

# Automating Networks with Paramiko and Netmiko

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# Agenda



**Introducing infrastructure as code**

**Deploying jinja2 with Paramiko**

**Working with Netmiko**

- Device management
- File transfer

**Comparing Paramiko and Netmiko**



# Core IAC Concepts

**State declaration**

**Abstraction**

**Version control**



# Idempotent

Property defining an operation that can be executed many times and not make unnecessary changes after the initial setup.



---

vrf\_name: "POLICE"

route\_import:

- "65000:1"
- "65000:2"

route-export:

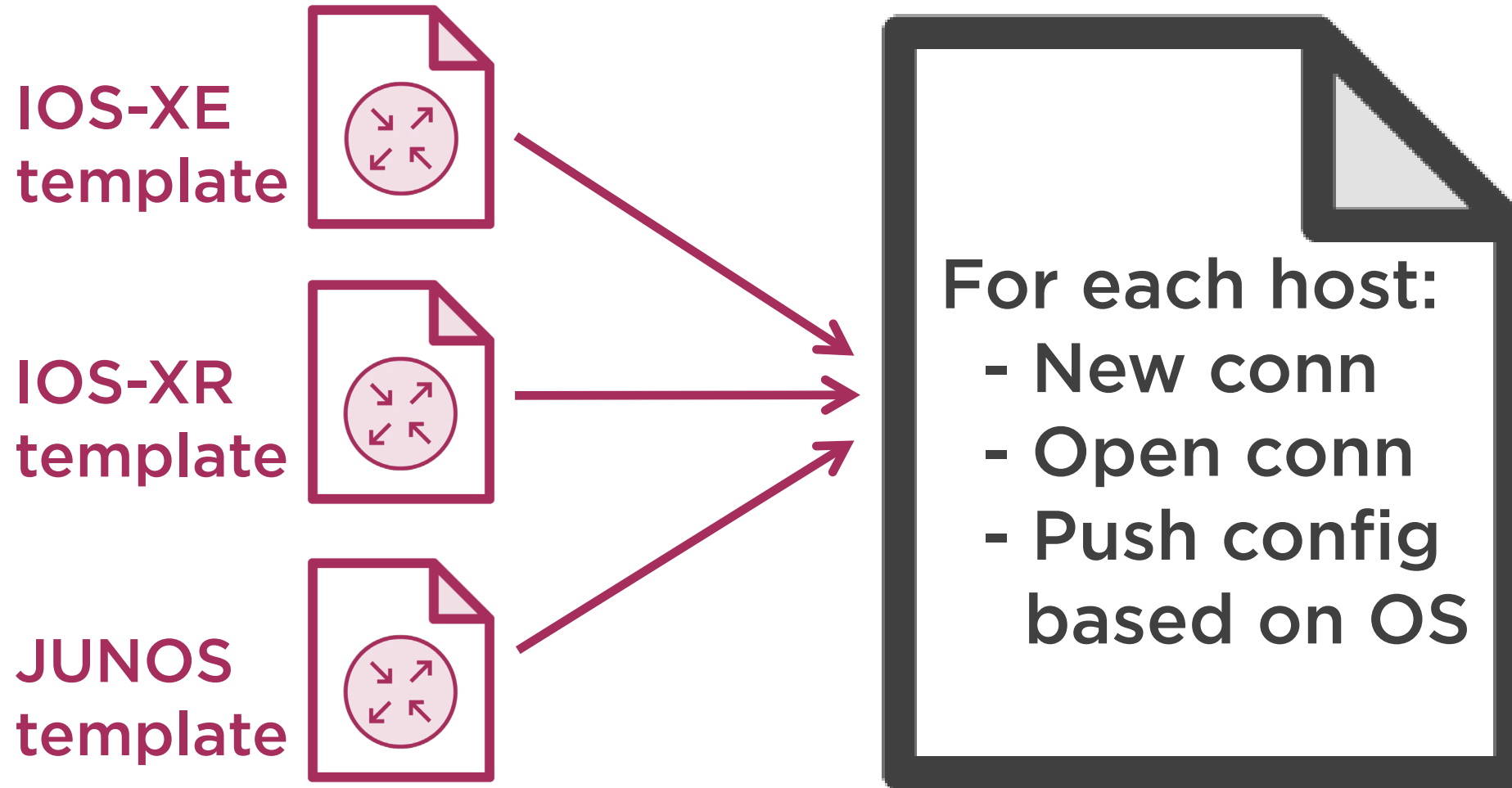
- "65000:1"

◀ Only 65000:1 and 65000:2  
should be present

◀ Only 65000:1 should be present



# Multi-platform Abstraction



# Version Control Saves the Day

**Time travel**

**History and diffs**

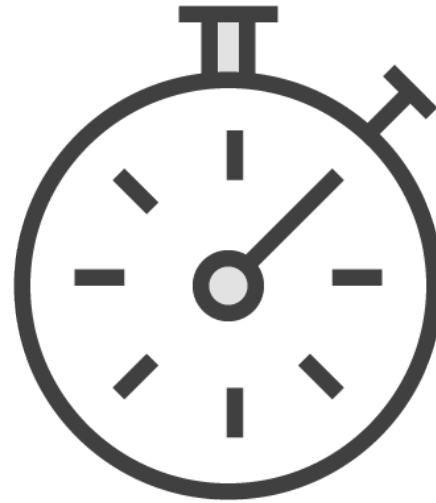
**Required for  
CI/CD**



# Good, Fast, Cheap; Pick Any Three



Improves quality  
through consistency



Free up talent for  
more useful work



Low CAPEX and OPEX





# Introducing Jinja2

**Intuitive text  
templating**

**Basic  
programming  
constructs**

**Tight Python  
integration**



```
---  
vrf:  
  update_config: true  
  vrfs:  
    - name: POLICE  
      desc: Police Dept  
    - name: CHEMICAL  
      desc: Chemical Engr
```

```
{% if vrf.update_config %}  
{% for v in vrf.vrfs %}  
vrf definition {{ v.name }}  
  description {{ v.desc }}  
{% endfor %}  
{% endif %}
```

◀ YAML input data

◀ List of VRFs

◀ Jinja2 template

◀ If update\_config is true

◀ Loop over each item in vrfs

◀ Declare the VRF based on name

◀ Add a description too



# Demo



## Infrastructure as code preparation



# Demo



## Integrating Paramiko and Jinja2



# What Is Netmiko?

**Network-focused  
Paramiko wrapper**

**Wide platform  
support**

**By Kirk Byers**  
**[github.com/kbbyers/netmiko](https://github.com/kbbyers/netmiko)**



# Demo



## Swapping out Paramiko for Netmiko



# Demo



**Bonus: Transferring files with Netmiko**



# Choosing between Paramiko and Netmiko

## Paramiko

SSH client or server

Down and dirty SSH access

Manually account for quirks

Relatively basic API

Least common denominator

## Netmiko

SSH client only

Built-in helper functions

Automatically handles many CLIs

Advanced features like file transfer

Start here and fallback to Paramiko

