

The background features a dark blue field on the left with white text. On the right, there are geometric shapes: a grey trapezoid at the top with white wavy lines, a blue trapezoid below it, and a 3D wireframe plot with a color gradient from yellow to blue. A faint blue circuit board pattern is visible in the bottom right corner.

MATLAB EXPO 2017

Integrate MATLAB Analytics into
Enterprise Applications

Dr. Roland Michaely

Data Analytics Workflow



Business Data

Sensor Data

**Data Reduction/
Transformation**

Feature Extraction

Model Creation

Model Validation

Enterprise Systems

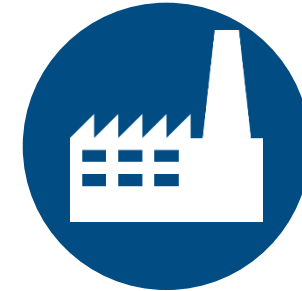
MATLAB Excel
.NET C/C++
.exe Java .dll

Embedded Devices

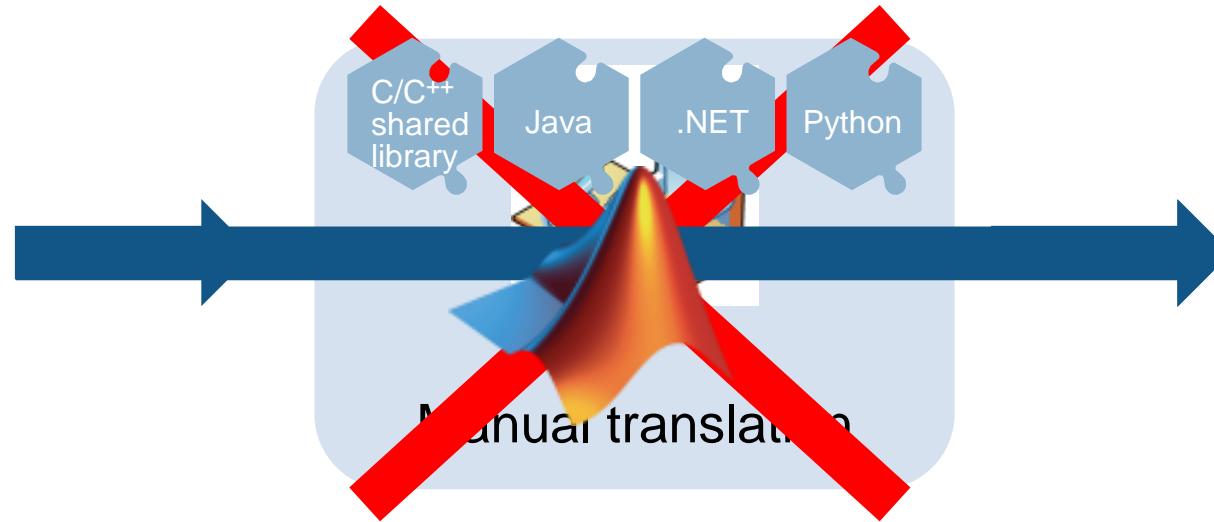
MATLAB: Single Platform

Challenges

- Bridging the gap between multiple disciplines
- Integrate solutions to enterprise scale frameworks
- Deliver fast results with large volumes of data



Bridging the Gap between...



