

Deploy a smart contract to your Arbitrum rollup

Overview

Welcome to the guide on deploying a smart contract to your Arbitrum rollup. In this tutorial, you will learn how to deploy a smart contract using the L2 Nitro devnet and the provided public and private keys for testing purposes.

Prerequisites

- [Nitro rollup devnet](#)
- running
- [Foundry](#)
- installed on your machine
- [Node.js](#)
- Basic understanding of Ethereum
- Basic understanding of Solidity and Node.js

Setup

First, in yourHOME directory, set up a new project folder for this tutorial and init the project with npm:

```
bash cd HOME mkdir
```

```
counter-project && cd
```

```
counter-project && npm
```

```
init
```

```
-y cd HOME mkdir
```

```
counter-project && cd
```

```
counter-project && npm
```

```
init
```

-y Next, initialize a Foundry project with the following command:

```
bash forge
```

```
init
```

```
counter_contract forge
```

```
init
```

```
counter_contract
```

Create your smart contract

Take a look at theCounter.sol file in yourcounter-project/counter_contract/src directory:

```
solidity // SPDX-License-Identifier: UNLICENSED pragma
```

```
solidity
```

```
^0.8.13 ;
```

```
contract Counter { uint256
```

```
public number;
```

```
function
```

```
setNumber ( uint256
```

```
newNumber ) public { number = newNumber; }
```

```
function
```

```
increment () public { number ++ ; } } // SPDX-License-Identifier: UNLICENSED pragma
```

```
solidity
```

```
^0.8.13 ;
```

```
contract Counter { uint256
```

```
public number;
```

```
function
```

```
setNumber ( uint256
```

```
newNumber ) public { number = newNumber; }
```

```
function
```

increment () public { number ++ ; } } The contract contains a public unsigned integer variable named "number". There are two public functions in this contract. ThesetNumber function allows anyone to set a new value for the "number" variable, while theincrement function increases the value of "number" by one each time it's called.

You can[learn more about Solidity and smart contract programming](#) .

To compile the contract, run the following forge command from theHOME/counter-project/counter_contract/ directory:

```
bash forge
```

```
build forge
```

build Your output should look similar to the following:

```
bash [·] Compiling... [·] Compiling 21 files with 0.8.19 [·] Solc 0.8.19 finished in 1.24s Compiler
```

```
run
```

```
successful [·] Compiling... [·] Compiling 21 files with 0.8.19 [·] Solc 0.8.19 finished in 1.24s Compiler
```

```
run
```

```
successful
```

Test your smart contract

Now, open the test/Counter.t.sol file:

```
solidity // SPDX-License-Identifier: UNLICENSED pragma
```

```
solidity
```

```
^0.8.13 ;
```

```
import
```

```
"forge-std/Test.sol" ; import
```

```
"../src/Counter.sol" ;
```

```
contract
```

```
CounterTest
```

```
is
```

```
Test { Counter public counter;
```

```
function
```

```
setUp () public { counter =
```

```
new
```

```
Counter (); counter. setNumber ( 0 ); }
```

```
function
```

```
testIncrement () public { counter. increment (); assertEq (counter. number (), 1 ); }
```

```
function
```

```
testSetNumber ( uint256
```

```
x ) public { counter. setNumber (x); assertEq (counter. number (), x); } } // SPDX-License-Identifier: UNLICENSED pragma
```

```
solidity
```

```
^0.8.13 ;
```

```
import
```

```
"forge-std/Test.sol" ; import
```

```
"../src/Counter.sol" ;
```

```
contract
```

```
CounterTest
```

```
is
```

```
Test { Counter public counter;
```

```
function
```

```
setUp () public { counter =
```

```
new
```

```
Counter (); counter. setNumber ( 0 ); }
```

```
function
```

```
testIncrement () public { counter. increment (); assertEq (counter. number (), 1 ); }
```

```
function
```

```
testSetNumber ( uint256
```

```
x ) public { counter. setNumber (x); assertEq (counter. number (), x); } } This file performs unit testing on the contract we created in the previous section. Here's what the test is doing:
```

