project Communities

Open Source Project Community

- An **open source project community** is
  - The group of people and companies engaged in an open source project
- The **developer community** is
  - The subset of the project community that is developing the software
- The **user community** is
  - The subset of the project community that is using the software

The Basic Career Path [R15a]



Committer

explicit promotion

Contributor

implicit promotion

User

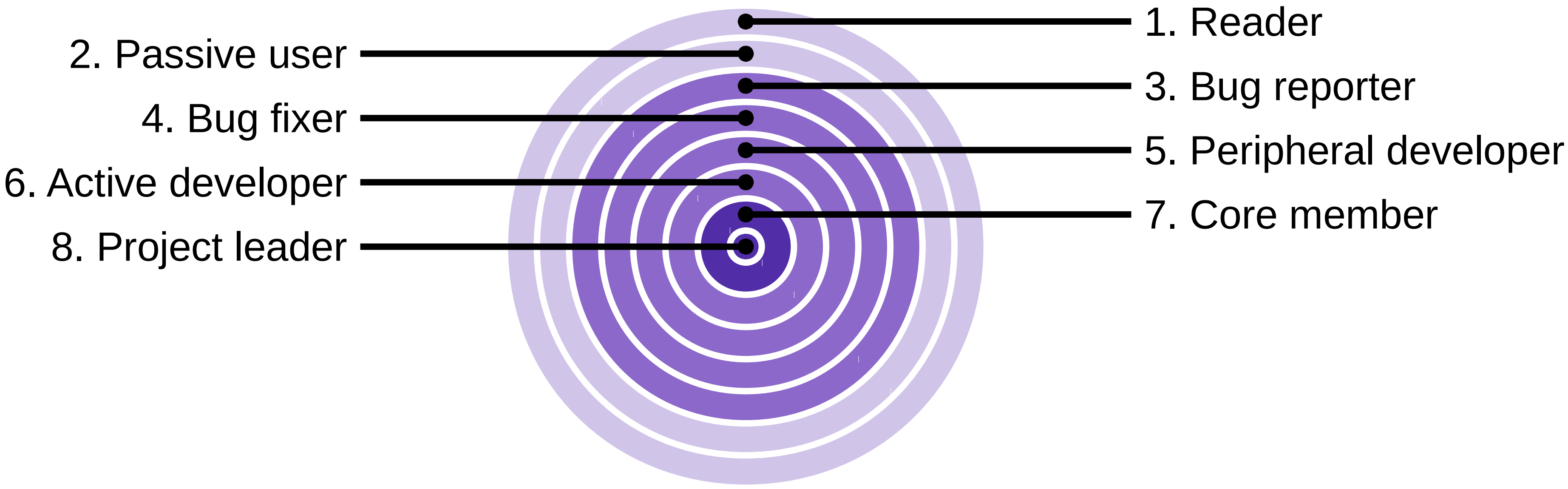
- Has commit (write) rights
- Performs bulk of the work, patch review

- Provides small features, bug fixes
- Submits patches (no commit right)

- Knows and uses software
- If so, helps with comments, feedback

[1] Committers are called “maintainer” (mostly in the Linux context)

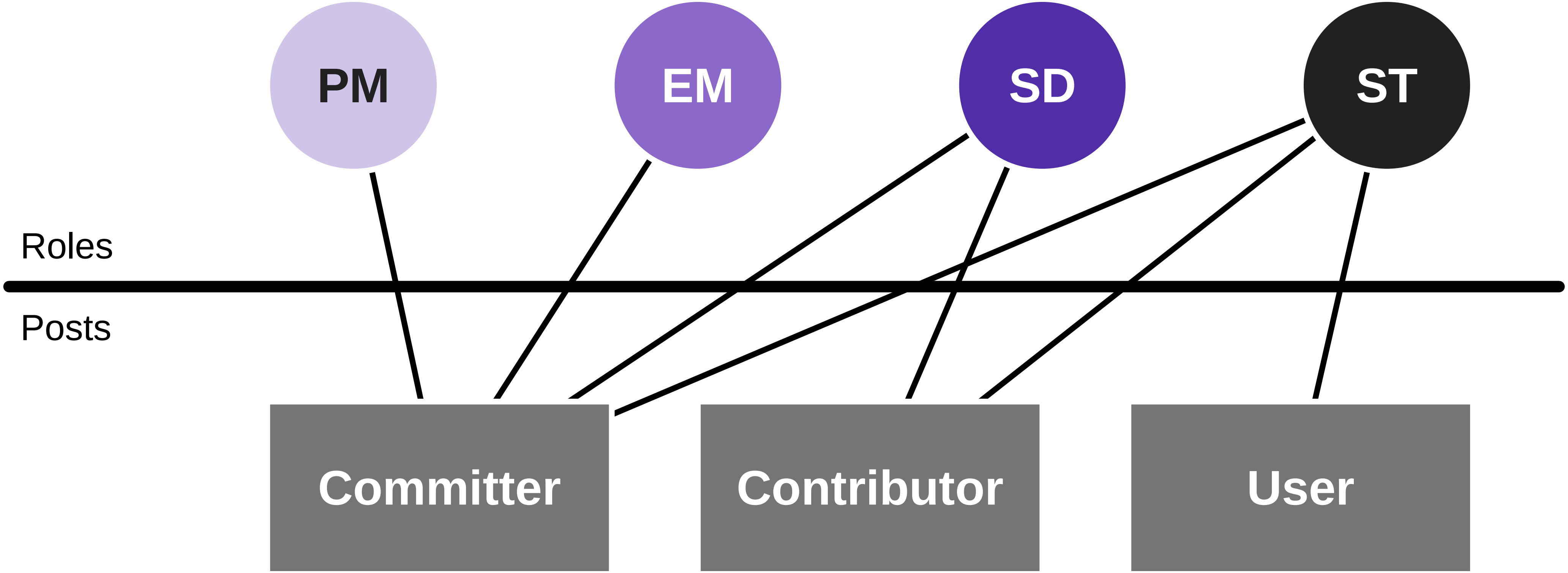
The Onion Model [CH11]



1. Reader
2. Passive user
3. Bug reporter
4. Bug fixer
5. Peripheral developer
6. Active developer
7. Core member
8. Project leader

User	Contributor	Committer

Roles and Posts in Open Source Projects



Product Management in Open Source

- Strategic product management
  - Does not take place in open source
- Technical product management
  - Product roadmapping
    - Some is performed but often is ad-hoc
  - Product specifications
    - Barely exist as documents (wikis, to-do lists, other)
  - Progress tracking
    - Managed by time, it is done when it is done

Engineering Management in Open Source

- Release planning
  - See product management: Some is performed but often is ad-hoc
- Resource allocation
  - Committers can prod contributors
  - Usually contributors pick up what they like to work on
- Process improvement
  - Ad-hoc, if any

Software Development in Open Source

- Programming
  - Like in closed source, but in general with less visibility as to completion

Quality Assurance in Open Source

- Code review
  - Is the core ingrained best practice followed by open source projects
- Automated testing
  - Like in closed source, though perhaps a bit more ad-hoc in general
- Manual testing
  - A lot of user testing, significantly more than in closed source
- Release management
  - Like in closed source, committers play release manager

Governance

- Governance is
  - The set of processes, practices, institutions, and roles used to lead and manage a social system

