



THE UNIVERSITY OF TEXAS AT ARLINGTON

**Advanced Topics in Software Engineering
CSE 6324 – Section 004**

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ITERATION-1

Project Proposal:

We are working on an issue posted by contributors of the truffle package. This involves reproducing the issue, finding the cause of the issue, and fixing it.

In this iteration, we worked on finding the modules required to be fixed and install the tools and packages required in fixing the issue.

Issue : **Bug: @truffle/require not able to resolve locally-installed modules (e.g. ts-node, typescript) when running under the globally-installed truffle bundle [#5381](#).**

Frameworks:

Truffle - It is an open-source development framework that allows users to develop, test and asset pipeline for ethereum.

Ganache - It is an ethereum simulator that makes developing ethereum applications faster and easier.

Lerna - It is a framework for managing and publishing multiple JS/TS packages from a single repo which is used by truffle for its packages.

Package Manager:

npm - It is the default package manager for javascript runtime environment Node.js.

Installing Node & NPM:

Reference: <https://docs.npmjs.com/downloading-and-installing-node-js-and-npm>

Installing Truffle:

This iteration is in fixing an issue that lies on the truffle version @5.5.24. We are going to install **truffle@5.5.24**

To install truffle@5.5.24, run the below command to install truffle: [1]

```
$ npm install -g truffle
```

```
Terminal — -zsh — 112x35
user@MacBookAir:~$ sudo npm install -g truffle
Password:
npm WARN deprecated mkdirp-promise@5.0.1: This package is broken and no longer maintained. 'mkdirp' itself supports promises now, please switch to that.
npm WARN deprecated har-validator@5.1.5: this library is no longer supported
npm WARN deprecated apollo-datasource@3.3.2: The 'apollo-datasource' package is part of Apollo Server v2 and v3, which are now deprecated (end-of-life October 22nd 2023). See https://www.apollographql.com/docs/apollo-server/previous-versions/ for more details.
npm WARN deprecated apollo-server-errors@3.3.1: The 'apollo-server-errors' package is part of Apollo Server v2 and v3, which are now deprecated (end-of-life October 22nd 2023). This package's functionality is now found in the 'apollo-server' package. See https://www.apollographql.com/docs/apollo-server/previous-versions/ for more details.
npm WARN deprecated uuid@2.0.1: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
npm WARN deprecated multicodec@1.0.4: This module has been superseded by the multiformats module
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
npm WARN deprecated apollo-server-env@4.2.1: The 'apollo-server-env' package is part of Apollo Server v2 and v3, which are now deprecated (end-of-life October 22nd 2023). This package's functionality is now found in the 'apollo/utils.fetcher' package. See https://www.apollographql.com/docs/apollo-server/previous-versions/ for more details.
npm WARN deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
npm WARN deprecated multibase@0.6.1: This module has been superseded by the multiformats module
npm WARN deprecated multibase@0.7.0: This module has been superseded by the multiformats module
npm WARN deprecated multicodec@0.5.7: This module has been superseded by the multiformats module
npm WARN deprecated cids@0.7.5: This module has been superseded by the multiformats module

changed 744 packages, and audited 773 packages in 43s

90 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
user@MacBookAir:~$
```

Installing Ganache:

To install ganache, run the below command: [2]

```
$ npm install -g ganache
```

```
Terminal — -zsh — 64x15
user@MacBookAir:~$ sudo npm install -g ganache

changed 17 packages, and audited 46 packages in 11s

6 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
user@MacBookAir:~$
```

Reproducing The Issue:

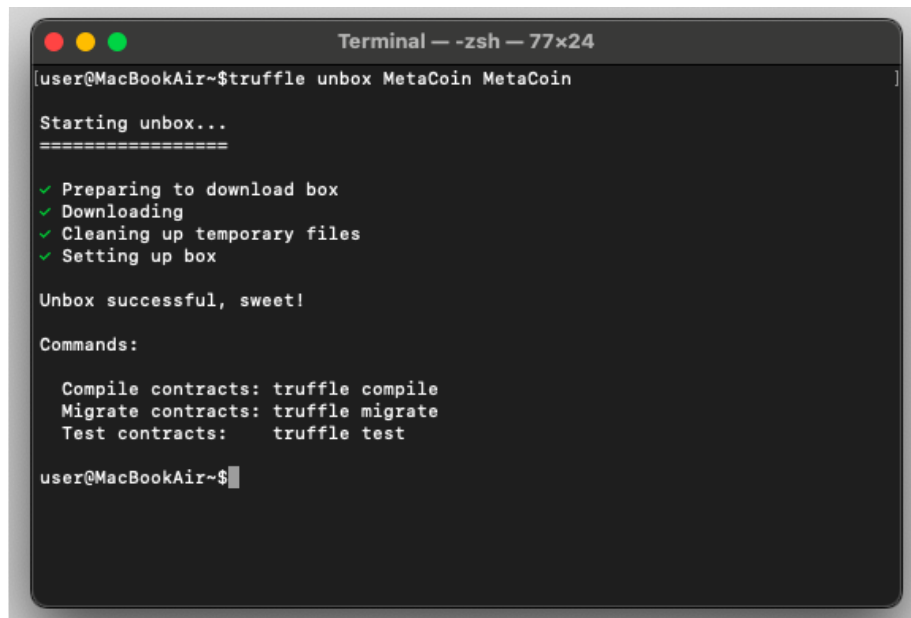
I have reproduced the issue by following the steps as mentioned in the issue.

Steps to reproduce,

- With the truffle installed, unbox any templates. we unboxed Metacoin by running:

[3]

```
$ truffle unbox MetaCoin MetaCoin
```



```
Terminal — -zsh — 77x24
[user@MacBookAir~$truffle unbox MetaCoin MetaCoin]

Starting unbox...
=====

✓ Preparing to download box
✓ Downloading
✓ Cleaning up temporary files
✓ Setting up box

Unbox successful, sweet!

Commands:

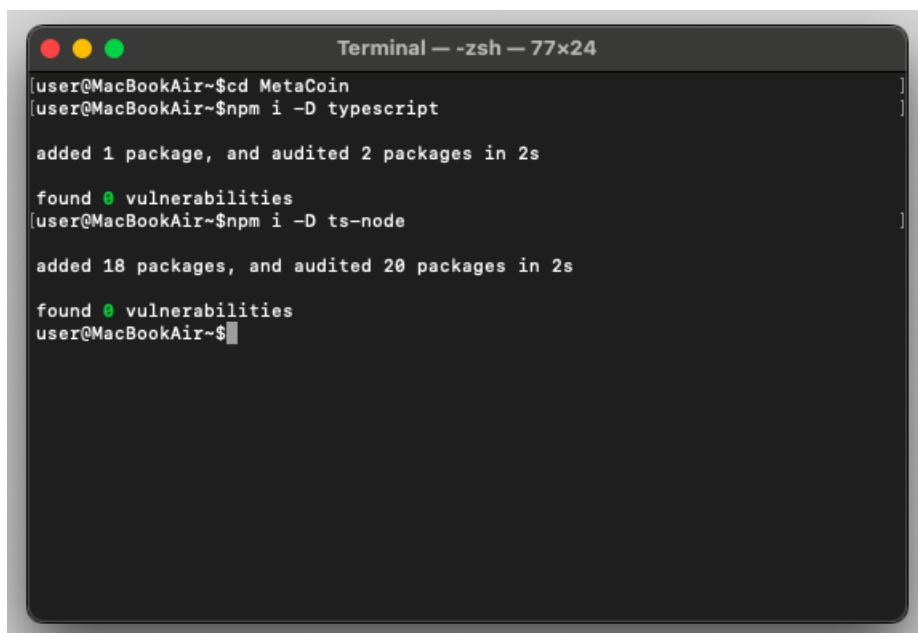
  Compile contracts: truffle compile
  Migrate contracts: truffle migrate
  Test contracts:    truffle test

user@MacBookAir~$
```

- Change the working directory to MetaCoin and run the below commands to add typescript modules: [4]

```
$ npm i -D typescript
```

```
$ npm i -D ts-node
```



```
Terminal — -zsh — 77x24
[user@MacBookAir~$cd MetaCoin]
[user@MacBookAir~$npm i -D typescript]

added 1 package, and audited 2 packages in 2s

found 0 vulnerabilities
[user@MacBookAir~$npm i -D ts-node]

added 18 packages, and audited 20 packages in 2s

found 0 vulnerabilities
user@MacBookAir~$
```

- Configure truffle-config.js to connect to my local node by running the below command in a separate terminal: [5]

```
$ ganache
```

