BEST OF BOTH WORLDS: SAS AND OPEN SOURCE
SAS AS AN OPEN PLATFORM

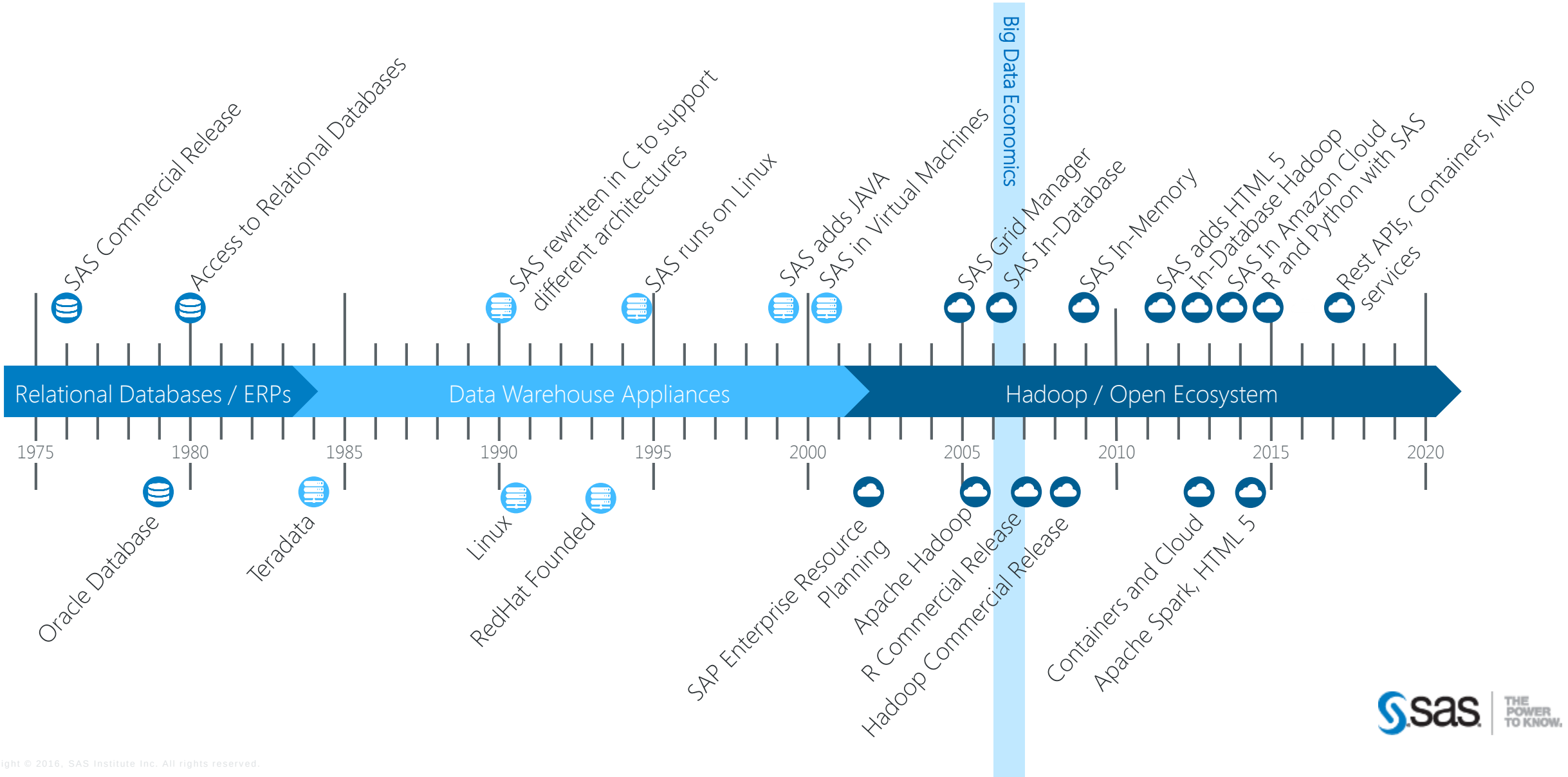
OPEN ANALYTICS DAY
BUDAPEST BI FORUM, 26 OCT 2016

Tuba Islam
SAS Global Technology Practice

- SAS' openness
- How SAS embraces and extends open source
- Demonstration of open source and SAS integration

SAS – MARKET PERCEPTION

EVOLUTION OF ANALYTICS MARKET AND SAS' OPEN TIMELINE



NEW OPEN ARCHITECTURE: SAS® VIYA™

Visual Interfaces

Programming Interfaces

python™

sas

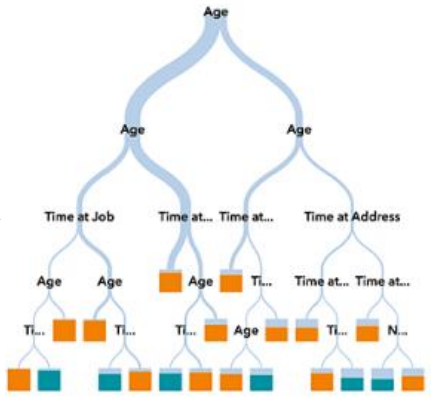
Java

Future Plans:

