SAS® Club

Der Business Analytics Club für SAS User
27. November 2019 | Wien

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sas
THE POWER TO KNOW.

SAS in der Cloud

SAS Club Wien, 27.11.2019

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THE POWER TO KNOW®

Agenda

- Überblick SAS & Cloud
- Container
  - Kurze Einführung
  - SAS for Containers Überblick
- Einsatz von Container-Technologie für Analytik

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What does SAS do *in the Cloud*?

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The ***SAS® Cloud*** combines software, infrastructure, and services that are ***designed and managed by SAS*** for optimal performance and value.

SAS provides ***cloud-deployable*** options that allow our customers to run SAS on almost any private, public, or hybrid cloud infrastructure.

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Software as a Service

Off-the-shelf offerings designed to scale and fit for purpose. Sign up, log in, and get to work. Can be modified to your future needs.

Results as a Service

Give us your data and problem, and we give you the answers on which you can take action.

Managed Services

Your software or infrastructure can be hosted or remotely managed by SAS experts 24/7.

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SAS® Cloud

Example Offerings

Software as a Service (SaaS)

- SAS® Visual Analytics
- SAS® Visual Statistics
- SAS® VDMML
- SAS® 360 Plan, SAS® 360 Discover, SAS® 360 Engage

Results as a Service (RaaS)

- SAS® Results: Analytic Insights
- SAS® Results: Fraud Insights
- SAS® Results: Customer Insights
- SAS® Results: Retail Insights

Managed Services

- Remote Managed Services
- Hosted Managed Services

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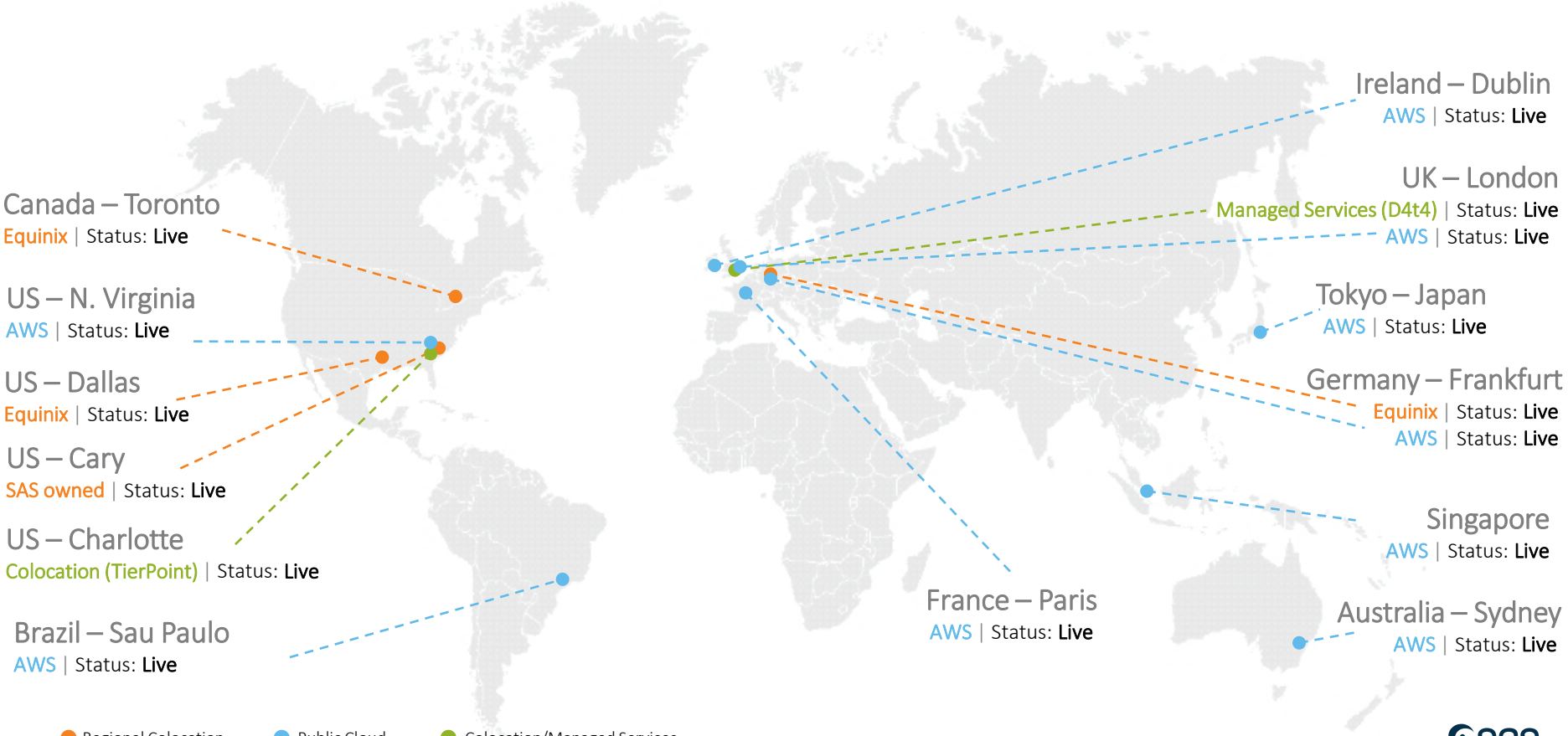
Global Data Center Coverage



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SAS® on
Cloud Providers

General Support for Cloud Providers

Support to run SAS Products on cloud infrastructures, if customers follow system requirements and policy on virtualized environments.

