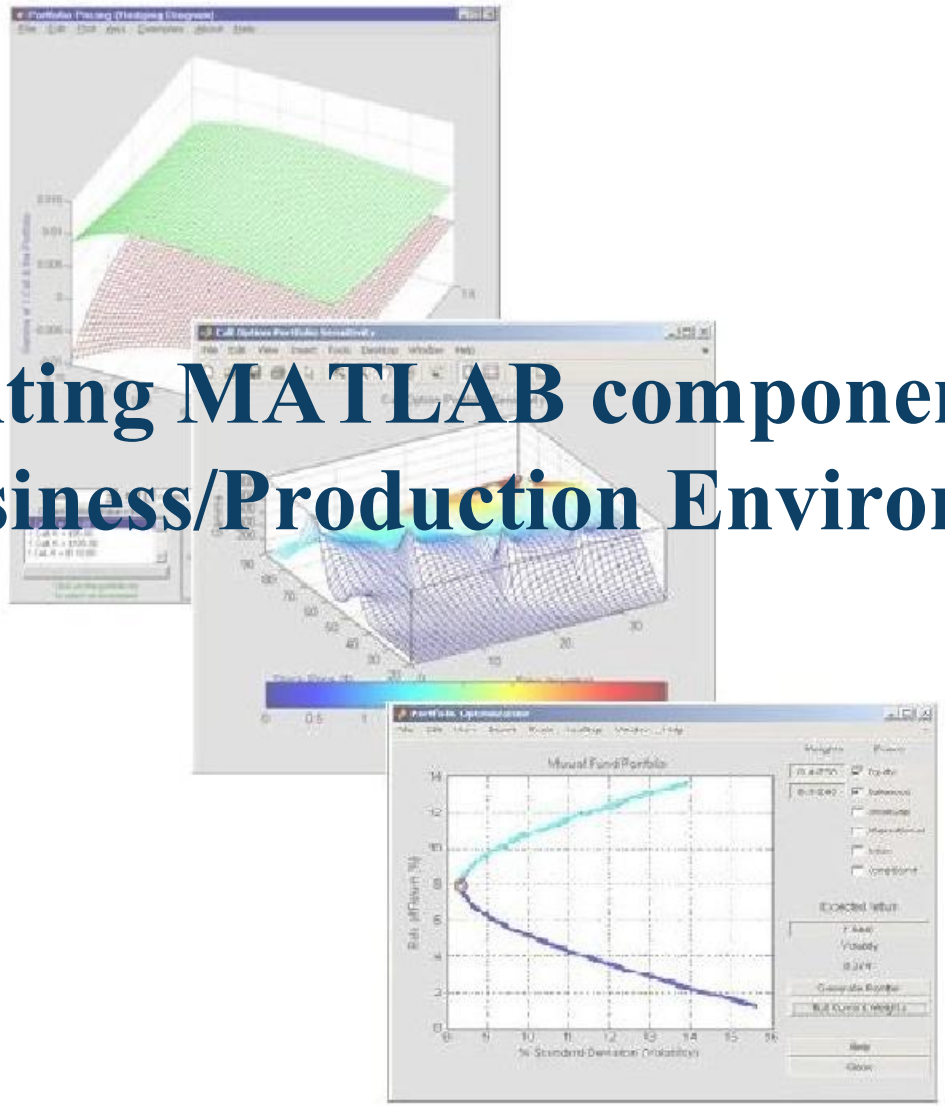


# Implementing MATLAB components in your Business/Production Environment

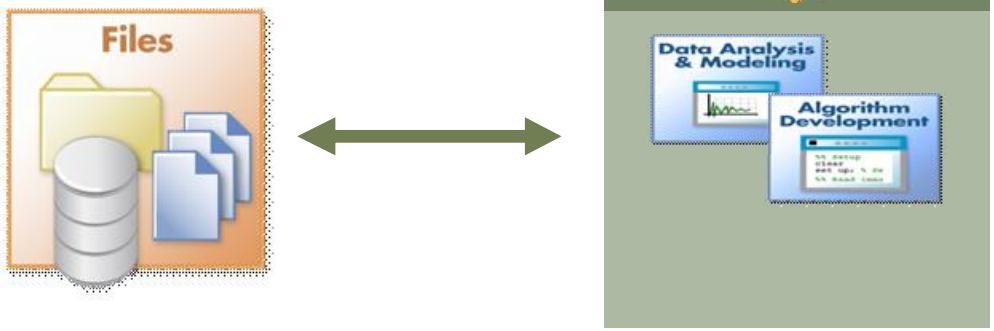
# Agenda

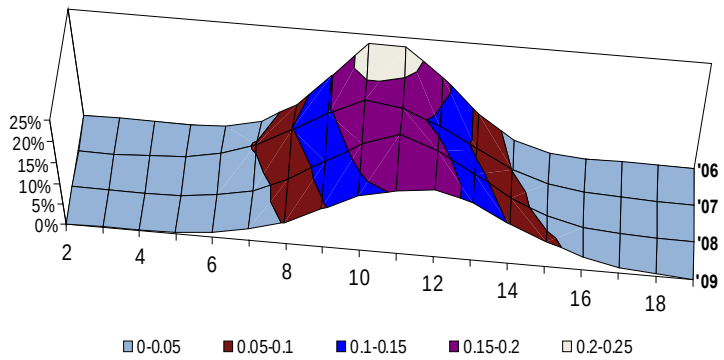
- Introduction to MathWorks™ Deployment Products
- Building and deploying a simple analytic from MATLAB
- MATLAB Component integration into a production system
- Using MATLAB components in multi product/layer solutions
- MATLAB front end applications for production solutions