R

API Interfaces

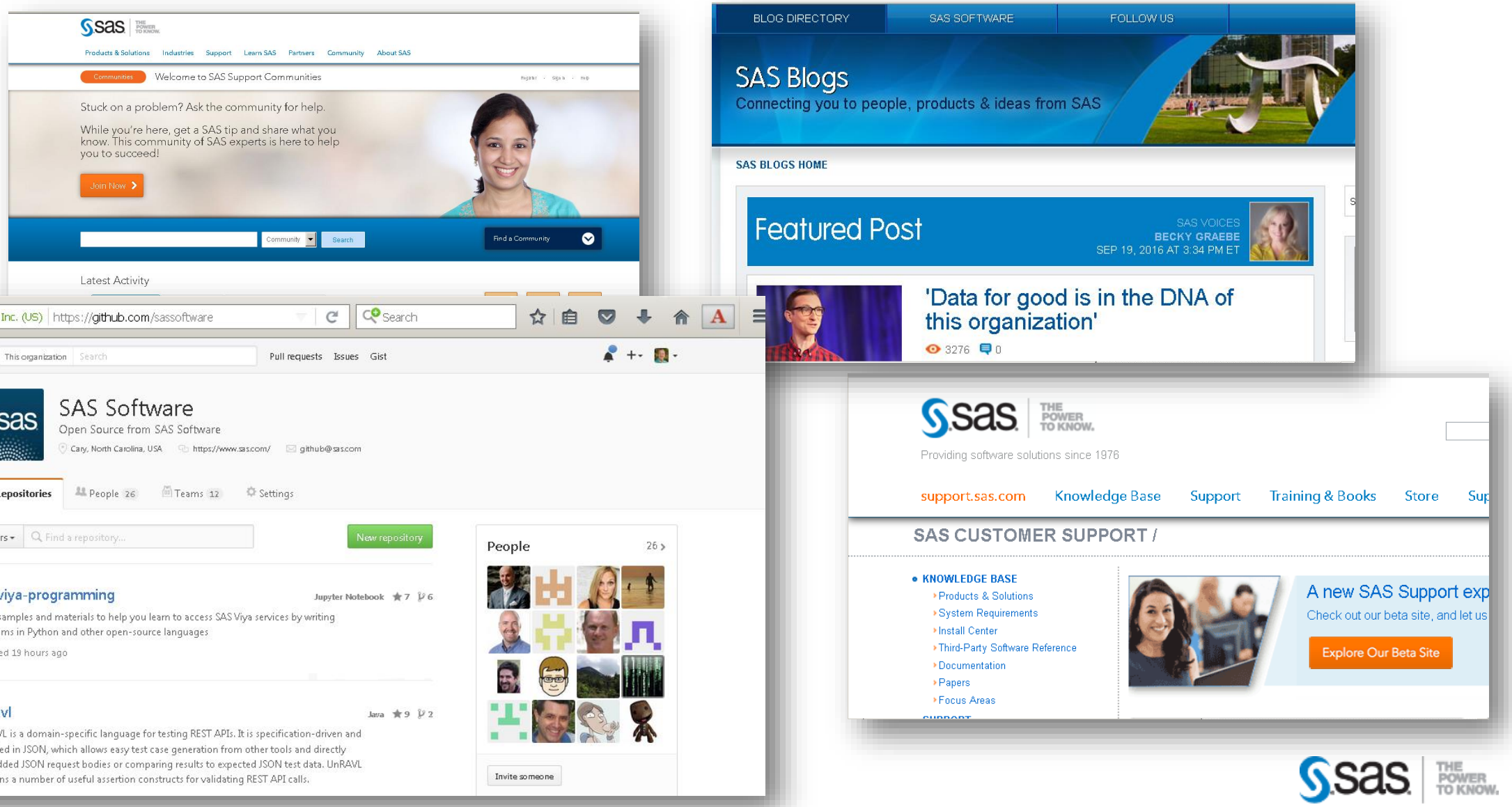
REST API



SAS® Viya™

sas THE POWER TO KNOW.

BEING MORE OPEN: Share of Knowledge and Collaborative Work



FREE SAS RESOURCES AVAILABLE ONLINE

FREE SOFTWARE, FREE TRAINING

SAS on Demand for Academics

42,956 total registered users

SAS University Edition

567,955 total downloads

SAS University Edition on AWS

2,638 total subscribers

8,621,212 total usage hours

sas THE POWER TO KNOW.

- SAS' openness
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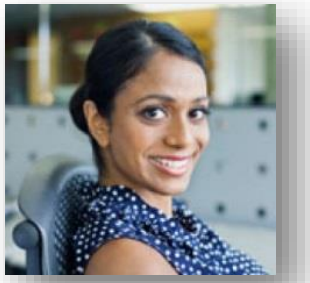
- Demonstration of open source and SAS integration

OPEN DISCUSSIONS…

- Are all your models equal? *Or some are more equal?*
  - Spending **weeks** to build a fraud model vs a couple of **hours** for propensity.
  - Executing the churn detection **every day** vs a product launch **only once**.