Cloud Deployment Patterns

Support cloud deployment patterns (e.g. containers, orchestration) so that our customers can deploy SAS in a variety of cloud infrastructures.

Cloud-Specific Offerings

Specific offerings and deployment best practices for cloud infrastructure providers.

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SAS® on Cloud Providers

Example Offerings

General Support for Cloud Providers

- General policy on virtualized environments

Cloud Deployment Patterns

- SAS Analytics for Containers
- SAS Analytics for Containers on SAS Viya
- SAS support of Docker Containers and Kubernetes Orchestration

Cloud-Specific Offerings

- Quick Start for
  - AWS
  - Microsoft Azure
  - Google Cloud Platform
- SAS/ACCESS for
  - Amazon Redshift
  - BigQuery
- …

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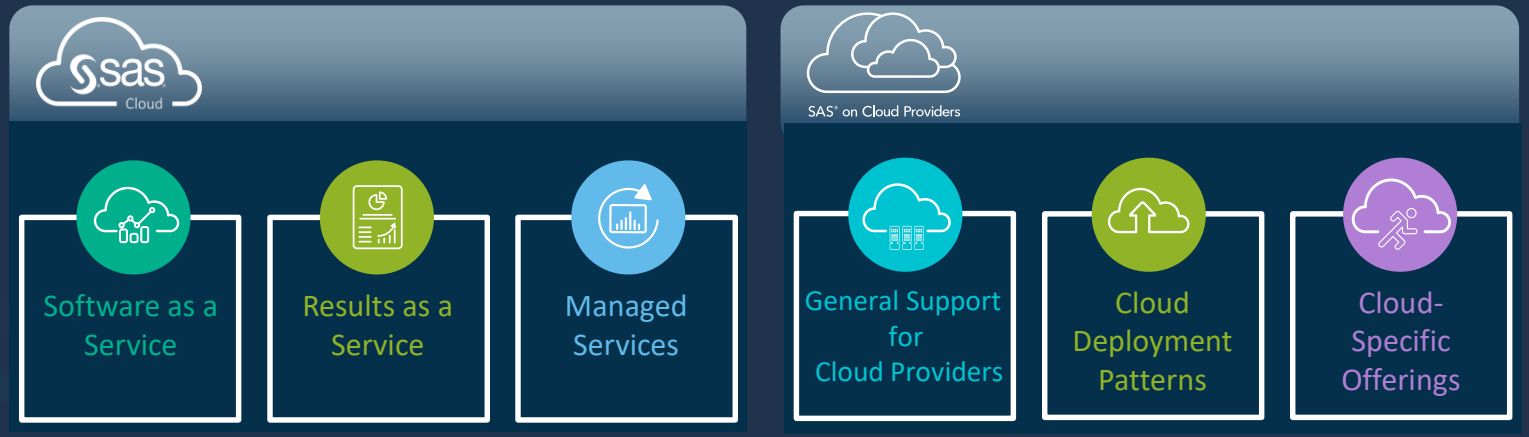
SAS® and Cloud Computing

Our Overall Cloud Strategy



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Containers

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Current State

How we deliver software

- Viya deployments have become highly automated
  - Cloud
  - Cloud tools such as CloudFormation, Terraform
  - Shell scripts
  - SAS Viya ARK
  - Not to mention ansible itself…
- But all Viya deployments are still done on dedicated infrastructure
  - “Always-on” Virtual Machines

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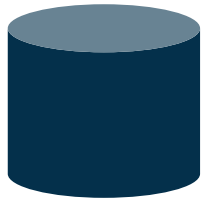
Software Evolution



