[](https://ida.interchain.io/)

[Interchain Developer Academy](https://ida.interchain.io/)/[Interchain Developer Academy](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)



Search

[Interchain Developer Academy](https://ida.interchain.io/)[Interchain Developer Academy](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

Search



Filters

Interchain Developer Academy

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 0 - Getting Started](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Getting Started](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Blockchain 101](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Blockchain History](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Public and Managed Blockchains](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Consensus in Distributed Networks](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Cryptography](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Self-Assessment Quiz](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Go Introduction - First Steps](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Go Basics](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Go Interfaces](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Control Structures in Go](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Arrays and Slices in Go](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Standard Packages in Go](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Concurrency in Go](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Good-To-Know Dev Terms](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Docker Introduction](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 1 - Introduction to the Interchain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Introduction to the Interchain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Blockchain Technology and the Interchain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[The Interchain Ecosystem](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Getting ATOM and Staking It](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[A Blockchain App Architecture](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Accounts](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Transactions](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Messages](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Modules](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Protobuf](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Multistore and Keepers](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[BaseApp](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Queries](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Events](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Context](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Testing](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Relaying with IBC](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Interchain Security](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Bridges](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Migrations](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 1 Quiz](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 2 - First Steps](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[First Steps](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Setup Your Work Environment](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Run a Node, API, and CLI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Ignite CLI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Exercise - Make a Checkers Blockchain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Store Object](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create Custom Messages](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create and Save a Game Properly](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Add a Way to Make a Move](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Emit Game Information](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Record the Game Winner](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 2 Exercise](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 3 - Introduction to IBC and CosmJS](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Introduction to IBC and CosmJS](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[What is IBC?](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC/TAO - Connections (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC/TAO - Channels (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC/TAO - Clients (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC Token Transfer](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Interchain Accounts (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC Middleware (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create a Custom IBC Middleware (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Integrate IBC Middleware Into a Chain (OPTIONAL)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC Tooling](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[What is CosmJS?](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Your First CosmJS Actions](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Compose Complex Transactions](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Learn to Integrate Keplr](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create Custom CosmJS Interfaces](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 4 - Ignite CLI and IBC Advanced](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Ignite CLI and IBC Advanced](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Keep an Up-To-Date Game Deadline](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Keep Track Of How Many Moves Have Been Played](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Put Your Games in Order](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Auto-Expiring Games](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Let Players Set a Wager](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Handle wager payments](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Integration tests](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Incentivize Players](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Help Find a Correct Move](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Play With Cross-Chain Tokens](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Understand IBC Denoms](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Go Relayer](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Hermes Relayer](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 5 - CosmJS Advanced](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[CosmJS Advanced](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create Custom Objects](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create Custom Messages](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Get an External GUI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Integrate CosmJS and Keplr](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Backend Script for Game Indexing](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 6 - IBC Deep Dive](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC Deep Dive](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[IBC Application Developer Introduction](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Make a Module IBC-Enabled](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Adding Packet and Acknowledgment Data](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Extend the Checkers Game With a Leaderboard](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Create a Leaderboard Chain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Week 7 - From Code to MVP to Production and Migrations](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[From Code to MVP to Production and Migrations](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Run in Production](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Prepare the Software to Run](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Prepare a Validator and Keys](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Prepare Where the Node Starts](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Prepare and Connect to Other Nodes](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Configure, Run, and Set Up a Service](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Prepare and Do Migrations](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Simulate Production in Docker](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Tally Player Info After Production](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Add a Leaderboard as a Module](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Migrate the Leaderboard Module After Production](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Simulate a Migration in Docker](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Final Exam](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[What's Next?](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

[Continue Your Interchain Journey](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html)

Docs Version Switcher

On this page

[Install](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#install)

[Prepare Docker](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#prepare-docker)

[Your chain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-chain)

[Interact via the CLI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#interact-via-the-cli)

[Your GUI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-gui)

[Your first message](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-first-message)

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#ignite-cli) **Ignite CLI**



Before diving into the details of how Ignite CLI helps you scaffold the basics for your application blockchain make sure to understand the main concepts presented in the following sections:

* [A Blockchain App Architecture](https://ida.interchain.io/academy/2-cosmos-concepts/1-architecture.html)
* [Accounts](https://ida.interchain.io/academy/2-cosmos-concepts/2-accounts.html)
* [Transactions](https://ida.interchain.io/academy/2-cosmos-concepts/3-transactions.html)
* [Messages](https://ida.interchain.io/academy/2-cosmos-concepts/4-messages.html)
* [Modules](https://ida.interchain.io/academy/2-cosmos-concepts/5-modules.html)
* [Protobuf](https://ida.interchain.io/academy/2-cosmos-concepts/6-protobuf.html)
* [BaseApp](https://ida.interchain.io/academy/2-cosmos-concepts/8-base-app.html)



In this section, you will:

* Install the Ignite CLI.
* Scaffold a blockchain.
* Use the CLI.
* Start the Ignite UI server.
* Send your first message.

You can follow a hands-on exercise for Ignite CLI in the sections that follow this introduction.

The Cosmos SDK provides the building blocks for a complete CometBFT blockchain, which implements the Inter-Blockchain Communication Protocol (IBC). The *BaseApp* of the Cosmos SDK assembles these building blocks and provides a fully-running blockchain. All there is left to do for the specific blockchain application is to create specific modules and integrate them with BaseApp to make the application *your own*.



Ignite CLI assists with scaffolding modules and integrating them with BaseApp. Ignite CLI is a command-line tool that writes code files and updates them when instructed to do so. If you come from an *on Rails* world, the concept will look familiar to you.   
  
Ignite CLI also handles some compilation, runs a local blockchain node, and helps you with other tasks.

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#install) Install



Want to dedicate some time to dive deeper into installing Ignite CLI? Learn [how to install Ignite CLI in the Ignite CLI Developer Guide (opens new window)↗](https://docs.ignite.com/welcome/install).



If you do not want to install Go and Ignite on your computer, look at the **section about Docker below** to facilitate your handling of specific versions and platforms.

This entire exercise was built using the Ignite CLI version 0.22.1. To install it at the command line:



Copy

$ curl https://get.ignite.com/cli@v0.22.1! | bash

Or if you install it in a Linux VM:



Copy

$ curl https://get.ignite.com/cli@v0.22.1! | sudo bash

You can verify the version of Ignite CLI you have once it is installed:



Copy

$ ignite version

This prints its version:



Copy

Ignite CLI version: v0.22.1

...



This entire exercise was built using the Ignite CLI version noted above. Using a newer version could work, but you might run into compatibility issues if you clone any code made with *this* version of Ignite CLI and then try to continue the project with *your* version of Ignite CLI.   
  
If you need to install the latest version of Ignite CLI, use:



Copy

$ curl https://get.ignite.com/cli@! | bash

When you then run ignite version, it prints its version:



Copy

Ignite CLI version: v0.22.2



If you'd like to upgrade an existing project to the latest version of Ignite CLI, you can follow the [Ignite CLI migration documentation (opens new window)↗](https://docs.ignite.com/migration).

You can also just type ignite to see the offered commands:



Copy

Ignite CLI is a tool for creating sovereign blockchains built with Cosmos SDK, the world’s

most popular modular blockchain framework. Ignite CLI offers everything you need to scaffold,

test, build, and launch your blockchain.

To get started, create a blockchain:

ignite scaffold chain github.com/username/mars

Usage:

ignite [command]

Available Commands:

scaffold Scaffold a new blockchain, module, message, query, and more

chain Build, initialize and start a blockchain node or perform other actions on the blockchain

generate Generate clients, API docs from source code

account Commands for managing accounts

relayer Connect blockchains by using IBC protocol

tools Tools for advanced users

docs Show Ignite CLI docs

version Print the current build information

help Help about any command

completion Generate the autocompletion script for the specified shell

Flags:

-h, --help help for ignite

Use "ignite [command] --help" for more information about a command.

