Nine mistakes I've done while building network automation

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For DKNOG13

Telia Company

Why this talk?

”Learn from the mistakes of others. You can’t live long enough to make them all yourself”
- Eleanor Roosevelt

About Me

— Worked in the service provider industry for 17 years
— Worked full time with network automation for three years now
— Lead developer and architect, automation team at Telia Company
— Primarily responsible for common architecture, and Norway as a country
— Co-founder of DKNOG
— Semi-dead blog: https://automate.network
— Twitter: @allaneising
— Mastodon: @eising@noc.social

— Made a lot of mistakes

Are mistakes bad?

— Maybe…

— Nothing is impossible to fix, but not all mistakes are possible to fix for me personally.

— It is mostly temporary solutions that end up being permanent. Not mistakes.

9 mistakes and some possible solutions

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Mistake #1

Not testing my automation on real hardware

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Not testing my automation on real hardware

“I tested using **virtual** routers”

“I tested using **simulated** routers”

“My code broke when it hit production”

Mistake #2
Thinking I understand all the details

“I’m a **network engineer**. I know how this works”

”My code **assumed** something that was untrue
and now we have a **hard to find** bug”

Possible solutions

— Get a **lab**

— Insist on getting a **lab**

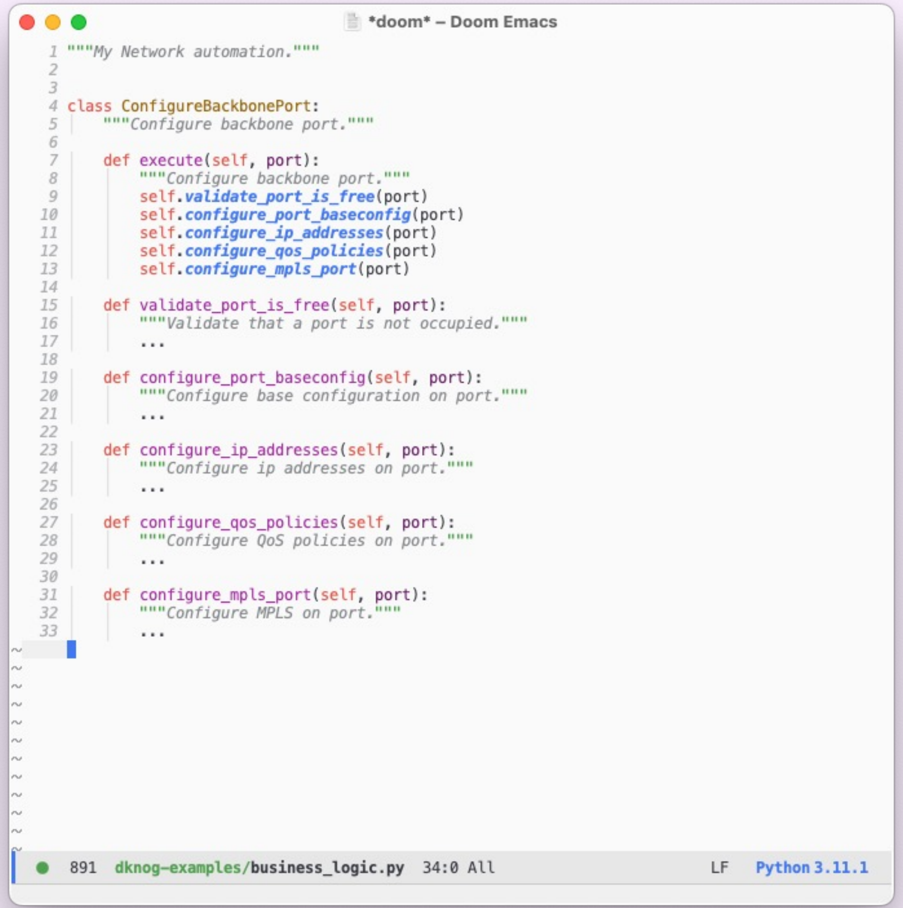
— (Don't) test in **production**

— Involve your **experts** early

— Give your experts time to **test** your code (preferrably in a lab)

