

## Creating and deploying a simple, smart contract with cargo casper and cargo test

Installing rust:

```
Gr33n_R4bb1t@kali: ~  
File Actions Edit View Help  
The cargo, rustc, rustup and other commands will be added to  
Cargo's bin directory, located at:  
  
/home/Gr33n_R4bb1t/.cargo/bin  
  
This path will then be added to your PATH environment variable by  
modifying the profile files located at:  
  
/home/Gr33n_R4bb1t/.profile  
/home/Gr33n_R4bb1t/.bashrc  
/home/Gr33n_R4bb1t/.zshenv  
  
You can uninstall at any time with rustup self uninstall and  
these changes will be reverted.  
  
Current installation options:  
  
default host triple: x86_64-unknown-linux-gnu  
default toolchain: stable (default)  
profile: default  
modify PATH variable: yes  
  
1) Proceed with installation (default)  
2) Customize installation  
3) Cancel installation  
>1
```

```
Gr33n_R4bb1t@kali: ~  
File Actions Edit View Help  
info: installing component 'rust-docs'  
17.0 MiB / 17.0 MiB (100 %) 3.4 MiB/s in 4s ETA: 0s  
info: installing component 'rust-std'  
22.3 MiB / 22.3 MiB (100 %) 7.3 MiB/s in 3s ETA: 0s  
info: installing component 'rustc'  
51.0 MiB / 51.0 MiB (100 %) 7.0 MiB/s in 6s ETA: 0s  
info: installing component 'rustfmt'  
info: default toolchain set to 'stable-x86_64-unknown-linux-gnu'  
  
stable-x86_64-unknown-linux-gnu installed - rustc 1.55.0 (c8dfcfe04 2021-09-06)  
  
Rust is installed now. Great!  
  
To get started you may need to restart your current shell.  
This would reload your PATH environment variable to include  
Cargo's bin directory ($HOME/.cargo/bin).  
  
To configure your current shell, run:  
source $HOME/.cargo/env
```

Restarting shell and checking version:

```
(Gr33n_R4bb1t@kali)-[~]
└─$ rustup --version
rustup 1.24.3 (ce5817a94 2021-05-31)
info: This is the version for the rustup toolchain manager, not the rustc compiler.
info: The currently active `rustc` version is `rustc 1.55.0 (c8dfcfe04 2021-09-06)`
```

Installing dependencies:

CMake

```
(Gr33n_R4bb1t@kali)-[~]
└─$ cmake --version
Command 'cmake' not found, but can be installed with:
sudo apt install cmake
Do you want to install it? (N/y)y
sudo apt install cmake
[sudo] password for Gr33n_R4bb1t:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  cryptsetup-run libamtk-5-0 libamtk-5-common libavresample4 librest-0.7-0
  libtepl-5-0
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cmake-data libjsoncpp24 librhash0
Suggested packages:
  cmake-doc ninja-build
The following NEW packages will be installed:
  cmake cmake-data libjsoncpp24 librhash0
0 upgraded, 4 newly installed, 0 to remove and 60 not upgraded.
Need to get 7,526 kB of archives.
After this operation, 33.1 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://kali.koyanet.lv/kali kali-rolling/main amd64 cmake-data all 3.18.4-2 [1,725 kB]
Get:2 http://kali.koyanet.lv/kali kali-rolling/main amd64 libjsoncpp24 amd64 1.9.4-4 [78.9 kB]
```

Checking version

```
(Gr33n_R4bb1t@kali)-[~]
└─$ cmake --version
cmake version 3.18.4

CMake suite maintained and supported by Kitware (kitware.com/cmake).
```

