

Lecture 1

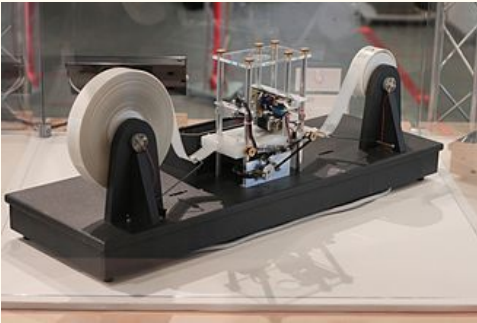
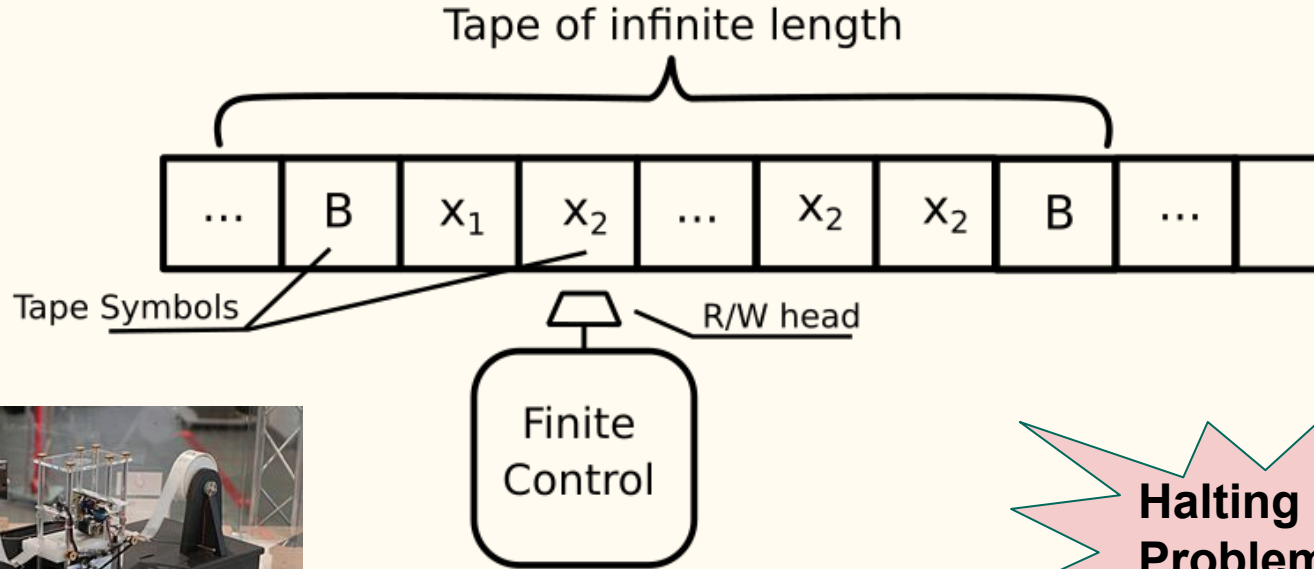
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Blockchain Basics and Open Source Principles

A history of computing and Ethereum

What is 3 in Web3?

