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The bridge to possible

How to leverage Cisco IOx to host your application?

Microservices at the Networks Edge

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DEVWKS-2934

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Agenda

- Introduction
- What is IOx?
- What is a DevNet Sandbox?
- Let’s prepare and install an application!
- Conclusion and Next Steps

Introduction

About our workshop

Who is working with linux
How heard about iox/ios?
Who is familiar with docker?

We will:

- Familiarize with Cisco IOx
- Get to know Cisco DevNet Sandboxes
- Prepare, install and operate your application to IOx

We will not:

- Use an automated control-plane or build-pipeline
- Optimize the application or the application image

Please…

- If you have questions, don’t hesitate to ask!

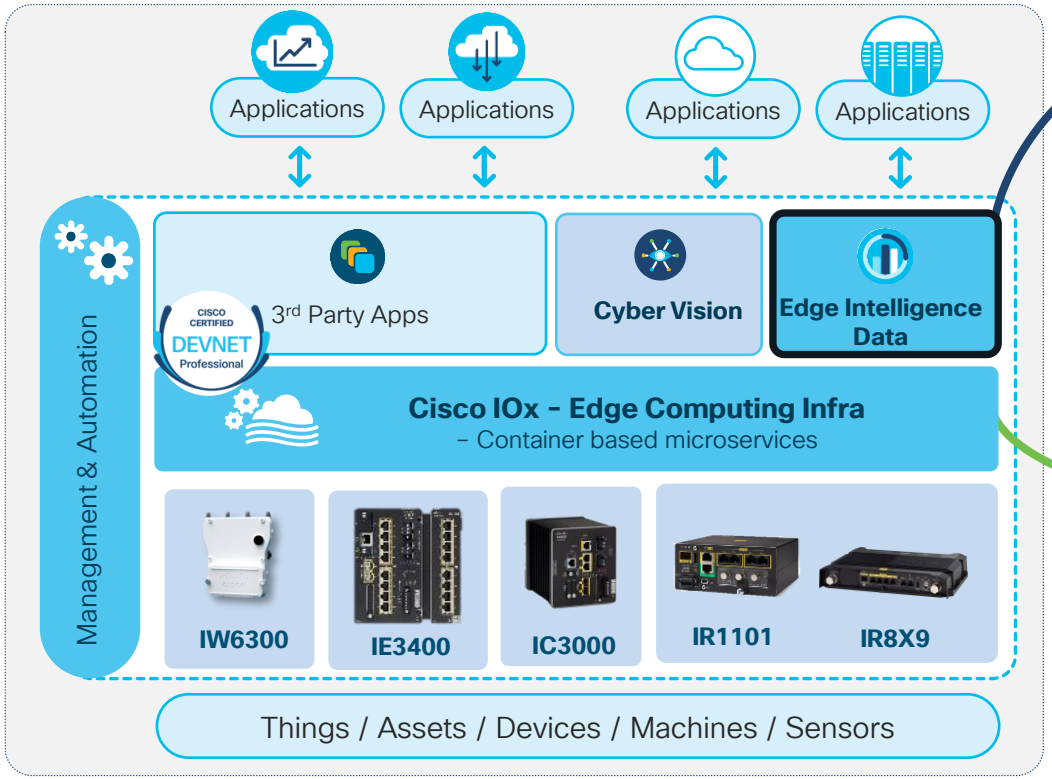
- If you don’t want to ask during the workshop, I will be around!

- If you want to exchange later: daecksteˆcisco.com

- Do not follow the guide blindly!

What is IOx?

Cisco IOx



{Buy}

Get Started Fast

Using Cisco Edge Intelligence for edge data processing is the fastest and easiest way to process and send data from the edge

{Or Build}

Your Own App

Using Cisco IOx compute infrastructure and development environment you can build your own Docker app that runs at the edge. You manage the lifecycle of your application and monitor its operation.

Cisco IOx - Summary

- Cisco IOx
  - is short for “Cisco IOS + Linux”
  - allows you to host custom applications
  - grants your application a share of the device-resources
  - provides access to subsystems and subtended devices
  - is being supported on many devices from the Cisco portfolio

- Applications
  - can be created in VM-style or Docker-style
  - can be managed via CLI, IoT OD or Local-Manager
    See: https://www.cisco.com/c/en/us/products/cloud-systems-management/iox/index.html

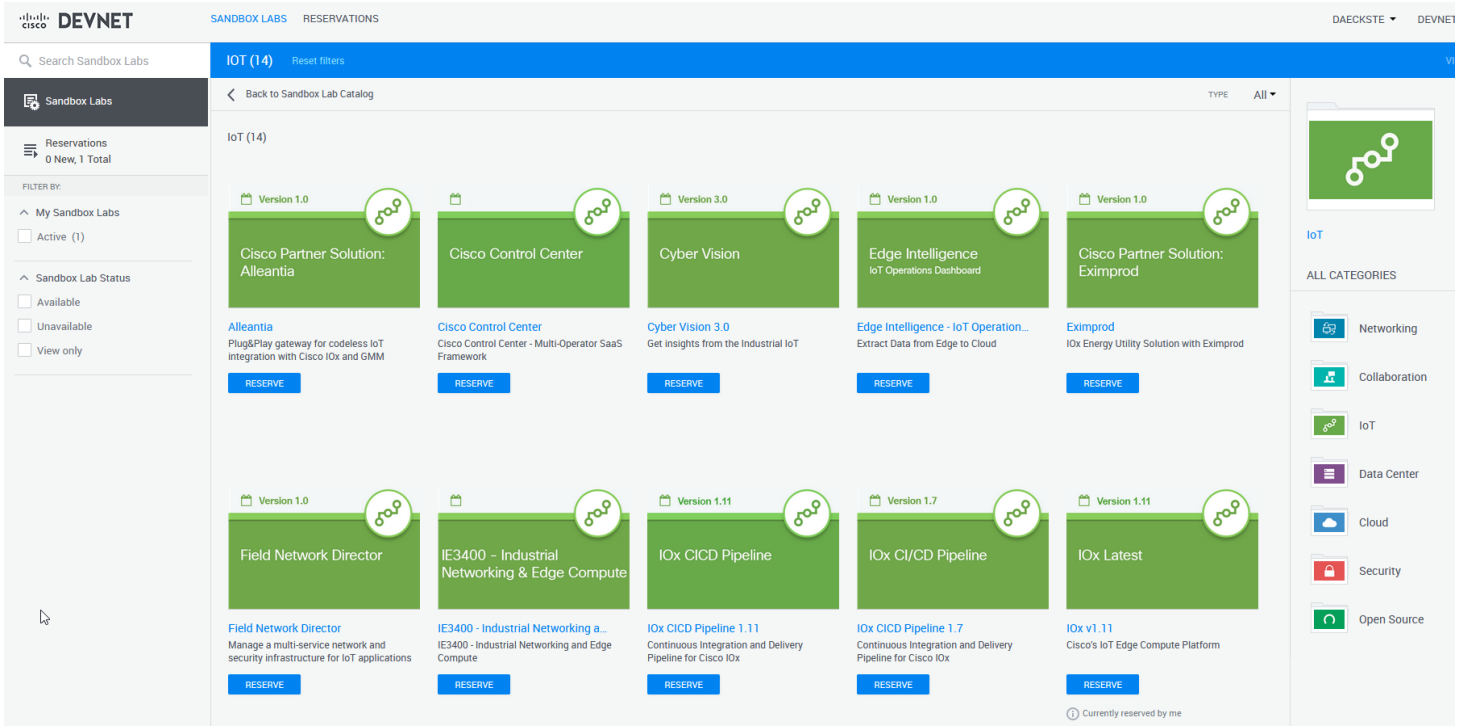
What is a DevNet Sandbox?

