cisco Live!

Let's go

The bridge to possible

Extending CML

Terraforming the Lost City

Quinn Snyder | Technical Advocate, Learning and Certifications
@qsnyder

DEVNET-1174

Cisco Webex App

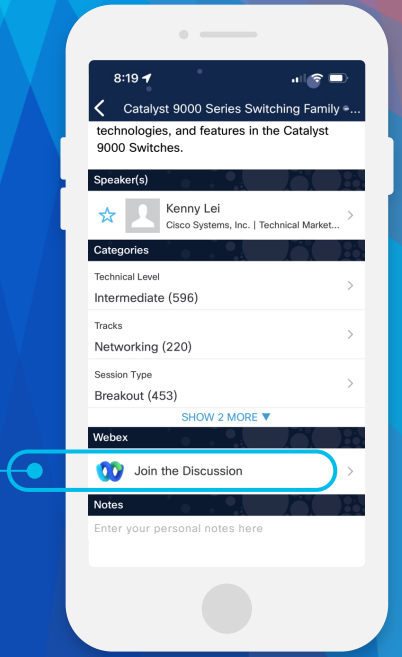
Questions?

Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until December 22, 2023.

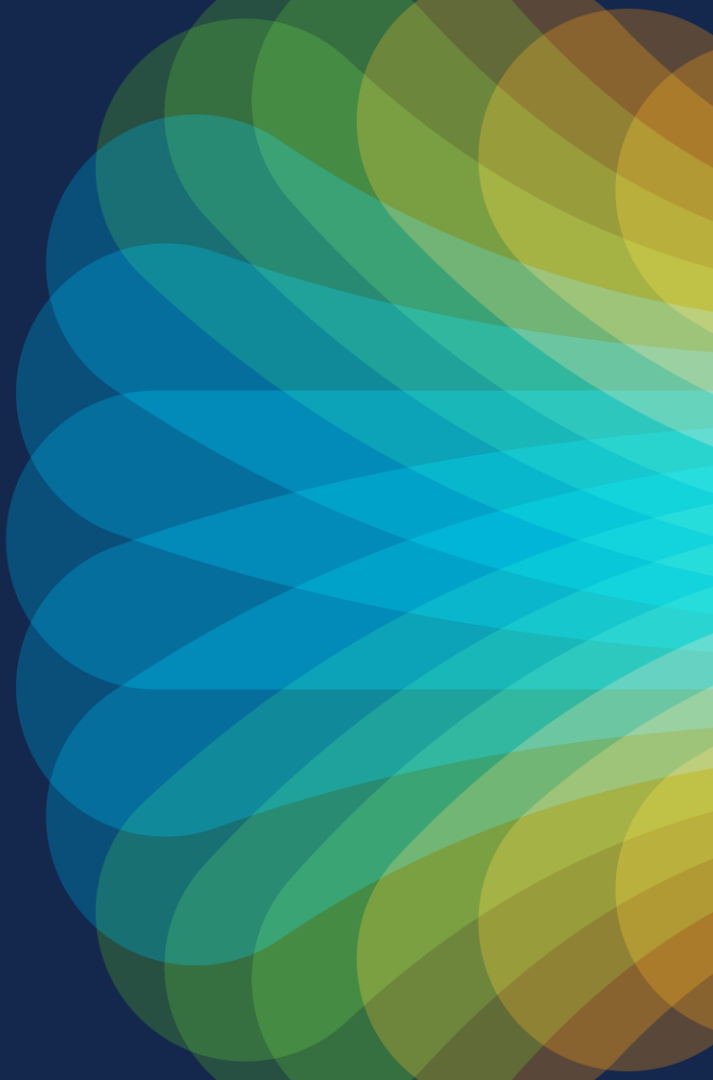


https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-1174

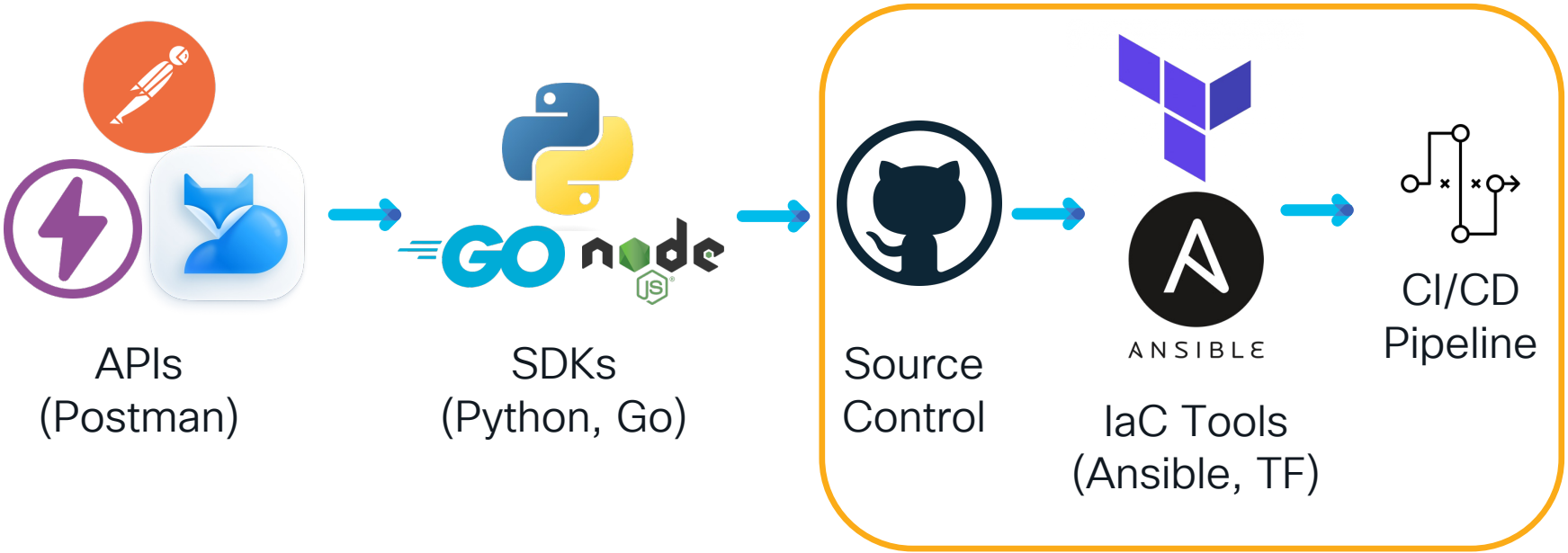
Agenda

- Introduction
- Current state of pipelines
- Abstracting complexity with OTS apps
- Tools of the trade
- Demo
- Conclusion