[1939] Turing machine / Turing Completeness



Turing - The cost of memory



1TB Crucial P3 SSD M.2 2280
PCIe 3.0 x4 3D-NAND QLC

Static, private memory



OVH.com

XaaS, on cloud



Decentralized ledger

[1951] UNIVAC I - computers commercially available

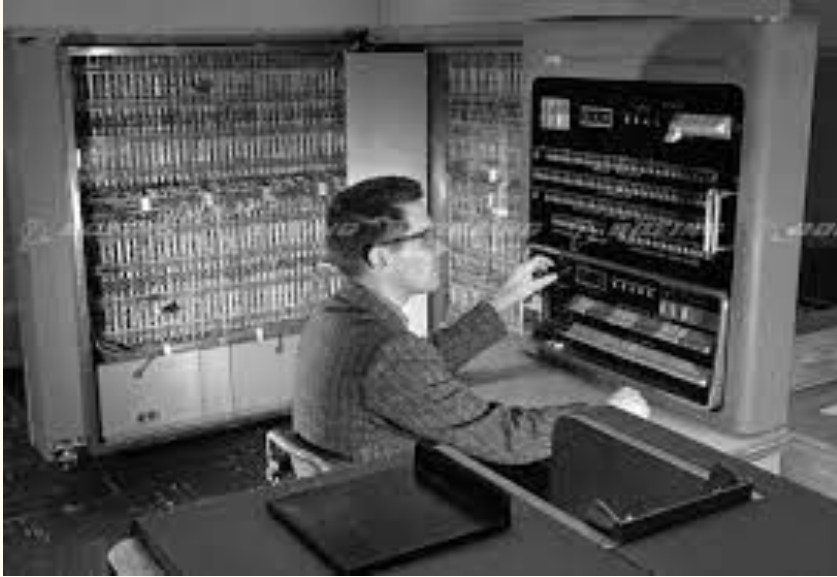


Filled a room

Available only to government
and universities

Maintenance was extremely
difficult and niche

[1952] IBM and PACT - birth of open source



IBM Type 701

Composed of 11 "compact" units

\$12,000 monthly rental

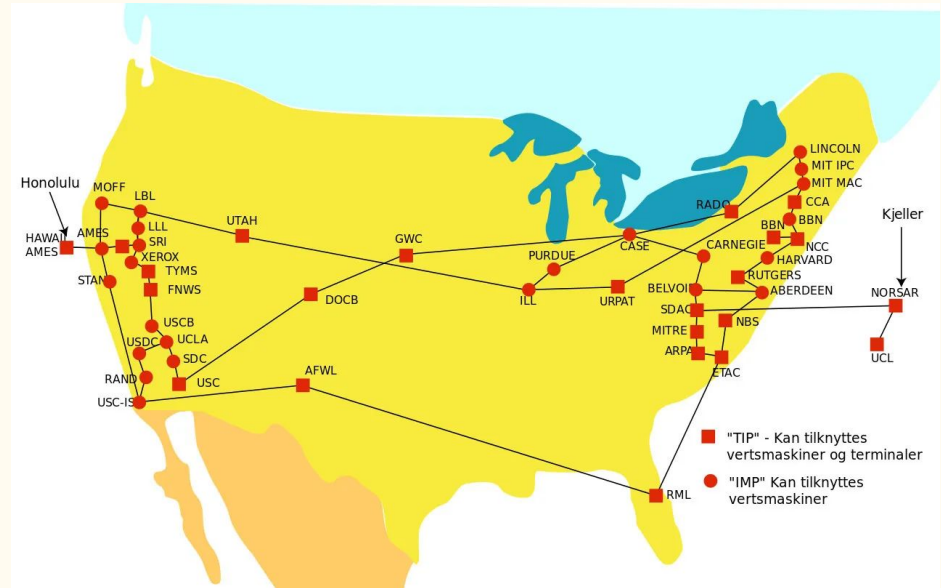
1 william tube = 1kb

Project for the Advancement
of Coding Techniques
(PACT)

[1960s - 1983] Birth of the Internet



ARPANET \rightarrow TCP/IP



Cypherpunks Movement - Secure, Anonymous, Independent

- ❖ Many attempts to create a digital currency and break free from traditional banking
 - eCash by David Chaum in 1983
 - Blockchain tech is not new!
 - HashCash, eGold, BitCash
- ❖ Lacked awareness, suffered from attacks, used for dark web activities



[1991] Web1 - Static age of information

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) ,[Mail robot](#) ,[Library](#))

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

[2000s] Web2 - Dynamic age of interaction



Websites able to respond to user input

Storage of user information (risk!)

Users now interact with each other and leave reviews (asymmetrical information)



[2008] Web 3 - Age of decentralization



Wallet addresses instead of user information

Extreme transparency without identity

No central authority, truth must be agreed upon - consensus

What is blockchain technology?

Anonymous computers voting on the truth

This truth is transparently recorded in block format

[2013] Ethereum - A Turing Complete State Machine

Ethereum World State Merkle Patricia Trie

EOA,
list of transactions

To

Smart contracts
Address, contract, event tries
.....



