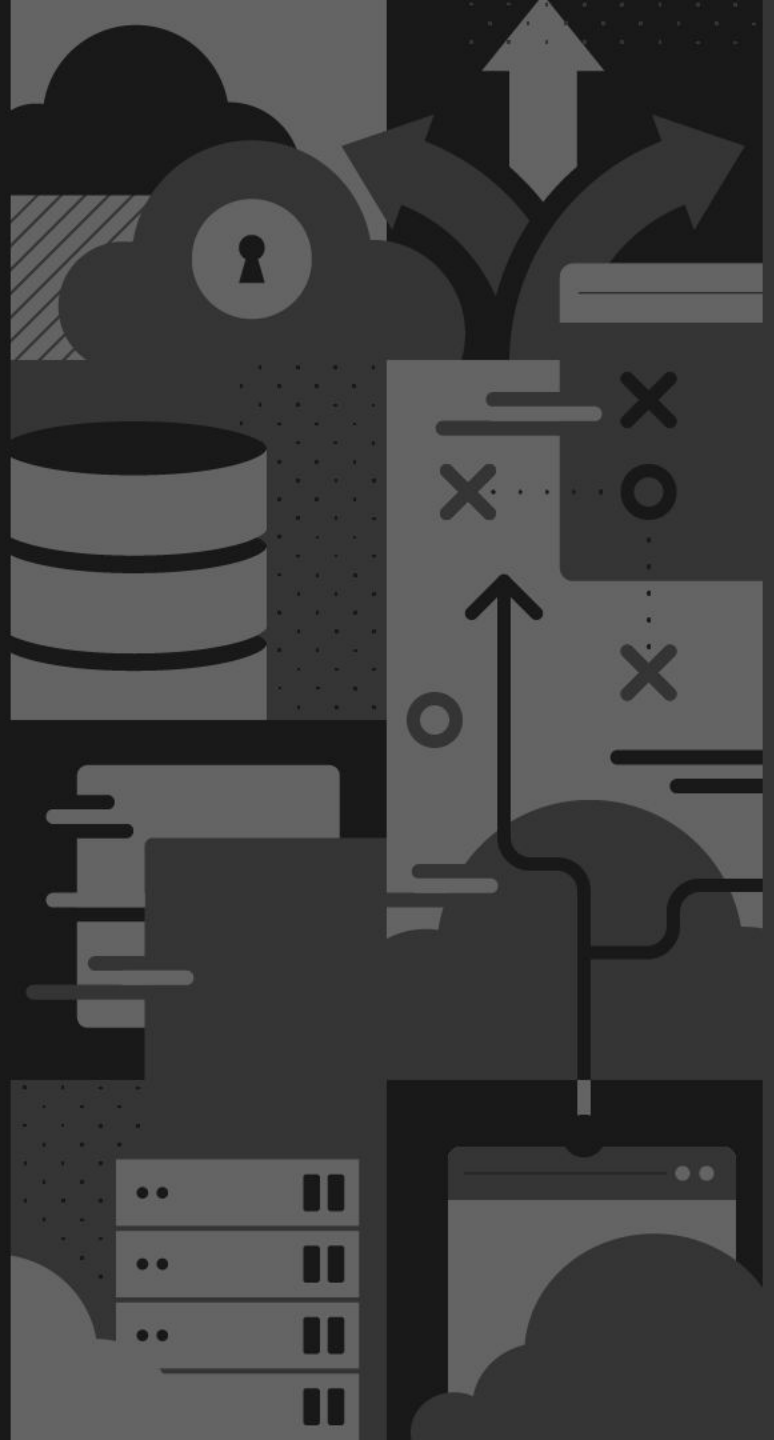


MLOps

DevOps for Machines

Tarcisio Oliveira

