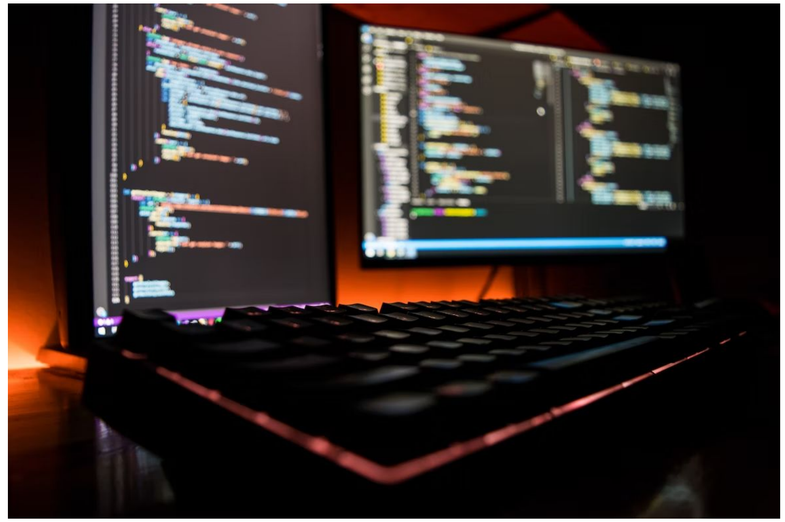
Ansible Montréal/Québec - Juin 2023

Le réseau comme du code (Network as code)

Philippe Bureau - Advanced Service Engineer / AVD tech lead

Automobiles - the most complex consumer product
Manufactured and delivered in the 20th Century



Software - the most complex consumer product
delivered today

How can we apply lessons from modern software development models to network engineering and operations?

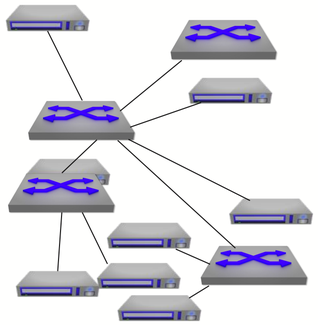
Network Operations Maturity Model

Legacy Enterprise Operations

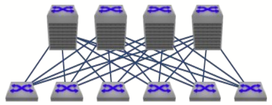
Modern Production Operations

Cloud-Scale Operations

Anti-Pattern



Patterns



Repeatable design patterns

Runbooks/ITSM

Multi-Vendor/ Open Protocols

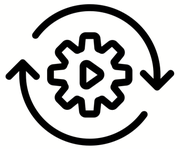
ITSM-Led

CloudVision

Monitoring / Telemetry / Observability

Read-Only Automation

Automated



Deployment and Workflow Automation

Testing environments

IaC

SW Defined

Database driven Source of Truth

Network CI Pipeline w/ pre-deployment testing

Proactive

AI-driven Ops

Predictive and Proactive Fault detection and correction

Network Simulation Environments

Years | Quarters | Weeks | Days | Hours | Real-Time

CLI-Led Operations

CLI Enhanced with CV

Infrastructure-as-Code / Network CI

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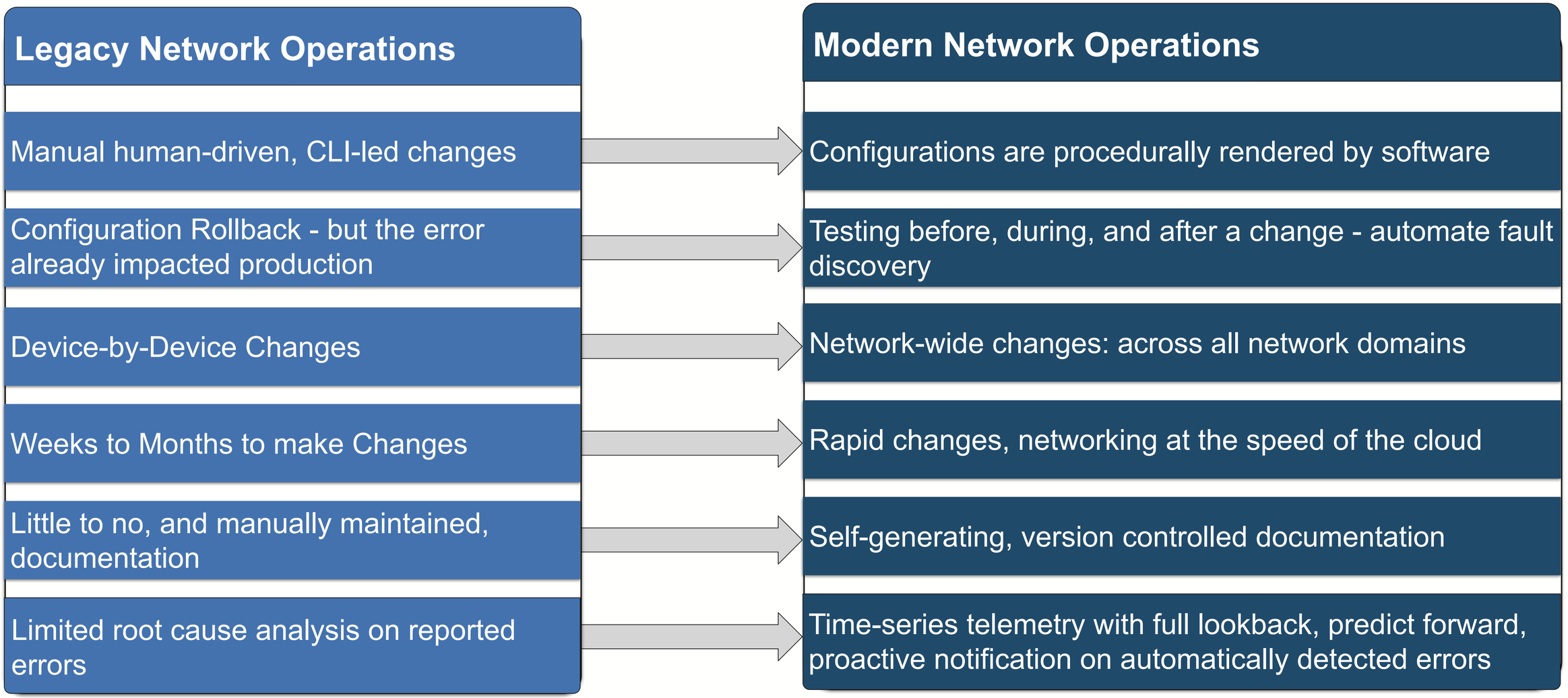
Benefits of a Modern Operating Model