Domain Expert

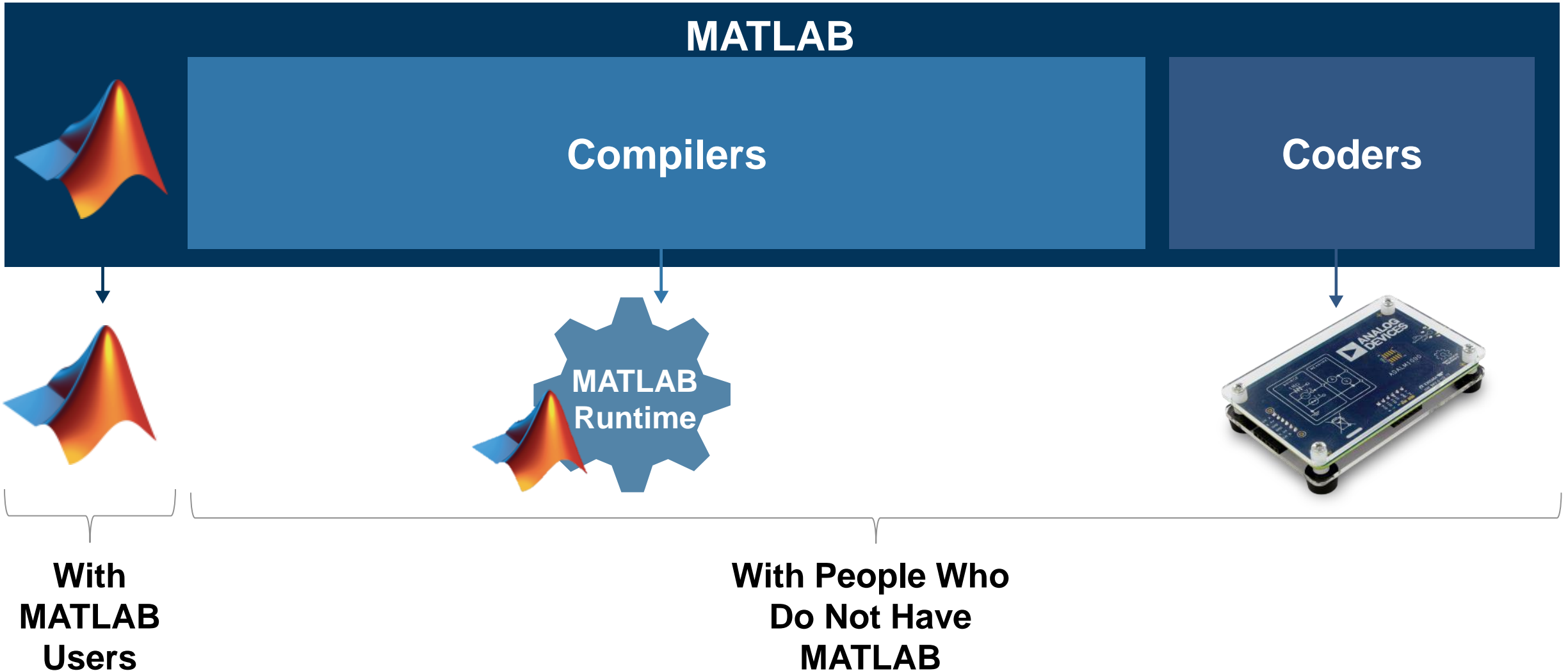
with automated deployment



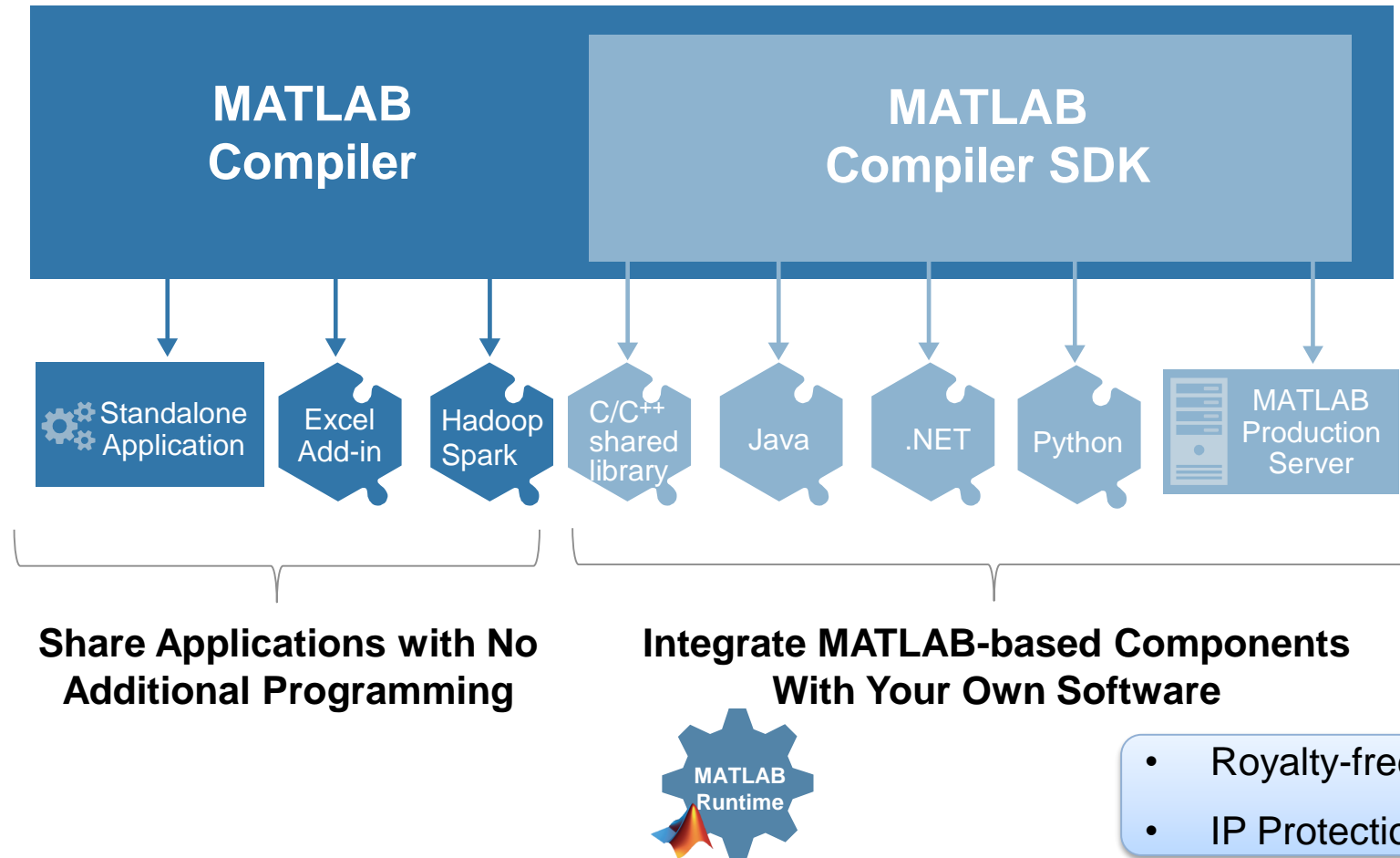
Solution Architect

Sharing and Deploying MATLAB Applications

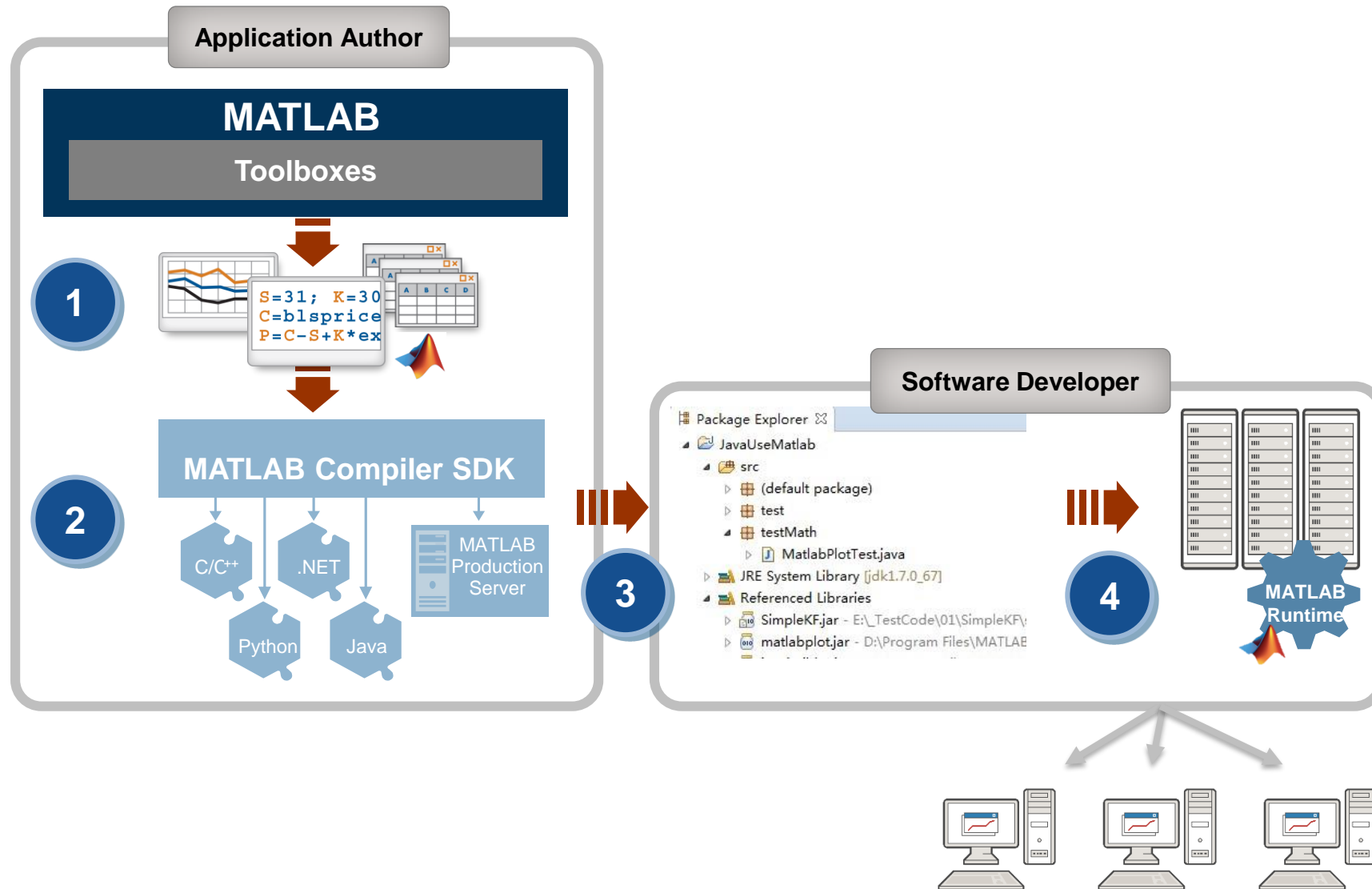
Write Your Programs Once, Then Share to Different Targets



Share with People Who Do Not Have MATLAB



Integrate MATLAB-based Components With Your Own Software



Using MATLAB Compiler SDK to create Java Classes

The screenshot shows the MATLAB Compiler interface for a project named 'SolarPredictorJA'. The main window displays the 'Library information' section with fields for name, author, email, and company. A 'Package' dialog box is open in the foreground, showing three icons representing different package types: a yellow box with '101 010', a brown box with three green arrows, and a yellow folder icon. Each icon has a green checkmark below it. The dialog box includes a link to 'Open output folder', a checked checkbox for 'Open output folder when process completes', and a 'Close' button. The background interface shows the 'COMPILER' tab with options for 'Runtime downloaded from web' (MyAppInstaller_web, 5 MB) and 'Runtime included in package' (MyAppInstaller_mcr, 1 GB). The 'EXPORTED FUNCTIONS' section lists three functions: 'makePrediction', 'loadPredictorData', and 'createPredictorFit'. The 'FILES' section shows 'createModelFro...', 'DavisDaily.xlsx', and 'importSolarData.m'. The 'FILES INSTALLED FOR YOUR END USER' section shows 'doc', 'readme.txt', and 'SolarPredictorJA.j...'.