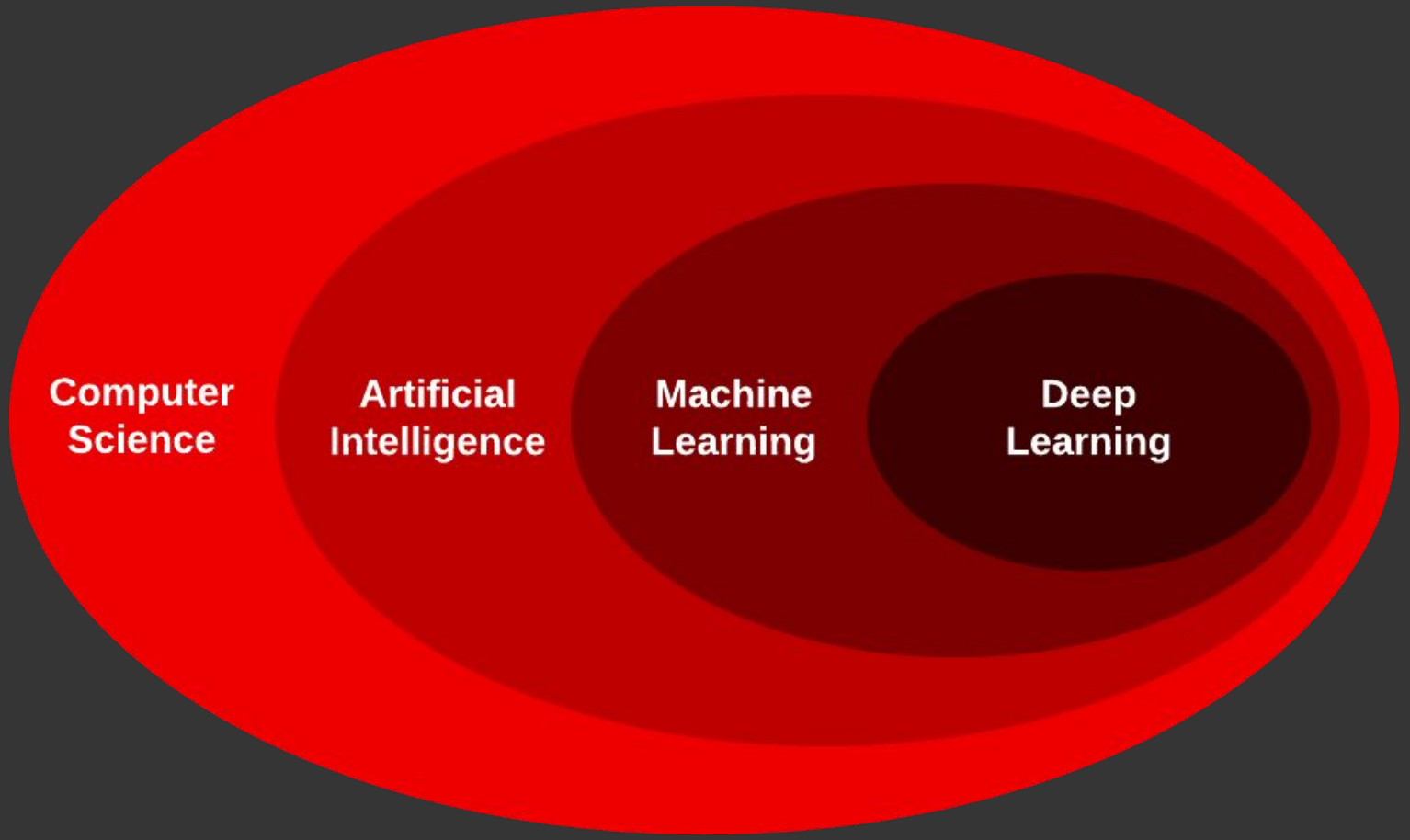
Technical Account Manager

Red Hat

What we will discuss today ?