- Analytical resources are scarce and they have diverse skills
  - How to enabling more people to develop many models easily and work collaboratively? How to allow data scientists to code in their language of choice?



- The speed of deployment brings value in return
  - How to move from development to production easily and efficiently with no risk of making errors? How to deal with massive deployments?

SAS as an Integrated Open Platform

- Joint development and deep integration with Hadoop
- Rapid prototyping and utilising all available resources
- Incorporating open source models into the analytical life cycle
- Providing governance and lineage of data and models
- Scalability and speed in deployment without any recoding

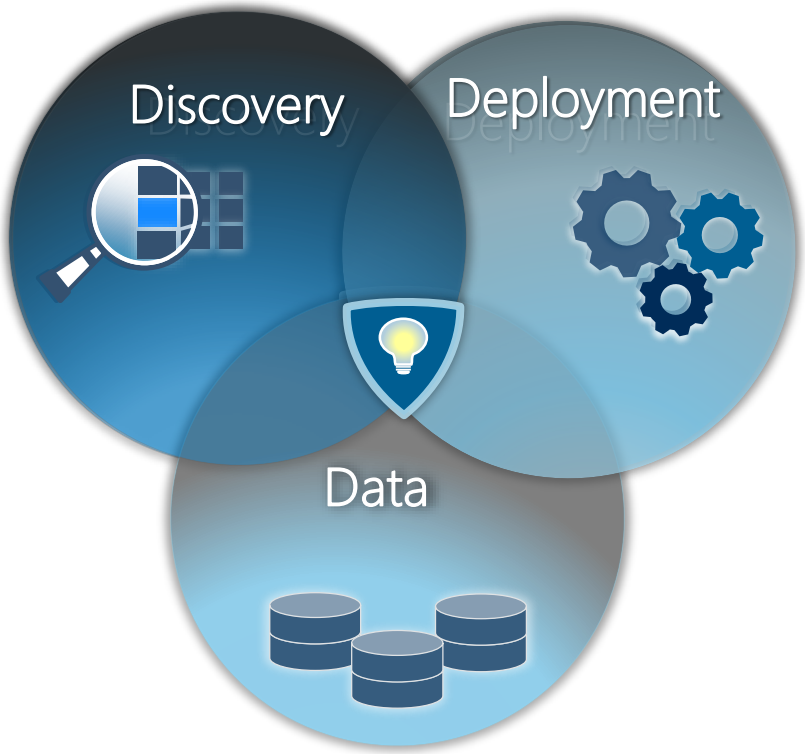
- SAS' openness
- How SAS embraces and extends open source
- Demonstration of open source and SAS integration

DEMO SCENARIO 1

OPERATIONALISING R MODELS WITH SAS

THE ANALYTICS LIFECYCLE – A Best Practice Open Journey

EMBRACING AND EXTENDING OPEN SOURCE



SAS Data Transformation **in Hadoop**

Build model in **SAS and Open Source** and select the champion

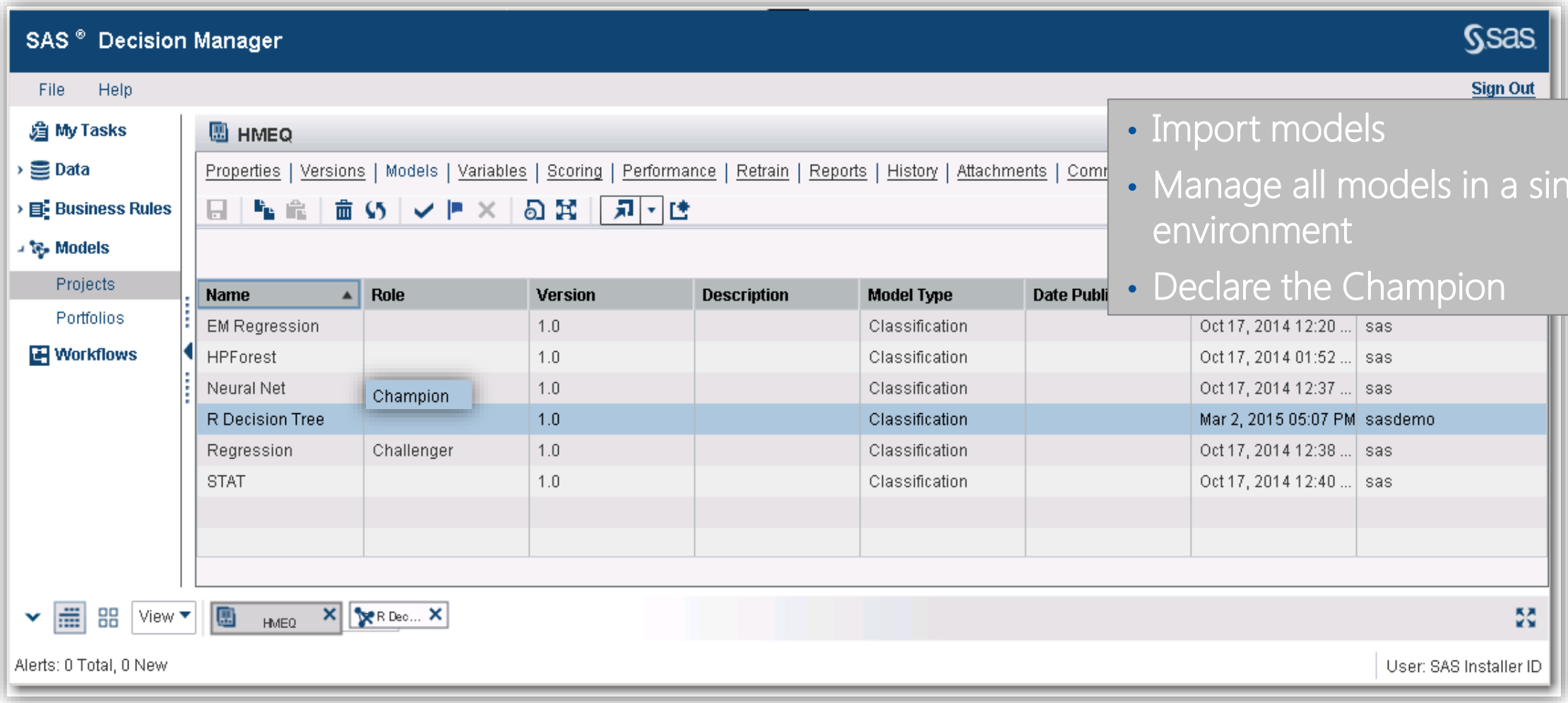
Monitor model performance of SAS and Open Source

