Kubeflow Workshop

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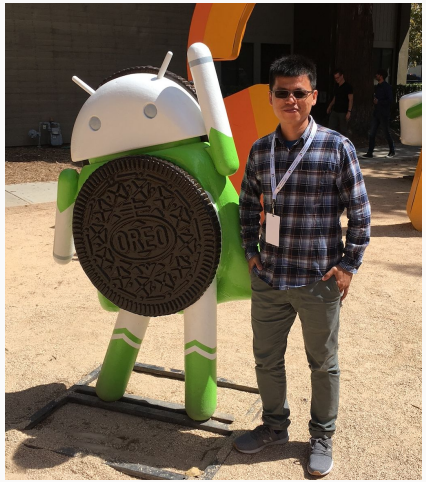
About me



- 2020 - Present at 信誠金融科技
  - Tech solution provider for financial sectors
    - Deepselling: A deep analytics platform for ecommerce
    - Tintin: Everyone-can-use machine learning platform
- 2016 - 2020 at IglooInsure (16M+ in series A+ 2020)
  - Provide digital insurance for e-conomic world
  - Funded in KUL, Headquartered in Singapore
  - First employee/ Engineering Lead / Regional Head/ Chief Engineer
- 2013 - 2016 at Studio Engineering @ hTC
  - Principal Engineer on Cloud Infrastructure Team
- 2009 - 2012 at IIS @ Academia Sinica
  - Computer vision, pattern recognition, and data mining
- CS@CCU, CS@NCKU alumni

Agenda

- Pre-requirement
- Why Kubeflow?
- What is Kubeflow?
- Kubeflow Architecture
- QA

Pre-requirement

- Be comfortable with UNIX command line
  - Navigating directories with `cd` or `tree`
  - Editing files, like `vim`, `nano`
  - Bash scripting, like env or looping
- Be an export with `Google`
  - https://letmegooglethat.com/?q=you+can+google+it

- It is totally OK if you don’t know what is Container and Kubernetes

荀子《儒效篇》

「不聞不若聞之，聞之不若見之，見之不若知之，知之不若行之；學至于行之而止矣。」

Workshop materials

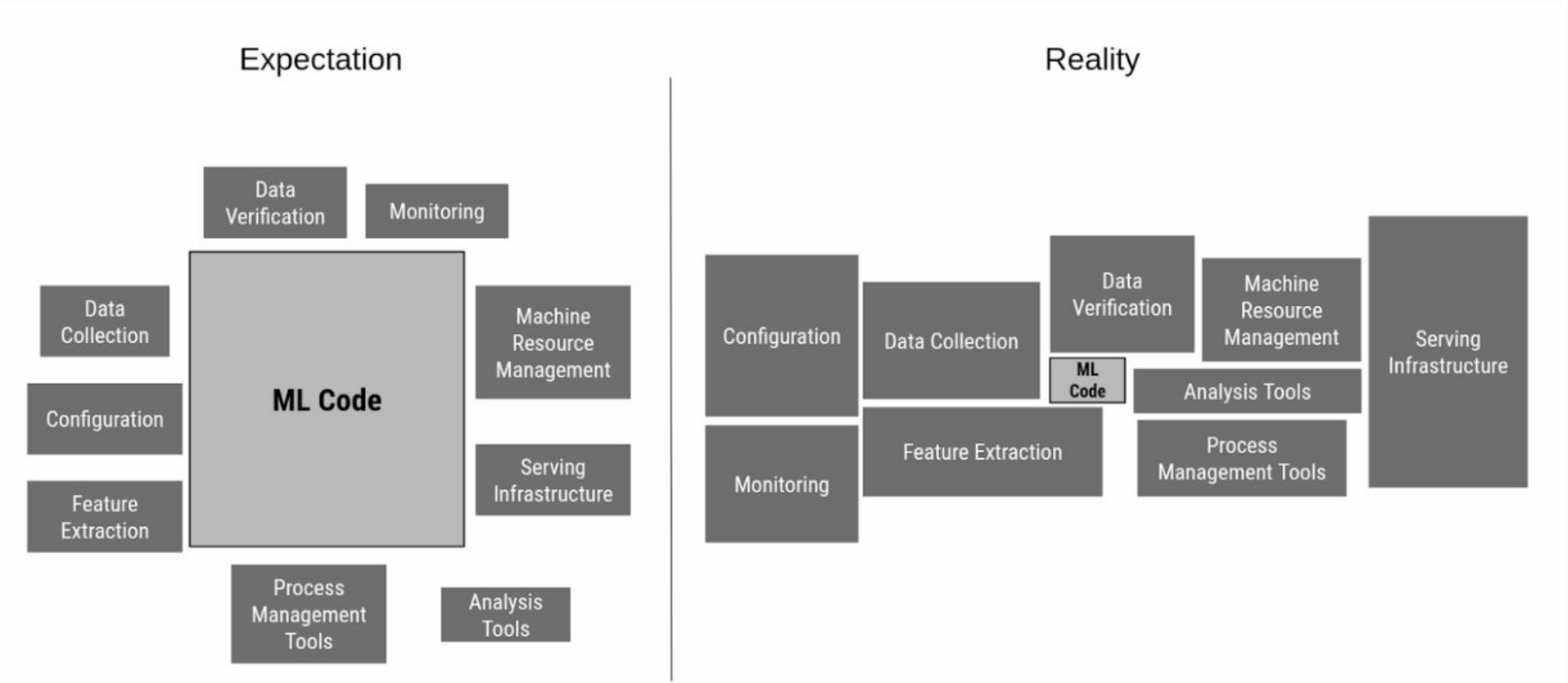
```
apt-get update
apt-get install -y git

git clone https://github.com/FootprintAI/kubeflow-workshop
```

