Building an interactive CLI app that people will love in Elixir

Unnawut Leepaisalsuwanna, @unnawut
Software Engineer at OmiseGO

July 18th, 2019

Hello!

- Maintainer of licensir
- Software Engineer at OmiseGO
- Both have CLIs!

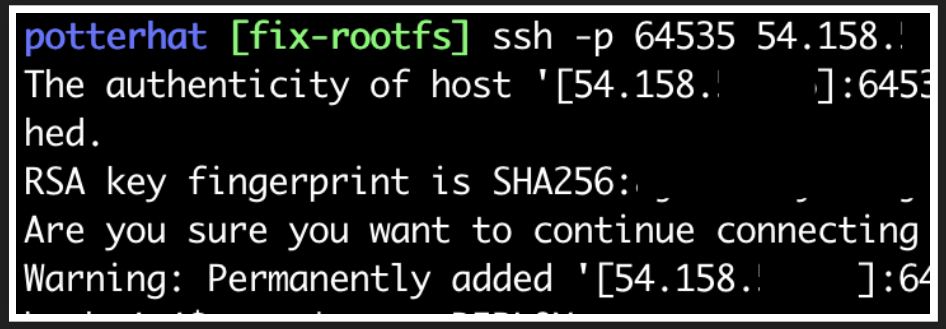
My claim today...

Command line interfaces should be adopted as a first-class citizen in your Elixir app.

1. Why CLI?
2. Developer Experience (DX) in CLIs
3. Elixir core features for CLI apps
4. Lessons learnt

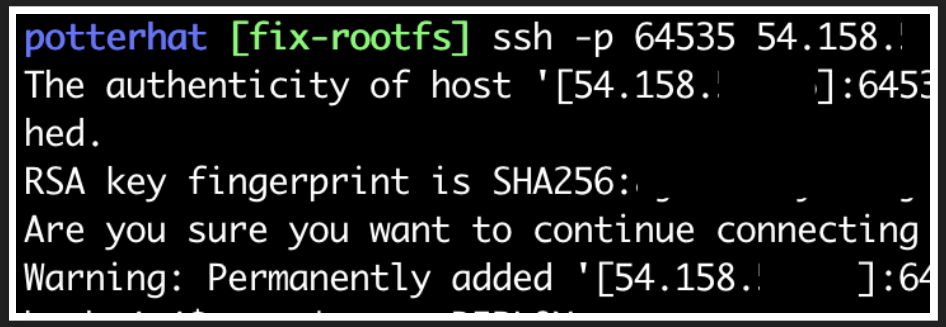
Why CLI?

- Light-weight, minimum-viable interface



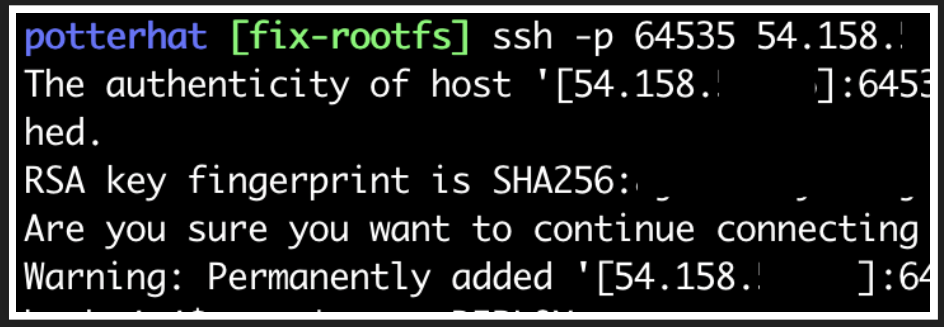
Why CLI?

- Light-weight, minimum-viable interface
- Utilizes OS/infra-level features



Why CLI?

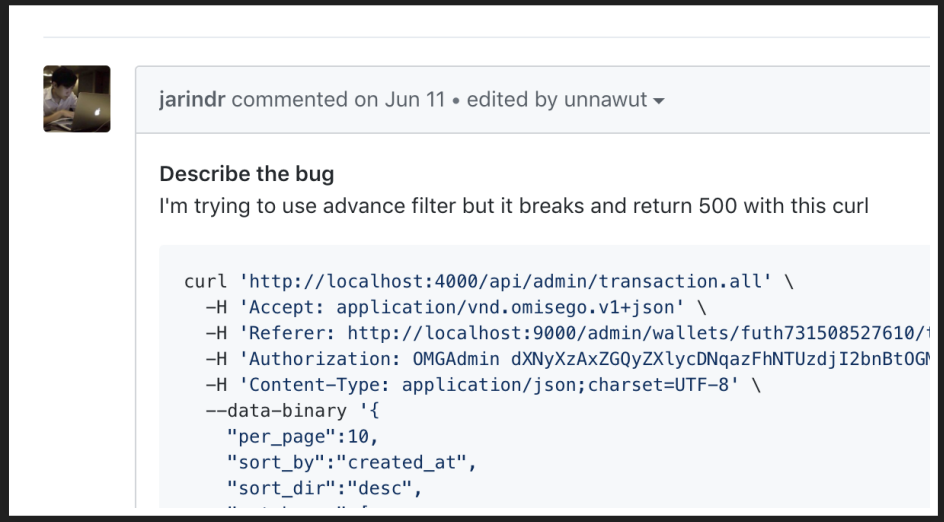
- Light-weight, minimum-viable interface
- Utilizes OS/infra-level features



- SSH for secure transport
- OS login for authentication
- User and group permission for authorization

Why CLI?

