

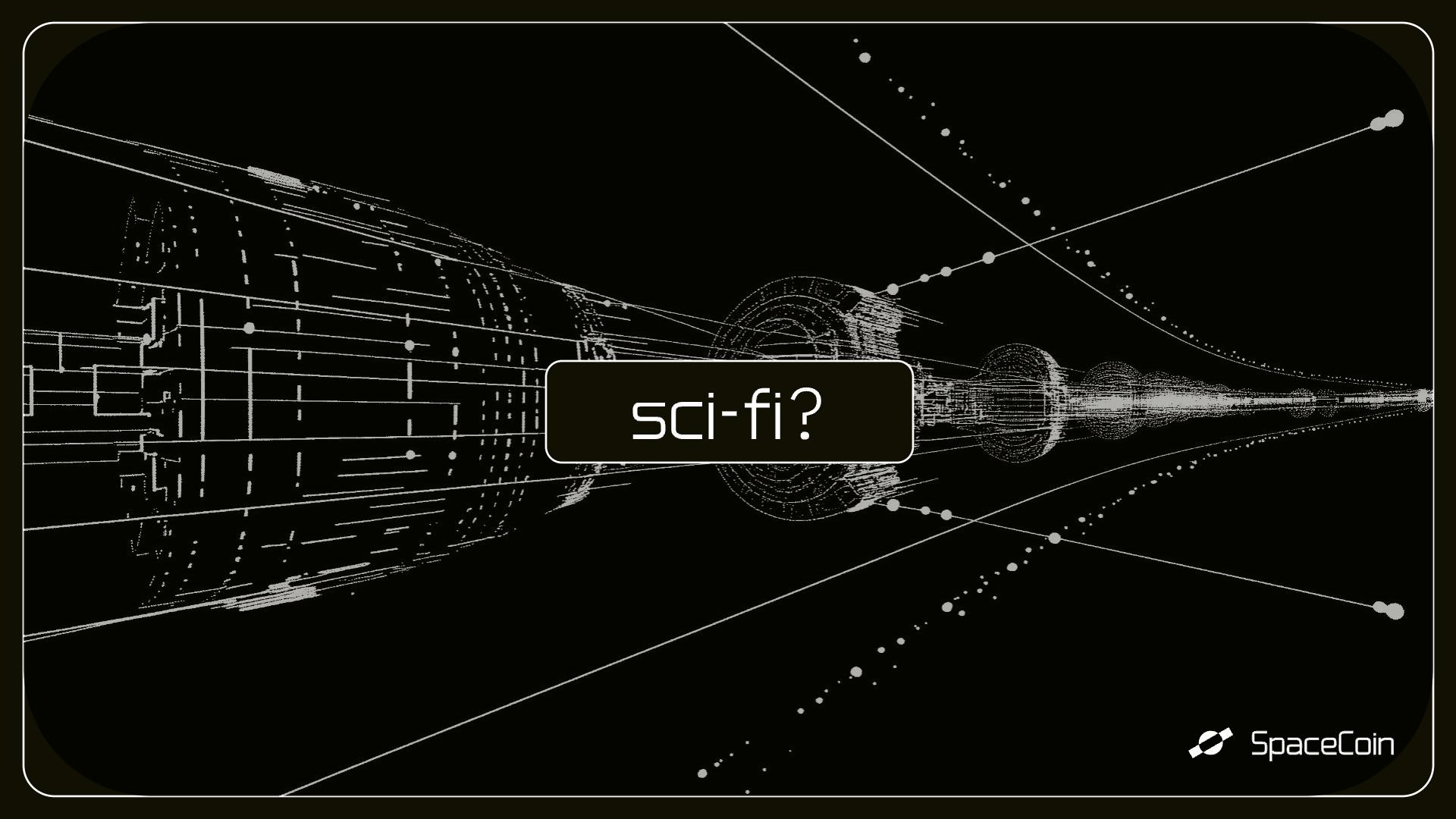
Satellite Cryptographic Layer

Extraterrestrial Extension to Ethereum

Daniel Exponent & Matej Yangwao

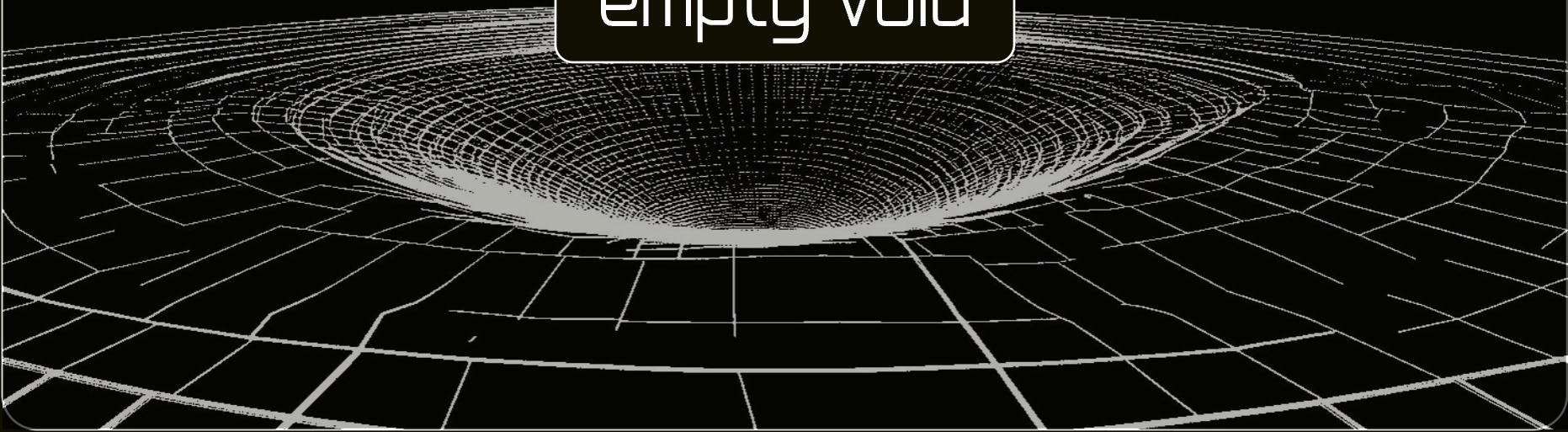
@semicondurian @yangwao