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Arista CI Pipeline

Continuous Design

Arista Validated Designs

Continuously evolving best practice network designs delivered as software - Infrastructure-as-Code - enabling consistent design patterns

Continuous Testing

Cloud Test

Test networks without physical hardware using Cloud Test

Continuous Integration & Deployment

CI Pipeline

Use CloudVision CI or Open CI to automate the workflow from build to test to deployment and documentation

Bringing Modern Software Development and DevOps Operating Models to Network Infrastructure

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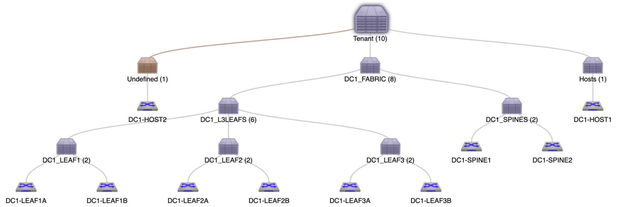
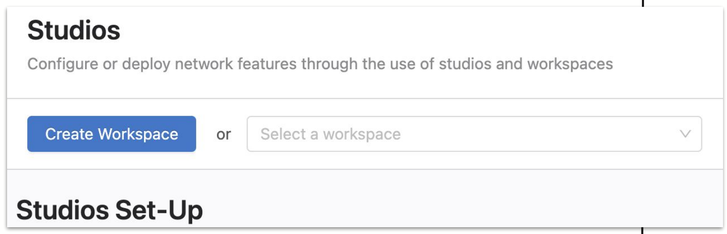
Arista’s Modern Operate Model Journey

Templatized
Consistent
Configuration

Configlets

Name	Containers
DC1-AVD_DC1-LEAF1A	0
DC1-AVD_DC1-LEAF1B	0
DC1-AVD_DC1-LEAF2A	0
DC1-AVD_DC1-LEAF2B	0
DC1-AVD_DC1-LEAF3A	0
DC1-AVD_DC1-LEAF3B	0
DC1-AVD_DC1-SPINE1	0





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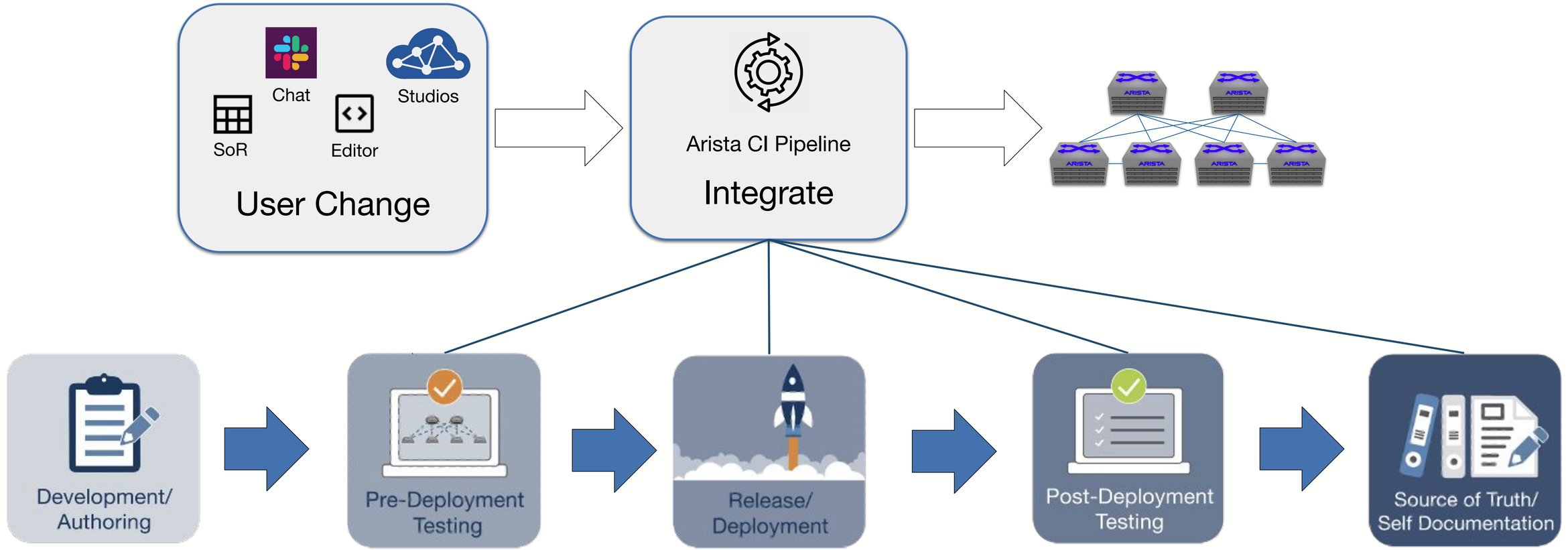
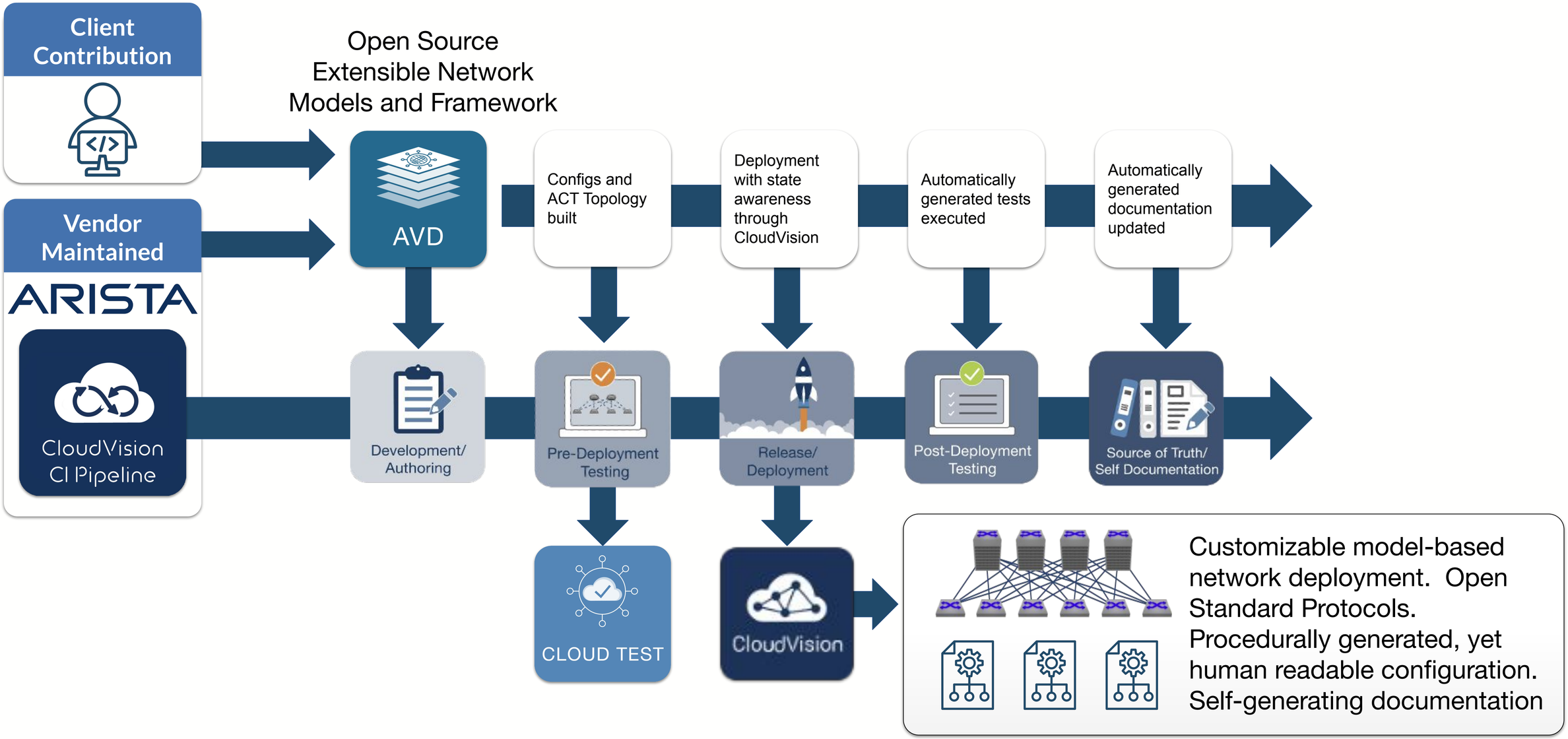
Continuous Integration Pipeline Workflow



