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Devnet Associate

Devasc 200-901

Module 1: Course Introduction

Instructors:
Josinfo
João Otavio

DevNet Associates v1.0

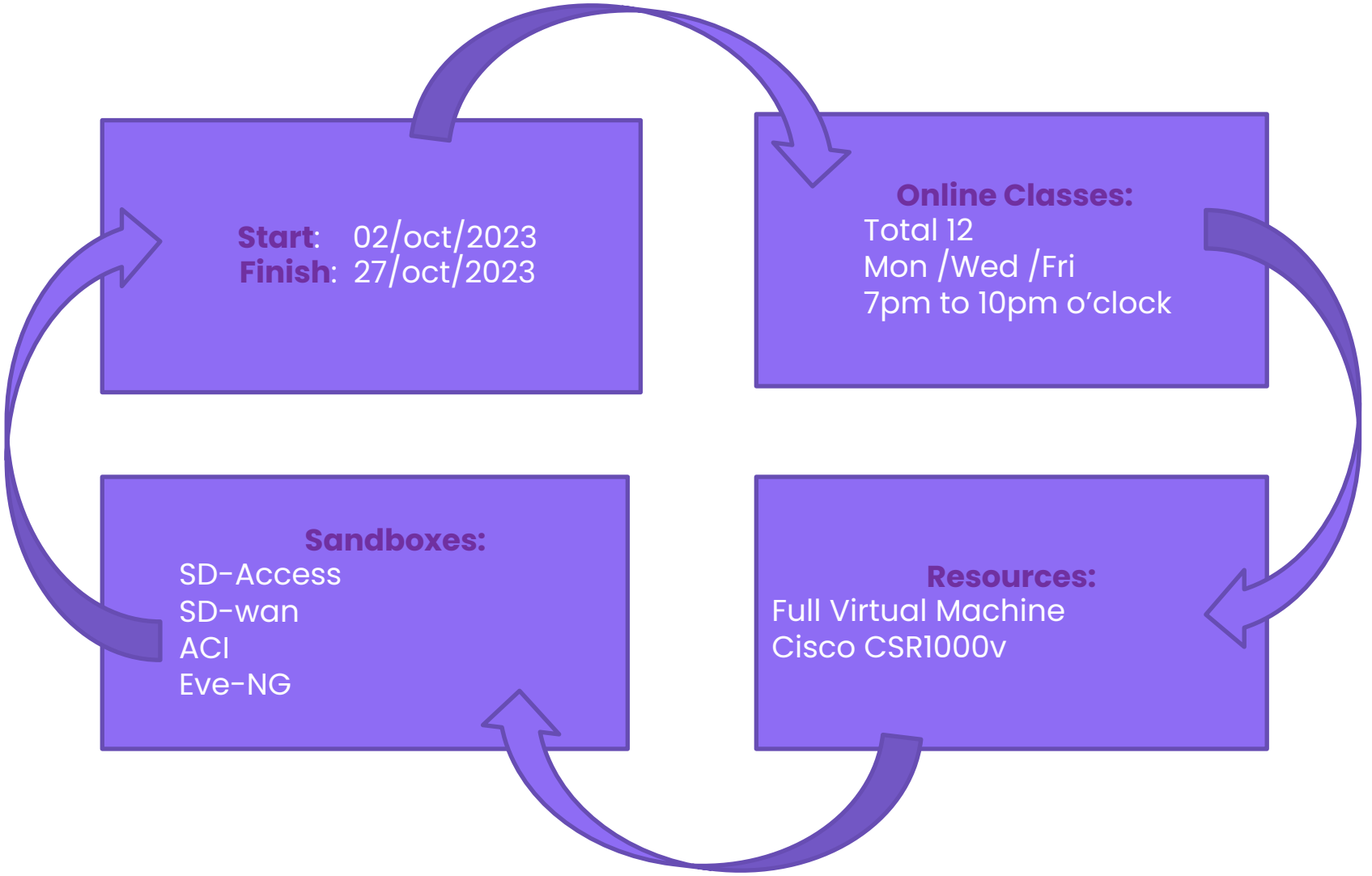
1.1: About Devnet

1.2: Instructors / Students

1.3: Calendar

1.4: Content Program

1.5: Exploring DevNet Online Resources


Start: 02/oct/2023
Finish: 27/oct/2023
Online Classes:
Total 12
Mon /Wed /Fri
7pm to 10pm o'clock
Resources:
Full Virtual Machine
Cisco CSR1000v
Sandboxes:
SD-Access
SD-wan
ACI
Eve-NG

CLASS	DATE	DAY	MODULE	TOPIC	INSTRUCTOR
01	02/oct/2023	2a	1	The DevNet Developer Environment	Josinfo
02	04/oct/2023	4a	2	Pyhton	Josinfo
03	06/oct/2023	6a	3	Software Development and Design	João Otavio
04	09/oct/2023	2a	4	Understanding and Using APIs	João Otavio
05	11/oct/2023	4a	5	Network Enterprise Fundamentals	Josinfo
06	13/oct/2023	6a	5	Network DataCenter Fundamentals	Josinfo
07	16/oct/2023	2a	6	Application Deployment	João Otavio
08	18/oct/2023	4a	6	Application Deployment	João Otavio
09	20/oct/2023	6a	5	Cisco DNA Fabric In a Box Lab	Josinfo
10	23/oct/2023	2a	7	Cisco Platforms and Development	João Otavio
11	25/oct/2023	4a	8	Cisco Platforms and Development	João Otavio
12	27/oct/2023	6a	8	Infrastructure and Lab	Josinfo

Josimar Caitano (Josinfo)

https://www.linkedin.com/in/josinfo/

João Otavio

https://www.linkedin.com/in/jotaviorc/

	Module Title	Objectives
1	Course Introduction	• Setup the lab environment • Review Python programming and Linux skills
2	The DevNet Developer Environment	• Explore and get familiar with DevNet Resources
3	Software Development and Design	• Use best practices from software development and design with Python
4	Understanding and Using APIs	• Discover API Design and Architecture styles and Advanced uses of REST APIs • Interact with REST APIs using command line, graphical tools and Python code
5	Network Fundamentals	• Explain the features and functions of common network devices • Troubleshoot basic network connectivity issues
6	Application Deployment and Security	• Use current technologies to deploy and secure applications and data in a local or cloud environments
7	Infrastructure and Automation	• Explore software testing and deployment methods in automation and simulation environments and use DevOps tools for infrastructure automation
8	Cisco Platforms and Development	• Compare Cisco platforms used for collaboration, infrastructure management, and automation • Use APIs to interact with and automate Cisco platforms

Course Overview

This course introduces the methodologies and tools of modern software development, applied to the IT and Network operations. It covers a 360 view of the domain including microservices, testing, containers and DevOps, as well as securely automating infrastructures with Application Programming Interfaces (APIs).

Benefits

Gain practical, relevant, hands-on lab experience, including programming in Python, using GIT and common data formats (JSON, XML and YAML), deploying applications as containers, using Continuous Integration/Continuous Deployment (CI/CD) pipelines and automating infrastructure using code.

Prepare for Careers

- ✓ Develop skills for entry-level software development and infrastructure automation jobs
- ✓ Prepare for DevNet Associate certification exam

Course Details

Target Audience: Secondary vocational students, 2-year and 4-year college students and participants of coding bootcamps

Recommended Preparation:
Coding skills, equivalent to:
PCAP: Programming Essentials in Python
Fundamental skills of networking, equivalent to:
CCNA: Introduction to Networks

Learning Component Highlights:
- ✓ 8 Modules with 6 Videos, 23 Hands-on Labs and 5 Cisco Packet Tracer Activities
- ✓ 8 Quizzes, 8 Module Exam, Practice Final Exam, Final Exam, Skills Based Assessment
- ✓ Practice Exam for DEVASC Certification

Recommended Next Course:
CCNA, CCNP or CyberOps Associate

Certification Aligned
Cisco Certified DevNet Associate

Knowledge Domains
• Understanding and Securely Using APIs • Software Development and Design • Application Deployment and Security • Infrastructure and Automation • Network Fundamentals