Deploy Open Source code **instantly** for **in-database or real time scoring**

Access and share the analytical insight quickly and take **decisions at scale**

SAS platform supporting the entire analytical life cycle and operationalising open source

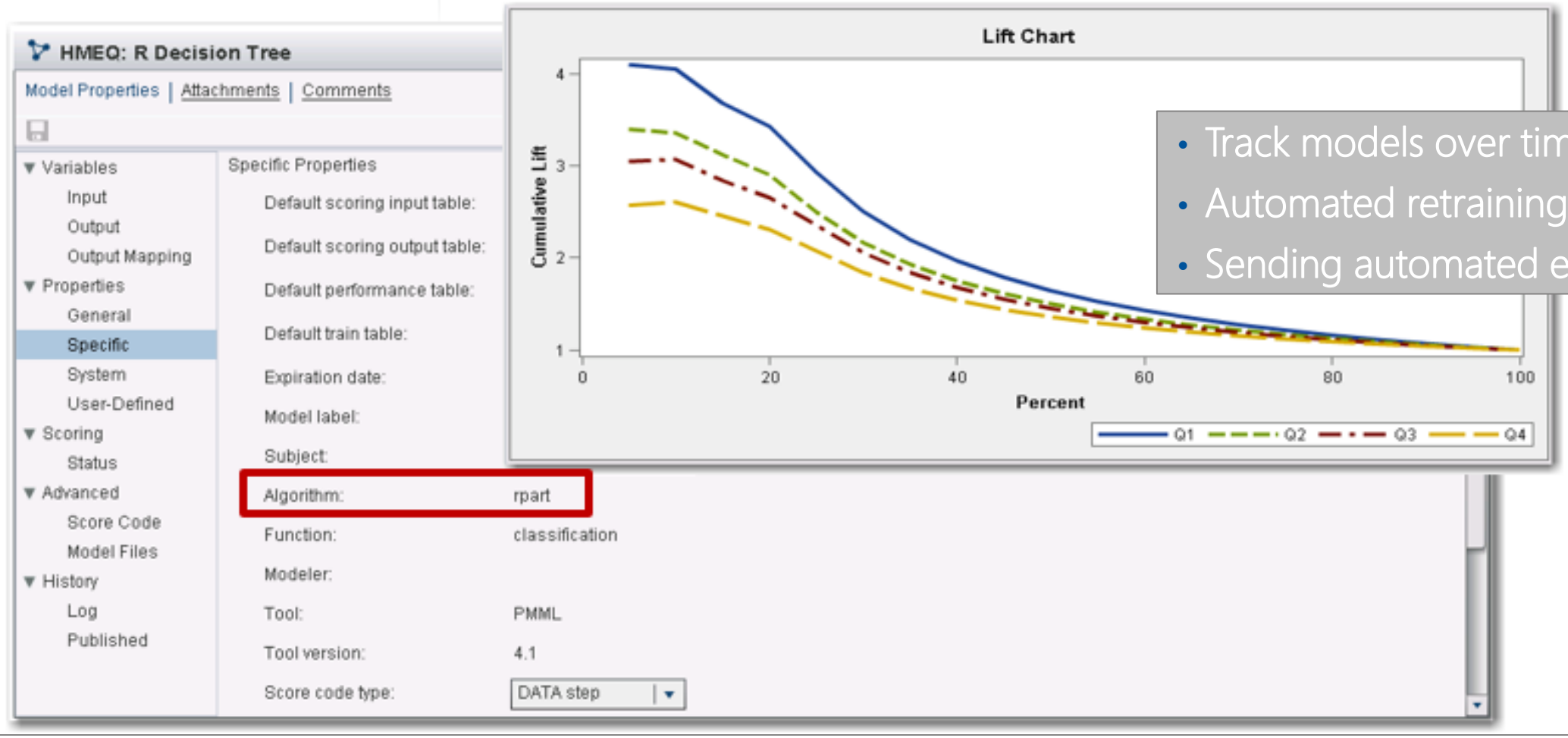
CENTRALISED MANAGEMENT ALL MODELS INCLUDING OPEN SOURCE