All changes are managed through a CI workflow

AVD Network-as-Code Model and Arista CI Pipeline



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How we got here

Arista Continuous Integration Pipeline - DevOps tooling for Network Automation and IaC

Arista Validated Designs - UCN defined as code, developed in the open

UCN Design Guides - Published network design best practices

Universal Cloud Networks (UCN) - networks built on cloud principles (Data Center, Campus, WAN)

Arista Validated Designs (AVD)

A model based approach to network infrastructure as code

Community Driven

Ansible Arista Validated Design

www.avd.sh

ansible jinja2 playbook arista avd eos cloudvision cvp eapi cloudvision-portal

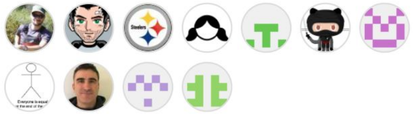
Readme
Apache-2.0 license
182 stars
30 watching
127 forks
Report repository

Releases 54

v3.8.6 Latest
last week

+ 53 releases

Contributors 74



+ 63 contributors

April 21, 2023 – May 21, 2023

Period: 1 month

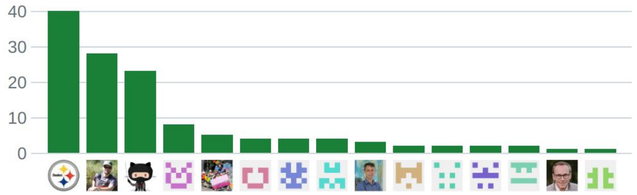
Overview

99 Active pull requests

60 Active issues

83 Merged pull requests	**16** Open pull requests	**37** Closed issues	**23** New issues

Excluding merges, **16 authors** have pushed **74 commits** to devel and **84 commits** to all branches. On devel, **1,461 files** have changed and there have been **47,098 additions** and **24,079 deletions**.



4 Releases published by **2** people

v4.0.0-dev11
published 3 weeks ago

v3.8.6
published last week

v4.0.0-dev12
published last week

v4.0.0-rc1
published 2 days ago

Languages

Python 63.7% **Jinja** 34.6%
Makefile 0.9% **CSS** 0.5%
Shell 0.1% **HTML** 0.1%
Other 0.1%

54 Releases

74 Contributors

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How does AVD work?

Step 1: User provides network model information

AVD Model

```
underlay_routing_protocol: EBGP
bgp_as: 65001
```

Model -> Structured device models

Step 2: Structured device configuration generated

```
router_bgp:
  as: 65001
  address_family_ipv4:
    peer_groups:
      UNDERLAY-PEERS:
        activate: true
```

Structured device models -> CLI, Doc, Tests

Step 3: Device CLI configs, documentation and molecule tests generated. Ready to deploy via CV and/or Ansible

CLI

```
router bgp 65001
   address-family ipv4
      neighbor UNDERLAY-PEERS
activate
```