Building & deploying real-world ML application is *hard* and *costly* because of *lack of tooling* that covers end-to-end ML development & deployment

- CloudNext'19

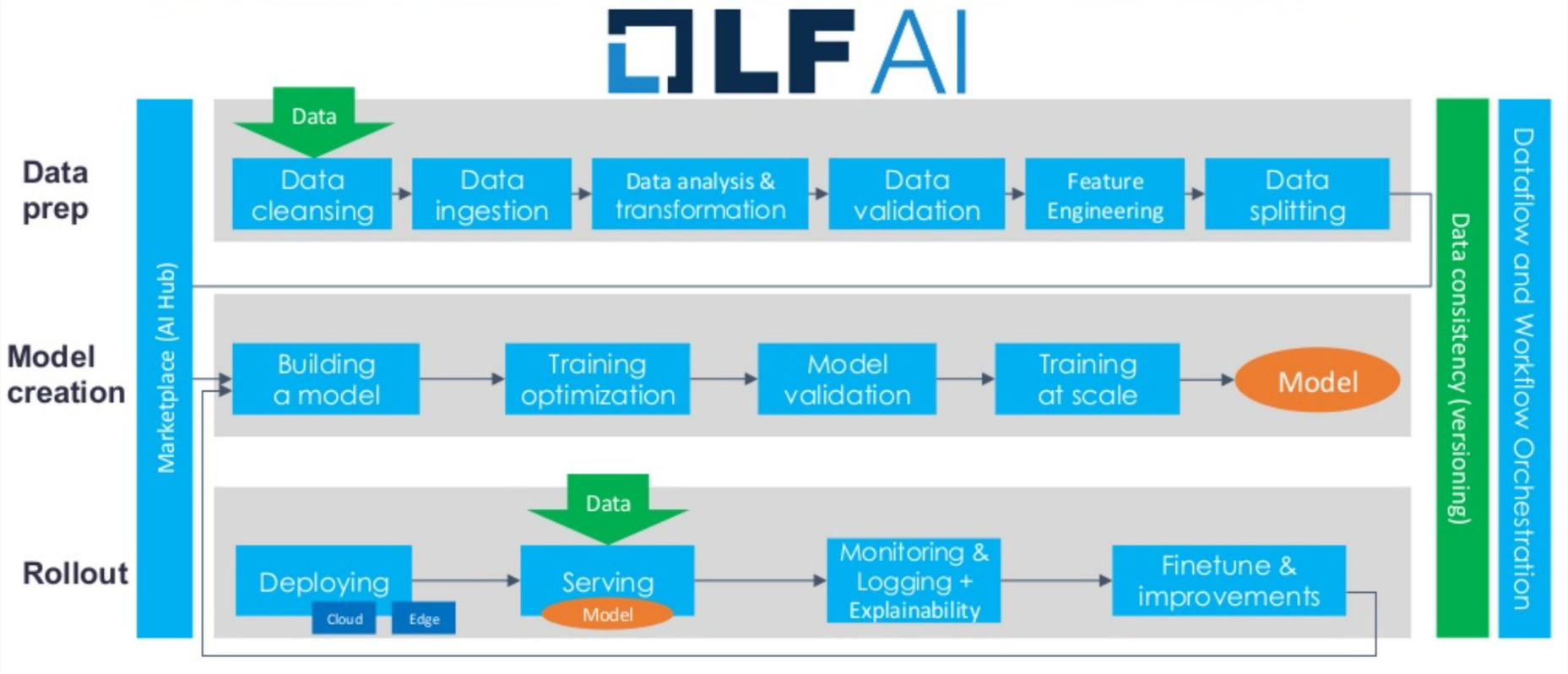
Source CloudNext'19: https://www.youtube.com/watch?v=TZ1lGrJLEZ0