- Import models
- Manage all models in a single environment
- Declare the Champion

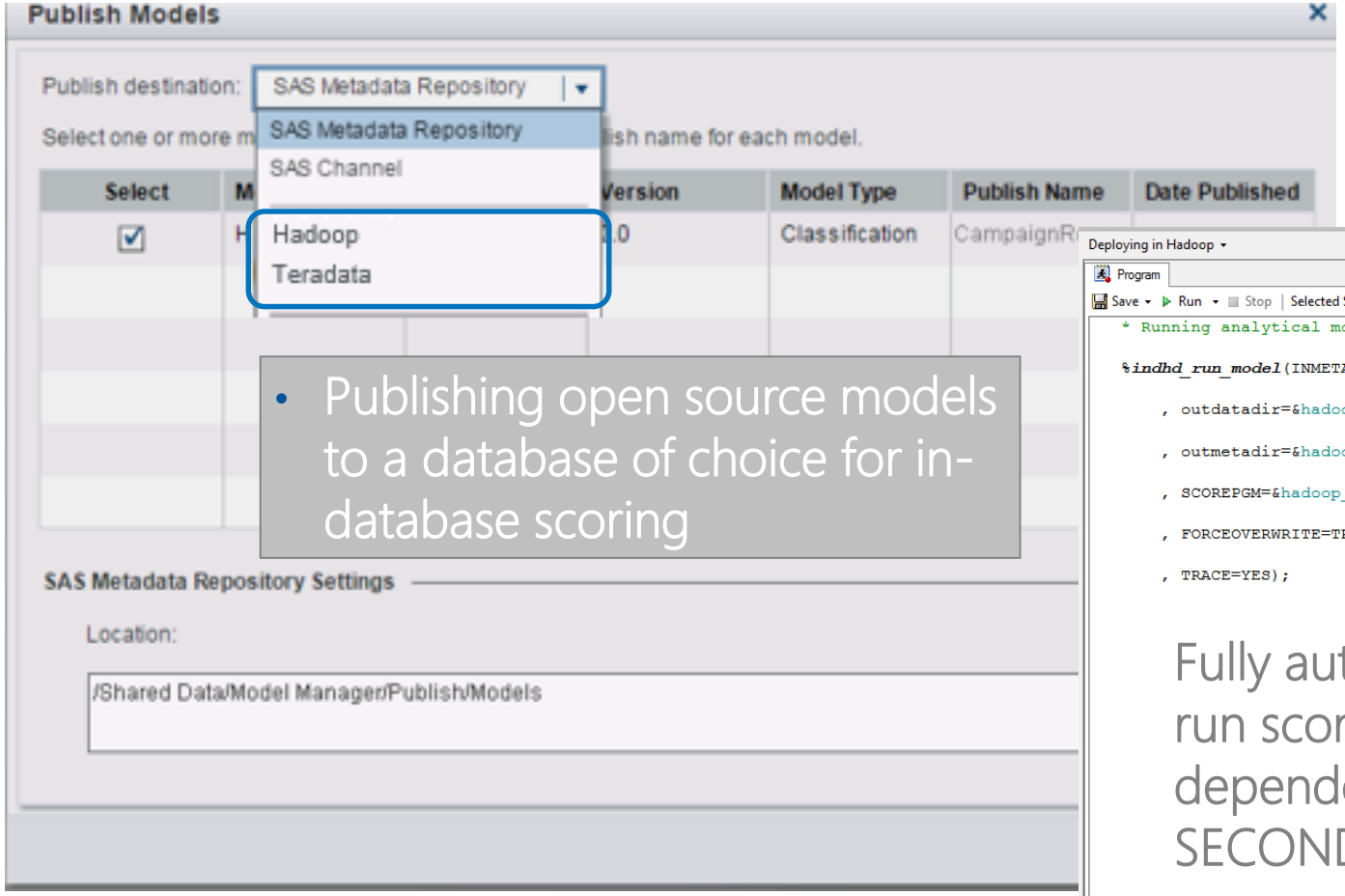
sas THE POWER TO KNOW.