Externally Owned Accounts

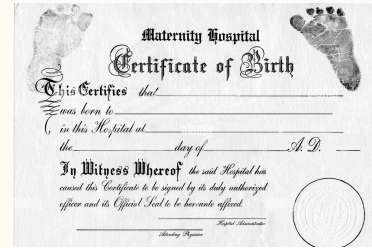
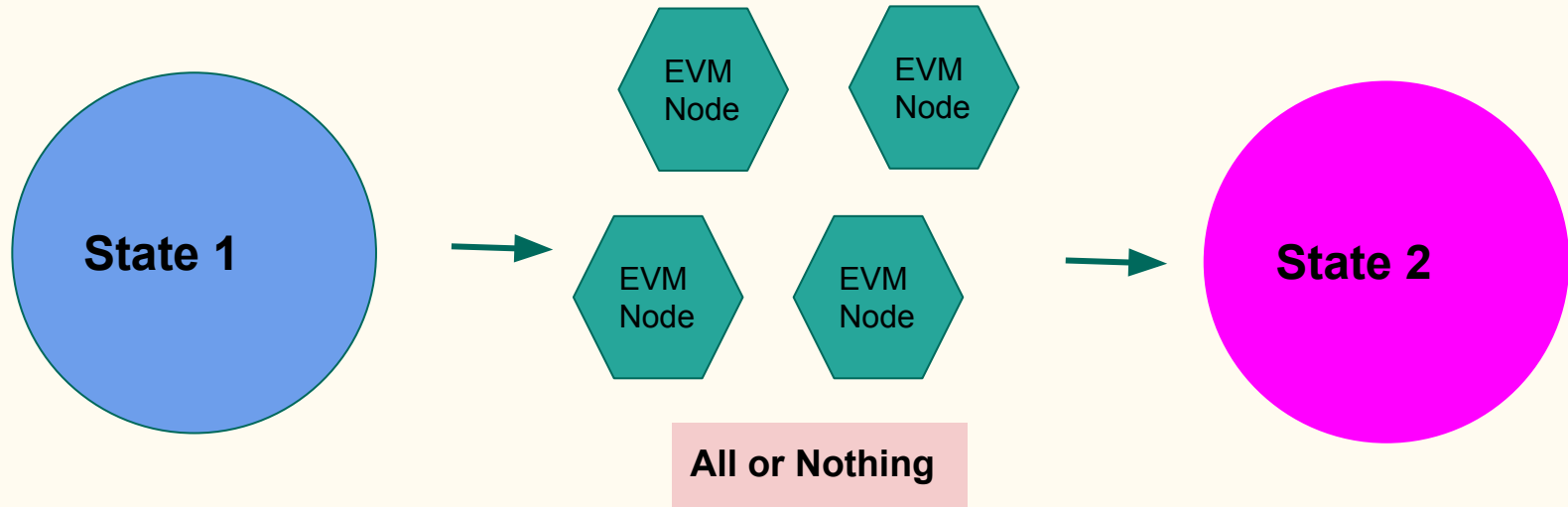
- No Code, no data
- Public/private keys
- Hardware, software