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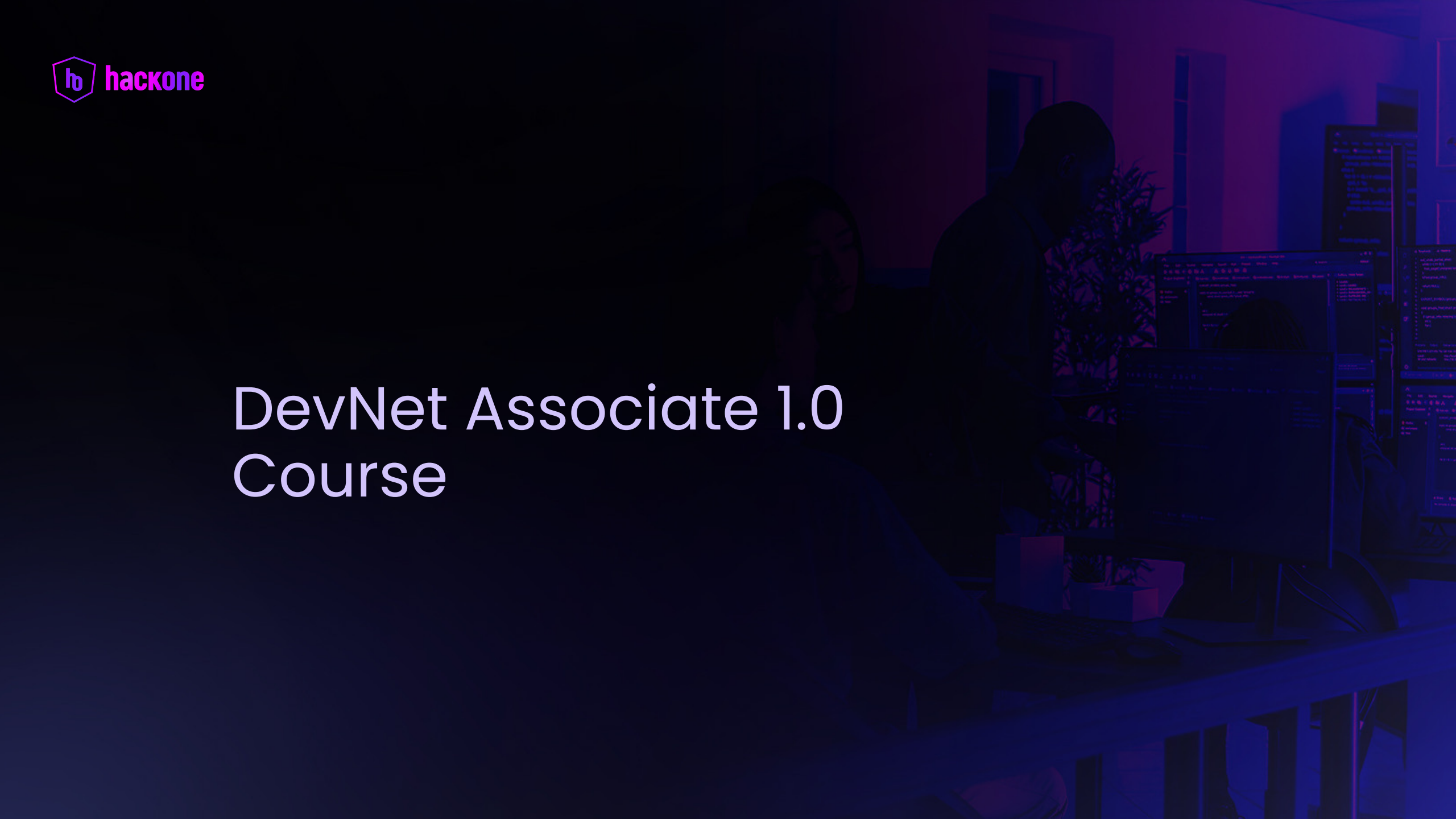
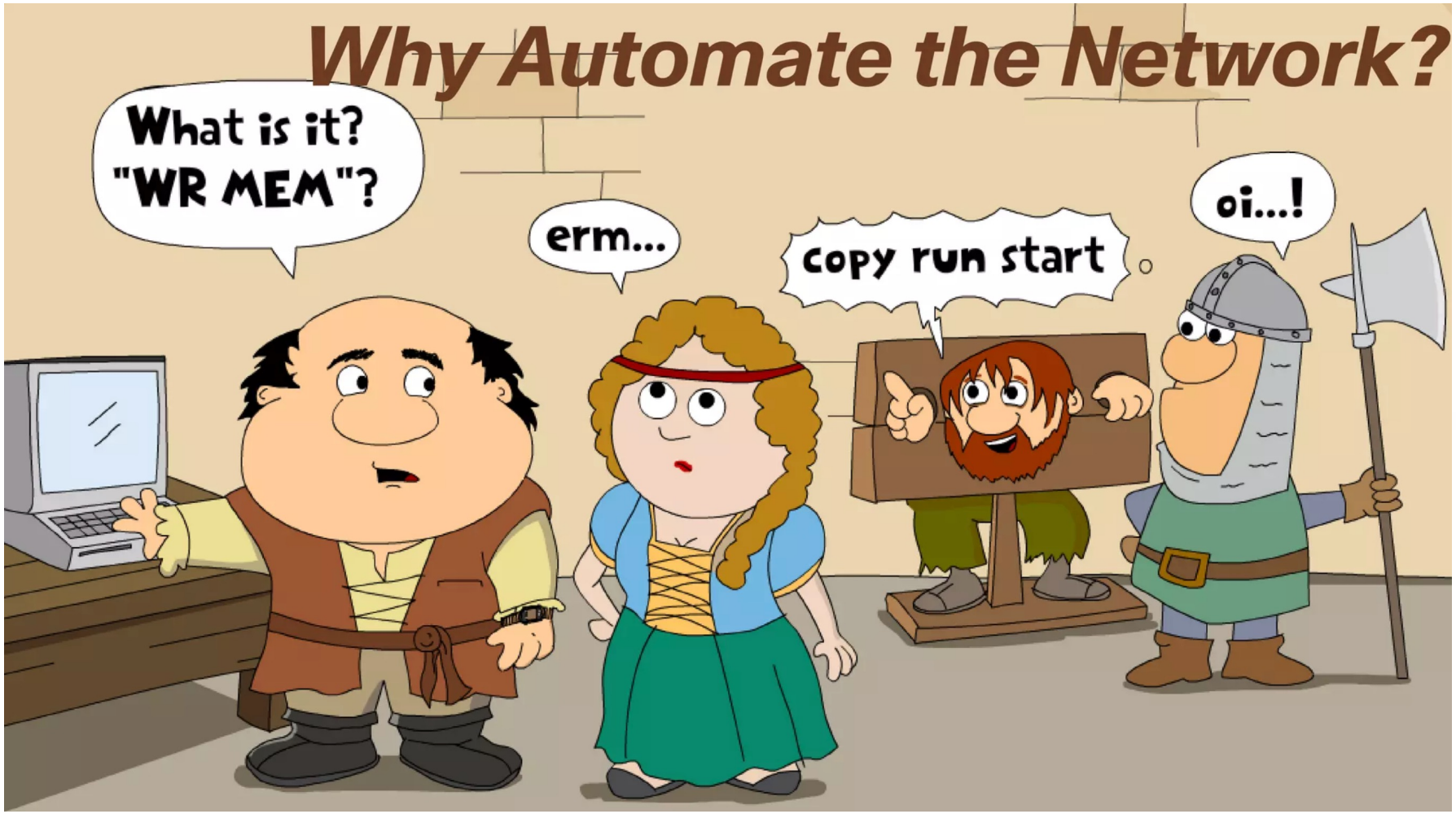
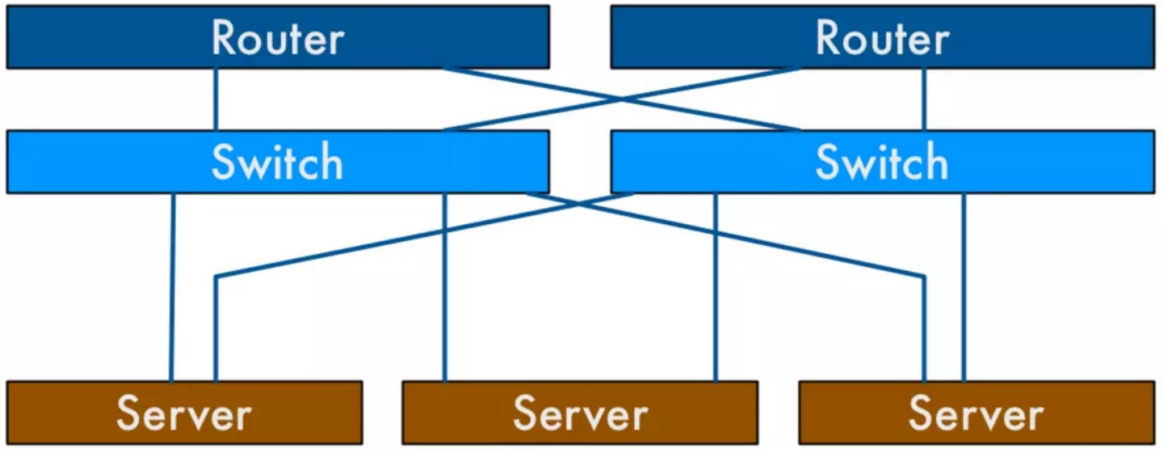
DevNet Associate 1.0 Course

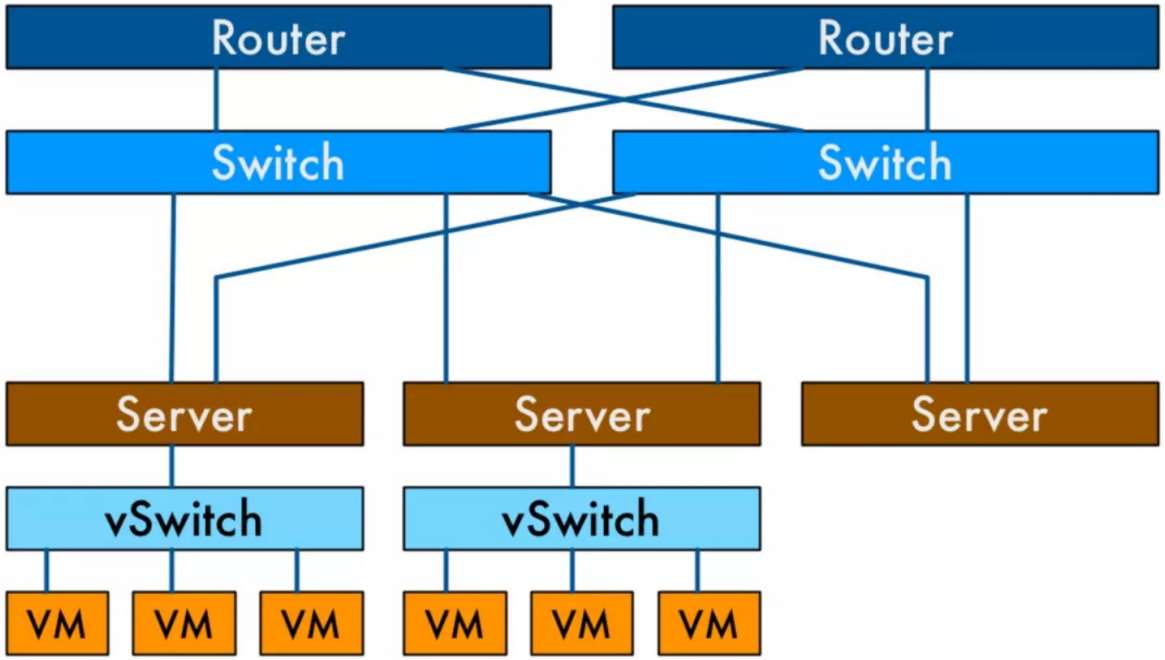



Why Automate the Network?
What is it? "WR MEM"?
erm...
copy run start
oi...!

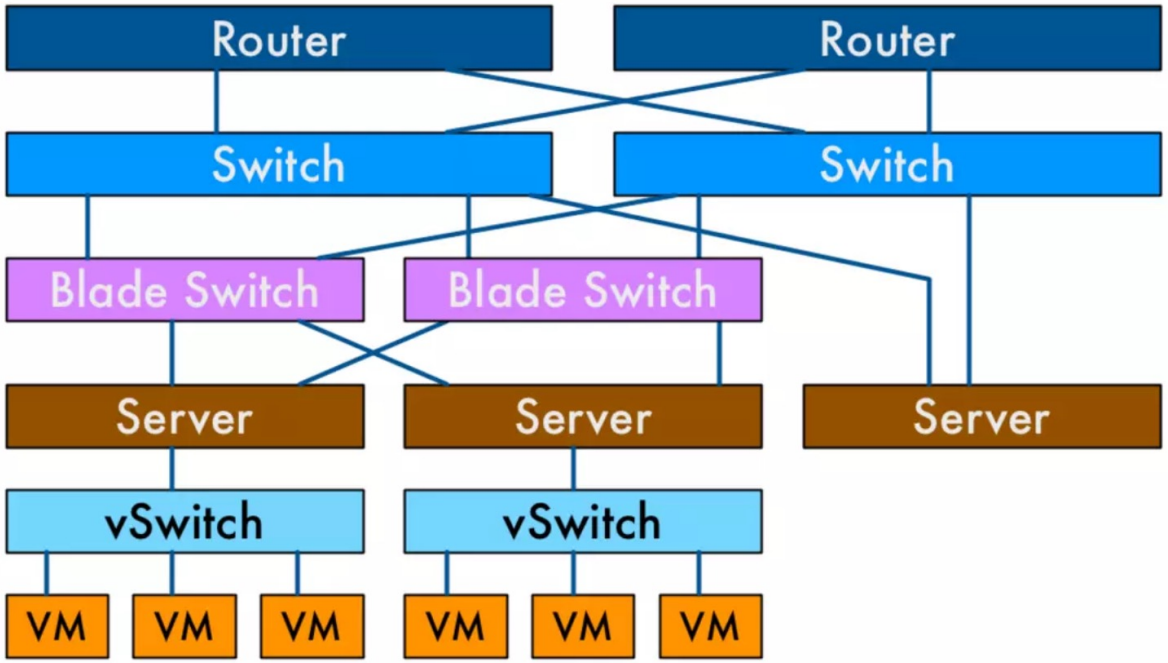
Evolution of Network ...



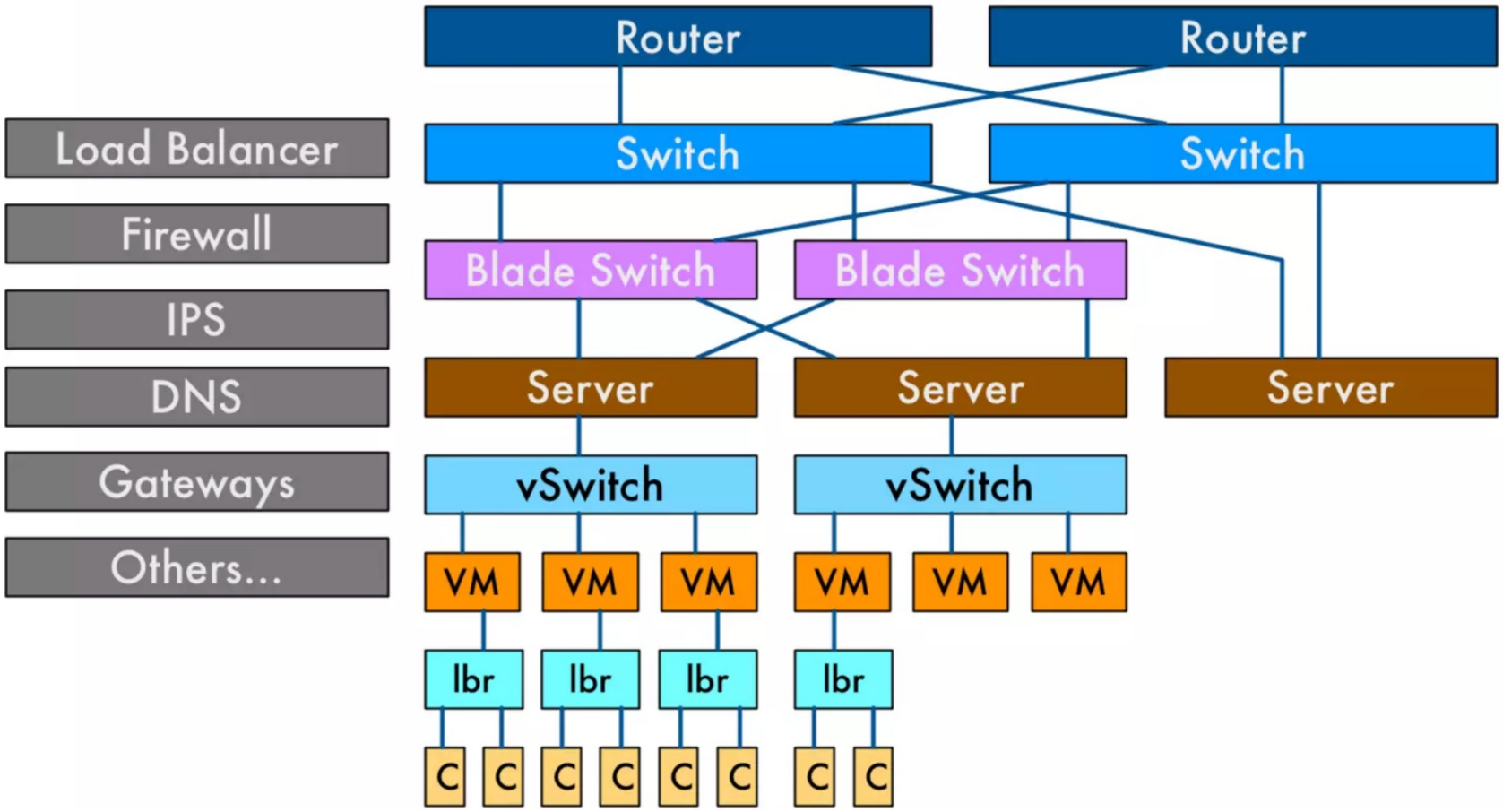
Evolution of Network ...