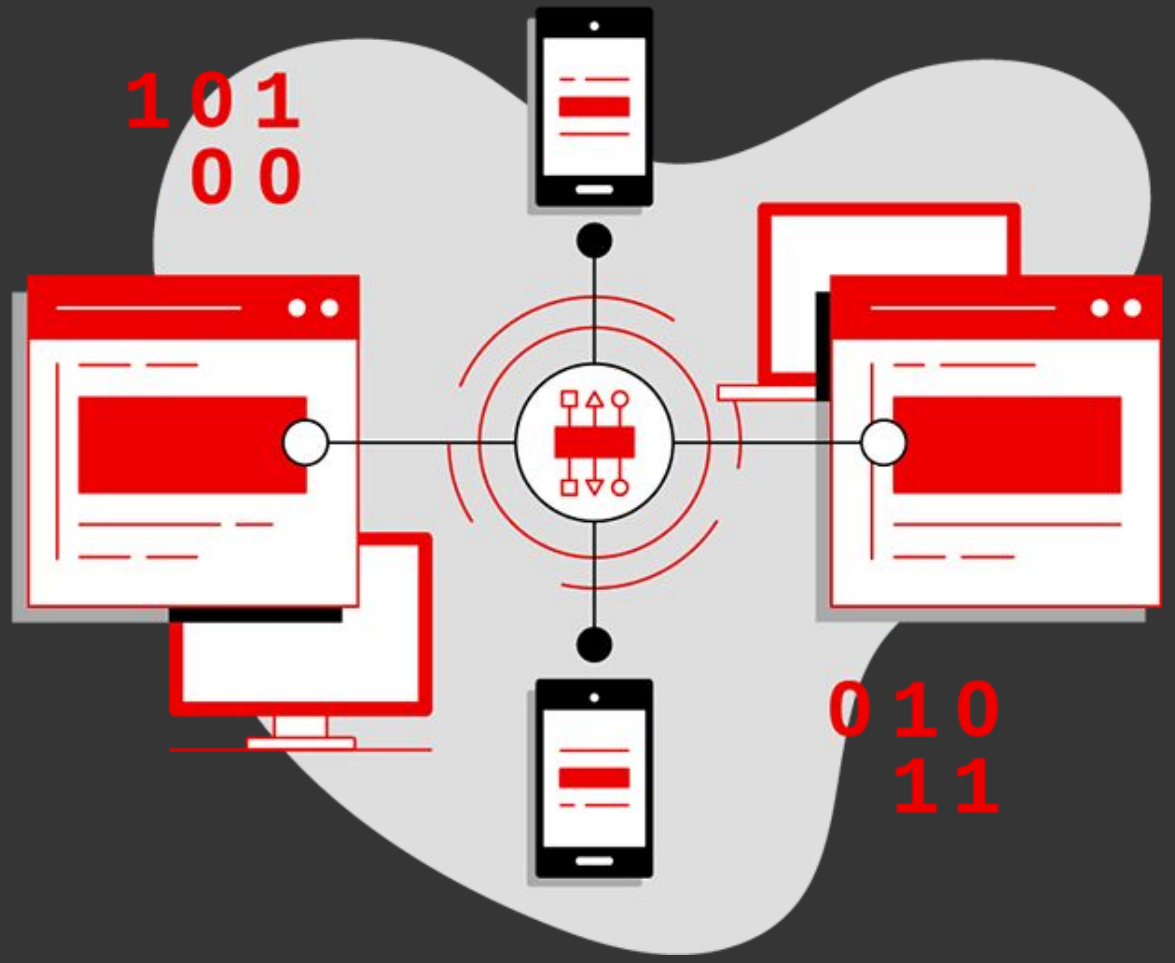
- Artificial Intelligence / Machine Learning
- DevOps
- MLOps
- Demo
- Links

Artificial Intelligence / Machine Learning



Source:
https://www.redhat.com/en/blog/what-machine-learning
McCarthy, John. 2004. *What is Artificial Intelligence ?*

Why AI/ML is important ?