# MathWorks Evolution in Financial Services

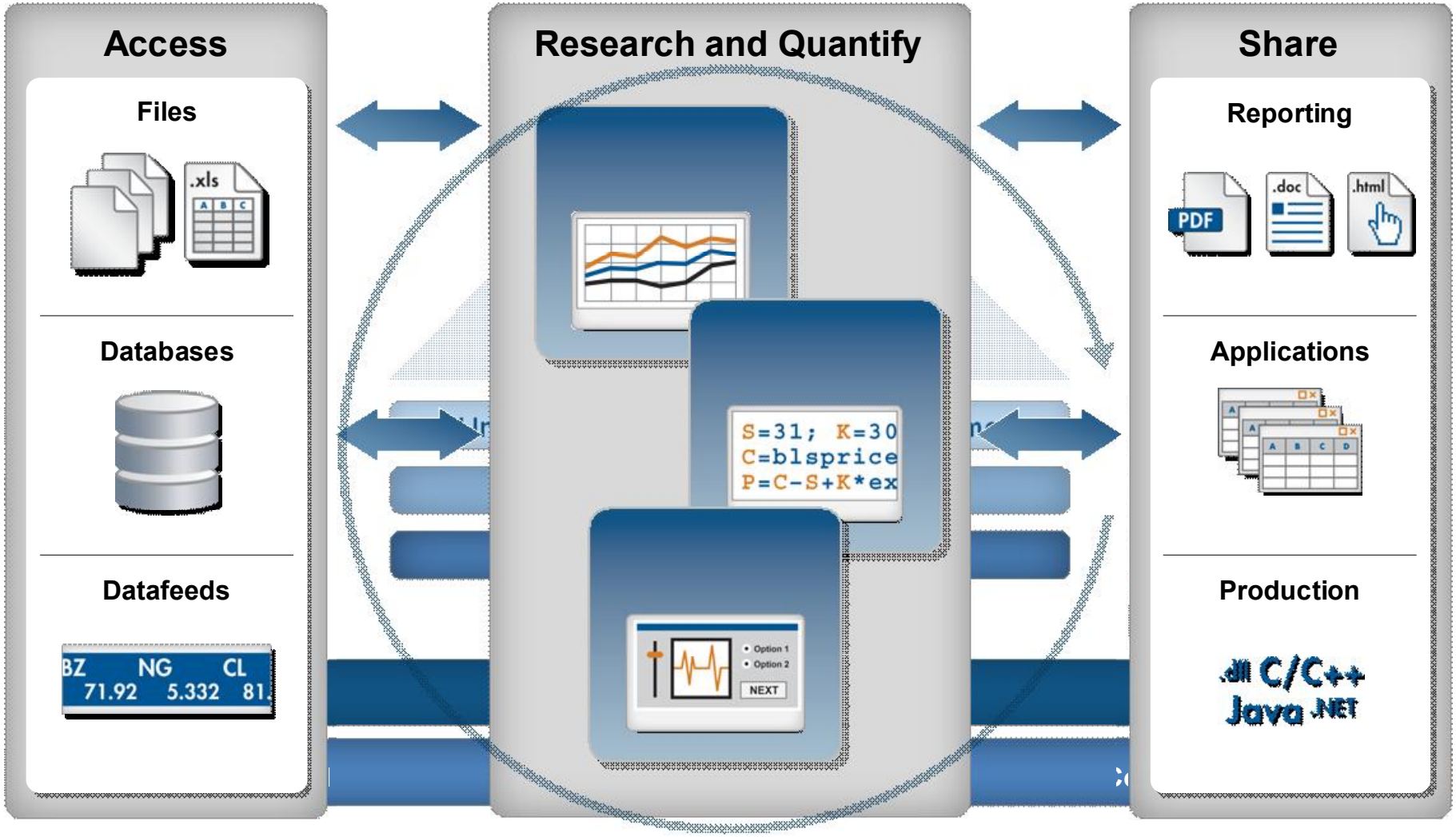
1995

- Quick prototyping environment
- Data pulled from flat files, Excel
- Limited financial functionality
- Ad-hoc research tool

