

# INSTALL

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This file contains the instructions to install and run the replication package of EtherDiffer. For using the docker image, please refer to [README.pdf](#).

## (Installation Instructions)

Please download the artifact(v1.0) from [Figshare Repository Link](#) or [GitHub Repository Link](#). Then, follow the instructions below to install dependency packages:

(Node v19.4.0) We recommend the installation using NVM(Node Version Manager)

```
$ curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.39.3/install.sh | bash
$ source $HOME/.nvm/nvm.sh
$ nvm install 19.4.0 && nvm alias default 19.4.0 && nvm use default
```

(.NET SDK 6.0)

```
$ wget https://packages.microsoft.com/config/ubuntu/20.04/packages-microsoft-prod.deb -O
packages-microsoft-prod.deb
$ sudo dpkg -i packages-microsoft-prod.deb
$ rm packages-microsoft-prod.deb
$ sudo apt-get update && sudo apt-get install -y dotnet-sdk-6.0
```

(OpenJDK JRE 16)

```
$ sudo apt-get -y install openjdk-16-jre
```

(libsnappy-dev, libc6-dev, libc6)

```
$ sudo apt-get -y install libsnappy-dev libc6-dev libc6
```

Once installed, enjoy EtherDiffer with the following command from the package root:

```
$ node src/main.js
```

Optionally, you can specify parameters:

```
--chain value          (default: 300)
    Height of non-deterministic chain to generate
--tc value              (default: 600)
    Number of test cases to generate
--mut-prob value        (default: 50)
    Probability of invalid test case mutation
```

```
$ node src/main.js --chain 30 --tc 60 --mut-prob 0
```

\* NOTE: The default setting takes a while during the chain generation.

When executed, EtherDiffer goes through the following phases and prints out related messages on console:

### 1. Network Construction

- Initializing a private network consisted of target nodes
- Setting up resources necessary for testing  
(creating accounts, charging with Ether, and deploying smart contracts)

### 2. Chain Generation

- Generating a non-deterministic chain by multi-concurrent transactions  
(This might take a while depending on `--chain` parameter)

### 3. Test Case Generation and Execution

- Generating a set of semantically-valid/invalid test cases for each target node
- Executing the set and cross-checking the return values

### 4. Deviation Report

EtherDiffer creates `out` directory that contains report files:

- `exec-results`: Execution results from each target node
- `reports/`: Error and value deviations found by EtherDiffer

Also, the directory contains all other resources to reproduce deviations:

- `configs/`: Network configuration files for each target node
- `data/`: Chain data directory for each target node
- `testcases/`: Generated test cases