



# Gridcoin Highlights

# Gridcoin Facts



- Permissionless
- Initiated in 2013
- Shifted from PoW to PoSv2 in 2014
- Operational on chain voting mechanism
- Unique emissions mechanism enables multiple incentivization layers
- Cross platform native C++ wallet, supporting Windows (32 and 64 bit), Linux (x86 and ARM, 32 and 64 bit), and MacOS
- White paper
  - [https://gridcoin.world/Gridcoin Whitepaper Draft.pdf](https://gridcoin.world/Gridcoin%20Whitepaper%20Draft.pdf)
- PoS documentation
  - [https://gridcoin.world/GRC\\_V8\\_Bluepaper\\_ETTS%20final.pdf](https://gridcoin.world/GRC_V8_Bluepaper_ETTS%20final.pdf)

# Gridcoin Development



- Codebase has been under active and increasing development since release
  - 6 Developers with over 100 commits
  - 12 Developers with 10 or more commits
  - 53 Developers with 1 or more commits
- Foundation fund of 31,000,000 GRC for community approved initiatives, including development, marketing, and ecosystem incubation
- Side-staking capability implemented in 2018
  - Enables automatic donation-based funding
  - Mechanism adopted from Pinkcoin

Graph shows Gridcoin repo activity after the 2014 shift to PoS



# Gridcoin Infrastructure



- Permissionless blockchain-based open-source operation and governance model
- Gridcoin foundation funds held in multi-signature wallet
- Gridcoin whitelist/greylist manages second layer incentives
- On-chain voting mechanism serves to
  - Inform participants on decisions
  - Provide directional feedback to developers
  - Release funds from the foundation
  - Manage the whitelist
  - Seek common ground or otherwise mediate arguments on network protocol and operation

# Gridcoin Economics



- Current coin supply 420,000,000 GRC
- Linear decreasing emissions rate
  - 3,504,000 GRC yearly distribution for staking; 0.83% APR
  - 10,220,000 GRC yearly distribution for computing contributions; 2.43% APR
  - 3.26% total APR
  - ~2.5% total APR after 10 years
- Shifted from time-based interest to Constant Block Reward in 2018.
  - 10 GRC reward per block
  - Raised average difficulty from ~2.5 to steadily over 10
  - Network now averages over 25% of coins online and staking
- Exploring Dynamic Block Reward models

# Gridcoin Incentives



- Base layer incentivizes block production through a Constant Block Reward PoS mechanism
- Current 2nd layer incentivizes computation contributions to BOINC, the Berkeley Open Infrastructure for Networked Computing
  - Gridcoin is the largest BOINC team globally
  - The Gridcoin network alone is the 25th largest supercomputer in the world by FLOPS
- 13,500 individuals incentivized through the Gridcoin-BOINC incentivization layer
- Can support additional incentive layers in the future
  - Stanford's Folding@home
  - HTCondor systems
  - Contributions to other blockchains
  - Any network-approved leaderboard



# Gridcoin Innovations

- Multi-incentive protocol-based coin distribution
- The Gridcoin Oracle
  - Consists of multiple nodes for resilient and highly corruption resistant measurement of off-chain data and on blockchain recording
- Leaderboard whitelist/greylist procedure and parameters
  - Enables multiple incentivization layers based on off-chain leaderboard statistics
  - Initiates multiple process-based educational incentivize mechanisms
- On-chain voting
- Proof-of-Work to boot-strap Proof-of-Stake
- Auto UTXO Balancing
  - A money management tool



# Gridcoin Innovations (cont.)

- **Magnitude**
  - Determines the number of GRC a researcher earns
  - Derived through a calculation involving a participant's computation contribution to a project relative to other participants contributing to that same project, the total number of whitelisted projects, and a targeting magnitude-unit
  - Drives a process-based computation distribution incentive layer
- **Beacons**
  - Keep track of a participant's computation contribution statistics
- **Superblocks**
  - Contain the officially sanctioned network statistics encoded in the blockchain
  - Can potentially store additional unique data and provide additional network functionality
- **Research Savings Accounts**
  - Tracks the research rewards owed to a beacon for as long as that beacon remains active