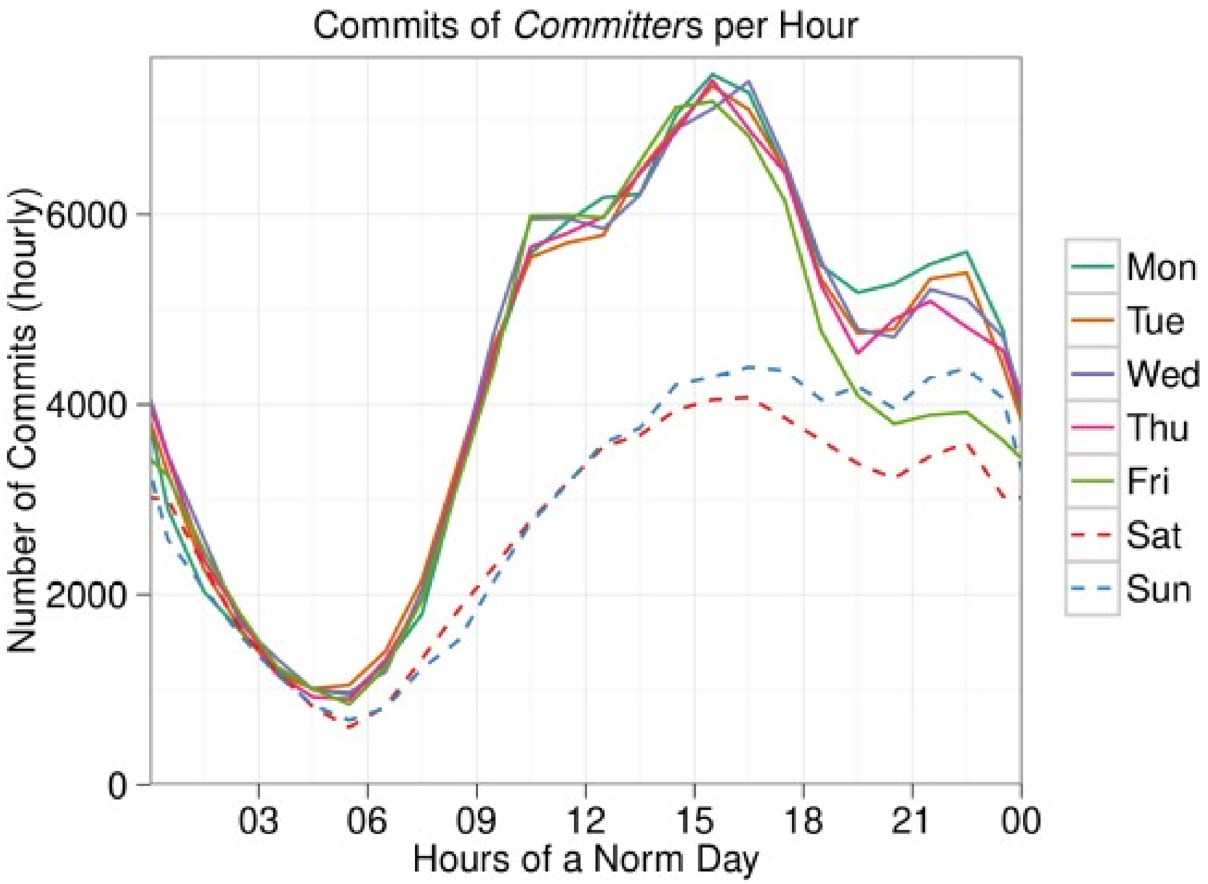
Governance Models

- The BDFL (“benevolent dictator for life”)
- The peer group (cf. Apache)
- The do-ocracy

Work on the Linux Kernel 2.6.20

“At least 65% of the code which went into 2.6.20 was created by people working for companies.” [C07]

Daily and Weekly Work in Open Source Projects [R+14]



3. Developer-led Foundations

Developer-led Open Source Foundations (Recap)

- An **developer-led open source foundation** is
  - a **non-profit organization** (foundation, consortium)
  - with the purpose of **managing and performing the development** of
  - **non-differentiating open source software**
  - made available to foundation members and **the general public**
- Typical members of a developer-led foundation are
  - Individual developers
  - Software vendors
  - Service providers
  - Consulting firms

Motivation for Developer-led Foundations (Recap)

1. Support and protect people and their projects
    - Protect developers from lawsuits
    - Accept donations; manage books
    - Legally represent project interests
2. Create a stronger more competitive ecosystem
    - Increase share of customer wallet
    - Reach more price-sensitive customers
    - Grow addressable market
3. Create a fair and equal playing field for members
    - Regulate access to intellectual property
    - Regulate access to marketing channels
    - Regulate product roadmap and development

Solutions to Abuse of Relevant Property Ownership

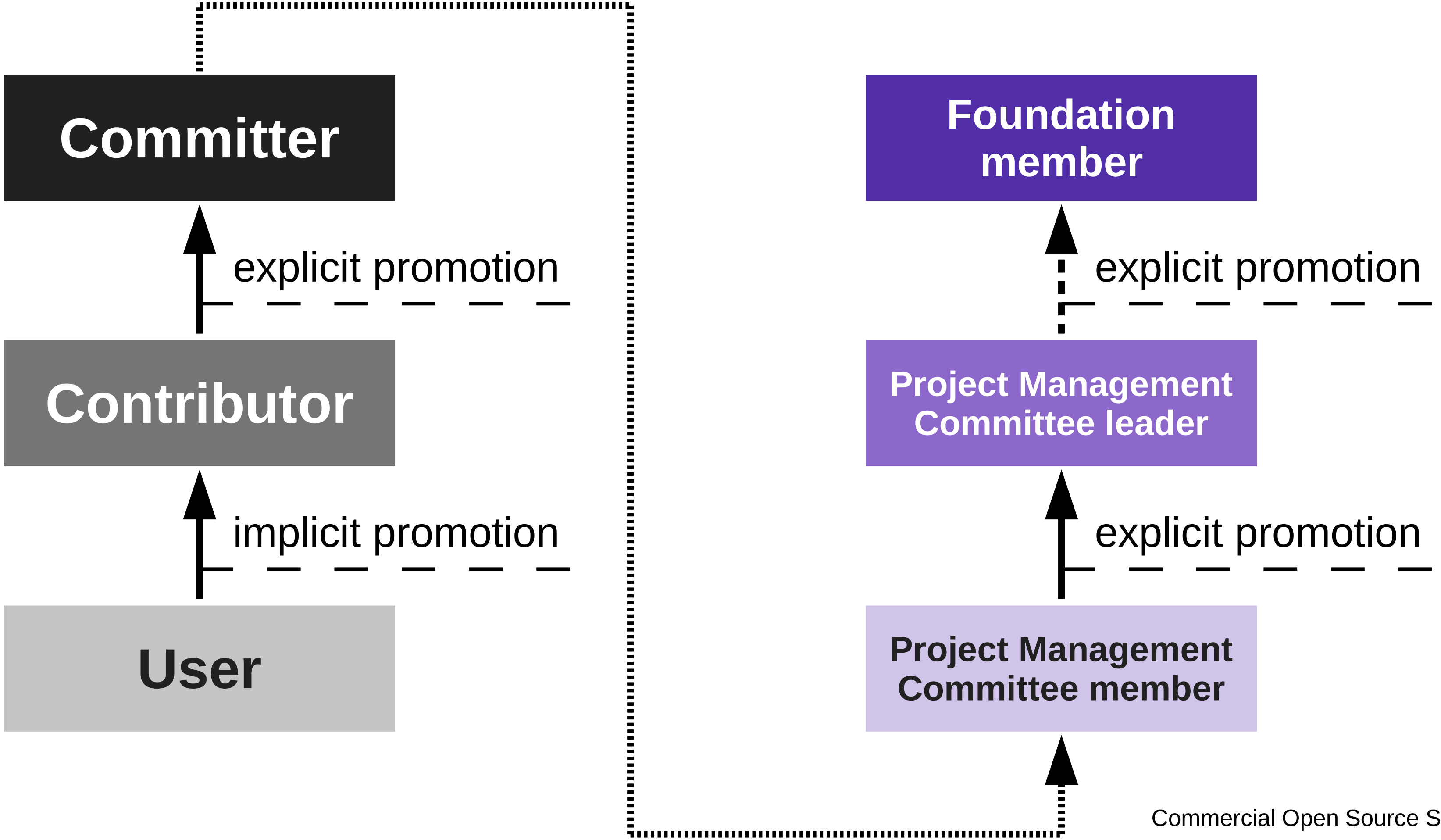
- The foundation becomes the owner of all relevant (“chokepoint”) properties
  - Re: **copyright**
    - The foundation acquires copyright via contributor license agreement
    - The foundation licenses out using an agreed-upon open source license
  - Re: **patent rights**
    - The foundation chooses an open source license with a patent usage rights grant
    - The foundation arranges for a FRAND [1] patent usage rights grant (uncommon)
  - Re: **trademark rights**
    - The foundation acquires all necessary trademark rights
    - The foundation clarifies access to and usage rights of trademarks
  - Re: **other properties** (e.g. domain names)
    - The foundation acquires them and handles them appropriately

