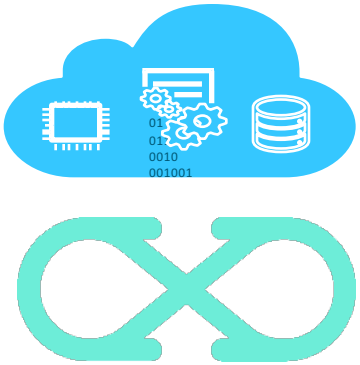
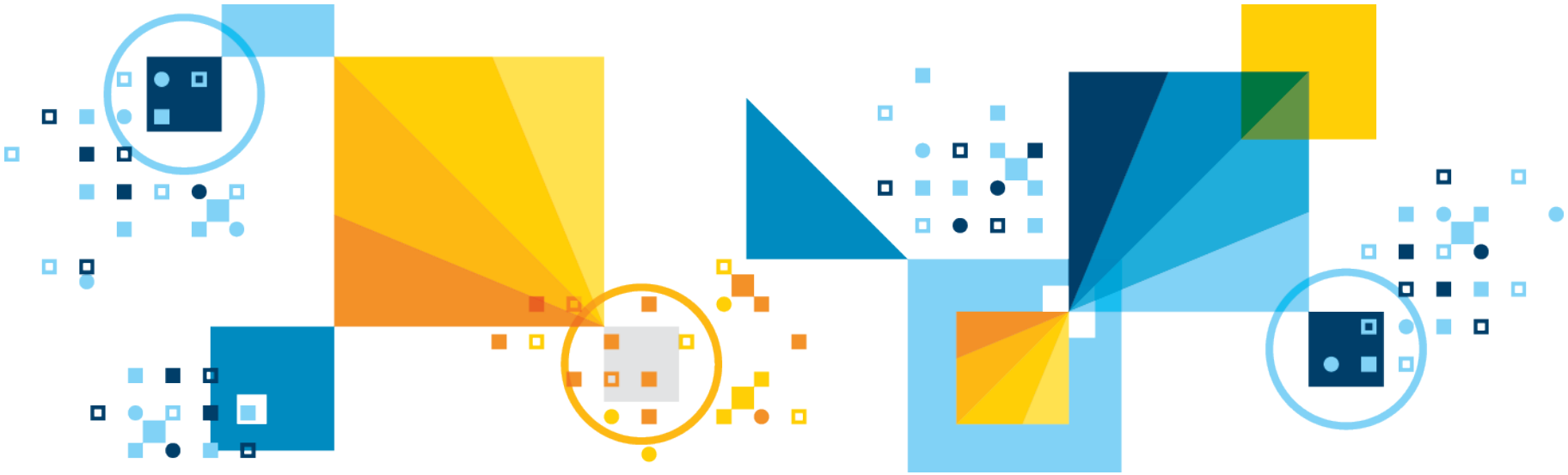
IBM IoT Analytics in the Cloud



Steve Geringer, Data Science Solutions Architect

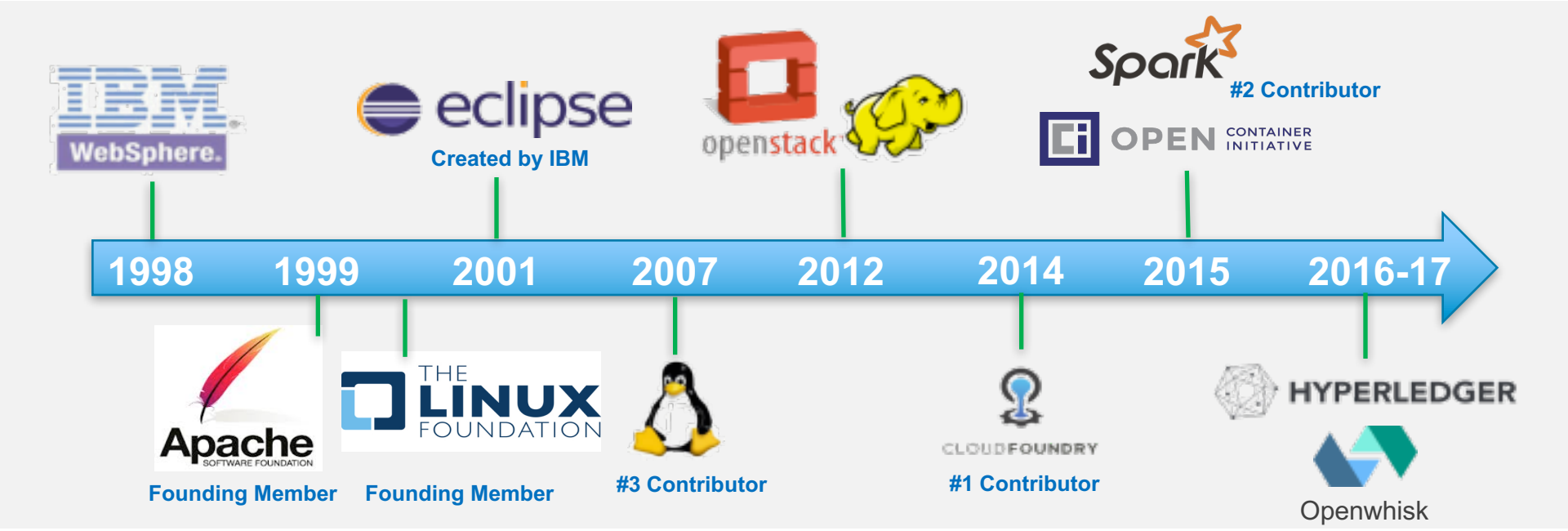
Steve.Geringer@IBM.com



Background

- **About Me:**
  - Data Science Solutions Architect
  - IBM Analytics team covering
    - Healthcare, Life Sciences and State/Local Government.
  - Achieved the "Kaggle Competitions Expert" Designation
    - Earned two Silver Medals in Kaggle Machine Learning Competitions.
  - Steve.Geringer@ibm.com

IBM Has a Rich History with Open Source



IBM and Open Source:

Today companies have lots of options

Open Source Only

Significant Assembly

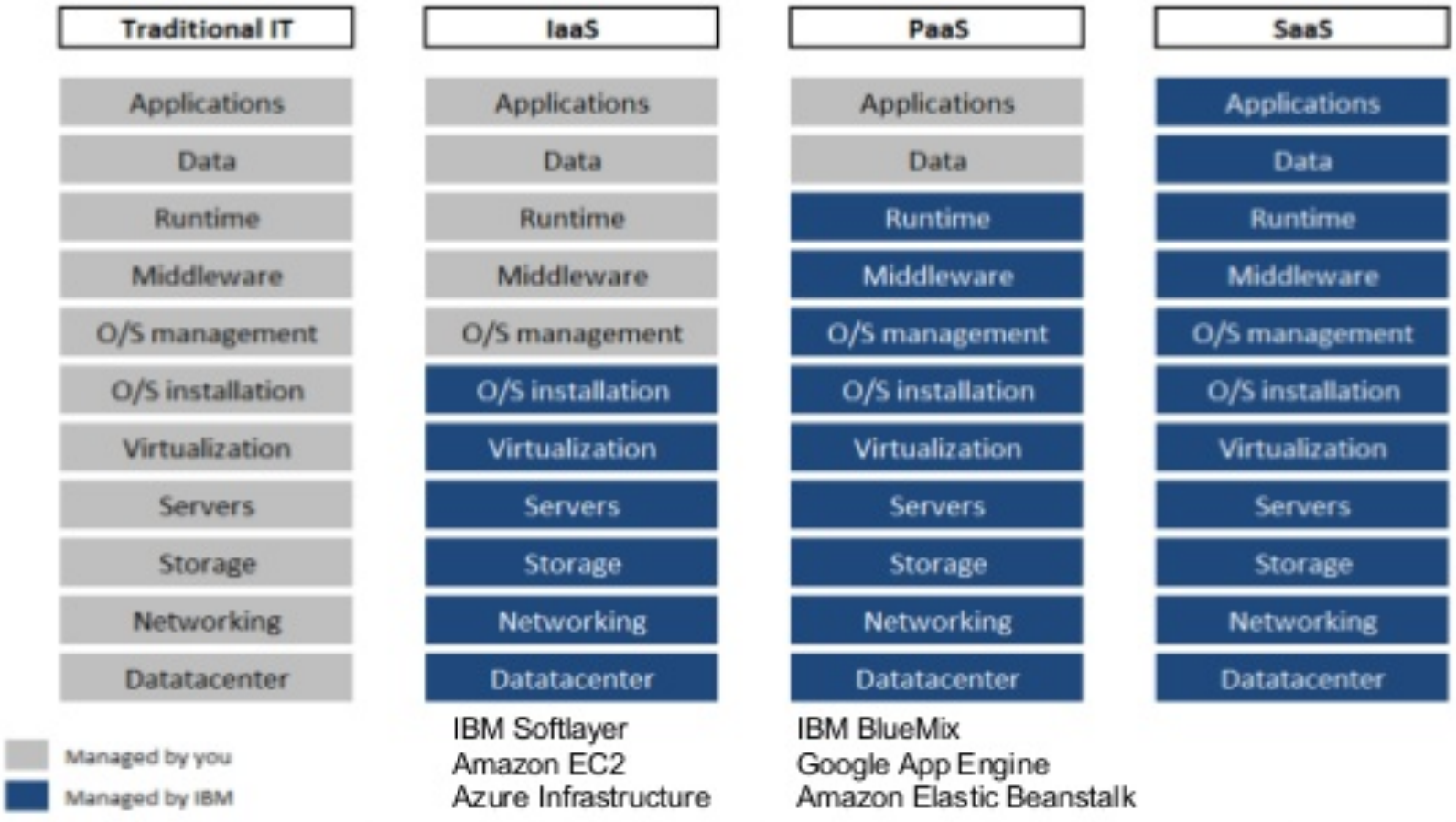
Open Plus

Enterprise Ready Innovation

Proprietary

Vendor Lock-in

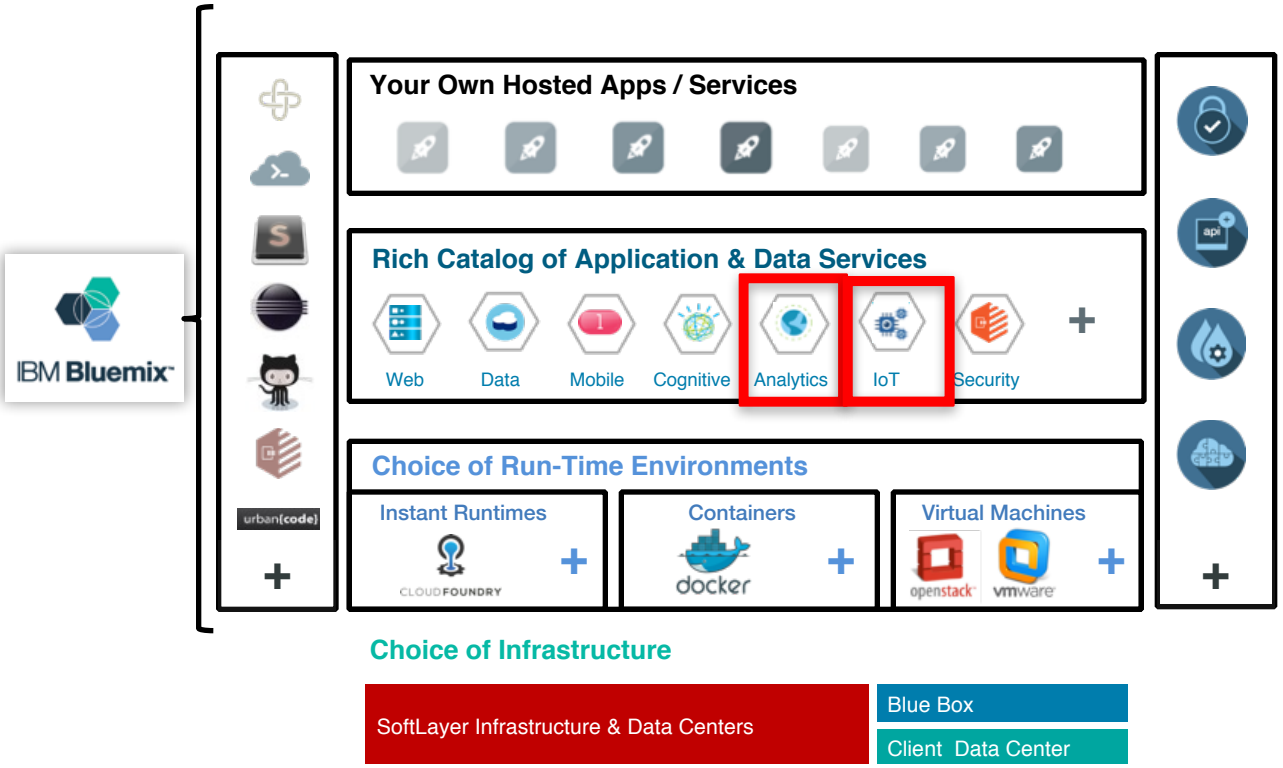
BlueMix is a Platform as a Service (PaaS)