M↓

Router BGP

Router BGP Summary

BGP AS	Router ID
65104	192.168.255.14

UNDERLAY-PEERS

Settings	Value
Address Family	ipv4
Send community	all
Maximum routes	12000

Tests

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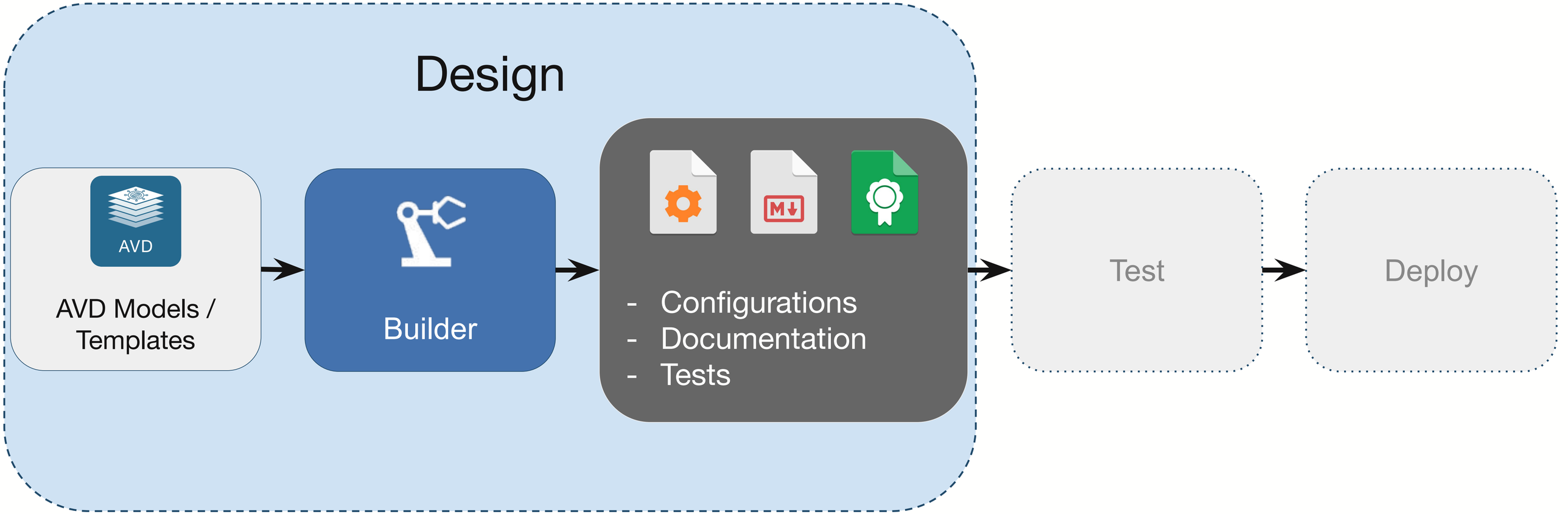
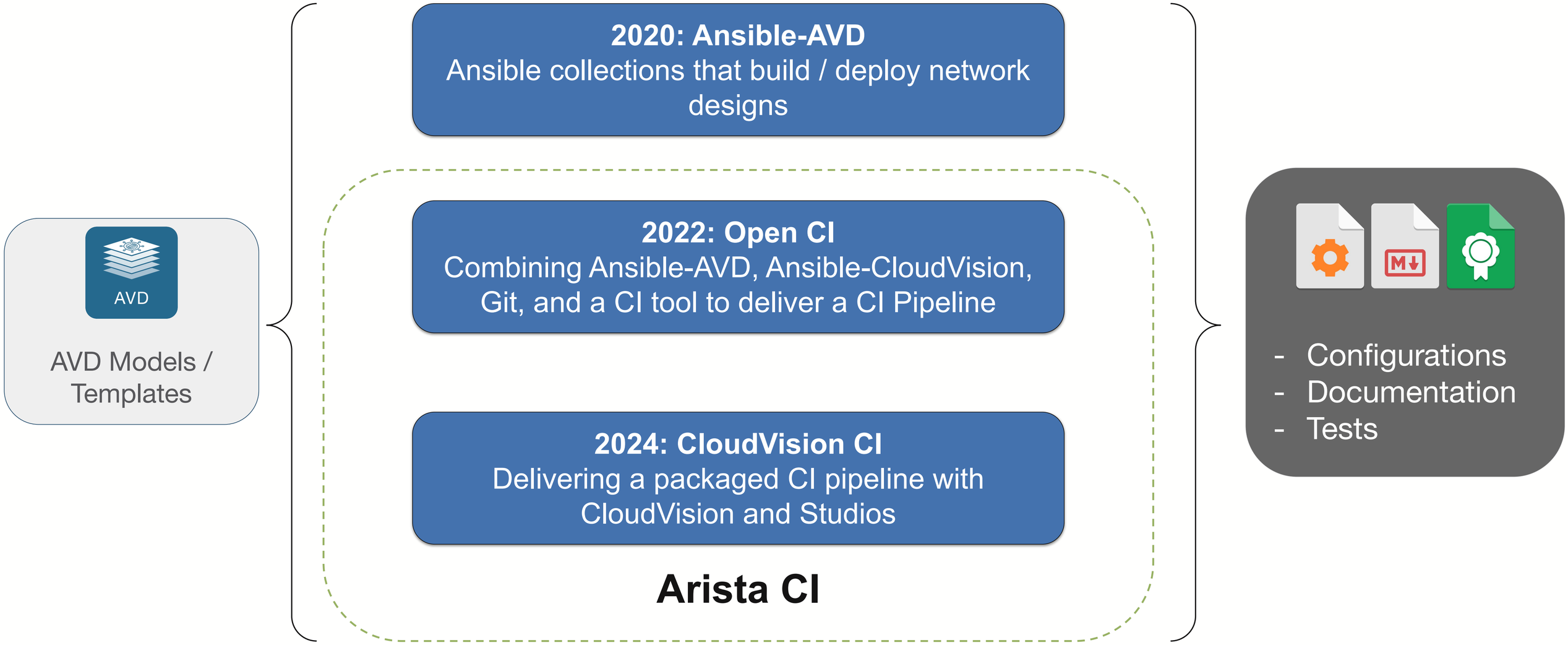
AVD Role