Cisco DevNet

- DevNet supports Developers with various resources

- DevNet covers all areas of Cisco Business

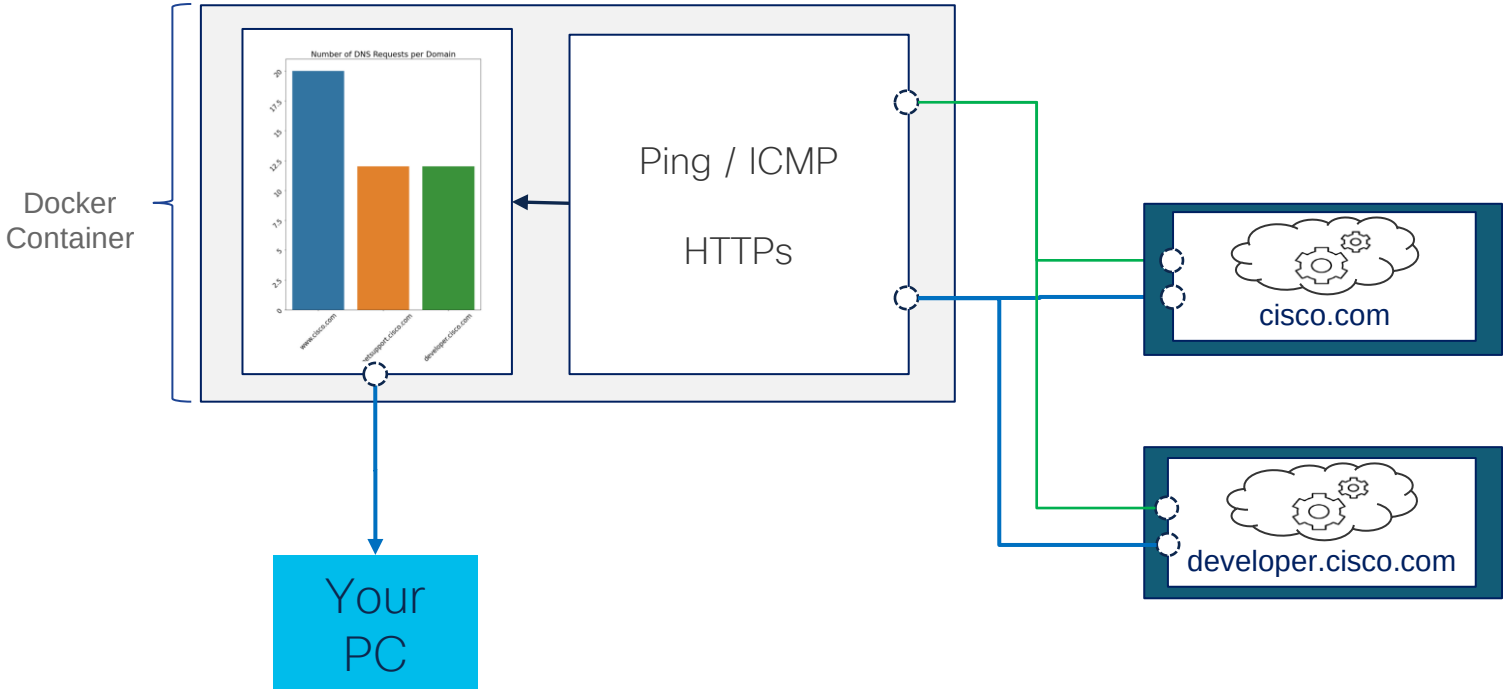
Cisco DevNet - Sandbox



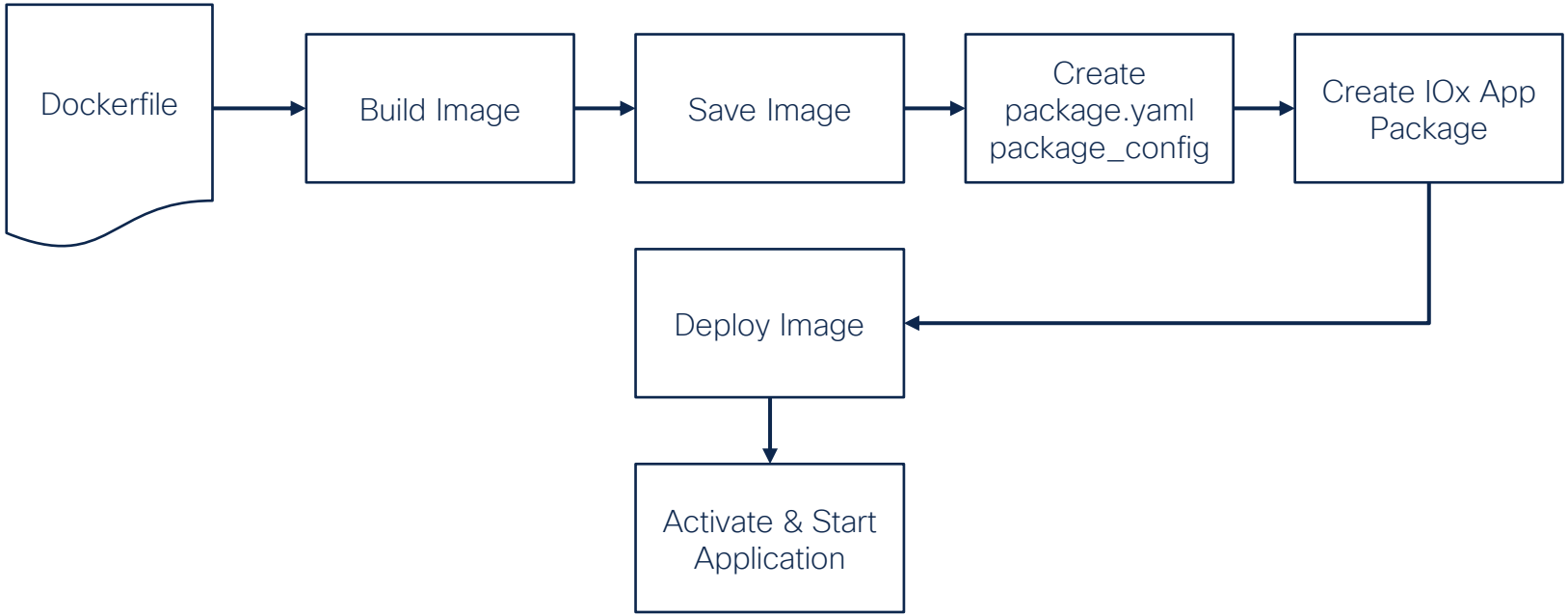
https://devnetsandbox.cisco.com
https://devnetsandbox.cisco.com/RM/Diagram/Index/74f1d717-5856-48fb-9d24-85bb2d3fce7c?diagramType=Topology

Let’s prepare and install your application!

About your application for today



Workflow to create your Docker application



package.yaml: https://developer.cisco.com/docs/iox/#!package-descriptor

Your application internals

```
FROM alpine:latest AS build

RUN apk update && \
    apk add make g++ jpeg-dev blas-dev blas openblas openblas-dev python3 py3-pip libxml2-dev libxslt-dev gcc libxml2 python3-dev linux-headers musl-dev  && \
    apk add py3-matplotlib py3-wheel py3-numpy py3-scipy py3-pandas && \
    pip3 install pyshark seaborn && \
    mkdir -p /data/appdata
```

```
FROM alpine:latest

RUN apk update && \
    apk add python3 wireshark-common tshark

COPY --from=build /usr/lib/python3.8/site-packages/ /usr/lib/python3.8/site-packages/
COPY --from=build /usr/lib/libxml2.so.2 /usr/lib/