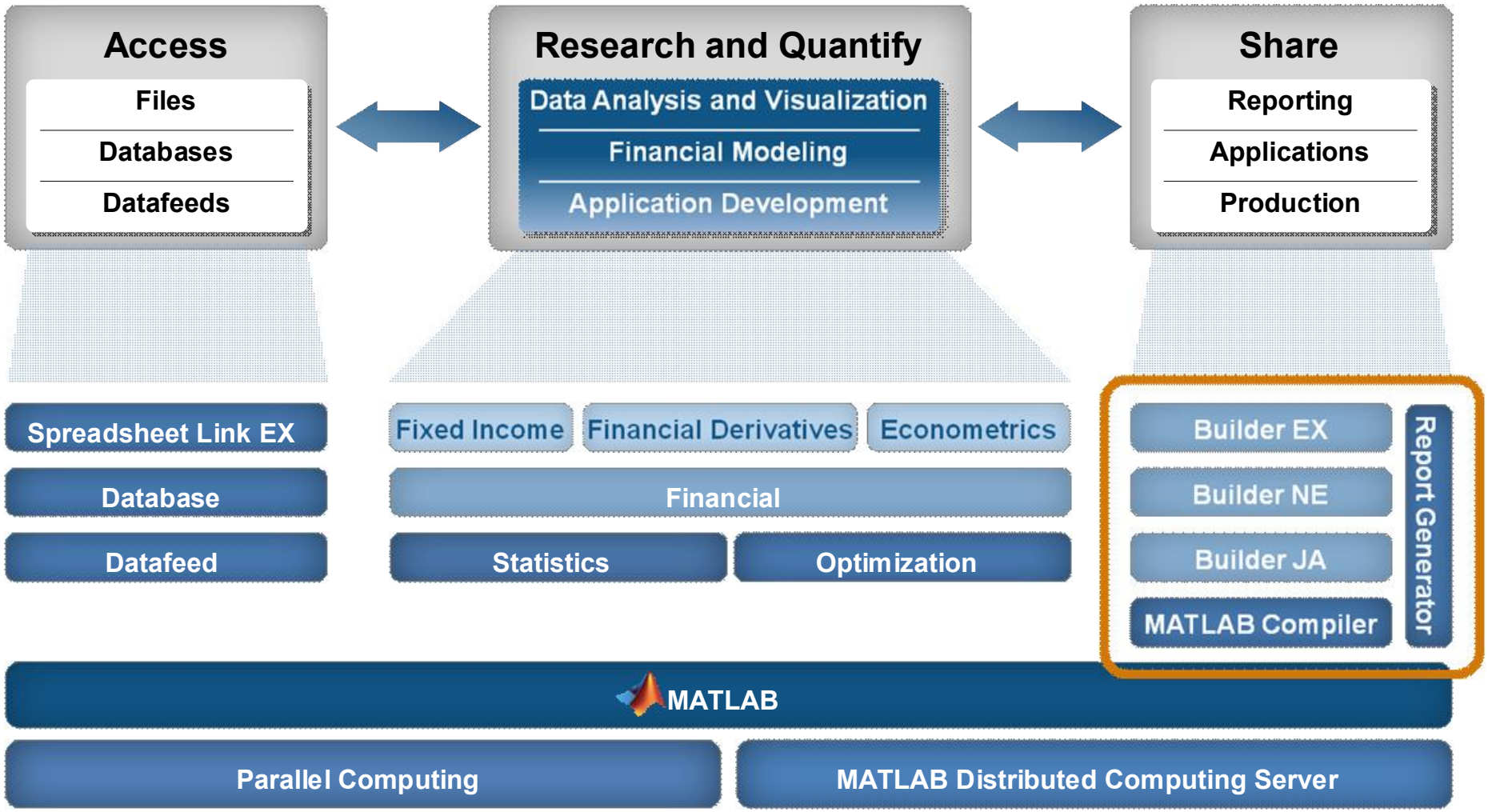


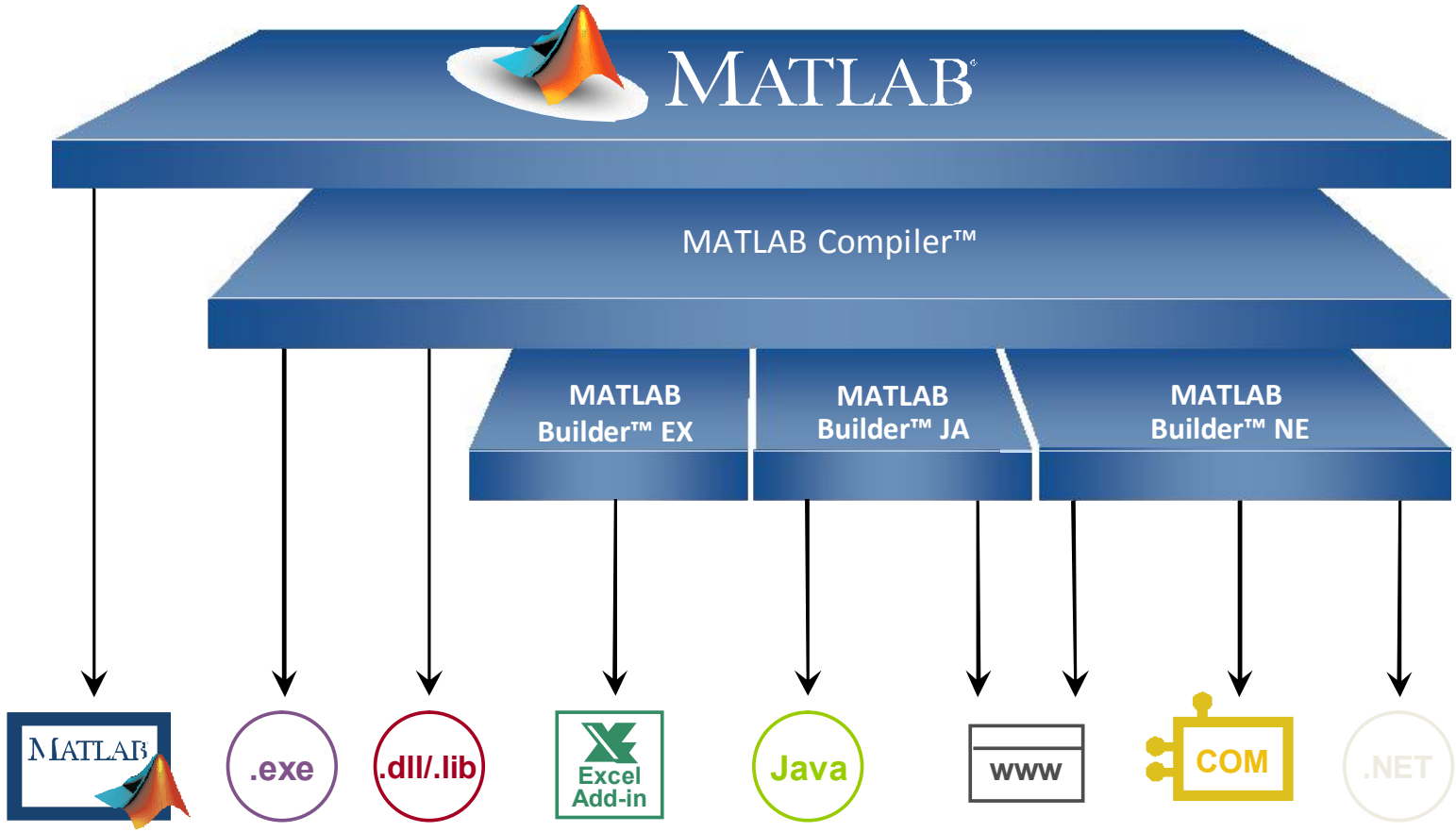
# Computational Finance Workflow



# Computational Finance Workflow

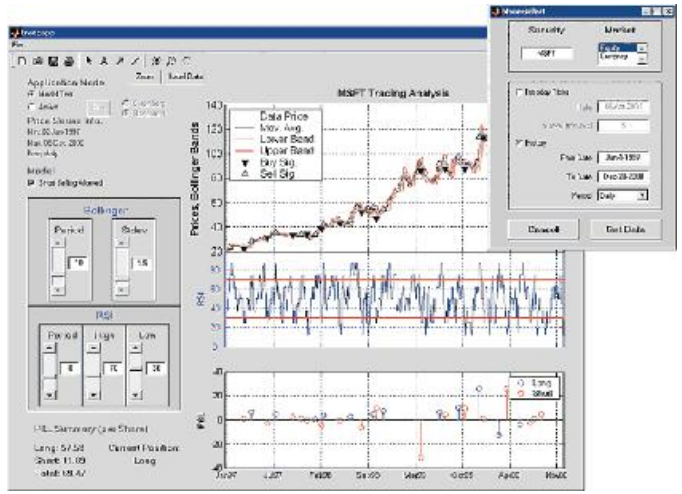