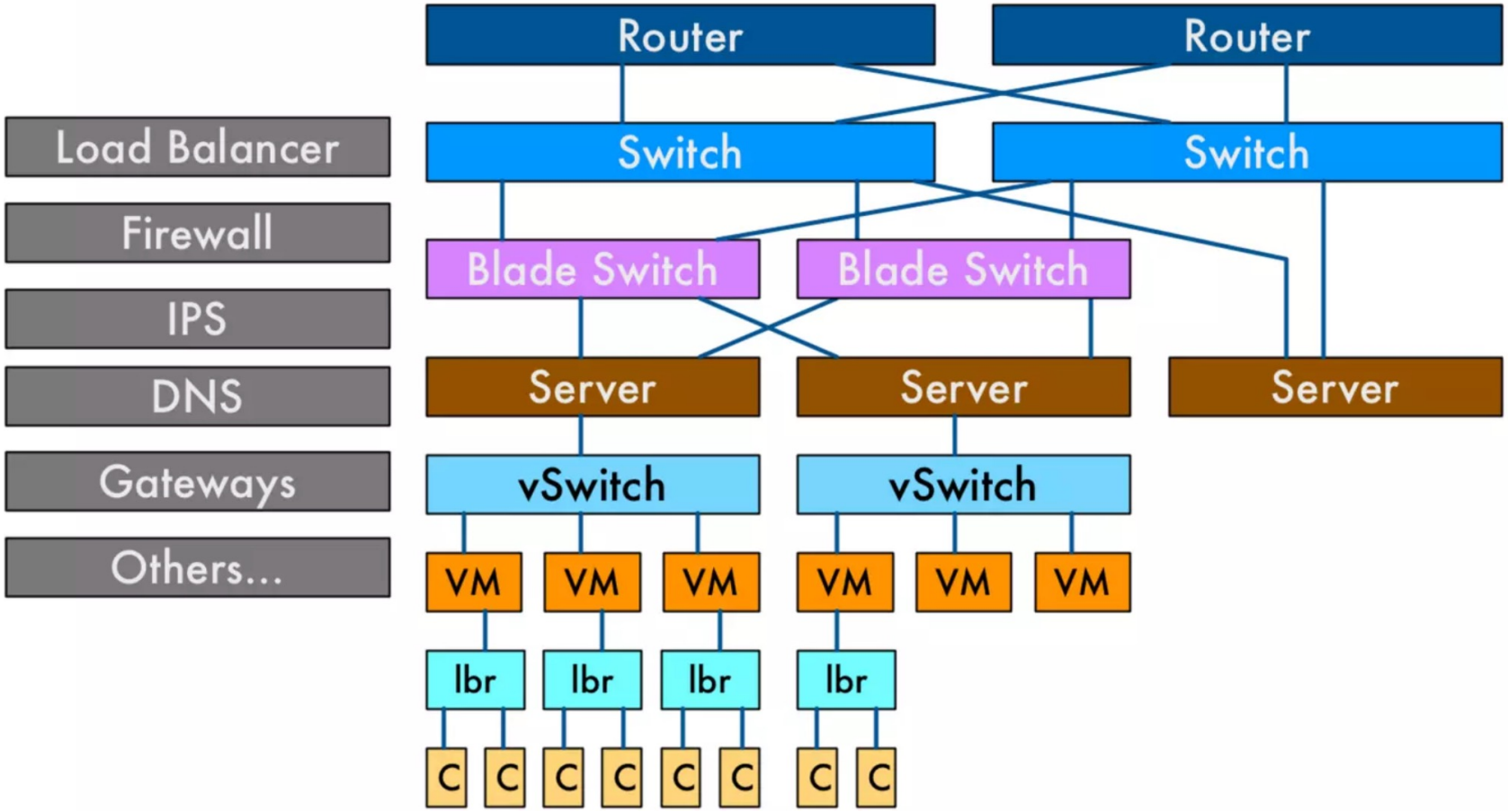
Evolution of Network ...

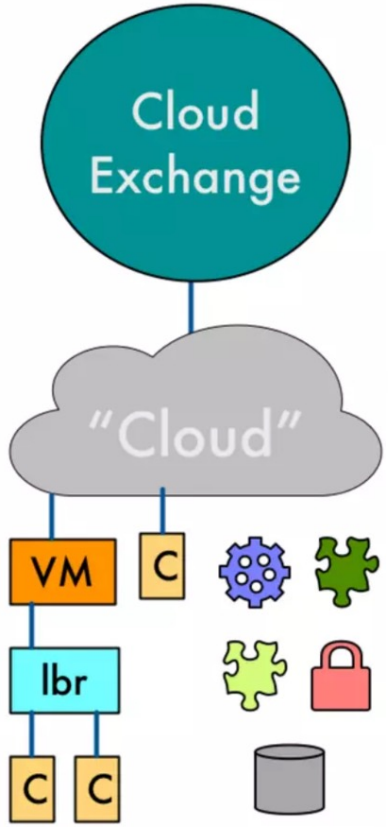


Evolution of Network ...



Evolution of Network …





- Functional but considered fragile
- Network configuration more “art than science”
- Tribal knowledge of key engineers

“Every time we implement a network change something goes wrong…”

“Isn’t it great, our switch hasn’t been rebooted in 6 years”

“We can’t update/change the network, our business won’t allow it”

* Paraphrased quotes from actual network operators

```
show ver
Cisco Internetwork Operating System Software
IOS (tm) 3000 Software (IGS-J-L), Version 11.1(8), RELEASE SOFT
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Thu 05-Dec-96 11:41 by tamb
Image text-base: 0x03038820, data-base: 0x00001000

ROM: System Bootstrap, Version 5.2(8a), RELEASE SOFTWARE
ROM: 3000 Bootstrap Software (IGS-RXBOOT), Version 10.2(8a), RE

orl-sn2 uptime is 20 years, 2 days, 21 hours, 21 minutes
System restarted by reload at 10:39:11 CST Wed Jan 29 1997
System image file is "flash:igs-j-l_111-8.bin", booted via flas
Network configuration file is "20010729155316-orl-sn2.cfg", boo

cisco 2500 (68030) processor (revision D) with 16384K/2048K byt
```

```
[redacted]# show ver | i up|Hard|Ver
Cisco Adaptive Security Appliance Software Version 7.2(4)
Device Manager Version 5.2(4)
Config file at boot was "startup-config"
[redacted] up 9 years 156 days
Hardware:   ASA5505, 256 MB RAM, CPU Geode 500 MHz
[redacted]
```

```
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-D-L), Version 12.0(9), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Mon 24-Jan-00 22:06 by bettyl
Image text-base: 0x03038700, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), SOFTWARE
BOOTFLASH: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c), RELEASE SOFT

[redacted] uptime is 14 years, 1 week, 3 days, 15 hours, 51 minutes
System restarted by reload at 02:20:35 GMT Sat Oct 21 2000
```

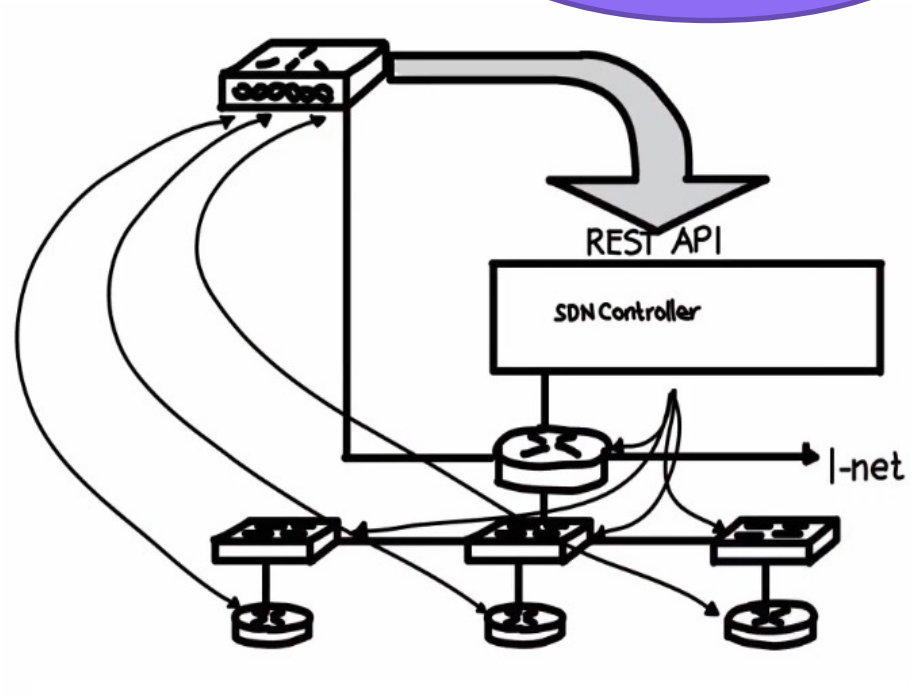
```
[redacted]: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Sat 21-Dec-02 18:55 by ccai
Image text-base: 0x60008930, data-base: 0x61836000

ROM: System Bootstrap, Version 11.1(19)AA, EARLY DEPLOYMENT REL

[redacted] uptime is 19 years, 3 days, 2 hours, 11 minutes
System returned to ROM by power-on
System restarted at 13:18:32 UTC Wed Mar 3 2004
System image file is "flash:c3640-is-mz.122-11.T3.bin"

cisco 3640 (R4700) processor (revision 0x00) with 78848K/52224K
[redacted]
```

74% of operators report network changes have significantly impacted their business*

97% of operators admit human factors cause network outages*

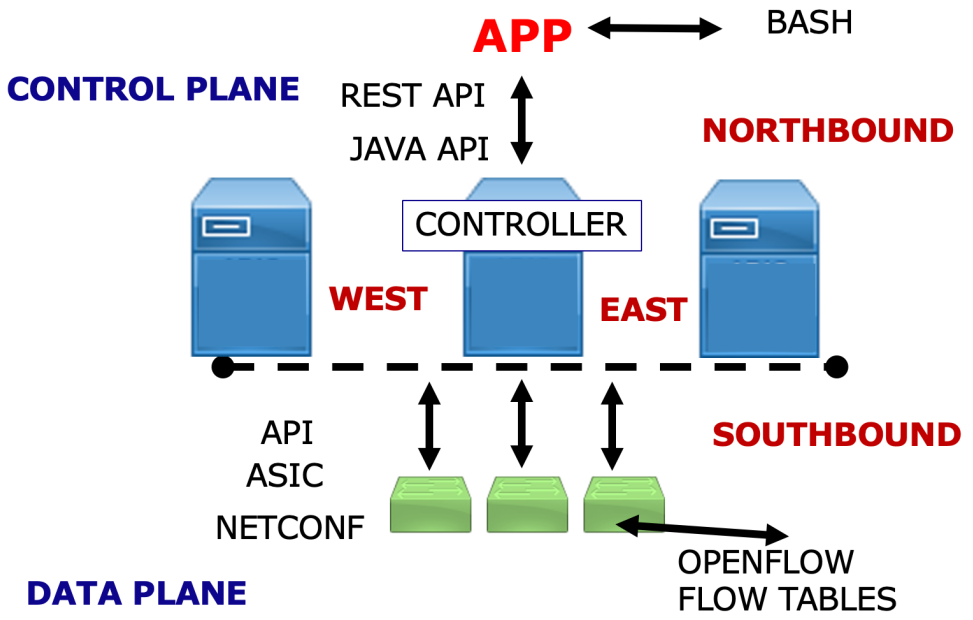
22% of unplanned outages caused by human error**