Guiding Principles Define the IBM Cloud Platform

IBM Cloud
Guiding Principles

- DevOps Productivity
- Hybrid Integration
- Powerful, Accessible Data and Analytics
- Cognitive Solutions
- Choice with Consistency



Comprehensive

- Broadest selection of data and analytics services
- Seamless integrations
- Open-source leadership

Trusted

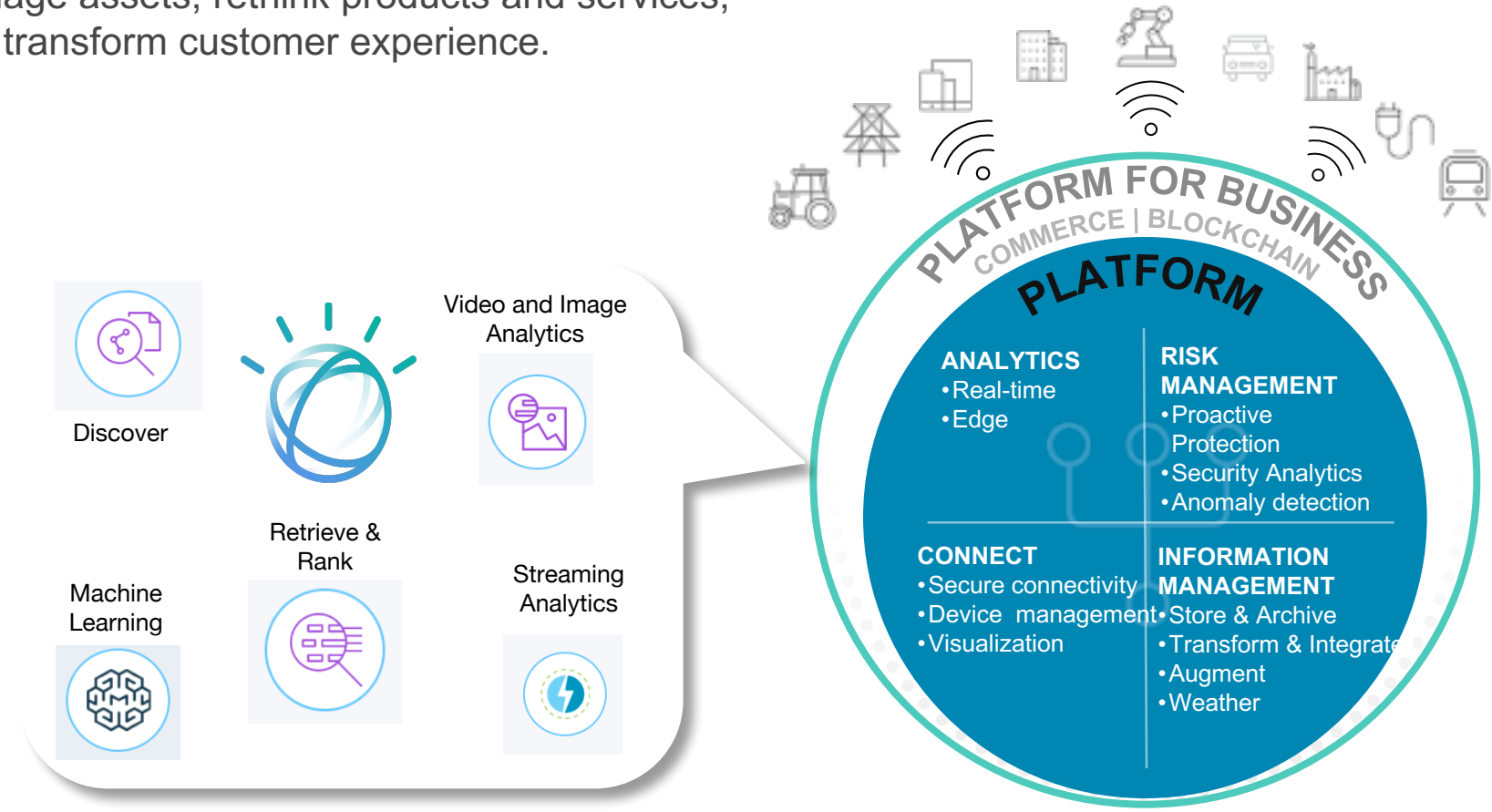
- Fully managed environment 24 x 7
- Secure infrastructure
- No installation, configuration, maintenance required

Flexible

- Cloud, on-premises & hybrid support
- No vendor lock-in
- Subscription pricing

IBM Watson IoT Platform

Make sense of data to optimize operations, manage assets, rethink products and services, and transform customer experience.



IBM Watson IoT Platform

Devices and Sensors

Cloud Platform

Watson IoT Platform

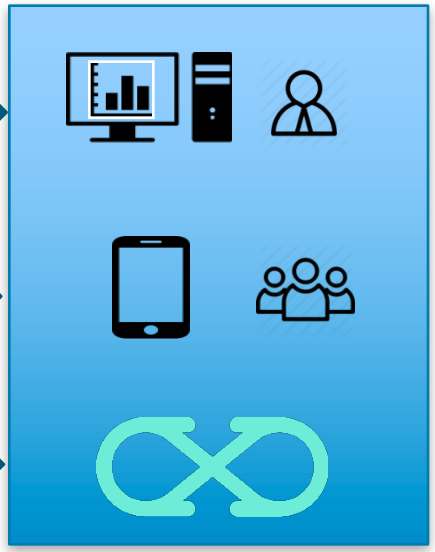
ANALYTICS
- Real-time
- Edge

RISK MANAGEMENT
- Proactive Protection
- Security Analytics
- Anomaly detection

CONNECT
- Secure connectivity
- Device management
- Visualization

INFORMATION MANAGEMENT
- Store & Archive
- Transform & Integrate
- Augment
- Weather

Analytics and Applications

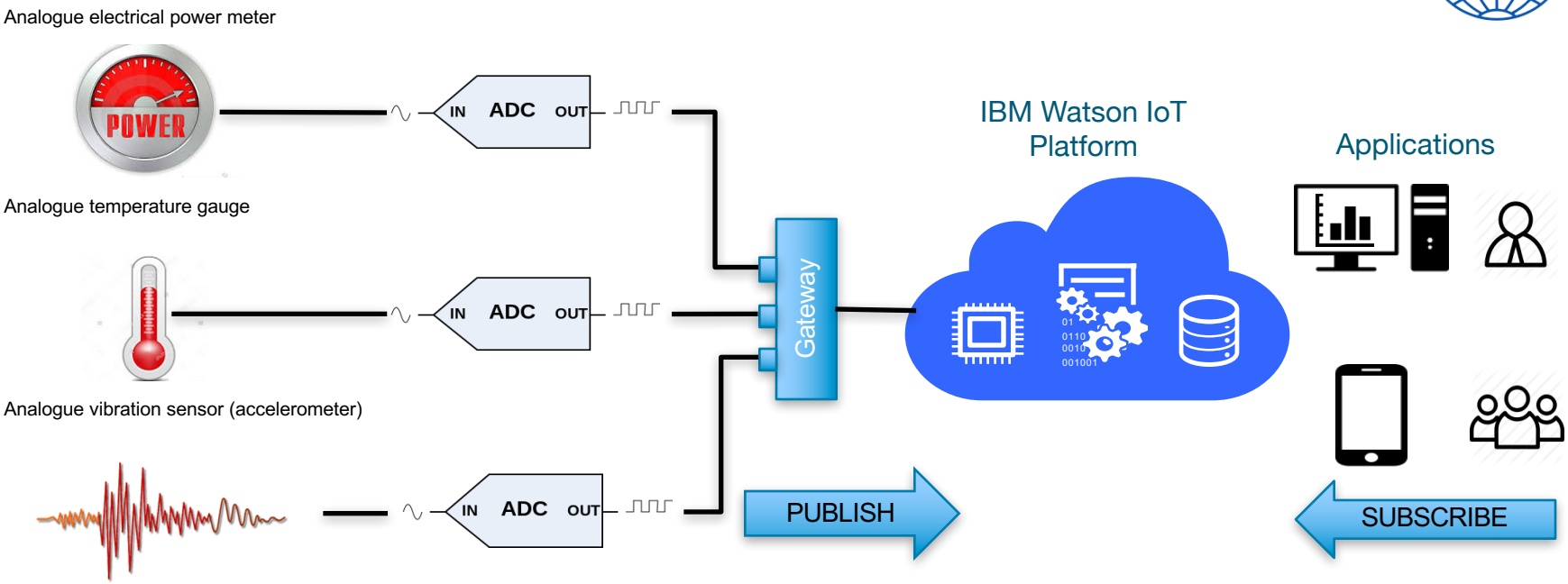


Other Data Sources

Weather

Map

MQTT – The Protocol for IoT Messaging



MQTT is a publish and subscribe, extremely simple and lightweight messaging protocol, designed for low-bandwidth, high-latency or unreliable networks.

Platform

Everything you need to innovate with IoT

Connect

Attach: MQTT, HTTPS
Visualize
Collect & Organize
Device Management
Users

Information Management

Parsing Unstructured Data
Storage & Archiving
Metadata Management
Reporting
Streaming Information

Risk Management

Proactive Protection

Analytics

Predictive
Cognitive
Realtime Performance
Contextual

Product Family

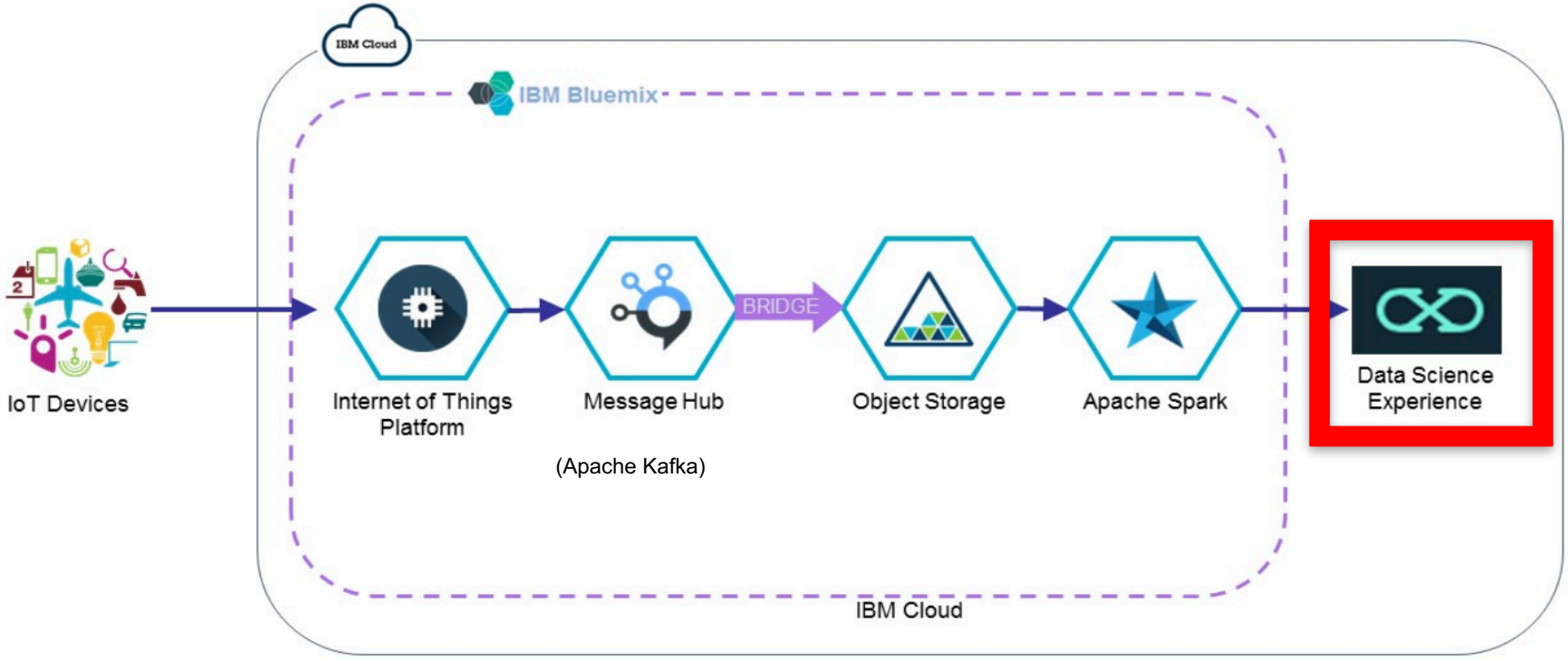
Watson IoT Platform
Continuous Engineering

