



# Hyperledger Burrow

[Hyperledger Burrow Documentation](#)

<b>Project</b>	
<b>Status</b>	INCUBATION
<b>CII Badge</b>	
<b>Description</b>	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](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>

## Hyperledger Burrow Documentation

- 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](#) (29 days ago)
- [Kelly Cooper](#) (173 days ago)
- [David Huseby](#) (310 days ago)
- [Tracy Kuhrt](#) (424 days ago)
- [Silona Bonewald](#) (440 days ago)