Source:
https://www.redhat.com/en/partners/machine-learning-software

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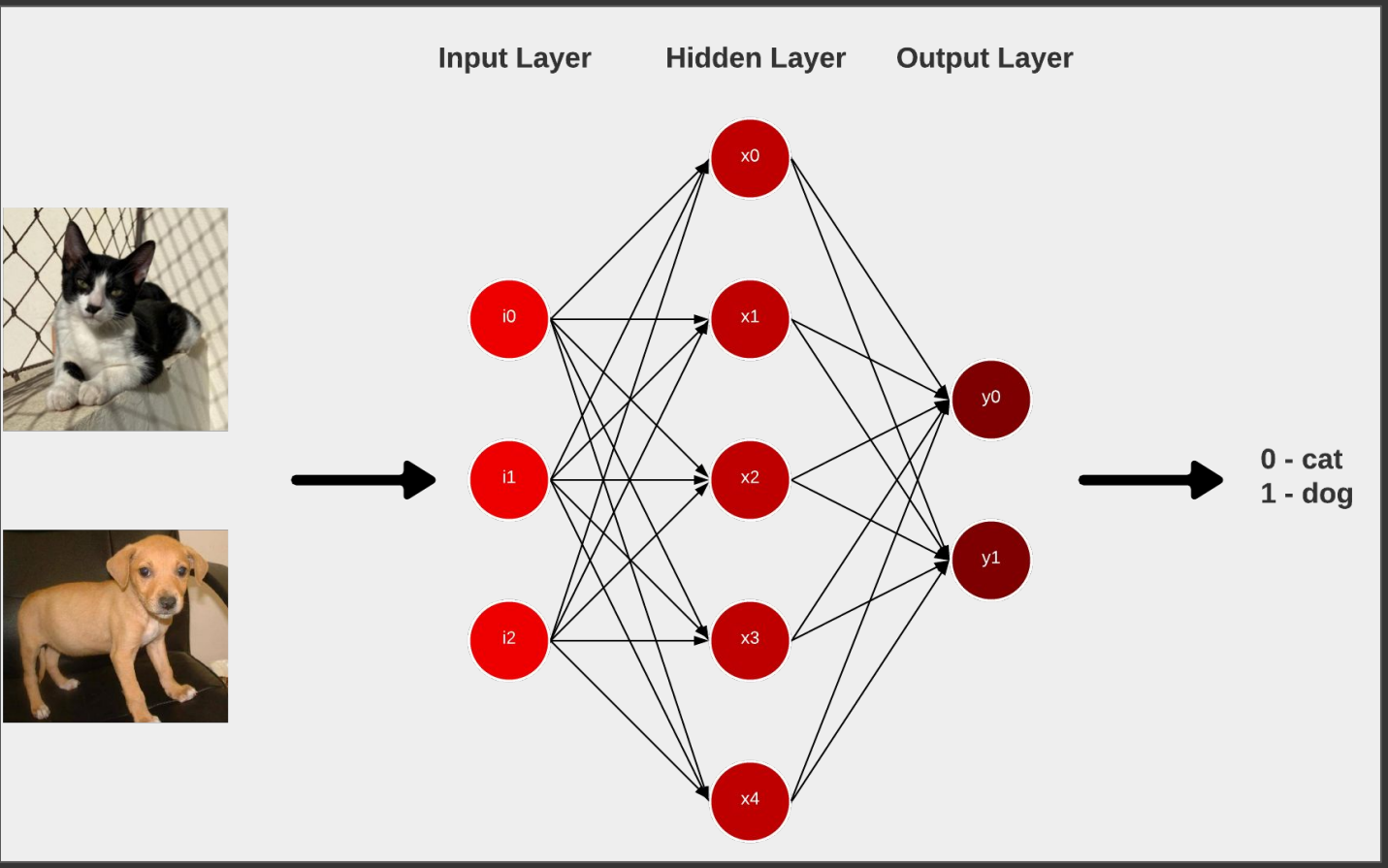
AI/ML examples

- Automated customer support
- Personalized shopping experience
- Healthcare
- Finance
- Smart cars and drones
- Travel and navigation
- Social media
- Smart home devices
- Creative arts
- Security and surveillance

Source:
https://becominghuman.ai/10-powerful-examples-of-ai-applications-553f7f062d9f

Neural Network



- Artificial Neural Networks (ANN)
- Convolutional Neural Networks (CNN)
- Recurrent Neural Networks (RNN)

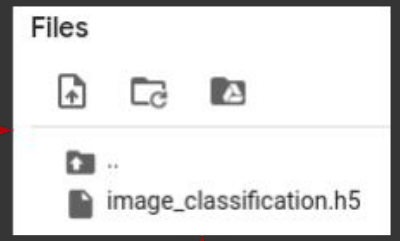
- Natural Language Processing (NLP)
- Image Classification

Source:
https://www.ibm.com/cloud/learn/neural-networks

Model

```
model = tf.keras.models.Sequential([
    rescaling,
    data_augmentation,
    model_transfer_learning,
    tf.keras.layers.GlobalAveragePooling2D(),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(1, activation = 'sigmoid')
])
```

```
model.save('image_classification.h5', save_format = 'h5')
```