— Write the **business logic** into your code

— Be humble



```python
"""My Network automation."""


class ConfigureBackbonePort:
    """Configure backbone port."""

    def execute(self, port):
        """Configure backbone port."""
        self.validate_port_is_free(port)
        self.configure_port_baseconfig(port)
        self.configure_ip_addresses(port)
        self.configure_qos_policies(port)
        self.configure_mpls_port(port)

    def validate_port_is_free(self, port):
        """Validate that a port is not occupied."""
        ...

    def configure_port_baseconfig(self, port):
        """Configure base configuration on port."""
        ...

    def configure_ip_addresses(self, port):
        """Configure ip addresses on port."""
        ...

    def configure_qos_policies(self, port):
        """Configure QoS policies on port."""
        ...

    def configure_mpls_port(self, port):
        """Configure MPLS on port."""
        ...
```

```
891  dknog-examples/business_logic.py  34:0 All        LF  Python 3.11.1
```

Mistake #3

The golden hammer

Mistake #3
The golden hammer

“We’re using *[framework]* for **everything**”

”Even though i**t doesn’t support it**, we’ve made [application] do it anyway”

”We pay a lot of money to [**vendor**], so we must use their [thing]!”

“Our solution has become way too **complex**!”

Mistake #4
Building too much complexity into my code

“Network engineering is **complicated**, and so is the automation”

“I’m executing complicated **workflows** from inside one application”

“This **corner case** is taking up the majority of my code”

“My colleagues are **avoiding me** at lunch”

Possible solutions

- **Who** did this to you?
- **Explore** new ways of doing things.
- Build your applications with **flexibility** in mind
- Talk to your industry peers and **learn new approaches**
- **Refactor** your code early and often, or **start over** fresh
- Identify if your logic is better solved with **smaller components** and an central **orchestrator**
- Have a **test suite**

Mistake #5

The lone cowboy

Mistake #5
The Lone Cowboy

“I made **something cool** and now it’s part of production”

“I have a different role, so I made it in **my spare time**”

“The thing **broke** and nobody are able to **help** me”

Mistake #6
Poor code quality

”My stack has **grown too big** and it is **failing randomly**”

“**Unknown exceptions** happen that make no sense to users”

”My code is **hard to read**, my colleagues can’t help me”

“My code is **hard to understand**, so I won’t let anybody help me”

Possible solutions

- Try not to write business critical software alone
- Don’t give your spare time to work for nothing.
- Try to sell it off as a project with proper time allocations.
- Make your manager your ally early
- Use code linting, unit tests, auto formaters, etc.
- Look up a code styleguides.
- Hold code reviews regularly

Python links

Google Python Style Guide: http://google.github.io/styleguide/pyguide.html

Black autoformater: https://github.com/psf/black

Python Language Server: https://github.com/python-lsp/python-lsp-server

Mistake #7
Automatic tests that don't test realistic scenarios

"I made up my **test data** myself"

"I test my services **one at a time**"

"I just **mock** the APIs of the systems I integrate with"

"My services didn't work with **real-world data**"

"The systems didn't respond like I thought they would"

Possible solutions

— Create an integration test environment

— Try to replicate what the users are doing in your tests

— Get real-life data from your users or experts and use that in your tests

— Test services in combination, not just create, but also delete and update

Mistake #8

Not listening to my users

Mistake #8
Not listening to my users

“I built the system, so **I know** best how to use it”

“Why can’t the users **read my mind?**”

“Why don’t they **read the documentation**?”

“They broke everything because they didn’t **read the warnings**!”

Possible solutions

— Treasure the user who doesn’t read the documentation and breaks things

— Make sure to log all interactions and provide ways to revert breaking changes

— Talk to your users often and understand how they are using your tools

— Consider doing small videos complementing your text documentation

— Consider classroom training

Mistake #9

Not making mistakes

Mistake #9
Not making mistakes

“I don’t **take risks**, but I don’t achieve very much”

“I **worry** too much about **failing** to even start”

”I **overthink** my solutions and will never be done”

“I only read the mistake slides in this presentation. Were there solutions too?”

Possible solutions

— Start small, define an MVP

— Think about how to test your solutions

— Make yourself accountable

— Allow yourself to fail and learn from the experience

— Find networkers at NOG events and listen to their war stories

— Tell about your mistakes at NOG events

Thank you!