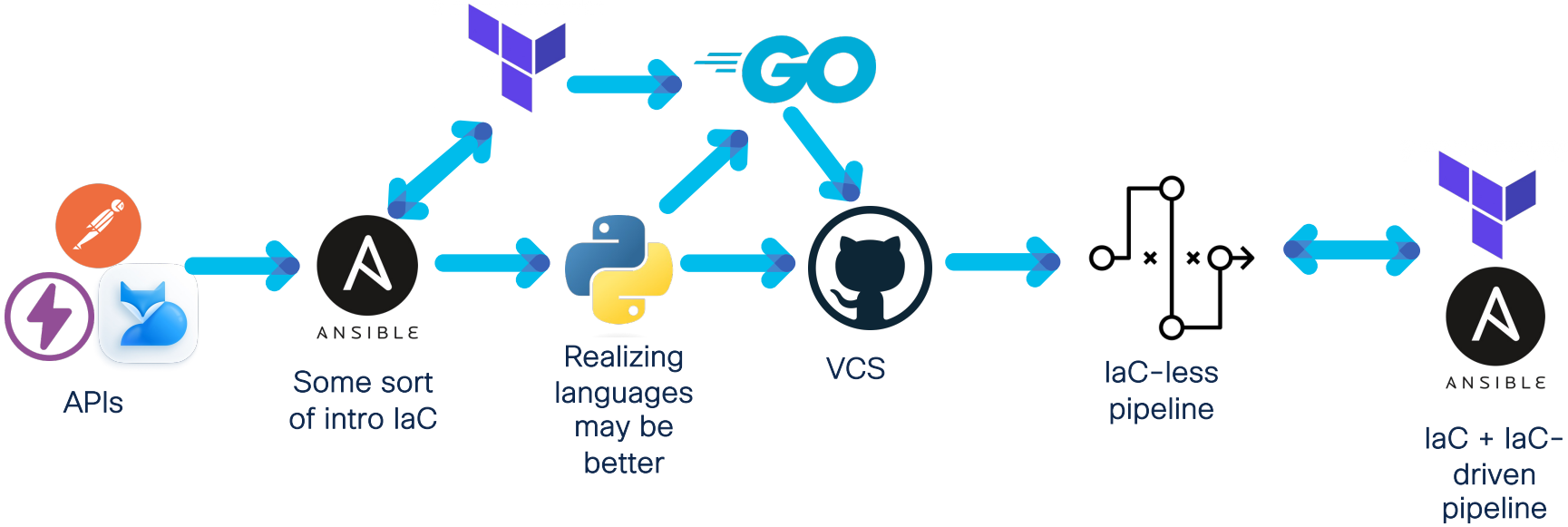
The current state of pipelines



The Progression of Network Automation (so far)



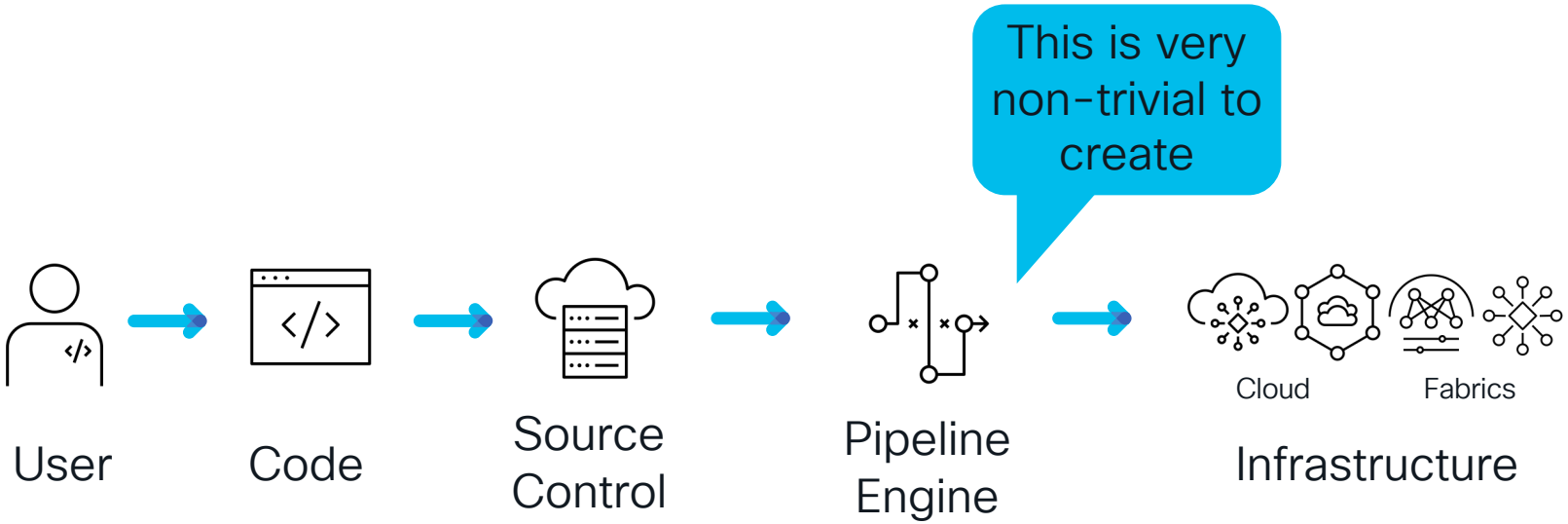
Realistic Network Automation Journey



Why Do I IaC?

