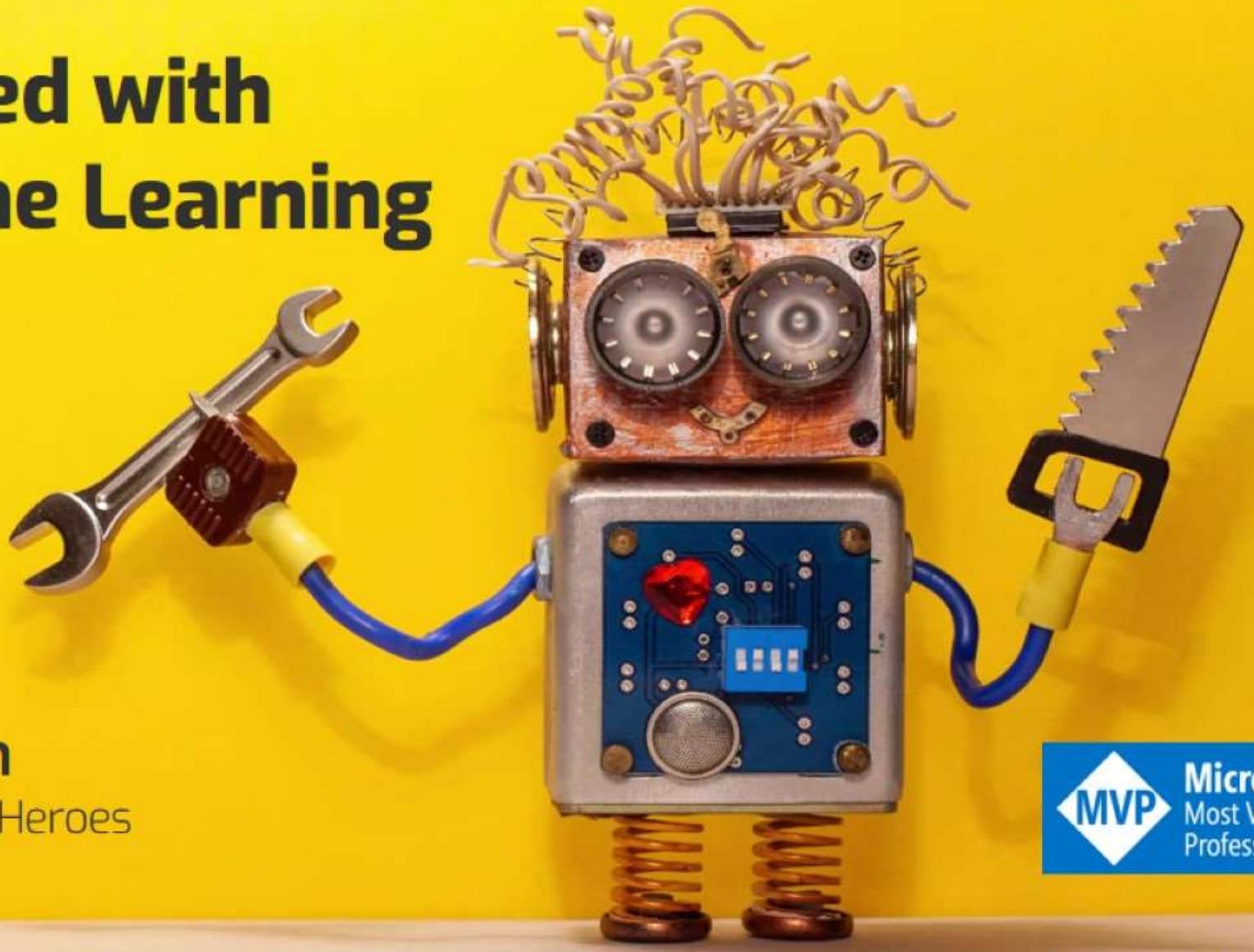
Getting started with Azure Machine Learning Service