SDN



OPEN NETWORKING FOUNDATION

NFV



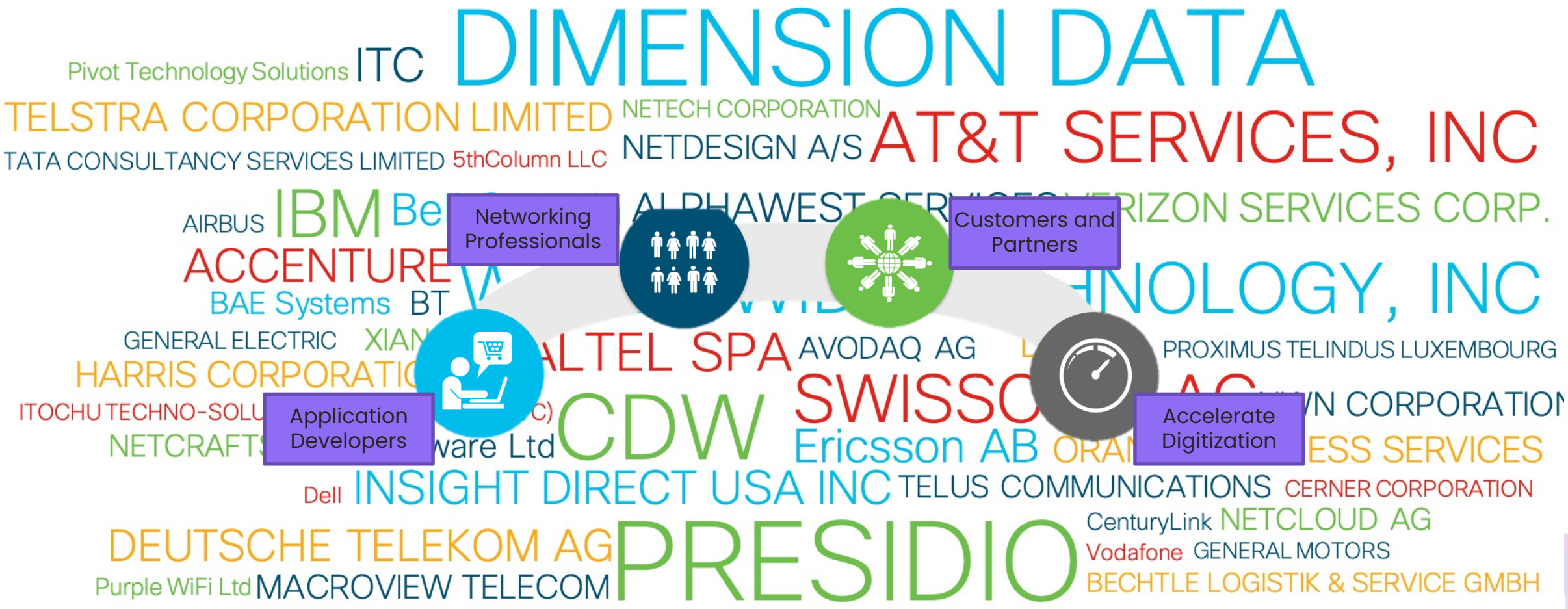
OpenFlow

SDN

NFV

OPEN NETWORKING FOUNDATION

OpenFlow™


Networking Professionals
Customers and Partners
Application Developers
Accelerate Digitization
Pivot Technology Solutions
ITC
DIMENSION DATA
TELSTRA CORPORATION LIMITED
NETECH CORPORATION
NETDESIGN A/S
AT&T SERVICES, INC
TATA CONSULTANCY SERVICES LIMITED
5thColumn LLC
AIRBUS
IBM
ACCENTURE
BAE Systems
BT
GENERAL ELECTRIC
HARRIS CORPORATION
ITOCHU TECHNO-SOLUTIONS
NETCRAFTS
CDW
Ericsson AB
PROXIMUS TELINDUS LUXEMBOURG
AVODAQ AG
Dell
INSIGHT DIRECT USA INC
TELUS COMMUNICATIONS
CERNER CORPORATION
DEUTSCHE TELEKOM AG
PRESIDIO
CenturyLink
NETCLOUD AG
Vodafone
GENERAL MOTORS
Purple WiFi Ltd
MACROVIEW TELECOM
BECHTLE LOGISTIK & SERVICE GMBH

Enabling end-to-end developer success

API Experience

network-device

GET	/network-device/config
GET	/network-device/config/count
GET	/network-device/{networkDeviceId}/config
GET	/network-device
POST	/network-device

Developer Sandbox

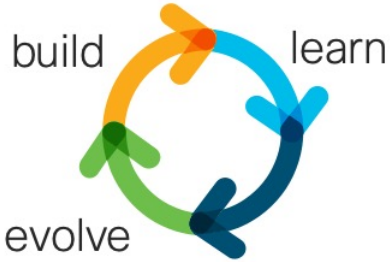
Training and Tutorials

Sample Code

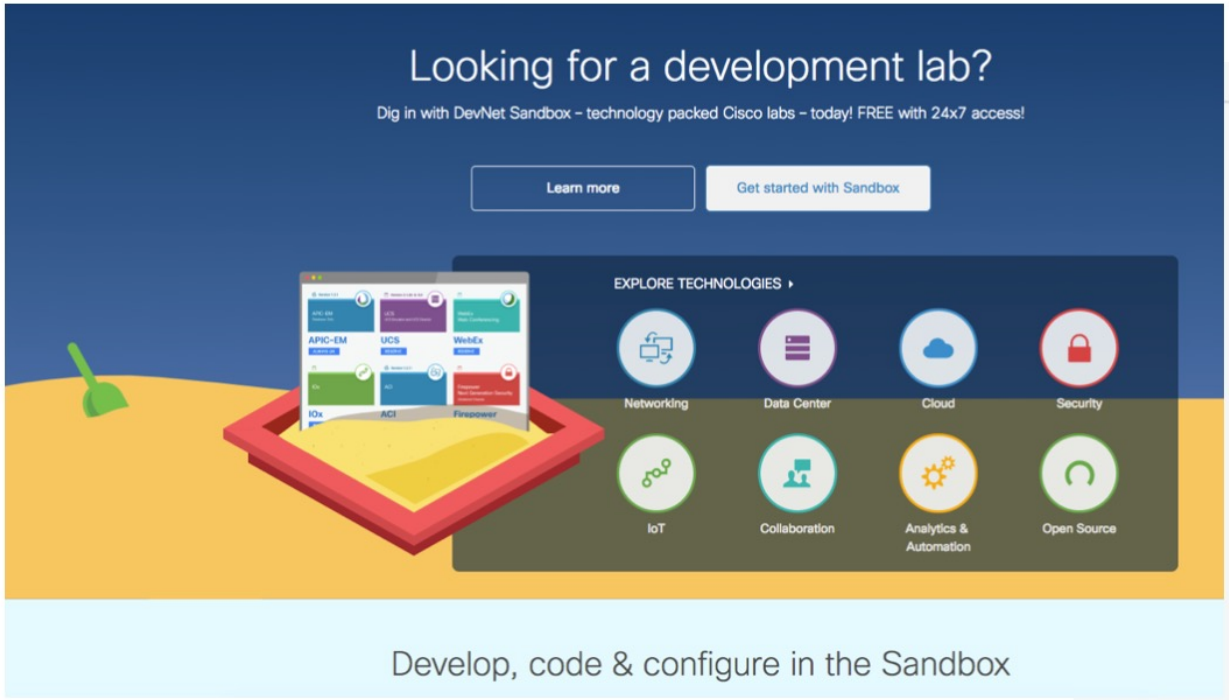
developer.cisco.com

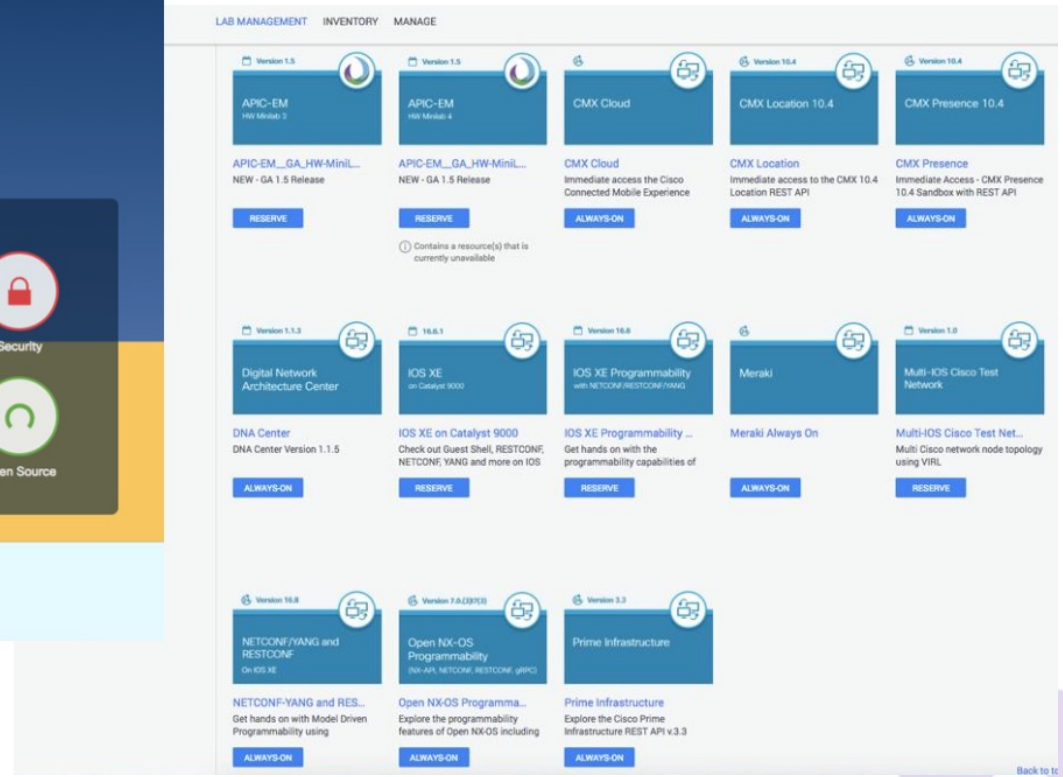
Co-Creations

Developer Advocacy

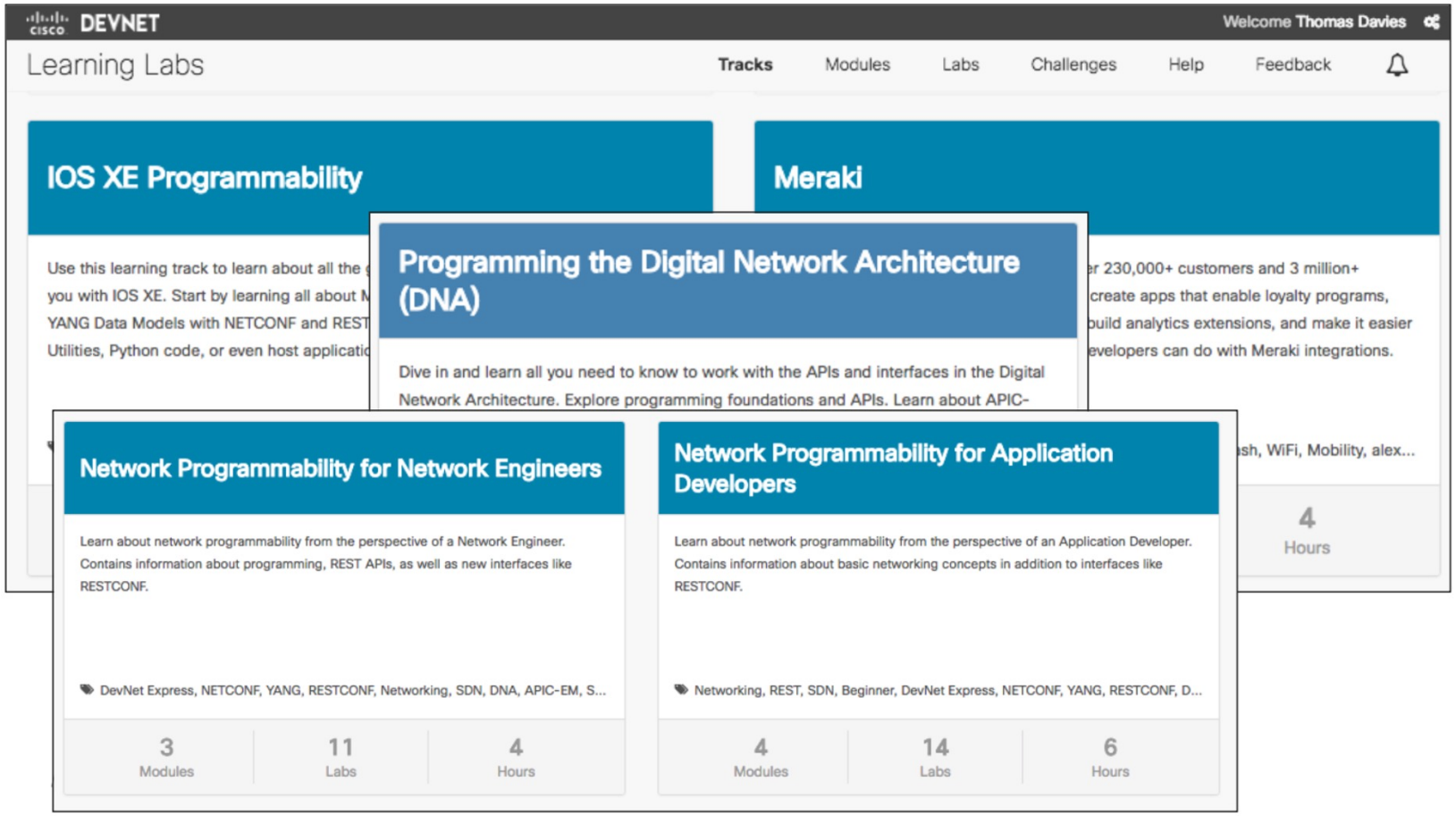


Sandbox: Networking





Sandbox: Learning Labs



Network as Code and Configuration Management strategies

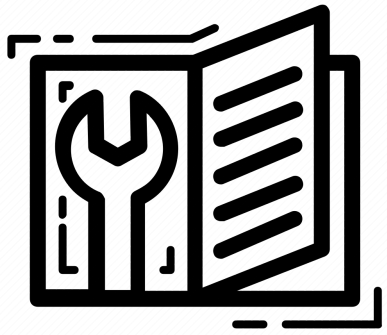
- Continuous Development approach to network changes.
- Continuous health and improvement approach to monitoring.
- Deliver End User Self Service experience in “eStores”