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#prepare-docker) Prepare Docker

If you want to allow for portability and avoid version issues, it is advisable to use [Docker (opens new window)↗](https://docs.docker.com/engine/install/). If you are new to Docker, have a look at [this tutorial](https://ida.interchain.io/tutorials/5-docker-intro/).

First, you need to create a Dockerfile that details the same preparation steps. Save this as Dockerfile-ubuntu:



Copy

FROM --platform=linux ubuntu:22.04

ARG BUILDARCH

# Change your versions here

ENV GO\_VERSION=1.18.3

ENV IGNITE\_VERSION=0.22.1

ENV NODE\_VERSION=18.x

ENV LOCAL=/usr/local

ENV GOROOT=$LOCAL/go

ENV HOME=/root

ENV GOPATH=$HOME/go

ENV PATH=$GOROOT/bin:$GOPATH/bin:$PATH

RUN mkdir -p $GOPATH/bin

ENV PACKAGES curl gcc jq

RUN apt-get update

RUN apt-get install -y $PACKAGES

# Install Go

RUN curl -L https://go.dev/dl/go${GO\_VERSION}.linux-$BUILDARCH.tar.gz | tar -C $LOCAL -xzf -

# Install Ignite

RUN curl -L https://get.ignite.com/cli@v${IGNITE\_VERSION}! | bash

# Install Node

RUN curl -fsSL https://deb.nodesource.com/setup\_${NODE\_VERSION} | bash -

RUN apt-get install -y nodejs

EXPOSE 1317 3000 4500 5000 26657

WORKDIR /checkers

Dockerfile-ubuntu

[View source→](https://github.com/cosmos/b9-checkers-academy-draft/blob/ignite-start/Dockerfile-ubuntu" \l "L1-L33" \t "_blank)

Note that the linked code contains more lines than shown above. Because you do not yet have a go.mod file, stick to the lines in the quoted code above for now.

Next you need to create the Docker image:



Copy

$ docker build -f Dockerfile-ubuntu . -t checkers\_i

You can confirm the installed version of Ignite:



Copy

$ docker run --rm -it checkers\_i ignite version

It should return, among other things:



Copy

Ignite CLI version: v0.22.1

That is the bare minimum required to be able to run the commands that come on this page. If at a later stage you want to create a persistent container named checkers, you can do:



Copy

$ docker create --name checkers -i -v $(pwd):/checkers -w /checkers -p 1317:1317 -p 3000:3000 -p 4500:4500 -p 5000:5000 -p 26657:26657 checkers\_i

$ docker start checkers

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-chain) Your chain

Start by scaffolding a basic chain called checkers that you will place under the GitHub path alice:

**Local**

**Throwaway Docker container**



Copy

$ ignite scaffold chain github.com/alice/checkers

Copy

$ docker run --rm -it -v $(pwd):/checkers -w /checkers checkers\_i ignite scaffold chain github.com/alice/checkers

This only works if you have prepared the checkers\_i Docker image.

github.com/alice/checkers is the name of the Golang module by which this project will be known. If you own the github.com/alice path, you can even eventually host it there and have other people use your project as a module.

****

**Troubleshooting**

For the sake of good support, the versions of all software used are communicated as encountered throughout this course. It is natural that after the writing of the course material some version changes will appear, and it may occur that something breaks. Instead of using different versions of the software from the ones in the course, please look at the following list, which might fix problems you are running into. Otherwise, use Docker as explained on this page.

If all else fails, please post the issue you face on Discord.

1

**Apple M1**

If you work with a machine using M1 architecture, the Docker image should allow you to run with your specific CPU architecture. However, if you encounter too many problems you can try the following:

1. Follow this course in a [Rosetta (opens new window)](https://www.courier.com/blog/tips-and-tricks-to-setup-your-apple-m1-for-development/) terminal.
2. Install [Homebrew (opens new window)](https://brew.sh/index).
3. Install Golang with brew install go.