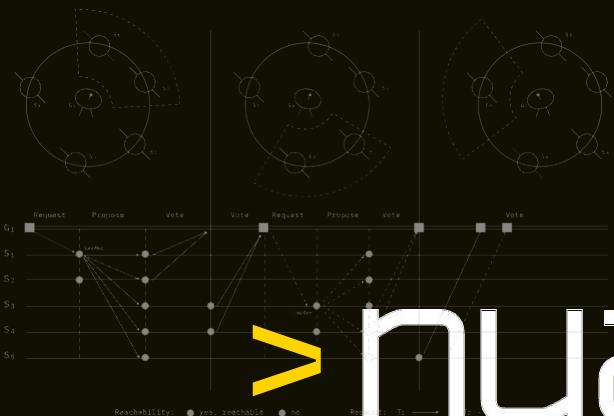
Co-founders, Spacecoin.xyz



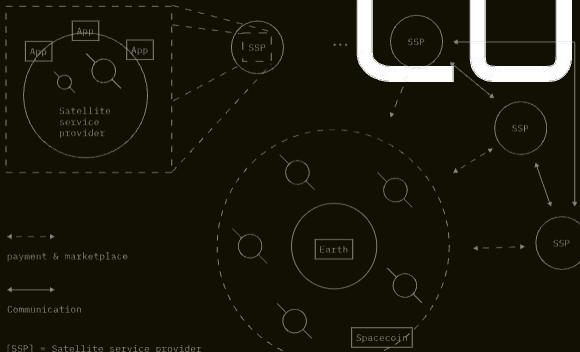
sci-fi?

empty void





nuance of complexity





Orbital Data Centers, why now?