- Automate the provisioning and management of the technology stack
- Translate manual tasks into reusable, robust, distributable code
- Rely on practices that have been successfully used for years in software development (version control, automated testing, release tagging, continuous delivery, etc.)
- Benefits: much higher delivery speed; significant reliability boost

The Infrastructure as Code journey



Typical pipeline functions

Linting of source code

Deploy to test/dev/QA environment

Validation of test environment functionality

Deploy to production environment

Validation of production environment

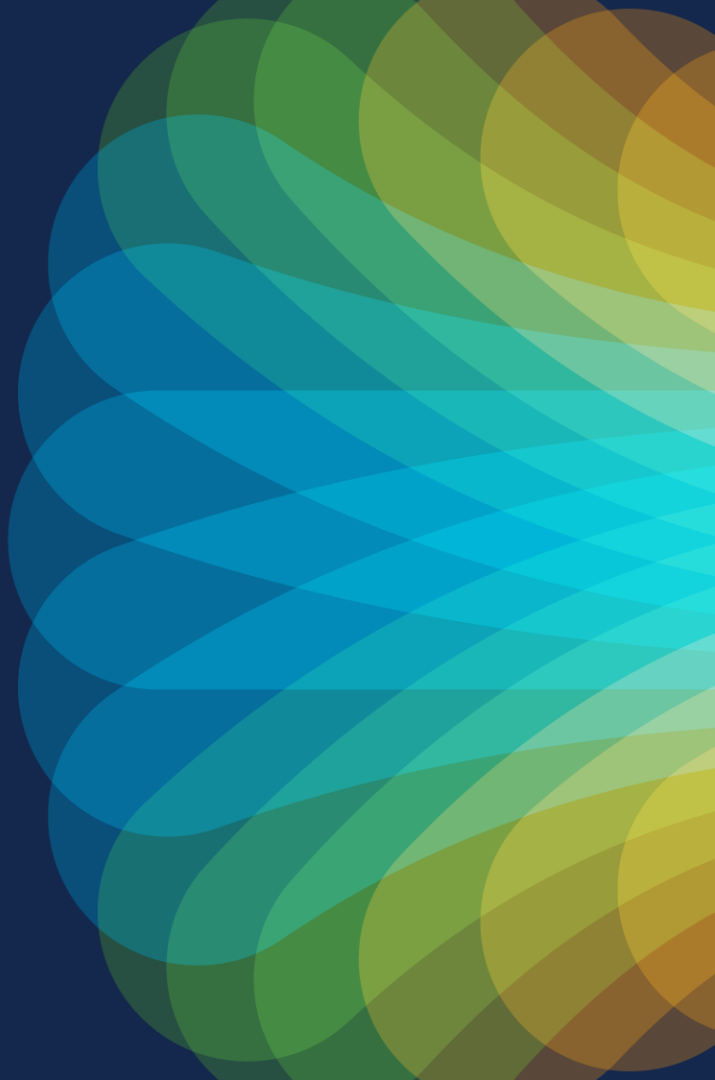
That's a lot of YAML-wrapped-bash

```yaml
stages:
  - validate
  - deploy_to_prod
  - deploy_to_test
  - verify_deploy_to_prod
  - verify_deploy_to_test
  - verify_website_reachability

lint:
  stage: validate
  image: geerlingguy/docker-centos8-ansible:latest
  variables:
  script:
    - ansible-playbook --syntax-check -i inventory/prod.yaml site.yaml
    - ansible-playbook --syntax-check -i inventory/test.yaml site.yaml

deploy_to_prod:
  image: geerlingguy/docker-centos8-ansible:latest
  stage: deploy_to_prod
  script:
    - echo "Deploy to prod env"
    - ansible-playbook -i inventory/prod.yaml site.yaml
  environment:
    name: production
  only:
  - master

deploy_to_test:
  image: geerlingguy/docker-centos8-ansible:latest
  stage: deploy_to_test
  script:
    - echo "Deploy to test env"
    - ansible-playbook -i inventory/test.yaml site.yaml
  environment:
    name: test
  only:
  - test
```

```yaml
verify_test_environment:
  image: ciscotestautomation/pyats:latest-robot
  stage: verify_deploy_to_test
  environment:
    name: test
  script:
    - pwd
    - cd tests
    # important: need to add our current directory to PYTHONPATH
    - export PYTHONPATH=$PYTHONPATH:$(pwd)
    - robot test.robot

  artifacts:
      name: "TEST_${CI_JOB_NAME}_${CI_COMMIT_REF_NAME}"
      when: always
      paths:
        - ./tests/log.html
        - ./tests/report.html
        - ./tests/output.xml
  only:
  - test

verify_prod_environment:
  image: ciscotestautomation/pyats:latest-robot
  stage: verify_deploy_to_prod
  environment:
    name: test
  script:
    - pwd
    - cd tests
    # important: need to add our current directory to PYTHONPATH
    - export PYTHONPATH=$PYTHONPATH:$(pwd)
    - robot prod.robot
```

```yaml
  artifacts:
      name: "PROD_${CI_JOB_NAME}_${CI_COMMIT_REF_NAME}"
      when: always
      paths:
        - ./tests/log.html
        - ./tests/report.html
        - ./tests/output.xml
  only:
  - master

internet_sites:
  image: ciscotestautomation/pyats:latest-robot
  stage: verify_website_reachability
  environment:
    name: test
  script:
    - pwd
    - cd tests/websites/
    - make test
  only:
  - master
```