# MathWorks Deployment Products

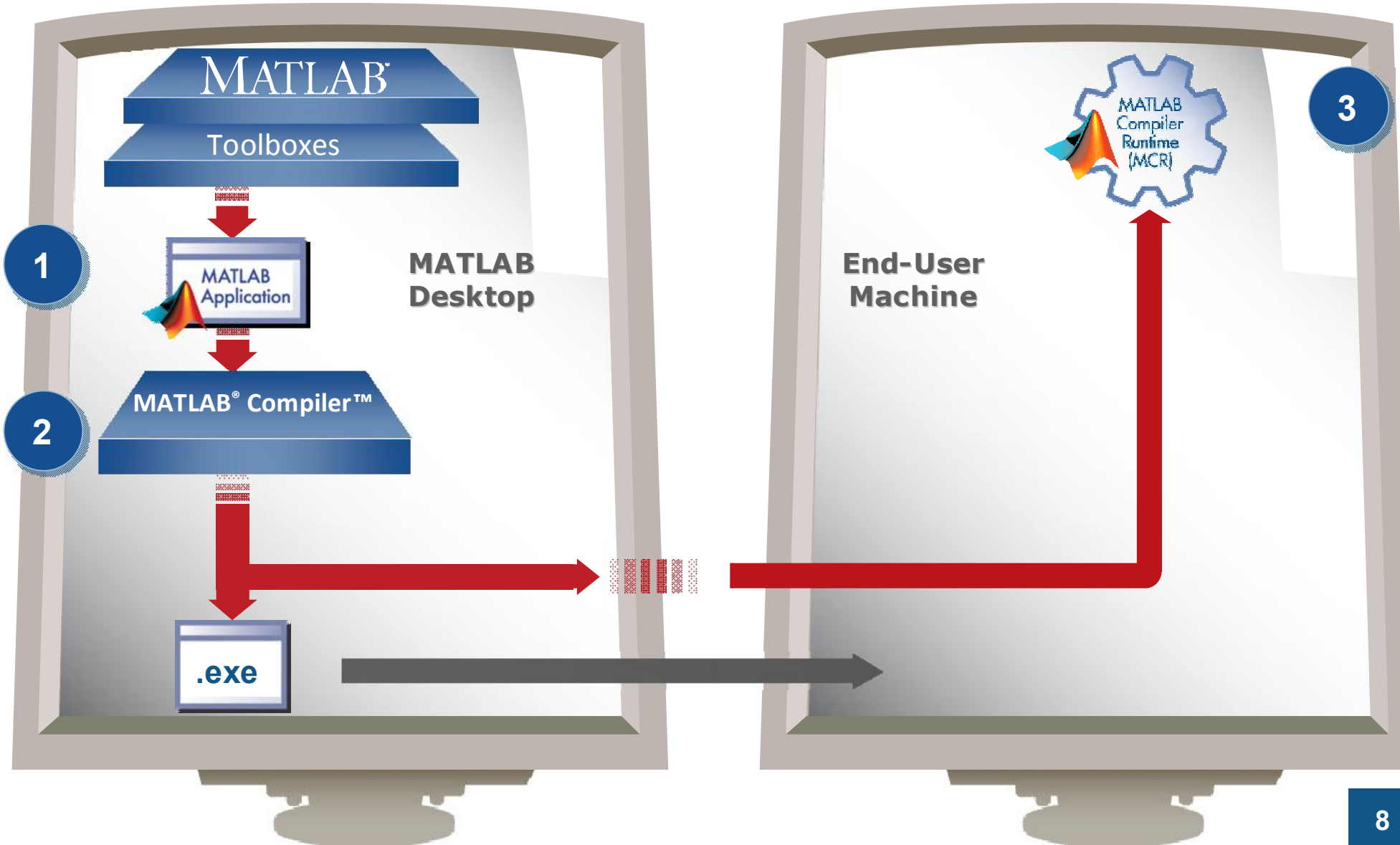


# The MATLAB Compiler

- Automatically packages your MATLAB programs as standalone applications and software components
- Supports 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