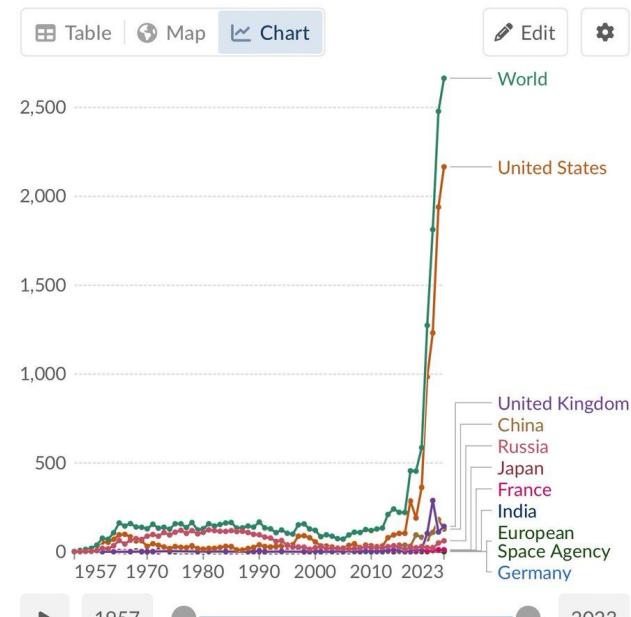
- Access to solar power
- Reduced cooling costs
- Lower latency in space

> fun fact: humanity launched more satellites in the past two years than we did in all of 1957 to 2010

Annual number of objects launched into space

Our World in Data

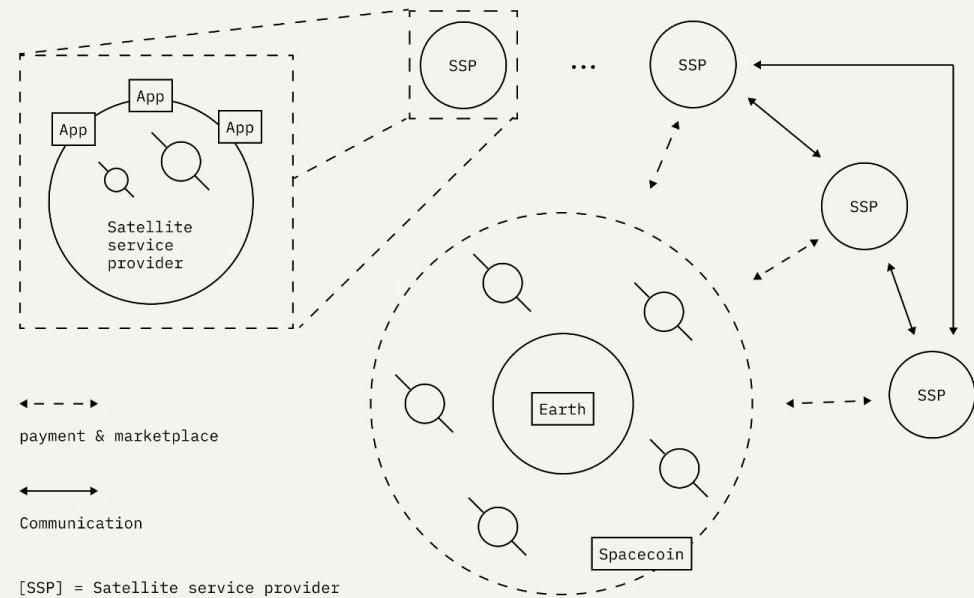
This includes satellites, probes, landers, crewed space crafts, and space station flight elements launched into Earth orbit or beyond.