Abstracting complexity with OTS apps



What does this abstraction provide?

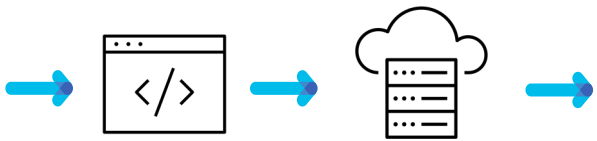
- Prebuilt apps perform actions using driver from IaC files
- Common “boiler plate” services (linting, validation) can be handled by app
- Integrates using open methods (webhooks, access tokens) to connect SCM to app and build server

– BUT –

- Typical OTS platforms require specific tooling/code/etc; loss of flexibility

Our YAML-bash becomes...

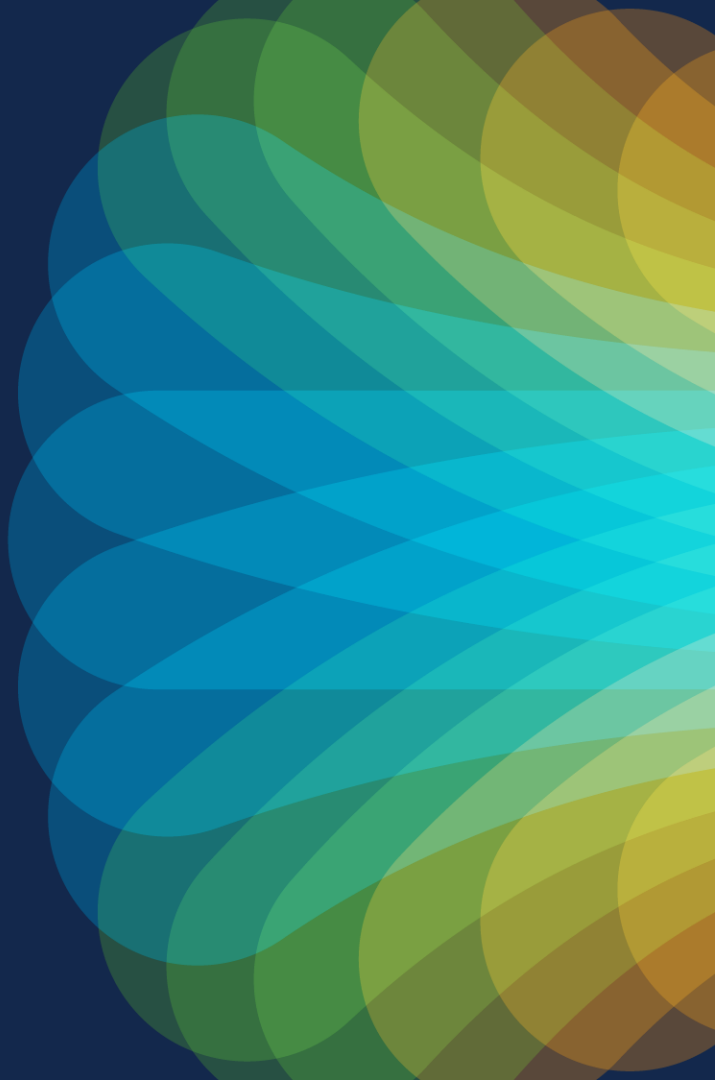
```
atlantis server \
--atlantis-url="$URL" \
--gh-user="$GH_USER" \
--gh-token="$TOKEN" \
--gh-webhook-secret="$SECRET" \
--repo-allowlist="$GH_REPO"
```