Using MATLAB Compiler SDK to create Java Classes

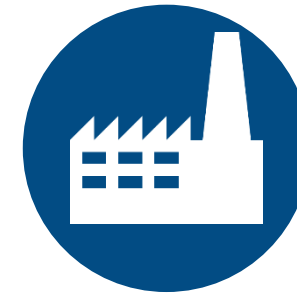
The screenshot displays the MATLAB IDE interface. On the left is the Project Explorer showing the file structure for 'DetailedSolarAnalyzerJA'. The main window, titled 'Solar Ratio Predictor Model' and 'DavisDaily', contains a 3D scatter plot of Solar Ratio (z-axis, 0 to 1) versus Relative Humidity (x-axis, 0 to 100) and Temperature Change (°F) (y-axis, 50 to 80). The plot shows a dense cloud of blue data points. To the left of the plot are control buttons: 'Use Default Data', 'Load Data', and 'Display Model'. Below these are input fields for 'Temp. Change (F)' (value: 20), 'Rel. Humidity' (value: 80), and 'Solar Ratio' (value: 0.52). A 'Predict Solar Ratio' button is positioned above the input fields. On the right side of the IDE, a code editor shows Java code snippets, including `field1.getText();`, `field2.getText();`, and `coefficients)`. The bottom status bar indicates '14 chars 255:69 CRLF+ UTF-8+ Git: master'.

MATLAB *and* MATLAB Production Server

is the **easiest** and most **productive** environment to *take your enterprise analytics or IoT solution* from **idea** to **production**



Idea



Production

Energy Load Forecast

Electricity Demand Forecast

ec2-54-165-201-58.compute-1.amazonaws.com:8080/DemandForecastWeb/demandForecast.jsp

Predictive Data Analytics
Home
Demand Forecasting
Web Service Description
Documentation

Select Zone

Zone Generate Forecast Model Diagnostics Report

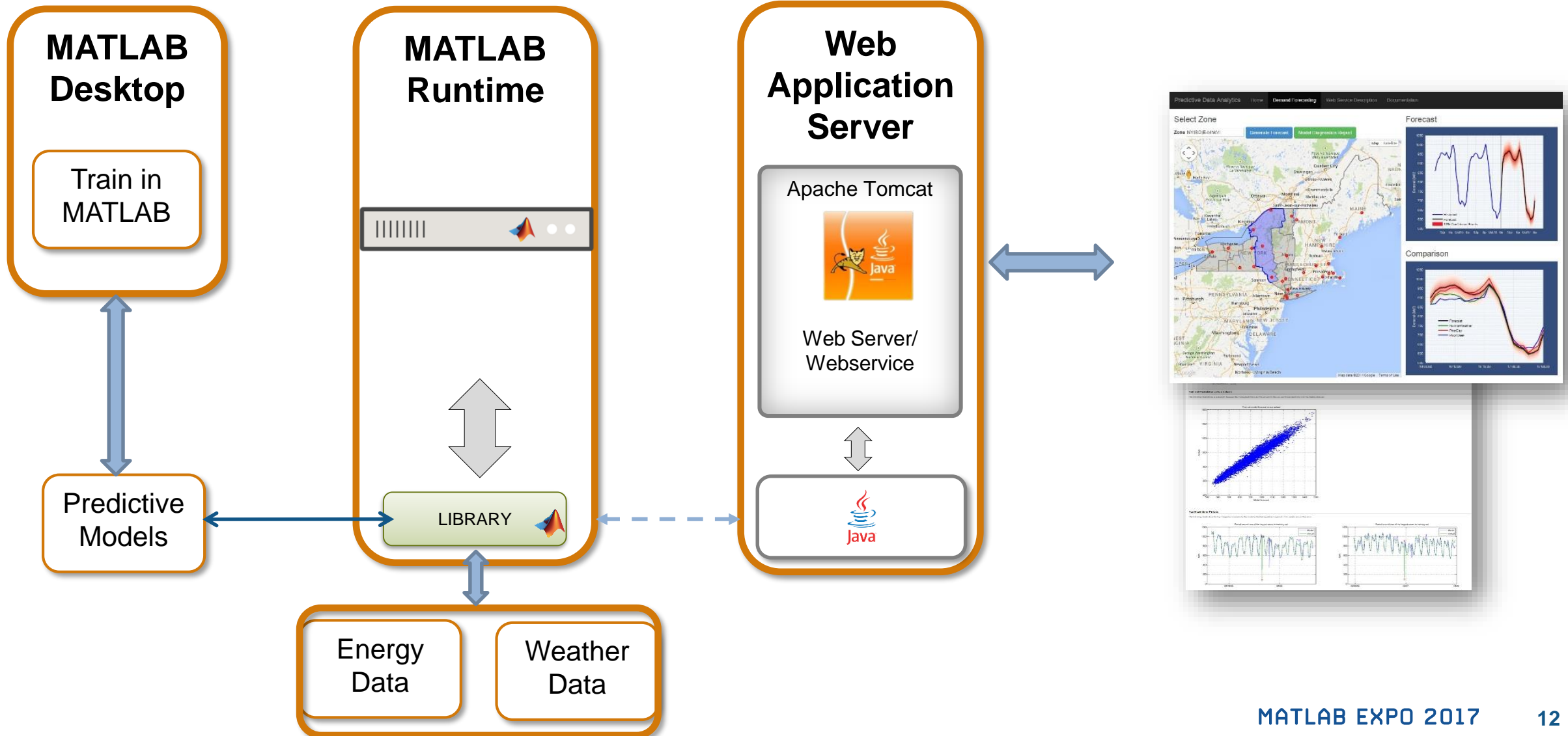
Plattsburgh International Airport
 Station ID: KPBG
 Contributes to zones: NYISO D-North(100%), NYISO F-Capitl(5%)