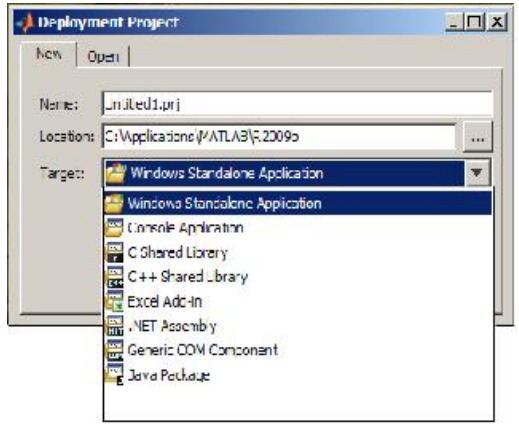


# Deploying Applications with MATLAB®



# Working with MATLAB Builders

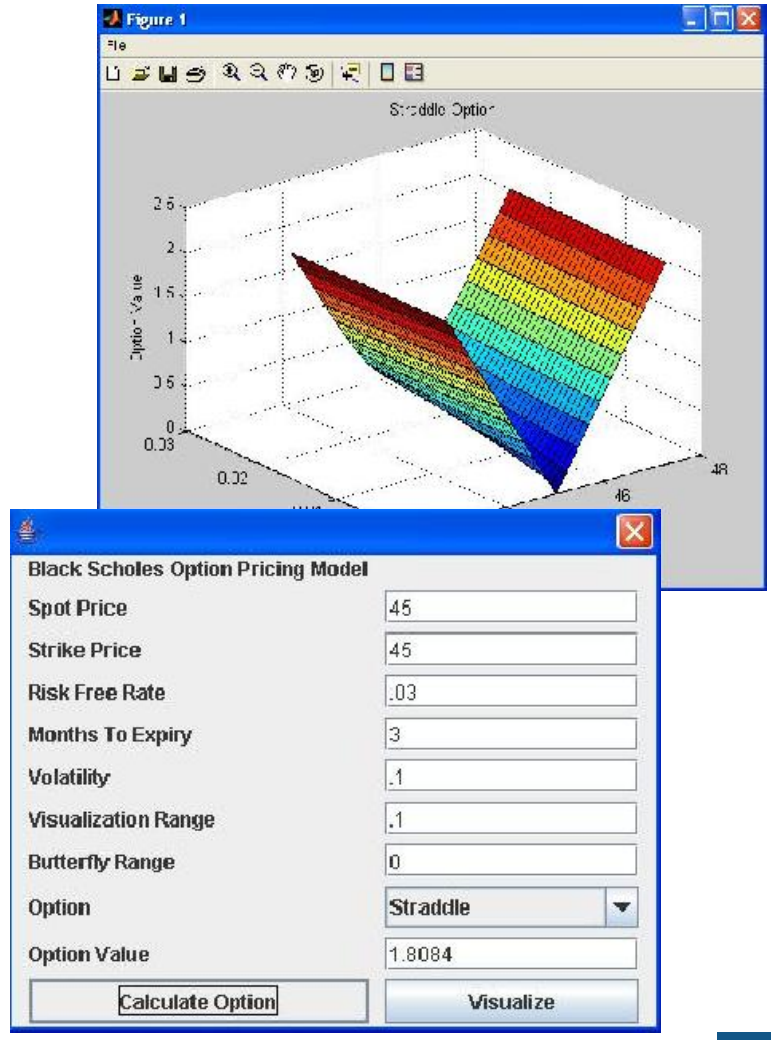
- Package MATLAB based algorithms for integration into: Java, .NET, COM, or Excel




- Same interface, workflow, and royalty-free deployment as MATLAB Compiler

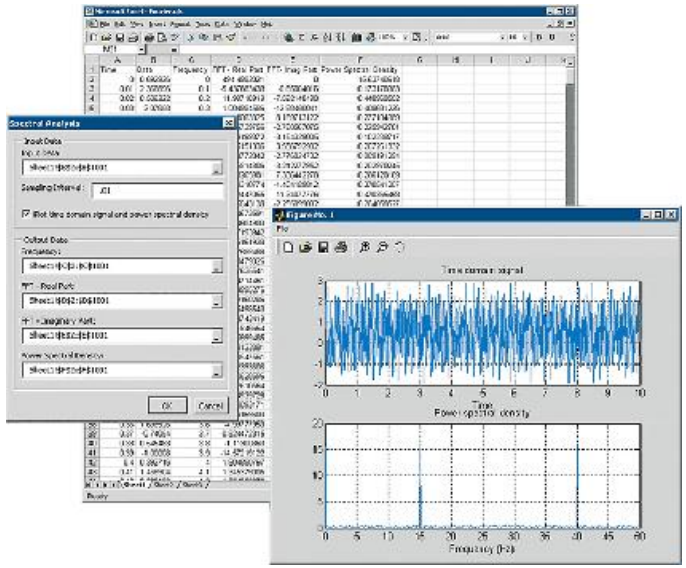
# MATLAB Builder JA for Java language

- Deploys MATLAB code as Java classes
- Can be used with Java applications for desktop or Web
- Provides zoom, pan, and rotate controls for Web figures
- Royalty-free deployment model



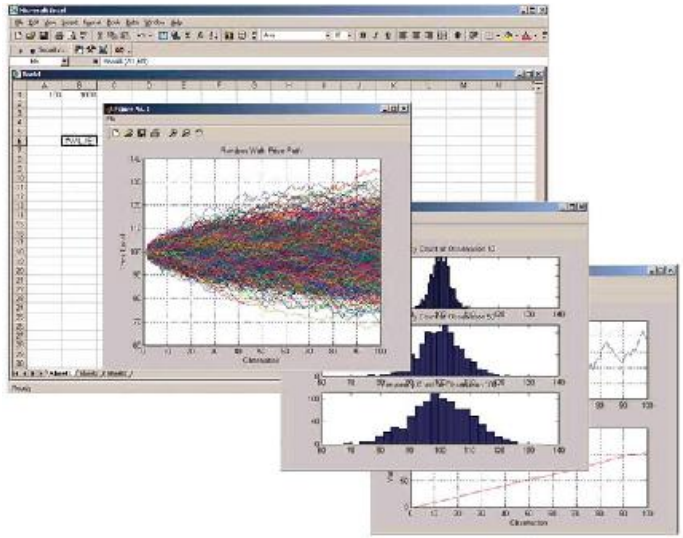
# MATLAB Builder NE for Microsoft .NET Framework

- Deploys MATLAB code as .NET and COM components
- .NET components integrate with any .NET language, including:
  - C#
  - VB.NET
  - Web applications in ASP.NET
- Royalty-free deployment model



# MATLAB Builder EX for Microsoft Excel

- Deploys MATLAB code as Excel add-ins
  - Run faster than Visual Basic add-ins



- Packages two files for end user:
  1) .bas [for creating Excel add-in]
  2) .ctf [archive of supporting files]