Smart Contracts

- Hash of code and data storage
- Needs a sender address

Ethereum - A Turing Complete State Machine



Open Source

The principle that inspired Decentralization

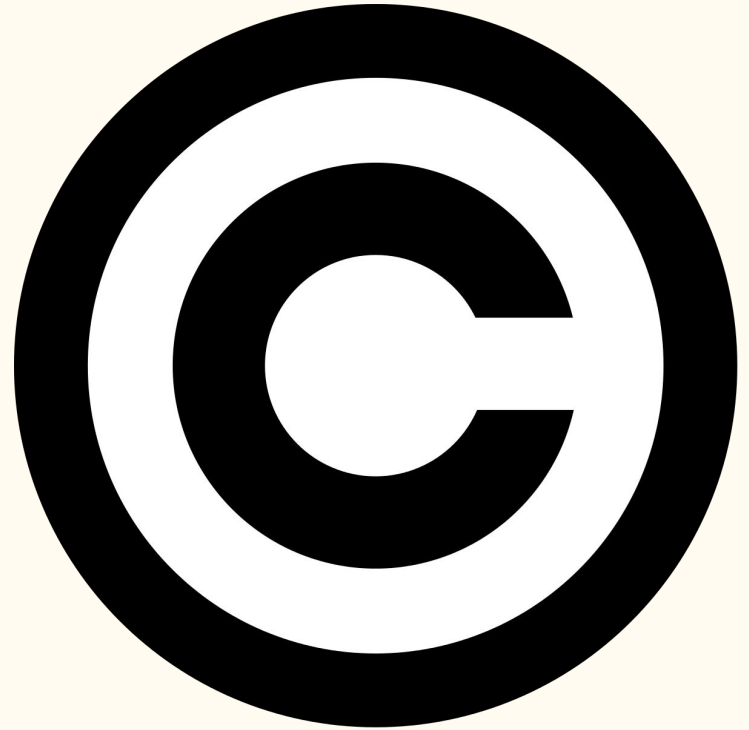
Free Software Movement



4 Fundamental Freedoms

Purpose Freedom to run the program as you wish, for any purpose.	Knowledge Freedom to study and modify the program.
Solidarity Freedom to distribute your creations to help others	Community Freedom to redistribute changes and improvements for the benefit of the community

Battle of the Copies - Left vs Right



Open Source Licensing - The corporate strikes back

Permissive



BSD

- Do what you want
- You can copyright your version
- Don't sue me
- No marketing? (BSD3)
- Can withdraw (Apache2)

Copy Left

Weak



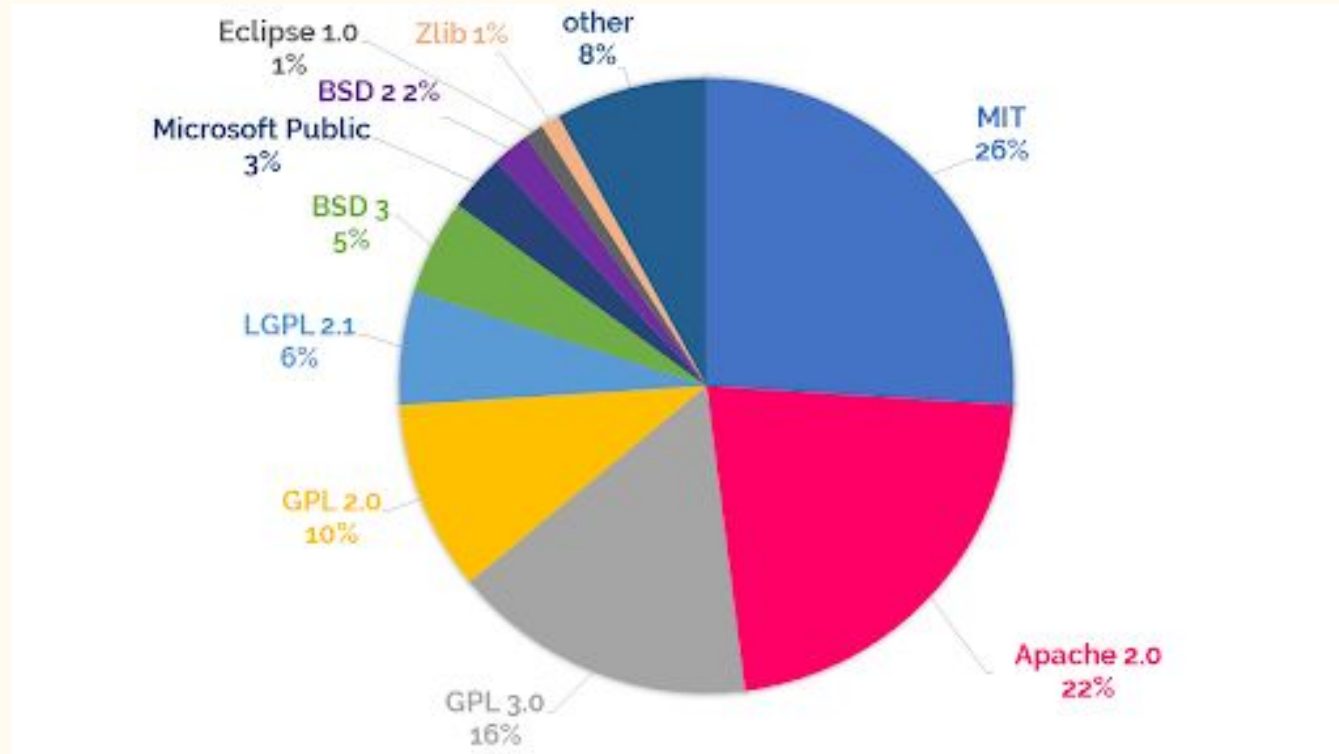
- Must show source code of the original or direct modification
- your own code can be proprietary (use original as library)