Weather forecast

Forecast

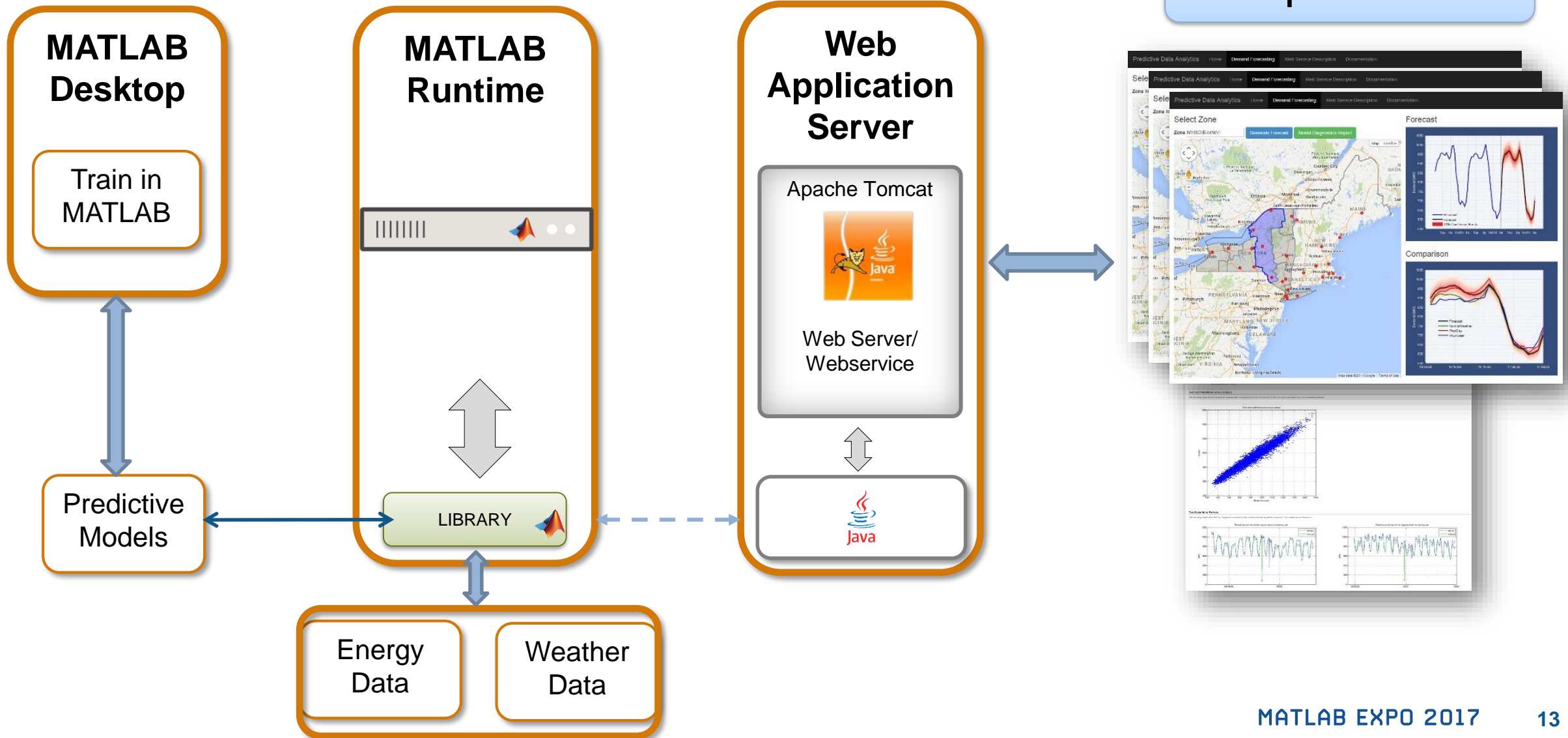
Comparison

Energy Load Forecast

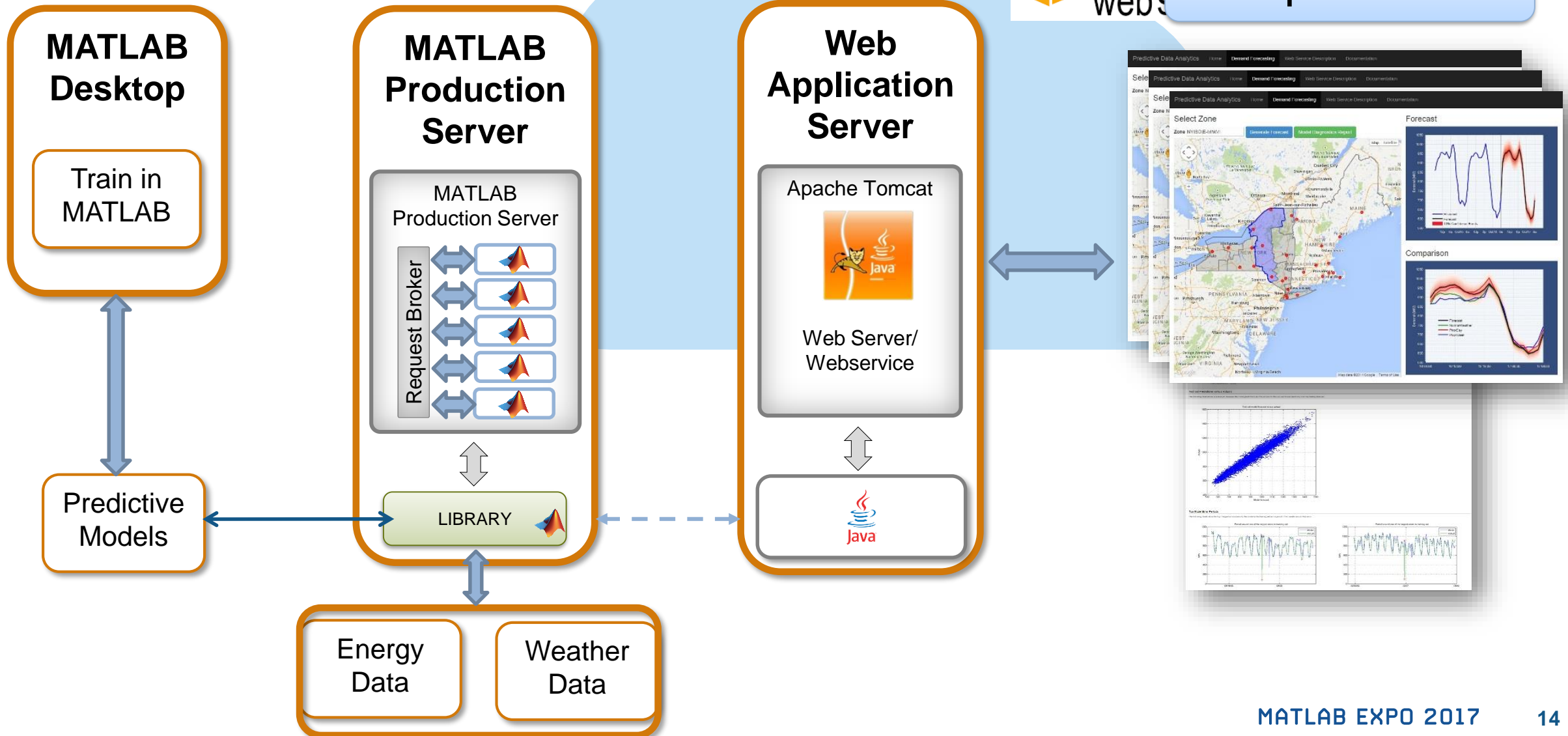


Energy Load Forecast

Multiple users



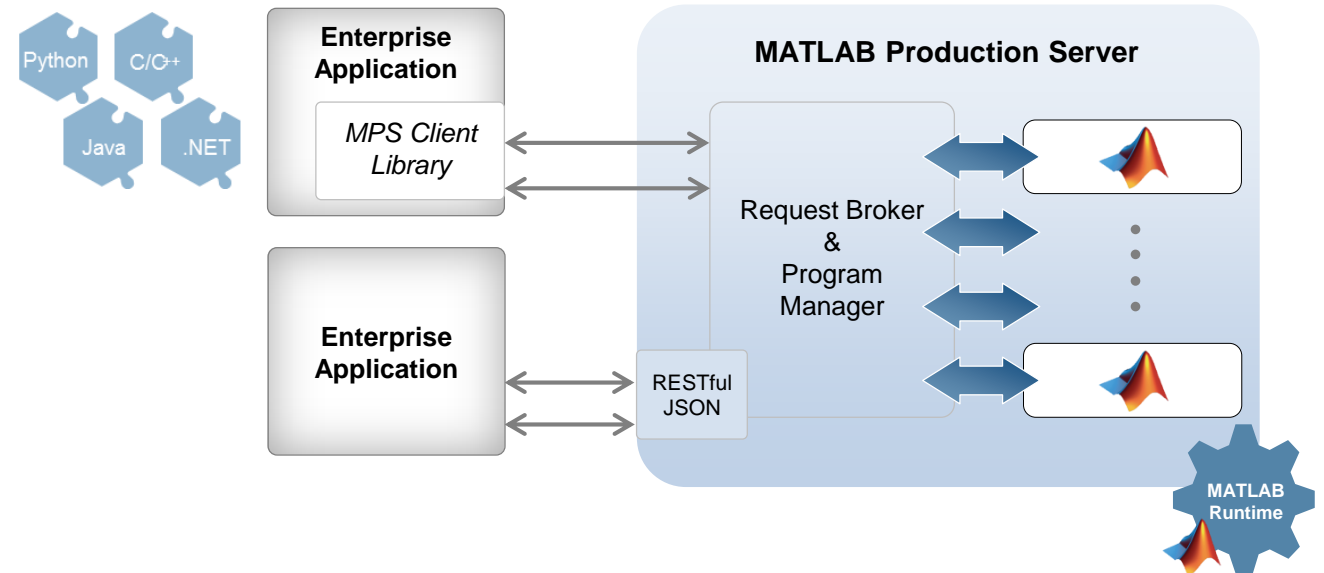
Energy Load Forecast



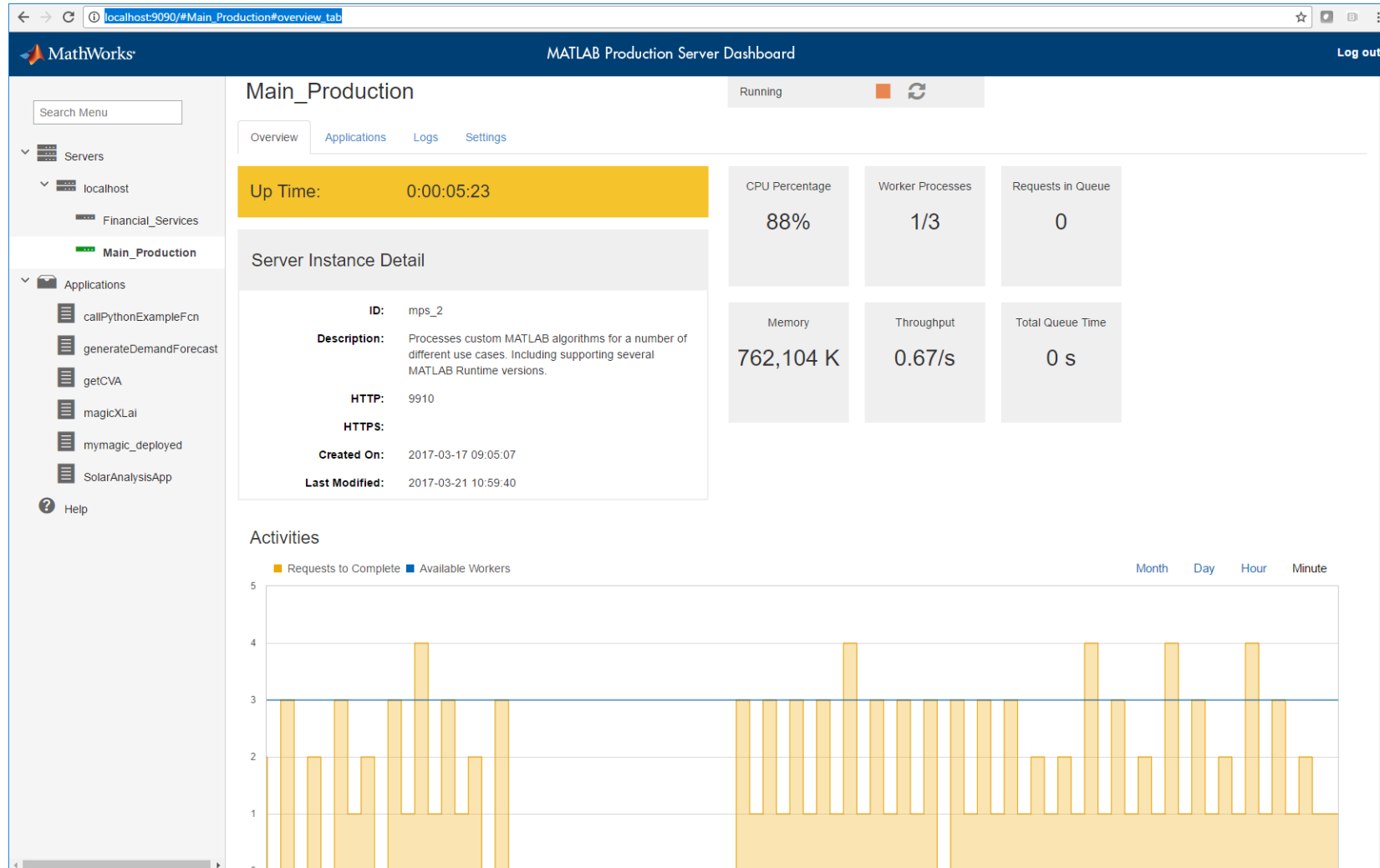
MATLAB Production Server

Enterprise Class Framework For Running Packaged MATLAB Programs