Network Skills

- Spanning-Tree
- Routing Protocols
- QoS
- VPN Design
- VOIP
- Fibre Channel
- Security Policy
- MPLS
- etc

Programming Skills

- TCL
- EEM
- Expect Scripts

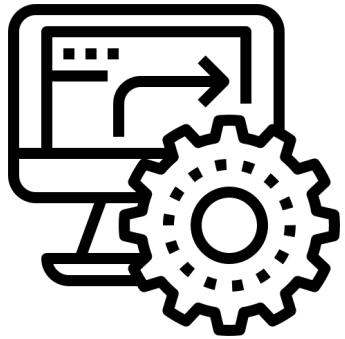


Network Skills

- Layer 2 & 3 Fundamentals
- Quality of Service
- Security and Segmentation
- Linux Networking
- Container Networking
- Cloud Networking
- IOT Networking
- Model Driven Programmability
- Network Function Virtualization

Platform Skills

- Linux Administration
- Container Fundamentals
- Micro Service Platforms
- Cloud Fundamentals Programming Skills
- Data Formats (ex: JSON/YAML)
- Python and APIs (ex: REST)
- Source Control (ex: git)
- Configuration Management (ex: Ansible)



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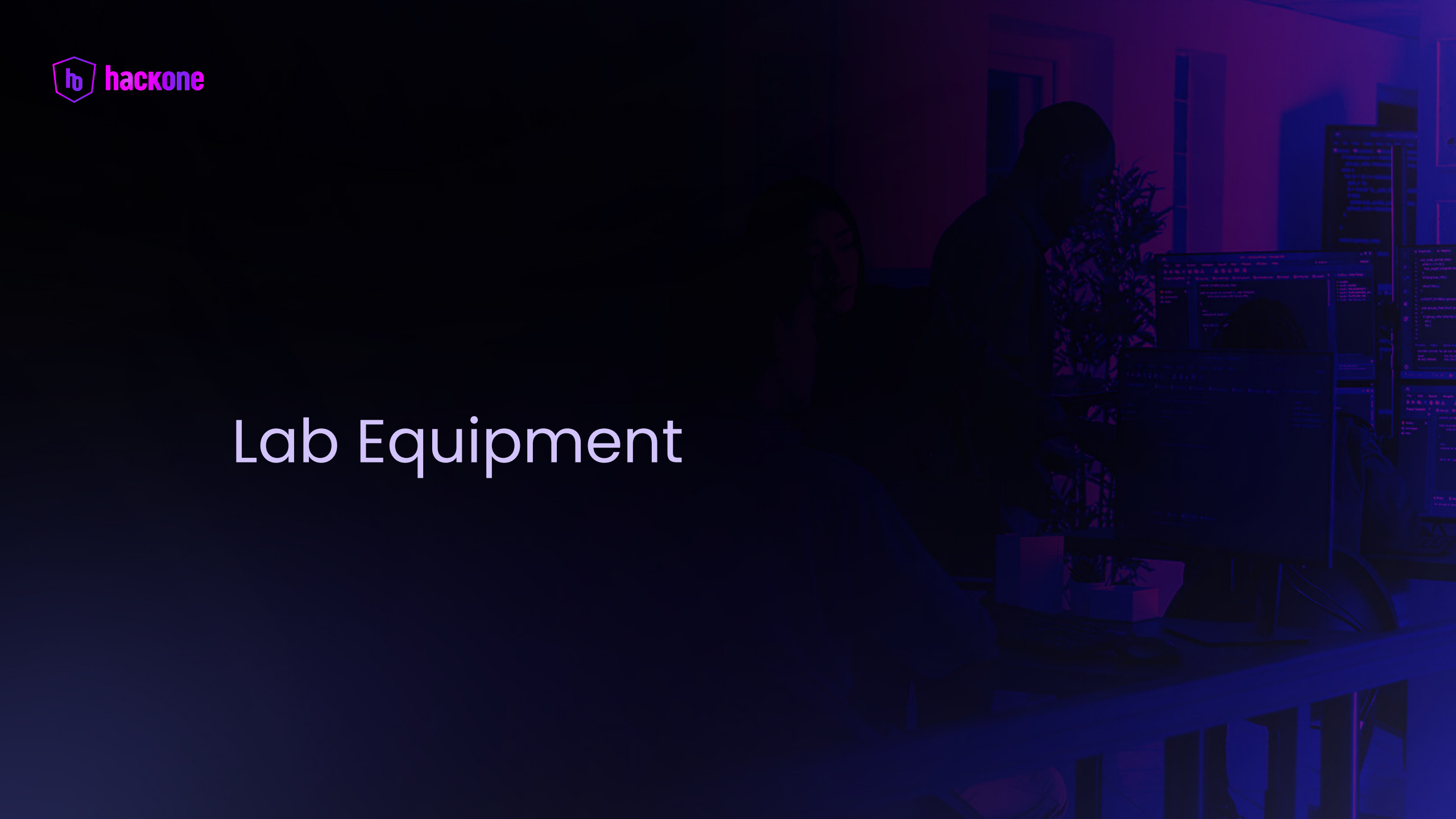
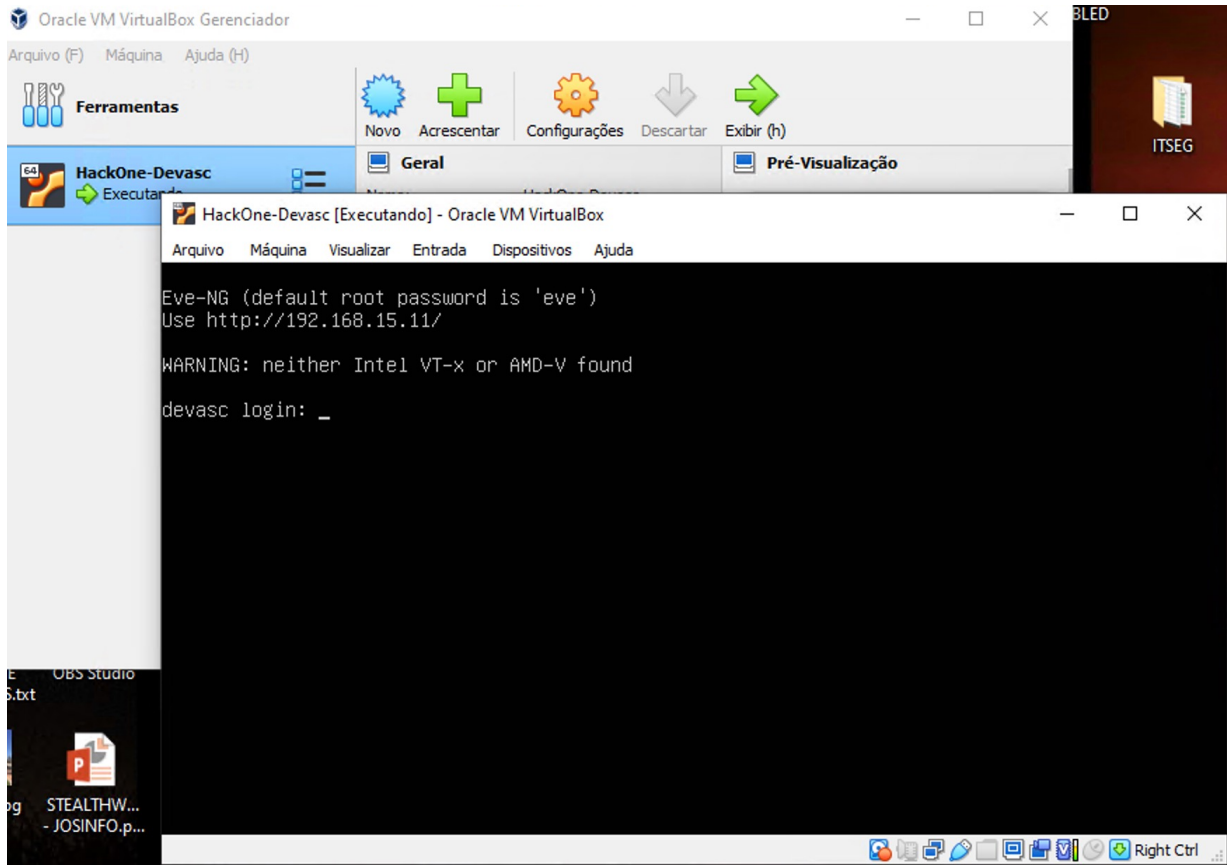
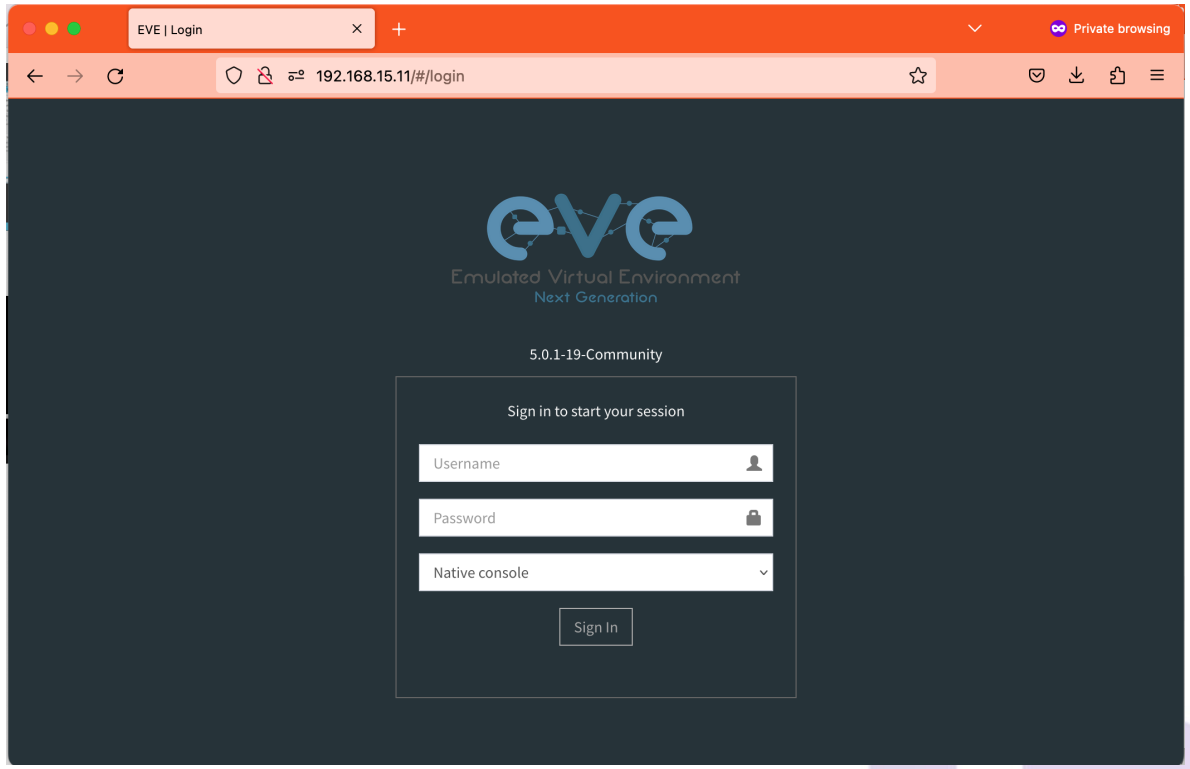
Lab Equipment



