
cisco Live!
Let's go
#CiscoLive

The bridge to possible

Infrastructure as Code + Full-Stack Observability = Love story

Hakan Palm, Technical Solutions Architect

DEVNET-1059

Cisco Webex App

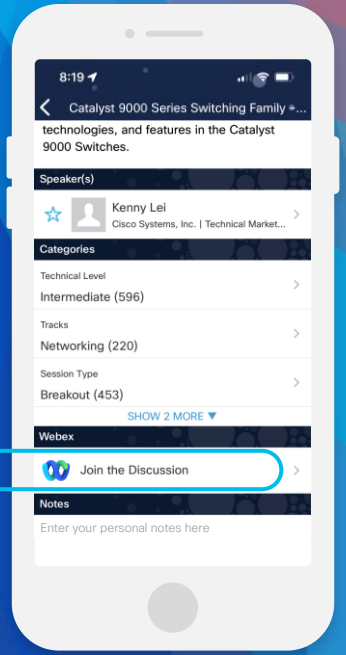
Questions?

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 June 9, 2023.



https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-1059

Agenda

- Why Infrastructure as Code with Full Stack Observability?
- Session Concepts
  - Full Stack Observability (FSO)
  - Continuous Integration / Continuous Delivery (CI/CD)
  - Infrastructure as Code (IaC)
- Session Objective
- Demonstration
- Conclusion
- Next Steps

Why Infrastructure as Code with Full Stack Observability?

Why this is relevant for you

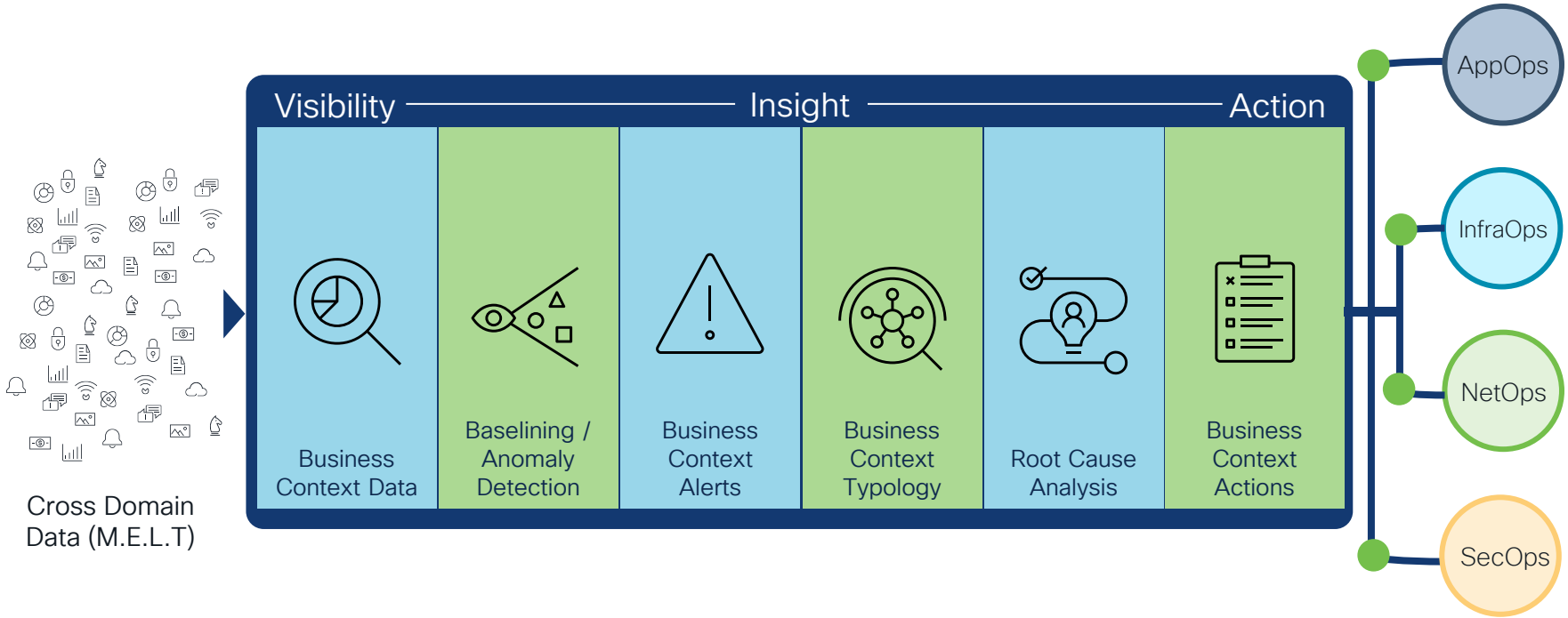
1. Full ***control*** of the ***user experience***, already from the development process

2. Real-time ***insights with business context*** for troubleshooting & optimization

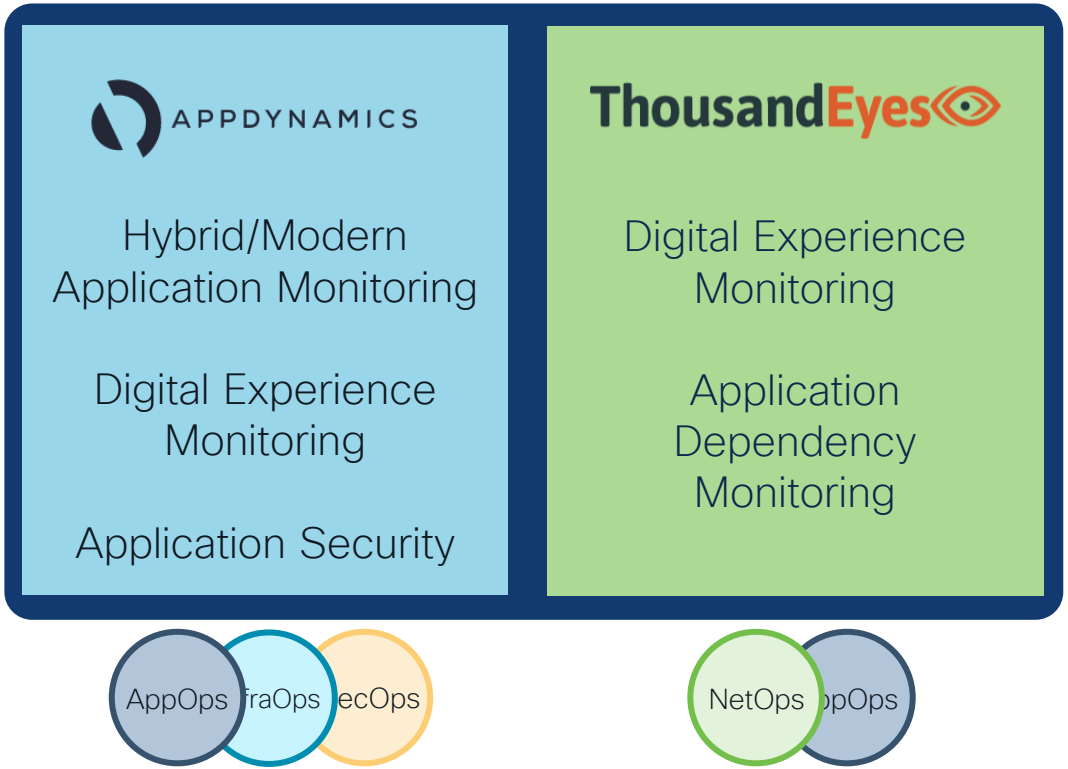
3. Easy to ***integrate*** and ***automatically deploy***