- The contract includes a public "Counter" type variable called "counter". In the setUp function, it initializes a new instance of the "Counter" contract and sets the "number" variable to 0.
- There are two test functions in the contract: testIncrement and testSetNumber
- testIncrement
 - function tests the "increment" function of the "Counter" contract by calling it and then asserting that the "number" in the "Counter" contract is 1. It verifies if the increment operation correctly increases the number by one.
- testSetNumber
 - function is more generic. It takes an unsigned integer argument 'x' and tests the "setNumber" function of the "Counter" contract. After calling the "setNumber" function with 'x', it asserts that the "number" in the "Counter" contract is equal to 'x'. This verifies that the "setNumber" function correctly updates the "number" in the "Counter" contract.

Now, to test your code, run the following:

```
bash forge
```

```
test forge
```

If the test is successful, your output should be similar to this:

```
bash [ : ] Compiling... No
```

```
files
```

```
changed,
```

```
compilation
```

```
skipped
```

```
Running
```

```
2
```

```
tests
```

```
for
```

```
test/Counter.t.sol:CounterTest [PASS] testIncrement () ( gas:
```

```
28334 ) [PASS] testSetNumber( uint256 ) ( runs:
```

```
256 ,
μ:
27709 ,
~:
28409 ) Test
result:
ok.
2
passed ; 0
failed ; finished
in
8.96 ms [ : ] Compiling... No
files
changed,
compilation
skipped
Running
2
tests
for
test/Counter.t.sol:CounterTest [PASS] testIncrement () ( gas:
28334 ) [PASS] testSetNumber( uint256 ) ( runs:
256 ,
μ:
27709 ,
~:
28409 ) Test
result:
ok.
2
passed ; 0
failed ; finished
in
8.96 ms
```

Deploying your smart contract

Funded accounts

Your L2 Nitro devnet will have a [public and private key funded as a faucet to use for testing](#):

- On both L1 and L2* Public key:0x3f1Eae7D46d88F08fc2F8ed27FCb2AB183EB2d0E
- - Private key:0xb6b15c8cb491557369f3c7d2c287b053eb229daa9c22138887752191c9520659

Alternatively, you can [fund other addresses by using the scriptssend-l1 andsend-l2](#).

The L1 Geth devnet will be running at `http://localhost:8545` and the L2 Nitro devnet will be on `http://localhost:8547` and `ws://localhost:8548`.

Using our Arbitrum devnet

We will use the local RPC endpoint (`http://localhost:8547`) and accounts above to test with.

Let's deploy the contract now. First, set a private key from anvil:

```
bash export L2_PRIVATE_KEY = 0xe887f7d17d07cc7b8004053fb8826f6657084e88904bb61590e498ca04704cf2 export ARB_RPC_URL = http://localhost:8547 export L2_PRIVATE_KEY = 0xe887f7d17d07cc7b8004053fb8826f6657084e88904bb61590e498ca04704cf2 export ARB_RPC_URL = http://localhost:8547 Now, deploy the contract:
```

```
bash forge
```

```
create
```

```
--rpc-url ARB_RPC_URL \ --private-key L2_PRIVATE_KEY \ src/Counter.sol:Counter forge
```

```
create
```

```
--rpc-url ARB_RPC_URL \ --private-key L2_PRIVATE_KEY \ src/Counter.sol:Counter A successful deployment will return output similar to below:
```

```
bash [ : ] Compiling... No
```

```
files
```

```
changed,
```

```
compilation
```

```
skipped Deployer:
```

```
0xf39Fd6e51aad88F6F4ce6aB8827279cFfFb92266 Deployed
```

```
to:
```

```
0x5FbDB2315678afecb367f032d93F642f64180aa3 Transaction
```

What will you build next? In our next tutorial, we will be going over how to deploy a dapp to your Arbitrum rollup. [\[Edit this page on GitHub\]](#) Last updated: [Previous page](#) [Nitrogen testnet](#) [Next page](#)
[Deploy a dapp on your Arbitrum rollup devnet](#) [\]](#)