- Server software
 - Manages packaged MATLAB programs and worker pool
- MATLAB Runtime libraries
 - Single server can use runtimes from different releases
- RESTful JSON interface and lightweight client library (C/C++, .NET, Python, and Java)



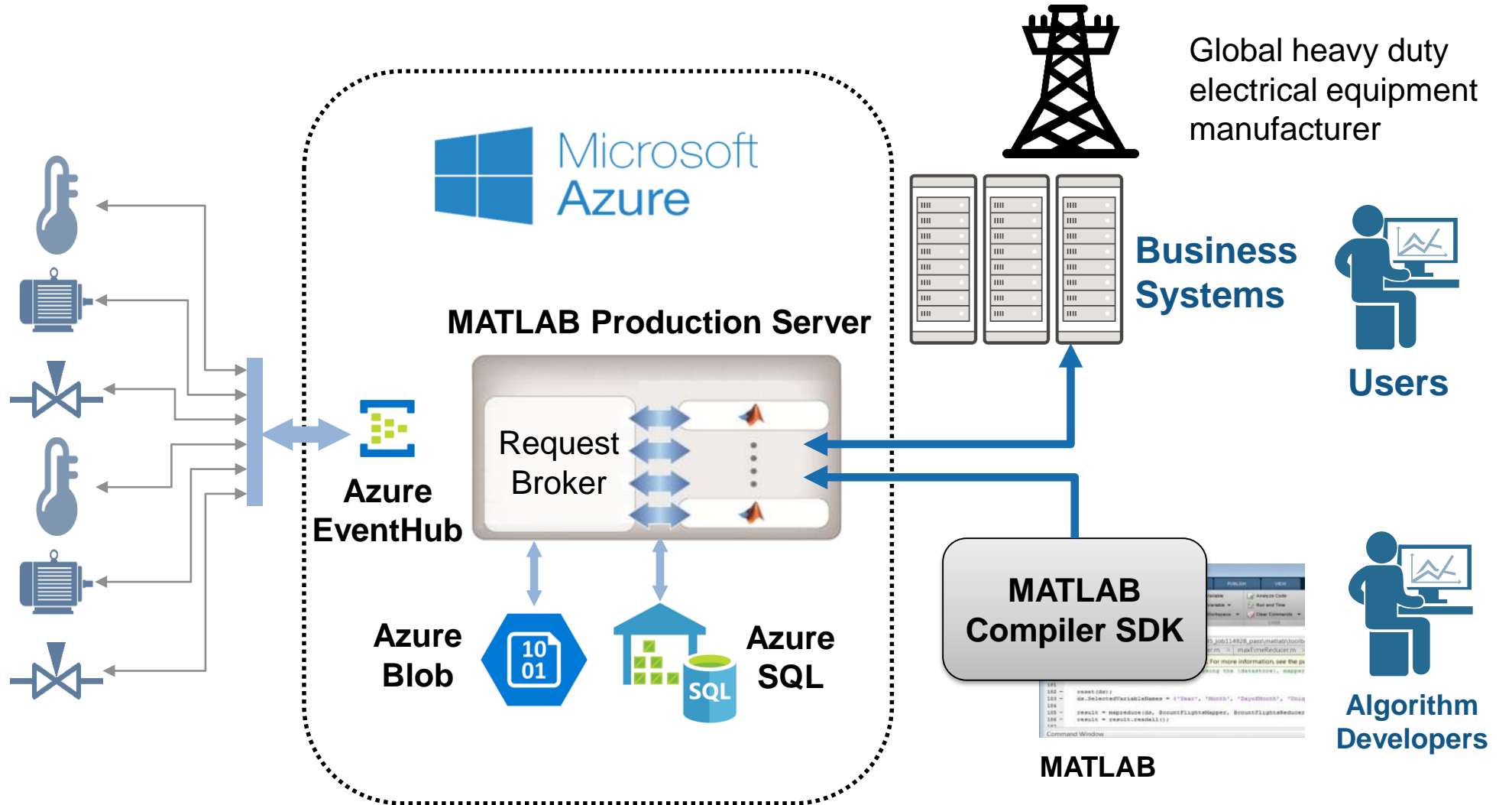
Manage Your Server Instances Using a Dashboard Interface