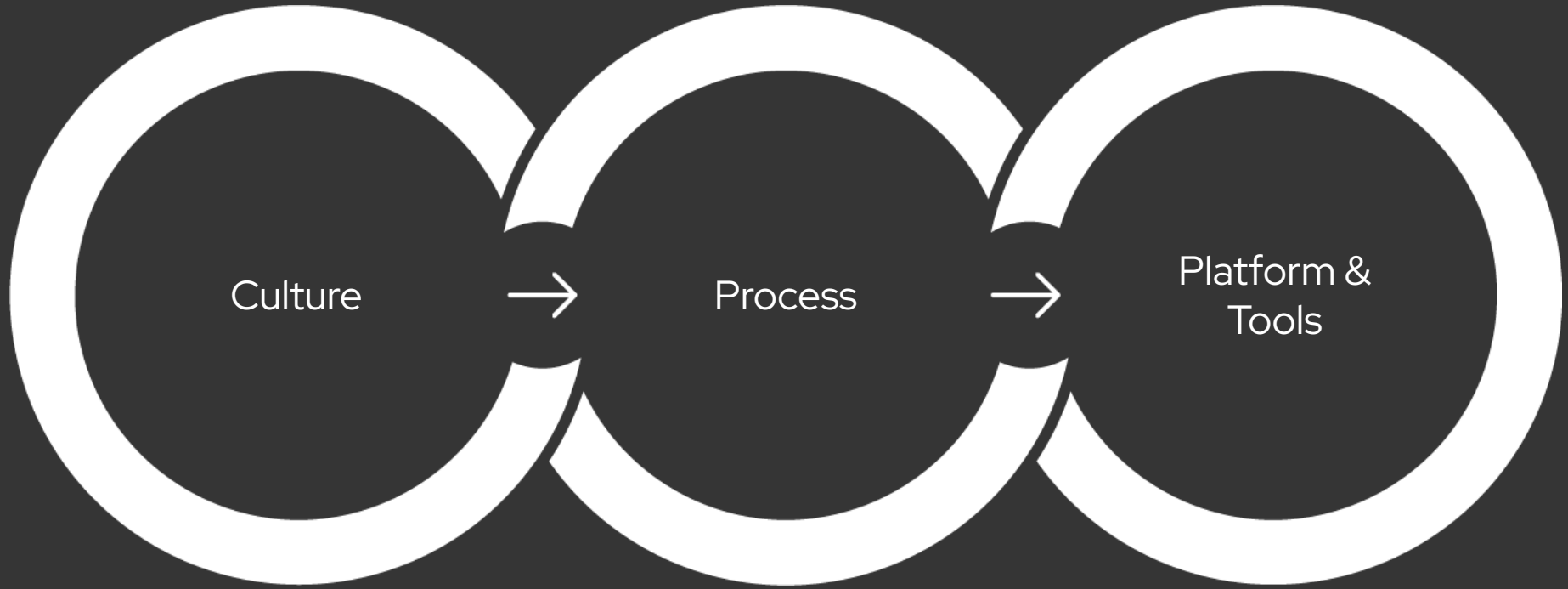



```
model = tf.keras.models.load_model('image_classification.h5')
```


Source:
https://www.tensorflow.org

DevOps

Development and Operations



Source:
https://www.redhat.com/en/topics/devops

DevOps

Best practices

- Continuous Integration
- Continuous Delivery
- Microservices architecture
- Infrastructure as Code
  - Configuration Management
  - Policy as Code
- Monitoring and Logging
- Communication and Collaboration

