MATLAB in Production Systems, Database Integration, and Big Data

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Agenda

- MATLAB Production Server and Excel

- Integrating MATLAB Production Server into Database Servers

- MATLAB Production Server and Web Applications

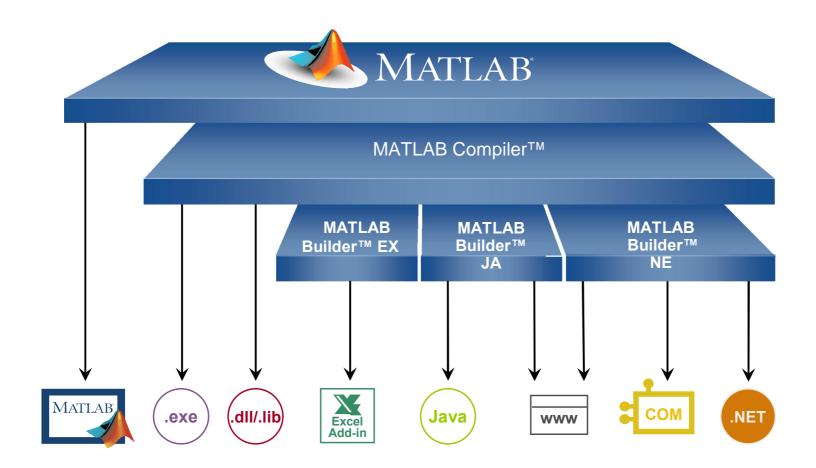- MATLAB Production Server based Trading System

MATLAB in the Enterprise

- Goals:

  - Enable customers to rapidly develop and deploy MATLAB applications onto the desktop.

  - Seamlessly integrate MATLAB generated components into other languages, applications and enterprise production systems.
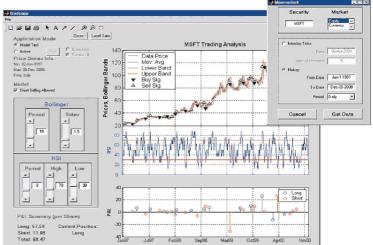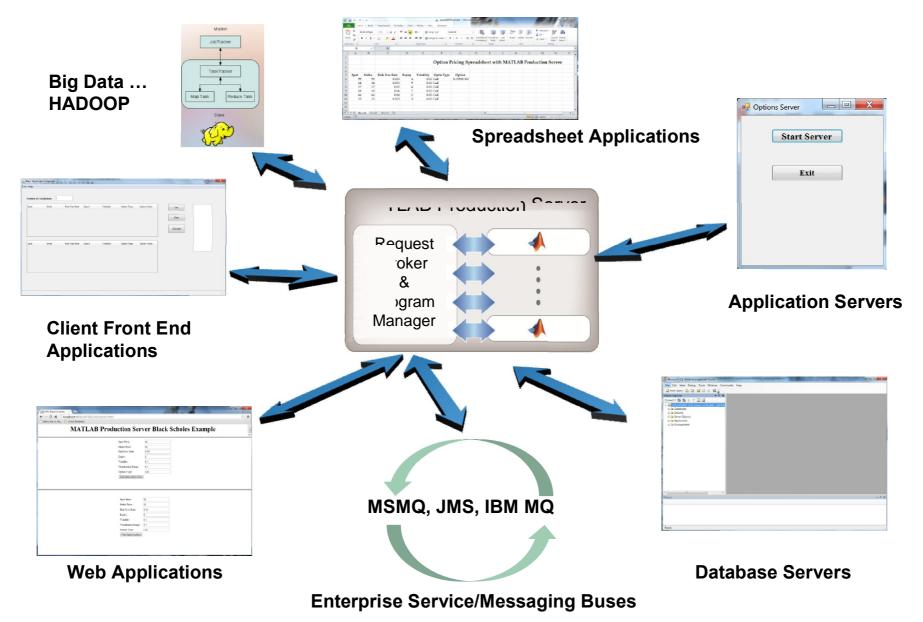
MathWorks Deployment Products

The MATLAB Compiler and Builder Products

- Automatically packages your MATLAB programs as standalone applications, software components, and targeted programming/application environments
  - Executable applications
  - Excel Add-in's
  - .Net and Java components
- Support full MATLAB language and most toolboxes