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HEROES

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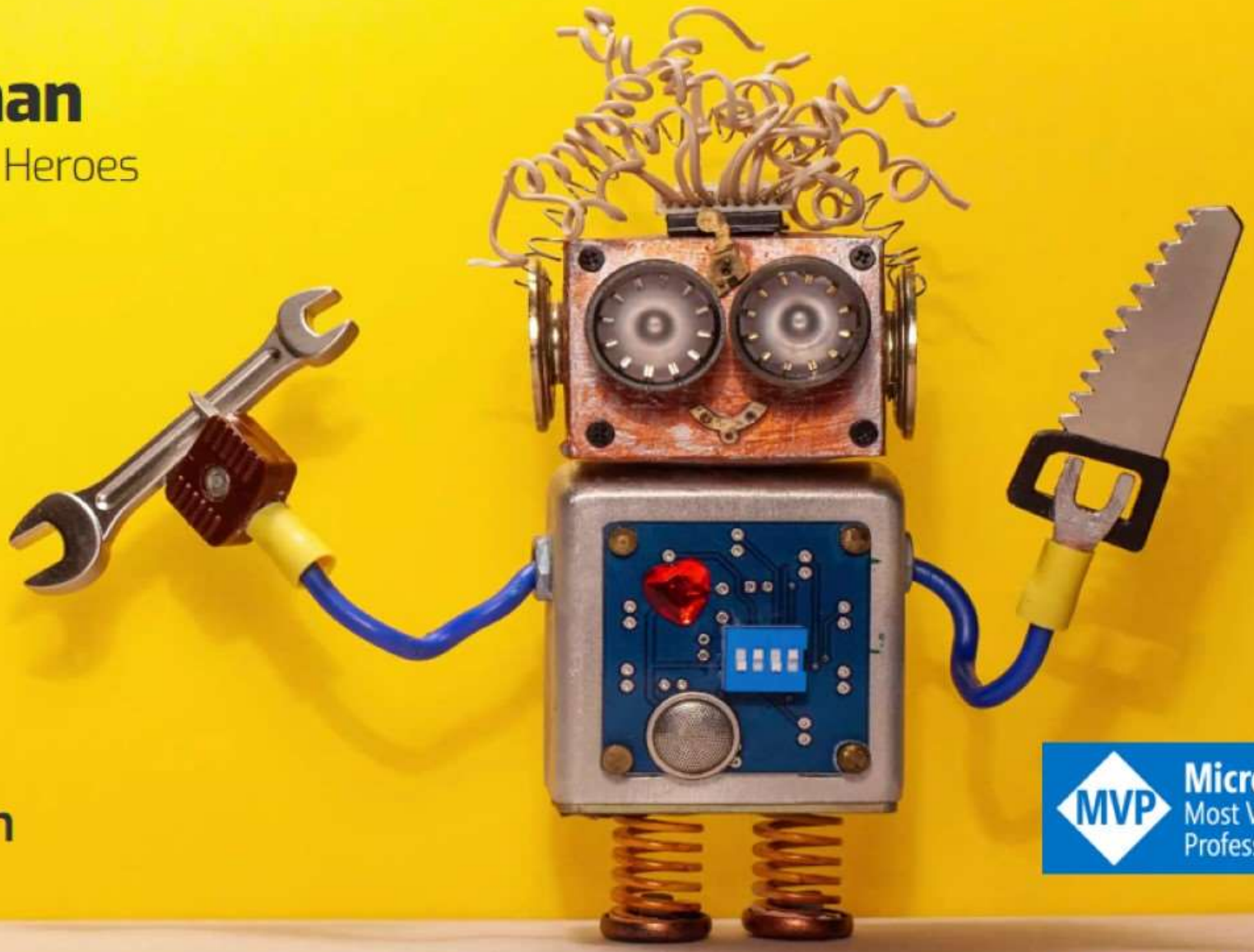

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GLOBAL AI BOOTCAMP
NEW INTELLIGENT WORLDS

Global AI Night
5 September 2019
Global AI Bootcamp
14 December 2019

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Uzbekistan
Morocco
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Libya
Iraq
Iran
Saudi Arabia
Oman
Yemen
Sudan
Senegal
Mali
Niger
Cuba
Brazil
Bolivia
Paraguay
Kenya
Tanzania
Angola
Namibia
South Africa
Madagascar
Maldives
Laos
Vietnam
Japan
Papua New Guinea
Australia
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean

Agenda

Brief overview on Machine Learning on Azure

Simpson recognition using Azure Machine Learning Service

Machine Learning on Azure

Sophisticated pretrained models
To simplify solution development

Cognitive Services: Vision, Speech, Language

Azure Search

Popular frameworks
To build advanced deep learning solutions

Pytorch, TensorFlow, Keras, Onnx

Productive services
To empower data science and development teams

Azure Databricks, Azure Machine Learning, Machine Learning VMs

Powerful infrastructure
To accelerate deep learning

CPU, GPU, FPGA

Flexible deployment
To deploy and manage models on intelligent cloud and edge

On-premises, Cloud, Edge

The data science process...

Ask a sharp question

Collect the data

Prepare the data

Select the algorithm

Train the model

Is it Marge or Homer?

Machine Learning on Azure

Sophisticated pretrained models
To simplify solution development

Cognitive Services: Vision, Speech, Language

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Azure Machine Learning Services

A fully-managed cloud service that enables you to easily build, deploy, and share predictive analytics solutions.

Keras

High-level neural networks API tat is capable of running on top of CNTK, Theano, or TensorFlow.

Keras is an API designed for human beings, not machines.