Data source: United Nations Office for Outer Space Affairs (2024) – [Learn more about this data](#)

SpaceCoin: Orbital Root of Trust

Marketplace and payment layer
for other satellite service providers





SpaceTEE

Tamper-proof Infrastructure

CHANGELOG

- Launched Crypto3, latest with Iridium connection
- Contributed to EIP4844 / KZG ceremony.
- Launch with Aptos Orbital (fka Cryptosat) cEDGE node will be EOY w/ Iridium NEXT
- Preparing fleet of Iridium enabled crypto engines
- Immune to side-channel attacks and admin tampering



Network Resilience

Communication - Iridium network

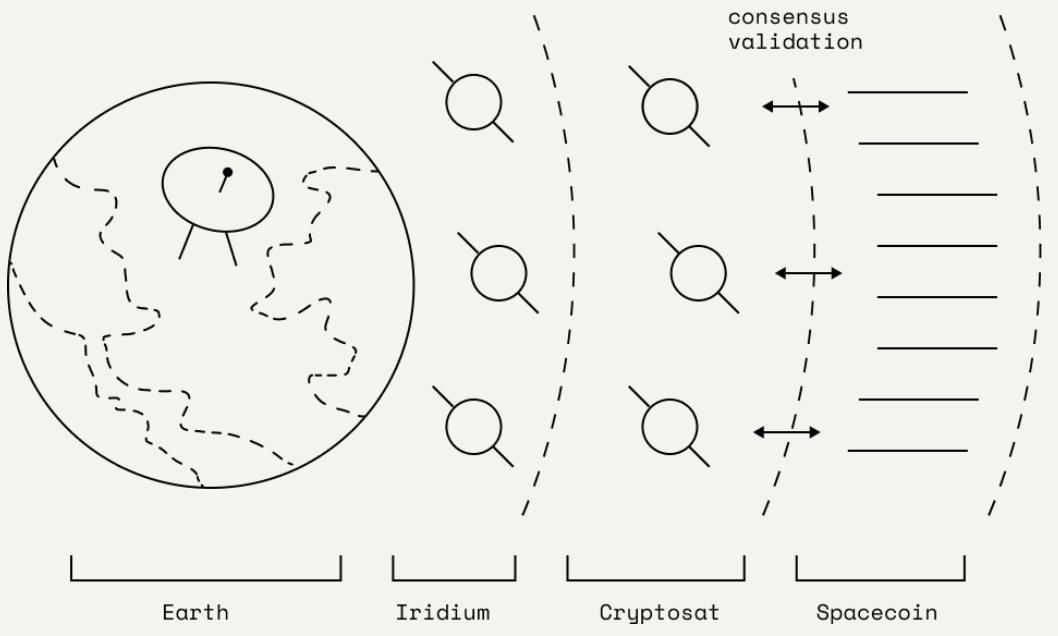
- Uses Iridium's distributed satellite network - 66+9 pcs

Aptos Orbital (fka Cryptosat)