COPY --from=build /usr/lib/libxslt.so.1 /usr/lib/
COPY --from=build /usr/lib/libexslt.so.0 /usr/lib/
COPY --from=build /usr/lib/libgcrypt.so.20 /usr/lib/
COPY --from=build /usr/lib/libgpg-error.so.0 /usr/lib/
COPY --from=build /usr/lib/libopenblas.so.3 /usr/lib/
COPY --from=build /usr/lib/libgfortran.so.5 /usr/lib/
COPY --from=build /usr/lib/libgcc_s.so.1 /usr/lib/
COPY --from=build /usr/lib/libfreetype.so.6 /usr/lib/
COPY --from=build /usr/lib/libstdc++.so.6 /usr/lib/
COPY --from=build /usr/lib/libpng16.so.16 /usr/lib/
COPY --from=build /usr/lib/libbrotlidec.so.1 /usr/lib/
COPY --from=build /usr/lib/libbrotlicommon.so.1 /usr/lib/
COPY --from=build /usr/lib/libjpeg.so.8 /usr/lib/
COPY --from=build /usr/lib/libopenjp2.so.7 /usr/lib/
COPY --from=build /usr/lib/libimagequant.so.0 /usr/lib/
COPY --from=build /usr/lib/libtiff.so.5 /usr/lib/
COPY --from=build /usr/lib/libxcb.so.1 /usr/lib/
COPY --from=build /usr/lib/libXau.so.6 /usr/lib/
COPY --from=build /usr/lib/libXdmcp.so.6 /usr/lib/
COPY --from=build /usr/lib/libbsd.so.0 /usr/lib/
COPY *.py *.sh *.html /data/appdata/
RUN addgroup root wireshark

EXPOSE 8080

CMD ["/bin/sh","/data/appdata/start.sh"]
```