Bluemix Open Standards Based Services

Full Development Lifecycle
DevOps Services
IBM Security

openstack docker CLOUDFOUNDRY

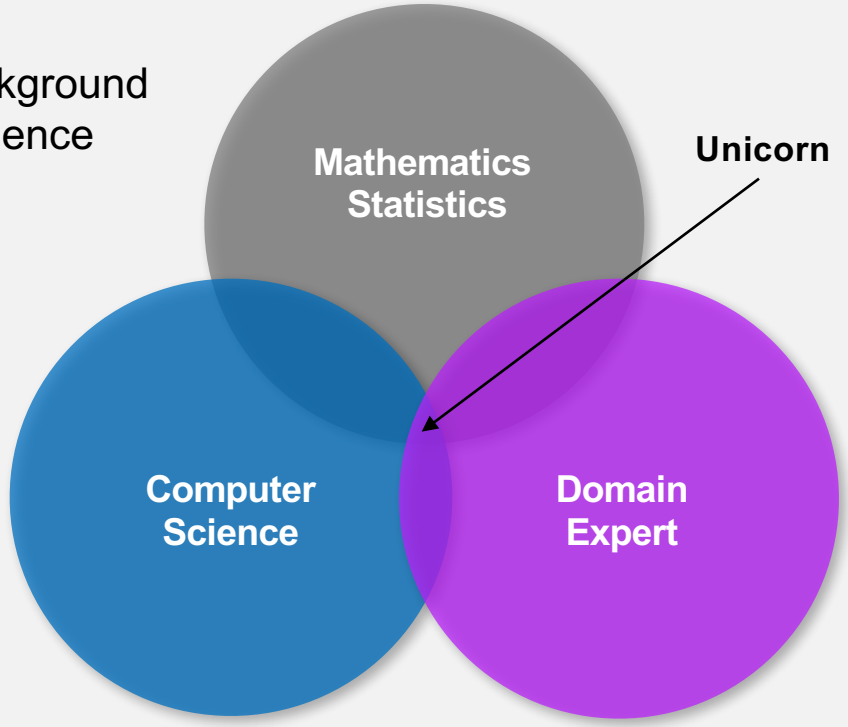
End-to-End IoT Data Pipeline



Data Science Professional

Data Scientists *combine skills across areas of Expertise*

Mathematical Background
Computational Science



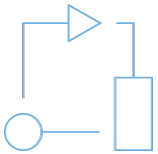
Scripting, SQL
Python, R Scala
Data Pipelines
Big Data/
Apache Spark

Business/Industry
Expertise
Domain Knowledge
- Supply Chain
- CRM
- Financials
- Networking

Data Science Is a Team Sport

Introducing IBM Watson Data Platform

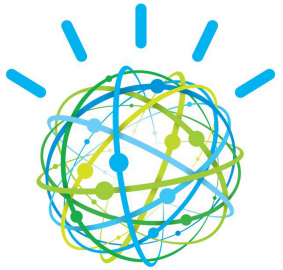
An Integrated Data Science Environment in the Cloud



Platform.

Method.

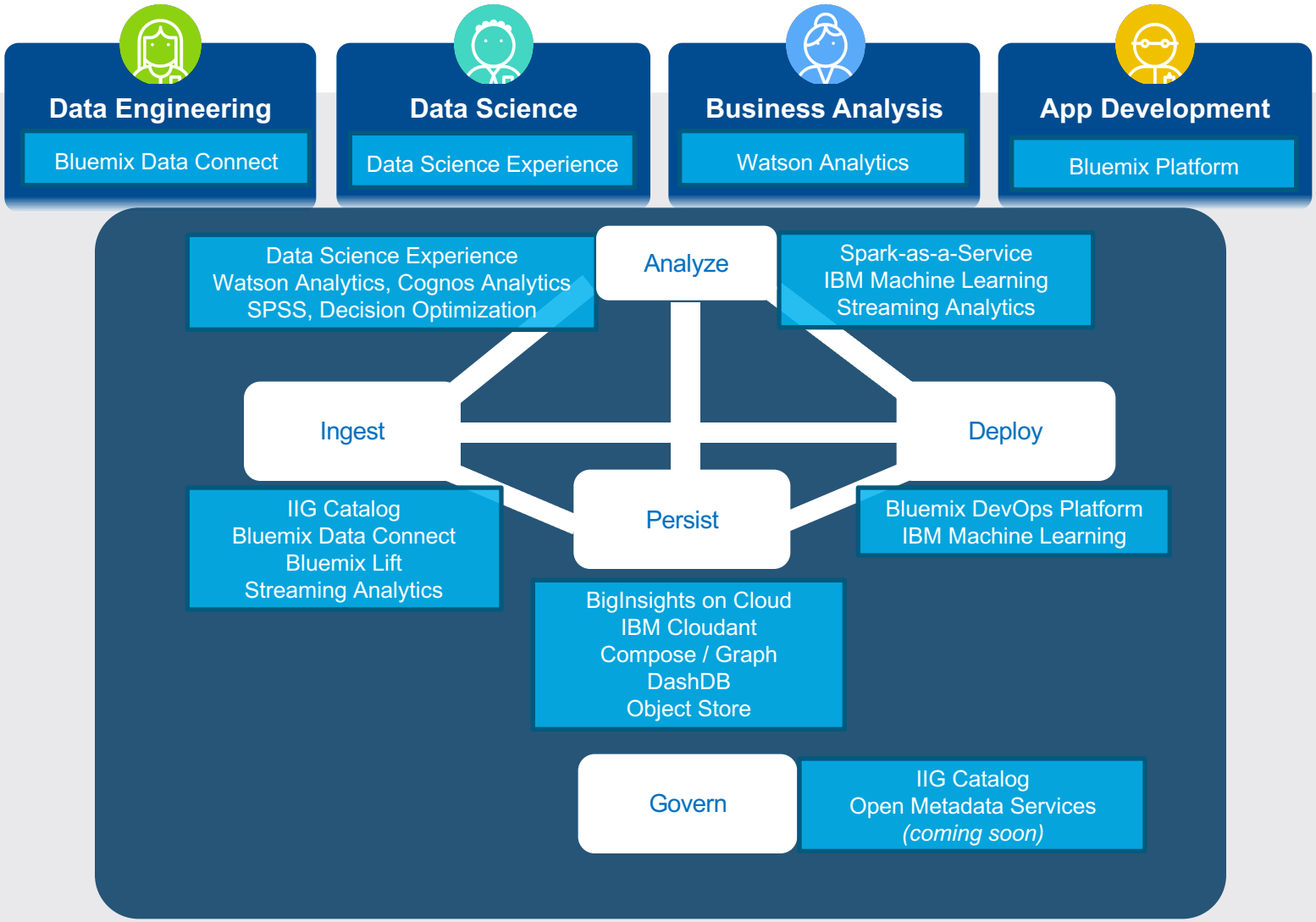
Ecosystem.



http://ibm.co/makedatasimple

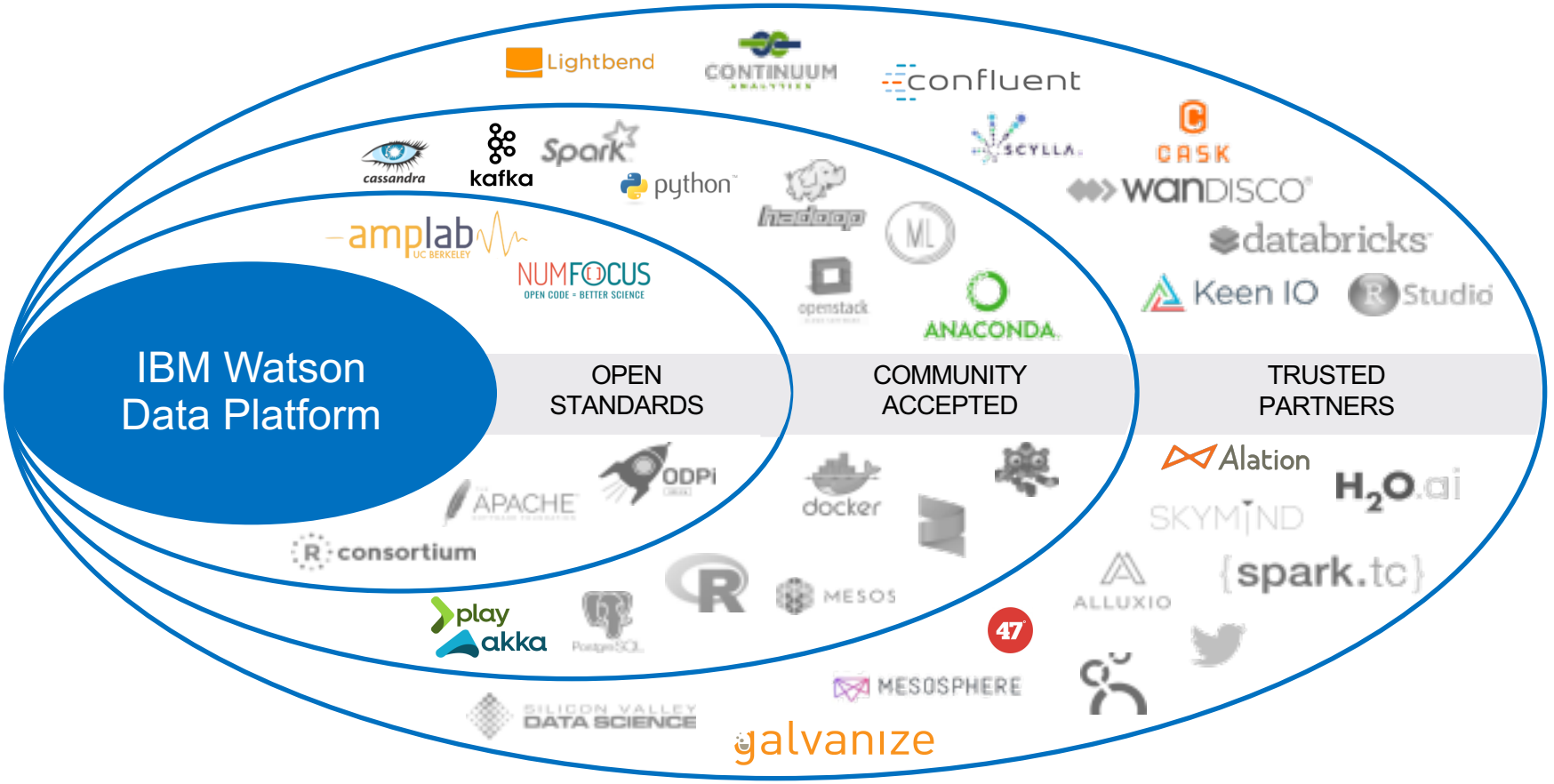
IBM Watson Data Platform

A closer look at what makes up the platform



IBM Watson Data Platform Partner Ecosystem

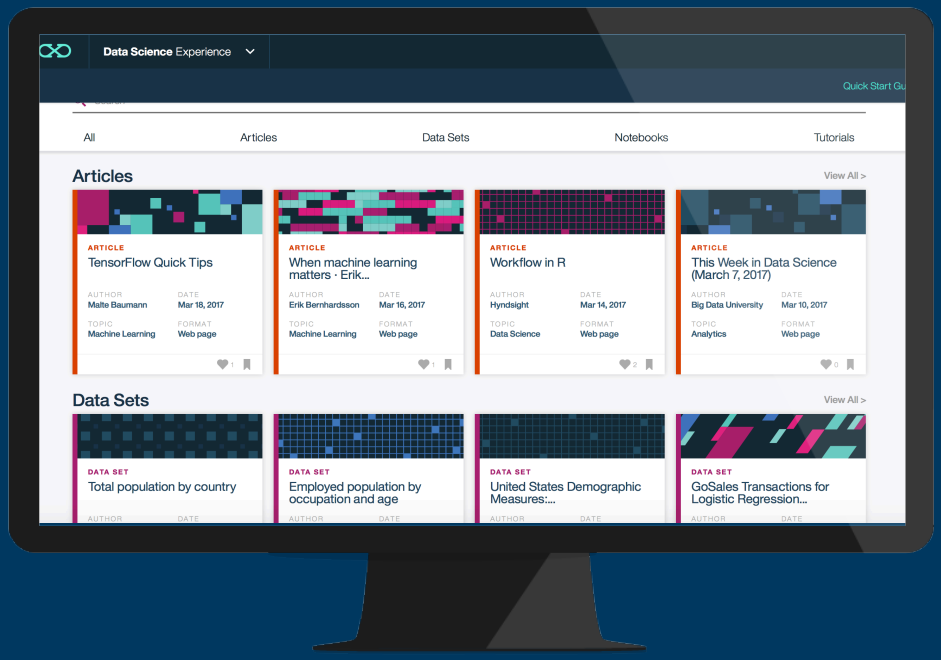
The Open Community To Innovate Faster With Data