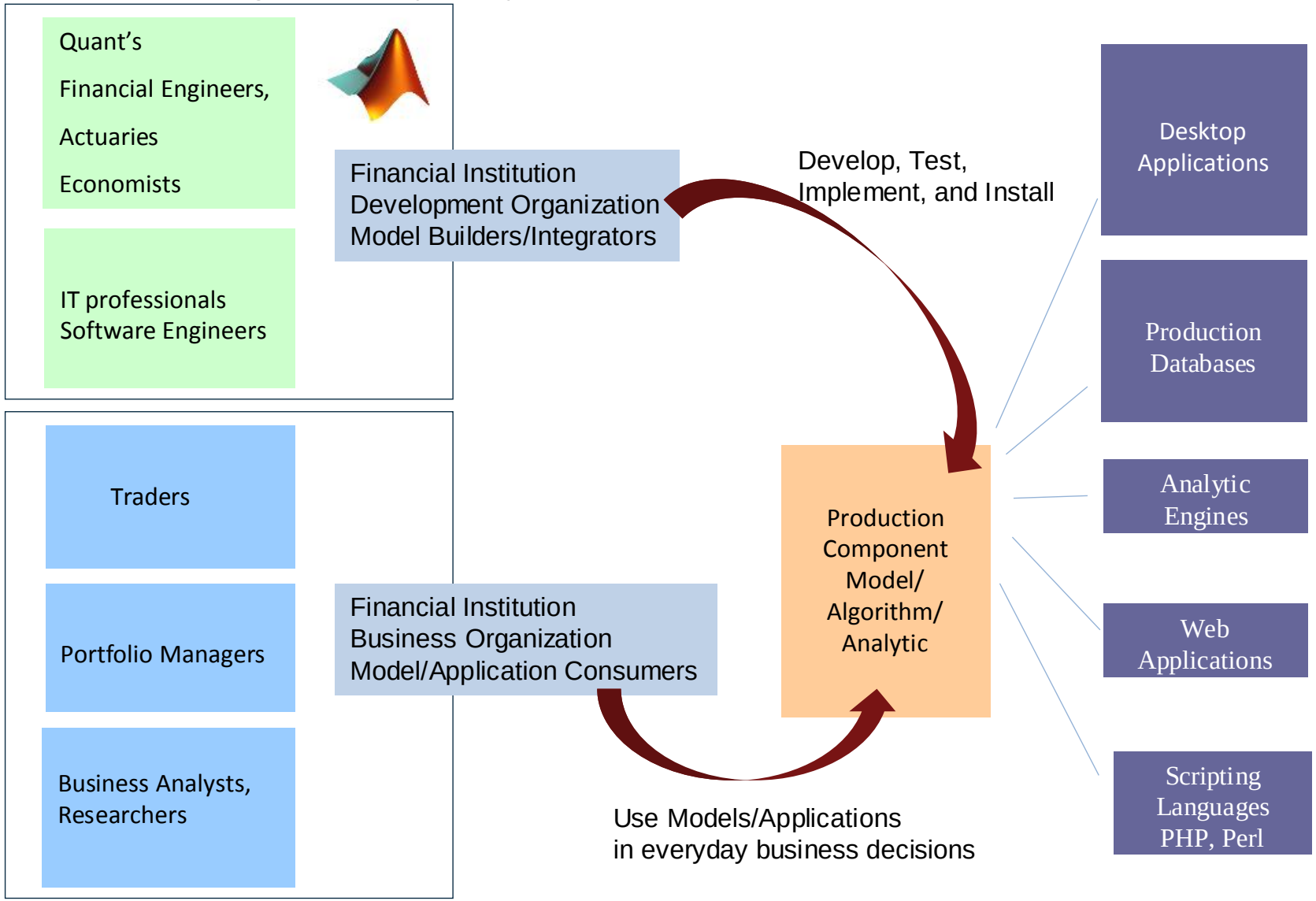
- Royalty-free deployment model

# MATLAB Financial Modeling Platform

- 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.

# Strategy

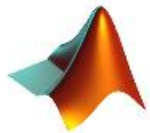
**Build a financial modeling and development platform that models the financial institution's workflow**



# Workflow for Embedding MATLAB Components in Enterprise Systems

The development to production process is a two step process

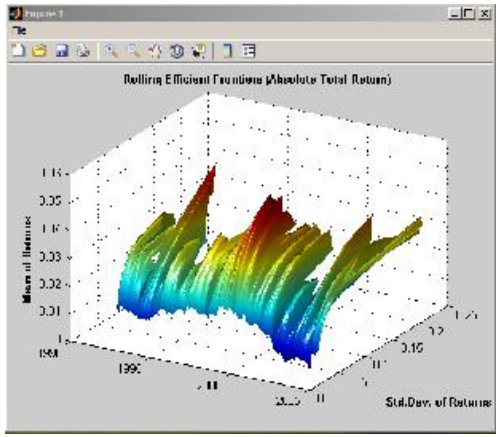
- Step 1: Bring Data to MATLAB
  - Multiple data sources
  - Build algorithms/models
  - Test
  - Compile to target platform component



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

# Case 1: Building and Deploying A Simple Analytic

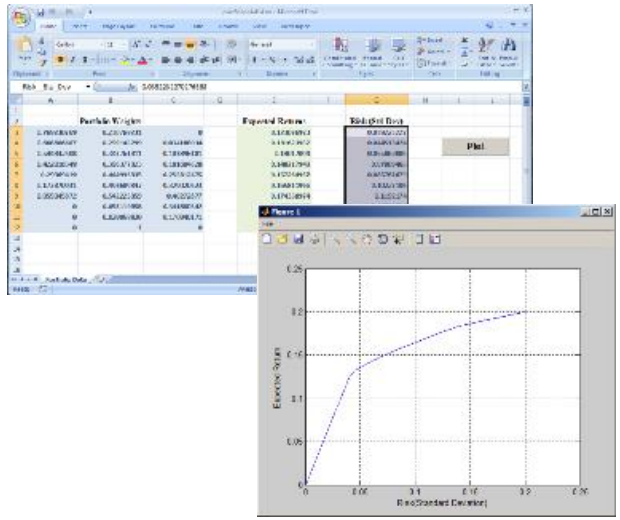
- Model development workflow
  - Importing data into MATLAB
  - Building simple analytic
- Deployment process
  - Building deployable component




- Integration of MATLAB Components into Production Systems
  - Ease of integration
  - Enhanced computational/Visualization functionality