Code

Source Control

Tools of the trade



Terraform

- Open-source infrastructure provisioning tool
- Commercial support from HashiCorp
- Declarative and idempotent
- Immutable infrastructure concept
- Can manage a wide range of systems:
  - VMs, network devices, cloud instances, etc.
- Agentless, single binary file
- Zero server-side dependencies

HashiCorp Terraform

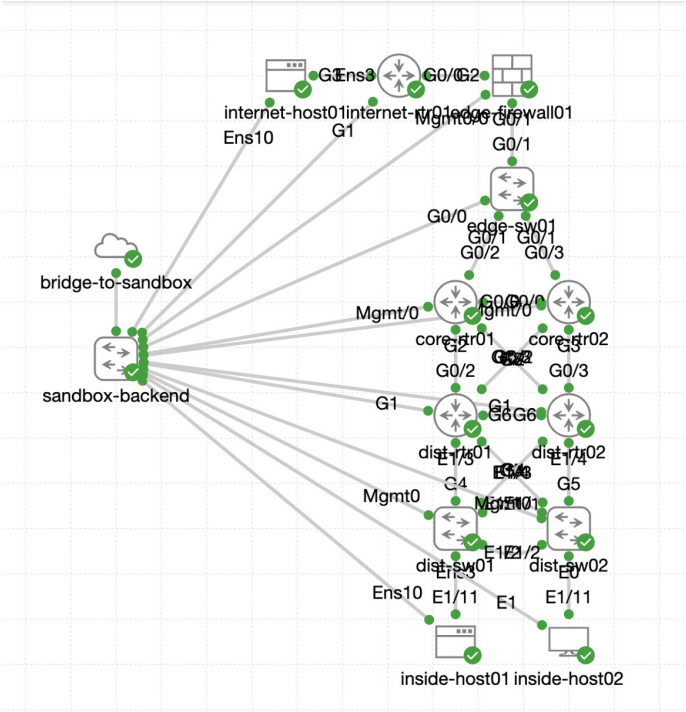
Atlantis (runatlantis.io)

- Open-source tool to automate Terraform workflows using SCM PRs
- Connects to SCM using webhooks, comments results of plan, apply, import into PR
- Runs locally (Go binary or Docker container); no commit of credentials to SCM
- All history logged, full collaboration and visibility amongst teams