It puts user experience front and center

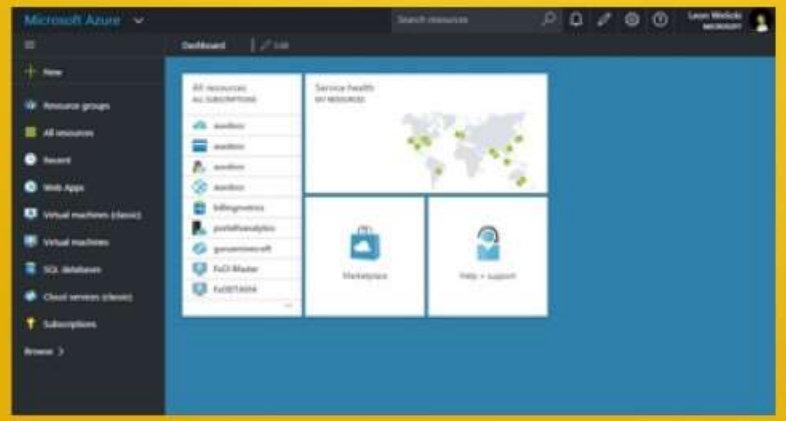
Prepare
your environment

Experiment
with your model & data

Deploy
Your model into production

Step 1: **Prepare your environment**

Setup your environment

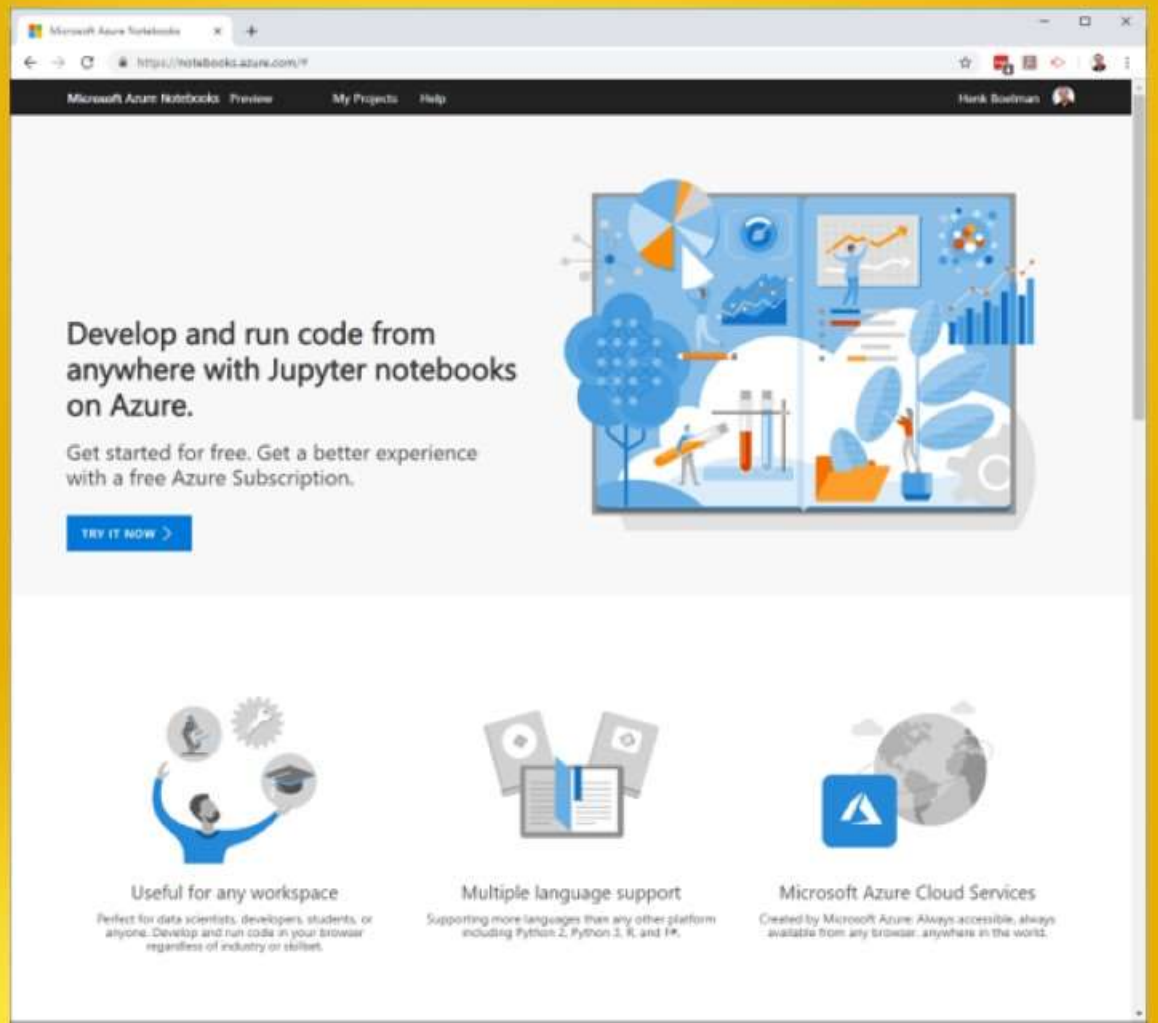


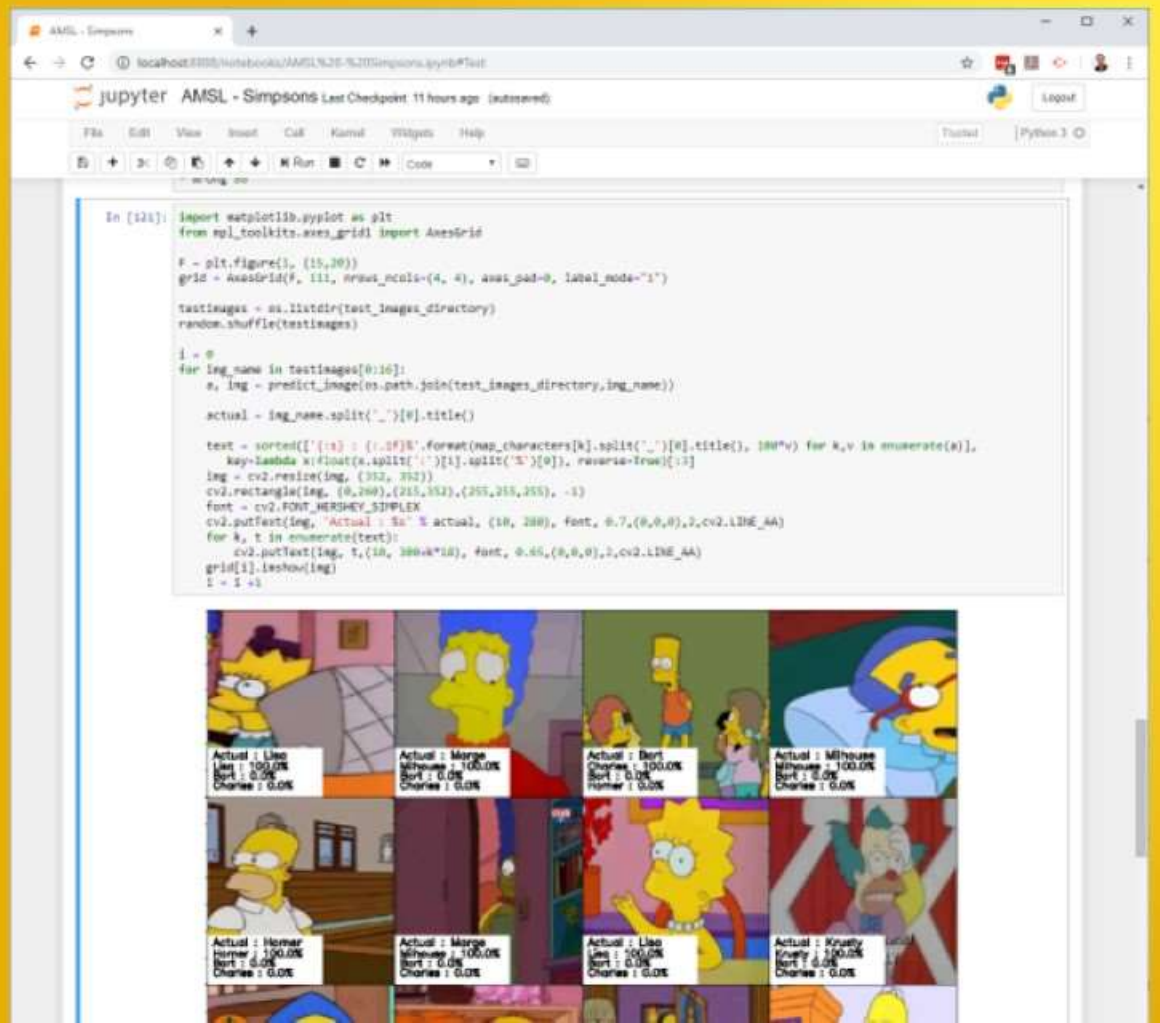
Azure Portal

VS Code

Azure Notebooks

Azure Notebook / Jupyter Notebook





Setup your environment

- Compute
- Models
- Experiments
- Images
- Data stores
- Deployments

Components in Azure

- Azure Machine Learning Workspace
- Storage
- Container registry
- Key vault
- Application Insights

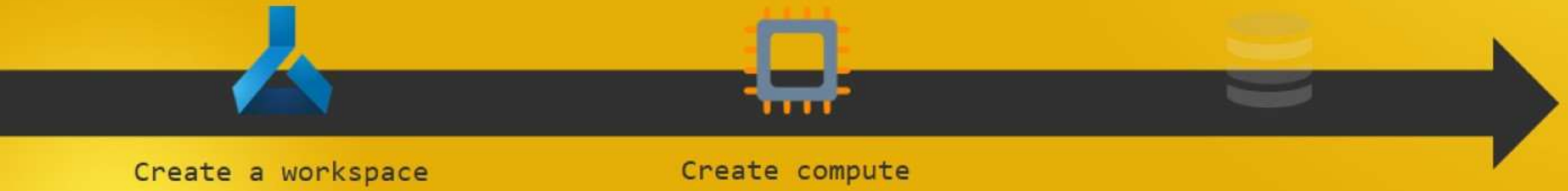
Create a workspace

```
ws = Workspace.create(
            name='<NAME>',
            subscription_id='<SUBSCRIPTION ID>',