[1] FRAND = “fair, reasonable, and non-discriminatory”

Solutions to Abuse of Control of Position of Power

- The foundation defines governance processes that resolve project strife
  - Re: **social leadership**
    - The foundation sets-up appropriate processes to avoid strife in the first place
    - If necessary, the foundation can still step in if project leaders misbehave
  - Re: **committer rights**
    - See abuse of social leadership

The Extended (Foundation) Open Source Career Path



Committer

explicit promotion

Contributor

implicit promotion

User

Foundation member

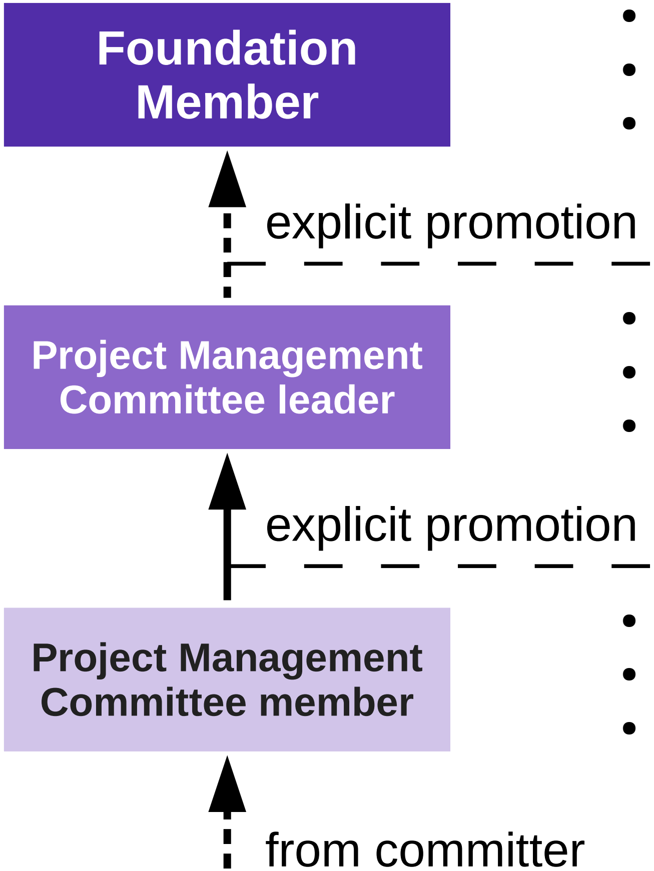
explicit promotion

Project Management Committee leader

explicit promotion

Project Management Committee member

Tasks and Purpose of New Positions



Foundation Member

- Has interest of foundation at heart
- Acts as coach, markets, represents
- Engages in internal discussions

explicit promotion

Project Management Committee leader

- Leads project management committee
- Coordinates with other PMCs
- Steers industry platform

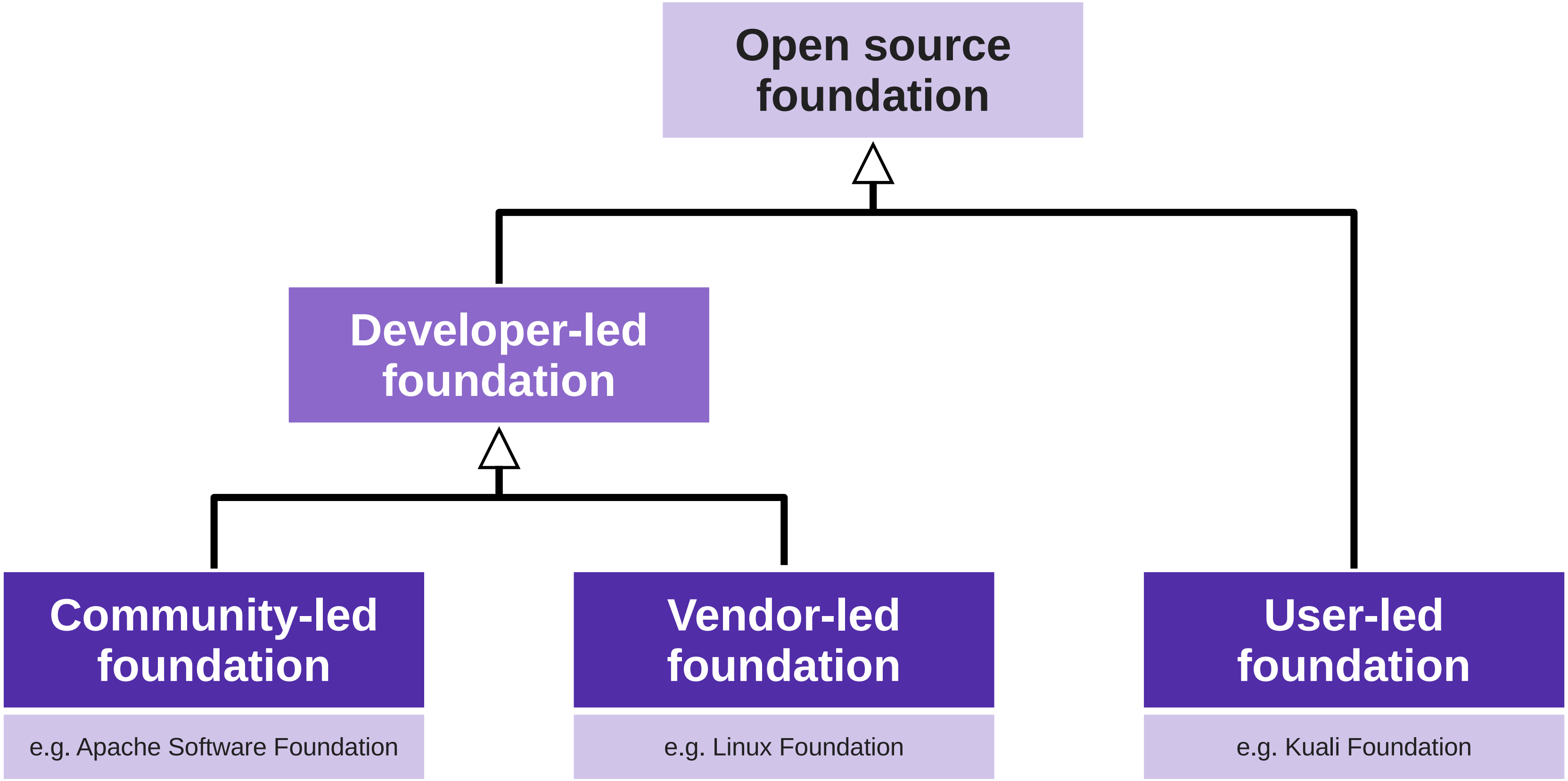
explicit promotion

Project Management Committee member

- Contributes to project management
- Helps steer industry platform
- Often (not always) active in project

from committer

Types of Open Source Foundations (Recap)