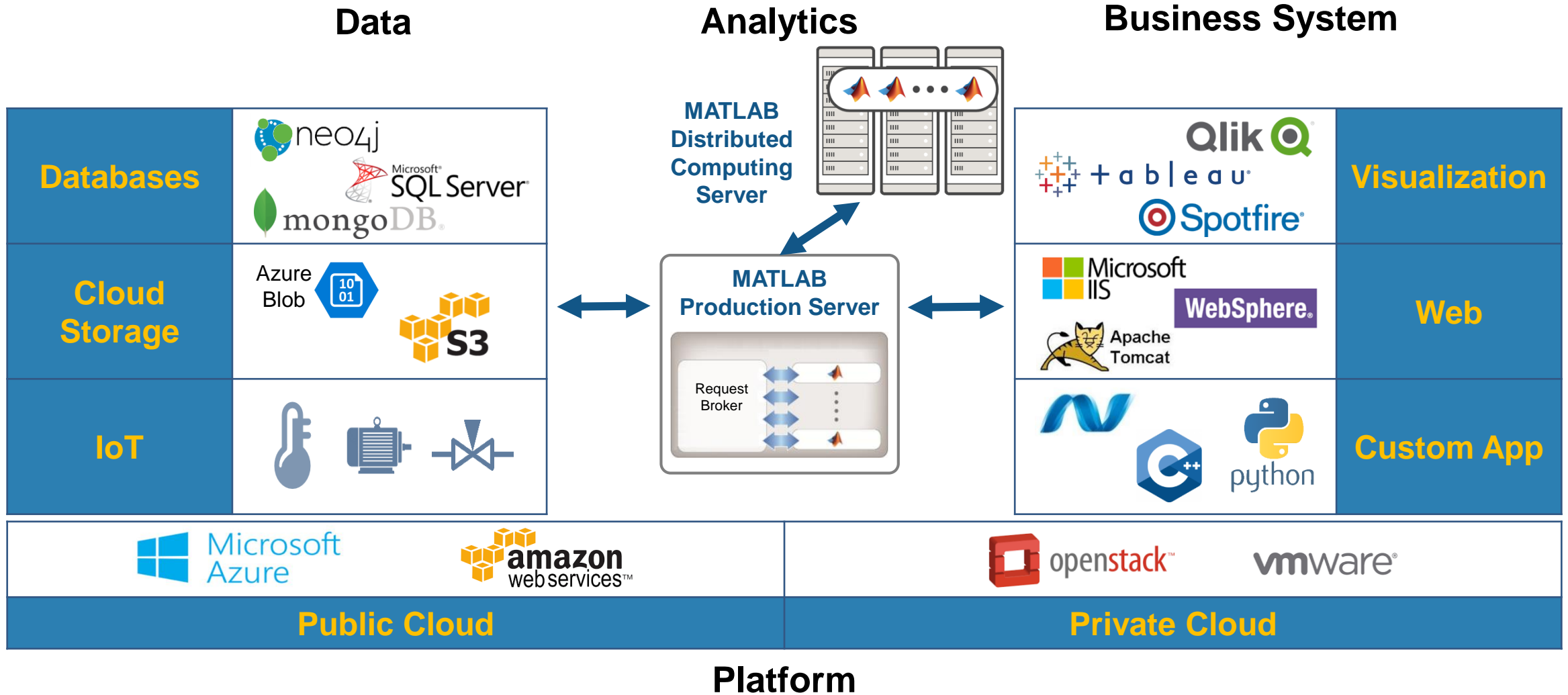
Building Automation IoT Analytics on Azure

Building/HVAC automation control system

- Variety of sensors and controls
- Networked communication
- Data reduction



Technology Stack



MATLAB and MATLAB Distributed Computing Server allow you to **speedup** your computations on multiple CPUs and GPUs **overcome memory limitations** and **offload** computations to **clusters and clouds**.



Desktop



Clusters and Clouds

Front-end Scalability

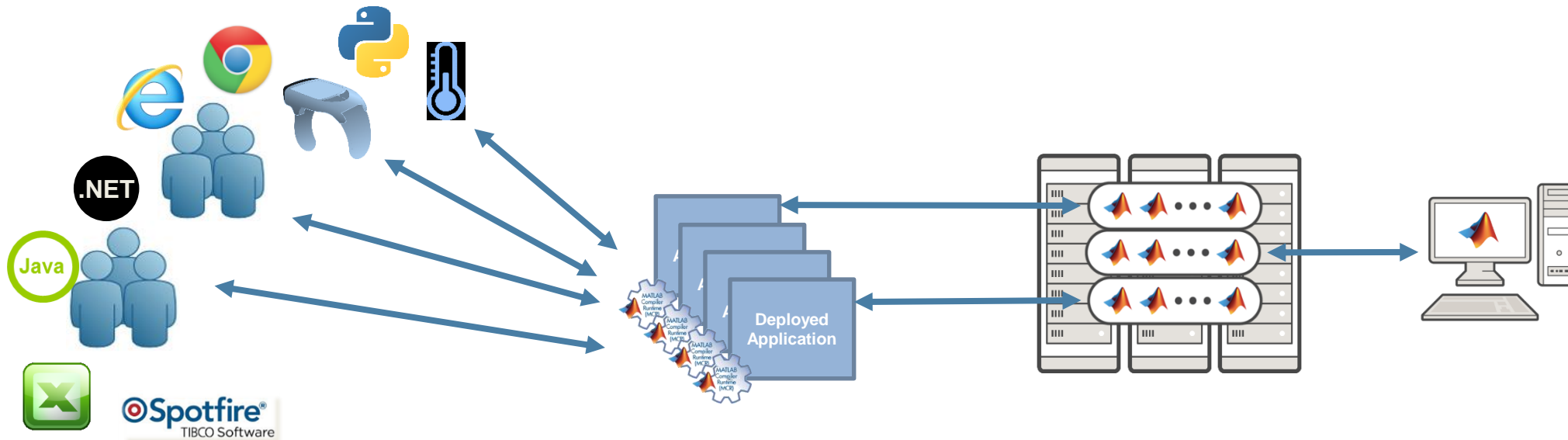
Back-end Scalability

MATLAB Production Server

- Application server for MATLAB
- Manage large numbers of requests to run deployed MATLAB programs

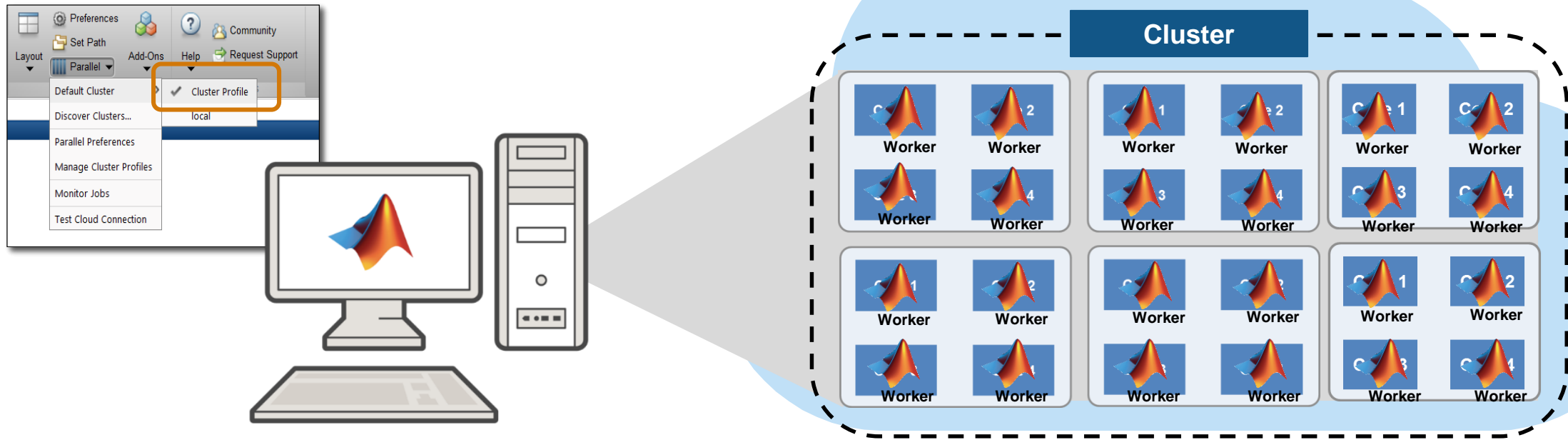
MATLAB Distributed Computing Server

- Cluster framework for MATLAB/Simulink
- Speed up computationally intensive programs on computer clusters, clouds, and grids