- Provides computation infrastructure

SpaceCoin

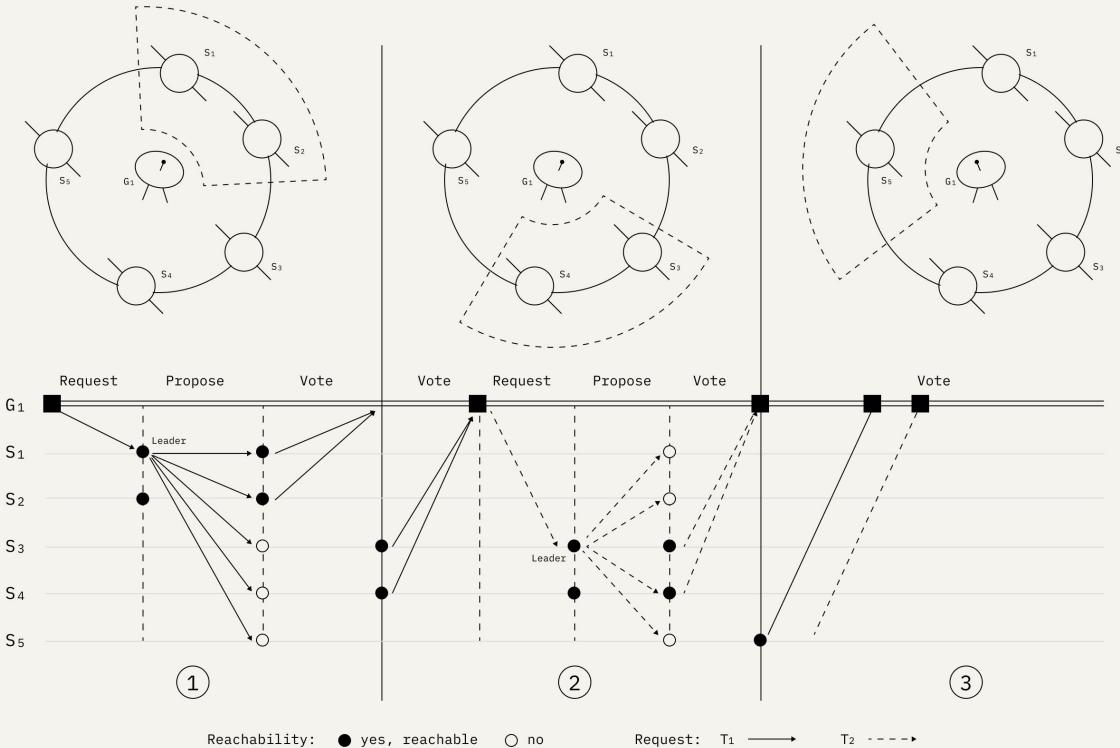
- Protocol with specific HW capabilities
- Resistant to DoS attacks and censorship
- Multiple communication paths



Celestial Layer-1

COMMUNICATION FLOW OF TWO REQUESTS
BETWEEN UNCELESTIAL AND CELESTIAL

- Modified HotStuff-1 with instant finality
- Lower bandwidth and messages
- Require connectivity with only one node designated as leader