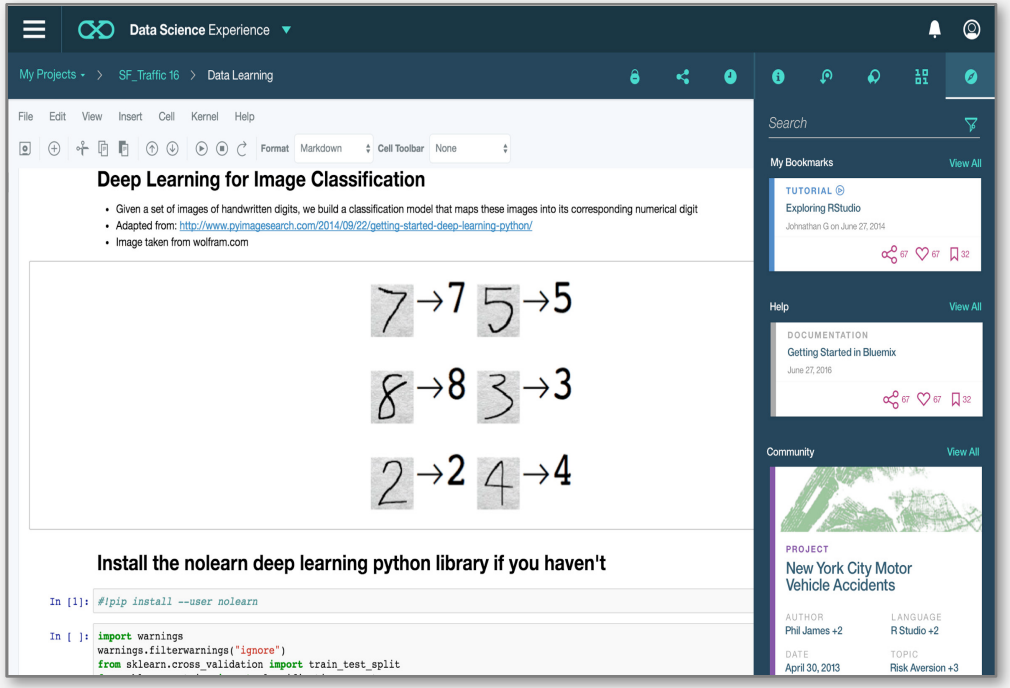
https://www.ibm.com/analytics/us/en/watson-data-platform/partners.html

Data Science Experience

IBM Data Science Experience is an environment that brings together everything that a Data Scientist needs. It includes the most popular **Open Source tools** such as Code in Scala/Python/R/SQL, Jupyter Notebooks, RStudio IDE and Shiny apps, Apache Spark and IBM unique value-add functionalities with community and social features, integrated as a first class citizen to make Data Scientists more successful.



Data Science Experience: Centralizes Open Source



Core Attributes of the Data Science Experience

IBM Data Science Experience

Community

- Find tutorials and datasets
- Connect with Data Scientists
- Ask questions
- Read articles and papers
- Fork and share projects

Open Source

- Code in Scala/Python/R/SQL
- Jupyter Notebooks
- RStudio IDE and Shiny
- Apache Spark
- Your favorite libraries

IBM Added Value

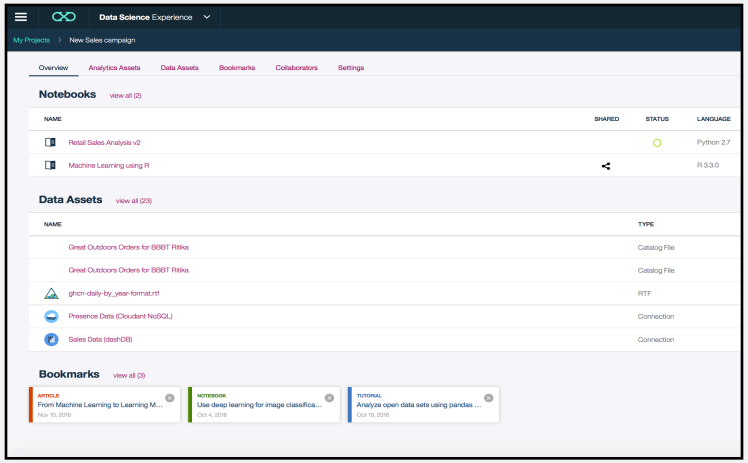
- IBM Machine Learning*
- SPSS Modeler Canvas*
- Prescriptive Analytics - DOcplexcloud
- Projects and Version Control
- Managed Spark Service

Powered by IBM **Watson Data Platform**

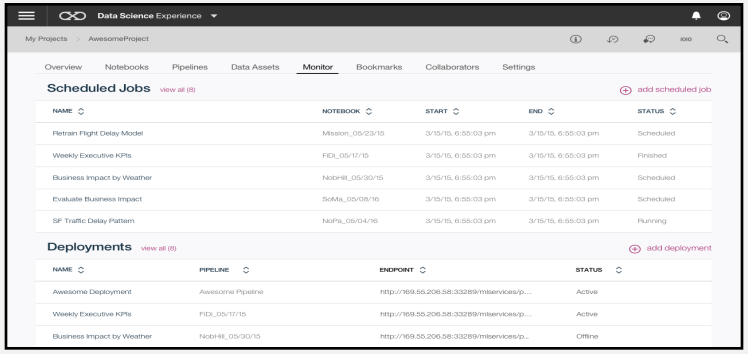
* Closed beta

IBM Data Science Experience Brings Together Visual and Programmatic Worlds

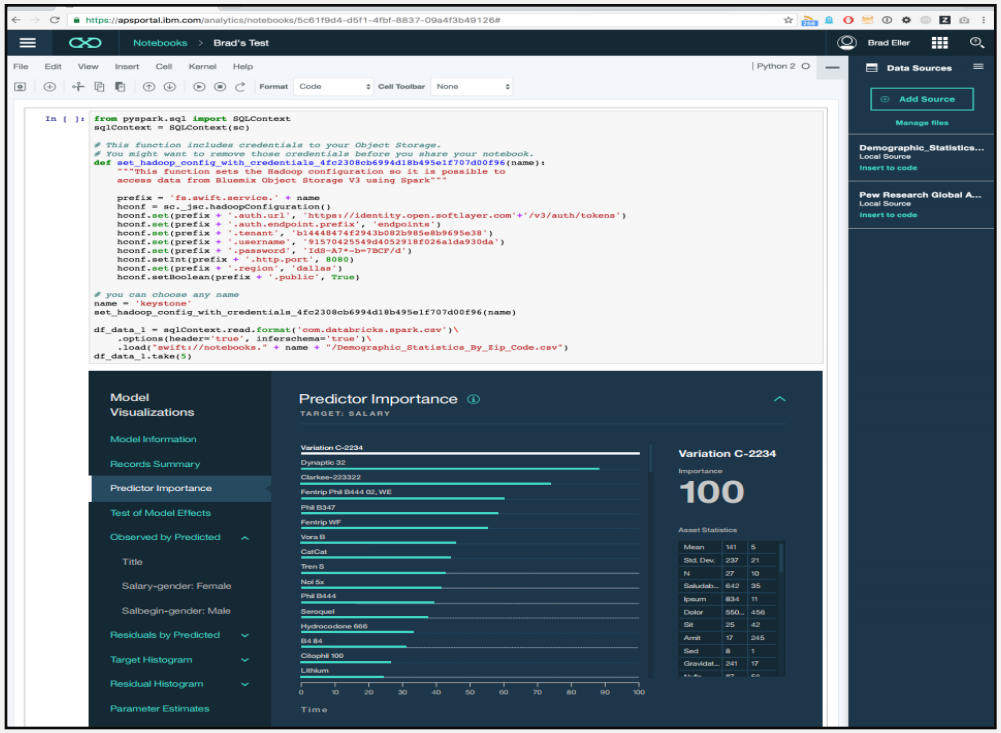
Collaborate Using Projects



Model Deployment (batch, streaming and real-time)



Code Algorithms in Python, R and Scala: Automatic Model Visualization



Integrated Jupyter Notebooks for interactive and collaborative development - seamless execution on Spark

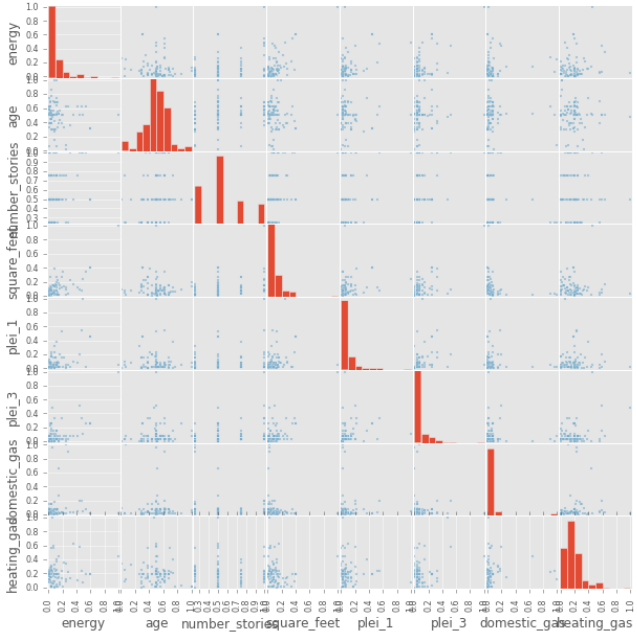
Notebooks > Spark Summit West - BlocPower Demo