Network Automation by Arista



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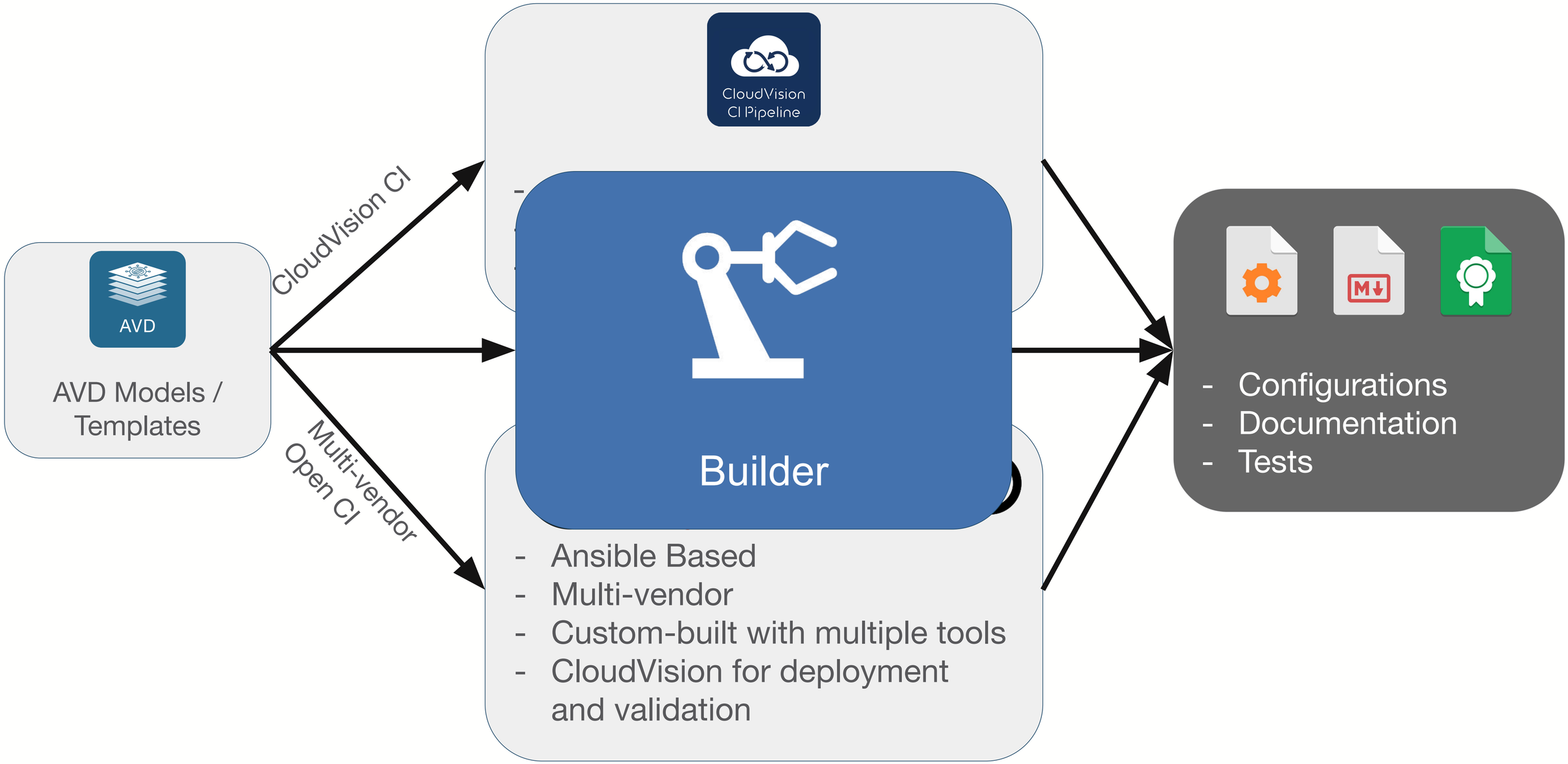
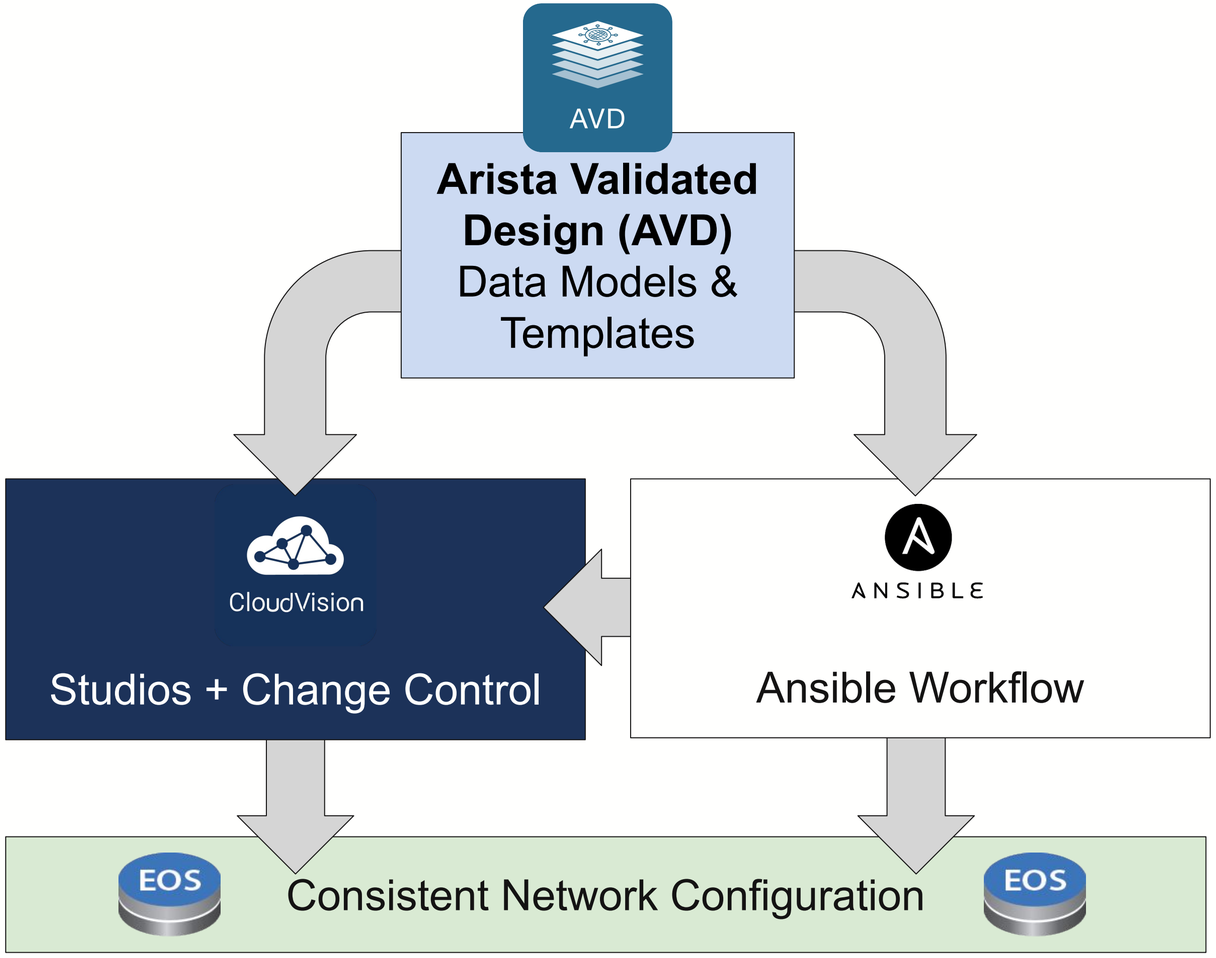
Two Paths - Consistent Models and Artifacts