            resource_group='<RESOURCE GROUP>',
            location='westeurope')

ws.write_config()

ws = Workspace.from_config()
```

Create a workspace

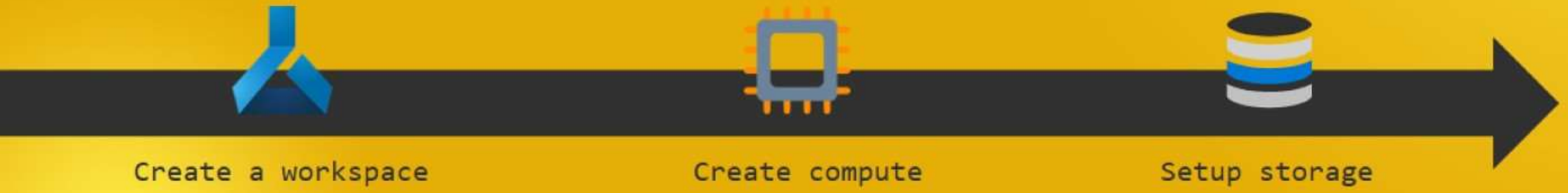
Create Compute

```
cfg = AmlCompute.provisioning_configuration(
            vm_size='STANDARD_NC6',
            min_nodes=1,
            max_nodes=6)

cc = ComputeTarget.create(ws, '<NAME>', cfg)
```

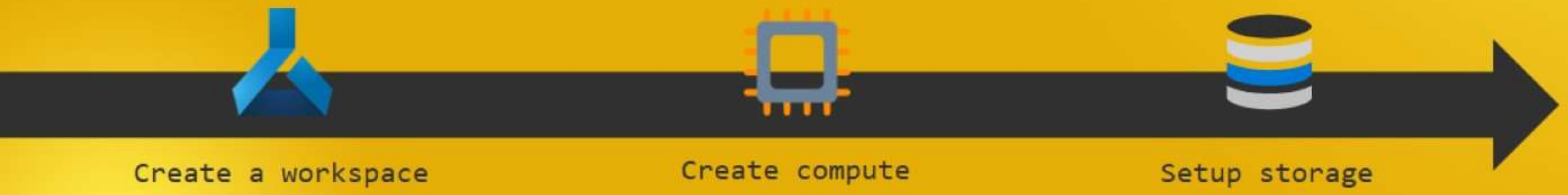


Attach storage

```
ds = ws.get_default_datastore()

ds = Datastore.register_azure_blob_container(
            workspace = ws,
            datastore_name = '<your datastore name>’,
            container_name = '<your blob container name>’,
            account_name = '<your storage account name>’,
            account_key = '<your storage account key>’
)
```