File Edit View Insert Cell Kernel Help | Python 2

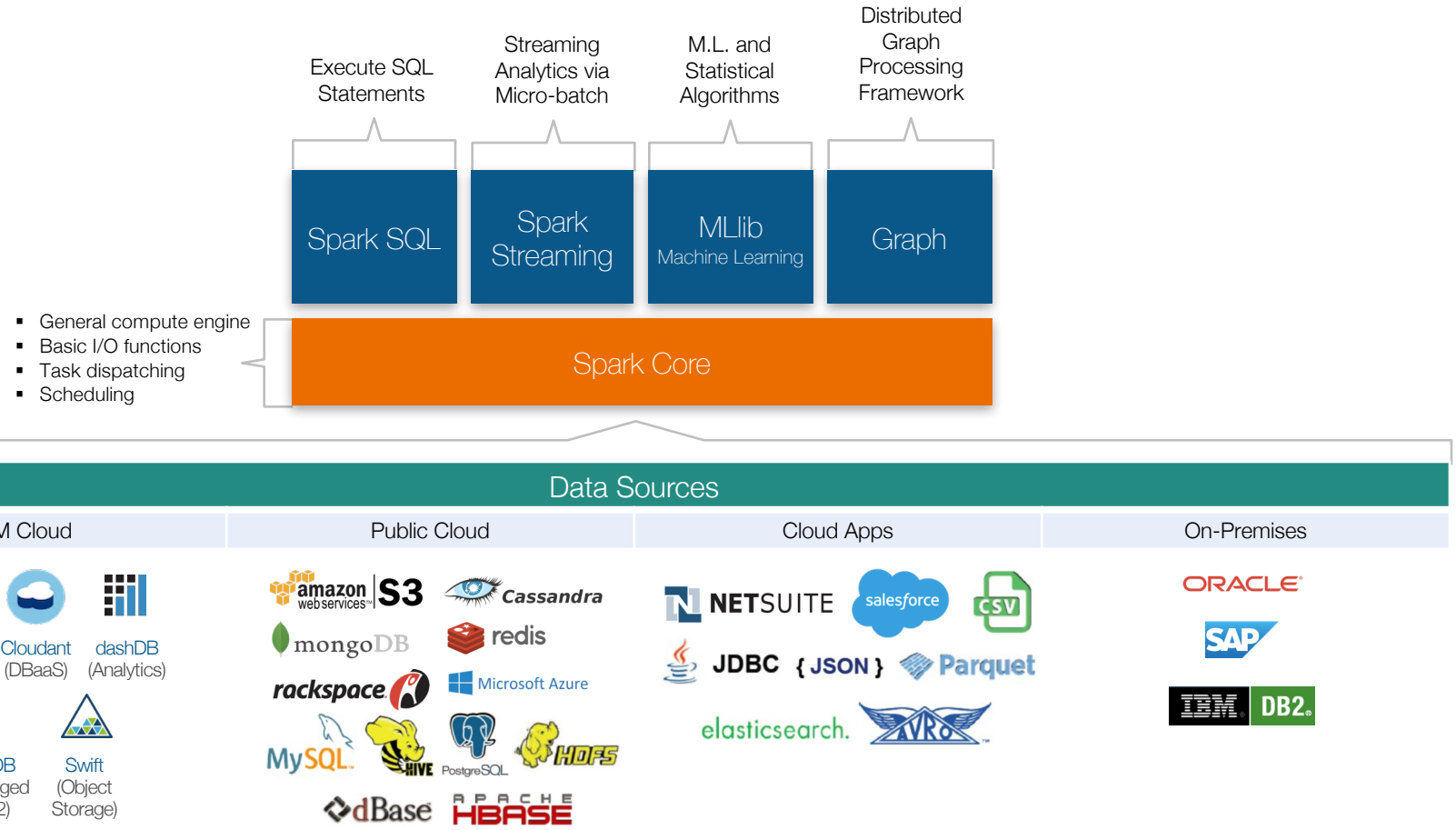
Format Markdown Cell Toolbar None

Explore the correlations

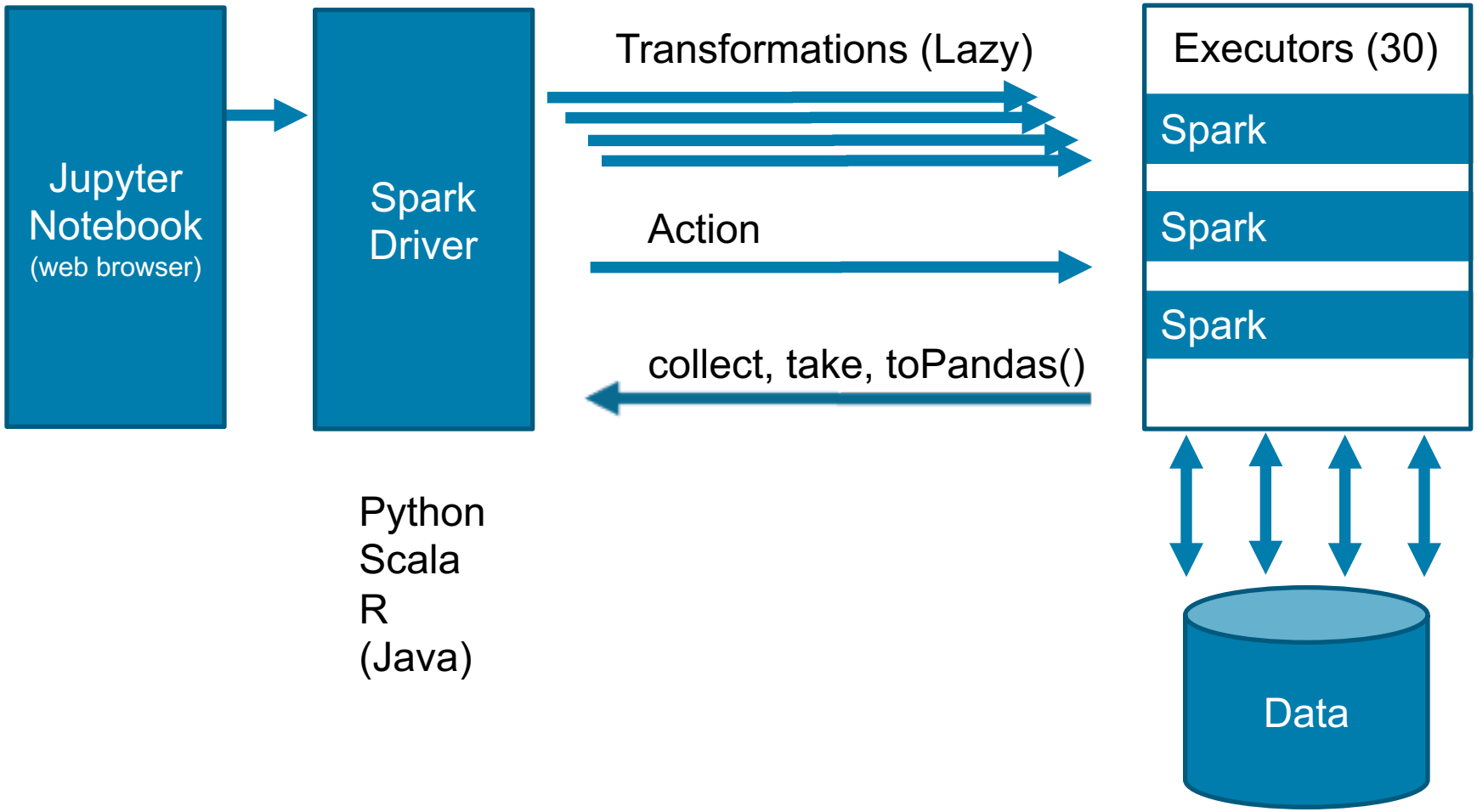
```
In [9]: import matplotlib.pyplot as plt
        %matplotlib inline
        plt.style.use('ggplot')
        ff = pd.tools.plotting.scatter_matrix(dfScaled, diagonal='hist',figsize=(10,10))
```



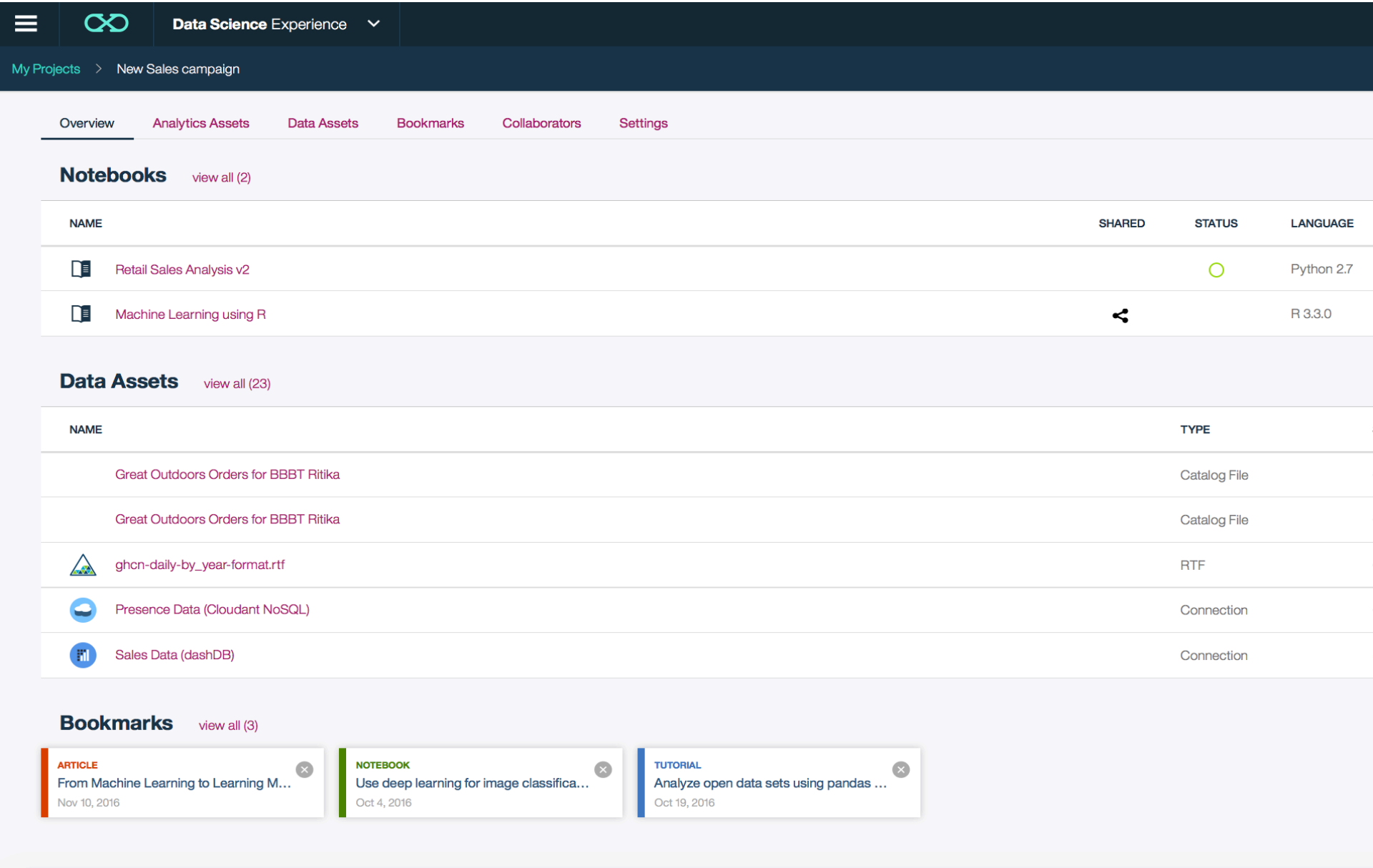
IBM's Managed Apache Spark Service in DSX