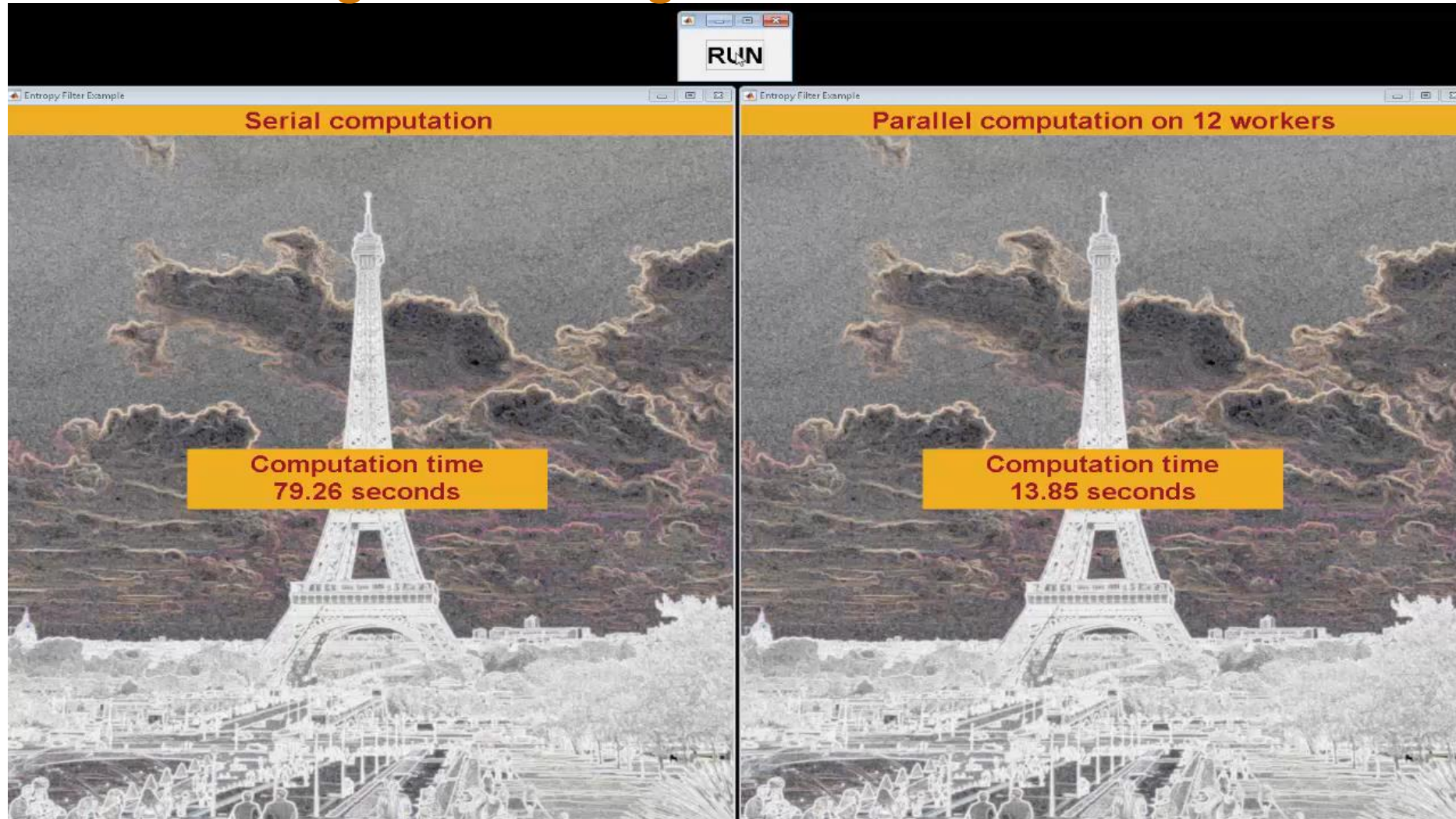
Parallel Computing Paradigm

Clusters

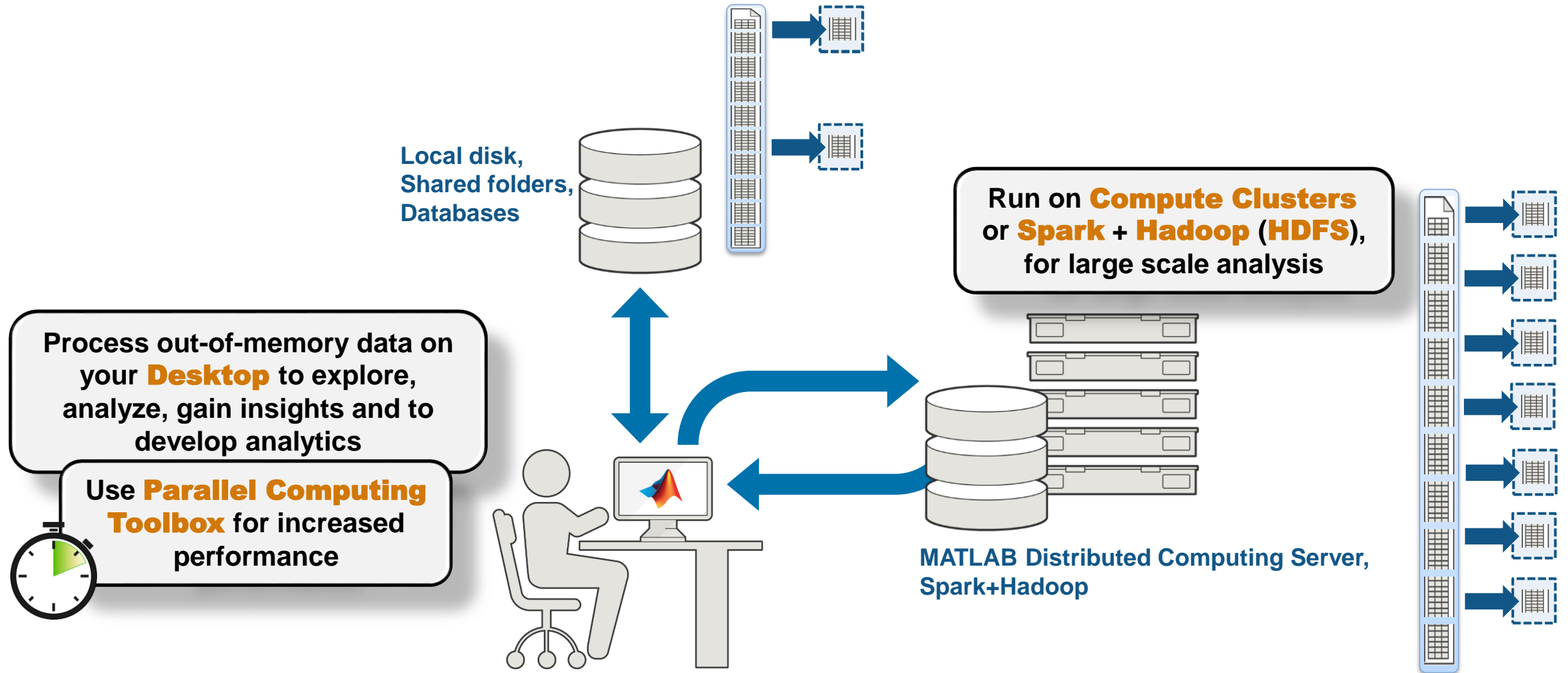


Speed-up using Multiple Cores on the Cloud

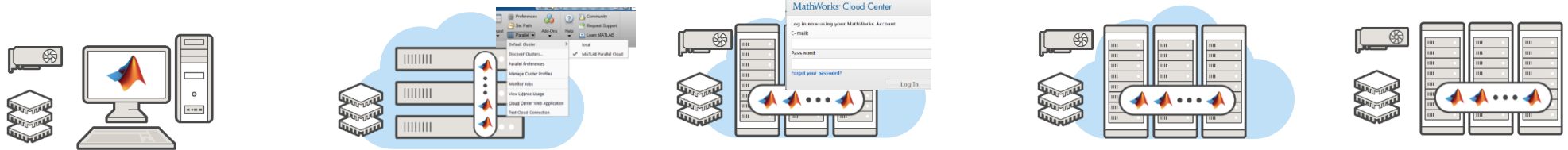
High Resolution Image Processing



Big Data Workflow



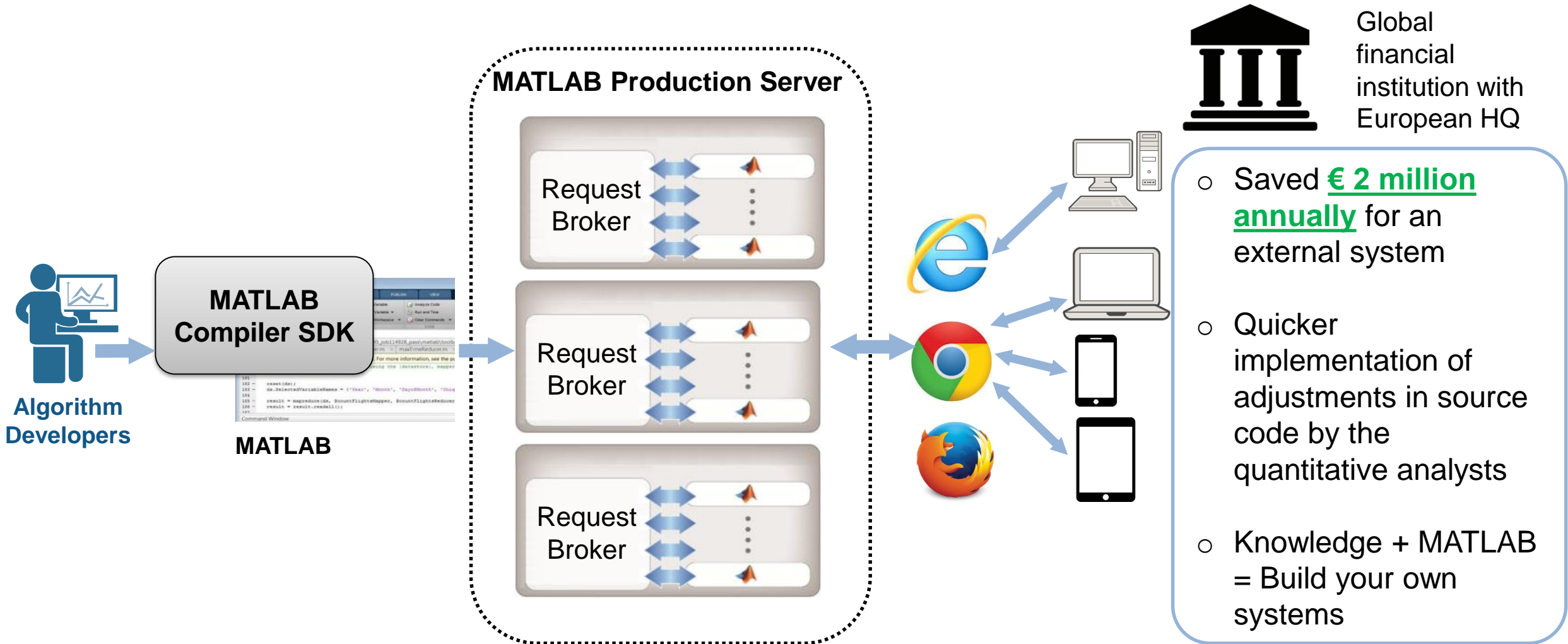
Scale your Applications Beyond the Desktop



Option	Parallel Computing Toolbox	MATLAB Parallel Cloud	MATLAB Distributed Computing Server for Amazon EC2	MATLAB Distributed Computing Server for Custom Cloud	MATLAB Distributed Computing Server
Description	Explicit desktop scaling	Single-user, basic scaling to cloud	Scale to EC2 with some customization	Scale to custom cloud	Scale to clusters
Maximum workers	No limit	16	256	No limit	No limit
Hardware	Desktop	MathWorks Compute Cloud	Amazon EC2	Amazon EC2, Microsoft Azure, Others	Any