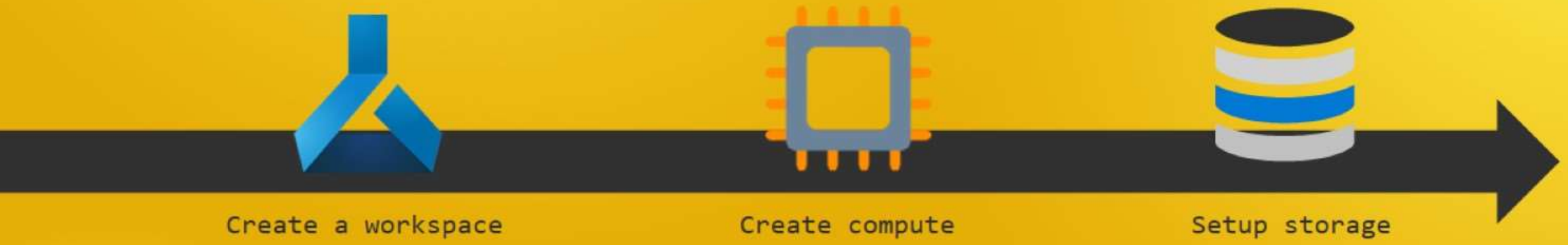


Demo: **Setup your workspace**



Step 1

Prepare your environment



Step 2: **Experiment with your model & data**

Create an experiment

```
exp = Experiment(workspace=ws, name="<ExperimentName>")
```

Create an Experiment

Create a training file

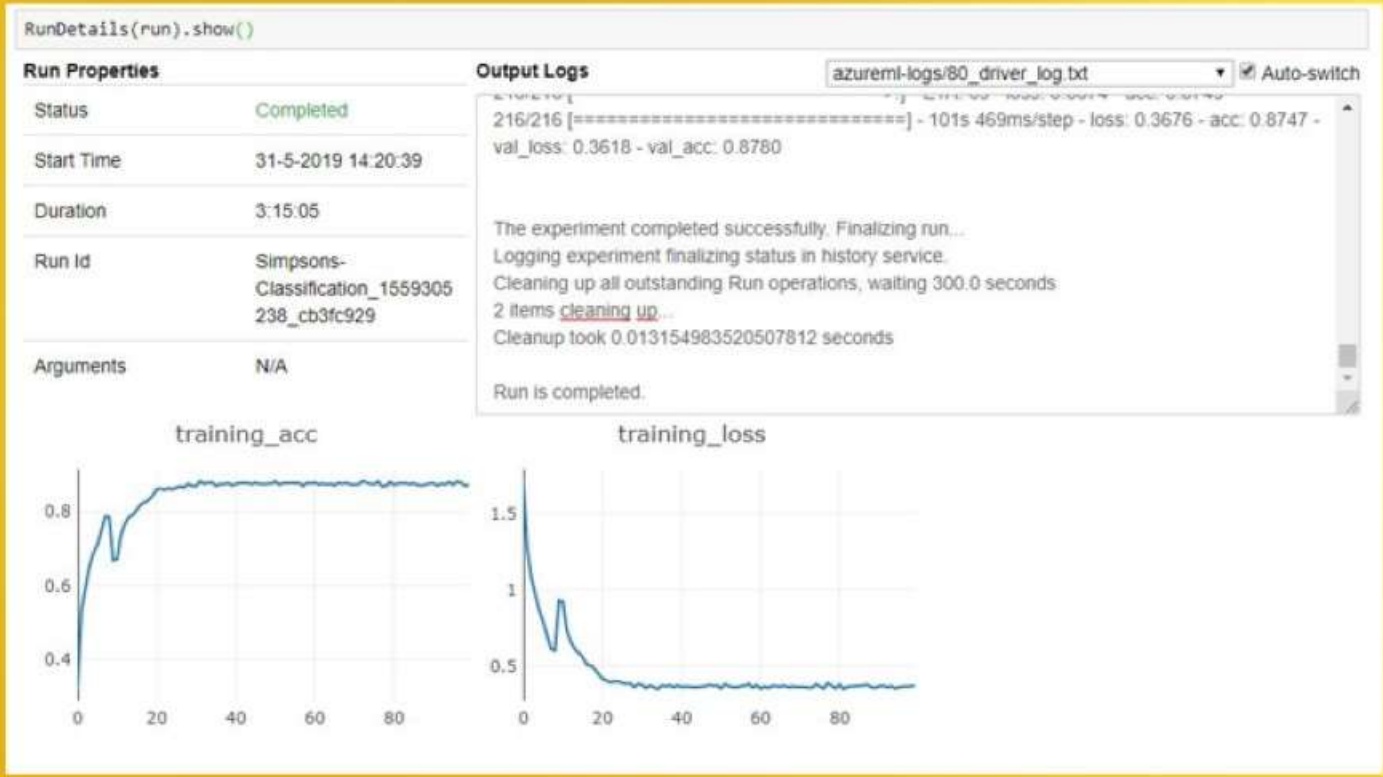
```
model=Sequential()
model.add(Conv2D(kernel_size=(3,3),filters=3,input_shape=(128,128,1),activation="relu"))
model.add(Conv2D(kernel_size=(3,3),filters=10,activation="relu",padding="same"))
model.add(MaxPooling2D(pool_size=(2,2),strides=(2,2)))
model.add(Conv2D(kernel_size=(3,3),filters=3,activation="relu"))
model.add(Conv2D(kernel_size=(5,5),filters=5,activation="relu"))
model.add(MaxPooling2D(pool_size=(3,3),strides=(2,2)))
model.add(Conv2D(kernel_size=(2,2),strides=(2,2),filters=10))
model.add(Flatten())
model.add(Dropout(0.3))
model.add(Dense(100,activation="sigmoid"))
model.add(Dense(1,activation="sigmoid"))
model.summary()

model.compile(optimizer="adadelta",loss="binary_crossentropy",metrics=["accuracy"])

history = model.fit(data1, labels, validation_split=0.2, epochs=30, batch_size=20, callbacks=[historyLoss])
```