- Rename 1_deploy_contracts.js to 1_deploy_contracts.ts and run:

```
$ truffle migrate --reset
```

```
Terminal — -zsh — 76x23
~/Kiruthik/Issue/MetaCoin — -zsh  ...n — node /usr/local/bin/ganache ... +

user@MacBookAir~$truffle migrate --reset

Compiling your contracts...
=====
> Everything is up to date, there is nothing to compile.

Starting migrations...
=====
> Network name:      'development'
> Network id:        1677863574884
> Block gas limit: 30000000 (0x1c9c380)

1_deploy_contracts.ts
=====

Attempted to execute module at path /Users/calibraint/Kiruthik/Issue/MetaCoin/migrations/1_deploy_contracts.ts, but the 'ts-node' module, or one of its
required peers has not been installed.
Truffle v5.7.9 (core: 5.7.9)
Node v16.17.0
user@MacBookAir~$
```

From the above REFERENCE [5], we have reproduced the issue.

Finding The Issue:

@truffle/require is responsible for importing modules and its supported typescript in default but fails to do so when the project couldn't check for its (ts-node) peer dependencies.

```
~/truffle/packages/require/lib — truffle

Ts typescript.ts 0 X
packages > require > lib > TS typescript.ts > _getOrCreateCompilationService
50
51
52 debug('compiling $(sourceFilePath)');
53 return compilationService.compile(source, sourceFilePath);
54
55
56 /**
57  * Creates and caches an instance of TypeScript compiler service that has been
58  * initialized with the global context for the module that we'll be executing.
59  *
60  * @param conf the instance of '@truffle/config' for the user's project
61  * @param sourceFilePath the path to the source module being compiled
62  * @param context the global context in which the compiled script will run
63  * @returns an instance of a TypeScript compiler service (TS Compiler API)
64  */
65
66
67 function _getOrCreateCompilationService(
68   conf: TruffleConfig,
69   sourceFilePath: string
70 ): TSNode.Service {
71   if (!tsNode) {
72     throw new TsNodeDependencyError(sourceFilePath);
73   }
74
75   // we get away with this here because the instance of 'process' that we pass
76   // into the child context is from our parent global context
77   if (!process.hasOwnProperty(tsNode.REGISTER_INSTANCE)) {
78     debug('registering ts-node compiler service');
79     const createOptions: TSNode.CreateOptions = {
80       cwd: conf.working_directory,
81       esm: false,
82       compilerOptions: {
83         inlineSourceMap: true
84       }
85     }
86   }
87 }
```

Work Plan for Remaining Iterations:

Iteration 1: Reproduce the issue, explore the packages, and find the issue.

Iteration 2: Bootstrap truffle source code and integrate ts-node locally.

Iteration 3: Add a flag to unbox typescript added boxes.

Competitor:

when we attempt to work around the issue by installing ts-node and typescript globally, it will then fail on a missing @truffle/resolver package. It should be resolving this from the bundle, but that doesn't seem to be happening. That said, if you go ahead and install that package (globally - yuck), it does work.

Risk Factors and Mitigation Plans:

Risk	Mitigation Plan
Analyzing Dependency issue	Considering a solution to solve the typescript error
Adapt Typescript programming language syntax	Daily Spending Some time for Typescript language.
Some bugs and defects may go unnoticed until and unless deployed on the live Ethereum Network	Must use built-in tools for testing the smart contract and also use the code Reviews and formal verifications.

Customers and Users:

- As these are primarily used for building the Decentralized applications.
- The Customers and the users are primarily the Developers who build smart contracts and Decentralised apps who deploy their contracts on the Ethereum blockchain technology.

- Also, many organisations started using these blockchain technologies.
- Organisation such as the financial institutes such as banks for cross border money transfer services etc.
- Health care industry also using these services as it provides more security to the patient data and also for medicinal drug supply etc.
- Additionally, Governments across the world are using these technologies however it might be difficult to tell which technology they are specifically using but Governments like Dubai, India, China, Estonia etc.
- After the modifications that are to be done users that use typescript to deploy the contracts on the local environment can use this tool .

References:

- <https://github.com/trufflesuite/truffle#install> [1]
 - <https://github.com/trufflesuite/ganache#command-line-use> [2]
 - <https://github.com/trufflesuite/truffle/issues/5381> [3], [4] and [5]
- GitHub Link: https://github.com/saicharan1248/cse6324_team1_project.git