Open source foundation

Developer-led foundation

Community-led foundation

e.g. Apache Software Foundation

Vendor-led foundation

e.g. Linux Foundation

User-led foundation

e.g. Kuali Foundation

Dysfunctions of Vendor-led Foundations

- Misuse of projects as marketing channels
- Special provisions in bylaws for ensuring influence

4. User-led Foundations

User-led Open Source Foundation (Consortium)

- A **user-led open source consortium** is
  - a **non-profit organization** (foundation, consortium)
  - with the purpose of **funding and managing the development** of
  - **non-differentiating open source software**
  - made available to foundation members and **the general public**

- Typical members of a user foundation are
  - Software user firms
  - Software vendors
  - Consulting firms
  - Service suppliers

Example User-led Foundations

FINOS Fintech Open Source Foundation

apereo Foundation

OSADL Open Source Automation Development Lab eG

OSEHRA Open Source Electronic Health Record Alliance

open KONSEQUENZ

THE OPEN LIBRARY FOUNDATION

Bahmni™

OGC® Making location count.

ASWF /* ACADEMY SOFTWARE FOUNDATION

OpenLMIS

openIMIS

LibLime Empowering Librarians

kuali FOUNDATION

GENIVI®

THE AUTOWARE FOUNDATION

OPENELIS GLOBAL

openMDM Measured Data Management

3MF CONSORTIUM

PATH FOUNDATION

GRAMEEN® FOUNDATION

OpenMRS

GNUHealth

OPEN EDUCATION CONSORTIUM The Global Network for Open Education

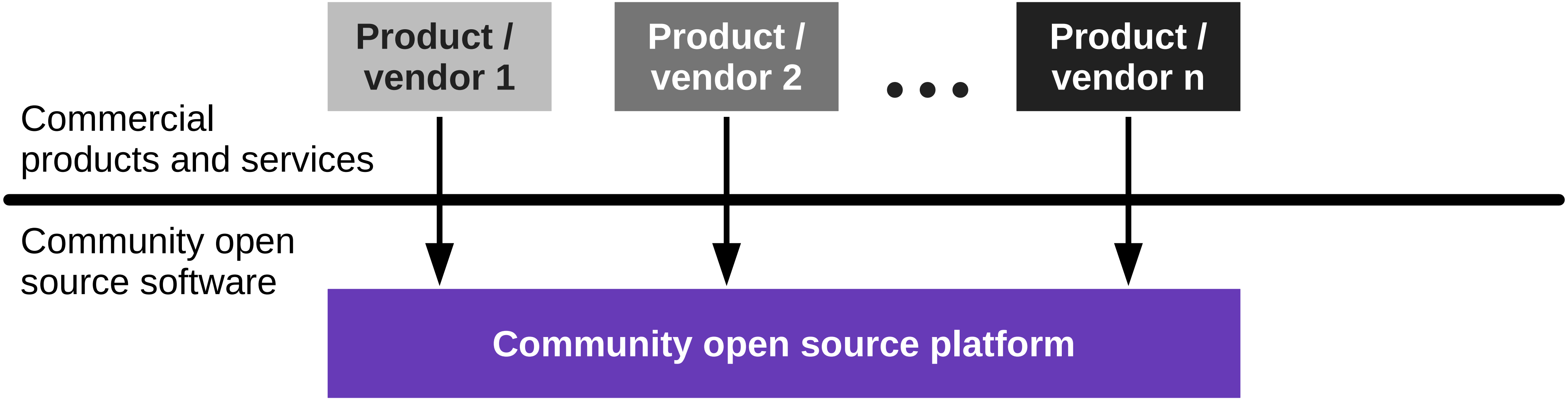
jembi

Purpose of a User-led Foundation

- To get rid of or reduce the problems of vendor lock-in
  - High total cost of ownership
  - Innovation blockage
  - Operational risk

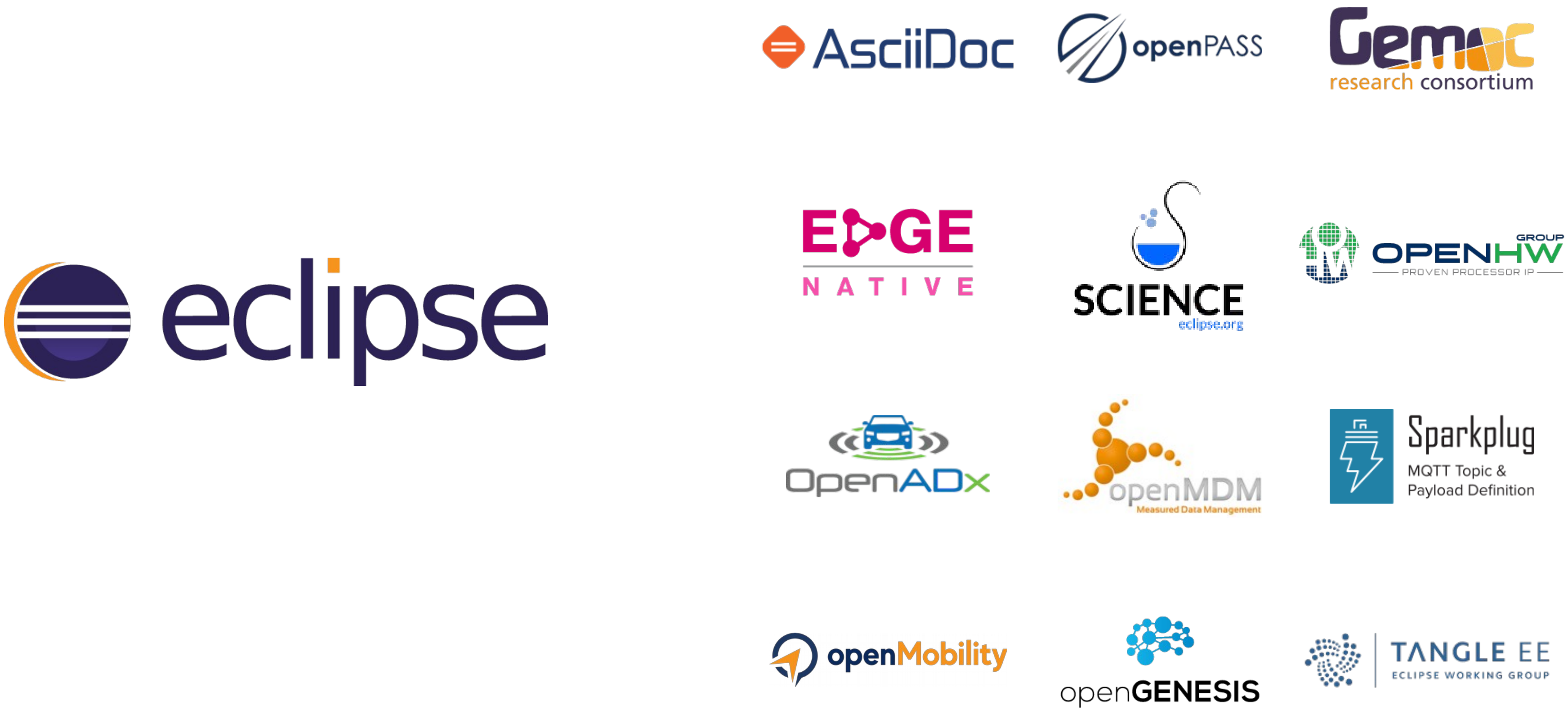
- By establishing a supplier ecosystem
  - For software products and services that
  - Is based on community open source software and
  - Conforms to the economics of the sponsors