Create an estimator

```
params = {'--data-folder': ws.get_default_datastore().as_mount()}

estimator = TensorFlow(
        source_directory = script_folder,
        script_params = params,
        compute_target = computeCluster,
        entry_script = 'train.py’,
        use_gpu = True,
        conda_packages = ['scikit-learn','keras','opencv’],
        framework_version='1.10')
```

Submit the experiment to the cluster

```
run = exp.submit(estimator)
RunDetails(run).show()
```



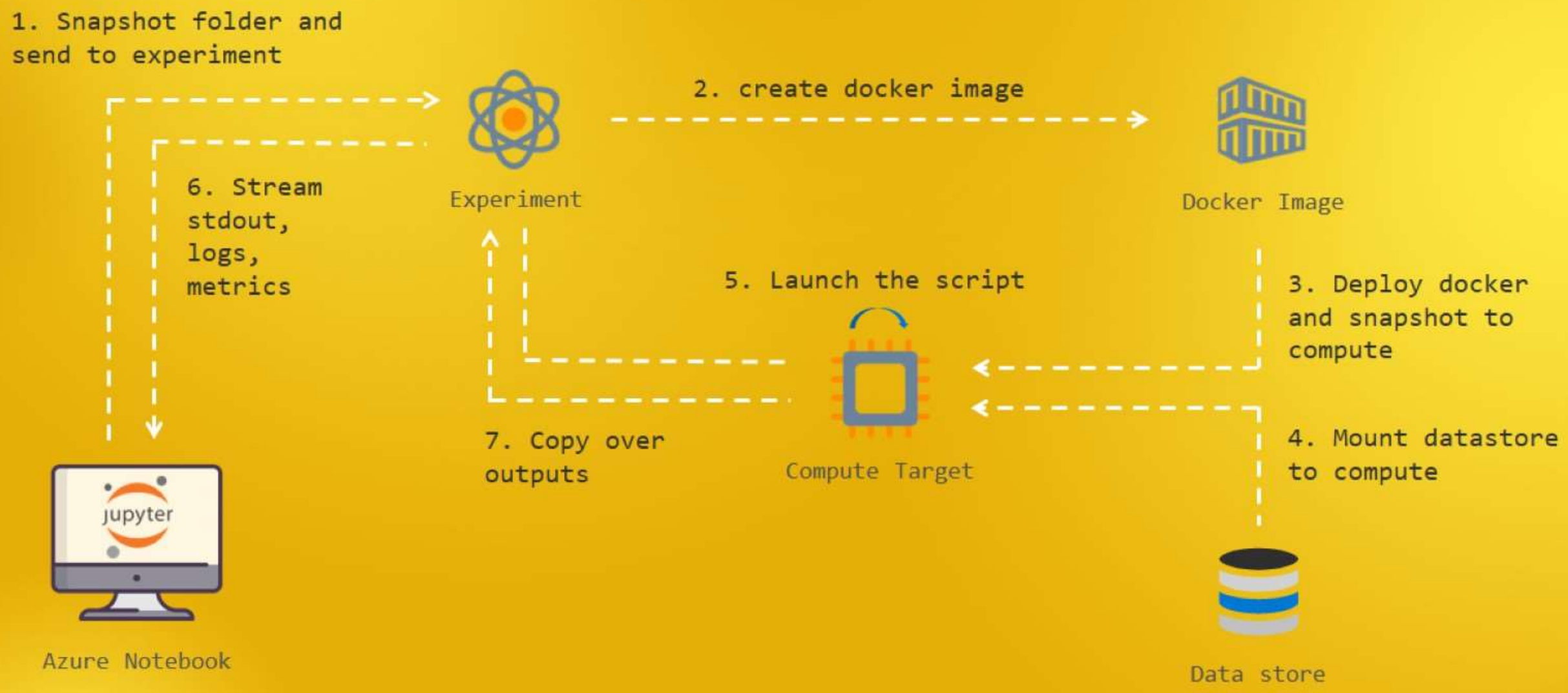