2

**Building Errors during scaffold**

If you work with Go 1.18, you may need to install the following:

* Copy

$ go install github.com/grpc-ecosystem/grpc-gateway/protoc-gen-grpc-gateway@latest

* Copy

$ go install github.com/grpc-ecosystem/grpc-gateway/protoc-gen-swagger@latest

* Copy

$ go install github.com/grpc-ecosystem/grpc-gateway/v2/protoc-gen-openapiv2@latest

* Copy

$ git clone https://github.com/regen-network/cosmos-proto

$ cd cosmos-proto/protoc-gen-gocosmos

$ go install

* Copy

$ go get github.com/golangci/golangci-lint/cmd/golangci-lint

* Copy

$ go get golang.org/x/crypto/ssh/terminal@v0.0.0-20220411220226-7b82a4e95df4

The scaffolding takes some time as it generates the source code for a fully functional, ready-to-use blockchain. Ignite CLI creates a folder named checkers and scaffolds the chain inside it.

The checkers folder contains several generated files and directories that make up the structure of a Cosmos SDK blockchain. It contains the following folders:

* [app (opens new window)↗](https://github.com/cosmos/b9-checkers-academy-draft/tree/ignite-start/app): a folder for the application.
* [cmd (opens new window)↗](https://github.com/cosmos/b9-checkers-academy-draft/tree/ignite-start/cmd): a folder for the command-line interface commands.
* [proto (opens new window)↗](https://github.com/cosmos/b9-checkers-academy-draft/tree/ignite-start/proto): a folder for the Protobuf objects definitions.
* [vue (opens new window)↗](https://github.com/cosmos/b9-checkers-academy-draft/tree/ignite-start/vue): a folder for the auto-generated UI.
* [x (opens new window)↗](https://github.com/cosmos/b9-checkers-academy-draft/tree/ignite-start/x): a folder for all your modules, in particular checkers.



If Vue.js is something new to you, check out the [Vue.js website (opens new window)↗](https://vuejs.org/) for more on this JavaScript framework.

If you look at the code that Ignite CLI generates, for instance in ./x/checkers/module.go, you will often see comments like the following:



Copy

// this line is used by starport scaffolding # 1

x /

checkers /

module.go

[View source→](https://github.com/cosmos/b9-checkers-academy-draft/blob/ignite-start/x/checkers/module.go" \l "L6" \t "_blank)



Do not remove or replace any lines like these in your code as they provide markers for Ignite CLI on where to add further code when instructed to do so. For the same reason, do not rename or move any file that contains such a line.

Go to the checkers folder and run:

**Local**

**Throwaway Docker**

**Persistent Docker**



Copy

$ cd checkers

$ ignite chain serve

Copy

$ cd checkers

$ docker run --rm -it -v $(pwd):/checkers -w /checkers -p 1317:1317 -p 3000:3000 -p 4500:4500 -p 5000:5000 -p 26657:26657 --name checkers checkers\_i ignite chain serve

Notice how you still name the container checkers so that you can access it for further commands.

Copy

$ cd checkers

$ docker create --name checkers -i -v $(pwd):/checkers -w /checkers -p 1317:1317 -p 3000:3000 -p 4500:4500 -p 5000:5000 -p 26657:26657 checkers\_i

$ docker start checkers

$ docker exec -it checkers ignite chain serve

The ignite chain serve command downloads (a lot of) dependencies and compiles the source code into a binary called checkersd. This command:

* Installs all dependencies.
* Builds Protobuf files.
* Compiles the application.
* Initializes the node with a single validator.
* Adds accounts.

****

**Go dependencies and Docker**

If you use Docker with throwaway containers (run --rm) you will notice that it downloads the Go dependencies every time. To increase your productivity, you can have the dependencies be downloaded in the Docker image itself:

1. Move your Dockerfile-ubuntu file into your checkers project, next to the go.mod file.
2. Add the following lines to Dockerfile-ubuntu:

Copy

COPY go.mod /checkers/go.mod

RUN go mod download

RUN rm /checkers/go.mod

Dockerfile-ubuntu

[View source](https://github.com/cosmos/b9-checkers-academy-draft/blob/ignite-start/Dockerfile-ubuntu" \l "L35-L37" \t "_blank)