- It is a regular Dockerfile
- Example available via github

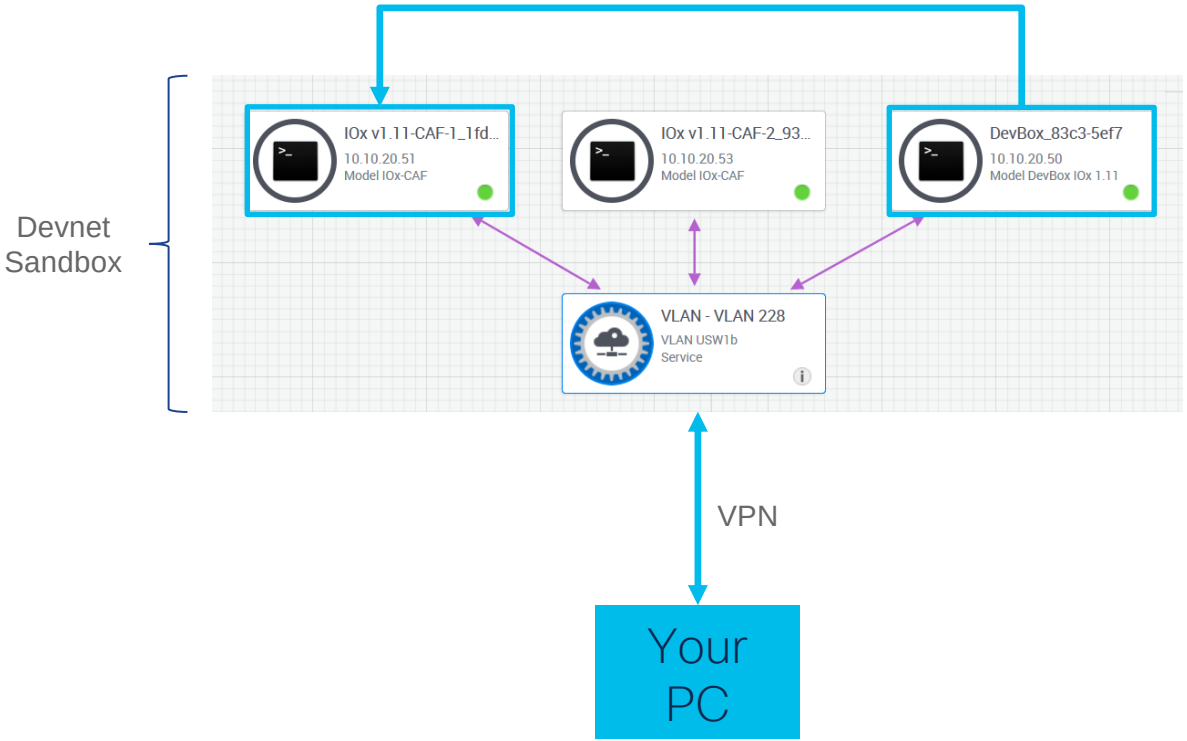
What we heard so far …

- Cisco DevNet provides you resources for education, exploration and testing
- Cisco IOx provides you the capability to host your application on Cisco devices
- Applications can be provided as Docker images

Preparing and installing an application!

- The overall Setup
- Access your Sandbox
- Create your docker image
- Save your docker image
- Install your docker image to your IOx
- Access your running application

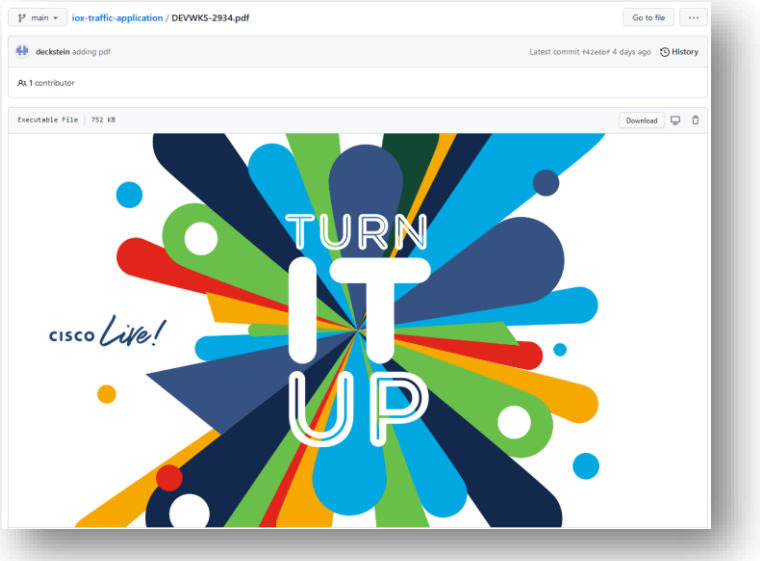
The overall Setup



1. Get Access
2. Create a Docker image
4. Create IOx application
5. Deploy your image
6. Start your application

But before we start!

https://bit.ly/cl2022-iox

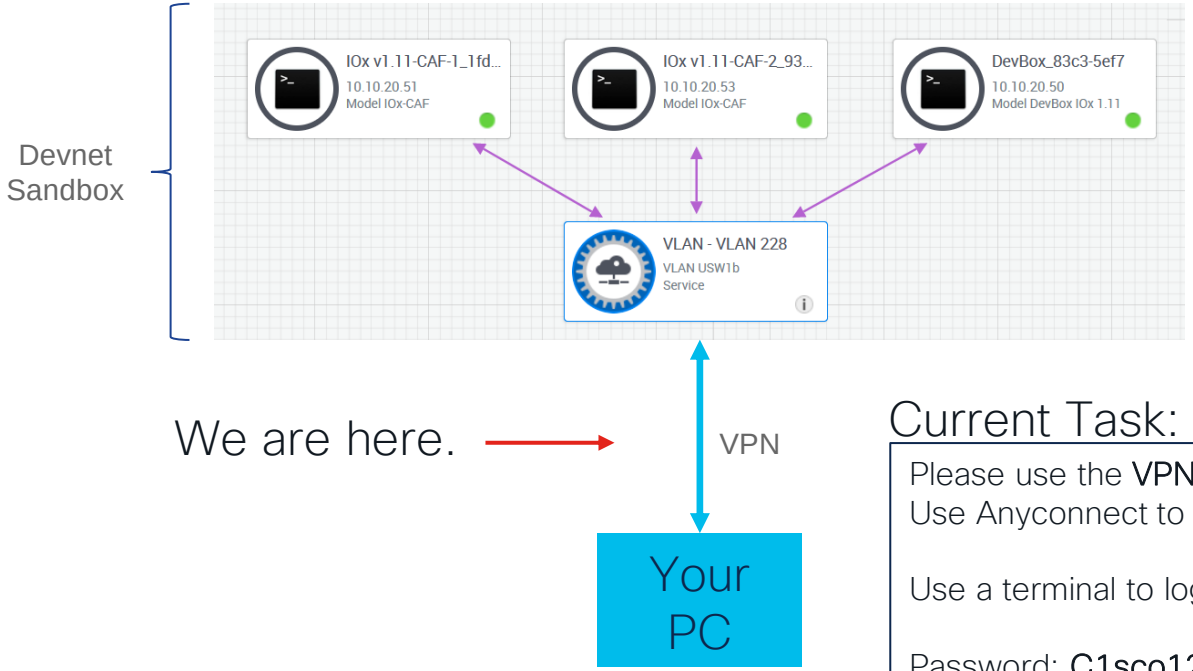


What are we going to do exactly?

1. Open VPN Tunnel
2. Log in to your linux VM
3. Clone application repository
4. Build docker image
5. Save docker image
6. Create IOx client profile
7. Package IOx application
8. Deploy & activate IOx application
9. Start application
10. Access application dashboard

Access your Sandbox

https://bit.ly/cl2022-iox



Current Task:

Please use the **VPN credentials provided at your desk**.
Use Anyconnect to open a VPN connection to your sandbox.