Create an Experiment

Create a training file

Create an estimator

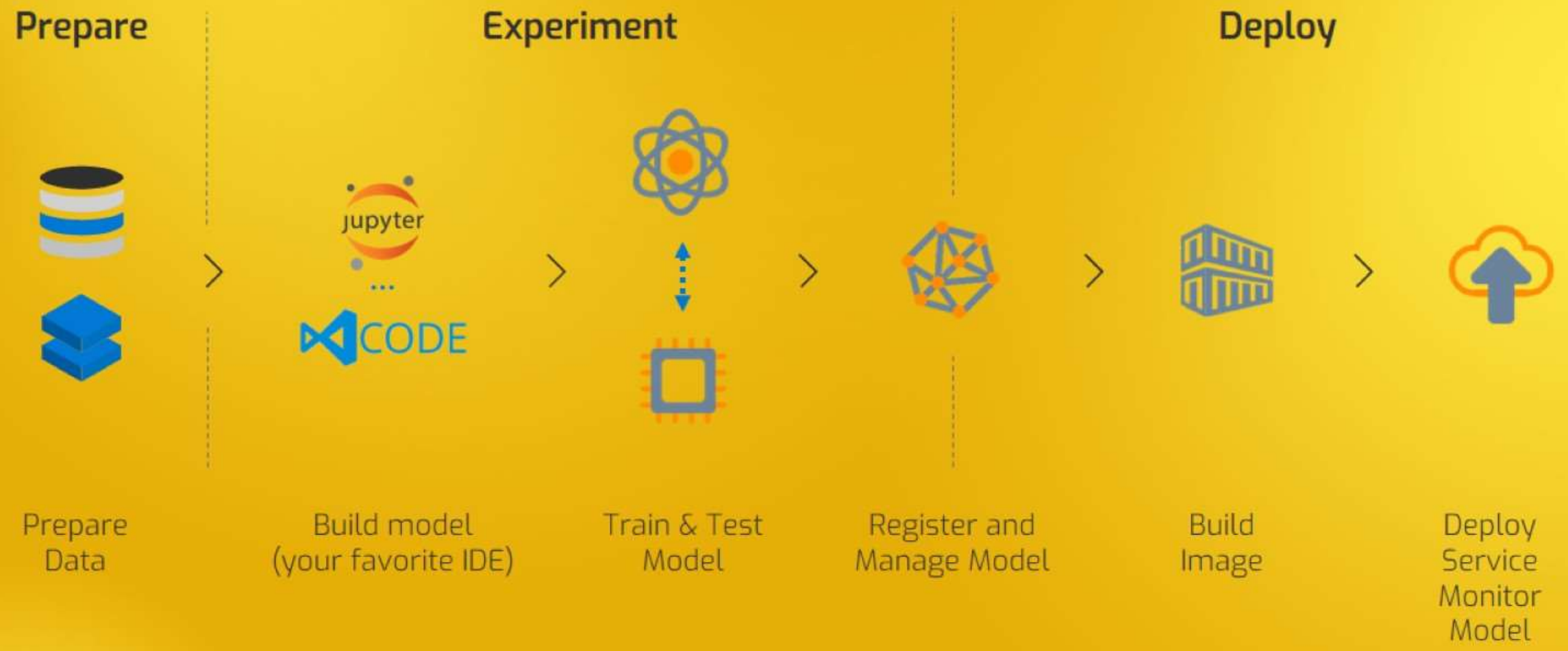
Submit to the AI cluster

Demo: **Creating and run an experiment**

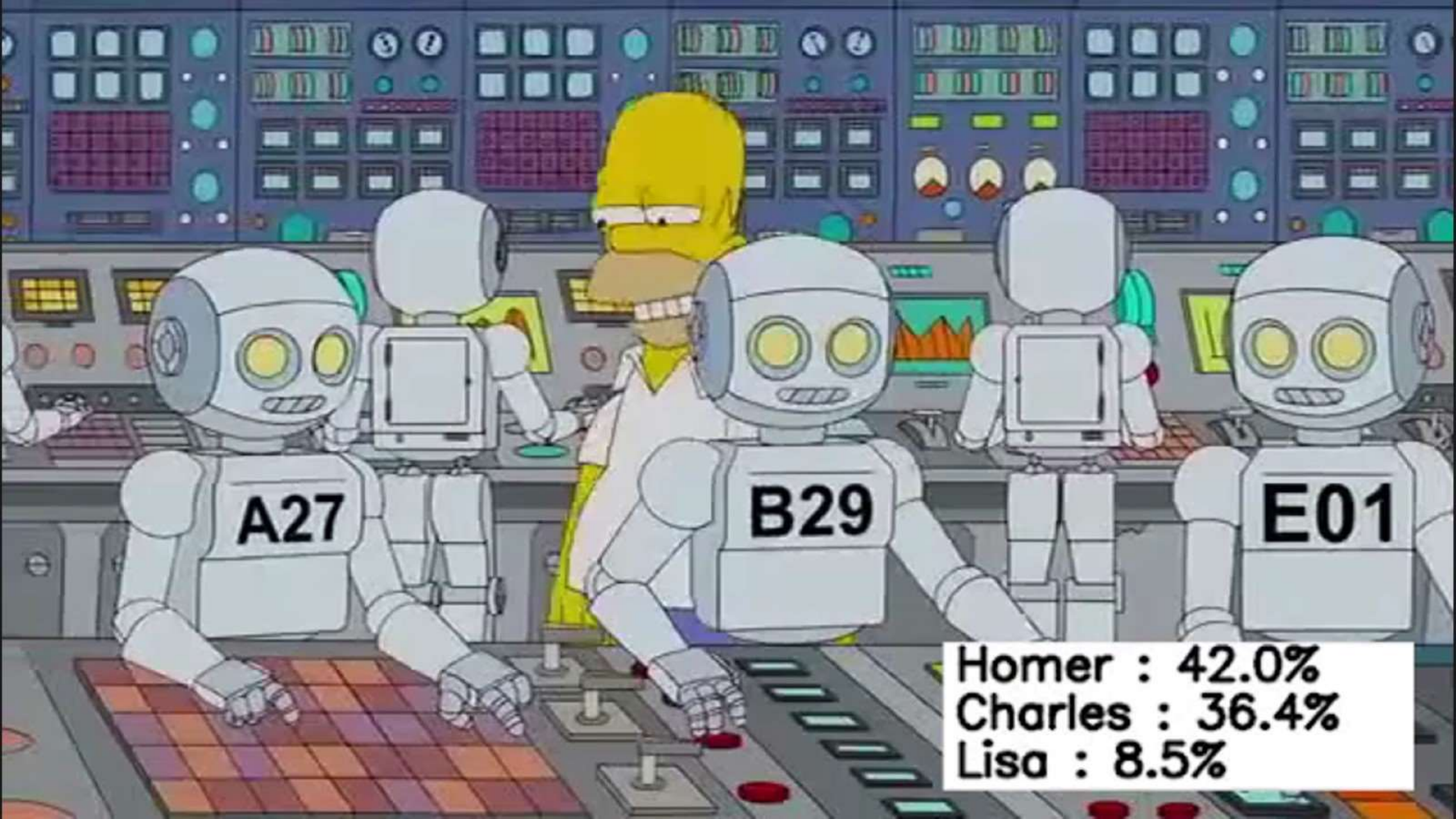

1. Snapshot folder and send to experiment
Experiment
2. create docker image
Docker Image
6. Stream stdout, logs, metrics
5. Launch the script
3. Deploy docker and snapshot to compute
7. Copy over outputs
Compute Target
4. Mount datastore to compute
jupyter
Azure Notebook
Data store

Register the model

```
model = Model.register(