1. Recreate the image:

Copy

$ docker build -f Dockerfile-ubuntu . -t checkers\_i

After the chain serve command completes, you have a local testnet with a running node. What about the added accounts? Take a look:



Copy

accounts:

- name: alice

coins: ["20000token", "200000000stake"]

- name: bob

coins: ["10000token", "100000000stake"]

validator:

name: alice

staked: "100000000stake"

client:

openapi:

path: "docs/static/openapi.yml"

vuex:

path: "vue/src/store"

faucet:

name: bob

coins: ["5token", "100000stake"]

config.yml

[View source→](https://github.com/cosmos/b9-checkers-academy-draft/blob/ignite-start/config.yml" \t "_blank)

In this file you can set the accounts, the accounts' starting balances, and the validator. You can also let Ignite CLI generate a client and a faucet. The faucet gives away five token and 100,000 stake tokens belonging to Bob each time it is called.

You can observe the endpoints of the blockchain in the output of the ignite chain serve command:



Copy

🌍 Tendermint node: http://0.0.0.0:26657

🌍 Blockchain API: http://0.0.0.0:1317

🌍 Token faucet: http://0.0.0.0:4500



Ignite CLI can detect any change to the source code. When it does, it immediately rebuilds the binaries before restarting the blockchain and keeping the state.

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#interact-via-the-cli) Interact via the CLI

You can already interact with your running chain. With the chain running in its shell, open another shell and try:

**Local**

**Docker**



Copy

$ checkersd status

Copy

$ docker exec -it checkers checkersd status

This prints:



Copy

{"NodeInfo":{"protocol\_version":{"p2p":"8","block":"11","app":"0"},"id":"8df1253b4deb59f63cc912dce096ab010c951e9d","listen\_addr":"tcp://0.0.0.0:26656","network":"checkers","version":"0.34.19","channels":"40202122233038606100","moniker":"mynode","other":{"tx\_index":"on","rpc\_address":"tcp://0.0.0.0:26657"}},"SyncInfo":{"latest\_block\_hash":"6F167C4E2C99385857663B9531016DBC85DC0AEC1B58BF759B729EEAC843B92A","latest\_app\_hash":"EE408C7580E1E4A81E20190D9131FBD07AE1C536D3507DF9C6E0CB476A2D7680","latest\_block\_height":"13","latest\_block\_time":"2022-06-27T15:43:14.906782552Z","earliest\_block\_hash":"48250CF257E117F28FE207A71DDCA67459FEBE2EF1367D7B0EAE43754D5A53A1","earliest\_app\_hash":"E3B0C44298FC1C149AFBF4C8996FB92427AE41E4649B934CA495991B7852B855","earliest\_block\_height":"1","earliest\_block\_time":"2022-06-27T15:42:57.697745314Z","catching\_up":false},"ValidatorInfo":{"Address":"98E9E157C87A44503BB8D01CAFC97DDB5D0C78DE","PubKey":{"type":"tendermint/PubKeyEd25519","value":"U3wlX8+lx6YQq3g2QbYnnAdUuMQ7AlMXH21Vxrq2OHg="},"VotingPower":"100"}}

In there you can see a hint of liveness: "latest\_block\_height":"13". You can use this one-liner to better see the information:

**Local**

**Docker**



Copy

$ checkersd status 2>&1 | jq

Copy

$ docker exec -it checkers bash -c "checkersd status 2>&1 | jq"

You can learn a lot by going through the possibilities with:

**Local**

**Docker**



Copy

$ checkersd --help

$ checkersd status --help

$ checkersd query --help

Copy

$ docker exec -it checkers checkersd --help

$ docker exec -it checkers checkersd status --help

$ docker exec -it checkers checkersd query --help

And so on.

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-gui) Your GUI

Ignite CLI also scaffolded a frontend. Boot it up by using the commands provided in the README.md file of the vue folder. Let the chain run in its own process and open a new terminal window in your checkers folder. In this terminal, execute:

**Local**

**Docker**



Copy

$ cd vue

$ npm install

$ npm run dev

If you want to serve on all network addresses, you need to run npm run dev -- --host.