PERFORMANCE TRACKING AND AUTOMATED RETRAINING

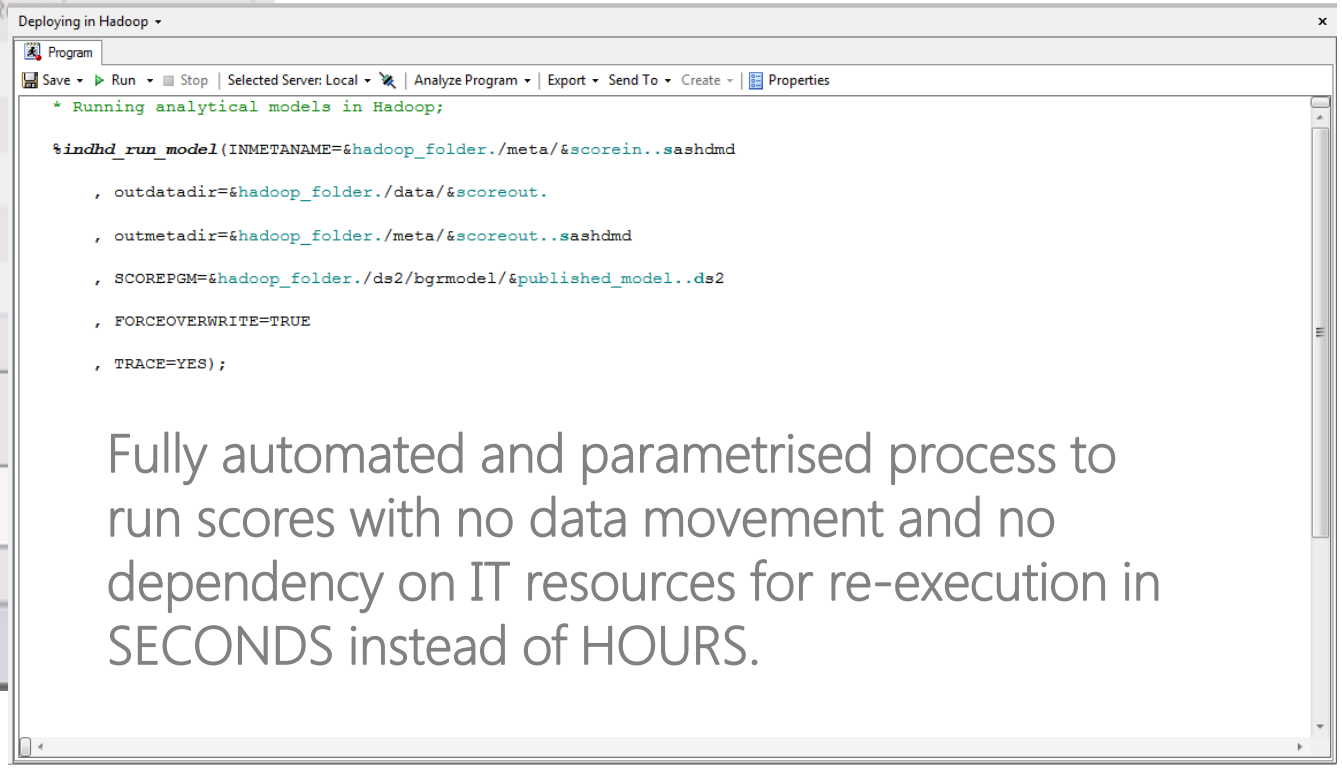


- Track models over time
- Automated retraining
- Sending automated e-mail alerts

PUBLISHING IN-DATABASE OR DEPLOYING IN REAL-TIME



- Publishing open source models to a database of choice for in-database scoring



Fully automated and parametrised process to run scores with no data movement and no dependency on IT resources for re-execution in SECONDS instead of HOURS.