Source:
https://aws.amazon.com/devops/what-is-devops

DevOps

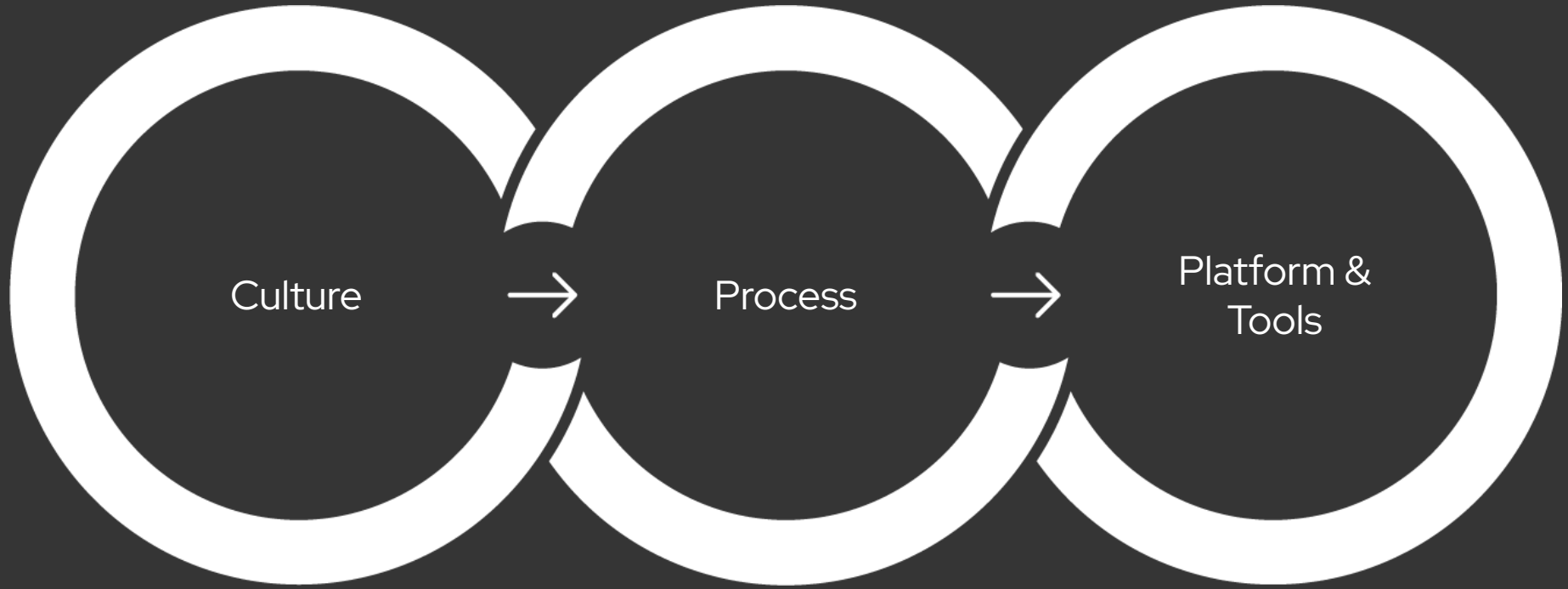
Platform & Tools

- Jenkins
- Tekton
- Spinnaker
- GoCD
- Concourse
- Screwdriver
- GitLab
- Github Actions
- CircleCI
- Travis CI
- Atlassian Bamboo
- Configuration management
  - Ansible
  - Chef
  - Puppet

Source:
https://www.redhat.com/en/topics/devops/what-is-ci-cd
https://www.redhat.com/en/topics/automation/what-is-configuration-management

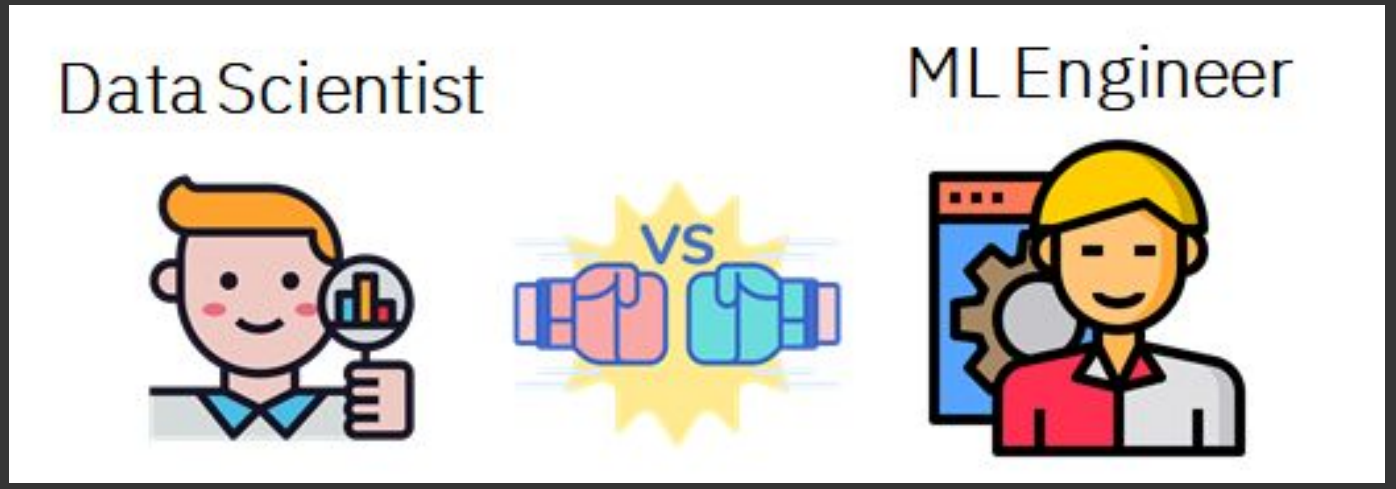
MLOps

Machine Learning and Operations



MLOps

Roles



Source:
https://howtolearnmachinelearning.com/articles/the-machine-learning-engineer