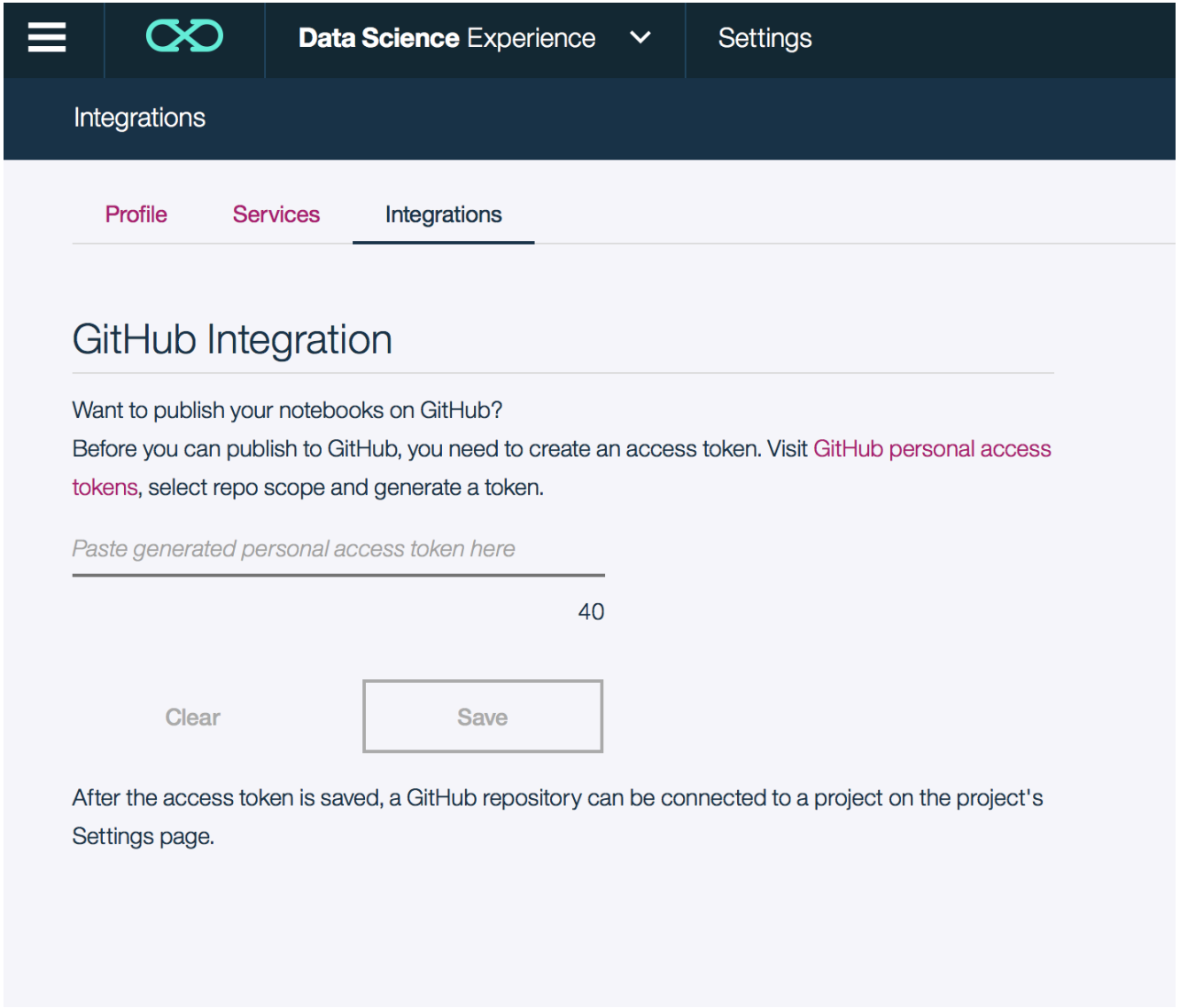
DSX - Spark Architecture



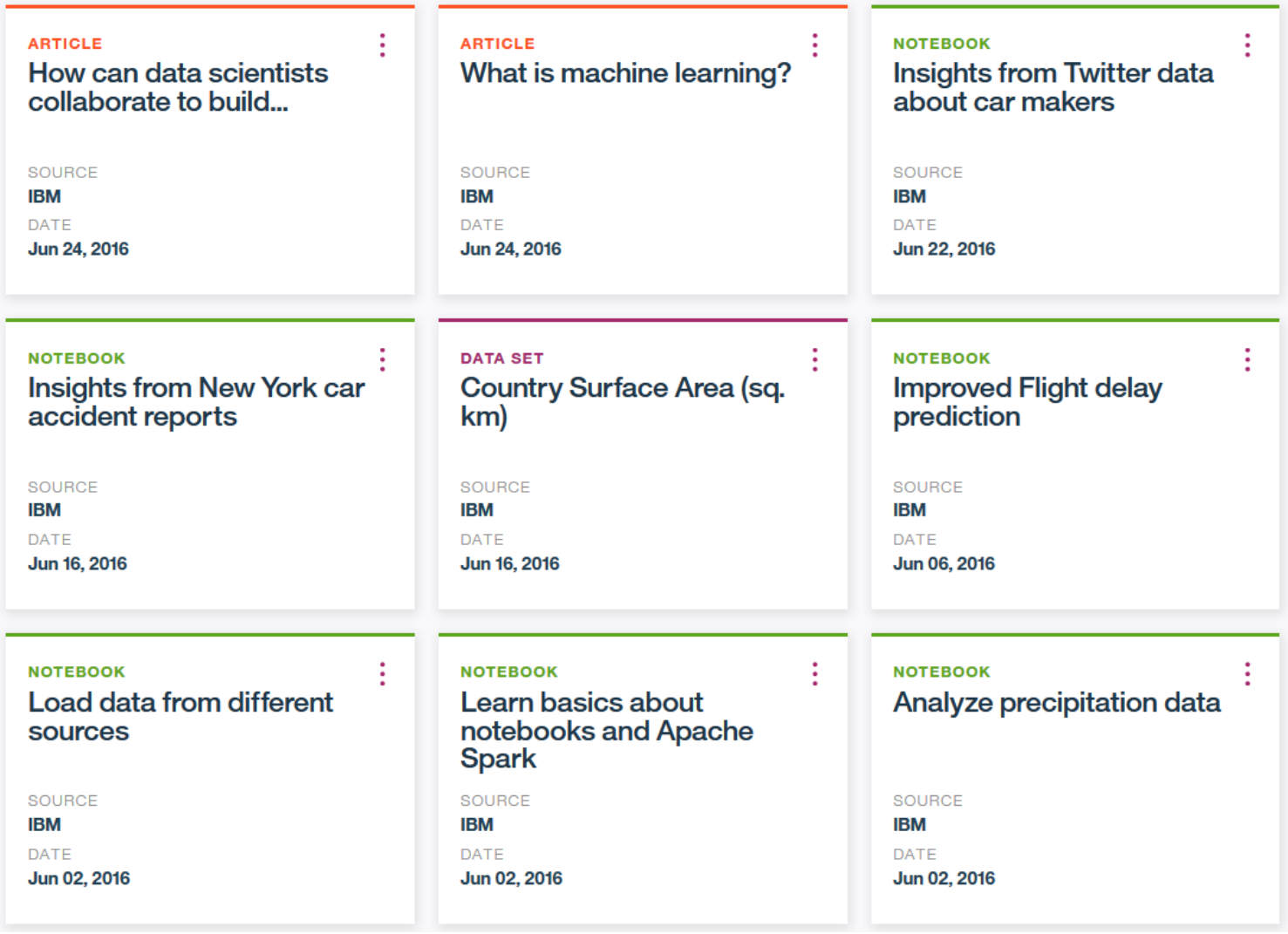
Collaborate Using Projects



GitHub Integration



Community Cards provide in-context learning for users

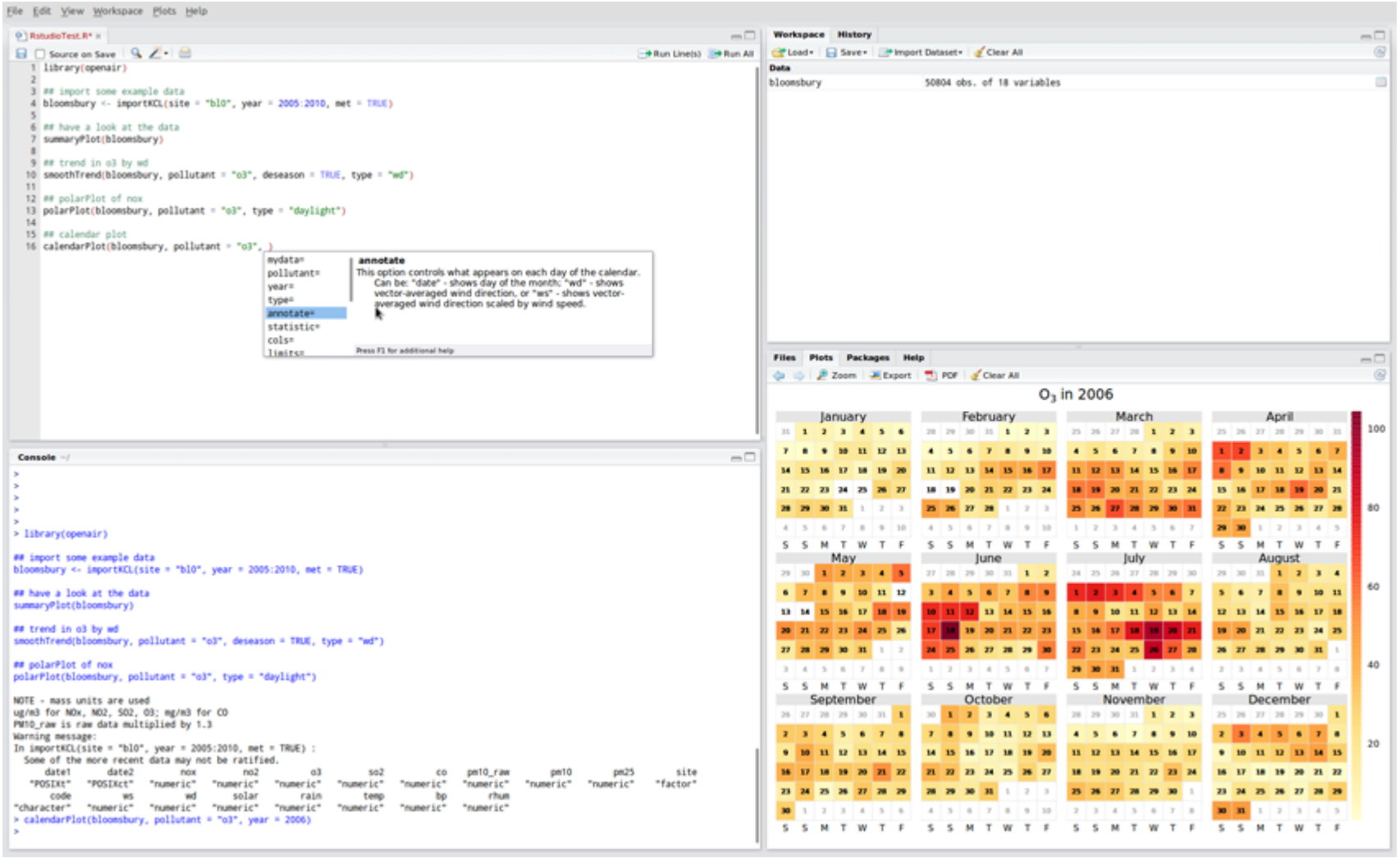


Supported Data Sources for DSX via on-premises and cloud Connections

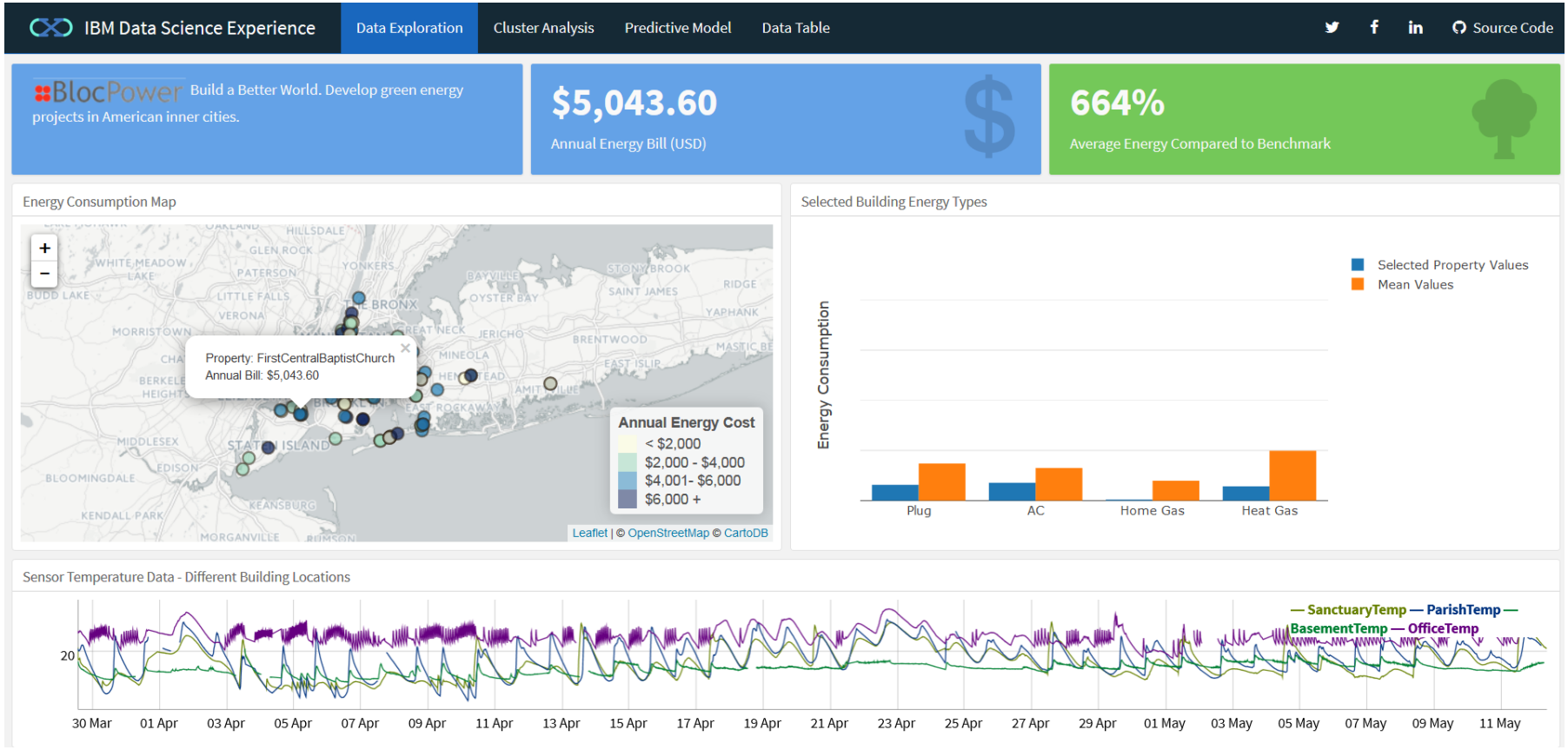
Cloud Sources	On-Premises Sources	Cloud Targets	On-Premises Targets
Amazon Redshift	Apache Hive	Amazon S3	IBM DB2® LUW
Amazon S3	Cloudera Impala	Bluemix Object Storage	IBM Pure Data for Analytics®
Apache Hive	IBM DB2® LUW	IBM Cloudant™	Teradata
Bluemix Object Storage	IBM Informix®	IBM dashDB	
IBM BigInsights™ on Cloud	IBM Pure Data for Analytics®	IBM BigInsights™ on Cloud	
IBM Cloudant™	Microsoft SQL Server	IBM DB2® on Cloud	
IBM dashDB	MySQL Enterprise Edition	IBM SQL Database	
IBM DB2® on Cloud	Oracle	IBM Watson™ Analytics	
IBM SQL Database	Pivotal Greenplum	PostgreSQL on Compose	
Microsoft Azure	PostgreSQL	SoftLayer Object Storage	
PostgreSQL on Compose	Sybase		
Salesforce	Sybase IQ		
SoftLayer Object Storage	Teradata		