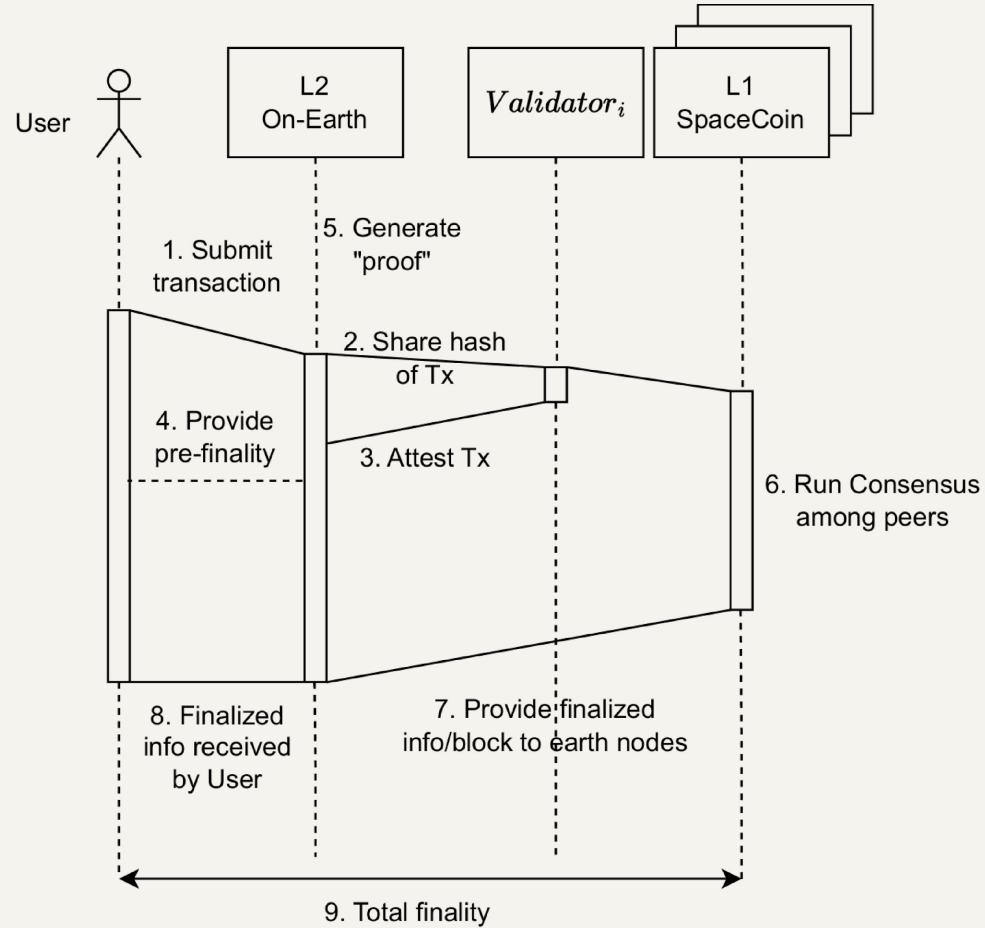


Uncelestial Layer-2 with Celestial Finality

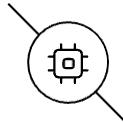
UNIQUE THREE-GRADE SECURITY SYSTEM

DESIGN OPTIONS:

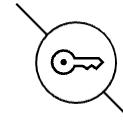
- Pre-finality by L2
- Pre-finality by L2 with L1 backup
- Full finality on L1



Security Services



Space-TEE



Secure
Custodian



Cosmic
Entropy / VRF



Secure
Deletion

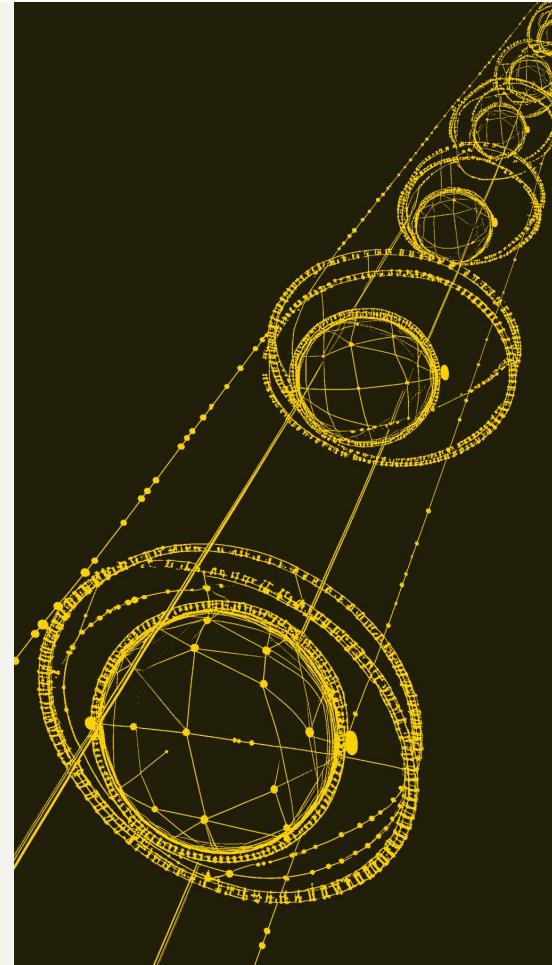


Eternal Bulletin
Board



Smart Contract Capabilities

- Plan is support EVM compatibility
- Initial deployment is focusing on bridge contracts
- Future extensibility through WASM or RISC-V based VMs



Who is SpaceCoin Building For?

L1/L2
foundations

MPC
Wallets

Validators

Entropy
Providers



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