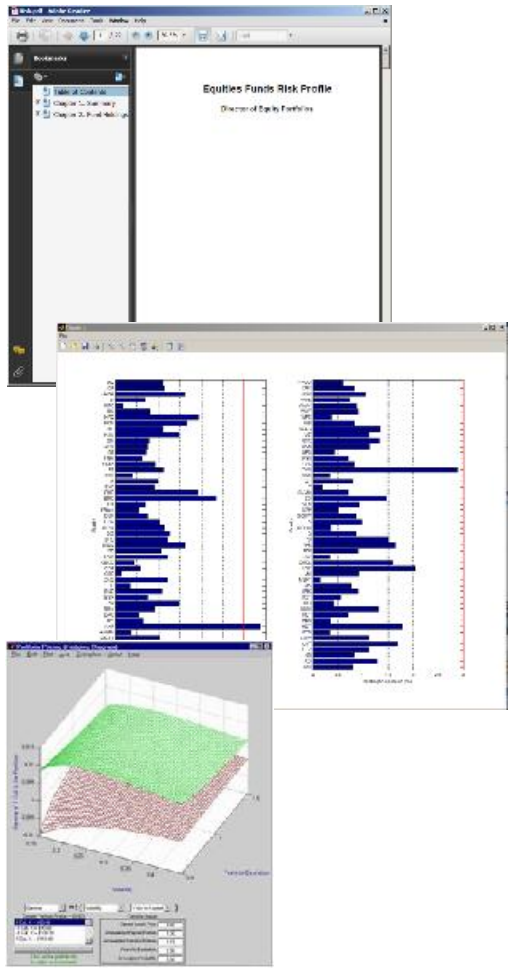
# Case 2: MATLAB Deployed Component as a Multi-Functional Layer

- MATLAB Components can be multifunctional
  - Computational
    - Analytics/Models built in MATLAB can be quickly and easily used in the production environment
  - Visualization
    - Interactive graphics and high quality visualization components
  - Communication layer
    - Read/Write to
      - Spreadsheets
      - Flat files
      - Databases

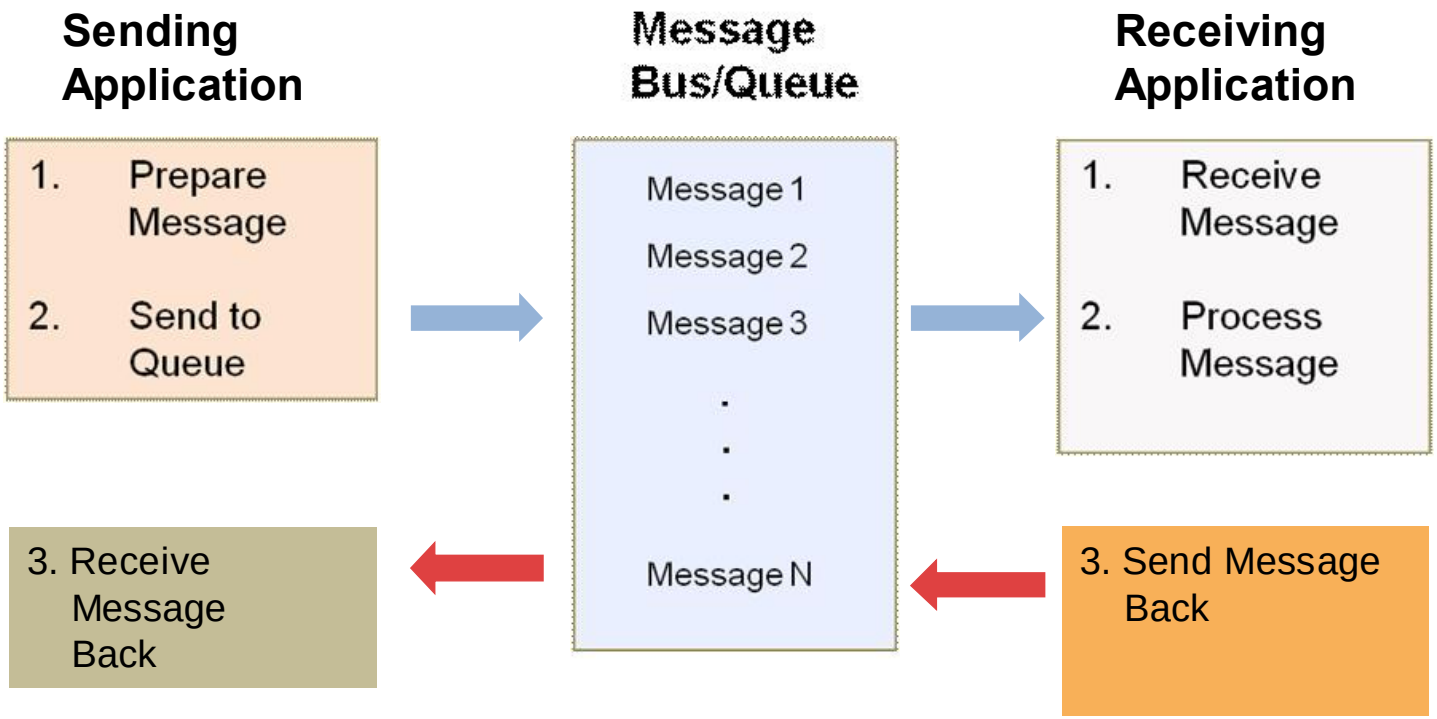


# Case 3: Building deployed Applications and Reporting Tools for Production Systems

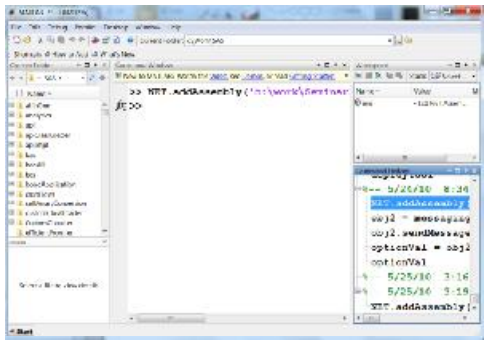
- MATLAB Applications for Production Systems
  - Front End GUI based applications
    - Point and click tools for end users.
  - Batch Processes
    - Generate custom analytical reports overnight from within the production system.
  - Reporting Applications
    - Point and click reporting tools can be built and deployed