Real-world Machine Learning Application - Expectation vs Reality



Source: https://medium.com/ci-t/e2e-kubeflow-pipeline-for-time-series-forecast-239019ad2e34

Real-world Machine Learning Application - End-to-End ML LifeCycle



Source: https://www.slideshare.net/AnimeshSingh/advanced-model-inferencing-leveraging-kubeflow-serving-knative-and-istio-196096385

Why machine learning on Kubeneters?

- Composability
  - Each stage are independent systems and are able to compose together
- Portability
  - Dev/Staging/Prod
  - Laptop/Edge/Cloud environment
- Scalability
  - Hyperparameter tuning, production workloads

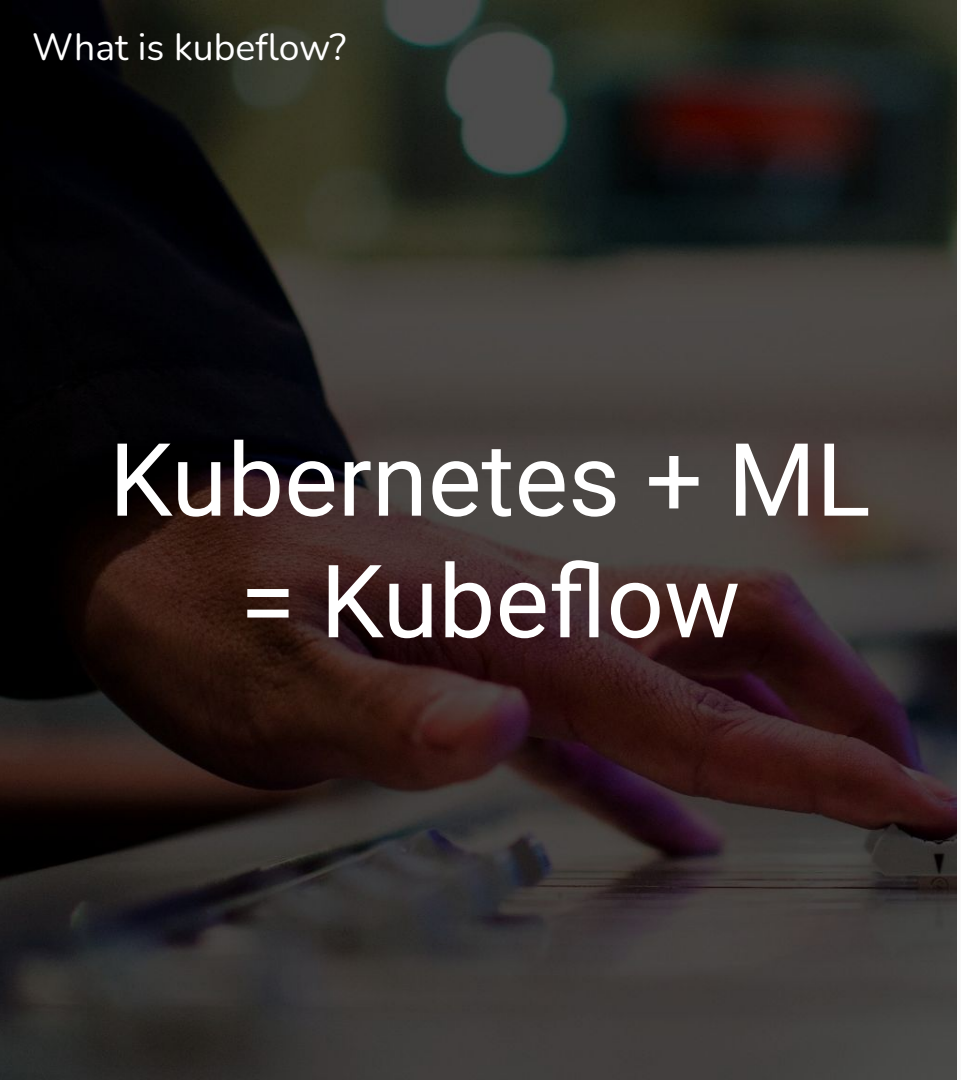
Source: https://www.slideshare.net/guard0g/kubeflow-and-data-science-in-kubernetes