Session Concepts

Cisco's Full Stack Observability

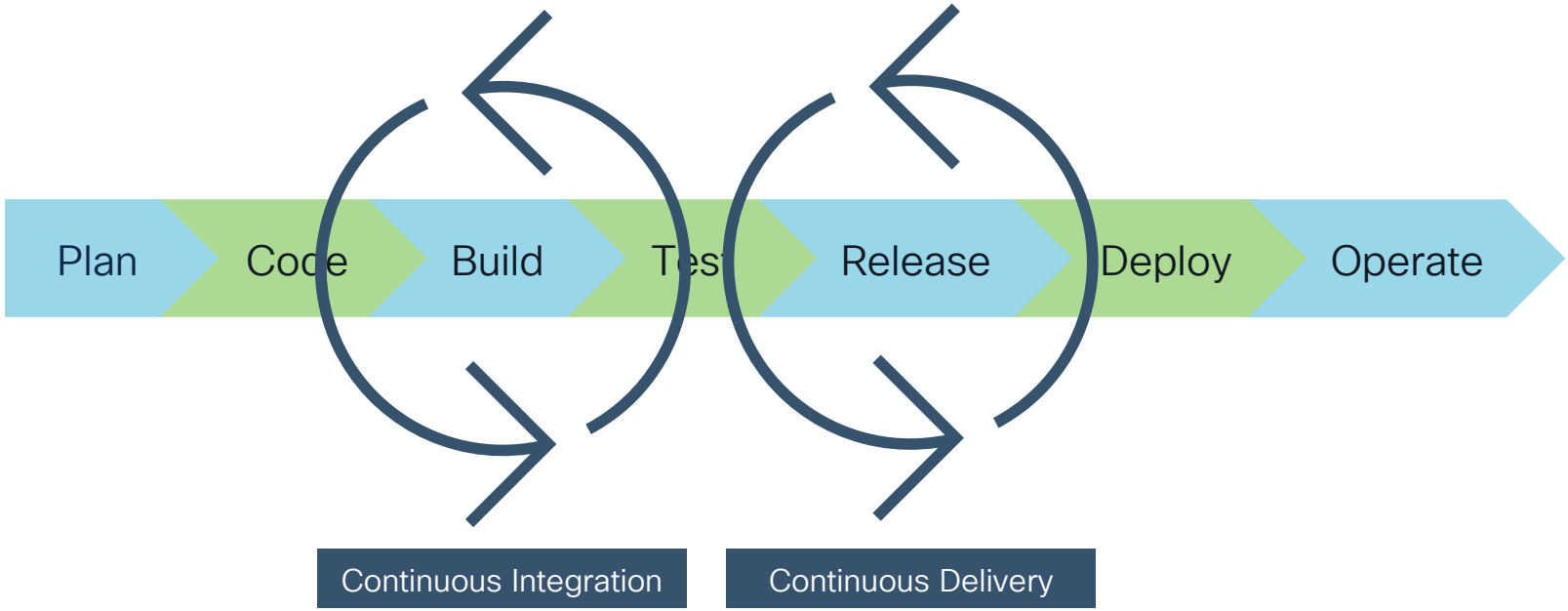


Cisco's Observability Solutions

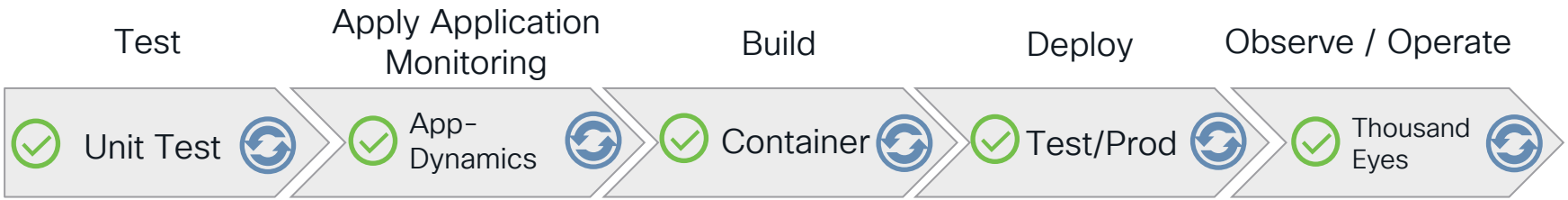


Continuous Integration, Continuous Delivery/Deployment

- CI/CD → DevOps

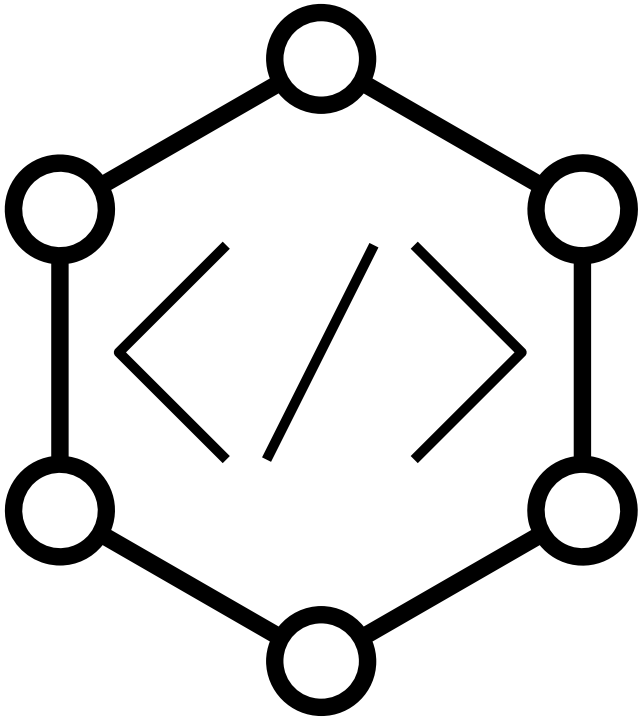


Our Pipeline



Infrastructure as Code

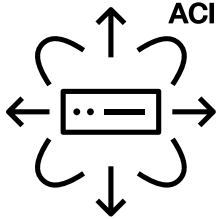
Infrastructure as Code



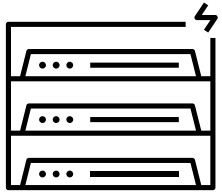
Flow

Infrastructure Used in This Demo

- Cisco ACI

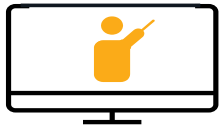