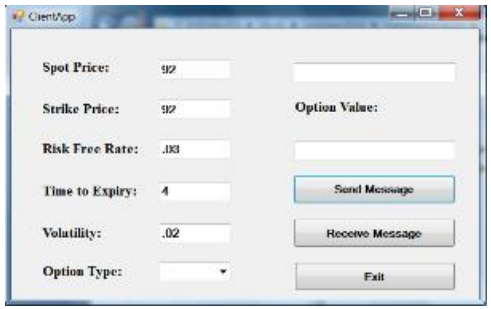


# Messaging


Sending Application
Message Bus/Queue
Receiving Application
1. Prepare Message
2. Send to Queue
Message 1
Message 2
Message 3
Message N
1. Receive Message
2. Process Message
3. Receive Message Back
3. Send Message Back

# Messaging







**Message Bus/Queue**

Message 1

Message 2

Message 3

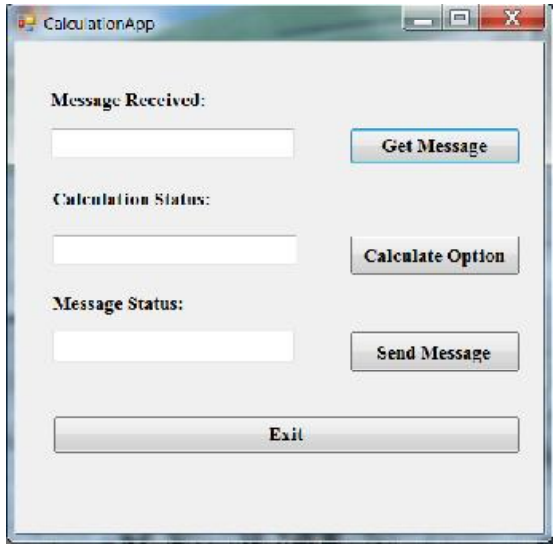
.

.

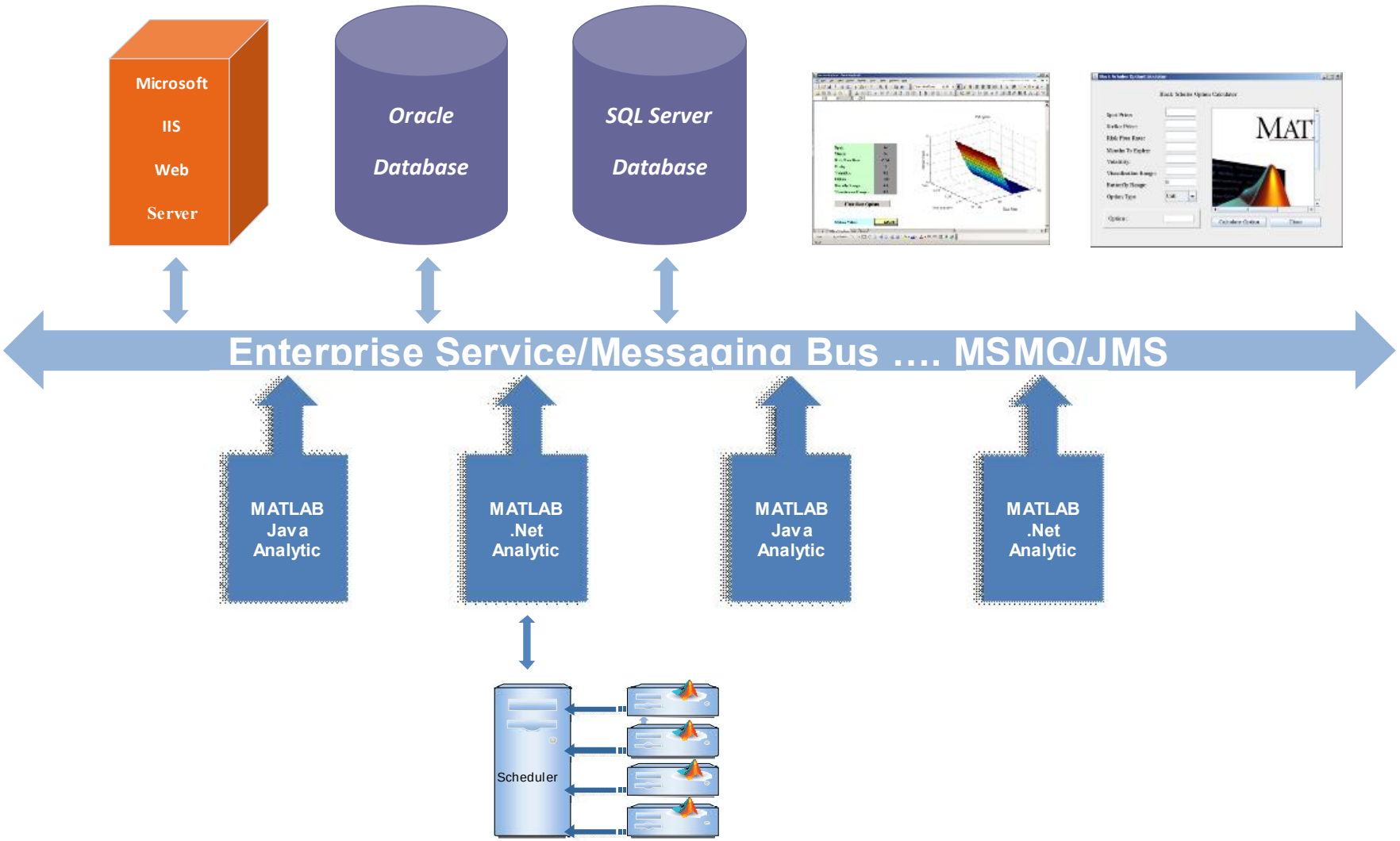
.

Message N

**MSMQ**

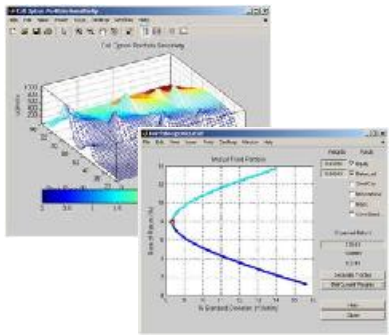


# MATLAB Components in an Enterprise Messaging Bus



# Summary

- Enhance existing production applications



- Seamless integration
- Leverage MATLAB and existing systems to provide powerful solutions.
- MATLAB component  can provide multiple possibilities for integrating various applications for a complete business solution.