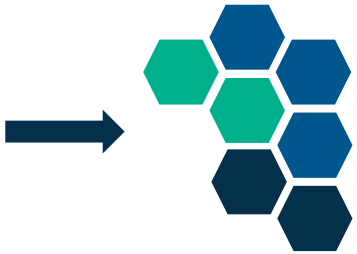
Physical

Cloud

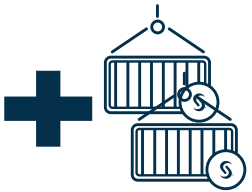
Infrastructure

Applications

Monolith



Microservices



Containers

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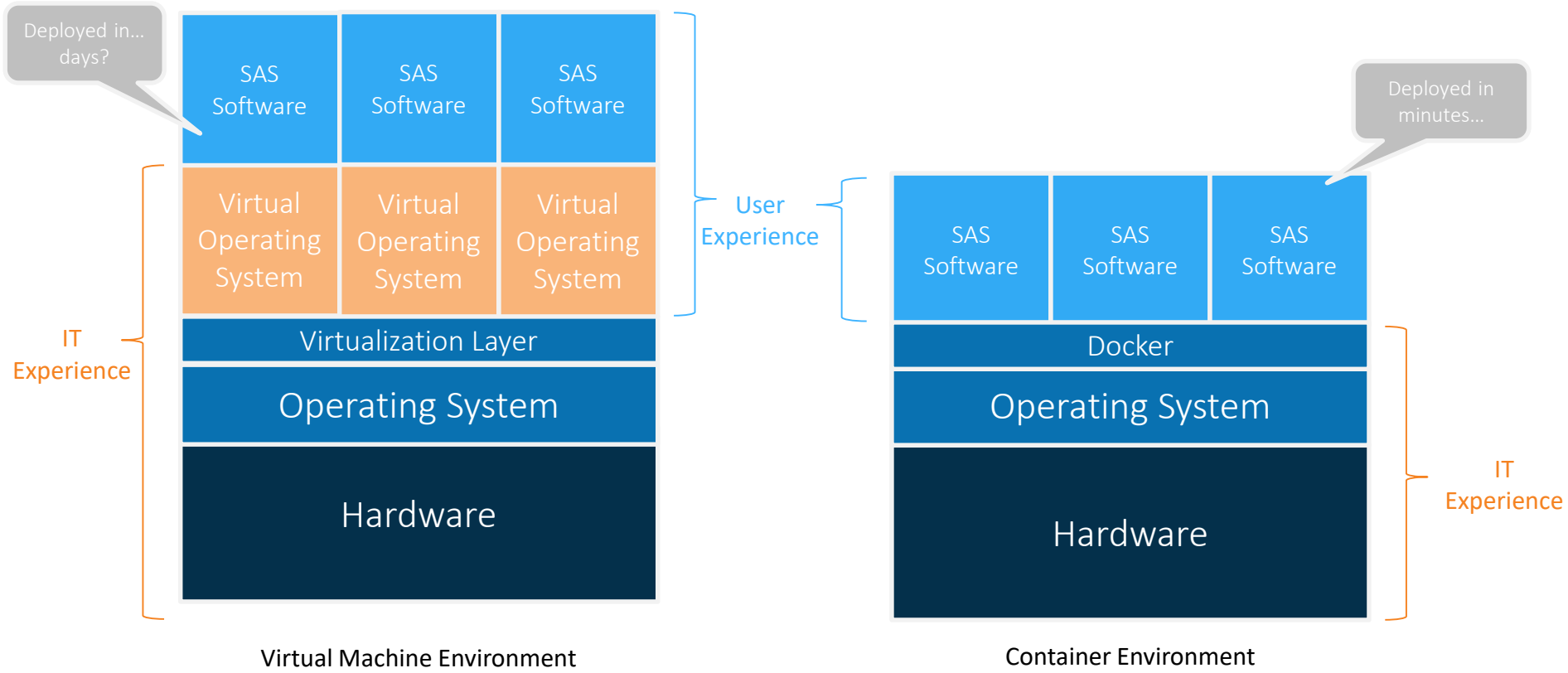
What is a Container?



Virtual Machine Environment

Container Environment

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```
ARG BASEIMAGE=centos
ARG BASETAG=7

FROM $BASEIMAGE:$BASETAG

ENV DOMINO_USER_NAME="centos"

# install pre-reqs
RUN rpmdb --rebuilddb; yum -y install java-1.8.0-openjdk openssh-clients
openssh-server glibc libpng12 libXp libXmu net-tools numactl sudo httpd mod_ssl rsync
which initscripts iproute lsof git wget bzip2; yum clean all

# prerequisites
RUN sed -i "/keepcache=/c\keepcache=1" /etc/yum.conf; sh -c 'echo "* - nofile 20480"
>> /etc/security/limits.conf'; sed -i.bak -e 's/4096/65536/g'
/etc/security/limits.d/20-nproc.conf;

# # Configure users
RUN useradd --create-home --shell /bin/bash ${DOMINO_USER_NAME} &&   sh -c 'echo
"SASpw1" | passwd "${DOMINO_USER_NAME}" --stdin' &&   echo "host localhost user
${DOMINO_USER_NAME} password SASpw1" > /home/${DOMINO_USER_NAME}/.authinfo  &&
useradd -M sas

# use chown to avoid separate run chown command, 1000=centos, 1001=sas
ADD --chown=1001:1001 sashome /nfsshare/sas9/sashome
```

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```
1  ARG BASEIMAGE=centos
2  ARG BASETAG=7
3
4  FROM $BASEIMAGE:$BASETAG
5
6  ENV DOMINO_USER_NAME="centos"
7
8  # install pre-reqs
9  RUN rpmdb --rebuilddb; yum -y install java-1.8.0-openjdk openssh-clients
   openssh-server glibc libpng12 libXp libXmu net-tools numactl sudo httpd mod_ssl rsync
   which initscripts iproute lsof git wget bzip2; yum clean all
10
11 # prerequisites
12 RUN sed -i "/keepcache=/c\keepcache=1" /etc/yum.conf; sh -c 'echo "* - nofile 20480"
   >> /etc/security/limits.conf'; sed -i.bak -e 's/4096/65536/g'
   /etc/security/limits.d/20-nproc.conf;
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   ${DOMINO_USER_NAME} password SASpw1" > /home/${DOMINO_USER_NAME}/.authinfo  &&
   useradd -M sas
16
17 # use chown to avoid separate run chown command, 1000=centos, 1001=sas
18 ADD --chown=1001:1001 sashome /nfsshare/sas9/sashome
```