CML²

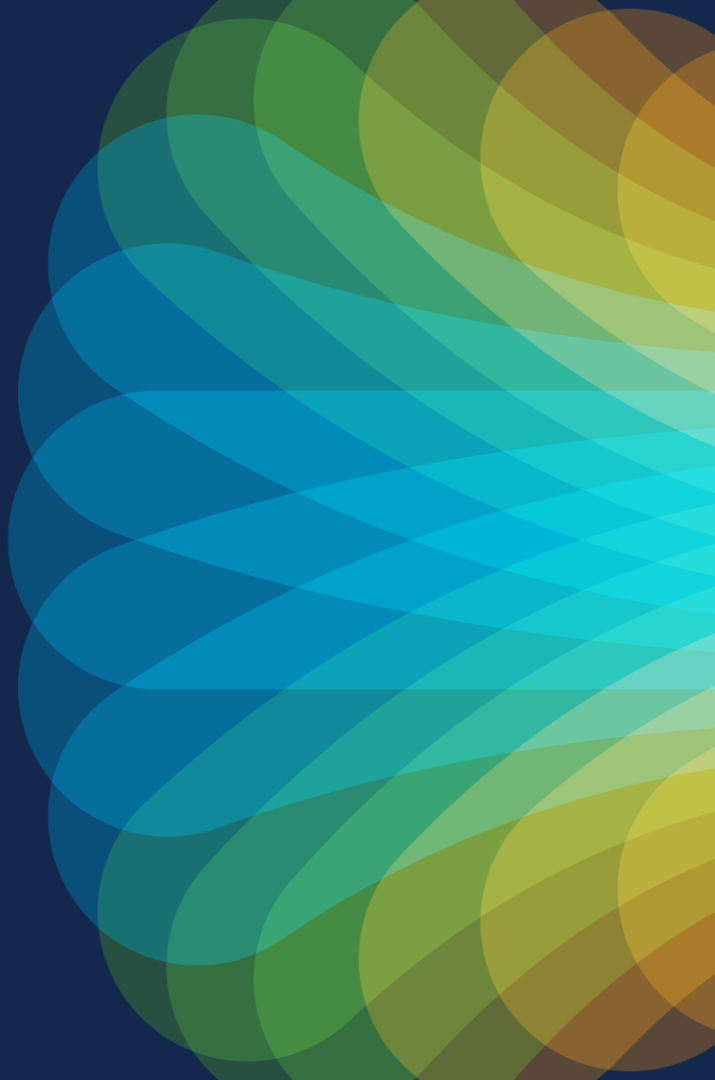
Cisco Modeling Labs

- IYKYK
- API-driven VNF topology builder and simulation software
  - Includes support for Ansible, Terraform
- Sandboxen available on DevNet
- You're already using it to study, why not study more with it?



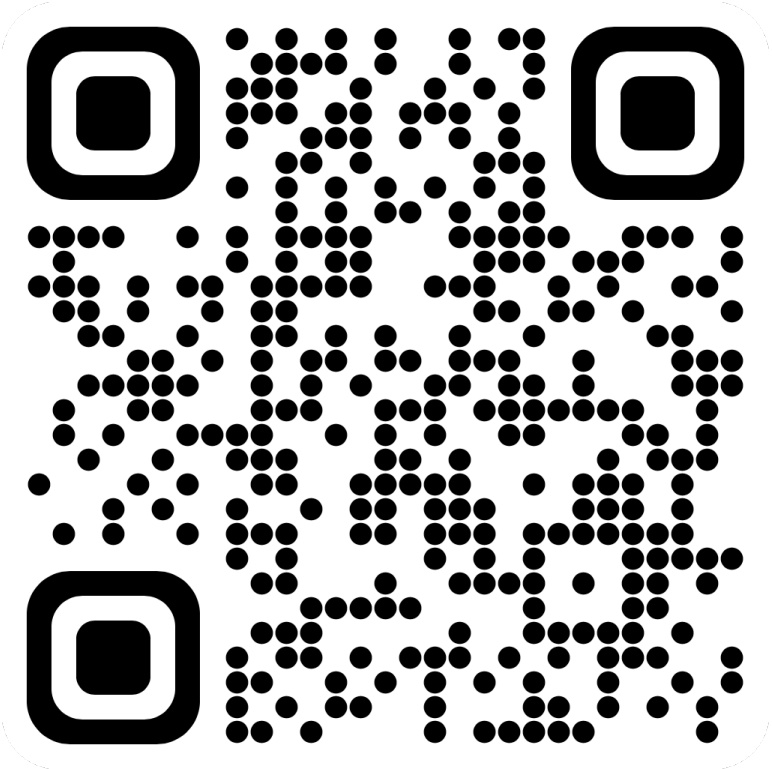
Demo

Bringing it all together



In conclusion...

- https://github.com/qsnyder/devnet-3008
  - QR code is nextdoor
- Contains sample code, scripts, etc to help bootstrap your Atlantis install
- Includes README with cross-links to other software as appropriate



cisco Live!

Did you know?

You can have a
one-on-one session with
a technical expert!

Visit Meet the Expert in The HUB
to meet, greet, whiteboard & gain
insights about your unique questions
with the best of the best.