- Cisco Hyperflex

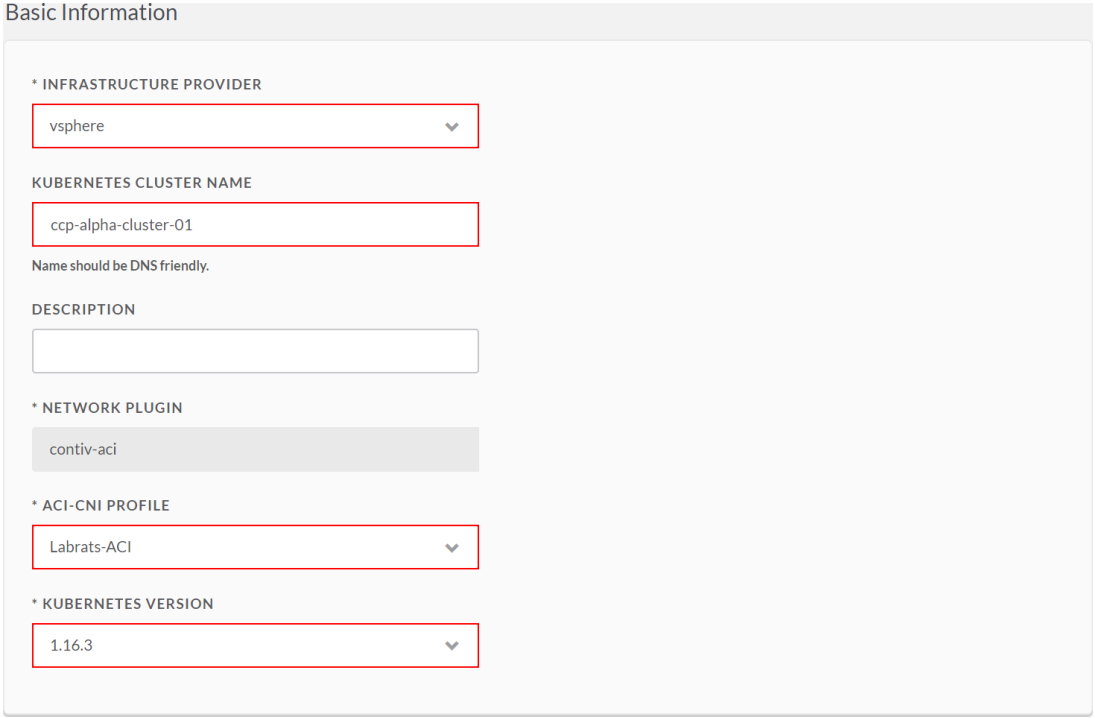


- Cisco Container Platform

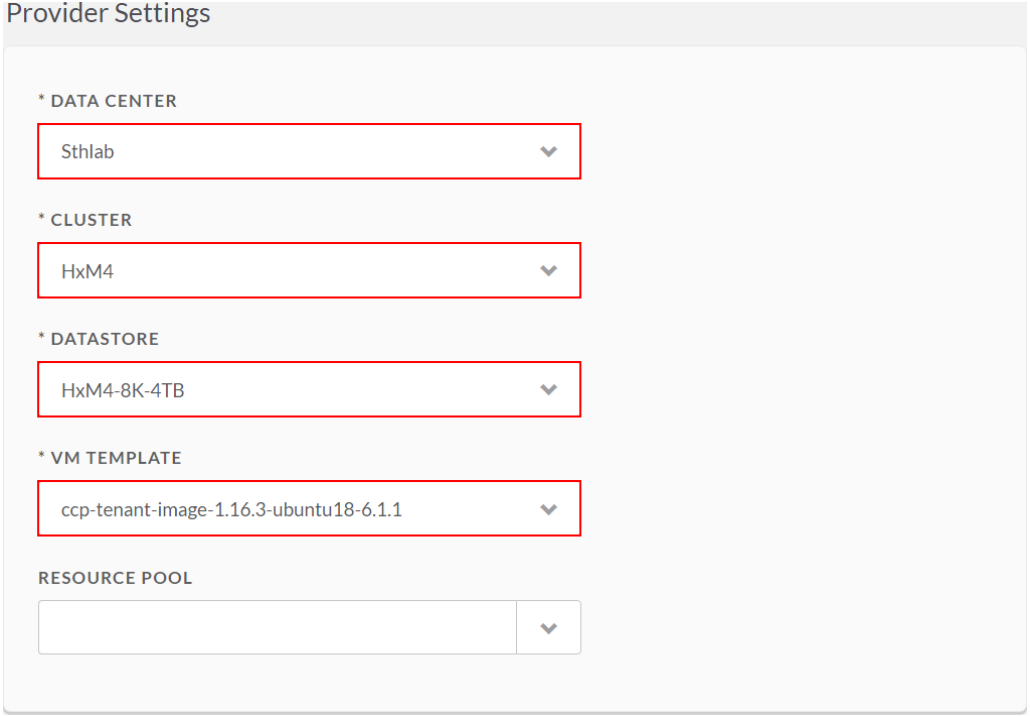
- Cisco UCS Director



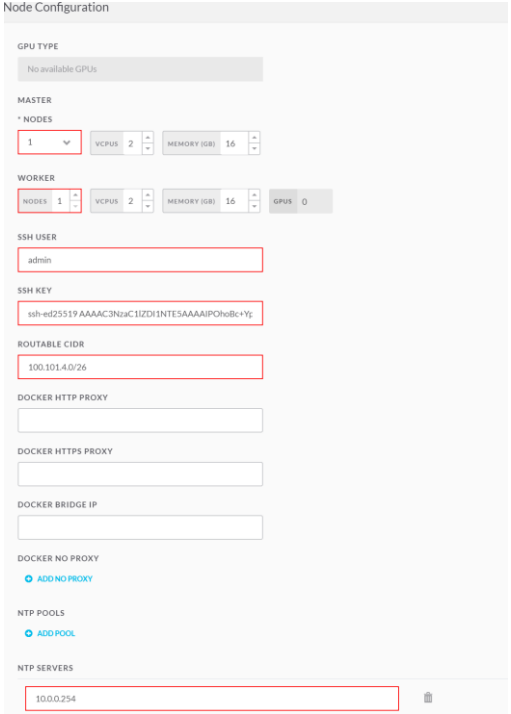
Deploy Cluster - Basic Information



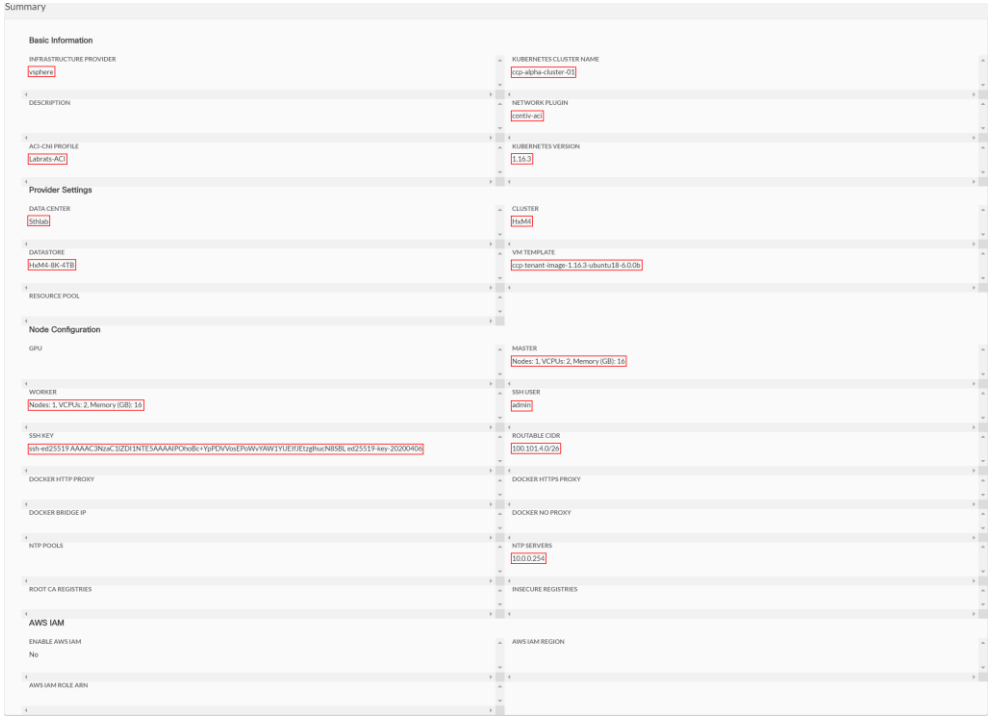
Deploy Cluster – Provider Settings



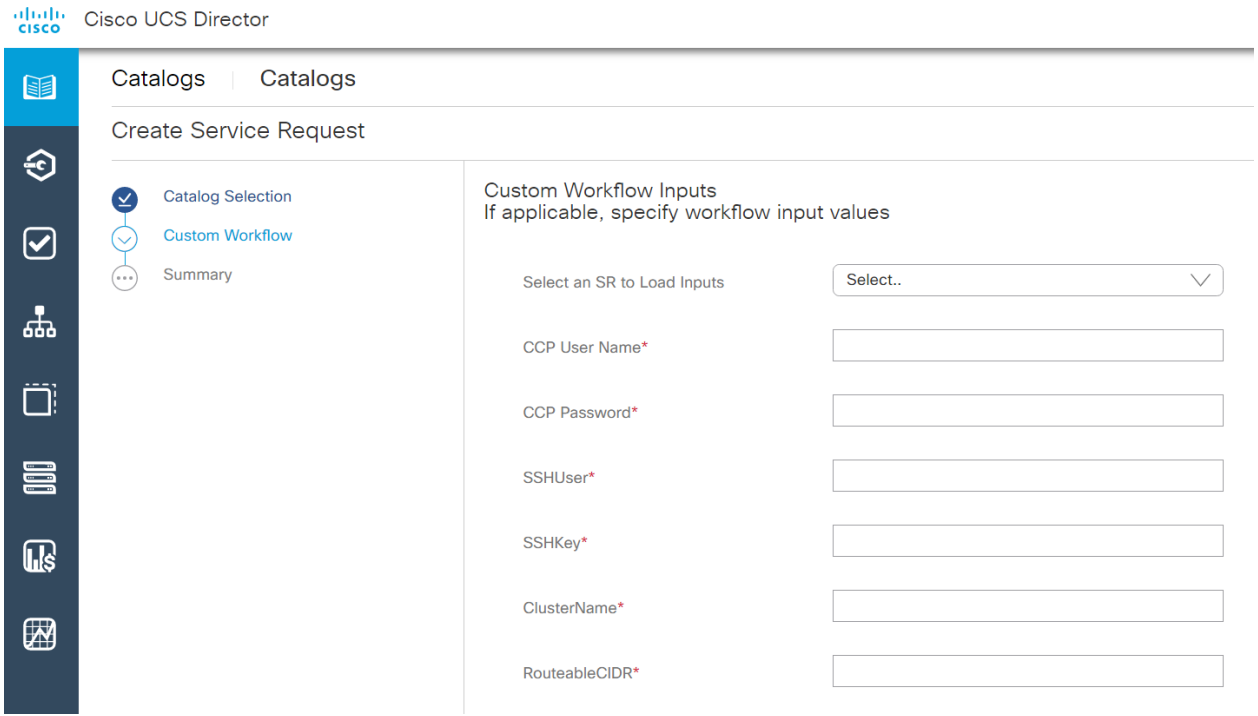
Deploy Cluster – Node Configuration



Deploy Cluster - Summary

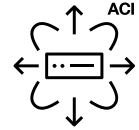


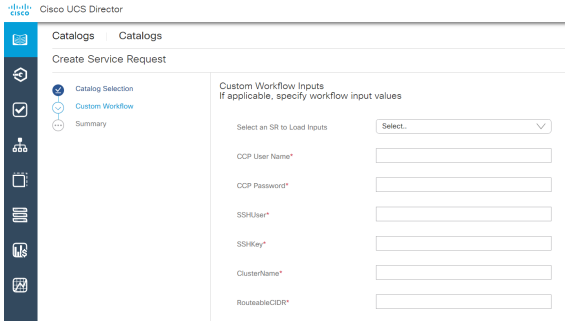
Reason for the Portal – Simplifying Ordering



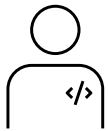
Ordering a Kubernetes Cluster

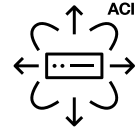
Developer goes to the UCS Director portal and orders a Kubernetes cluster





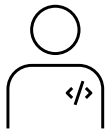
Ordering a Kubernetes Cluster



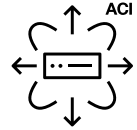


UCS Director deploys
a CCP Kubernetes
cluster using CCP's API

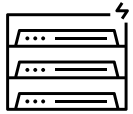
Ordering a Kubernetes Cluster



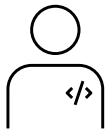
CCP creates a tenant for the cluster in ACI