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Two different flavors

How to get started with containers

Pre-baked

Build your own

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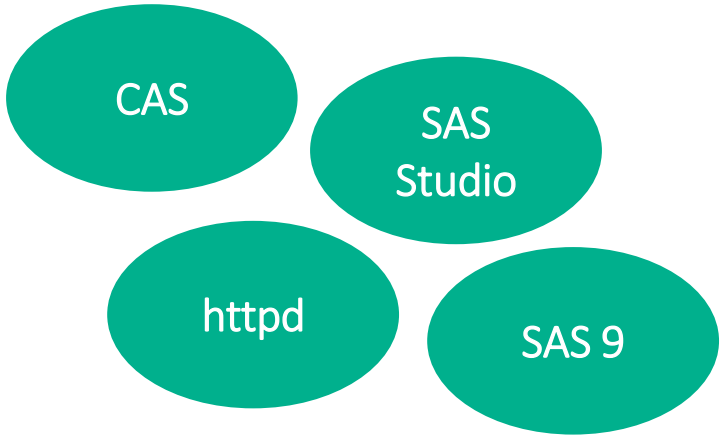
“Single” Container (programming only)
“poac”

- This container image can run on any host where Docker is installed



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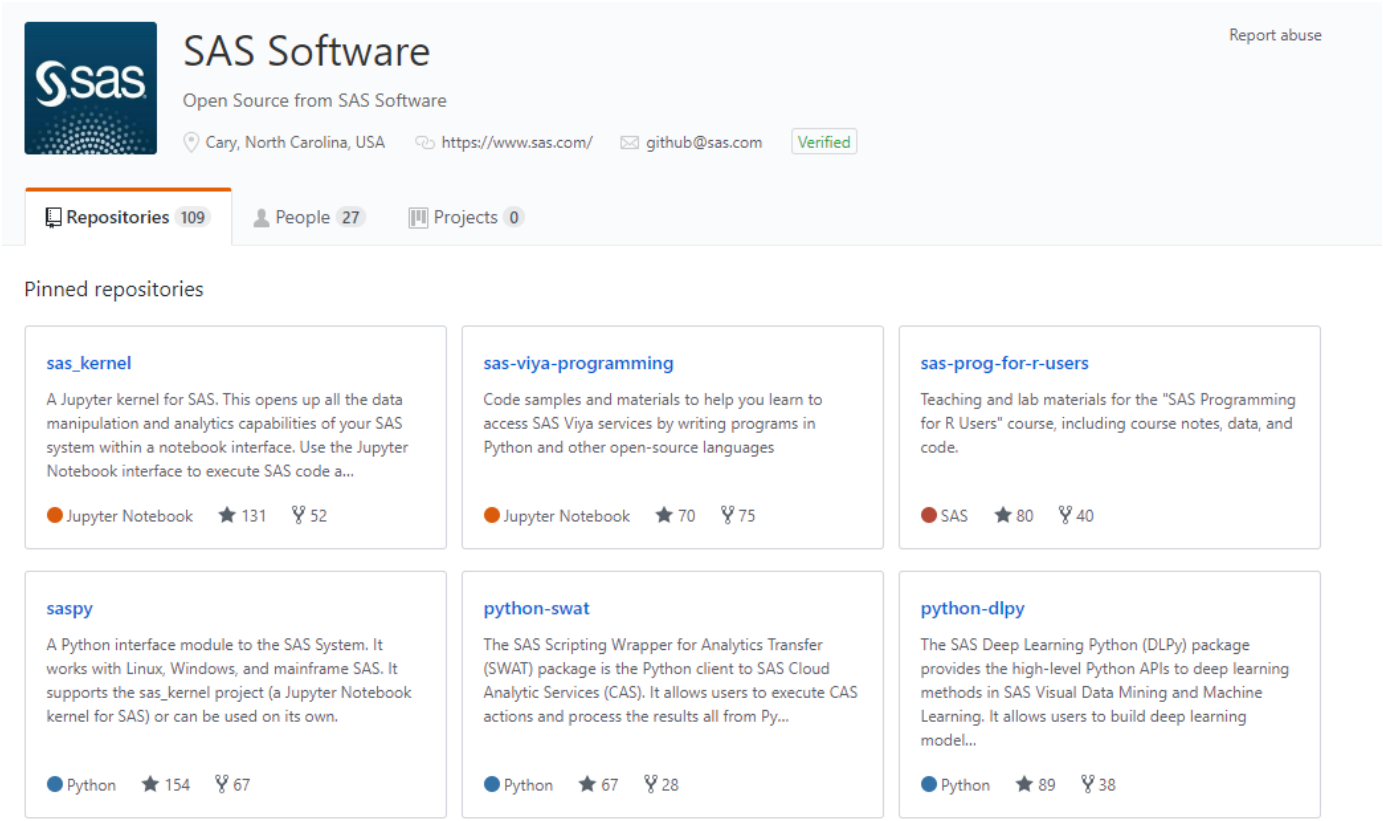
http://github.com/sassoftware