Oh, you want to use ML on K8s?

Before that, can you become an expert in:

- Containers
- Packaging
- Kubernetes service endpoints
- Persistent volumes
- Scaling
- Immutable deployments
- GPUs, Drivers & the GPL
- Cloud APIs
- DevOps
- ...

Source: @aronchick

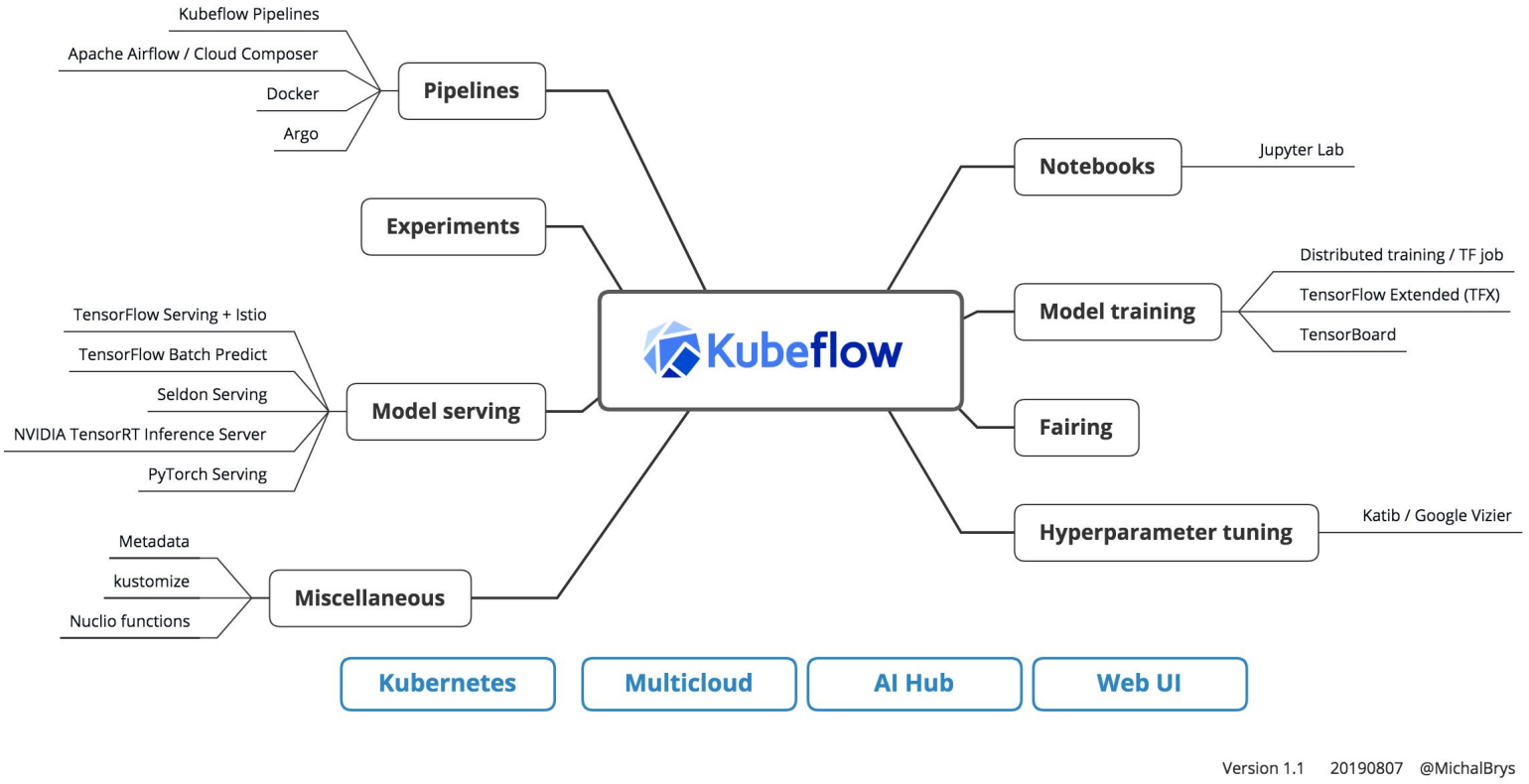


Kubernetes + ML = Kubeflow

The Kubeflow project is dedicated to making deployments of machine learning (ML) workflows on Kubernetes simple, portable and scalable.