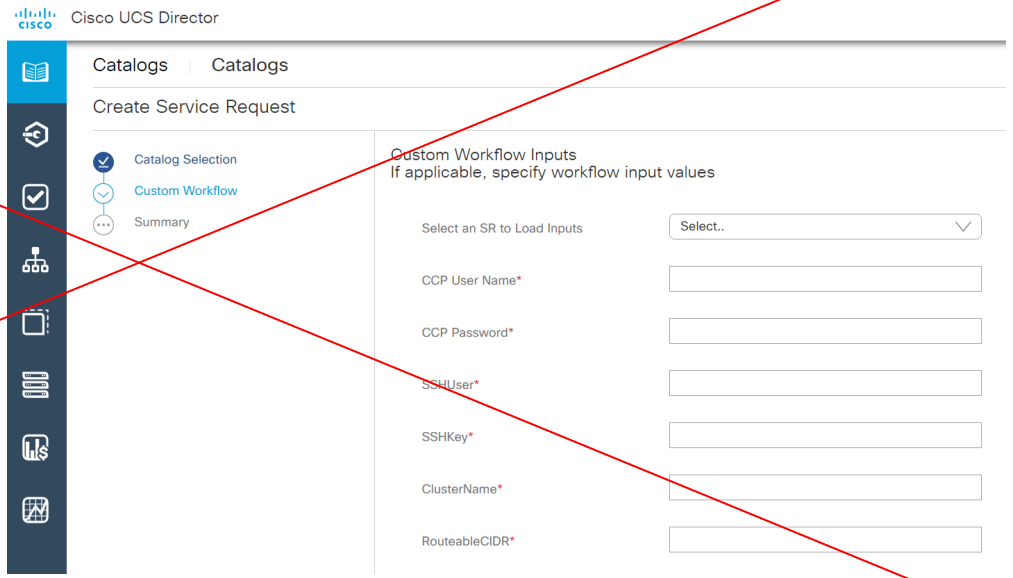


CCP clones and customizes the Kubernetes nodes on Hyperflex



Hey, That's Not Infrastructure as Code!

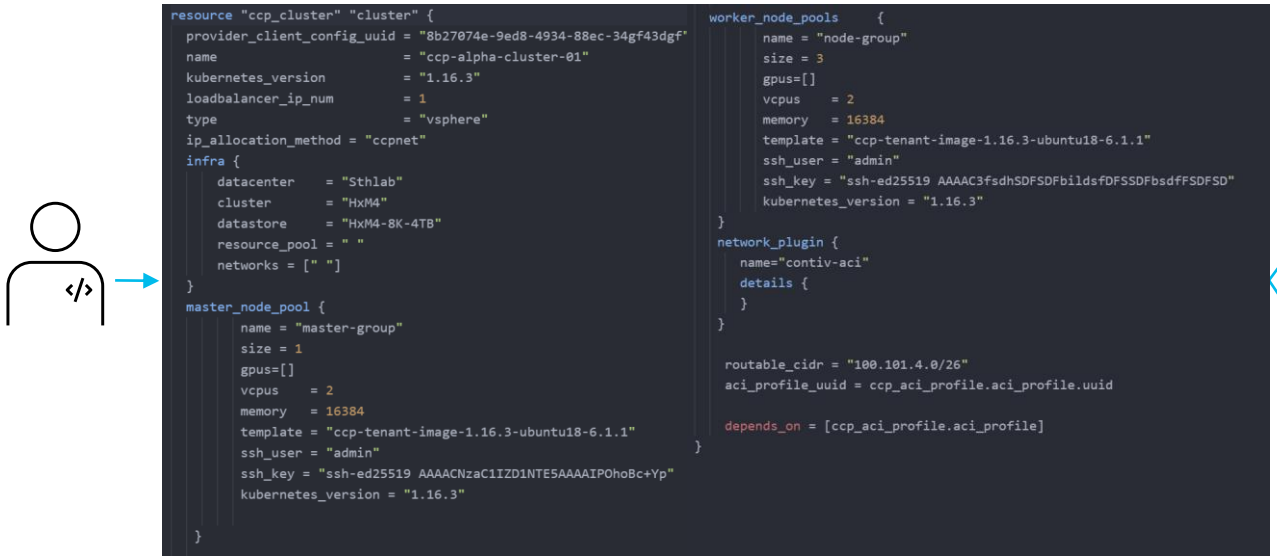




Ok, Use This Then... >)

```
{
    "node_groups": [
        {
        "name": "@{NodeGrpName}",
        "size": 3,
        "vcpus": 2,
        "memory_mb": 16384,
        "gpus": [],
        "template": "@{Template}",
        "kubernetes_version": "@{K8sVer}",
        "ssh_user": "@{SSHUser}",
        "ssh_key": "@{SSHKey}"
        }
    ],
    "master_group": {
        "name": "@{MasterGrpName}",
        "size": 1,
        "vcpus": 2,
        "memory_mb": 16384,
        "gpus": [],
        "template": "@{Template}",
        "kubernetes_version": "@{K8sVer}",
        "ssh_user": "@{SSHUser}",
        "ssh_key": "@{SSHKey}"
    },
    "docker_no_proxy": [],
    "kubernetes_version": "@{K8sVer}",
    "insecure_registries": [],
    "root_ca_registries": [],
    "ntp_servers": ["@{NTPServer}"],
    "ntp_pools": [],
    "ip_allocation_method": "ccpnet",
    "provider": "@{vSphereID}",
    "description": "",
    "name": "@{ClusterName}",
    "routable_cidr": "@{RouteableCIDR}",
    "network_plugin_profile": {
        "name": "contiv-aci",
        "details": {}
    },
    "vsphere_infra": {
        "cluster": "@{Cluster}",
        "networks": [],
        "datastore": "@{Datastore}",
        "datacenter": "@{Datacenter}"
    },
    "aci_profile": "@{aciProfileID}",
    "type": "vsphere",
    "cloud_provider": "in-tree"
}
```