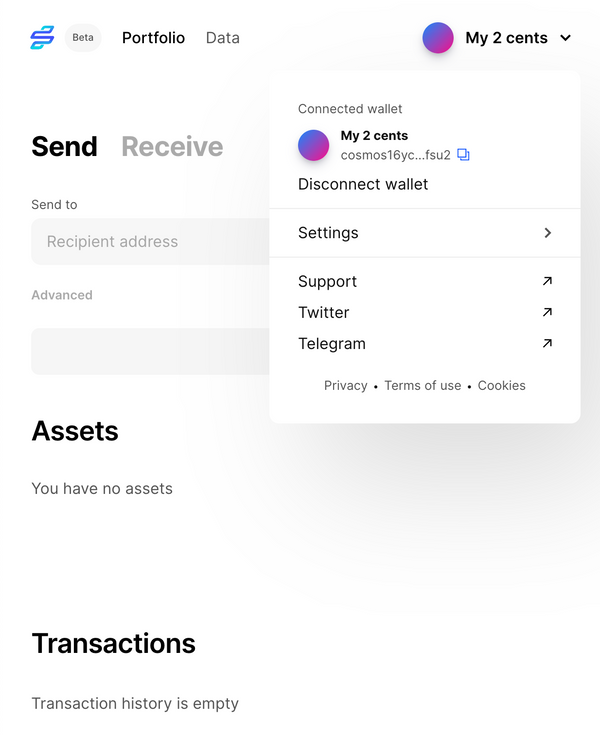
Copy

$ docker exec -it checkers bash -c "cd vue && npm install"

$ docker exec -it checkers bash -c "cd vue && npm run dev -- --host"

Note the --host flag, which is forwarded to the underlying vite command thanks to the -- separator. This is necessary if you run the frontend within Docker.

Navigate to [localhost:3000 (opens new window)↗](http://localhost:3000/), or to whichever address was listed when running dev. The first load may take a few seconds. On the client-side, from the top right you can connect to the page via [Keplr](chrome://extensions/?id=dmkamcknogkgcdfhhbddcghachkejeap) if you are on the Chrome browser. You should see something like this:

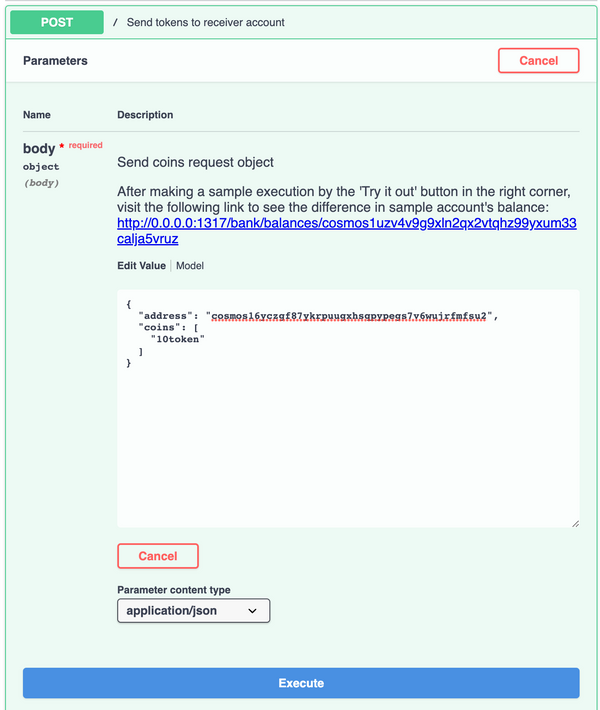




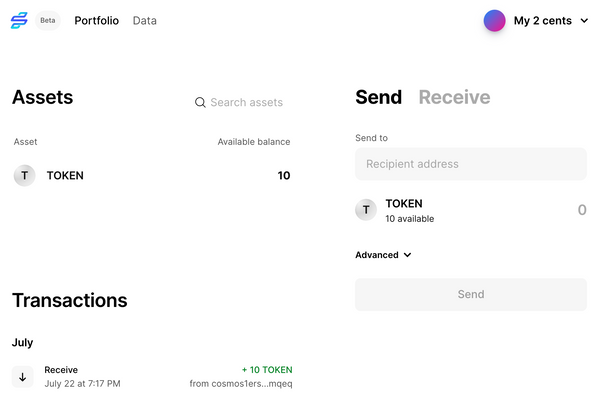
If you want Keplr to separate your mainnet keys and tokens from those you use for tests, have a look at [Google Chrome's profiles (opens new window)↗](https://www.techradar.com/how-to/how-to-use-profiles-in-chrome-to-keep-work-and-home-separate).

Your account is connected but has no balance. This is a good opportunity to use the faucet:

1. Head to [http://localhost:4500 (opens new window)↗](http://localhost:4500/)
2. Expand the POST / Send tokens to receiver account box.
3. Click the Try it out button.
4. Paste your address in the JSON at "address".
5. Click the big blue Execute button.



When you return to the main page, you should see your new assets:



From here, you can send tokens around. You can also ask for "10stake" from the faucet, if you recall the name of the tokens from config.yml.

There is not much else to do. After all, this is the Cosmos BaseApp. Ignite will continue scaffolding this GUI as your checkers project advances.



Keplr is also able to import Alice and Bob (i.e. the accounts that Ignite created). Use Keplr's +Add account feature. This is a convenient way to bypass having to use the faucet. You will need to use Alice's mnemonic, which you can find in the output of the ignite chain serve command.   
  
If you do not see the mnemonic, that is because the mnemonic was shown to you the first time you ran the command and you did not copy it. If so, reset with ignite chain serve --reset-once.   
  
Now you should see the balance of Alice's account and can act on her behalf.



Make a Git commit before you create a new message. In fact, it is generally recommended to make a Git commit before running **any** ignite scaffold command. A Git commit protects the work you have done so far and makes it easier to see what the scaffold command added. It also makes it easy to just revert all changes if you are unsatisfied and want to run a different scaffold command.

[#Copy link](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-first-message) Your first message

After your Git commit, and having stopped running Ignite, create a simple message with:

**Local**

**Docker**



Copy

$ ignite scaffold message createPost title body

Copy

$ docker run --rm -it -v $(pwd):/checkers -w /checkers checkers\_i ignite scaffold message createPost title body

The ignite scaffold message command accepts a message name (here createPost) as the first argument, and a list of fields for the message (here title and body), which are string fields unless mentioned otherwise.

A message is scaffolded in a module with a name that matches the name of the project by default. It is named checkers in this case. Alternatively you could have used --module checkers. Learn more about your options with:

**Local**

**Docker**



Copy

$ ignite scaffold message --help

Copy

$ docker run --rm -it checkers\_i ignite scaffold message --help

You can see a list of files that were created or modified by the scaffold message command in the Terminal output:



Copy

modify proto/checkers/tx.proto

modify x/checkers/client/cli/tx.go

create x/checkers/client/cli/tx\_create\_post.go

modify x/checkers/handler.go

create x/checkers/keeper/msg\_server\_create\_post.go

modify x/checkers/module\_simulation.go

create x/checkers/simulation/create\_post.go

modify x/checkers/types/codec.go

create x/checkers/types/message\_create\_post.go

create x/checkers/types/message\_create\_post\_test.go

The modify was made possible thanks to the lines like // this line is used by starport scaffolding # 1 that you did not remove.

So where is everything? You can find the root definition of your new message in:

**proto/checkers/tx.proto**



Copy

message MsgCreatePost {

string creator = 1;

string title = 2;

string body = 3;

}

Ignite CLI also wired a new command into your chain's CLI in:

**x/checkers/client/cli/tx\_create\_post.go**



Copy

func CmdCreatePost() \*cobra.Command {

cmd := &cobra.Command{

Use: "create-post [title] [body]",

Short: "Broadcast message createPost",

Args: cobra.ExactArgs(2),

...