Availability	Worldwide	United States and Canada	United States, Canada and other select countries in Europe	Worldwide	Worldwide

Learn More: [Parallel Computing on the Cloud](#)

Customer Example: Financial Customer Advisory Service

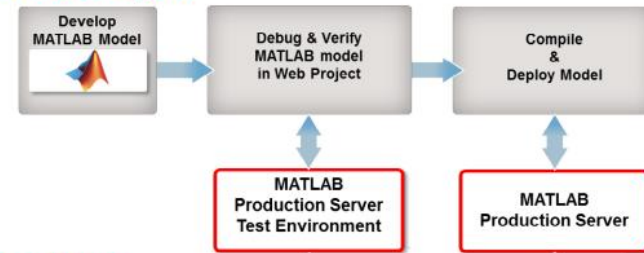


- Saved **€ 2 million annually** for an external system
- Quicker implementation of adjustments in source code by the quantitative analysts
- Knowledge + MATLAB = Build your own systems

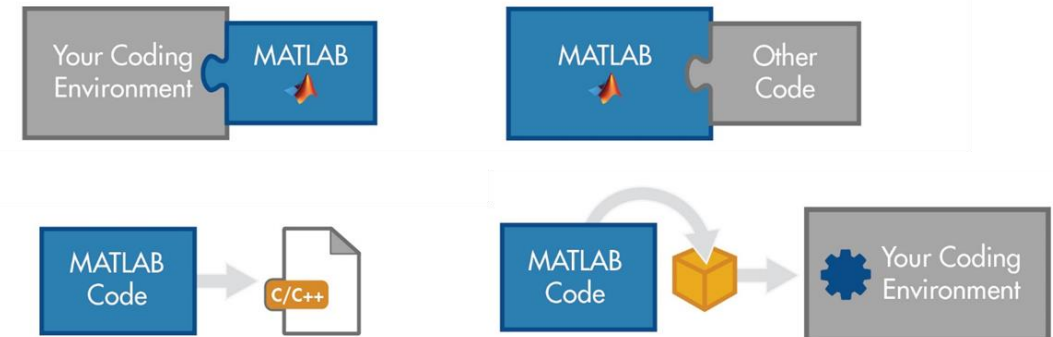
Online Resources

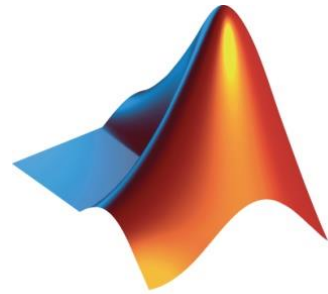
- Documentation – [Create and Share Toolboxes](#)
- Website – [Desktop and Web Deployment](#)
- Free White Paper – [Building a Website with MATLAB Analytics](#)
- Website – [Using MATLAB With Other Programming Languages](#)

MATLAB developer:



Web developer:





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