Software and Services Ecosystem of Suppliers



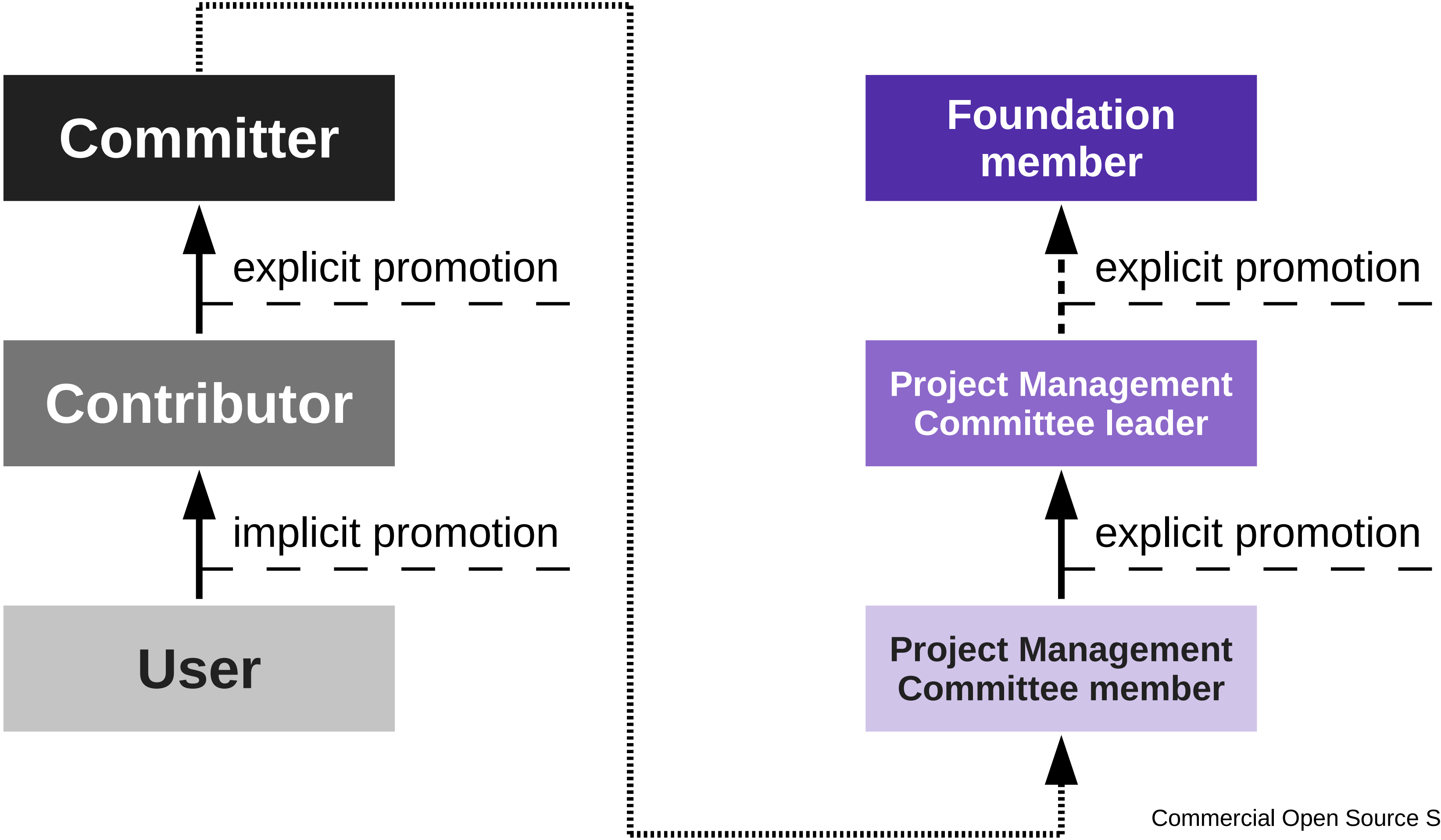
Product / vendor 1
Product / vendor 2
• • •
Product / vendor n
Commercial products and services
Community open source software
Community open source platform

The Next Billion Dollar Opportunity

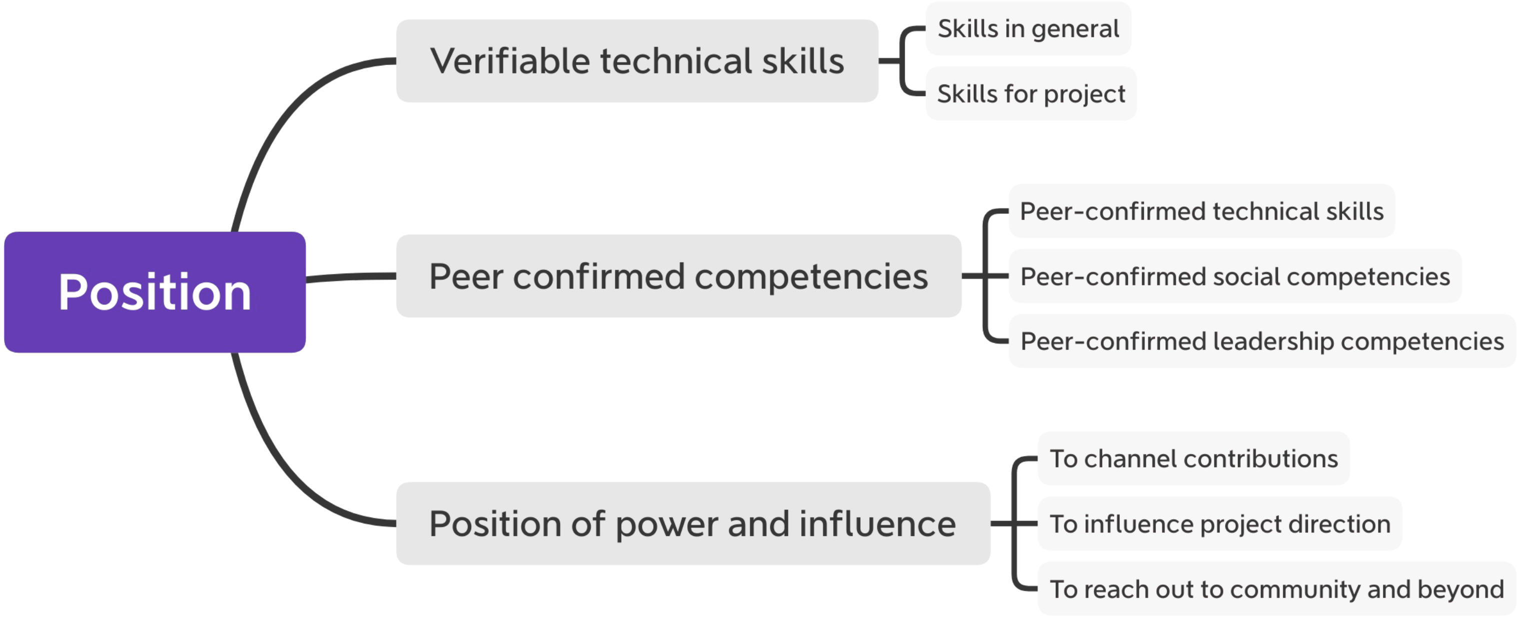

eclipse
AsciiDoc
openPASS
Gemoc research consortium
EDGE NATIVE
SCIENCE eclipse.org
OPENHW GROUP PROVEN PROCESSOR IP
OpenADx
openMDM Measured Data Management
Sparkplug MQTT Topic & Payload Definition
openMobility
openGENESIS
TANGLE EE ECLIPSE WORKING GROUP