Strong



- Must show source code!
- If you use this code, your code must also be show
- Known as 'viral'

Open Source Licensing - current distribution



Source:

<https://www.activestate.com/blog/the-developers-guide-open-source-software-license-comparison/>

Open Source Communities

Metrics and Incentives

Open Source Orgs

Author - Original creator of project

Owner - Highest admin. Can be author or someone else

Maintainers - Core dev group, responsible for project vision and roadmap.
Sometimes divided into committees.

Keep the community healthy and engaged.

Align on the vision and roadmap

Approve contributors' work

Manage commercialization - Sponsors,

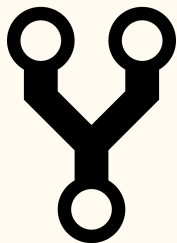
Enterprise maintenance

Creates new features, bug fixes.
Provides feedback, UX

Contributors - Adds technical or material content to the project.

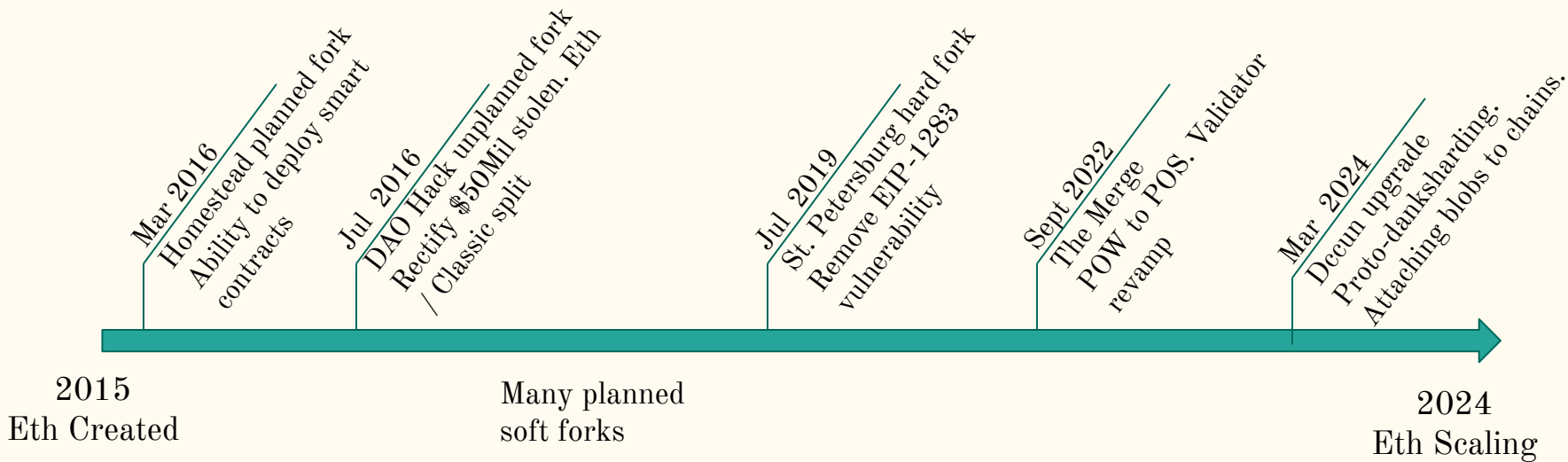
Community Member - Uses the software, provides feedback.

Drastic changes in vision? Hard Fork!



The chain splits into 2. The classic chain is preserved and the new chain begins. No backwards compatibility with the old version.

This operation is very intensive! All nodes upgrade to include new rules, dApps must find way to port users from old to new chain.