Meet the Expert Opening Hours:

Tuesday	**3:00pm – 7:00pm**
Wednesday	**11:15am – 7:00pm**
Thursday	**9:30am – 4:00pm**
Friday	**10:30am – 1:30pm**

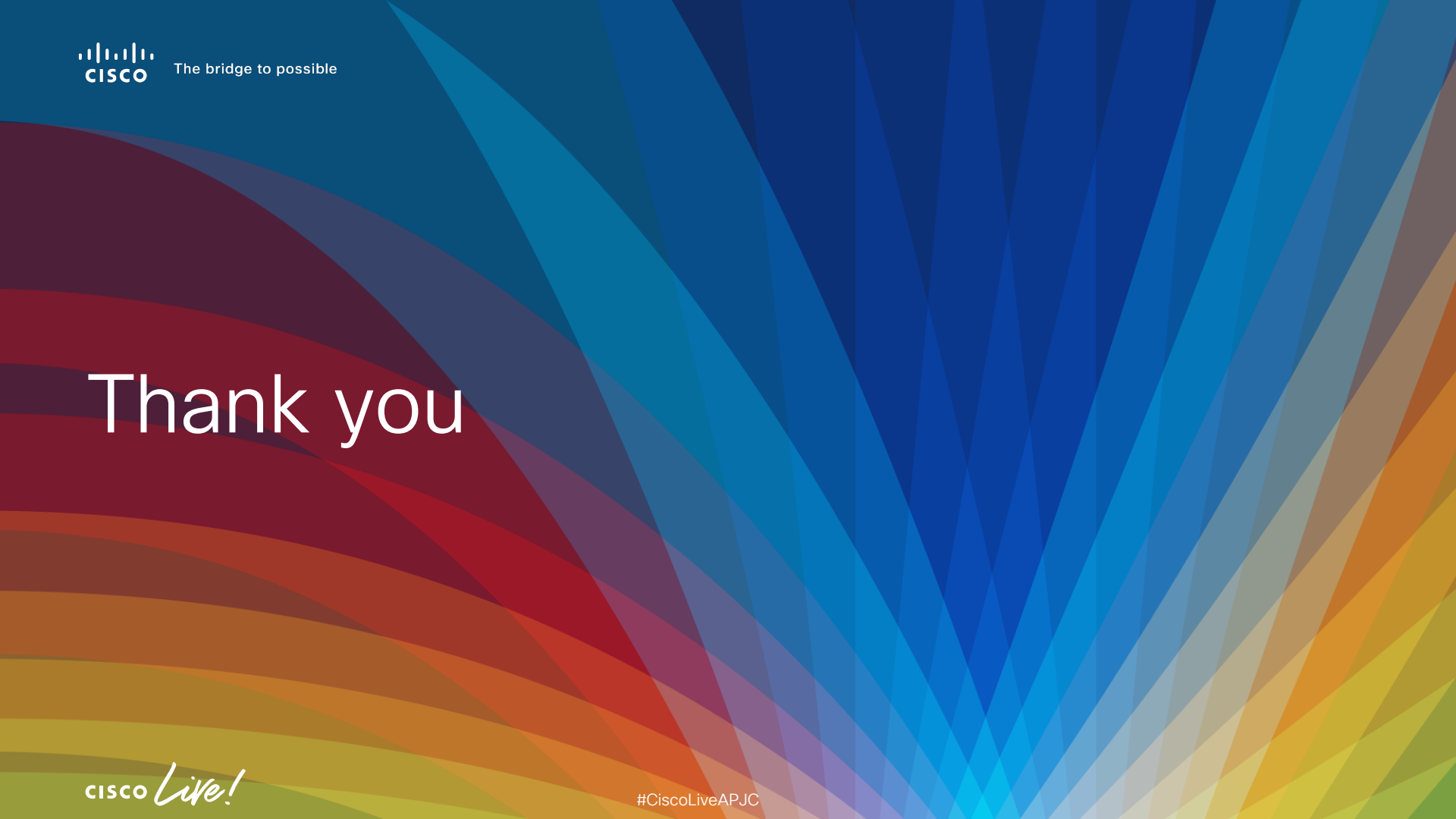
Session Surveys

We would love to know your feedback on this session!

- Complete a minimum of four session surveys and the overall event surveys to claim a Cisco Live T-Shirt

Continue your education

- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Expert meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand


cisco
The bridge to possible
Thank you
cisco Live!
#CiscoLiveAPJC

cisco Live!

Let's go

#CiscoLiveAPJC