5. Labor Economics

Position in Project = Status (Recap)



Value of Status in Open Source Project to Employers


Position
Verifiable technical skills
Skills in general
Skills for project
Peer confirmed competencies
Peer-confirmed technical skills
Peer-confirmed social competencies
Peer-confirmed leadership competencies
Position of power and influence
To channel contributions
To influence project direction
To reach out to community and beyond

Resulting Value to Developer

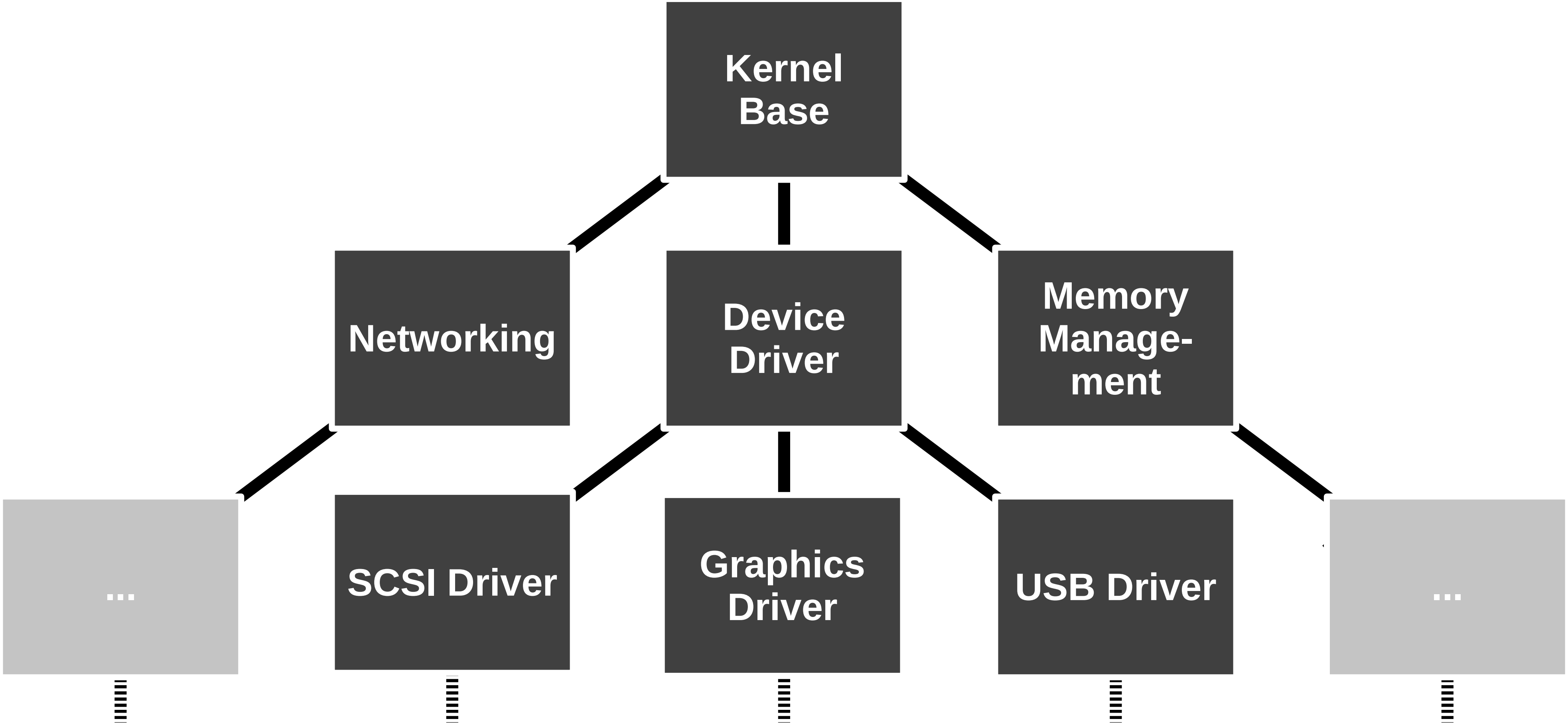
- Better negotiation position
- Higher job security
- Richer job experience

The Developer Labor Market

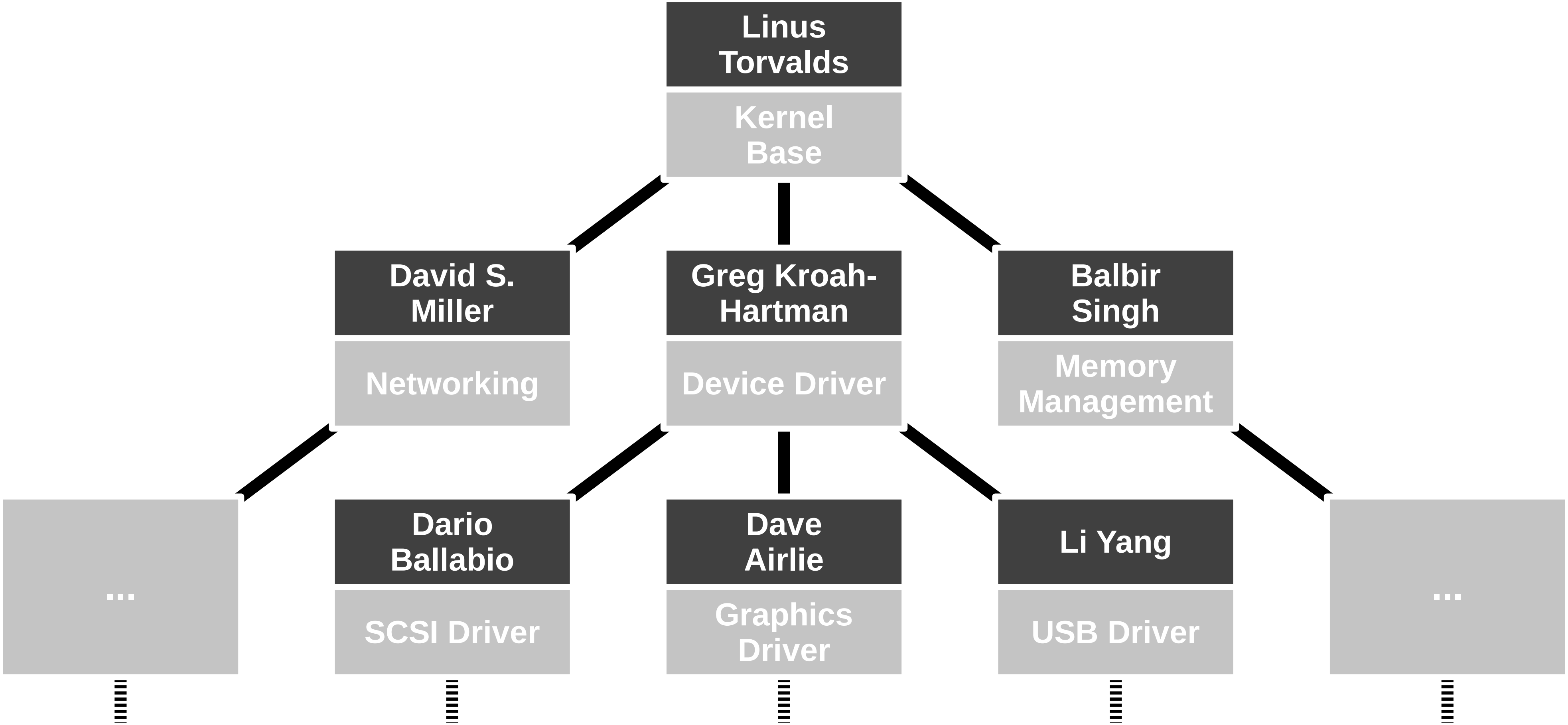
- A weaker position towards an employer
  - Because of more competition in general
- A stronger position towards an employer
  - If can get a coveted open source position