MLOps

Platform & Tools

- Apache Spark
- Apache Airflow
- Kubeflow
- Python
- R
- Julia
- Jupyter Notebook
- Tensorflow
- PyTorch
- Keras
- Cloud Platforms
  - Google Cloud AI Platform
  - Amazon SageMaker
  - Azure Machine Learning

Source:
https://searchbusinessanalytics.techtarget.com/feature/15-data-science-tools-to-consider-using

MLOps

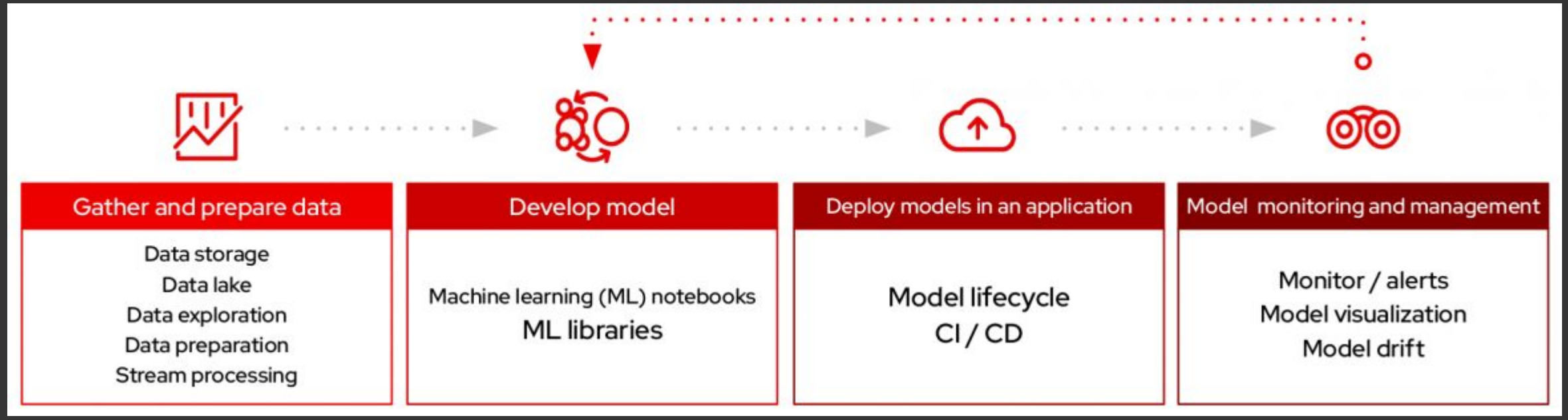
Top 5 considerations for your AI/ML platform

- Build a data strategy
- Provide self-service access to tools
- Create a collaborative environment
- Use a hybrid cloud approach
- Choose open source

Source:
https://www.redhat.com/en/resources/implement-mlops-processes-help-teams-collaborate-checklist

MLOps

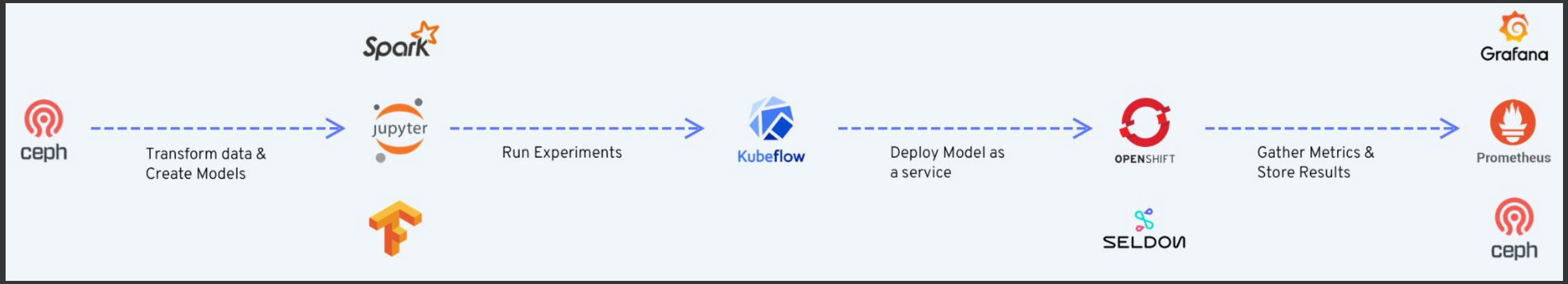
Machine Learning Workflow



Source:
https://cloud.redhat.com/learn/topics/ai-ml
https://www.redhat.com/en/blog/introducing-red-hat-openshift-data-science