AVD and CloudVision



CloudVision Benefits

- AVD is natively integrated with CloudVision Studios
- Single Set of Design Templates across open-source or CloudVision
- AVD's leverage CloudVision Change Control Strengths
- Modern Telemetry and Analytics for real-time visibility
- TAC support

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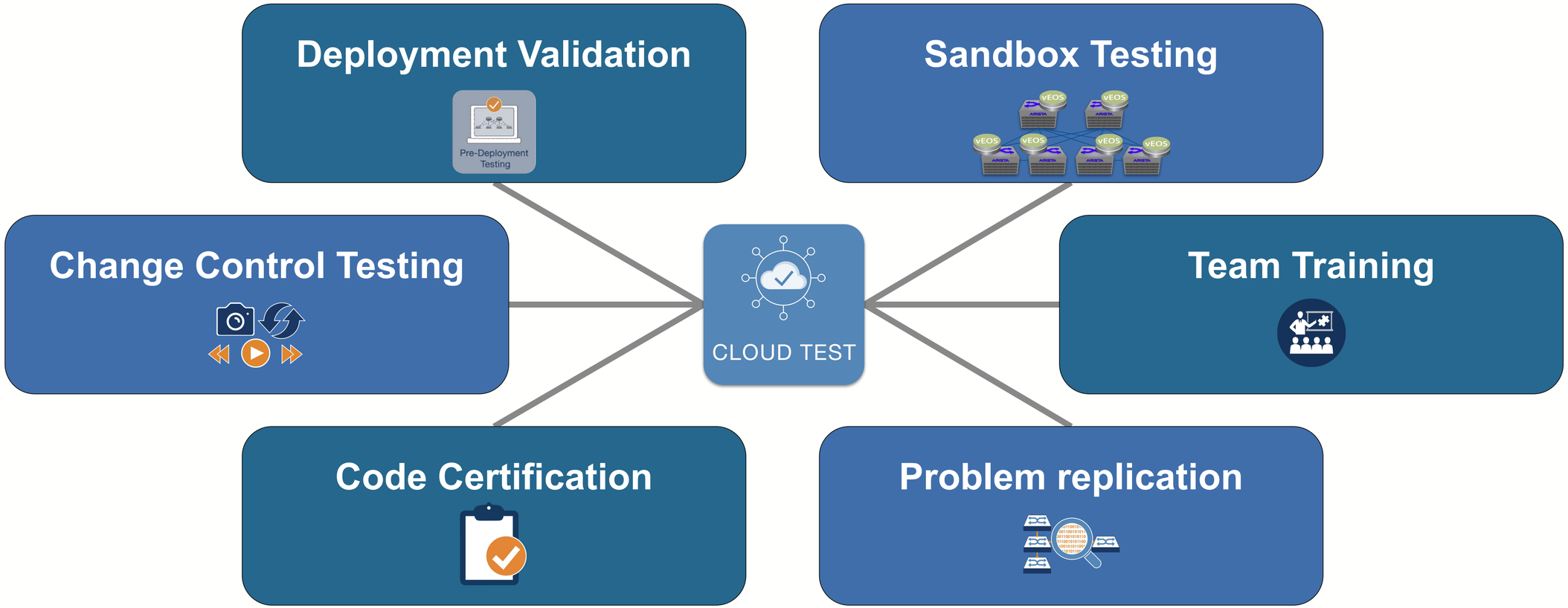
Cloud Test

A virtual network sandbox

Cloud Test



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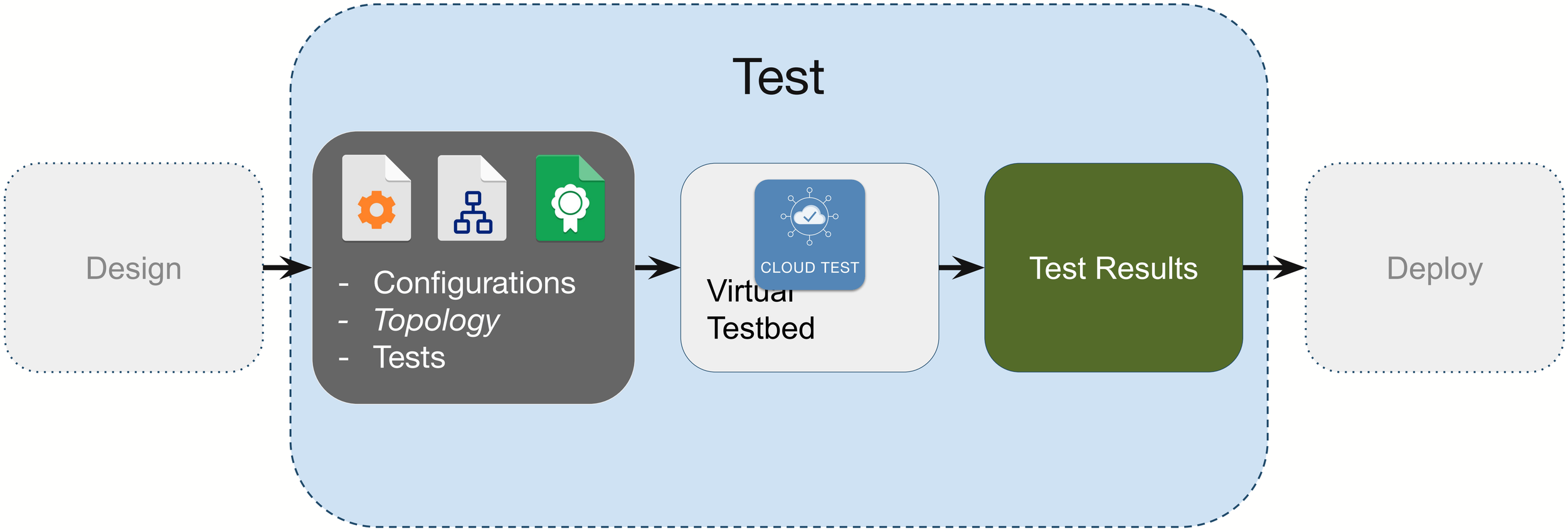
Test Stage