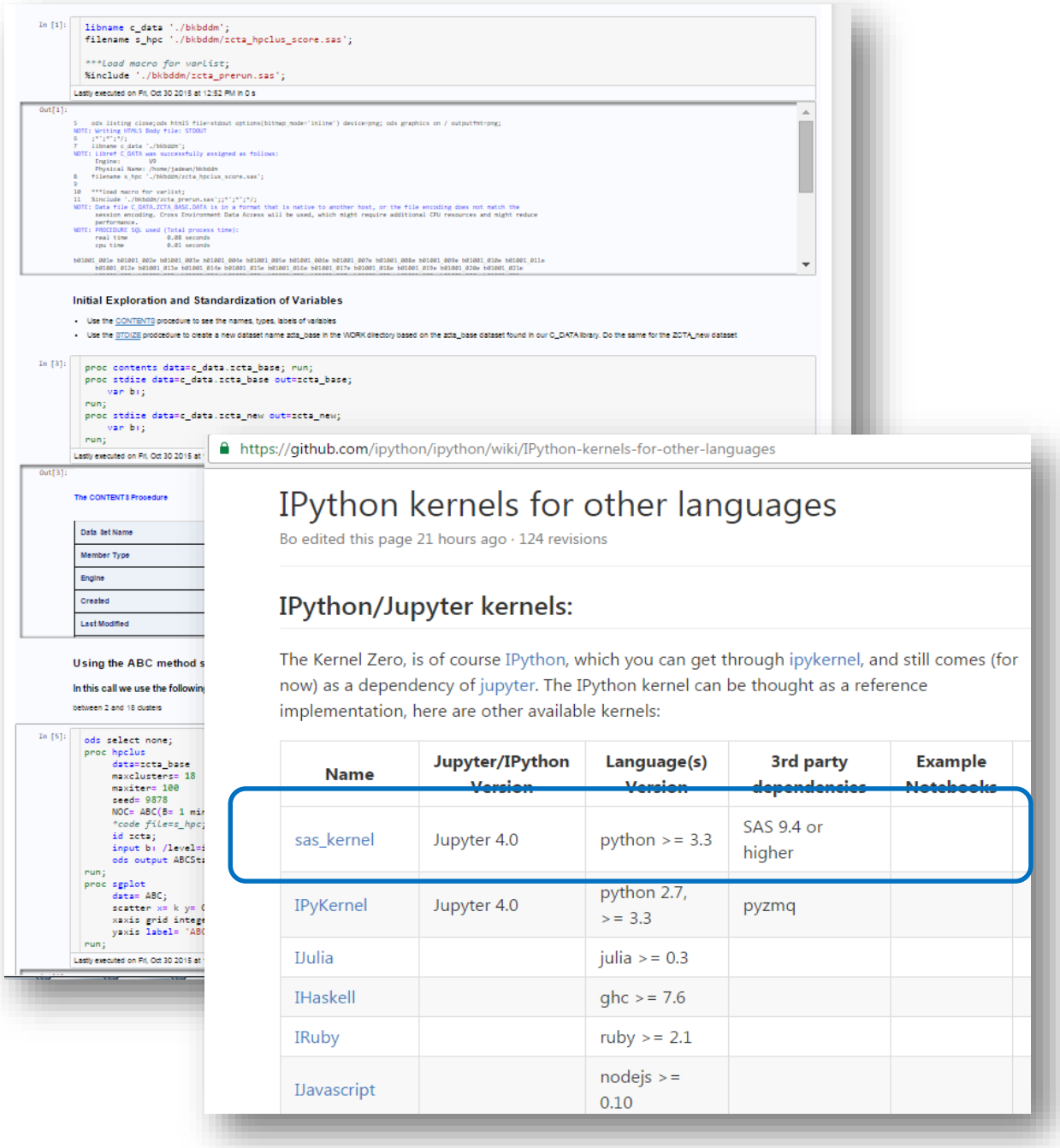
DEMO SCENARIO 2

USING SAS AND PYTHON TOGETHER IN JUPYTER NOTEBOOK

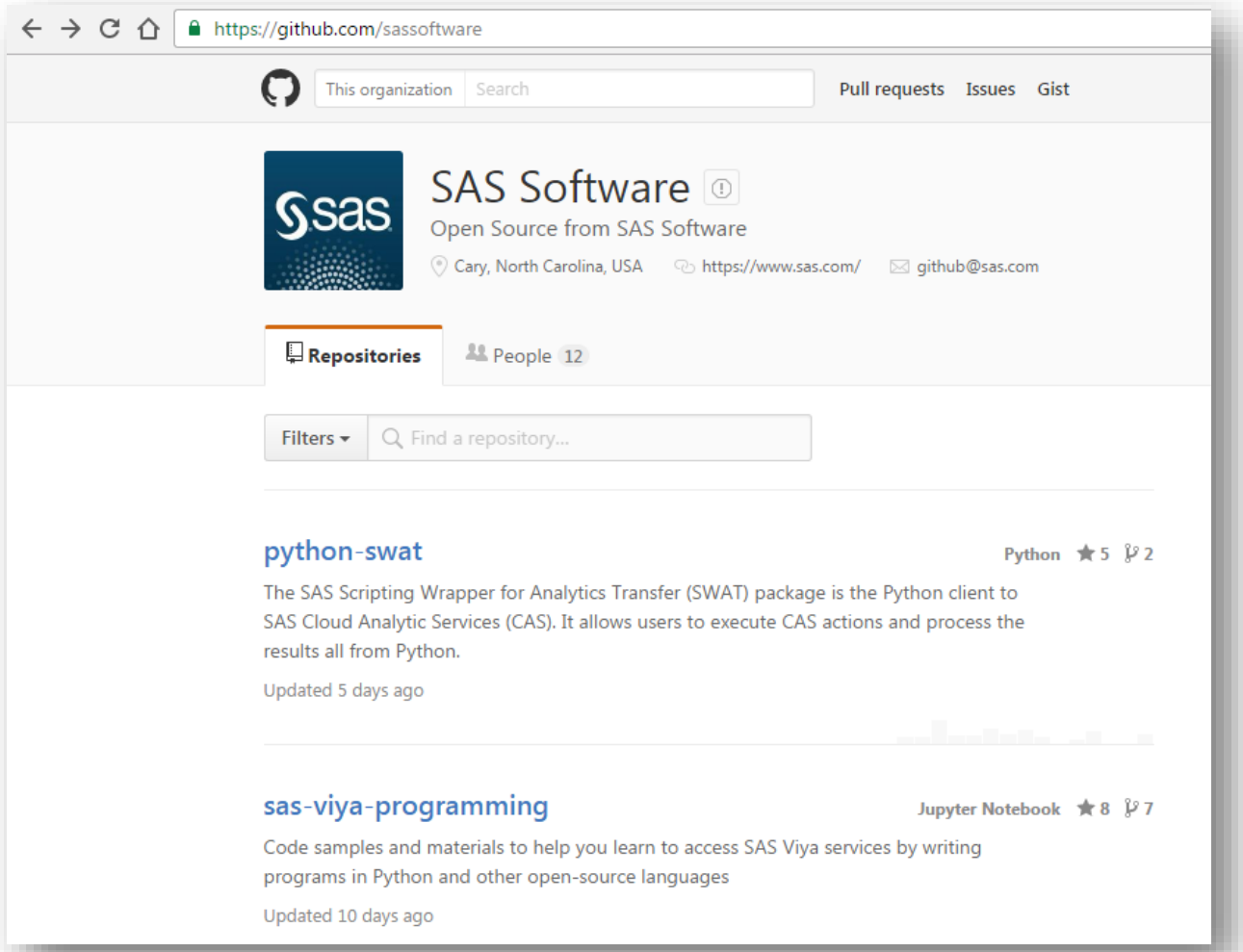
Python is an interpreted, object-oriented, high-level programming language with modular libraries that support data extraction and processing.