Source: https://www.kubeflow.org/

Architectures

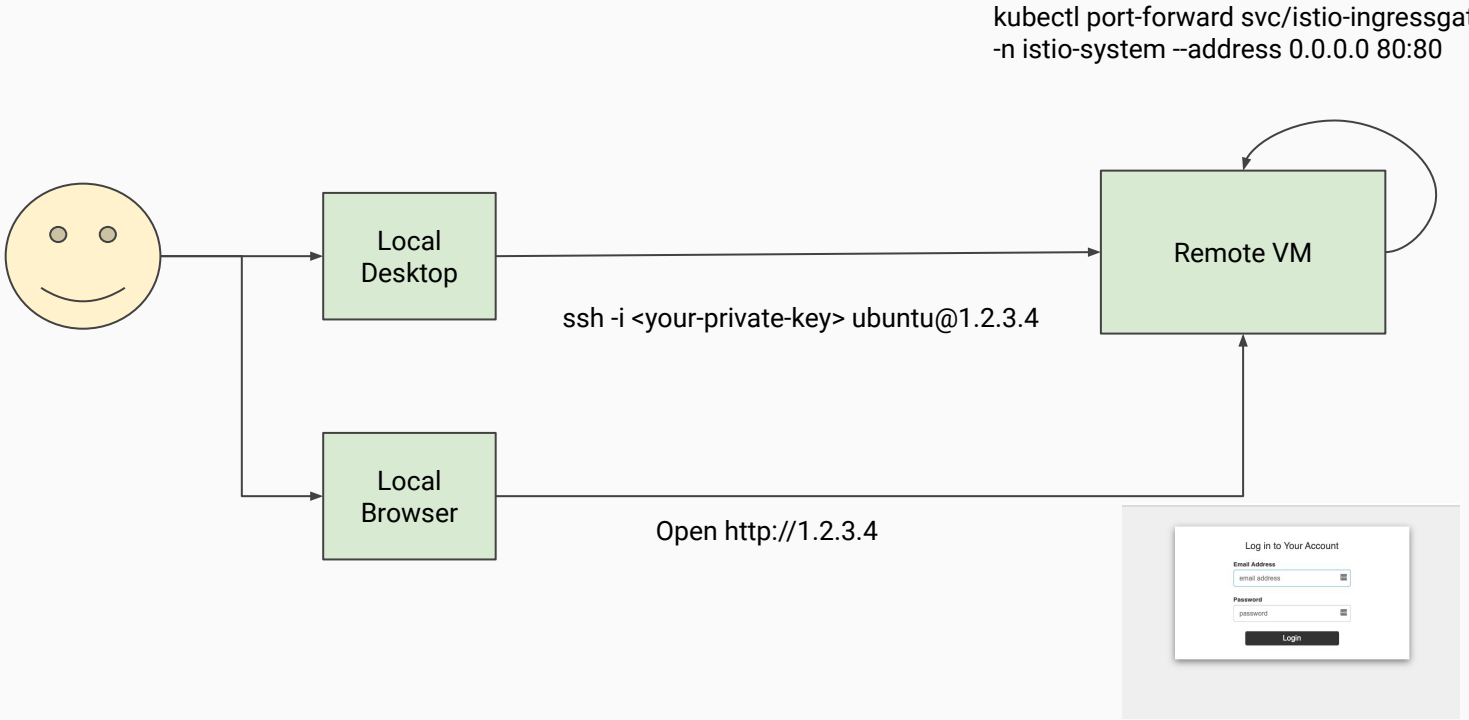


Environment Setup

Installation

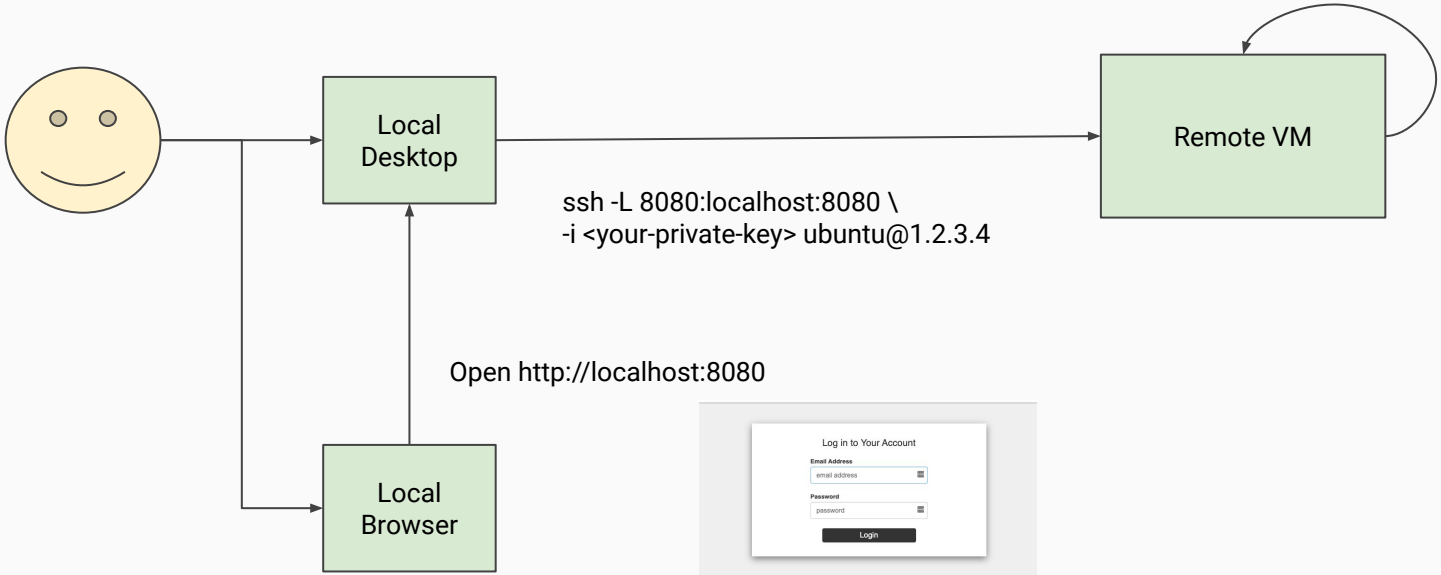
- Github Repo
  - https://github.com/FootprintAI/kubeflow-workshop
- Docker Runtime
  - https://github.com/FootprintAI/kubeflow-workshop/blob/main/install/dockerd.sh
- Minikube
  - https://github.com/FootprintAI/kubeflow-workshop/blob/main/install/minikube.sh
- Kubeflow 1.3 (Hot!!)
  - https://github.com/FootprintAI/kubeflow-workshop/blob/main/install/kubeflow.v13.sh