Virtual Machines

- Linux Lab VM
- Eve-NG





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DevNet First Steps

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Transformação Digital das Empresas

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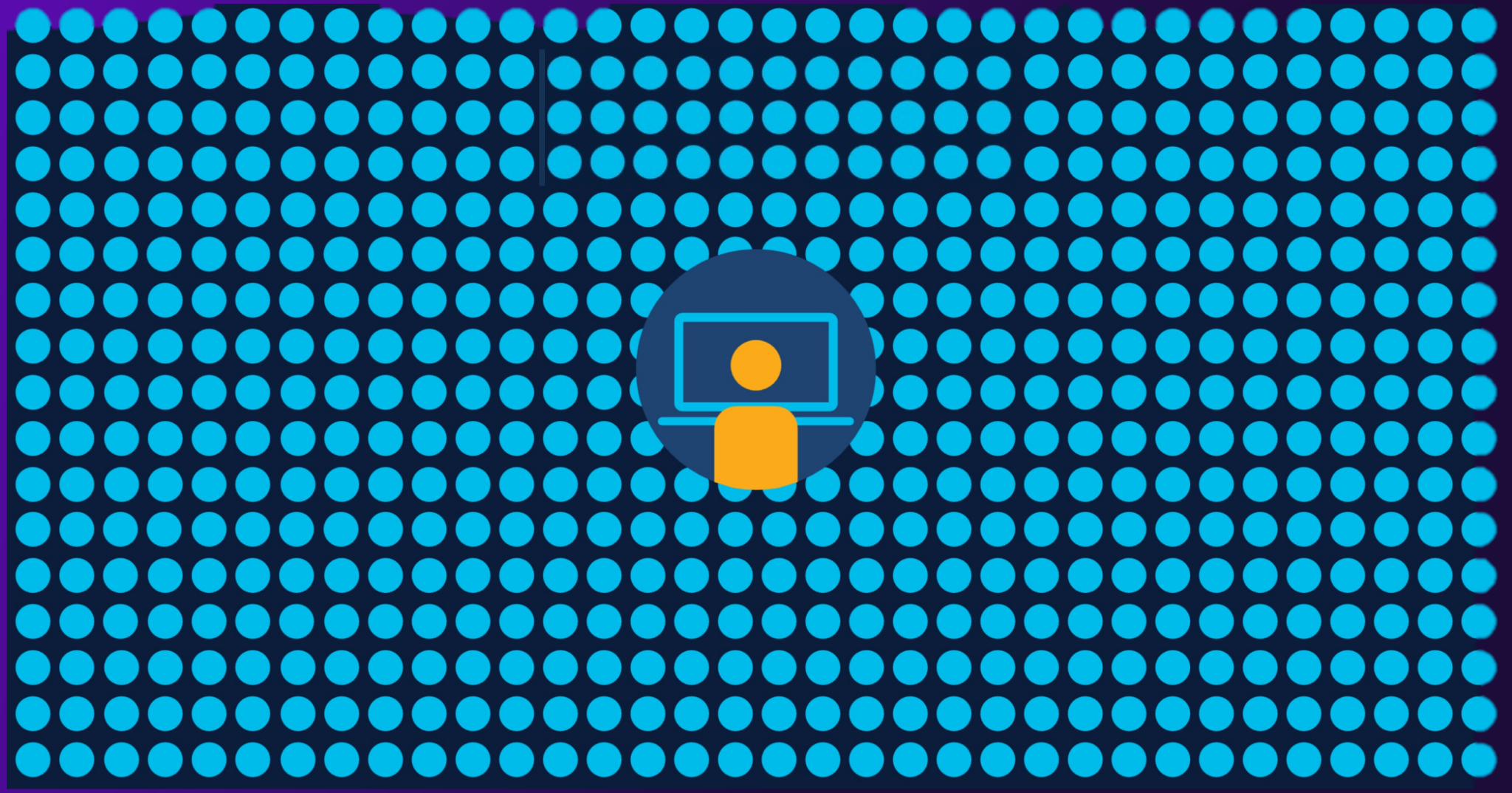
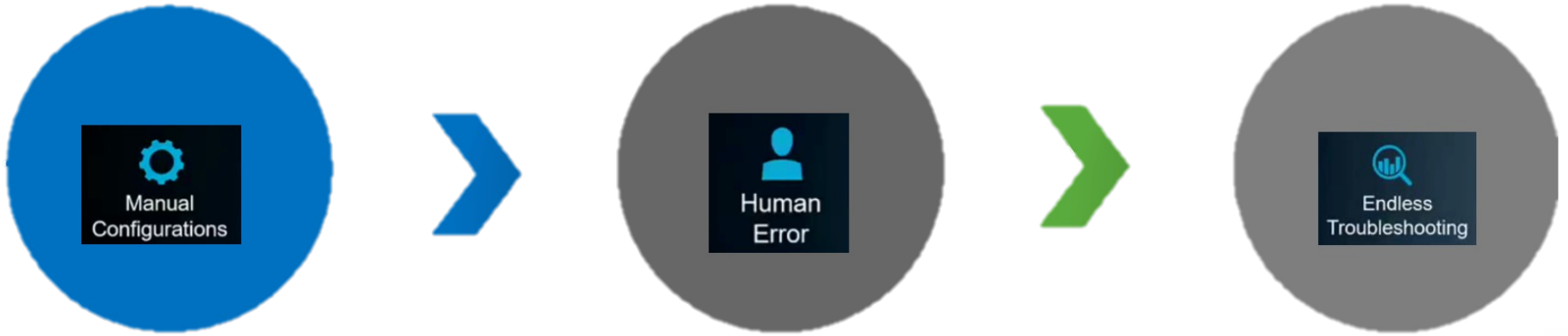
Transformação Digital das Empresas

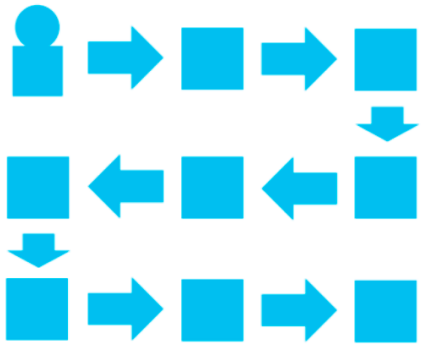




Changes to network configuration made manually

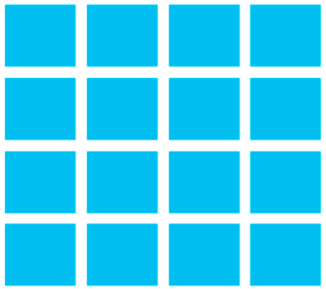
Human errors in configuration are common

High spending on tools and services to have network visibility and diagnostic tools



Manual and Sequential

Snowflakes



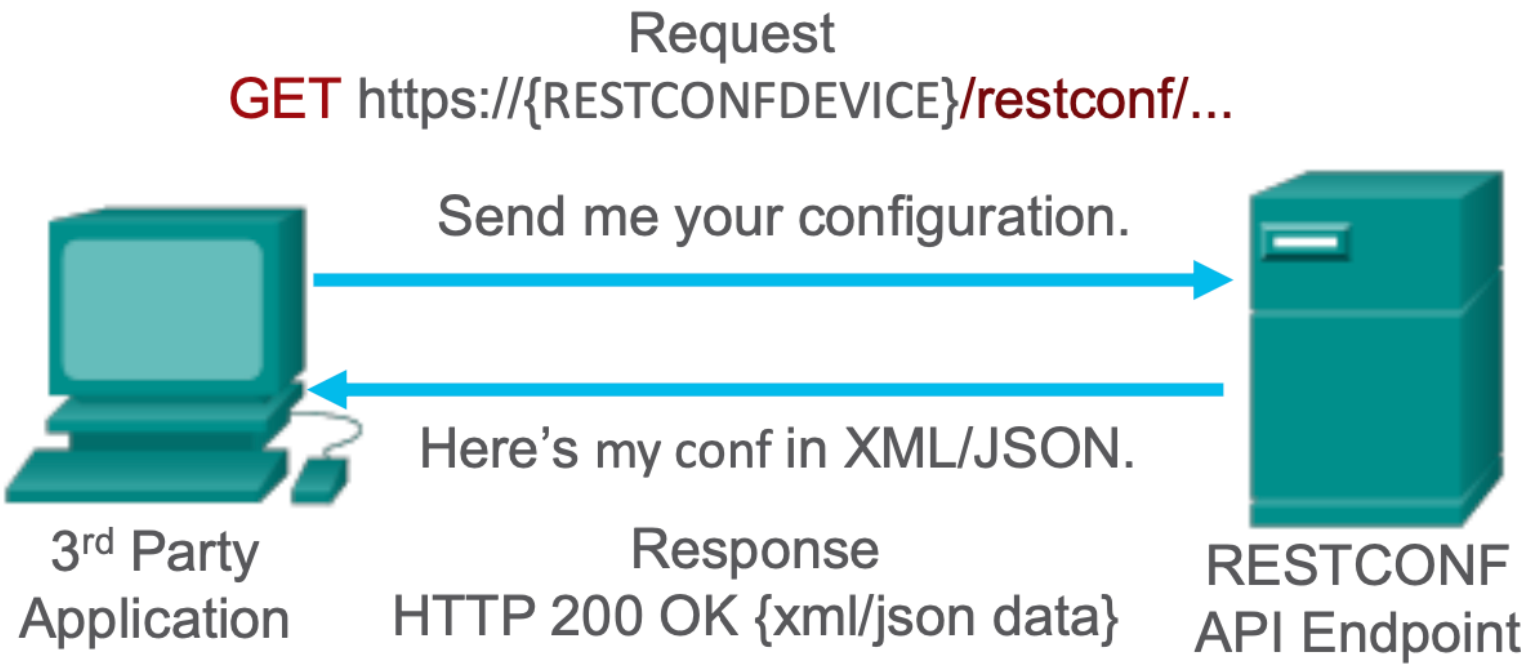
Standardization

Versioning

Automated

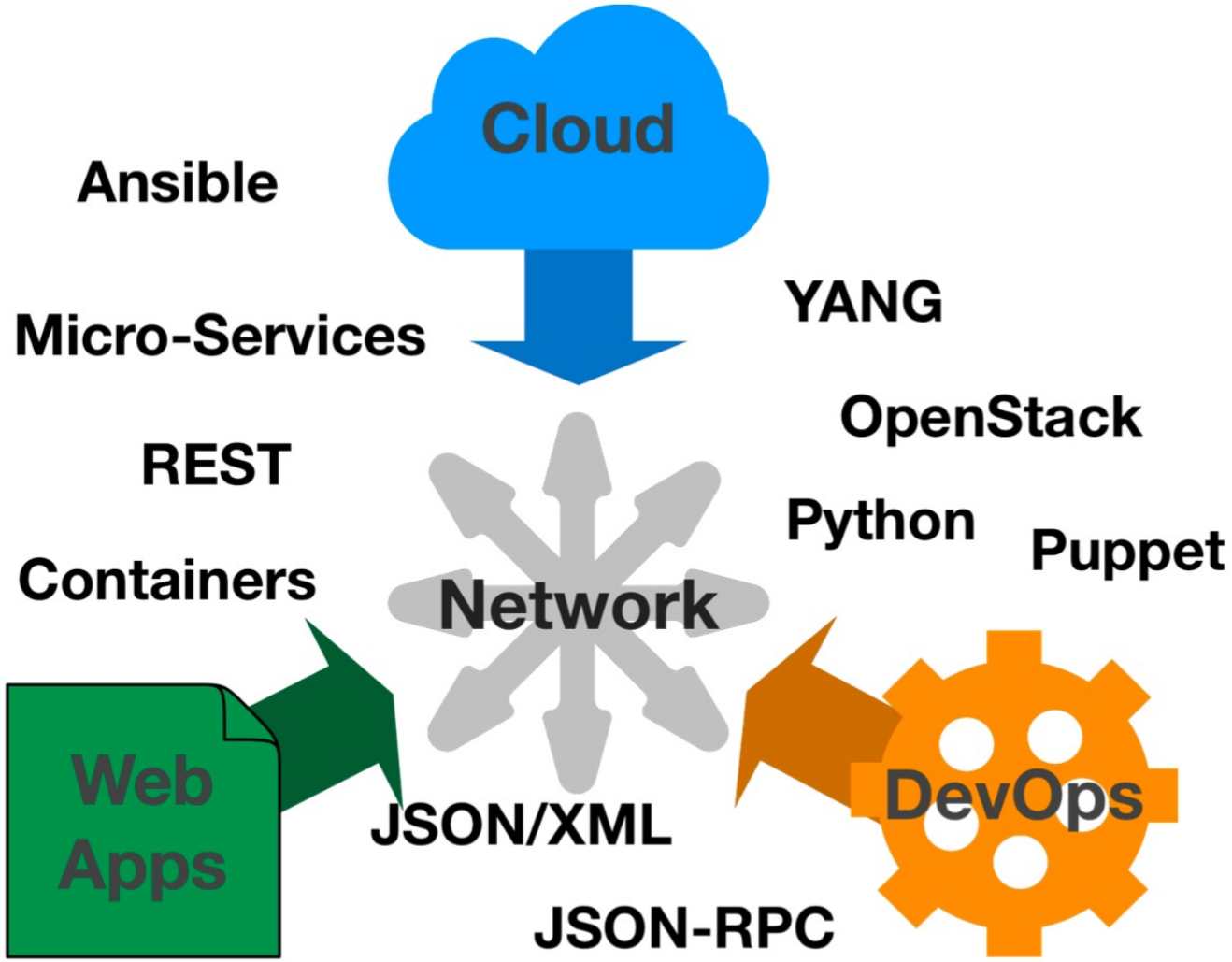
Application Program Interface

Basically, API are called based on Instructions that make two applications (resources) able to communicate between each other