Types of Contributors

Technical	Content	Community
<p>New comers:</p> <ul style="list-style-type: none">- Good first issue- Code cleanliness, linting <p>Seasoned devs:</p> <ul style="list-style-type: none">- Propose new features- Roadmap assistance- Bug fixes- PR review support- Mentorship	<ul style="list-style-type: none">- Translations- Project Documentation- Tutorials- Learning materials (eg. Quizzes)	<p>Ambassadors:</p> <ul style="list-style-type: none">- Host events to grow community.- Measure engagement- Pass issues to devs to resolve <p>Platform Managers:</p> <ul style="list-style-type: none">- Social media presence- Resolve conflict, marketing

Open Source Metrics

Developer Metrics

Monthly Active Developers - How many new github accounts contributing?

Full time vs part time vs one time devs

Dev localisation - some countries / cities more active than others

Repo Metrics

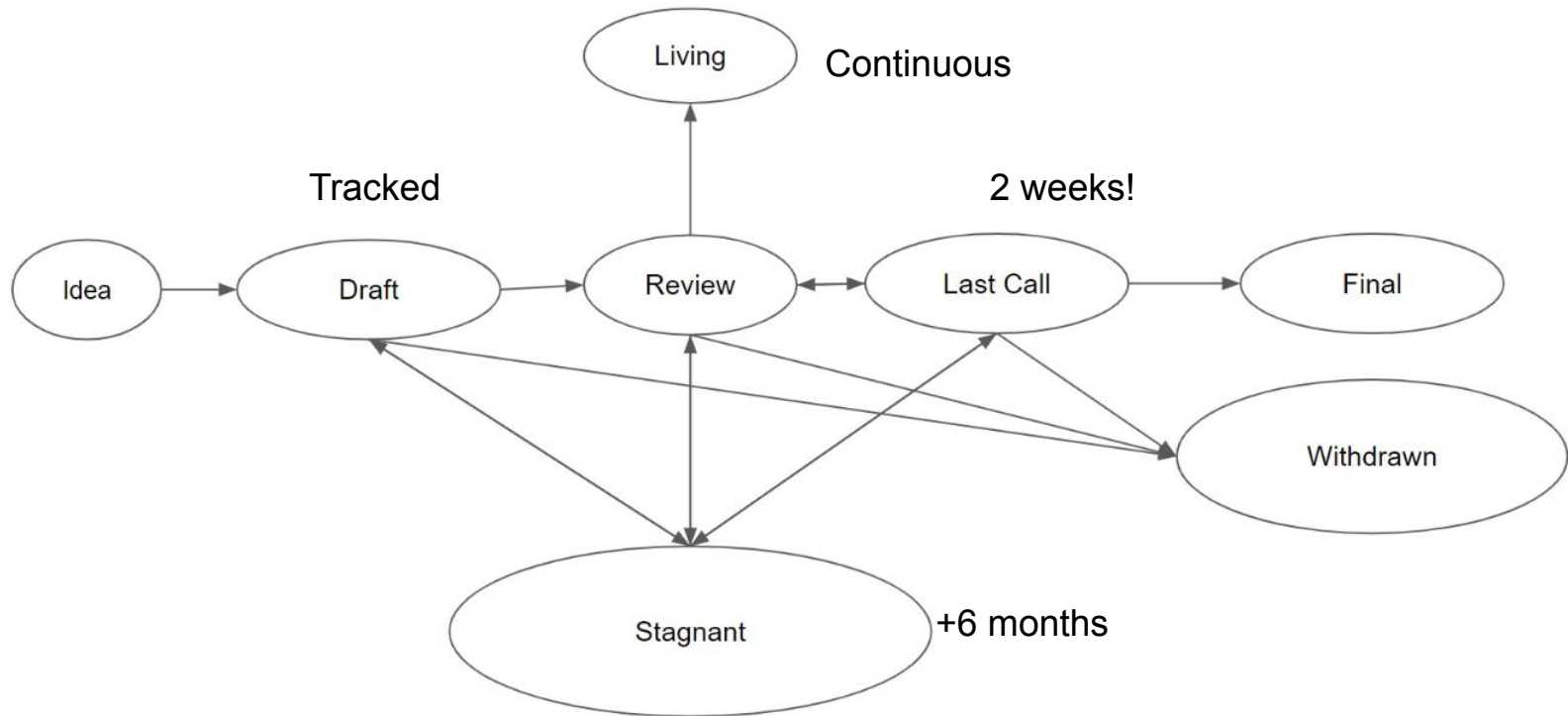
of PRs, issues - open and close rates

of Stars and Forks - level of interest

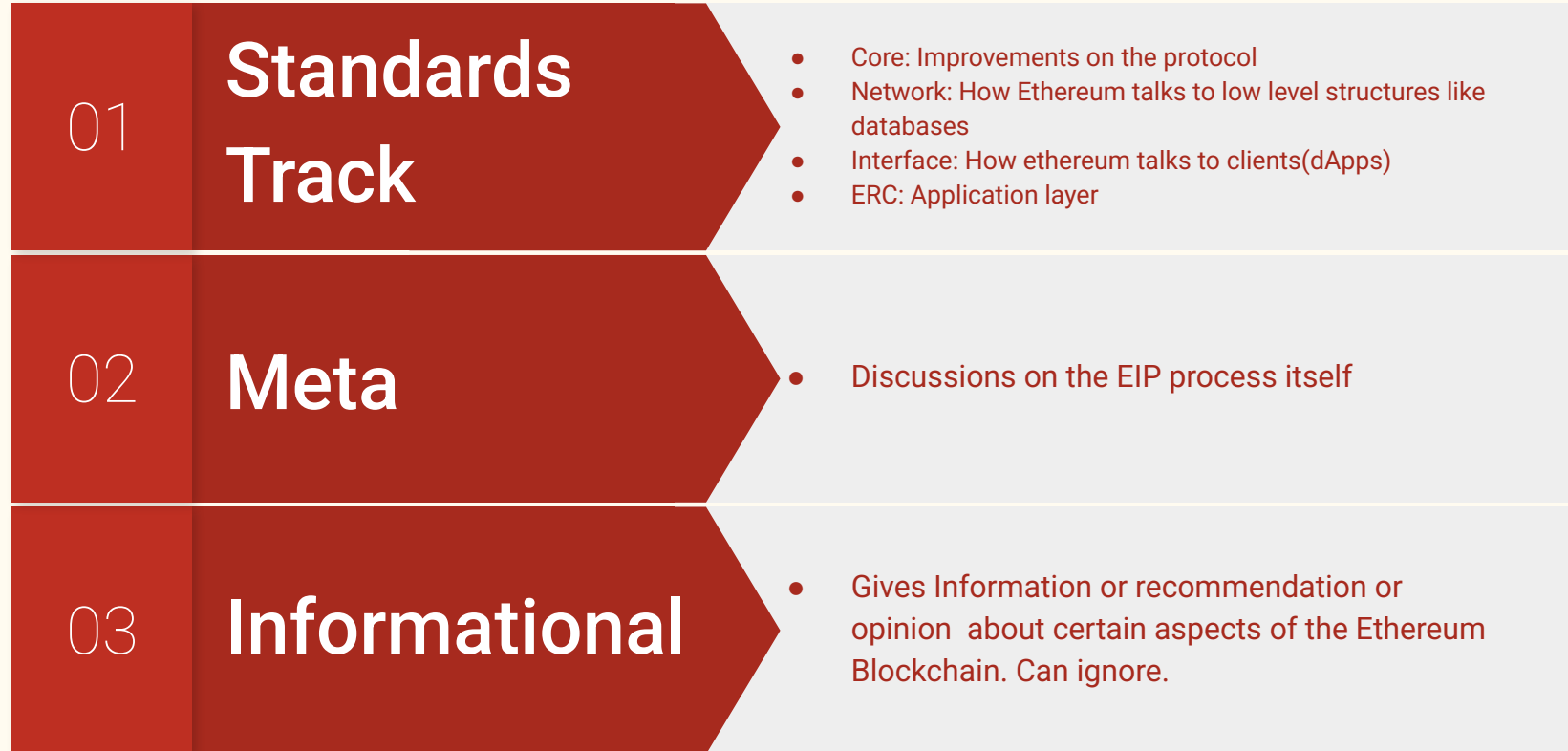
Sponsors - financial health

Time between releases and bug fixes - operational health

How to be an open source Contributor - Ethereum Improvement Proposals



How to be an open source Contributor - Ethereum Improvement Proposals



List of important EIP standards

ERC20 - Token Standard

ERC721 - NFT Standard

ERC1155 - Multitoken Standard

ERC2981 - NFT Royalty Standard

ERC4844 - Scaling

<https://eips.ethereum.org/erc>