}

}

Ignite CLI scaffolded GUI elements relating to your message with a Vue.js frontend framework. You can, for instance, start with this function in:

**vue/src/store/generated/alice/checkers/alice.checkers.checkers/index.ts**



Copy

async MsgCreatePost({ rootGetters }, { value }) {

try {

const txClient=await initTxClient(rootGetters)

const msg = await txClient.msgCreatePost(value)

return msg

} catch (e) {

if (e == MissingWalletError) {

throw new SpVuexError('TxClient:MsgCreatePost:Init', 'Could not initialize signing client. Wallet is required.')

}else{

throw new SpVuexError('TxClient:MsgCreatePost:Create', 'Could not create message: ' + e.message)

}

}

},

When you are done with this exercise you can stop Ignite's chain serve.



Want another demonstration? In the following video Denis Fadeev, creator of and core contributor to Ignite CLI, explains how to create and interact with a Cosmos SDK blockchain using just a few basic commands, then provides a real-time demonstration of Ignite CLI in action.

synopsis

To summarize, this section has explored:

* How to install Ignite CLI, a command-line tool that writes code files and updates them when instructed, handles some compilation, runs a local blockchain node, and assists with other tasks.
* How to scaffold a basic blockchain, with the suggested best practice not to replace lines with code markers indicating where to add further code on later instruction, nor to rename or move any file containing such a line.
* How to interact via the CLI to demonstrate that your chain is live when running in its shell.
* How to boot up the frontend that Ignite CLI has created by using a terminal window and navigating to the localhost on your browser.
* How to test the base functionality of your chain by creating a simple message.



You can remove the MsgCreatePost message as it is not part of the guided exercise in the next sections. You can clean it all by running:



Copy

$ git stash -u && git stash drop

previous

[](https://ida.interchain.io/tutorials/3-run-node/)

**[Run a Node, API, and CLI](https://ida.interchain.io/tutorials/3-run-node/)**

up next

**[Exercise - Make a Checkers Blockchain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/2-exercise-intro.html)**

[[](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/2-exercise-intro.html)](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/2-exercise-intro.html)

Rate this Page

icon smile

icon meh

icon frown

Would you like to add a message?

Submit

Thank you for your Feedback!

On this page

[Install](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#install)

[Prepare Docker](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#prepare-docker)

[Your chain](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-chain)

[Interact via the CLI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#interact-via-the-cli)

[Your GUI](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-gui)

[Your first message](https://ida.interchain.io/hands-on-exercise/1-ignite-cli/1-ignitecli.html#your-first-message)

#### **Get Cosmos updates**

Unsubscribe at any time. [Privacy Policy↗](https://v1.cosmos.network/privacy)

     Next

Documentation

[Cosmos SDK](https://docs.cosmos.network/)[Cosmos Hub](https://hub.cosmos.network/)[CometBFT](https://docs.cometbft.com/)[IBC Protocol](https://ibc.cosmos.network/)

Community

[Interchain blog](https://blog.cosmos.network/)[Forum](https://forum.cosmos.network/)[Discord](https://discord.gg/cosmosnetwork)

Contributing

[Source code on GitHub](https://github.com/cosmos/sdk-tutorials)

[](https://ida.interchain.io/)

[Interchain Developer Academy](https://ida.interchain.io/)

**[](https://blog.cosmos.network/)[](https://twitter.com/cosmos)[](https://discord.gg/cosmosnetwork)[](https://www.linkedin.com/company/interchain-foundation/about/)[](https://reddit.com/r/cosmosnetwork)[](https://t.me/cosmosproject)[](https://www.youtube.com/c/CosmosProject)**



Dark mode

† This website is maintained by the Interchain Foundation (ICF). The contents and opinions of this website are those of the ICF. The ICF provides links to cryptocurrency exchanges as a service to the public. The ICF does not warrant that the information provided by these websites is correct, complete, and up-to-date. The ICF is not responsible for their content and expressly rejects any liability for damages of any kind resulting from the use, reference to, or reliance on any information contained within these websites.

Cosmos is a registered trademark of the [Interchain Foundation.](https://interchain.io/)[Privacy](https://v1.cosmos.network/privacy)