Request
GET https://{RESTCONFDEVICE}/restconf/...
Send me your configuration.
Here's my conf in XML/JSON.
3rd Party Application
Response
HTTP 200 OK {xml/json data}
RESTCONF API Endpoint

```
for switch in my_network:
    for interface in switch:
        if interface.is_down() and interface.last_change() > thirty_days:
            interface.shutdown()
            interface.set_description("Interface disabled per Policy")
```

Coding is the process of writing instructions, in a language a computer can understand, to complete a specific task.


Cloud
Ansible
Micro-Services
REST
Containers
YANG
OpenStack
Python
Puppet
Network
Web Apps
JSON/XML
JSON-RPC
DevOps

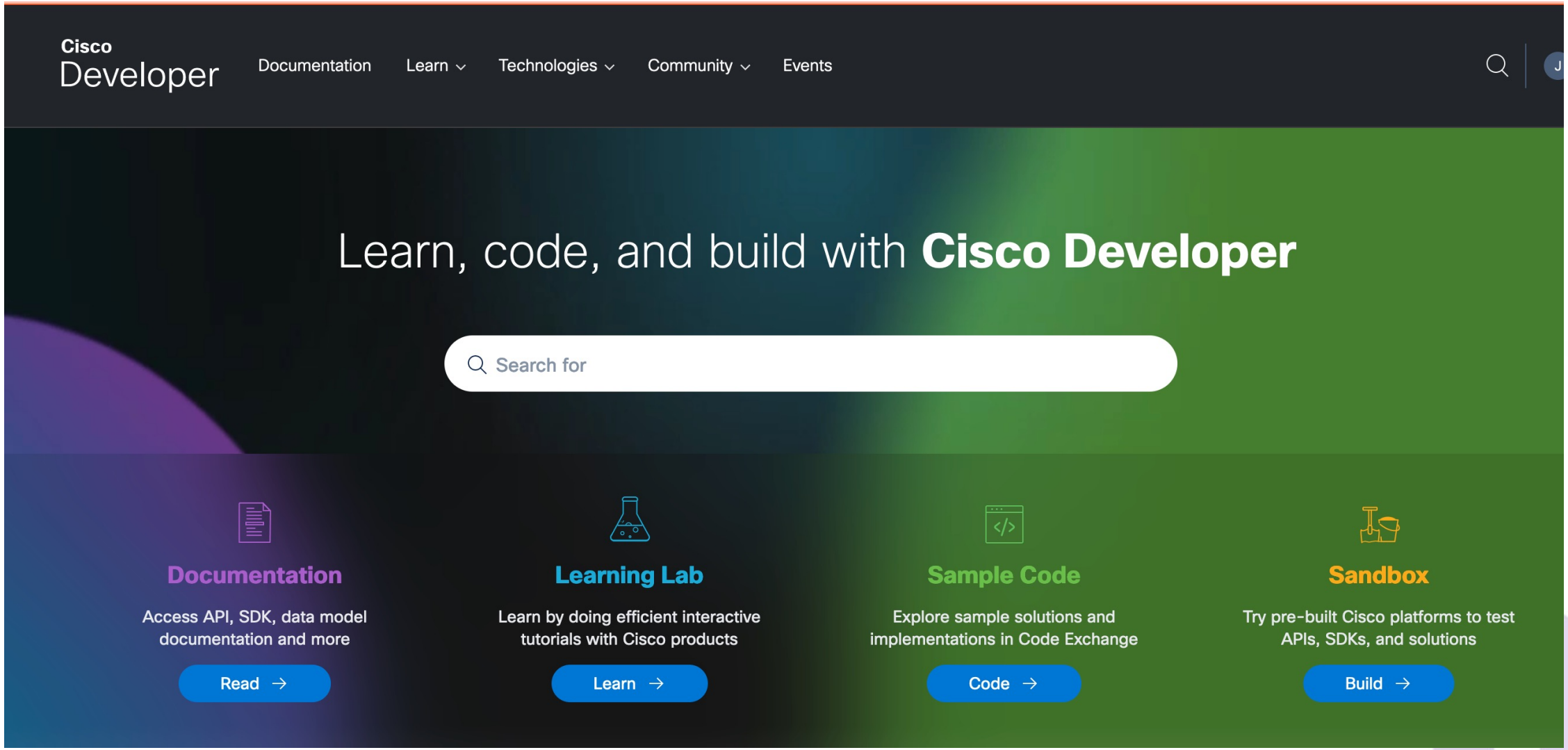

CISCO
CERTIFIED
DEVNET
Associate


CISCO
CERTIFIED
DEVNET
Professional

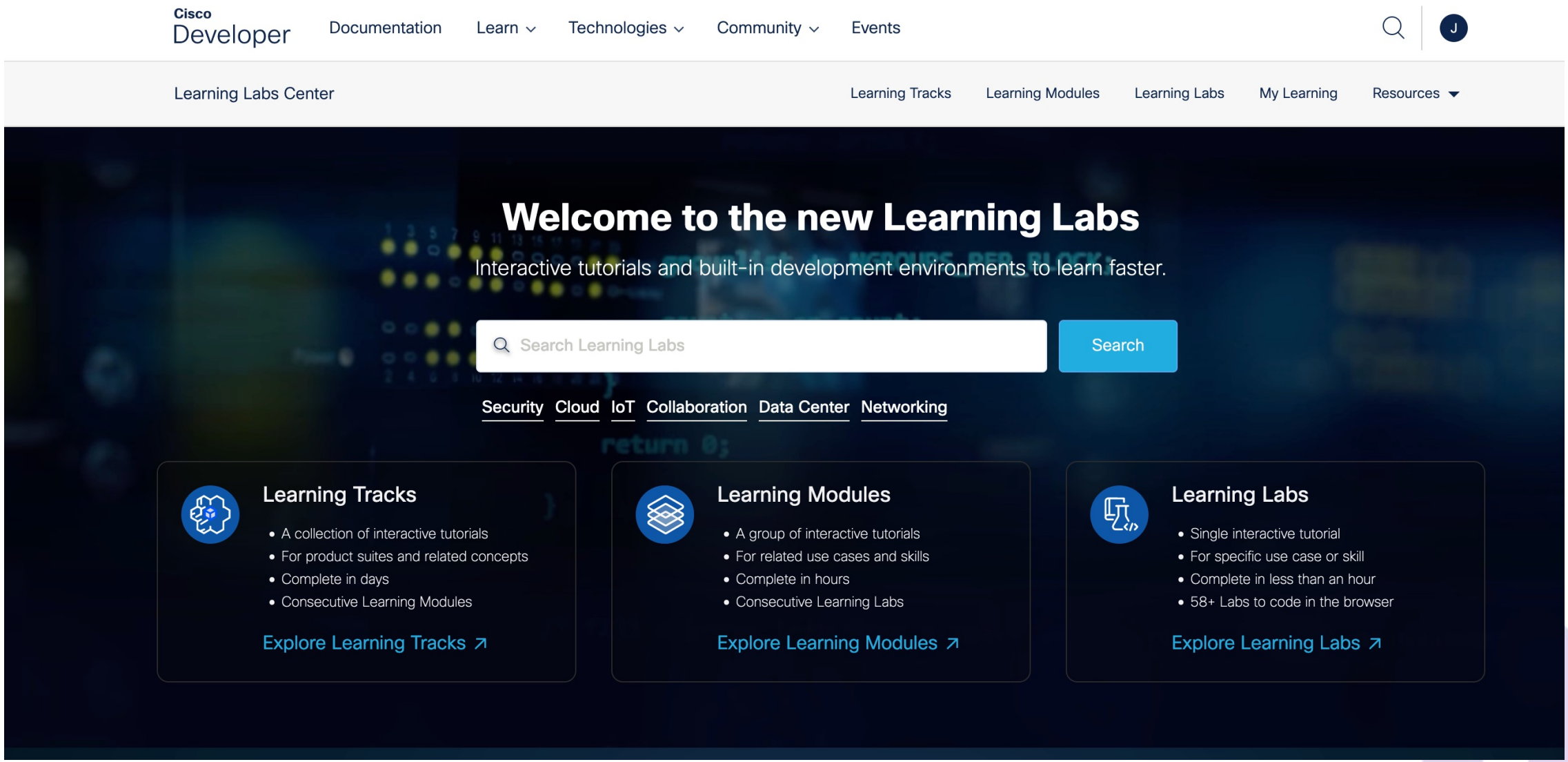

CISCO
CERTIFIED
DEVNET
Expert


CISCO
CERTIFIED
DEVNET
SPECIALIST