# Gridcoin Engagement



- Social Media

- 14670 Twitter followers
- 4745 Reddit followers
- 2162 Telegram members
- 1983 Discord members
- 1533 users from other discord servers engaged with the GRC wallet-bot
- 737 Slack members
- 63 Medium followers

- Weekly Live Discussions

- The Gridcoin Fireside - Covers Gridcoin topics, blockchain and cryptocurrency principles and developments, and BOINC projects
- Gridcoin Hangouts - open agenda discussion

- Monthly State of the Network (SotN) reports on multiple outlets

- Multiple additional community run engagement initiatives

# Gridcoin Development

## Moving Forward



- Elizabeth milestone (next mandatory, 2019Q3)
  - Changes to beacon registration, superbloc and contract infrastructure to support scaling and removal of BOINC team requirement
- New UX/UI improvements (515,000 GRC bounty - anticipated w/i one year)
  - Loosely coupled to main core
  - Extension to mobile
  - New assets already developed
    - <https://projects.invisionapp.com/share/APJIDTNFV47#/screens/314123716>
- Manual Rewards Claims (one year timeframe)
  - Ability to claim research rewards without staking
  - Unique fee-based economic tool that simultaneously lowers the bar for entry
- Exploratory stage
  - Additional data hashed, signed, and stored on blockchain in secondary data cache
    - scientific results, reputation, and accreditation
    - the beginnings of a new scientific publishing and funding ecosystem
  - Integration of blockchain to e-commerce payment systems to facilitate better spend adoption

# Berkeley Open Infrastructure for Networked Computing (BOINC)



- Founded in 2004
- Over 165 published scientific articles based on computation results
- 4,465,519 Total users
- 138,000 Active users
- In the top five most powerful supercomputers in the world by floating point operations per second (FLOPS)



# BOINC - Utilized By



- CERN
- IBM Corporate Citizenship
- University of California, Berkeley
- Oxford University
- Purdue University
- Max Planck Institute for Gravitational Physics - Hanover
- Karelian Research Centre, Russian Academy of Sciences
- Texas Advanced Computing Center
- Chinese Academy of Sciences
- University of Sussex
- University of North Dakota
- Southwest State University
- Barcelona Biomedical Research Park
- Rensselaer Polytechnic Institute
- California State University Fullerton
- Arizona State University, school of Mathematics
- Hochschule RheinMain University of Applied Sciences
- University of Wisconsin - Milwaukee
- San Jorge University, Zaragoza, Spain
- University of Warsaw

# BOINC - Utilized By (cont.)

- University of Southern California
- University of Washington
- University of Illinois at Urbana-Champaign
- University of Dayton and Wright State University
- Citizen scientists around the world