- Light-weight, minimum-viable interface
- Utilizes OS/infra-level features
- Facilitates reproducibility



Why CLI?

- Light-weight, minimum-viable interface
- Utilizes OS/infra-level features
- Facilitates reproducibility
- Increases composability

```
my_app balance "bal123456" | jq
```


```
{
  "jsonrpc": "2.0",
  "id": 1,
  "result": "0x5cc9a30d74f000"
}
```

Why CLI?

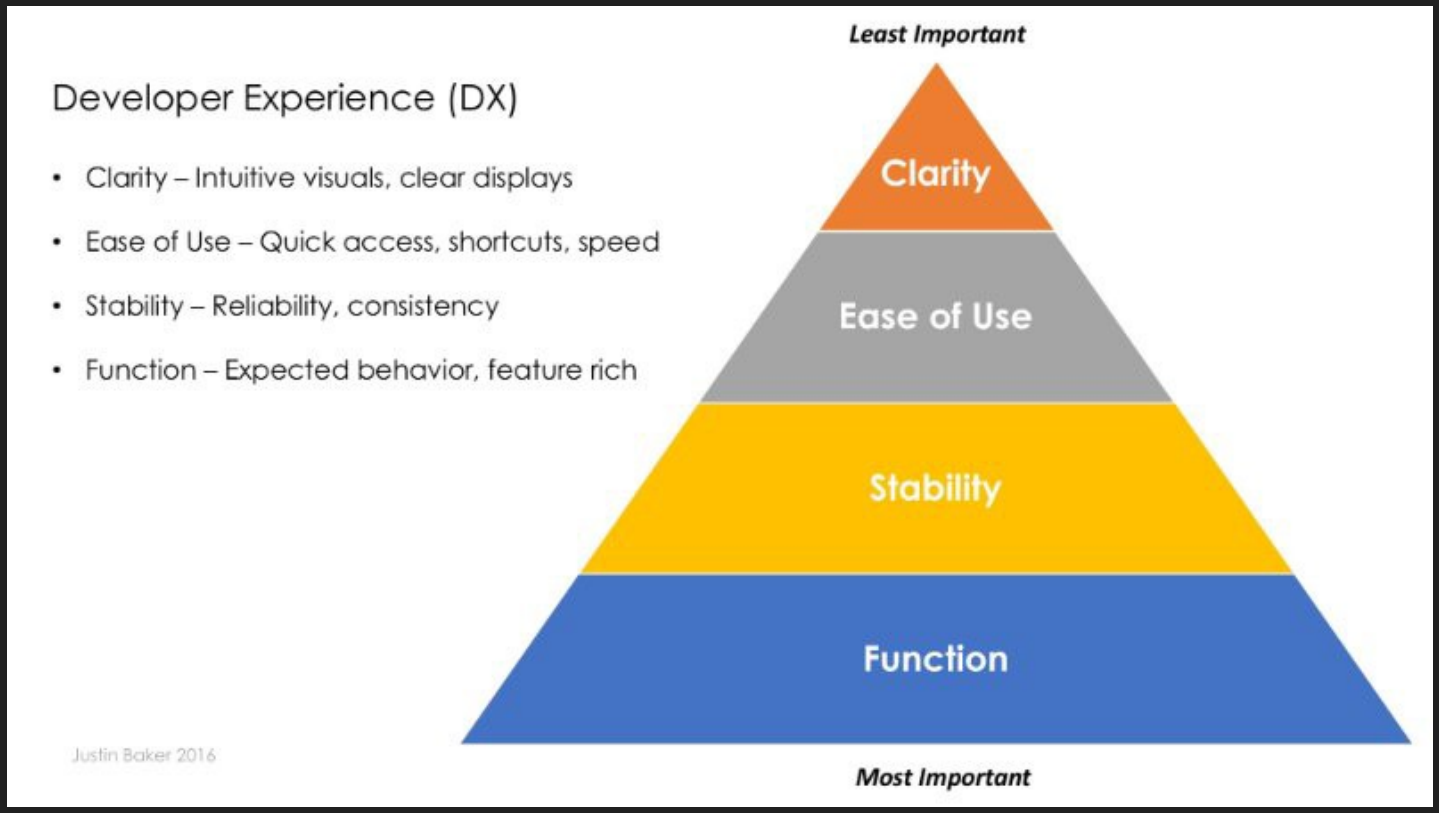
- Light-weight, minimum-viable interface
- Utilizes OS/infra-level features
- Facilitates reproducibility
- Increases composability
- Enables automation

```
deploy:
  steps:
    - checkout
    - run: my_app conf_secret "$SECRET"
    - run:
        command: sh .circleci/ci_slack.sh
        when: on_fail
```

1. Why CLI?
2. **Developer Experience (DX) in CLIs**
3. Elixir core features for CLI apps
4. Lessons learnt

Delivering robust functionality that is stable, speedy, and visually intuitive.