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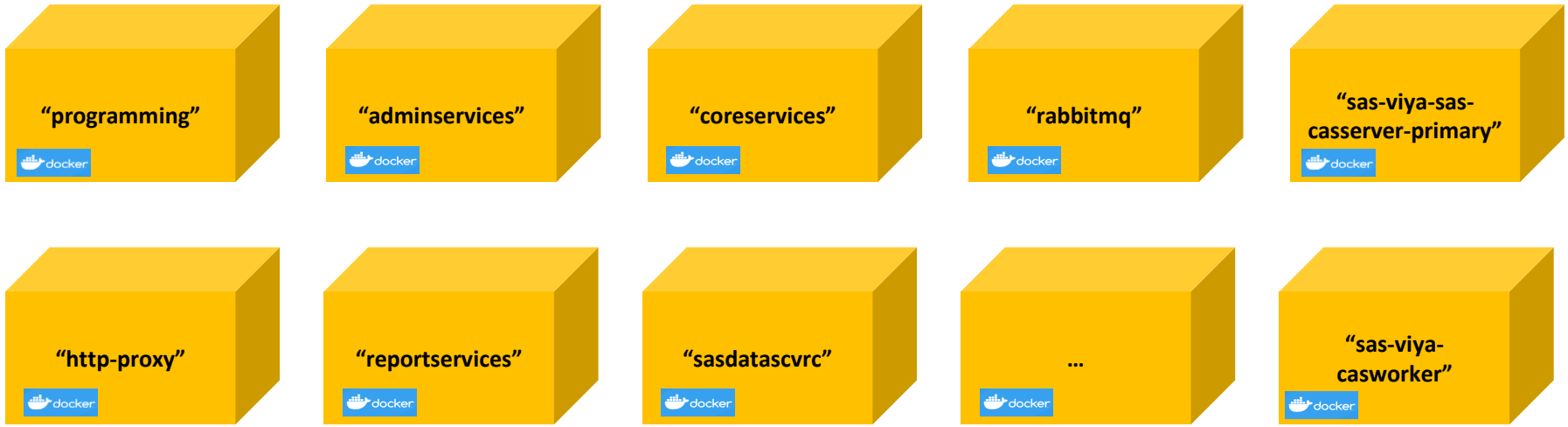
“Full” Containers (viya visuals)

Also can be smp or mpp cas

- These container images can run on any Kubernetes cluster



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Container Recipe vs Image

SAS "stuff" in a Docker Container

- Build your own
- Whether you ***should or not***, is up to you
- Not tested, limited support
- Our customers are ***trying*** this today

Container Recipe from SAS

- Instructions for building your own
- Tested and supported
- Can be modified to some extent
- 9.4 available now, SAS Viya available now

Container Image from SAS

- Already created
- Tested and supported
- Limited customizations
- SAS Viya

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Workloads Suitable for Containers

Data Science Workbench

- Individual workspaces
- Spin up when needed
- Scalable compute
- Code in SAS, Python or R
- Domino Data Lab

Runtime engine

- Single purpose
- Packaged with model and decision code
- Spin up multiple containers to scale out
- Integrate with DevOps
- Suitable for edge deployment