The Jupyter Notebook is a web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text.

The notebook has support for over 40 languages including SAS and Python.



SAS on GitHub



SAS kernel for Jupyter Notebook:
https://github.com/sassoftware/sas_kernel

SAS Cell Magic for Python:
https://github.com/sassoftware/saspy

SAS Viya Open API for Python:
https://github.com/sassoftware/python-swat

Home | Analysing Customer Rev

gbrblade5-08.suk.sas.com:8888/notebooks/Analysing%20Customer%20Reviews%20using%20SAS%20Text%20Mining%20in%20Python.ipynb#

jupyter Analysing Customer Reviews using SAS Text Mining in Python Last Checkpoint: a minute ago (unsaved changes)

File Edit View Insert Cell Kernel Help Python [Root]

Markdown CellToolbar

Voice of the Customer: Processing online airline reviews

Loading SAS kernel and SAS Cell Magic for Jupyter Notebook: https://github.com/sassoftware/saspy

In [ ]:
```
%load_ext saspy.sas_magic
```

Display available cell magics - %%SAS is one of them.

In [ ]:
```
%lsmagic
```

Define a SAS library

In [ ]:
```
%%SAS
libname mylib "/home/sasinst/data";
```

Import review data from web using python (for demo purpose only)

In [ ]:
```
import requests
dls = "http://www.airlinequality.com/review-pages/latest-airline-reviews/all_reviews.xls"
resp = requests.get(dls)
output = open('airline_reviews.xls', 'wb')
```

A POTENTIAL BUSINESS APPLICATION FOR IMAGE PROCESSING

Severity analysis of car damage

Biggest challenge for image processing (as always) : Quality of the data

- Condition of the day (dark, bright)
- Resolution of the image (blurred, zoomed in, out)
- Angle of the capture (alignment, referencing)

jupyter SAS Viya Image Processing Demo for Car Damage Last Checkpoint: 20 minutes ago (unsaved changes)

File Edit View Insert Cell Kernel Help

Apply noise reduction and binarization

```
In [35]: r = s.image.processImages(casout={'name':'resultingImages','replace':True},
             imagetable={'name':'inputTable_resized'},
             imagefunctions=[
                 {'options':{'functiontype':'CONVERT_COLOR'}}, #change color space

                 {'options':{'functiontype':'BILATERAL_FILTER', #noise reduction
                             'diameter':13,'sigmacolor':30,'sigmaspace':30}},

                 {'options':{'functiontype':'THRESHOLD', #image binarization
                             'type':'OTSU','value':125}}
             ])
print(r)
outTable = s.CASTable('resultingImages')
imageShow(s, outTable,0, nimage)
```

Calling SAS Viya image processing actions from python

```
NOTE: Table INPUTTABLE_RESIZED contains compressed images.
NOTE: 4 out of 4 images were processed successfully and saved as compressed images to the Cloud Analytic Services table resulti
ngImages.
+ Elapsed: 0.488s, user: 1.44s, sys: 0.056s, mem: 195mb
```

CUSTOMER SUCCESS STORIES

MUNICH RE INSURANCE

"With these new technologies (Hadoop and SAS Text Analytics), we are considerably enhancing our global ability to combine our customers' data with our own findings and expert knowledge."

Chief Executive Officer

A MAJOR INTERNATIONAL BANK

"SAS has outpaced any vendor in its speed and breadth… in moving with us to open source, they have turned on a dime on delivering for us. SAS is data-agnostic, making analyzing data coming in from anywhere easy. Management can now visualize the results of analytics on our customer data in seconds."

Chief Data Officer

NORTH AMERICAN TELCO SERVICE PROVIDER

"The proven capability, security and the continuity of SAS is its strength within our organization. Open source has its place, and will continue to work in tandem with our SAS implementation."

Principal Analyst, Business Systems

SAS – MARKET PERCEPTION

BEST OF BOTH WORLDS: SAS AND OPEN SOURCE
SAS AS AN OPEN PLATFORM

- ✓Quick Access to Intelligence
  - Enabling **more users**
  - **Operationalising** analytics
- ✓Improved Productivity
  - **Freedom** of choice of language
  - Utilising **all resources**
  - **Collaborative** environment
- ✓Governance and Lineage
  - Managing an **enterprise** ecosystem

THANK YOU FOR LISTENING

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