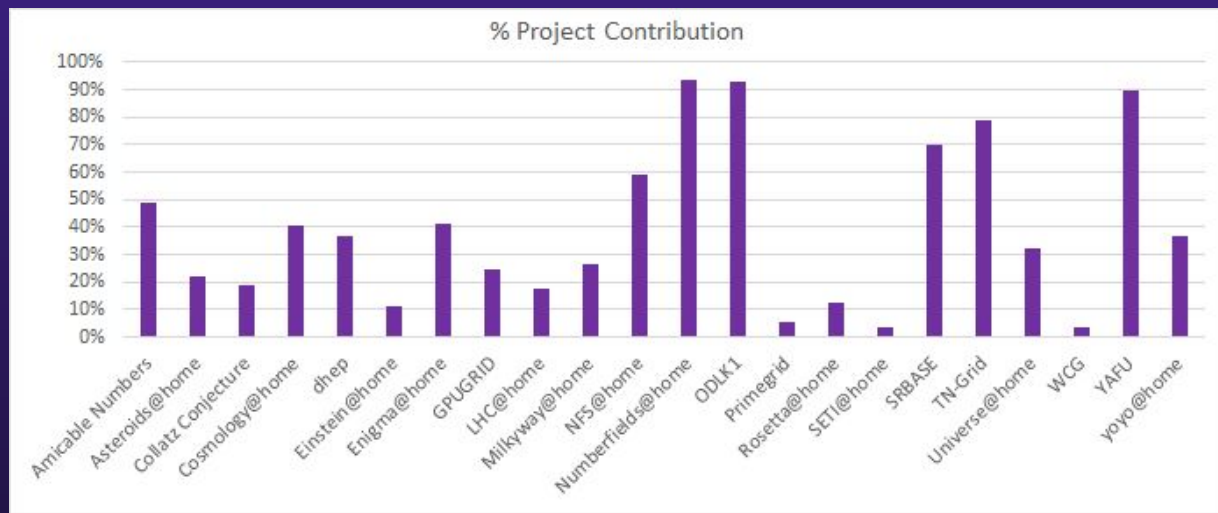


# Research Incentivized by Gridcoin



- Particle Physics
- Astrophysics
- Astronomy
- Molecular Biology
- Computer Science
- Electrical Engineering
- Mathematics
- Medical
- Environmental
- Humanitarian

Graph shows the Gridcoin network's relative computation contributions to whitelisted BOINC projects (June 2019)



# Gridcoin Presentations



## The Open Systems of Science

2019 BOINC Workshop

**Speaker:** jringo

**Note:** The room was not mic'd so the discussion at the end is edited to include only the speaker's comments which were mic'd.

### Referenced Content

**Contact:** jringo@gridcoin.world

**Website:** <https://gridcoin.world>

**Basic Principle** (6:50)

"No one needs to seek permission in order to participate, to run a node, to change the code, to build, or to innovate."

**Governance Quote from the Proposed Gridcoin Whitepaper** (11:40, 13:20)

"Permissionless blockchain networks progress through merit based arguments supported by contributor reputation and finally settled through software alterations committed to open-source repositories that are either installed or ignored by network nodes."

<https://dcuni.podbean.com/e/the-open-systems-of-science-2019-boinc-workshop/>

## Gridcoin, Bitcoin and BOINC

2019 BOINC Workshop

**Speakers:** fkinglag and loadedanvils

<https://www.youtube.com/watch?v=VCy4AyoiyEc>

# Gridcoin Presentations (cont.)



Rewarding BOINC Computation

2018 BOINC Workshop

**Speaker:** CM

[https://www.youtube.com/watch?v=\\_oJOqeKB-IM](https://www.youtube.com/watch?v=_oJOqeKB-IM)

Rewarding BOINC Computation

2017 BOINC Workshop

**Speaker:** CM

[https://www.youtube.com/watch?v=\\_oJOqeKB-IM](https://www.youtube.com/watch?v=_oJOqeKB-IM)



# Block Explorers



- <https://www.gridcoinstats.eu>
  - Sophisticated block explorer detailing distributed computing information for BOINC projects and contributors, polls, as well as standard blockchain information
- <https://gridcoin.network/>
- <https://grcexplorer.neuralminer.io/>
- <https://www.nuad.de>

# Exchanges

- SouthXchange
- Bitshares DEX - RuDEX gateway
- QBTC
- /r/MarketGrid



# Additional Resources



Website: <https://gridcoin.us>

Codebase Repository: <https://github.com/gridcoin-community/Gridcoin-Research>

Community Repository: <https://github.com/gridcoin-community>

Twitter: [@gridcoinnetwork](https://twitter.com/gridcoinnetwork)

Reddit: <https://www.reddit.com/r/gridcoin/new/>

Discord: <https://discord.gg/jf9XX4a>

Medium: <https://medium.com/@gridcoinnetwork>

BOINC: <https://boinc.berkeley.edu>

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