Full platform – work in progress

- Collaborative workspaces
- Visual interfaces

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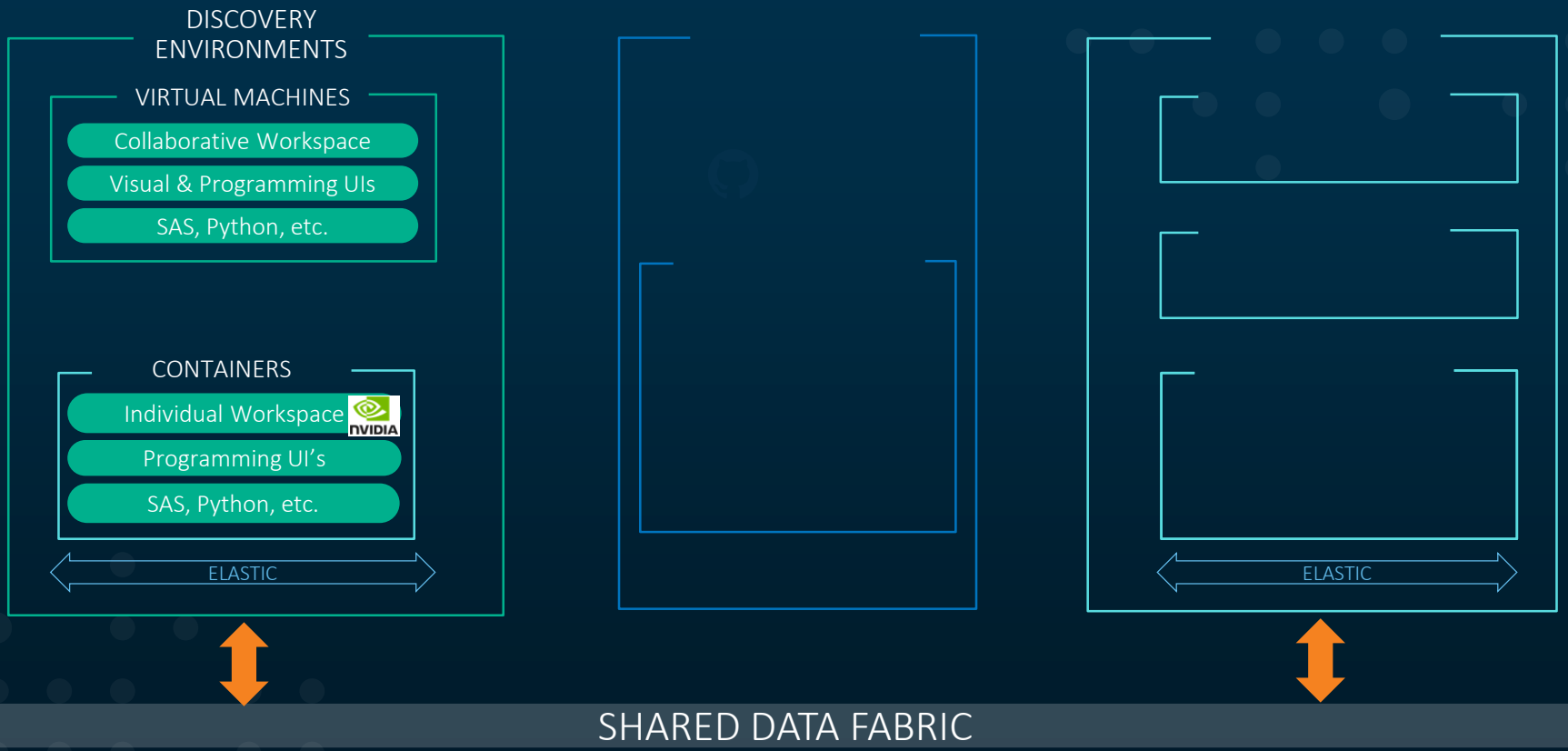