Access Remote VM via Public IP



Access Remote VM via SSH Local Forwarding

kubectl port-forward svc/istio-ingressgateway
-n istio-system 8080:80



Hands-on Time

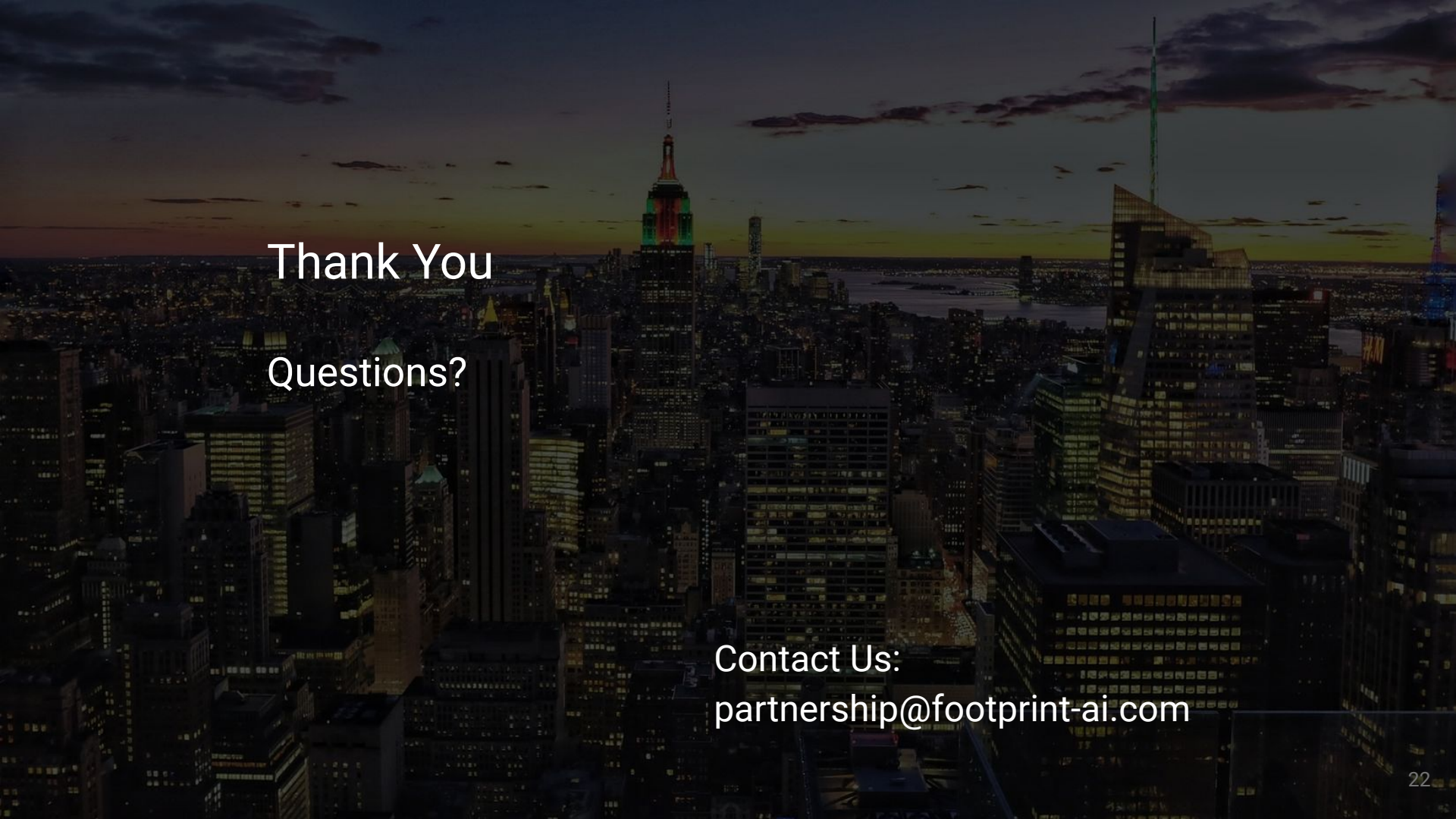
```
// install kubectl, a cli interface for kubernetes v1.20.0

// Get kubeflow running resources
kubectl get pods -n kubeflow

// Get current user running resources
Kubectl get pods -n kubeflow-user

// Get Argo Workflow Resources
kubectl get workflow -n kubeflow-user

// Get Katib Experiment Resource
kubectl get experiment -n kubeflow-user

// Get KFserving Resources
Kubectl get inferenceservices -n kubeflow-user
```

Q&A

One minute takeaway

- Kubectl/Kubeflow
- Pipeline / Katib / KFServing

- And it is just a beginning ...


Thank You
Questions?
Contact Us:
partnership@footprint-ai.com

Additional materials

- Documentations
  - https://www.kubeflow.org/
- Kubectl cheatsheet
  - https://kubernetes.io/docs/reference/kubectl/cheatsheet/