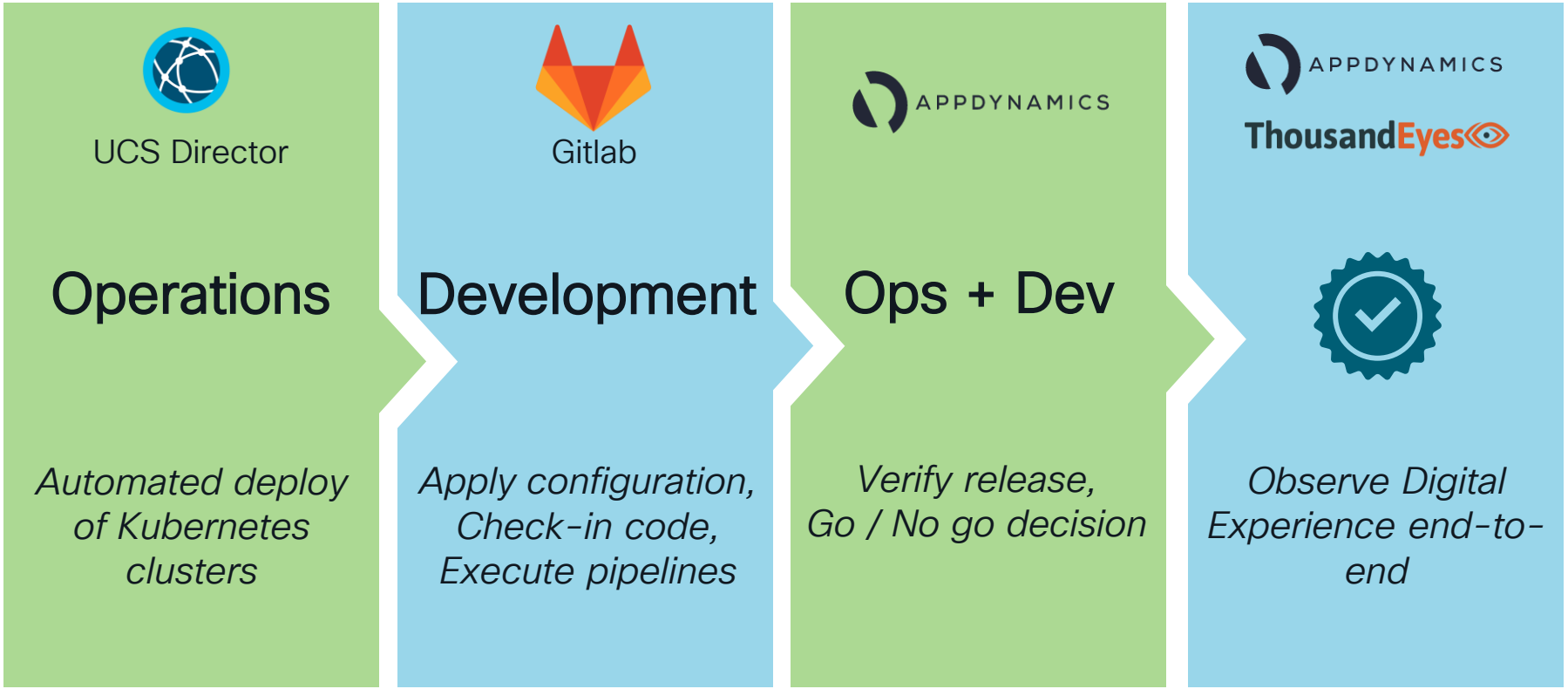
Or this...



```
resource "ccp_cluster" "cluster" {
  provider_client_config_uuid = "8b27074e-9ed8-4934-88ec-34gf43dgf"
  name                        = "ccp-alpha-cluster-01"
  kubernetes_version          = "1.16.3"
  loadbalancer_ip_num         = 1
  type                        = "vsphere"
  ip_allocation_method = "ccpnet"
  infra {
      datacenter    = "Sthlab"
      cluster       = "HxM4"
      datastore     = "HxM4-8K-4TB"
      resource_pool = " "
      networks = [" "]
  }
  master_node_pool {
        name = "master-group"
        size = 1
        gpus=[]
        vcpus    = 2
        memory   = 16384
        template = "ccp-tenant-image-1.16.3-ubuntu18-6.1.1"
        ssh_user = "admin"
        ssh_key = "ssh-ed25519 AAAACNzaC1IZD1NTE5AAAAIPOhoBc+Yp"
        kubernetes_version = "1.16.3"

   }
  worker_node_pools     {
        name = "node-group"
        size = 3
        gpus=[]
        vcpus    = 2
        memory   = 16384
        template = "ccp-tenant-image-1.16.3-ubuntu18-6.1.1"
        ssh_user = "admin"
        ssh_key = "ssh-ed25519 AAAAC3fsdhSDFSDFbildsfDFSSDFbsdfFSDFSD"
        kubernetes_version = "1.16.3"
  }
  network_plugin {
     name="contiv-aci"
     details {
     }
  }

   routable_cidr = "100.101.4.0/26"
   aci_profile_uuid = ccp_aci_profile.aci_profile.uuid

   depends_on = [ccp_aci_profile.aci_profile]
}
```

Session Objective

What you will see today



Demonstration

Order Kubernetes Cluster


Cisco UCS Director
Username:
Password:
Login
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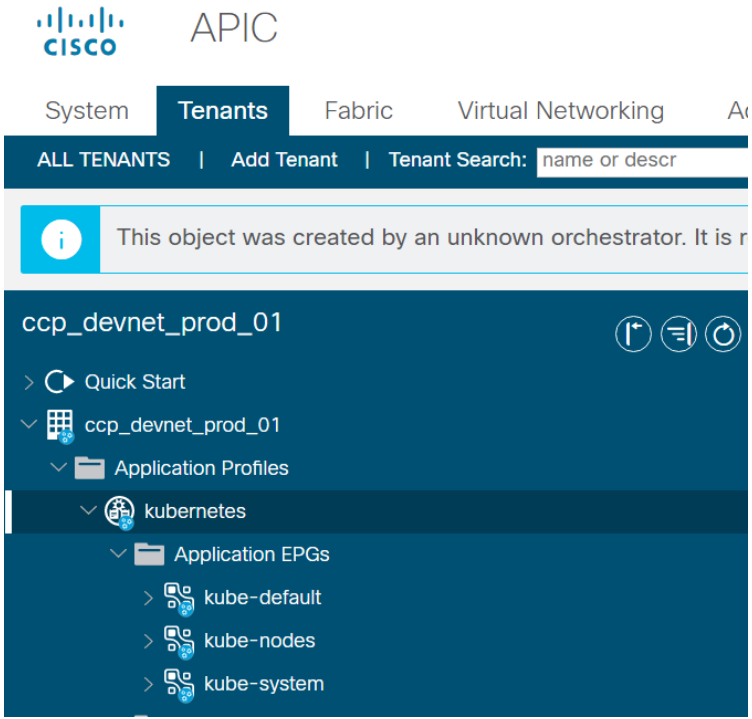
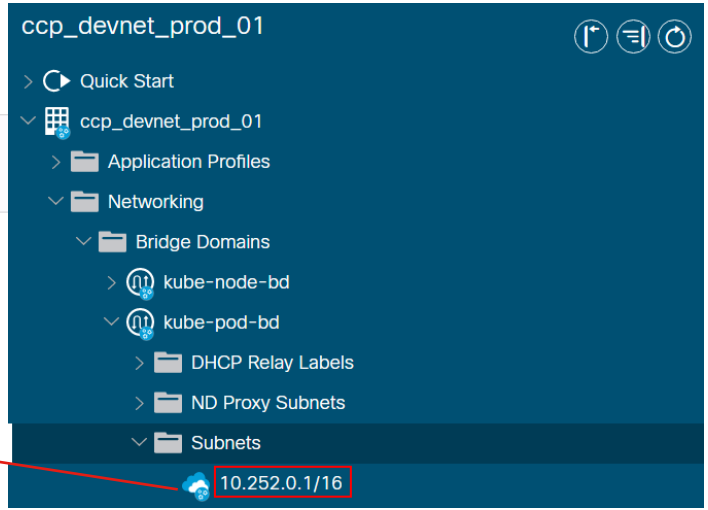
CCP Builds a Tenant in ACI



Testing the K8s Deployment – CI/CD pipeline

```
19  stages:
20    - test01
21
22  run-test01-tests:
23    stage: test01
24    image: "python:3"
25    script:
26      - echo "Installing requirements"
27      - pip3 install -r requirements.txt
28      - echo "Install completed"
29      - echo "Starting robot framework"
30      - mkdir reports
31      - robot --outputdir reports tests/test01
32      - echo "Robot framework done"
33    artifacts:
34      paths:
35        - reports
```