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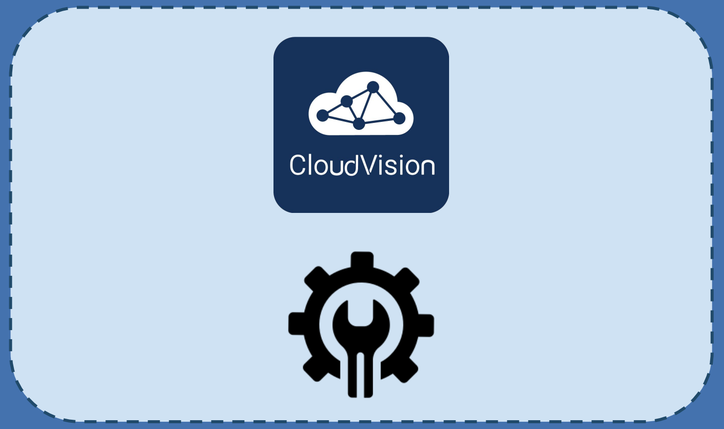
CloudVision CI Pipeline

Evolution of CloudVision for Advanced Automation

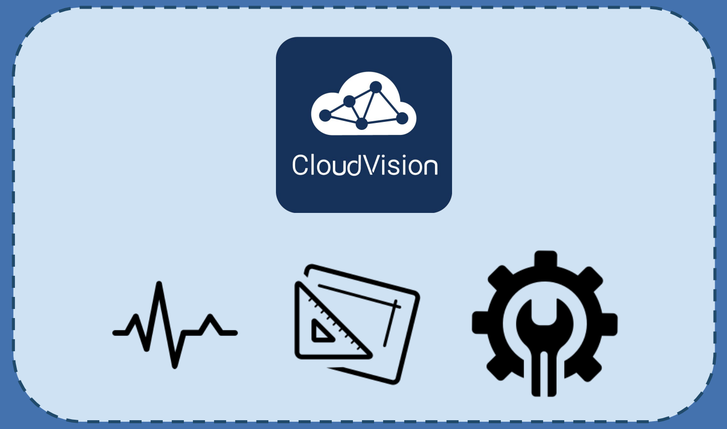
Phase 1

CloudVision For Network Management



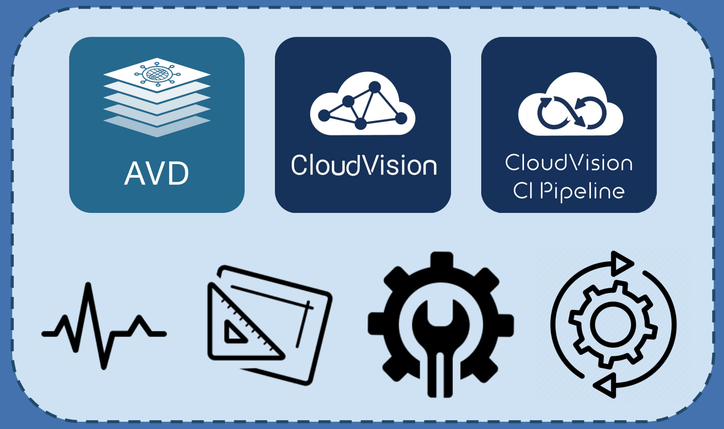
Phase 2

CloudVision with Streaming Telemetry and Studios



Phase 3

CloudVision Continuous Integration



Base

Intermediate

Advanced

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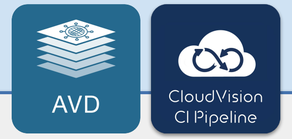
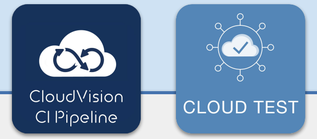
CloudVision CI

Integration



Design

- Studios based on AVD to build configurations, tests, and docs
- Integration with IPAM and external SoTs



Test

- Config validation
- Test changes in virtual sandbox
- *Future integration with 3rd party testing tools such as Forward / Batfish / IP Fabric*

Deliver/Deploy

- State aware deployment
- Managed change control process
- Approval workflows
- *Future integration with ITSM systems*

Verify/Validate

- Post-deployment execution of AVD generated tests in CloudVision
- Test reporting in CloudVision dashboards
- *Future integration to sync with SoT and 3rd party testing tools*

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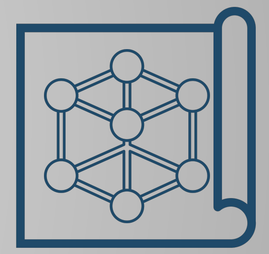
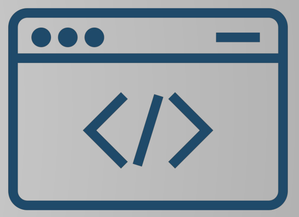
Arista's Modern Operating Transformational Model

	Legacy Operations Model		Modern Operating Model
Architectures		Arista Network Transformation Services	
Operations			
Personnel			