Use a terminal to log in: **ssh -l developer 10.10.20.50**

Password: **C1sco12345**

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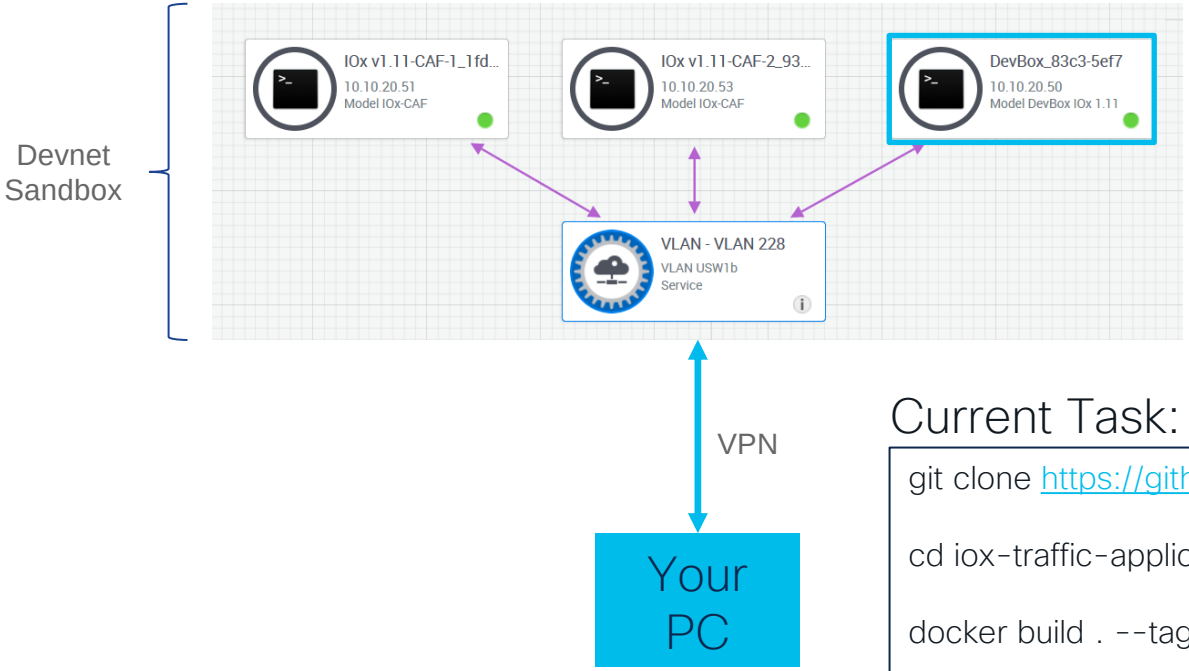
Create your Docker Image



We are here.

Current Task:

git clone https://github.com/deckstein/iox-traffic-application

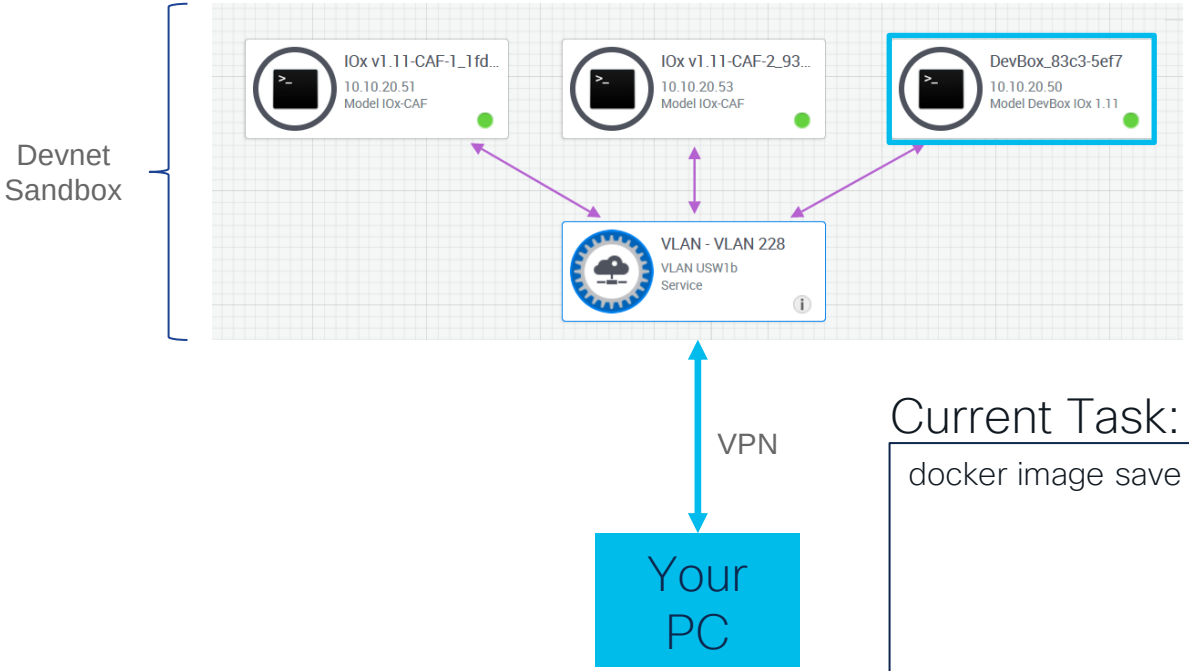
cd iox-traffic-application

docker build . --tag ioxapp

docker image ls

https://bit.ly/cl2022-iox

Save your Docker Image



We are here.

Current Task:

```
docker image save ioxapp -o ioxapp.tar
```

Create your IOx profile

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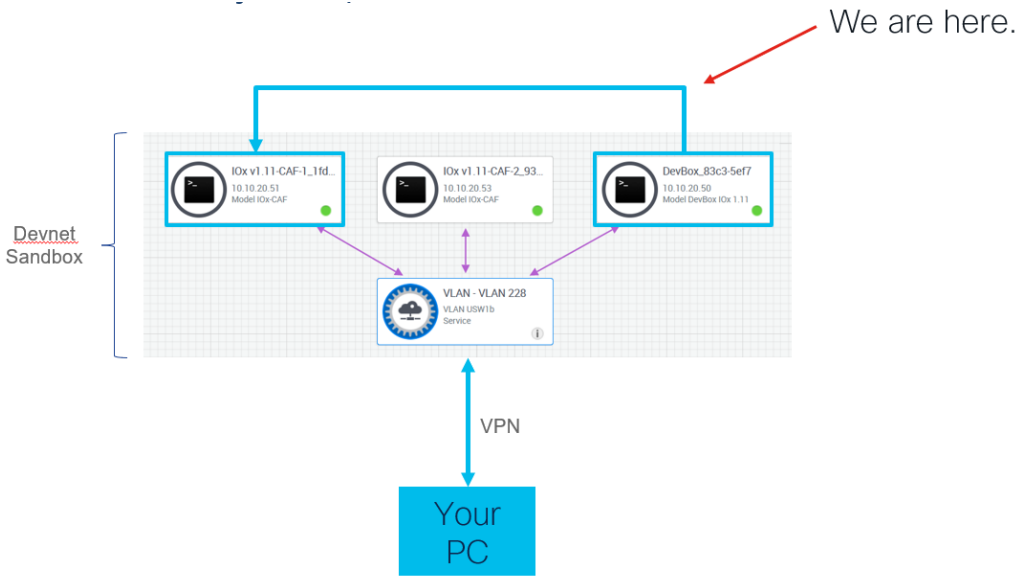