6. Example Governance Models

Illustration of the Code Architecture of the Linux Kernel



The BDFL Model or Conway's Law Applied



Commercial Open Source Startups

Engineering Management in PostgreSQL

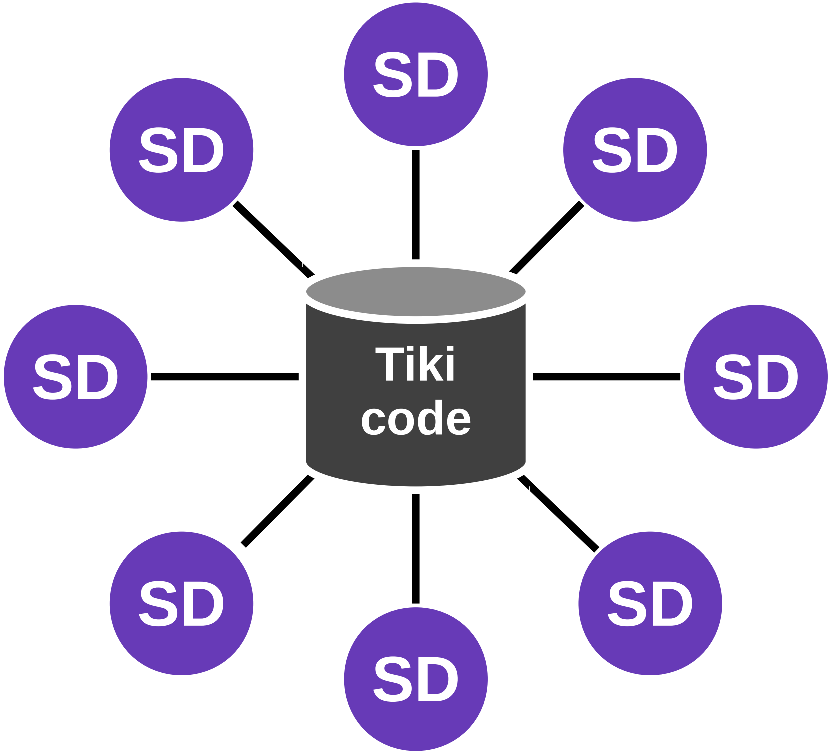
- Core team (long-term stable six members)
  - Coordinate release management activities
  - Facilitate consensus building process
  - Decide if community consensus fails
  - Administer major assets (website, repository)
- 20+ major contributors (committers)
  - Have commit rights, contribute to code base
- (Regular) contributors
  - Contribute to code base through committers
- “Hacker Emeritus” and past contributors

Product Management in PostgreSQL

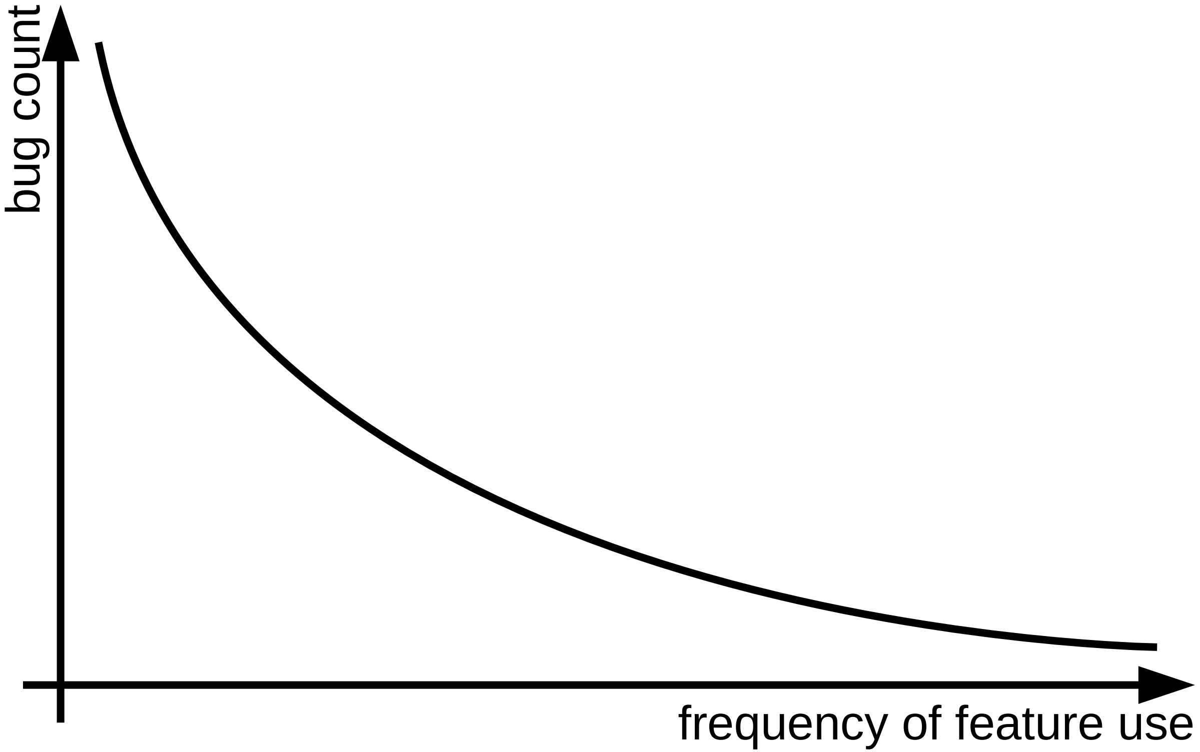
- Product roadmap is defined by core team [2]
- Product backlog is maintained as a to-do list
- There is no prioritization: “Pick your feature”
- Community uses user polls for market research

Tiki’s Do-ocracy

- Tiki has a plug-in based software architecture
- Everyone gets access (upon request)
- Has strong code ownership



An Example of “Just Good Enough”