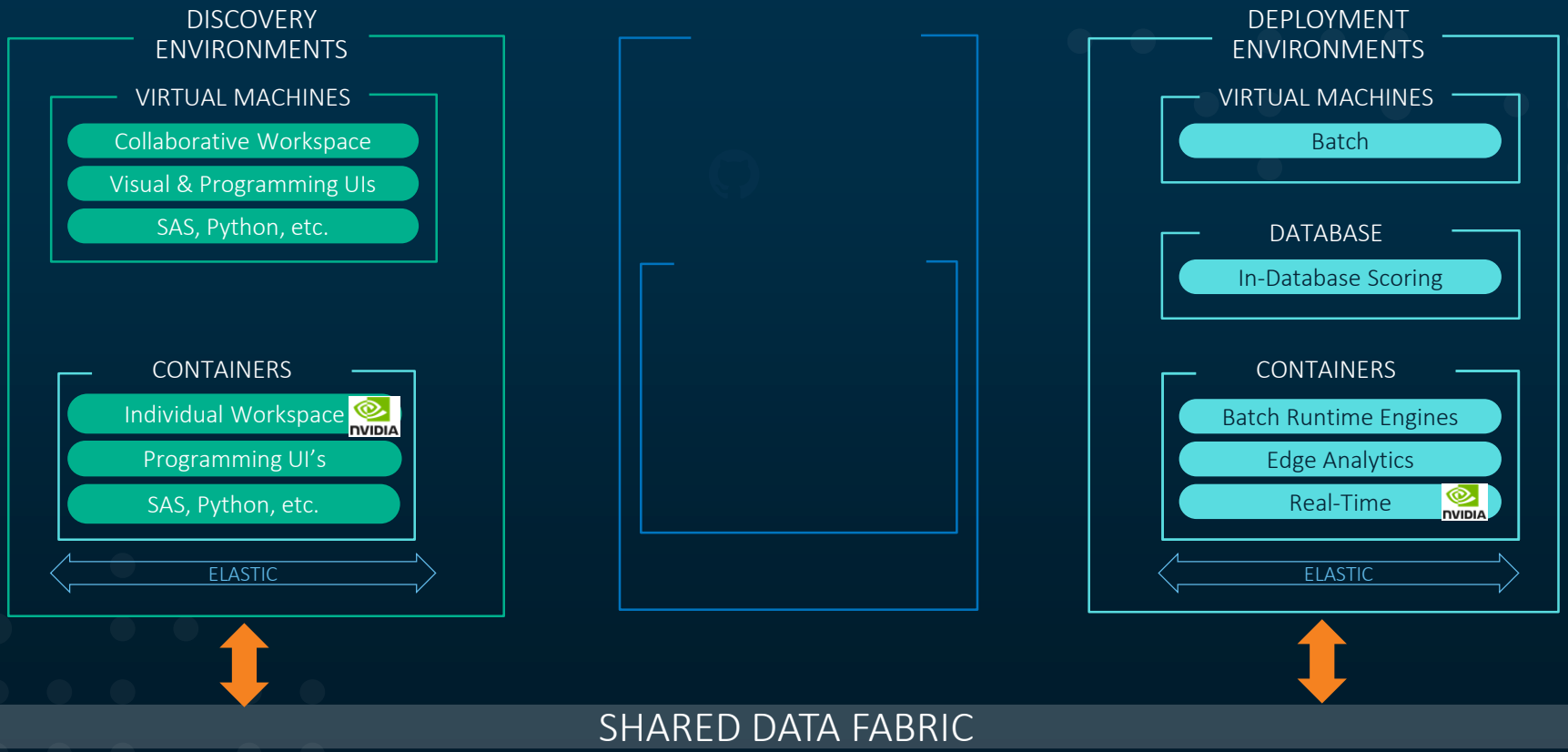
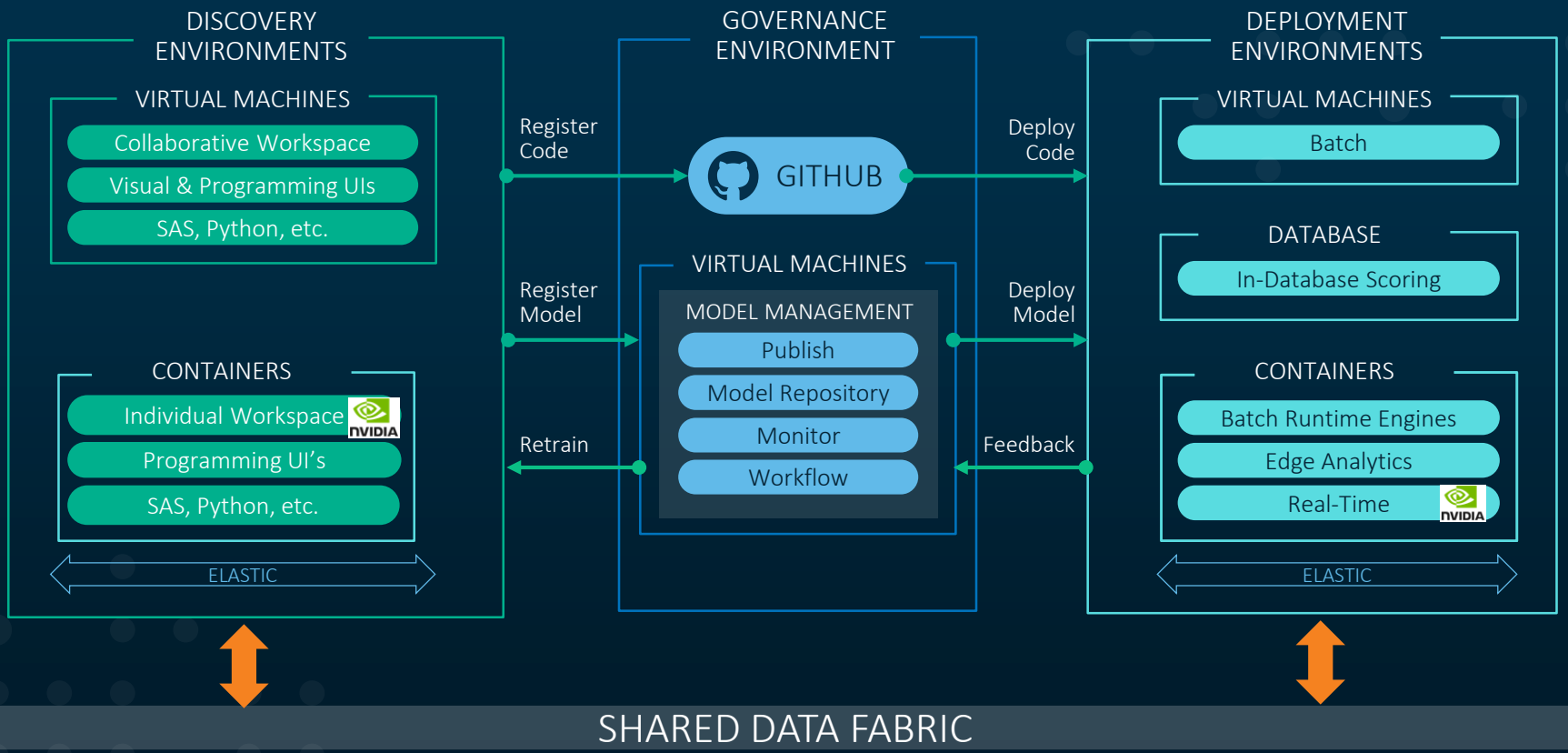
Enterprise KI Plattform: logische Architektur