All of the supported targets are compatible with each source

DSX has RStudio built into the experience thanks to our strategic partnership



With RStudio you can create Shiny web applications to make your analysis accessible to the business

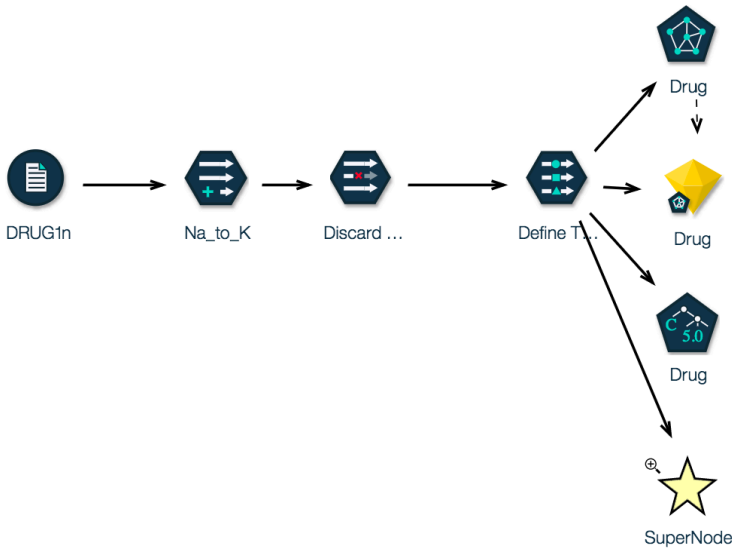


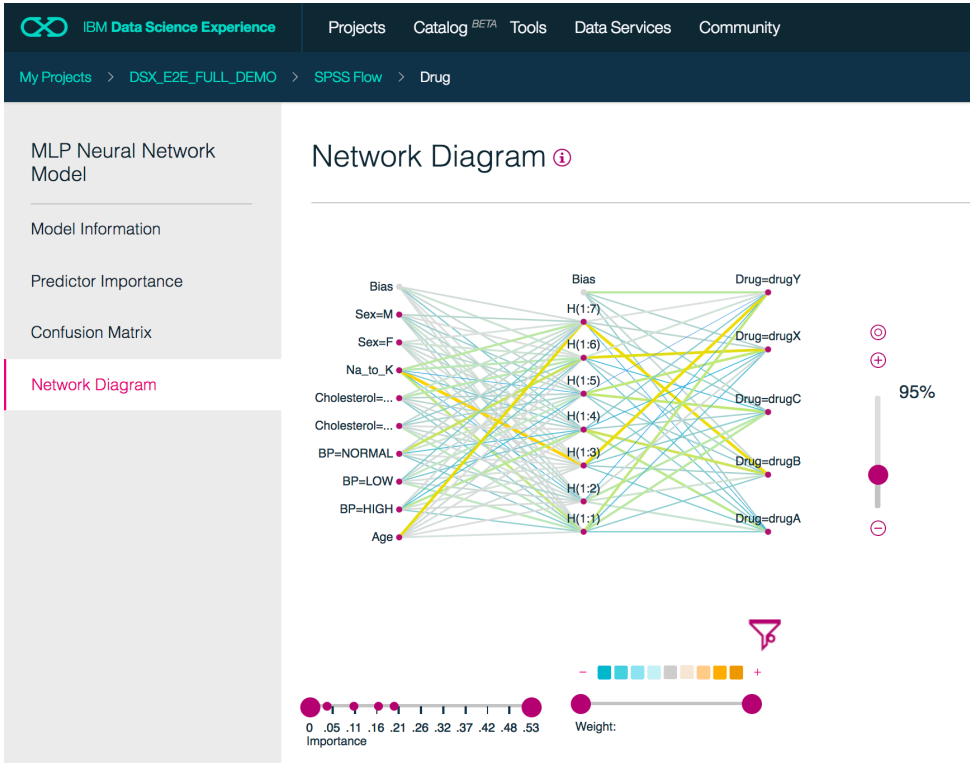
IBM Watson Machine Learning in Data Science Experience

Data Scientist

Flows

Open Beta





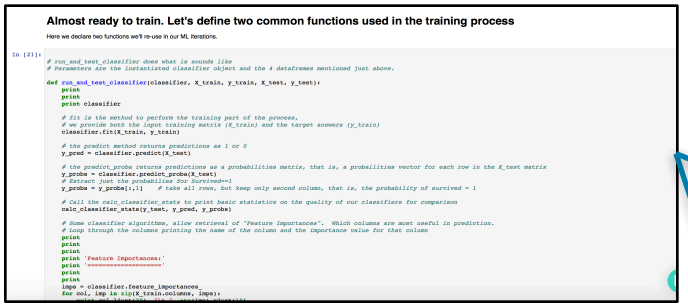
Create Advanced Models without coding

Advanced Model Visualization: Easy to understand their performance

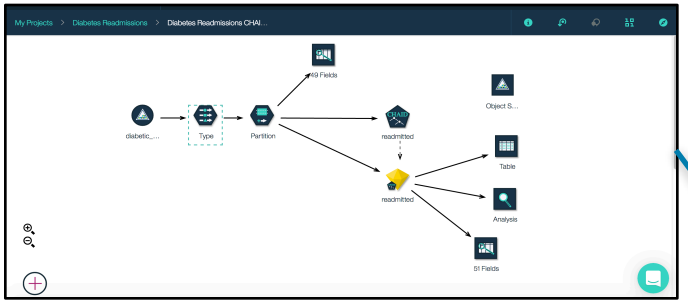
Three Paths to Operational Machine Learning on DSX

Model Development

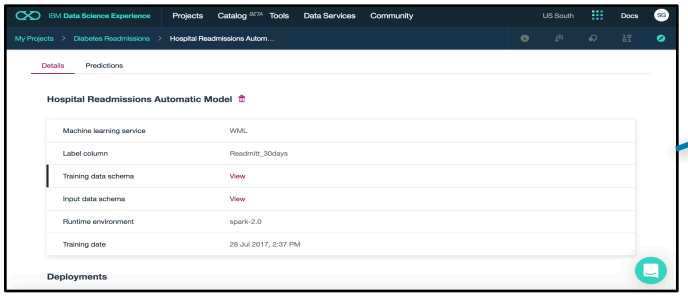
Custom Coding



Visual Builder

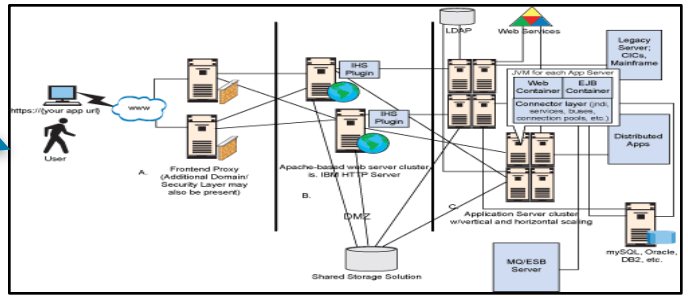


Automatic Model Builder

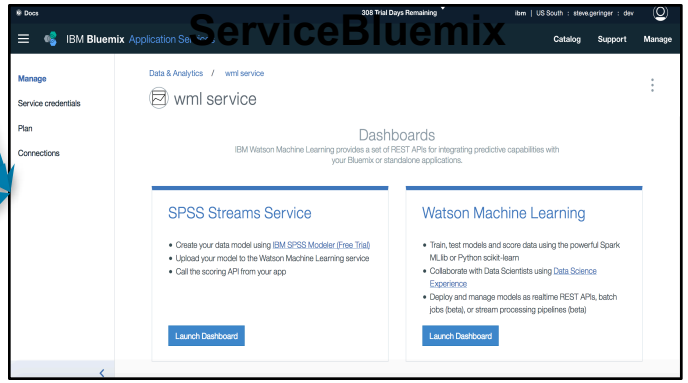


Model Deployment

Custom built deployment



Deploy WML Bluemix Service



DSX is *The Power Tool for Today's Data Scientist*

- **Fully Configured and Managed Data Science Environment**
  - Running on Powerful IBM Cloud Servers
  - Integrated Apache Spark – 30 Executors
- **Built on Open Source Tools**
  - Maximum Innovation
  - Choice of Languages, Libraries and Visualization Tools
- **Easily Deploy Machine Learning Models to Production**
- **Part of IBM's Comprehensive Big Data Cloud Story**