Testing the K8s Deployment – test01.robot



test01.robot 312 bytes

```
1  *** Settings ***
2  Library         Process
3
4  *** Variables ***
5  ${target}         10.252.0.1
6
7  *** Test Cases ***
8  Ping test
9      [Documentation]    ping ${target}
10     ${result} =      Run Process         ping ${target} -c 1    shell=True  stdout=stdout.txt
11     Should Contain  ${result.stdout}    64 bytes from ${target}
12
```

Job result

passed | #4410006472 | infra bb055644 | #889016687 created by | test01 | run-test01-tests | 00:00:08 | 8 minutes ago

```
Running with gitlab-runner 14.10.1 (f761588f)
  on gitlabrunner MDyyLzQ6
Preparing the "shell" executor
Using Shell executor...
Preparing environment
Running on gitlabrunner.labrats.se...
Getting source from Git repository
Fetching changes with git depth set to 50...
Reinitialized existing Git repository in /home/gitlab-runner/builds/MDyyLzQ6/0/cisco-fso-swe
Checking out bb055644 as infra...
Removing reports/
Removing stdout.txt
Skipping Git submodules setup
Executing "step_script" stage of the job script
$ echo "Installing requirements"
Installing requirements
$ pip3 install -r requirements.txt
Requirement already satisfied: robotframework==6.0.2 in /usr/local/lib/python3.8/dist-packag
$ echo "Starting robot framework"
Starting robot framework
$ mkdir reports
$ robot --outputdir reports tests/test01
==============================================================================
Test01
==============================================================================
Test01.Test01
==============================================================================
Ping test :: ping 10.252.0.1                                          | PASS |
------------------------------------------------------------------------------
Test01.Test01                                                         | PASS |
1 test, 1 passed, 0 failed
==============================================================================
Test01                                                                | PASS |
1 test, 1 passed, 0 failed
==============================================================================
Output:  /home/gitlab-runner/builds/MDyyLzQ6/0/cisco-fso-sweden/guestbook/reports/output.xml
Log:     /home/gitlab-runner/builds/MDyyLzQ6/0/cisco-fso-sweden/guestbook/reports/log.html
Report:  /home/gitlab-runner/builds/MDyyLzQ6/0/cisco-fso-sweden/guestbook/reports/report.html
$ echo "Robot framework done"
Robot framework done
Uploading artifacts for successful job
Uploading artifacts...
Runtime platform                                    arch=amd64 os=linux pid=5549 revision=f761588f version=14.10.1
reports: found 4 matching files and directories
Uploading artifacts as "archive" to coordinator... 201 Created  id=4410006472 responseStatus=201 Created token=64_WyUAK
Cleaning up project directory and file based variables
Job succeeded
```

Configure GitLab and Commit Code

G guestbook
Project information
Learn GitLab 33%
Repository
Issues 0
Merge requests 0
CI/CD
Security & Compliance
Deployments
Packages & Registries
Infrastructure
Monitor
Analytics
Wiki
Snippets
Settings
General
Integrations
Webhooks
Repository
CI/CD
Packages & Registries
Pages
Monitor
Usage Quotas
Collapse sidebar

Search settings

General pipelines

Expand

Customize your pipeline configuration.

Auto DevOps

Expand

Automate building, testing, and deploying your applications based on your continuous integration and delivery configuration. How do I get started?

Runners

Expand

Runners are processes that pick up and execute CI/CD jobs for GitLab. How do I configure runners?

Artifacts

Expand

A job artifact is an archive of files and directories saved by a job when it finishes.

Variables

Expand

Variables store information, like passwords and secret keys, that you can use in job scripts. Learn more.

Variables can be:

- `Protected:` Only exposed to protected branches or protected tags.
- `Masked:` Hidden in job logs. Must match masking requirements. Learn more.

Pipeline triggers

Expand

Trigger a pipeline for a branch or tag by generating a trigger token and using it with an API call. The token impersonates a user's project access and permissions. Learn more.

Deploy freezes

Expand

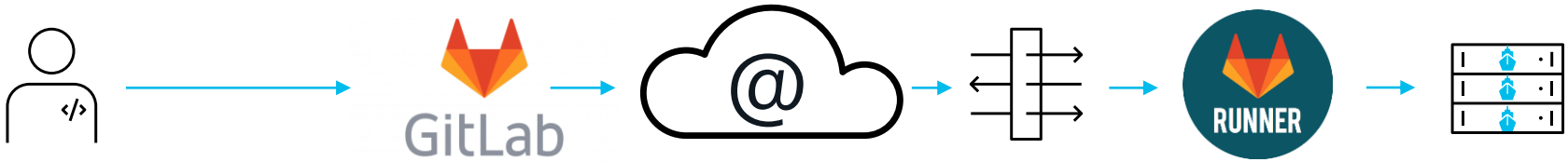
Add a freeze period to prevent unintended releases during a period of time for a given environment. You must update the deployment jobs in `.gitlab-ci.yml` according to the deploy freezes added here. Learn more. Specify deploy freezes using cron syntax.

Token Access

Expand

Control which projects can be accessed by API requests authenticated with this project's CI_JOB_TOKEN CI/CD variable. It is a security risk to disable this feature, because unauthorized projects might attempt to retrieve an active token and access the API. Learn more

GitLab and GitLab Runner



Verify Code Quality and Performance in Test Environment

CiscoLive Demo Guestbook with GitLab CI/CD

Sign the guestbook

Ayala, Hawkins and Ware

Himself goal deal anything stop like. Image themselves nor help white. Final himself fund four.

Perez Ltd

Possible later skill bed plan. Onto red whose hour. Do tough shake experience.

Preston Ltd

Local quality role store bag world inside. Require heavy military federal city. Its least seek who process oil.

Nelson and Sons

Might treatment year. Poor interest tend on manager what. Cultural player agent consumer out.

Bennett LLC

Officer guess each skin place personal unit. Year spring half foreign able. Listen yourself despite environmental trade. Season western research energy. Business lead should as before everything start understand.

Observe the Digital Experience end-to-end

CiscoLive Demo Guestbook with GitLab CI/CD

Home Tools About

Sign the guestbook

Parks Ltd

Nearly local impact everyone spend. Beat marriage country knowledge down set. Admit time her chance factor join nice. True opportunity woman me think leg turn window.

George and Sons

Her carry party speak establish according place. Within ever skill hotel anything field. Behind already do above oil to of.

Murphy, Martin and Parker

Certain go common skill it stand dog. Recently evening community reflect. Plant exist investment president admit. Go nature enter debate. Example center event network.

Long Ltd

Join power owner may. Us wear candidate seem rich local. Him development television. Worry understand value difference. Have morning young movement move spend left.