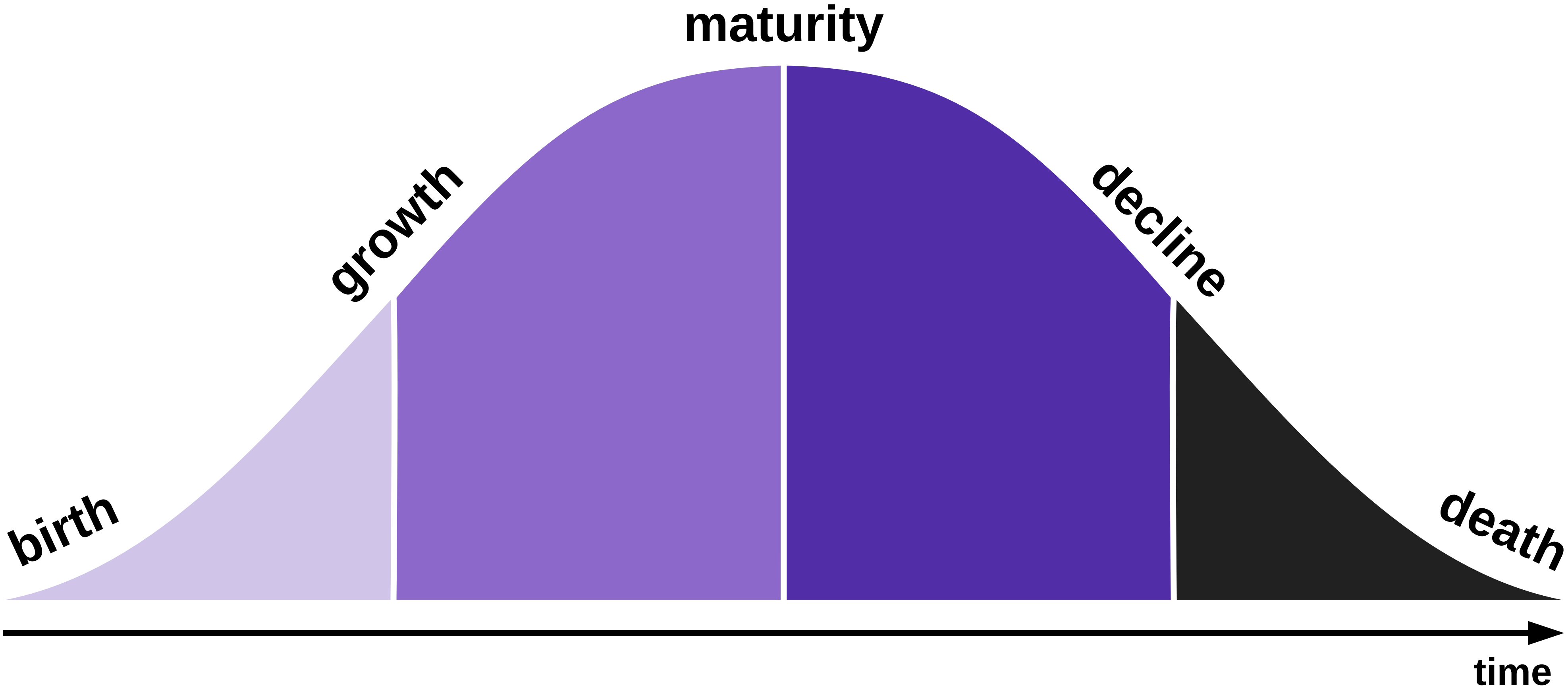


Three Different Governance Models

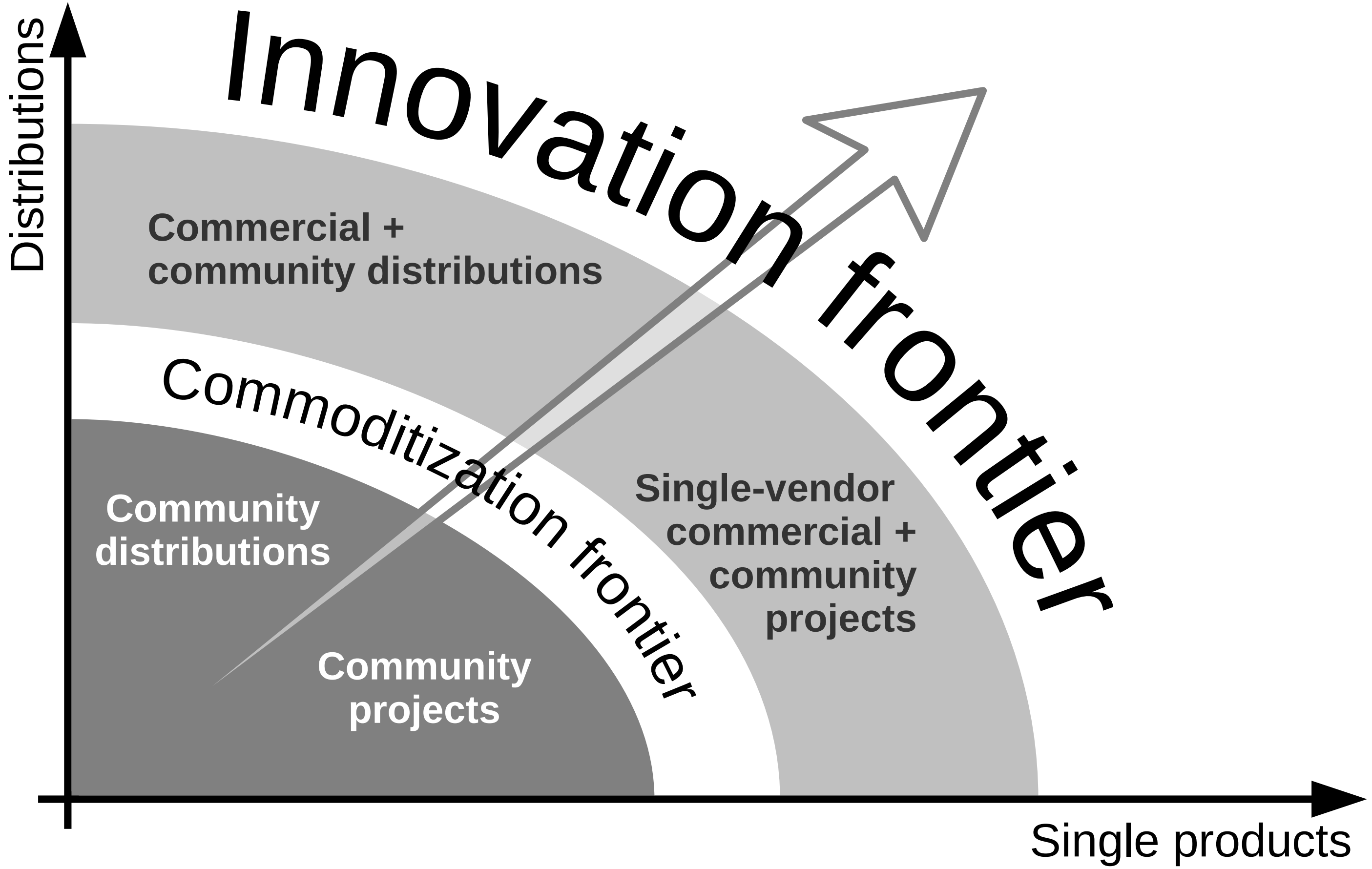
- The BDFL Model
  - Hierarchical with strong code ownership
  - Example: The Linux kernel
- The Peer Group model
  - Core group of committers and evangelists
  - Example: The PostgreSQL RDBMS
- The Do-ocracy
  - Those who do, rule
  - Example: Tiki Wiki CMS Groupware

7. Project Life-cycles

Life-cycle of Open Source Projects (Similar to Products)



Innovation and Commoditization



Summary

1. Process definition (open source)
2. Project communities
3. Developer-led foundations
4. User-led foundations
5. Labor economics
6. Example governance models
7. Project life-cycle

Thank you! Questions?

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Credits and License

- Original version
  -
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- Contributions
  - None yet