Hyperledger Burrow

Hyperledger Burrow Documentation

Project	
Status	INCUBATION
CII Badge	
Description	Permissioned Ethereum smart-contract blockchain

Burrow is a permissively licensed (Apache 2.0) EVM smart contract machine and Byzantine Fault Tolerant permissioned ledger that uses Tendermint consensus and implements some novel extensions to the EVM whilst remaining EVM-compliant. It provides EVM execution within the Ethereum account model and an internal token to meter computation in the permissioned setting with transactions finality. Burrow is named after the trans-dimensional intergalactic tubules used by marmots to communicate.

Key Characteristics

Burrow has three primary aims:

- To be a good compliant and simple EVM library friendly towards integrators (see for example https://github.com/hyperledger/sawtooth-seth and https://github.com/hyperledger/fabric-chaincode-evm)
- To be a fast, light, lean single-process full Tendermint/EVM permissioned ledger with transaction finality
- To provide a practical base for EVM extensions in a many-chain world

Burrow is not trying to be:

- Highly pluggable (see Sawtooth or Fabric)
- Hard to deploy

Notable features:

- Single pure go binary including all tooling
- GRPC API interfaces (see: https://github.com/hyperledger/burrow/tree/develop/protobuf) - use from any supported GRPC https://grpc.io/docs/quickstart/)
- Javascript client library: https://github.com/hyperledger/burrow/tree/develop/js with smart contract function mapping layer
- Go client library (via GRPC codegen): https://github.com/hyperledger/burrow/blob/develop/rpc/rpctransact/rpctransact.pb.go
- Vent SQL mapping and projections layer (https://github.com/hyperledger/burrow/blob/develop/vent/README.md)
- Permissioned EVM (see: https://github.com/hyperledger/burrow/blob/develop/permission/perm_flag.go)
- On-chain EVM ABIs (function and contract definitions) and contract metadata)
- Streaming execution events service (https://github.com/hyperledger/burrow/blob/develop/protobuf/rpcevents.proto)
- Experimental WASM contract support
- Governance mechanism capable of atomically upgrading systems of contracts based on quorum voting
- Chain-global DNS-like name registry (https://github.com/hyperledger/burrow/blob/develop/protobuf/names.proto)
- Validator bonding for proof-of-stake networks (https://hyperledger.github.io/burrow/#/tutorials/5-bonding-validators)
- Solidity compilation, contract deployment, and testing tool `burrow deploy`
- Scriptable transaction tool `burrow tx`
- Forensics tool `burrow examine`
- Chain generation and genesis tool `burrow spec` and `burrow configure`
- Dump/restore functionality `burrow dump` and `burrow restore` (ship state between versions or chains) - also allows state serialisation
- Keys signing service command-line wallet and server `burrow keys`

- Kubernetes Helm charts: https://hyperledger.github.io/burrow/#/tutorials/5-bonding-validators

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- Godoc: https://godoc.org/github.com/hyperledger/burrow
- See also: https://github.com/hyperledger/burrow/tree/develop/docs for documentation source, architecture decision records, and further historical and design documentation

Project Management

Burrow is being heavily tested as the core of the Agreements Network. It sits at the intersections of a number of emerging technologies:

- EVM contracts and host-native code contracts - Public permissioned networks - permissioned Ethereum and public Tendermint/Cosmos - Layer 2 scaling - acting as a side-chain or state channel

We aim to provide a robust blockchain node for running multiple interconnected chains in a many-chain world. As well as blurring the public/private chain divide.

Roadmaps

- **Q1 2019**
- **Q4 2018** - *post-mortem*
- **Q3 2018** - *post-mortem*
- **Q2 2018**
- **Q1 2018** - *post-mortem*

Repositories

Burrow's repository is on github here: https://github.com/hyperledger/burrow

The Burrow binary contains everything you need to specify, configure, run, and deploy smart contracts to a chain.

- `burrow spec` - for describing template genesis state
- `burrow configure` - for realising a specific configuration (including key generation)
- `burrow keys` - both a standalone key signing daemon and key generation tool
- `burrow deploy` - a declarative Solidity compilation, chain management, testing, and smart contract deployment tool
- `burrow dump` - a forensics, auditing, and data extraction tool
- `burrow snatives` - a tool for interacting with Burrow's 'secure natives' - host code that is callable as if it were an EVM contract
- `burrow start` - for starting a blockchain node

For deploying contracts you will need a local installation of Solidity.

For previous versions of standalone Burrow you can find:

- **binaries**: https://github.com/hyperledger/burrow/releases
- **docker images**: https://hub.docker.com/r/hyperledger/burrow

Deployment

Burrow can be deployed in any environment but we have focussed on deploying related sets of validators (or validator pools) using Kubernetes/Helm and you can find helm charts here: https://github.com/helm/charts/tree/master/incubator/burrow.

Contributing

Please fork, branch, and make pull requests to the develop branch.

Our build, CI, and testing process is executed via our Makefile, see the comments there for details.

Communication

Mailing List

- burrow

Chat (for questions and ephemeral discussions)

- #burrow - General usage questions
- #burrow-contributors - Contributor discussions

Meeting

Quarterly updates

2019

- Q3 2019 Update
- Q2 2019 Update
- Q1 2019 Update

2018

- Q4 2018 Update
- Q3 2018 Update
- Q2 2018 Update
- Q1 2018 Update

2017

- Q4 2017 Update

History

Burrow was approved for incubation on the 6th of April 2017 by the Hyperledger TSC.

Recent space activity

Silas Davis

Burrow - The Boring Blockchain updated Feb 29, 2020 • view change

Kelly Cooper

Burrow - The Boring Blockchain updated Oct 08, 2019 • view change

Burrow Contributor or Volunteer Welcome updated Sep 06, 2019 • view change

Meeting Notes updated Sep 05, 2019 • view change

Meeting Agendas updated Sep 05, 2019 • view change

Space contributors

- Silas Davis (27 days ago)
- Kelly Cooper (172 days ago)
- David Huseby (309 days ago)
- Tracy Kuhrt (422 days ago)
- Silona Bonewald (438 days ago)