Mathews Group

About including final I article candidate present economy. Husband big always pull. Anything

Cloud & Enterprise Agents
Views
Test Settings
Agent Settings
BGP Monitors
Endpoint Agents
Devices
Internet Insights
Dashboards
Alerts
Reports
Sharing
Account Settings

Current Test: http://prod.fso.labrats.se
Settings | Agent: All agents

Run Now | Save | Share

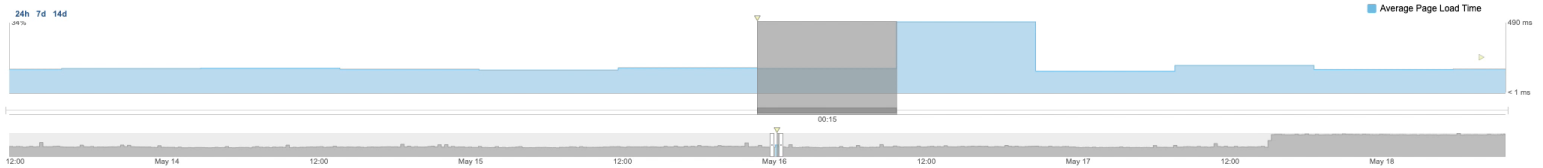
Views

WEB
- **Page Load**
- HTTP Server

NETWORK
- Overview
- Path Visualization

ROUTING
- BGP Route Visualization

Metric: **Page Load Time**



Target URL
http://prod.fso.labrats.se

Showing data from **Mon, May 16 00:14 - 00:16 CEST** (2 days ago)

Latest

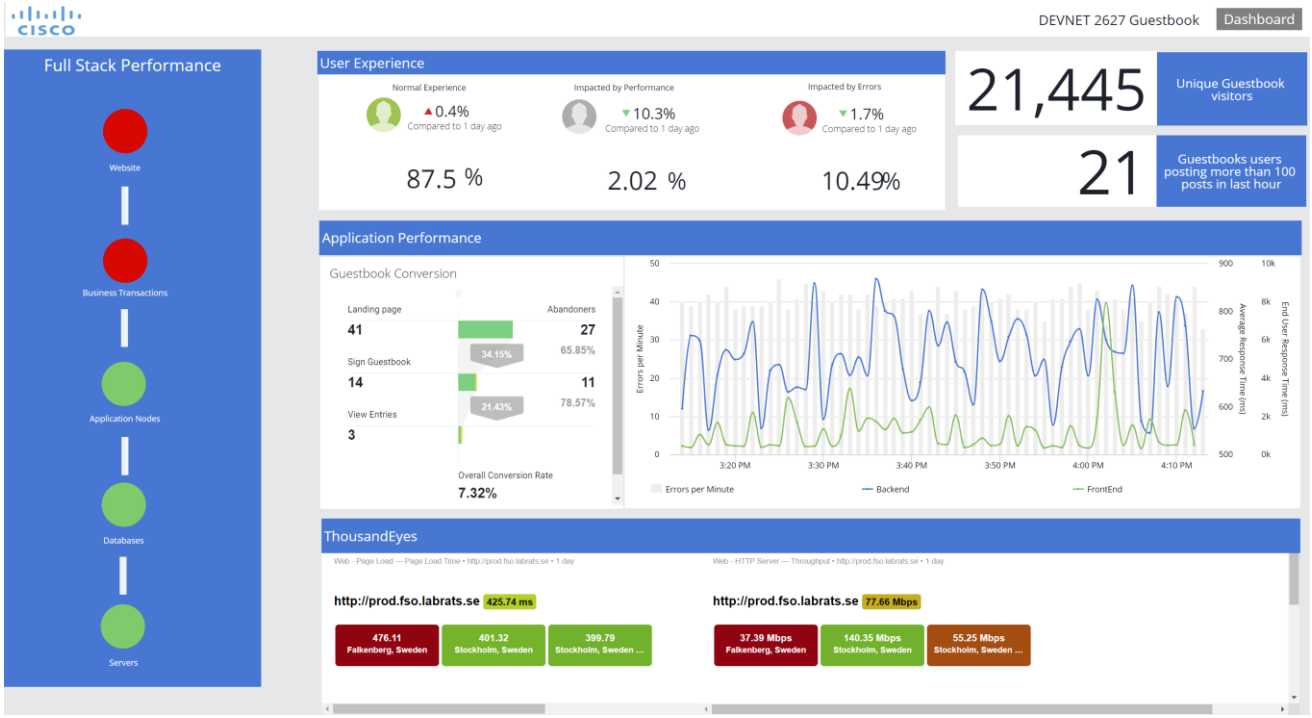
Map | Table | Waterfall

Details for all 3 agents

DOM Load Time	168 ms
Page Load Time	168 ms

Warnings from 1 agent

Example Full Stack Observability Dashboard



Conclusion

In summary we've been covering

1. Full ***control*** of the ***user experience***, already from the development process

2. Real-time ***insights with business context*** for troubleshooting & optimization

3. Easy to ***integrate*** and ***automatically deploy***

Next Steps

Learn more and try it out yourself!

Some other FSO sessions:

BRKAPP-2759: Full-Stack Observability: The HOW!

BRKAPP-204: Using Full Stack Observability to align application security and lifecycle management

BRKAPP-2624: Full-stack Observability (FSO) for App Security in the Cloud or Wherever

LABCLD-1011: Full Stack Observability – Monitoring and troubleshooting a simple application

Hands on experience with 15 days free trial

APPDYNAMICS

ThousandEyes

Q&A

Fill out your session surveys!

Attendees who fill out a minimum of four session surveys and the overall event survey will get **Cisco Live-branded socks** (while supplies last)!

Attendees will also earn 100 points in the **Cisco Live Challenge** for every survey completed.

These points help you get on the leaderboard and increase your chances of winning daily and grand prizes

Continue your education

- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer 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

The bridge to possible

Thank you

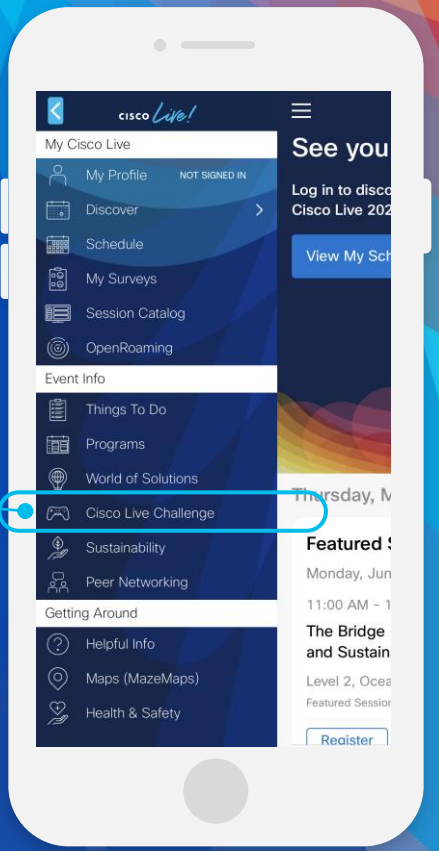
Cisco Live
Challenge

Gamify your Cisco Live experience!

Get points for attending this session!

How:

1. Open the Cisco Events App.
2. Click on 'Cisco Live Challenge' in the side menu.
3. Click on View Your Badges at the top.
4. Click the + at the bottom of the screen and scan the QR code:

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Let's go
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