Current Task:

ioxclient
Creating one time configuration.
Your / your organization's name : CLUS22
Your / your organization's URL :
Your IOx platform's IP address[127.0.0.1] : 10.10.20.51
Your IOx platform's port number[8443] :
Authorized user name[root] :
Password for root : cisco123
Local repository path on IOx platform[/software/downloads]:
URL Scheme (http/https) [https]:
API Prefix[/iox/api/v2/hosting/]:
Your IOx platform's SSH Port[2222]:
Your RSA key, for signing packages, in PEM format[]:
Your x.509 certificate in PEM format[]:
Activating Profile default
Saving current configuration

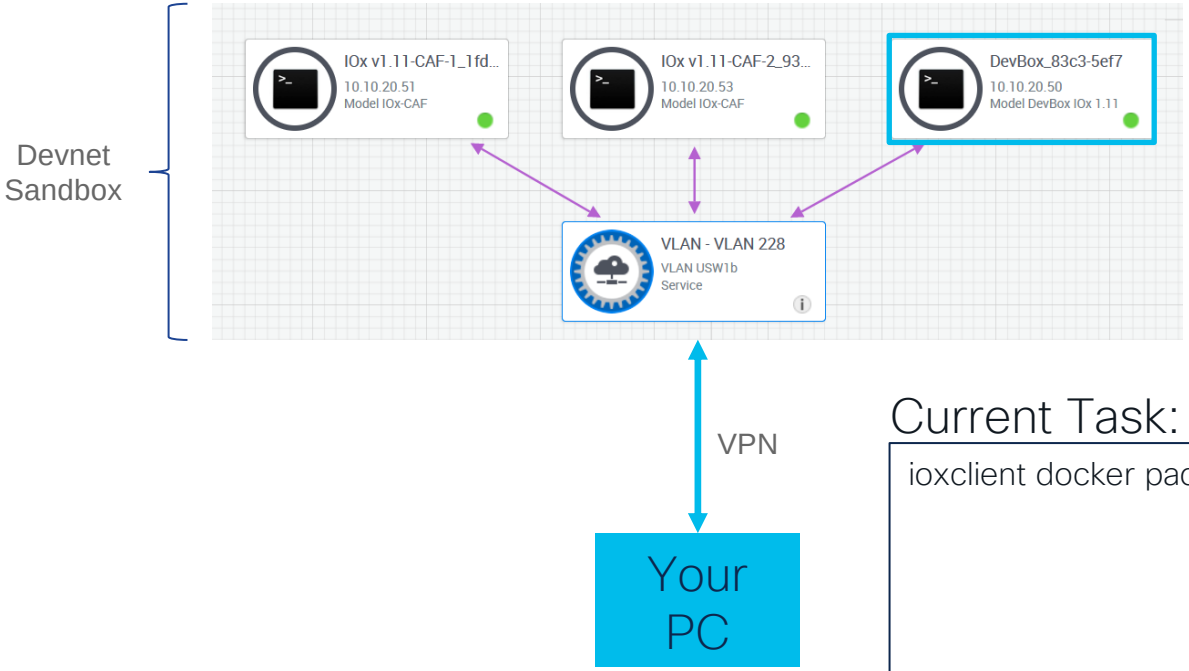
Your package.yaml

```
[developer@devbox iox-traffic-application]$ cat package/package.yaml
descriptor-schema-version: "2.2"
info:
  name: iox-traffic
  version: "0.1"
app:
  cpuarch: "x86_64"
  env:
    PATH: /usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
  resources:
    cpu: 1000
    memory: 600
    disk: 100
    network:
    - interface-name: eth0
      ports:
        tcp:
        - "8080"
    profile: custom
  startup:
    rootfs: ioxapp.tar
    target:
    - /bin/sh
    - -c
    - /start.sh
  type: docker
```

package.yaml:
https://developer.cisco.com/docs/iox/#!package-descriptor

https://bit.ly/cl2022-iox

Create your IOx application package



We are here.

Current Task:

ioxclient docker package ioxapp.tar package/

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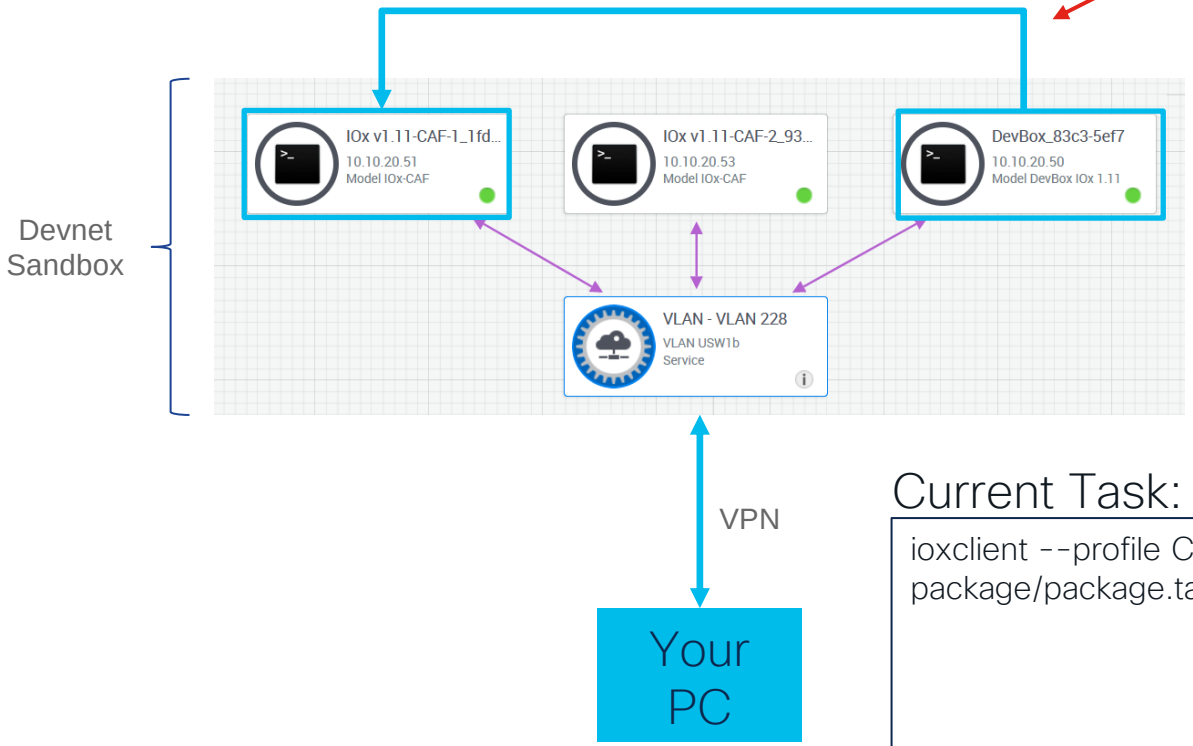
Deploy your IOx application package

We are here.



Current Task:

ioxclient --profile CLUS22 application install ioxapp package/package.tar

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Activate your IOx application

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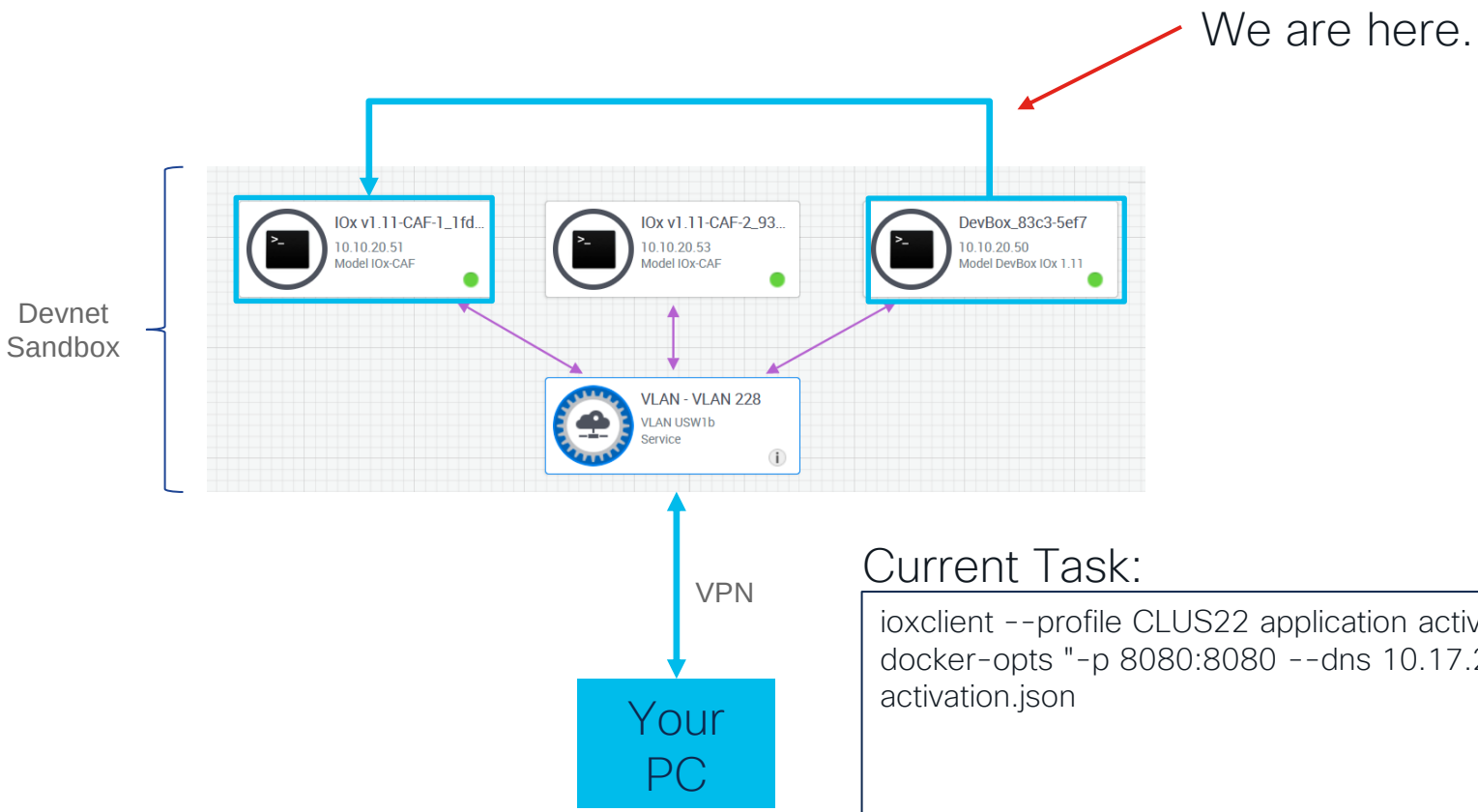