## Development Environment Setup

### Installing the Casper Crates:

```
# cargo install cargo-casper
Updating crates.io index
Installing cargo-casper v1.3.3
Compiling libc v0.2.102
Compiling proc-macro2 v1.0.29
Compiling cfg-if v1.0.0
Compiling version_check v0.9.3
Compiling unicode-xid v0.2.2
Compiling log v0.4.14
Compiling syn v1.0.76
Compiling parking_lot_core v0.8.5
Compiling scopeguard v1.1.0
Compiling autocfg v1.0.1
Compiling smallvec v1.6.1
Compiling lazy_static v1.4.0
Compiling heck v0.3.3
Compiling indexmap v1.7.0
Compiling textwrap v0.14.2
Compiling quote v1.0.9
Compiling mio v0.7.13
Compiling signal-hook-registry v1.4.0
Compiling atty v0.2.14
Compiling parking_lot v0.11.2
Compiling signal-hook v0.1.17
Compiling crossterm v0.19.0
Compiling colour v0.6.0
Compiling clap_derive v3.0.0-beta.4
Compiling clap v3.0.0-beta.4
error: unexpected token: `include_str`
--> /root/.cargo/registry/src/github.com-1ecc6299db9ec823/clap-3.0.0-beta.4/src/lib.rs:8:
10
8 | #[doc = include_str!("../README.md")]
   |          ^^^^^^^^^^^
error: aborting due to previous error

error: failed to compile `cargo-casper v1.3.3`, intermediate artifacts can be found at `/tmp/cargo-installpQd0Eq`
Caused by:
  could not compile `clap`.

To learn more, run the command again with --verbose.

(root@kali)-[/home/Gr33n_R4bb1t]
#
```

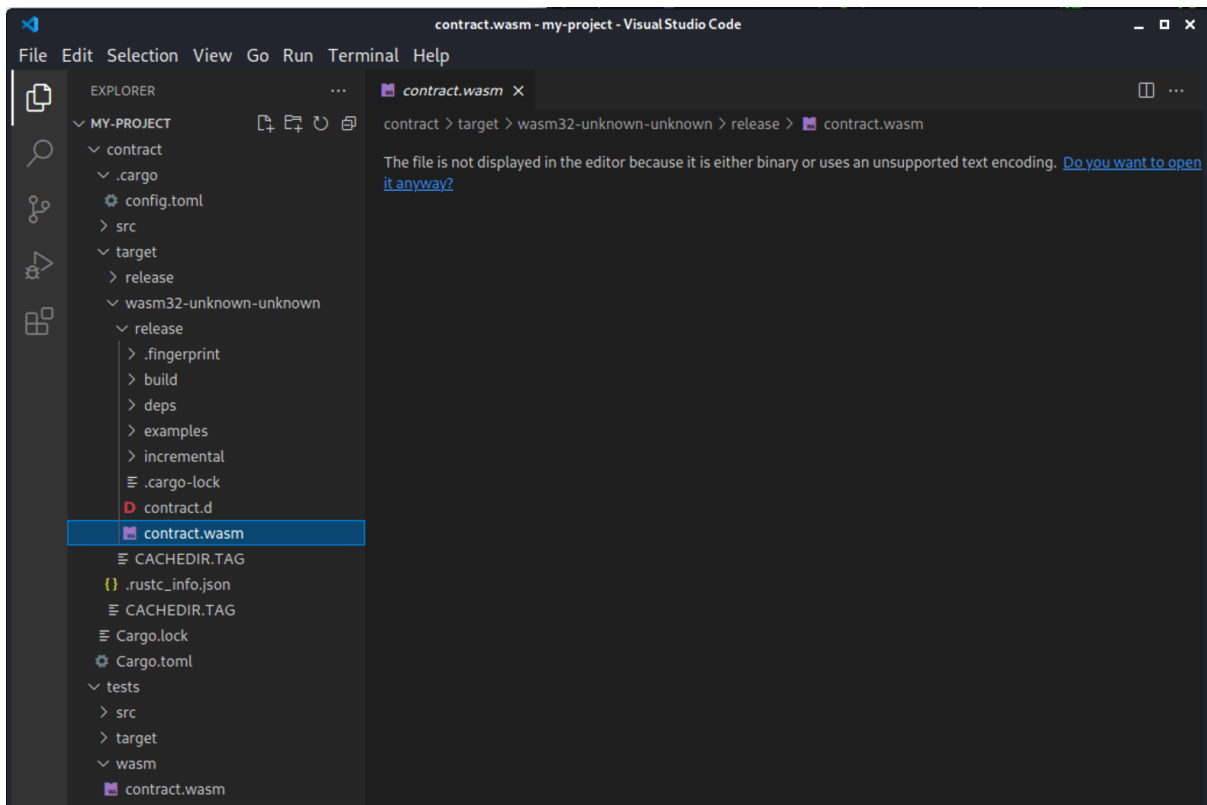
An alternative way of installation was chosen (from a dev branch)

```
(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
└─$ https://github.com/casper-network/casper-node.git
bash: https://github.com/casper-network/casper-node.git: No such file or directory

(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
└─$ rustup install $(cat rust-toolchain)
info: syncing channel updates for 'nightly-2021-06-17-x86_64-unknown-linux-gnu'
info: nightly-2021-06-17-x86_64-unknown-linux-gnu unchanged - rustc 1.55.0-nightly (a85f584ae 2021-06-16)
info: checking for self-updates
(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
└─$ rustup target add --toolchain $(cat rust-toolchain) wasm32-unknown-unknown
info: component 'rust-std' for target 'wasm32-unknown-unknown' is up to date

(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
└─$ cd contract/
(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project/contract]
└─$ cargo build --release
    Updating crates.io index
   Compiling proc-macro2 v1.0.29
   Compiling unicode-xid v0.2.2
   Compiling syn v1.0.76
   Compiling typenum v1.14.0
   Compiling version_check v0.9.3
   Compiling rand_core v0.5.1
   Compiling subtle v2.4.1
   Compiling curve25519-dalek v3.2.0
   Compiling ecdsa v0.10.2
   Compiling ed25519-dalek v1.0.1
   Compiling k256 v0.7.3
   Compiling casper-types v1.3.3
   Compiling casper-contract v1.3.3
   Compiling contract v0.1.0 (/home/Gr33n_R4bb1t/Downloads/Working_Directory/my-project/contract)
  Finished release [optimized] target(s) in 1m 11s

(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project/contract]
└─$ cd ..
(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
└─$ make test
cd contract && cargo build --release --target wasm32-unknown-unknown
wasm-strip contract/target/wasm32-unknown-unknown/release/contract.wasm 2>/dev/null | true
mkdir -p tests/wasm
cp contract/target/wasm32-unknown-unknown/release/contract.wasm tests/wasm
cd tests && cargo test
    Updating crates.io index
  Downloaded cc v1.0.70
  Downloaded num-bigint v0.4.2
  Downloaded tracing-core v0.1.20
  Downloaded time v0.1.43
  Downloaded ctor v0.1.21
  Downloaded tracing-attributes v0.1.16
  Downloaded tracing v0.1.28
```