BlocPower Demo

Analyze energy consumption in NYC buildings

Modelling Energy Usage in NYC – BlocPower

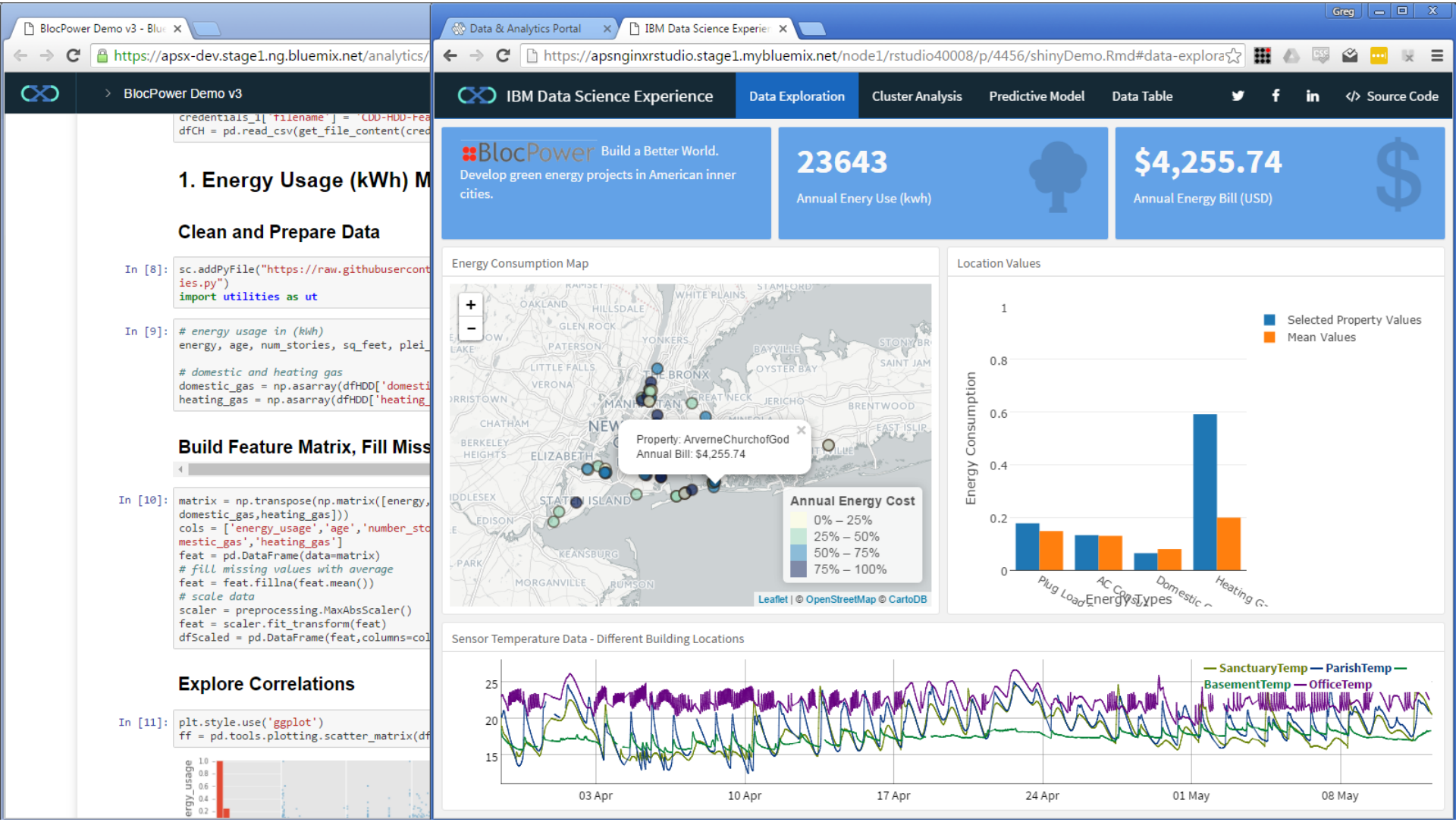
BlocPower

— Tooraji Arvajeh,
Chief Engineering Officer,
BlocPower

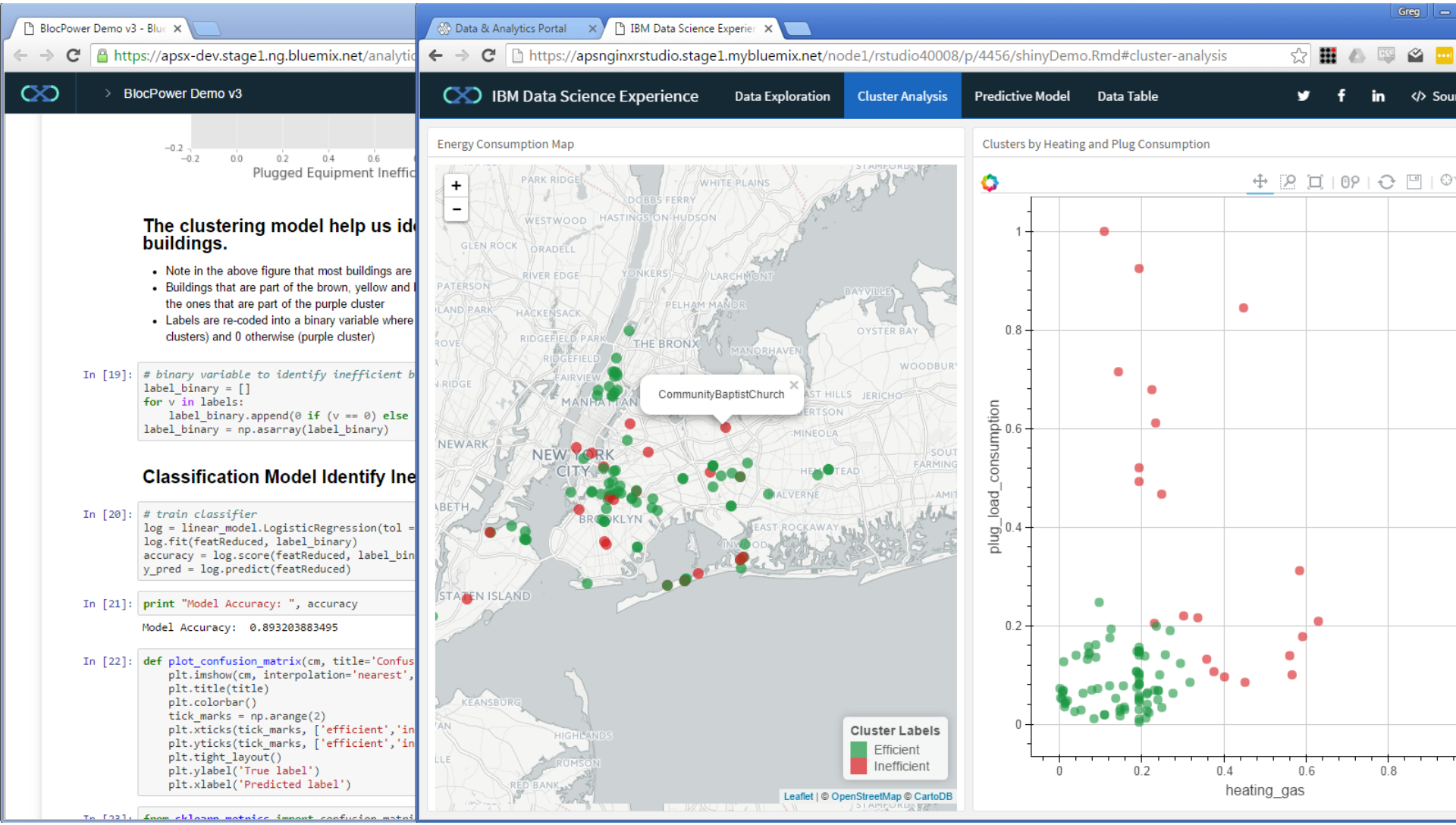
"BlocPower operation is diverse from outreach and targeting, origination of investment-grade clean energy projects to financing projects through our crowdfunding marketplace. Data is the underlying tool of our operation and IBM's Data Science Experience will facilitate a closer integration across it and help our business scale up faster. "

Blog Link: http://ibm.co/29KLbvu

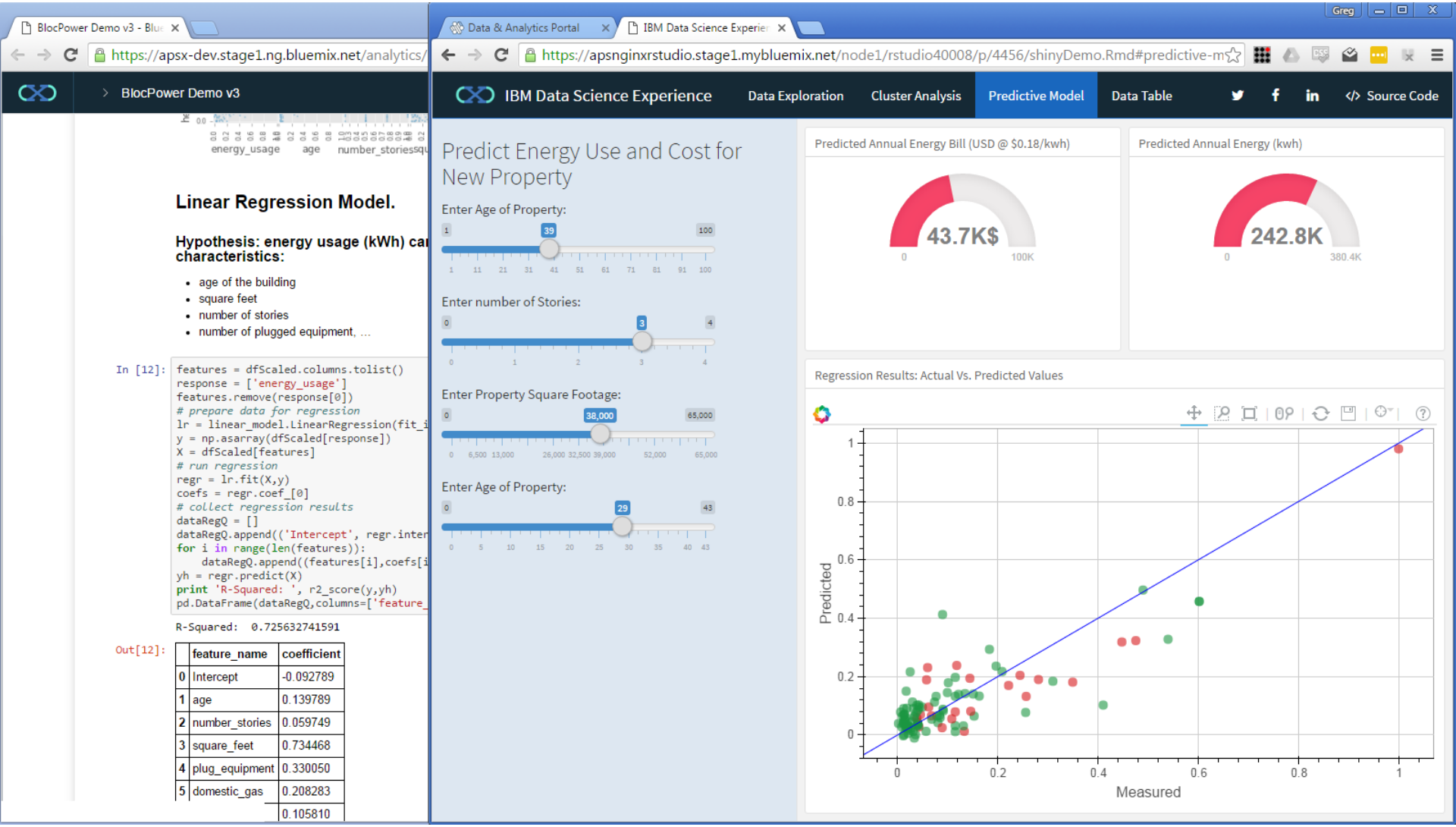
Use Shiny apps to share your analysis with business users



Interactively explore the analysis of your data science team



Adjust parameters on-the-fly and visualize model predictions



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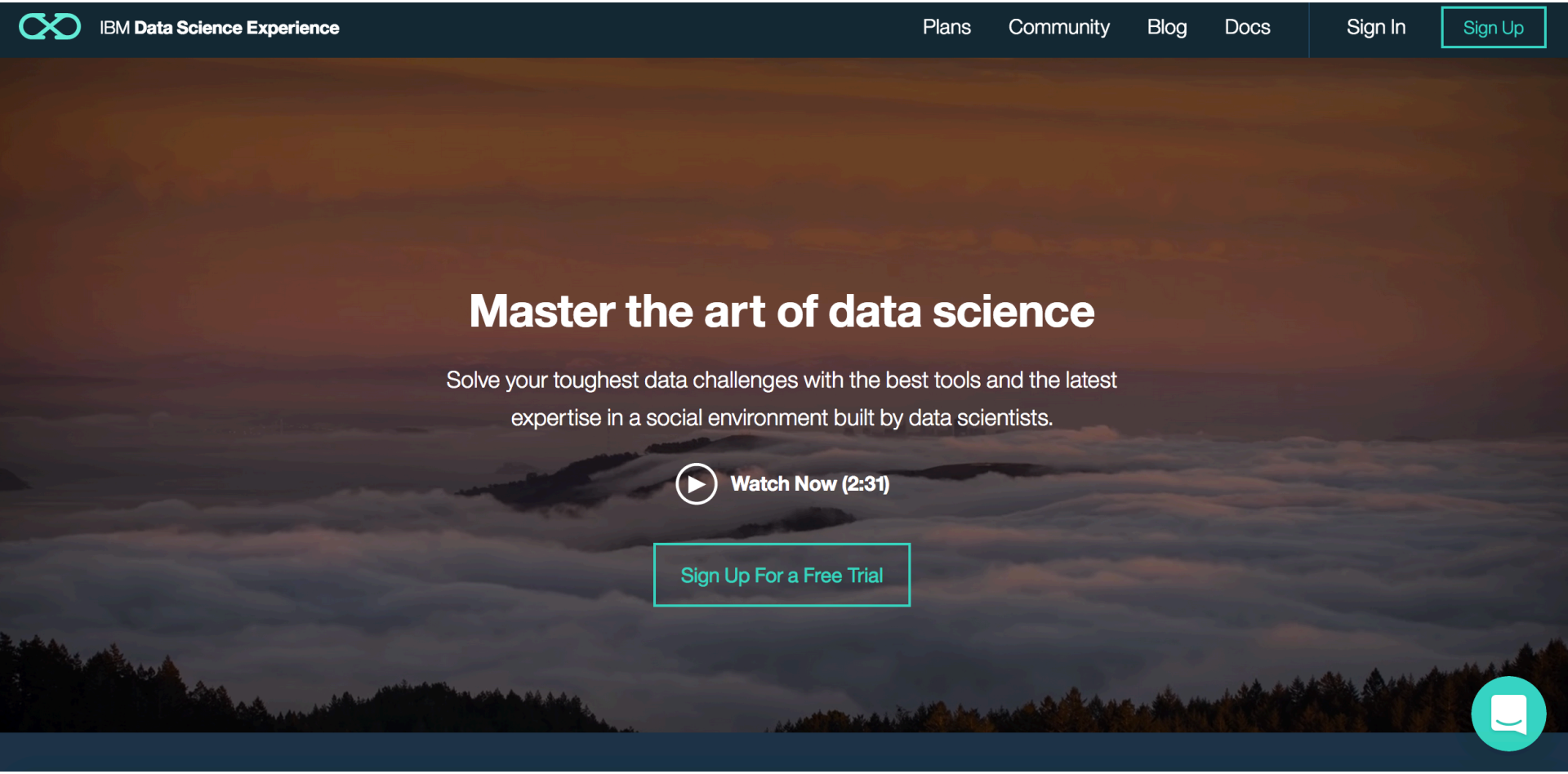

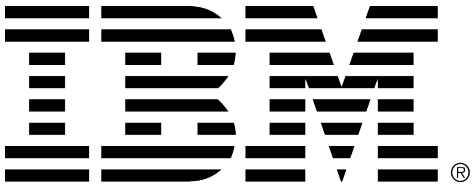

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