- Justin Baker



Developer Experience (DX) — Devs Are People Too (Justin Baker, 2017)

1. Why CLI?
2. Developer Experience (DX) in CLIs
3. **Elixir core features for CLI apps**
4. Lessons learnt

Write & read to IO

IO.puts/2, IO.write/2

```
IO.puts("Hello World!")
#=> Hello World!

IO.write("Hello World!")
#=> Hello World!
```

IO.gets/2

```
"Hello, " <> IO.gets("Name?\n")
#=> Name?
# Enters John Doe
#=> Hello, John Doe
```

Colors with `IO.ANSI`

```elixir
defmodule EWallet.CLI do
  def info(message), do: [:normal, message] |> IO.ANSI.format() |> IO.puts()
  def debug(message), do: [:faint, message] |> IO.ANSI.format() |> IO.puts()
  def success(message), do: [:green, message] |> IO.ANSI.format() |> IO.puts()
  def warn(message), do: [:yellow, message] |> IO.ANSI.format() |> IO.puts()

  def error(message) do
    formatted = IO.ANSI.format([:red, message])
    IO.puts(:stderr, formatted)
  end
end

CLI.info("This is informational")
CLI.error("Something went wrong")
```

`OptionParser`

How would you parse `my_app --help --unsupported some_args`?

OptionParser

How would you parse `my_app --help --unsupported some_args`?

OptionParser.parse/2

```
OptionParser.parse(argv(), options()) :: {parsed(), argv(), errors()}
```

```
iex> OptionParser.parse(["--help --unsupported some_args"], strict: [help: :boolean])
{[help: true], ["some_args"], [{"--unsupported", nil}]}
```


docker-compose exec ewallet bash (docker)
bash-4.4$

1. Why CLI?
2. Developer Experience (DX) in CLIs
3. Elixir core features for CLI apps
4. **Lessons learnt**

Custom release commands

Custom release commands

rel/config.exs

```
release :my_app do
  # ...
  set commands: [
    save_secret: "rel/commands/save_secret.sh"
  ]
end
```

Custom release commands

rel/config.exs

```
release :my_app do
  # ...
  set commands: [
    save_secret: "rel/commands/save_secret.sh"
  ]
end
```

rel/commands/save_secret.sh

```
#!/bin/sh
# Same as: mix save_secret "foo" "bar"
release_ctl eval --mfa "Mix.Tasks.SaveSecret.run/1" --argv -- "$@"
```

Custom release commands

rel/config.exs

```
release :my_app do
  # ...
  set commands: [
    save_secret: "rel/commands/save_secret.sh"
  ]
end
```

rel/commands/save_secret.sh

```
#!/bin/sh
# Same as: mix save_secret "foo" "bar"
release_ctl eval --mfa "Mix.Tasks.SaveSecret.run/1" --argv -- "$@"
```

Run with `bin/my_app save_secret "foo" "bar"`

Don't invent a new language

- Usign unfamiliar terms mean learning curve and confuses users
- When in doubt, consult `mix help`.
- GNU Coding Standard's Table of Long Options (Link)

stdout vs. stderr

```
IO.puts(device \\ :stdio, item)
```

```
mix run -e 'IO.puts("info"); IO.puts(:stderr, "error")' 1>/dev/null
# error
```

- Customizable logging
- More efficient monitoring and diagnostics

Use flags, not `IO.gets/2`

- CLI interactiveness is about returning promptly
- Input prompts prevent automation
- Use flags for inputs, return error when missing
- E.g. supports `-y`, `--yes`, `--assume-yes` to bypass all confirmations

```
def assume_yes?(args), do: args in ["-y", "--yes", "--assume-yes"]
```

Exit codes

Code	Meaning
0	Success
1	Catchall for general errors
...	...

`System.stop/1` and `System.halt/1`:

```
System.stop(0) # Gracefully shuts down with exit status 0 (success)
System.halt(1) # Forceful immediate halt with exit status 1 (error)
```

See: Exit Codes With Special Meanings

1. Why CLI?
2. Developer Experience (DX) in CLIs
3. Elixir core features for CLI apps
4. Lessons learnt

Tools

1. `IO.write/2`, `IO.puts/2`, `IO.gets/2`
2. `IO.ANSI`
3. `OptionParser.parse/2`

Practices

1. Distillery command
2. `stdout` v.s. `stderr`
3. Flags, not `IO.gets/2`
4. Meaningful exit codes

Further readings

- Vitaly Tatarintsev's Writing a command line app in Elixir (Link)
- Dennis Beatty's Cool CLIs in Elixir (Part 1, Part 2)
- Unix Interface Design Patterns (Link)

Let's talk more

omisego

- twitter.com/unnawut
- omisego.network
- omisego/ewallet
- unnawut/licensir