## Making a test

```

Compiling pwasm-utils v0.16.0
Compiling k256 v0.7.3
Compiling casper-types v1.3.3
Compiling casper-execution-engine v1.3.3
Compiling casper-contract v1.3.3
Compiling casper-engine-test-support v1.3.3
Compiling tests v0.1.0 (/home/Gr33n_R4bb1t/Downloads/Working_Directory/my-project/tests)
Finished test [unoptimized + debuginfo] target(s) in 2m 53s
Running unittests (target/debug/deps/integration_tests-c50a2452bd6ac475)
test tests::should_error_on_missing_runtime_arg - should panic ... ok
test tests::should_store_hello_world ... ok
test result: ok. 2 passed; 0 failed; 0 ignored; 0 measured; 0 filtered out; finished in 0.11s
[unoptimized + debuginfo] target(s) in 0.08s
debug/deps/integration_tests-f54c86e3719442e8)

(Gr33n_R4bb1t@kali)-[~/Downloads/Working_Directory/my-project]
$

```

On this page

- Video Tutorial
- Prerequisites
- Setup
  - Creating a Project
  - Compiling to WASM
  - Build the Contract
  - Test the Contract
- Rust Resources

## Changing the key name and running the 2nd test and renaming back

```
running 2 tests
test tests::should_error_on_missing_runtime_arg - should panic ... ok
test tests::should_store_hello_world ... FAILED

failures:

---- tests::should_store_hello_world stdout ----
thread 'tests::should_store_hello_world' panicked at 'should be a value: Error { inner: "ValueNotFound(\"Name my-key-name not found in Account at path: Key::Account(3d5de8c609159a0954e773dd686fb7724428316cb30e00bdc899976127747f55)/my-key-name\")" }', src/integration_tests.rs:40:46

failures:
    tests::should_store_hello_world
test result: FAILED. 1 passed; 1 failed; 0 ignored; 0 measured; 0 filtered out; finished in 0.11s

error: test failed, to rerun pass '--bin integration-tests'
make: *** [Makefile:11: test] Error 101
```

## Running again

```
running 2 tests
test tests::should_error_on_missing_runtime_arg - should panic ... ok
test tests::should_store_hello_world ... ok

test result: ok. 2 passed; 0 failed; 0 ignored; 0 measured; 0 filtered out; finished in 0.11s
```