      ws,
      model_name=‘My Model Name',
      model_path='./savedmodel',
      description='My cool Model')
```

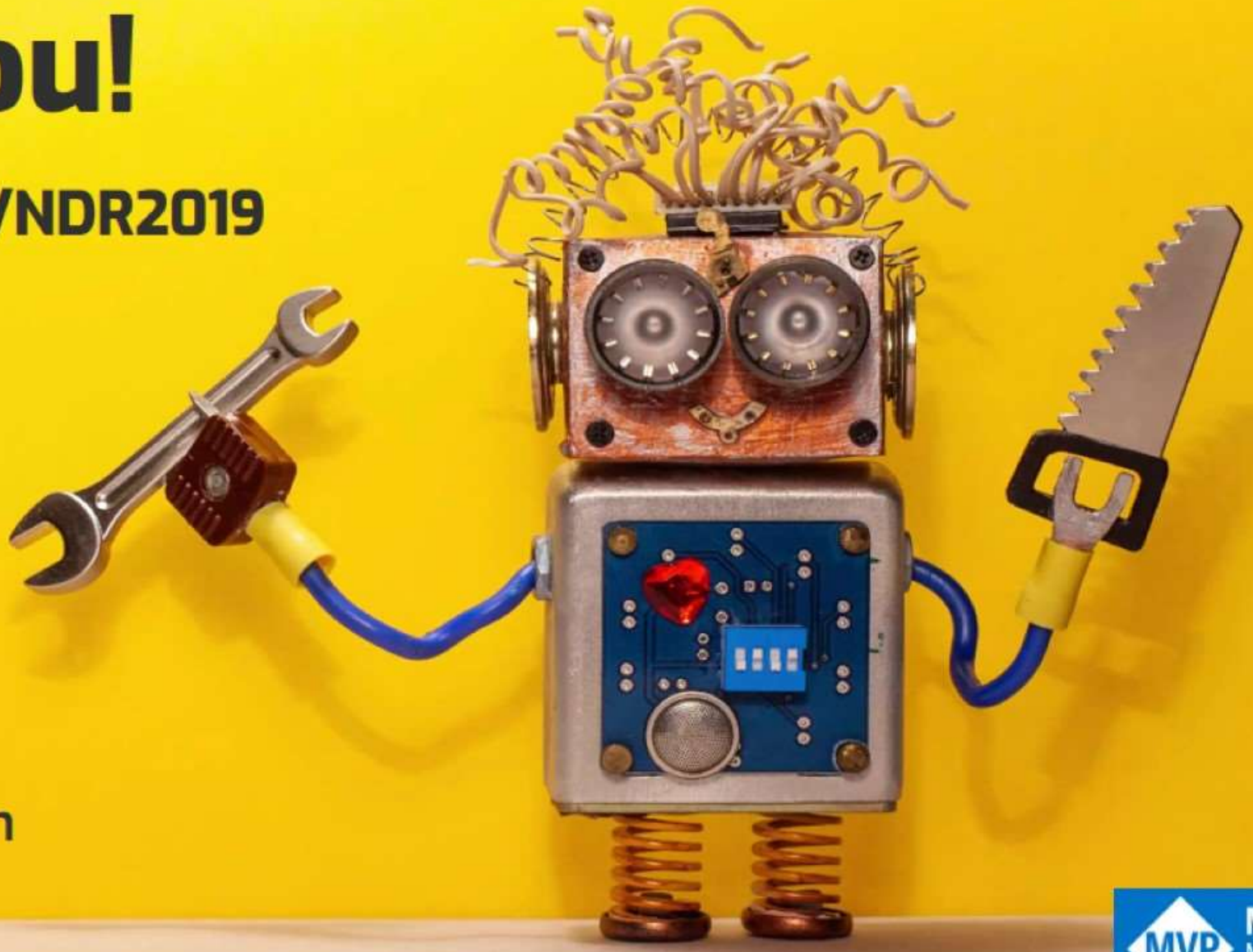

Prepare
Experiment
Deploy
jupyter
...
CODE
Prepare Data
Build model (your favorite IDE)
Train & Test Model
Register and Manage Model
Build Image
Deploy Service Monitor Model

Demo: **Register and test the model**


A27
B29
E01
Homer : 42.0%
Charles : 36.4%
Lisa : 8.5%

Thank you!

Read more on: **Henk.ml/NDR2019**



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