- Allows royalty-free deployment

- Provides shared infrastructure with MATLAB:
  - *Speed of compiled application equivalent to speed in MATLAB*
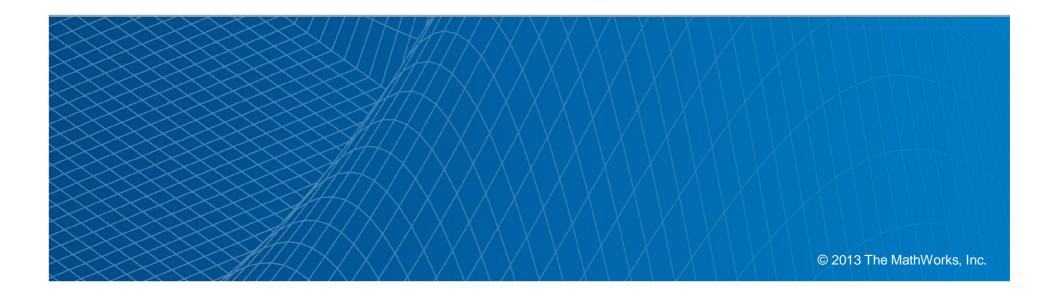
- Encrypts your functions

MATLAB Production Server Use Cases

Big Data … HADOOP

Spreadsheet Applications

Application Servers

Client Front End Applications

MSMQ, JMS, IBM MQ

Web Applications

Database Servers

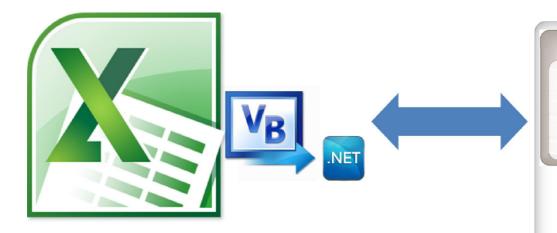**Enterprise Service/Messaging Buses**
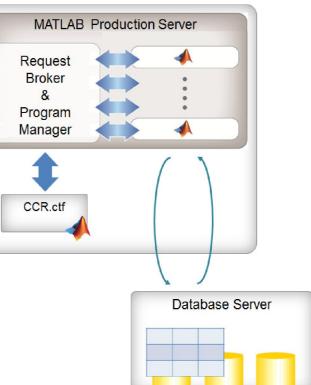
MATLAB Production Server and Excel

Trader: Architecture

- VB to the .NET client library
- Adds trade to portfolio
- New exposures & CVA
- Small data transfer

Integrating MATLAB Production Server into Database Servers

Workflow for Embedding MATLAB Components in Production Systems

The development to production process is a two step process

- Step 1: Bring Data to MATLAB
  - Multiple data sources
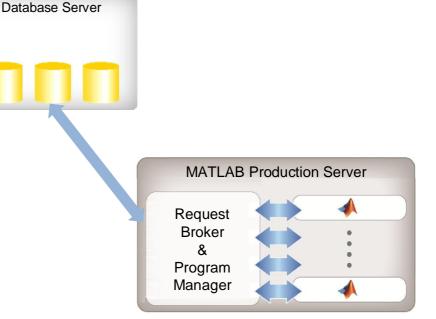 - Build algorithms/models
  - Test
  - Compile to target platform component

- Step 2: Bring algorithm to the Data
  - Install MATLAB component into the enterprise production applications.
  - Same functionality/single source

MATLAB Components in Production Databases

MATLAB Production Server can provide predictive analytics in the database

- Oracle (Java, .NET)

- Microsoft SQL Server (.NET)

- Microsoft Access (.NET)

- Netezza (JAVA)

- SAS (JAVA)

- Teradata (JAVA)

- Thin client with MPS
    - Java and .NET supported

- Central repository for models … Simplifies change management

Database Server

MATLAB Production Server

Request
Broker
&
Program
Manager

MATLAB Production Server and Web Applications

Risk Manager: Architecture

- Architecture

MATLAB Production Server based Trading System

Messaging … A very brief tutorial!

Sending Application

1. Prepare Message
2. Send to Queue

3. Receive Message Back

Message Bus/Queue

Message 1
Message 2
Message 3

.
.
.

Message N

Receiving Application

1. Receive Message
2. Process Message

3. Send Message Back

MATLAB Trading Application (1)

- Made up of many components

- Leverages MATLAB and Deployment Tools to integrate MATLAB analytics into 3rd party applications

- Uses MSMQ as a messaging system to "talk" to other applications

MATLAB Trading Application (2)