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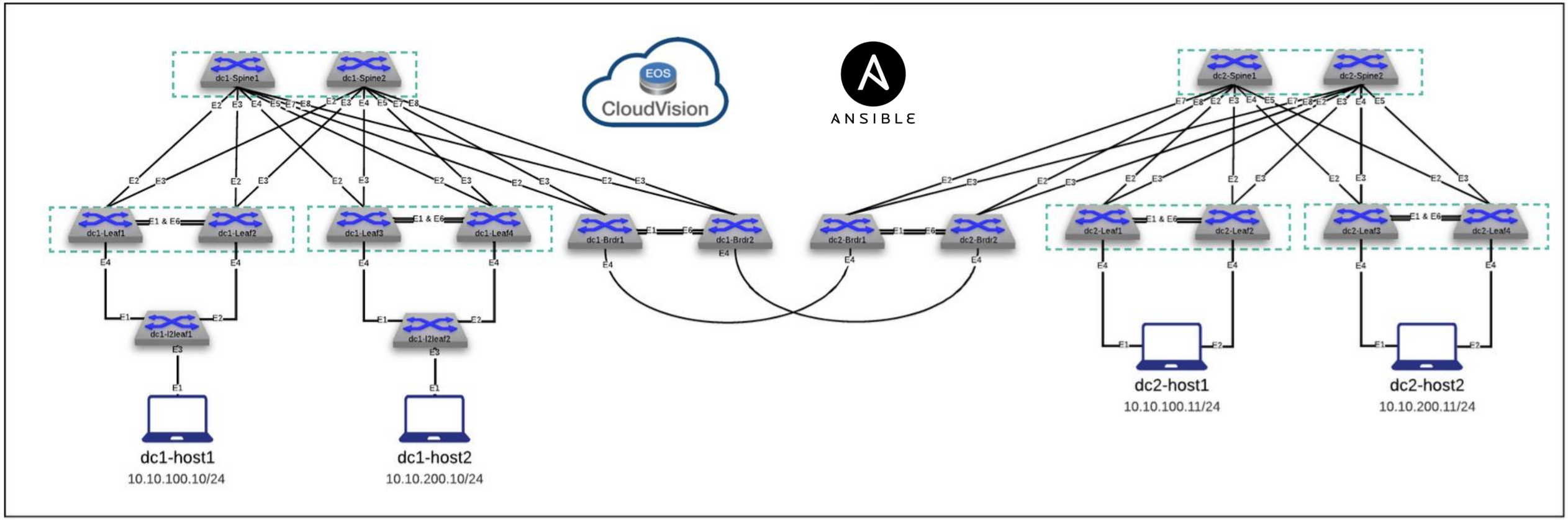
AVD Open-CI demo

Demo topology in ACT



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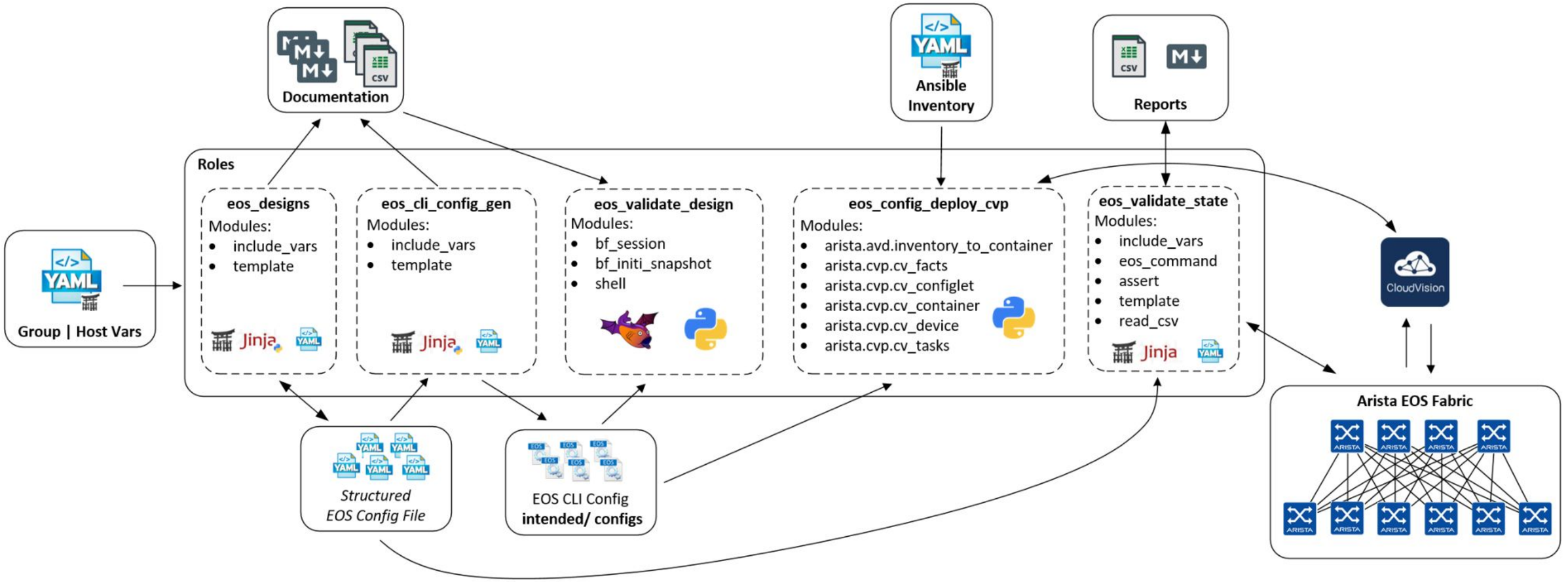
Arista.avd Configuration - Workflow



Key Links

- Ansible AVD project:
  - Documentation: https://avd.sh/en/latest/
  - GitHub: https://github.com/aristanetworks/ansible-avd
  - Ansible galaxy: https://galaxy.ansible.com/arista/avd
- Ansible CVP project:
  - Documentation: https://cvp.avd.sh/en/latest/
  - GitHub: https://github.com/aristanetworks/ansible-cvp
  - Ansible galaxy: https://galaxy.ansible.com/arista/cvp
- NetDevOps Community:
  - https://github.com/arista-netdevops-community

Thank You