DevOps

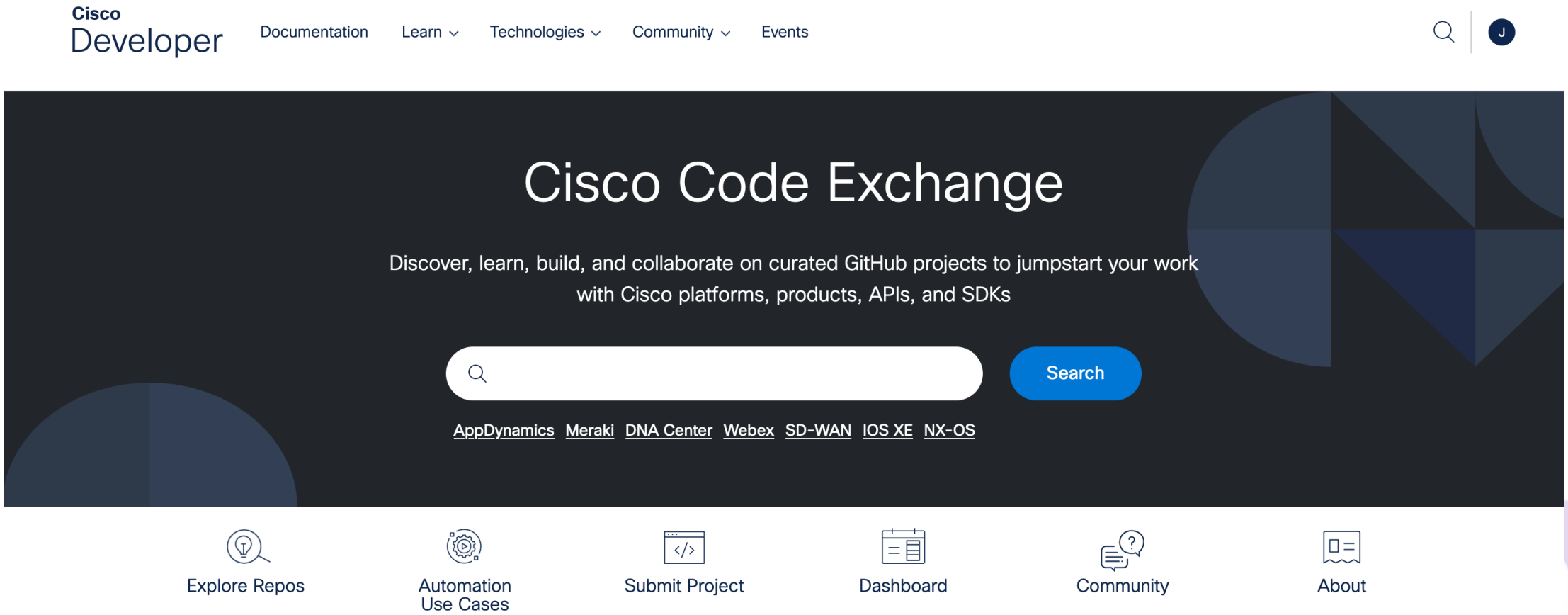

CISCO
CERTIFIED
DEVNET
SPECIALIST
Security
Automation



https://developer.cisco.com



https://developer.cisco.com



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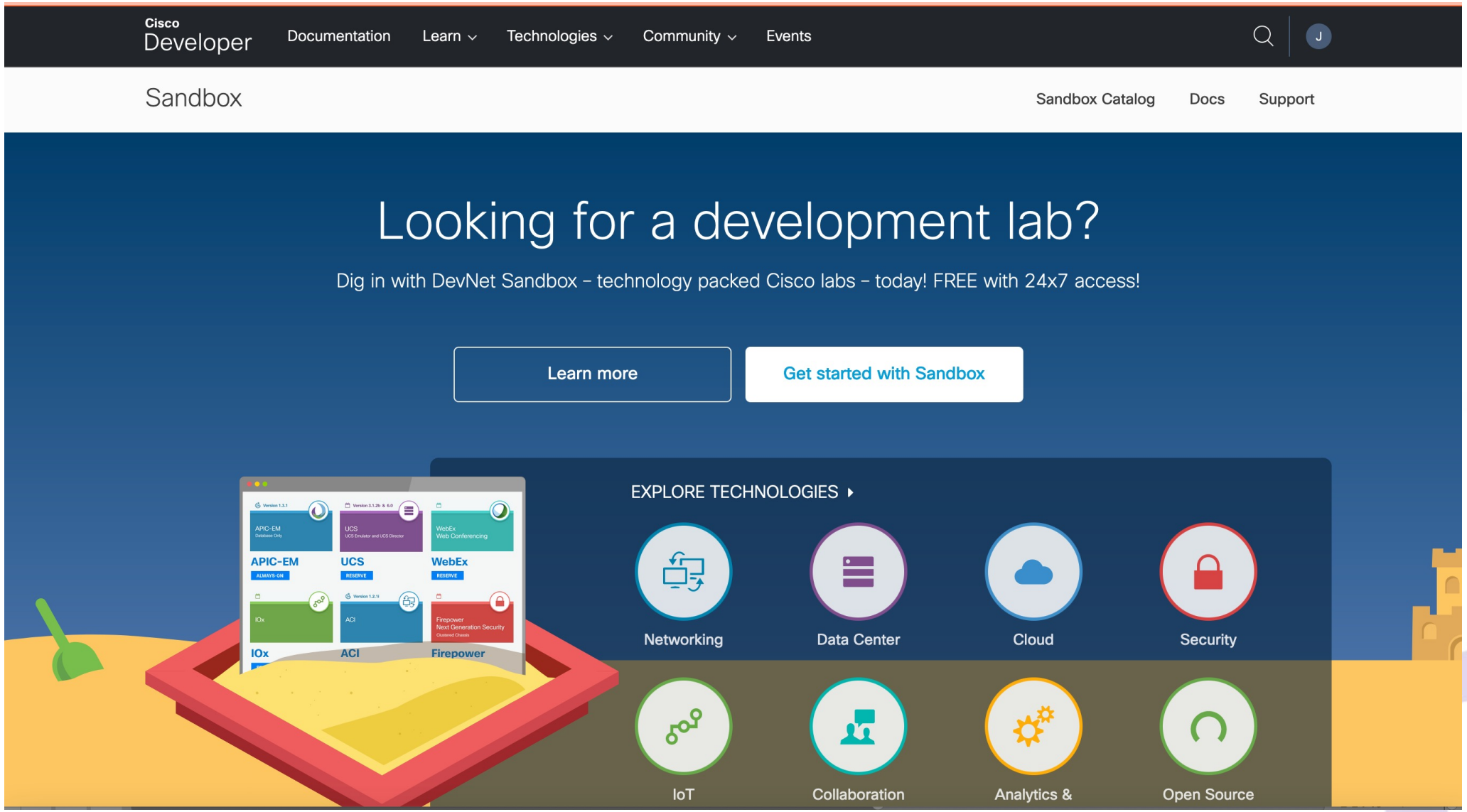
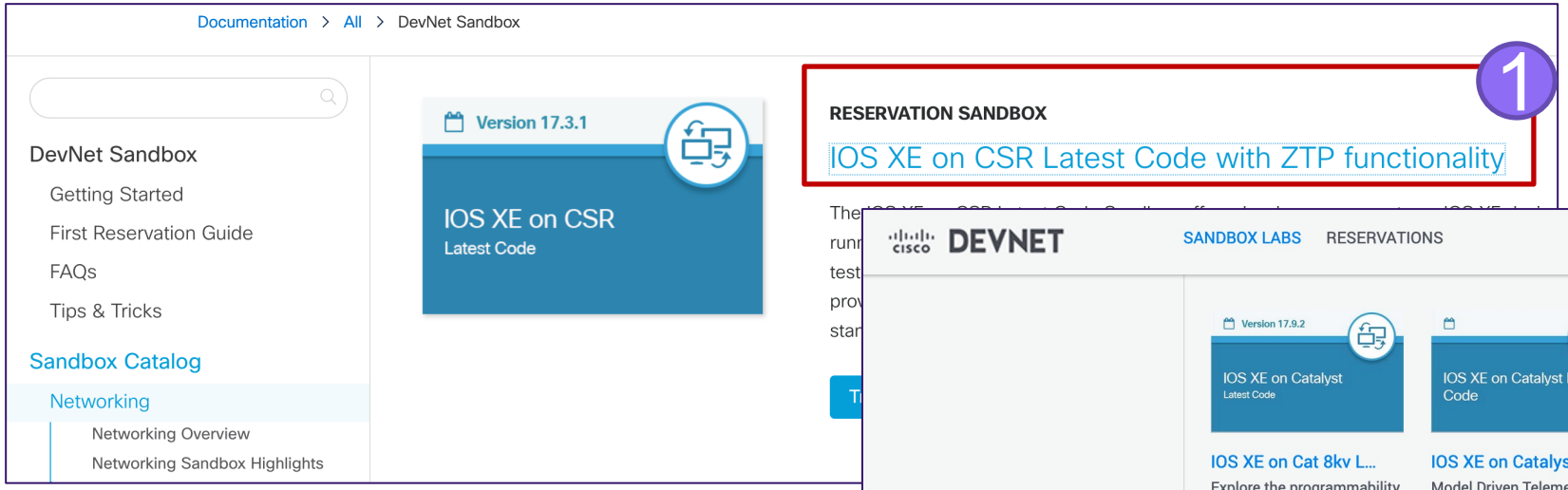
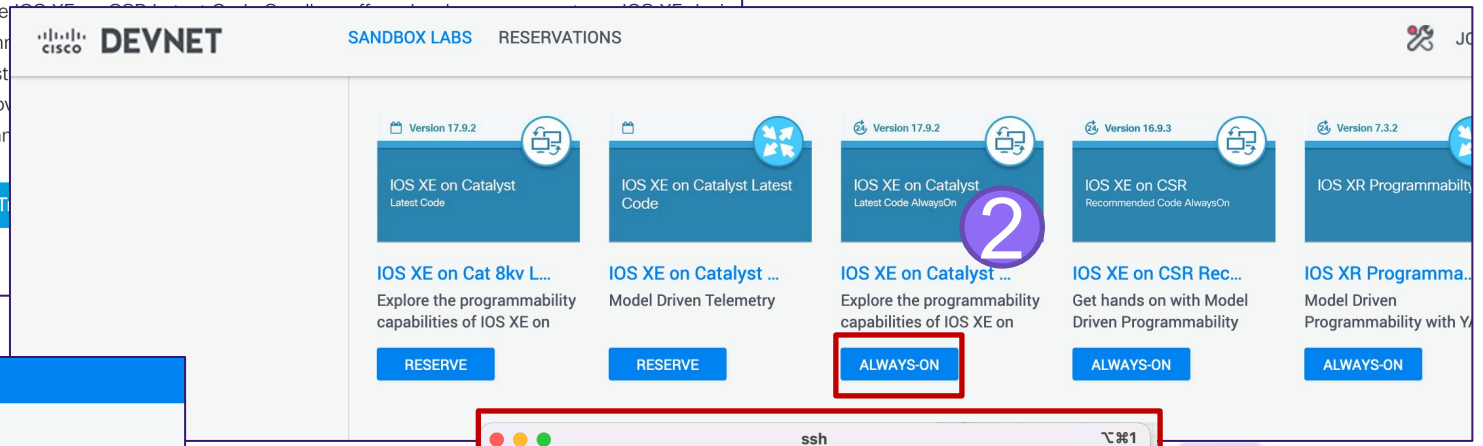
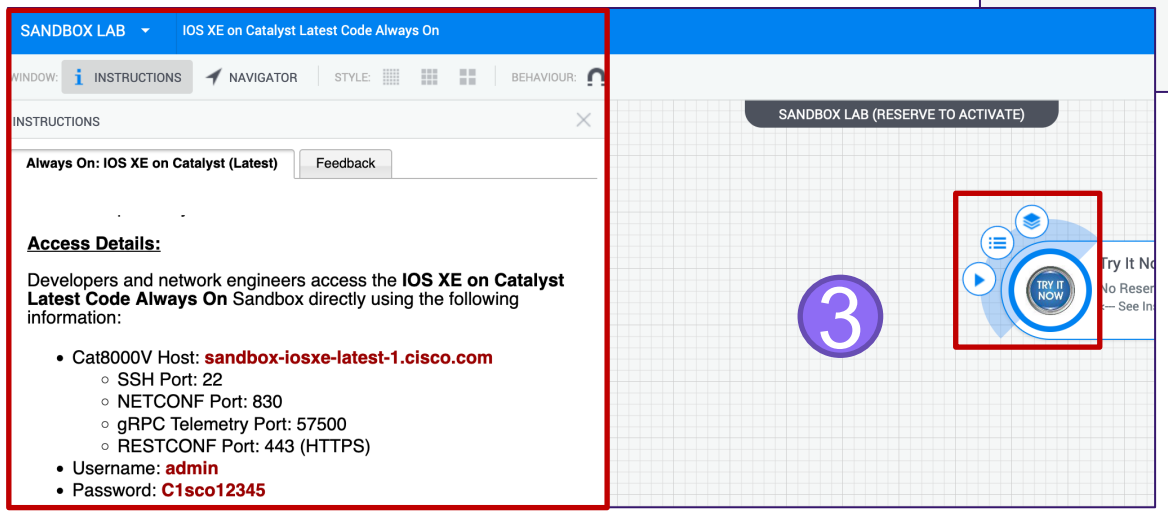


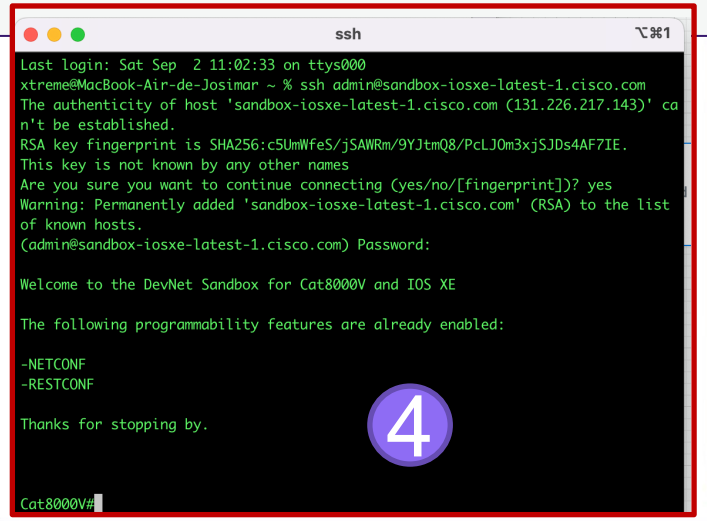
https://developer.cisco.com

developer.cisco.com > Sandbox > Networking > IoS XE on CSR









Próximos passos ...

Baixar o .ova do devasc → FAZER DEPLOY INICIAL (VM)

Criar conta no developer.cisco.com → EXPLORAR PLATAFORMA

Cisco Developer

Baixar o Webex → CRIAR GRUPO DA TURMA

webex by CISCO

https://developer.cisco.com/video/net-prog-basics/
https://developer.cisco.com/learning/
https://developer.cisco.com/netdevops/live/

OBRIGADO

ありがとう