Enterprise KI Plattform: logische Architektur



Enterprise KI Plattform: logische Architektur

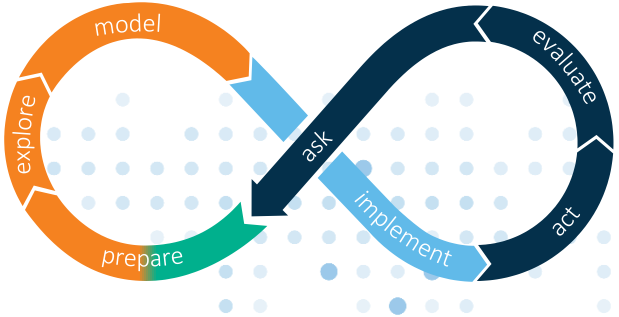


SAS Model Developer

Build and Spin Up a Model Development Container

Develop a Model in the Container

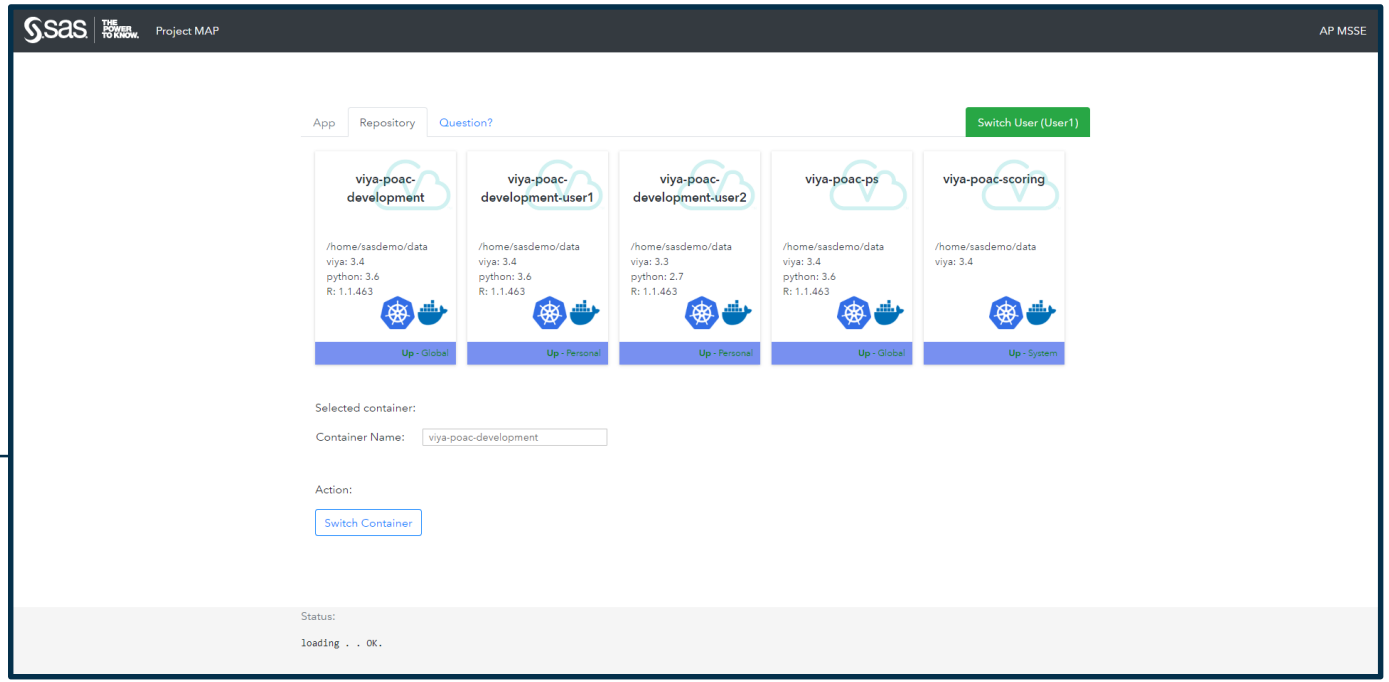
Register the Model to a Central Repository



Build and Spin Up a Model Development Container

Identify what is needed for modeling

Spin up container with software for modeling



Develop a Model in the Container

Build Models in Visual Interface

Compare Development Models

CONTINUE

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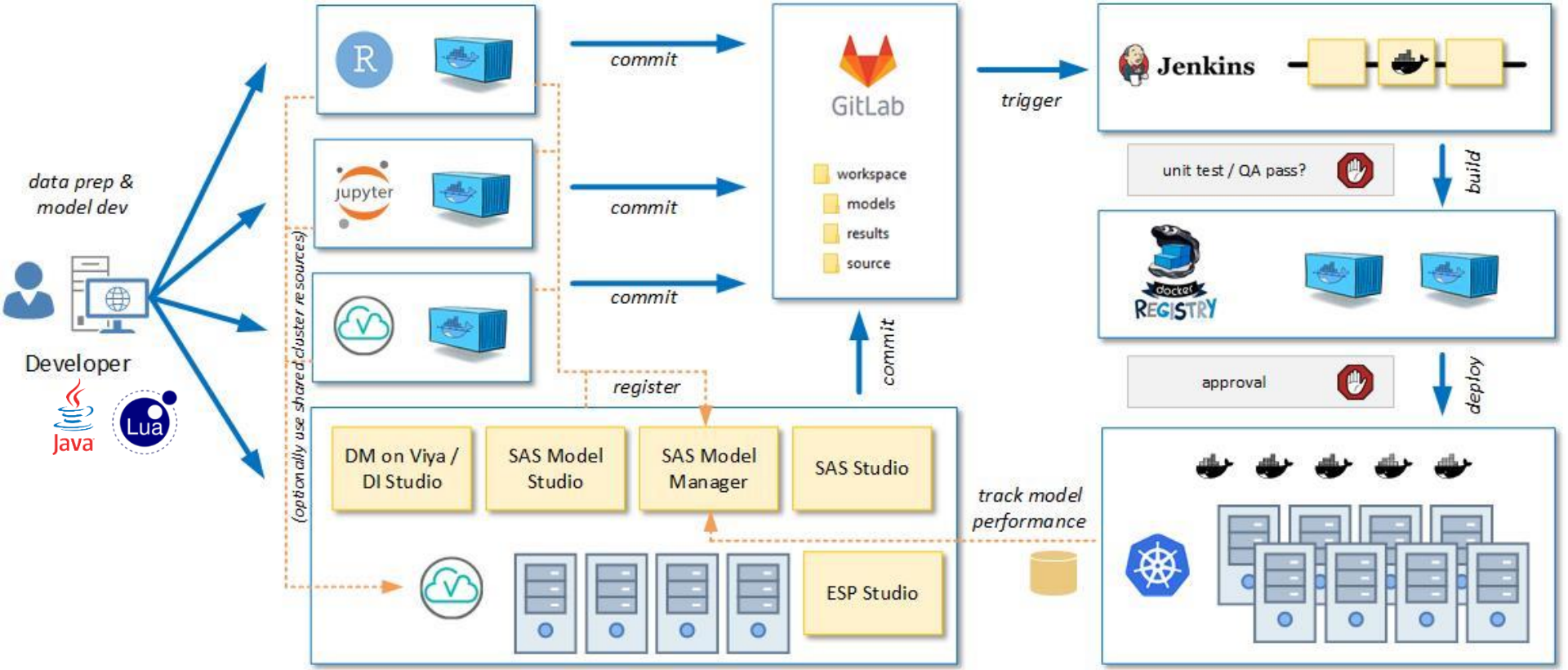
Register the Model to a Central Repository

Click button to Register Model in Model Repository

Build – ship – run



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