Open Data Hub

A Data & AI Platform for the Hybrid Cloud



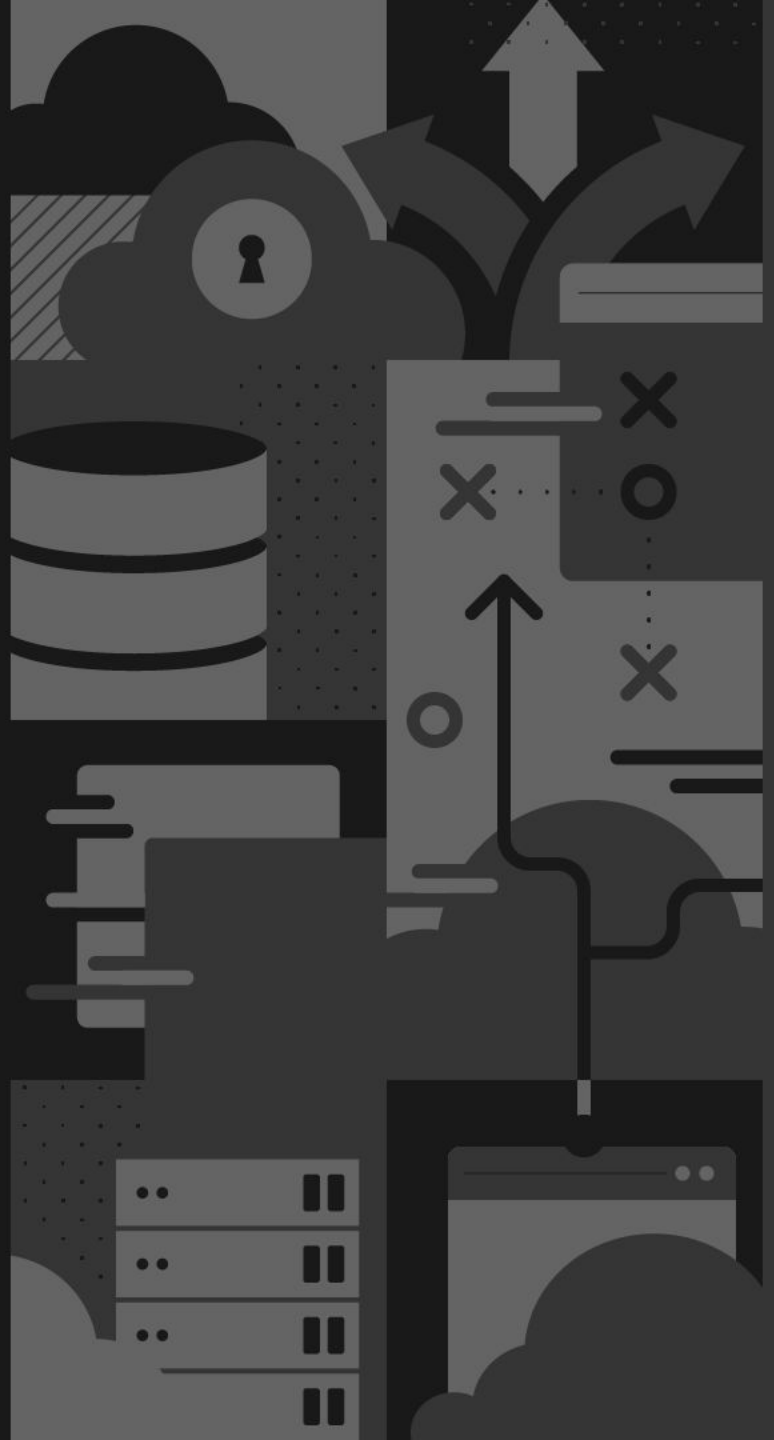
Source:
https://opendatahub.io

Demo

- OpenShift
- Open Data Hub
- Kubeflow
- Google Colab

Links

- https://www.redhat.com/en/technologies/cloud-computing/openshift/openshift-data-science
- https://www.redhat.com/en/technologies/cloud-computing/openshift
- https://www.redhat.com/en/partners/machine-learning-software
- https://cloud.redhat.com/learn/topics/ai-ml
- https://developers.redhat.com/courses
- https://www.kubeflow.org
-



Thank you

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