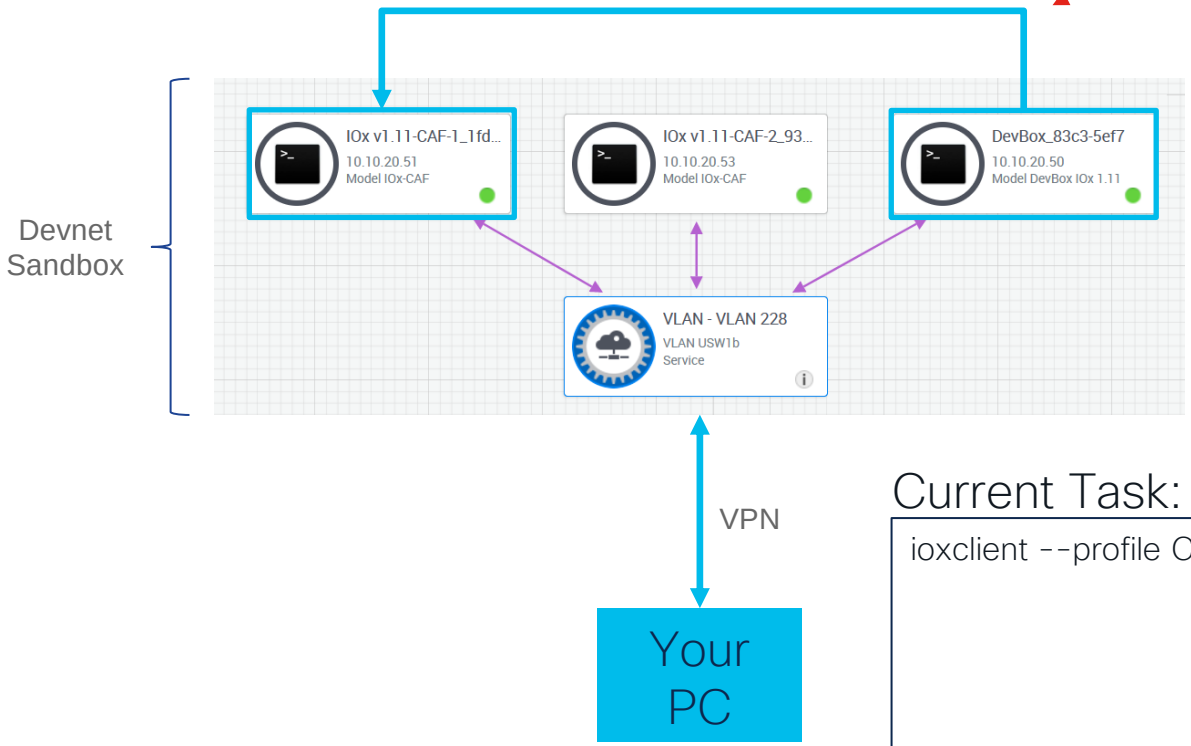
Current Task:

ioxclient --profile CLUS22 application activate ioxapp --docker-opts "-p 8080:8080 --dns 10.17.248.11" --payload activation.json

Start your application

https://bit.ly/cl2022-iox

We are here.



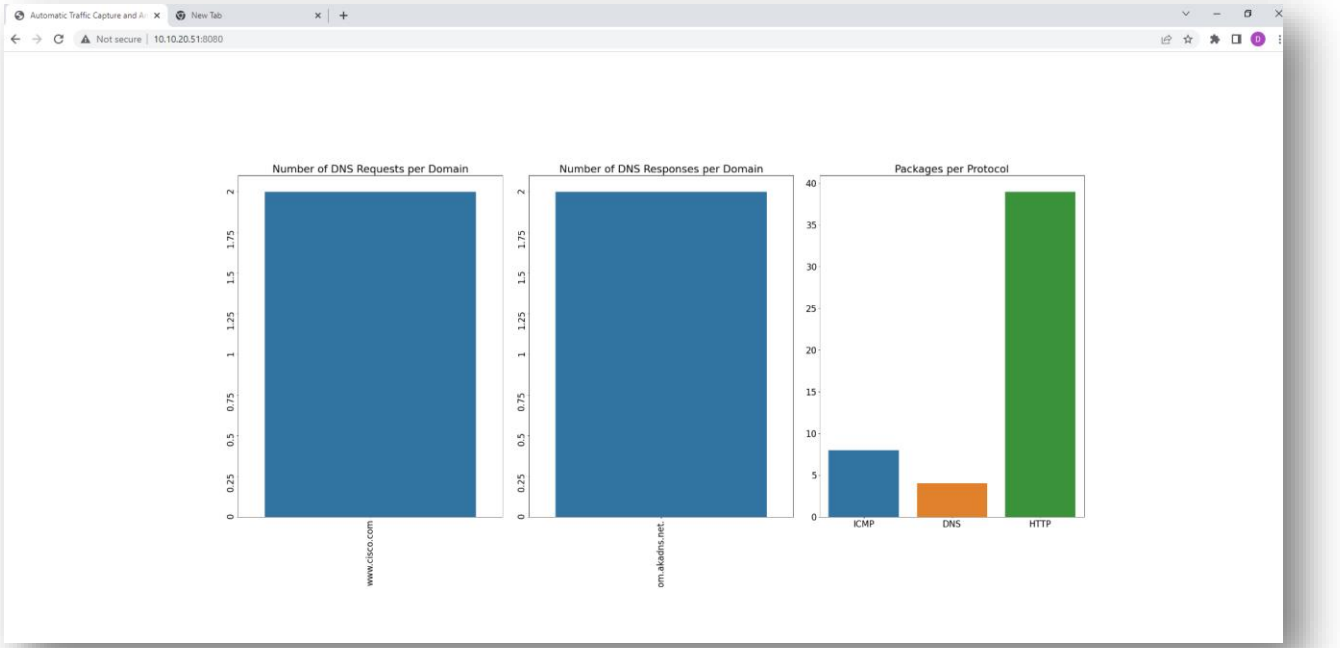
Current Task:

```
ioxclient --profile CLUS22 application start ioxapp
```

https://bit.ly/cl2022-iox

Access your application

Point your browser to: http://10.10.20.51:8080/



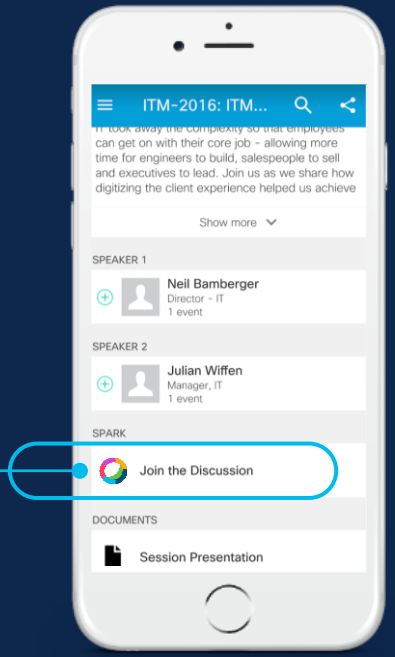
Cisco Webex

Questions?

Use Cisco Webex to chat with the speaker after the session

How

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



ciscolive.ciscoevents.com/ciscolivebot/INSERT SESSION ID

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