Deploying MATLAB Applications in Excel, Java, and .NET Environments

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Agenda

- Application Development Workflow
- Need for Deployment
- Application Scalability
- Summary of Deployment Solutions Offered
- Overview of MathWorks Services
Technical Computing Workflow

Access
- Files
- Software
- Hardware

Explore & Discover
- Data Analysis & Modeling

Share
- Reporting and Documentation
- Outputs for Design
- Deployment

Automate
- Code & Applications
Need for Deploying MATLAB Applications
Deploying MATLAB Models

1. MATLAB Desktop
2. MATLAB Compiler
3. End-User Machine

MATLAB Toolboxes

Deploying MATLAB Models
Deploying Applications with MATLAB

- Give MATLAB code to other users

- Share applications with end users who do not have MATLAB
  - Use MATLAB Compiler to create standalone executables and shared libraries
  - Use MATLAB Compiler add-ons to create software components
Example: Optimizing Tower Placement

- Determine location of cell towers
- Maximize coverage
- Minimize overlap
Deploying MATLAB Components

- Create MATLAB application
- Build component
  - MATLAB Compiler
  - MATLAB Builder JA for Java
  - MATLAB Builder NE for .NET
- Deploy against MATLAB Compiler Runtime (MCR)
  - One per process
  - Single threaded
  - Thread safe
Component Process Architectures

- In process model
  - MCR in application process

- Scalable model
  - MCR in separate processes
Web Deployment

In-Process Model

Web Server

MATLAB Component

MATLAB Compiler Runtime (MCR)

Single Process

Web Client
Web Deployment: Scalable

Web Clients

Web Server

MATLAB Component

MATLAB Component

Main Process

Java RMI

.NET Remoting

Servers
Web Deployment: Scalable
Scale Up to Clusters, Grids and Clouds

Computer Cluster

MATLAB Distributed Computing Server
Remote MATLAB Builder Components

- Thin Client
  - Java or .NET Enabled

- Server
  - MATLAB Component and MCR
  - MATLAB Compiler Runtime (MCR)

- Other Processes
  - .NET or Java Application
  - Java RMI
  - .NET Remoting
## Deployment with MATLAB Builders

<table>
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<tr>
<th>Web infrastructure</th>
<th>.NET Framework</th>
<th>Java Environment</th>
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<tr>
<td>Active Server Pages (ASP or ASP.NET), .NET Web Service</td>
<td>Java Server Pages (JSP), Java Servlets, Java Web Service</td>
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<tr>
<th>Interactive Graphics</th>
<th>.NET Remoting</th>
<th>Java Remote Method Invocation (RMI)</th>
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<td>MATLAB Builder JA</td>
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<th>License model</th>
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<td>Royalty Free</td>
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MATLAB Compiler

- Automatically packages MATLAB programs as standalone executables and shared libraries
- Supports full MATLAB language and most toolboxes
- Encrypts your functions
- Speed of compiled application equivalent to speed in MATLAB
- Allows royalty-free deployment
Working with MATLAB Builders

- Create components to integrate into other software environments
- Use the same workflow as MATLAB Compiler
- Deploy royalty-free
MATLAB Builder JA
for Java language

- Deploy MATLAB code as Java classes
- Integrate with desktop or Web applications
- Provides client-side controls for interactive Web graphics
- Royalty-free deployment
MATLAB Builder NE for Microsoft .NET Framework

- Deploy MATLAB code as .NET and COM components
- Integrate with desktop or Web applications
- Provides client-side controls for interactive Web graphics
- Royalty-free deployment
MATLAB Builder EX
for Microsoft Excel

- Deploy MATLAB code to Microsoft Excel
- Integrate MATLAB applications into Excel workbooks
- Provides a Visual Basic interface
- Royalty-free deployment
Training Services

*Exploit the full potential of MathWorks products*

Flexible delivery options:

- Public training available in several cities
- Onsite training with standard or customized courses
- Web-based training with live, interactive instructor-led courses

More than 30 course offerings:

- Introductory and intermediate training on MATLAB, Simulink, Stateflow, code generation, and Polyspace products
- Specialized courses in control design, signal processing, parallel computing, code generation, communications, financial analysis, and other areas

www.mathworks.in/training
## Public Trainings in the next Few Months

<table>
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<tr>
<th>Course</th>
<th>Dates</th>
<th>Location</th>
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<tbody>
<tr>
<td>Simulink for System and Algorithm Modeling</td>
<td>20 Aug 2012 – 21 Aug 2012</td>
<td>Bangalore</td>
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<tr>
<td>Embedded Coder for Production Code Generation</td>
<td>22 Aug 2012 – 24 Aug 2012</td>
<td>Bangalore</td>
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<tr>
<td>MATLAB Fundamentals</td>
<td>03 Sep 2012 – 05 Sep 2012</td>
<td>Bangalore</td>
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<tr>
<td>MATLAB Programming Techniques</td>
<td>06 Sep 2012 – 07 Sep 2012</td>
<td>Bangalore</td>
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<tr>
<td>MATLAB Fundamentals</td>
<td>24 Sep 2012 – 26 Sep 2012</td>
<td>Pune</td>
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<tr>
<td>Simulink for System and Algorithm Modeling</td>
<td>27 Sep 2012 – 28 Sep 2012</td>
<td>Pune</td>
</tr>
<tr>
<td>MATLAB Based Optimization Techniques</td>
<td>17 Oct 2012</td>
<td>Bangalore</td>
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Email: [training@mathworks.in](mailto:training@mathworks.in)    URL: [http://www.mathworks.in/services/training](http://www.mathworks.in/services/training)    Phone: 080-6632-6000
Consulting Services

A global team of experts provide support from initial project startup through integrated process automation to increase productivity and maximize the value of product investments.
Automated System for Trading and Risk Management of RWE

Challenge
RWE wanted to automate business processes, connected to their enterprise SAP system for quoting gas contracts and hedging against price fluctuations.

Solution (with the help of MathWorks’ Consulting)
- Able to develop and deploy to a production environment, a MATLAB-based automated pricing and risk management system that fits within the company's existing IT infrastructure using Java interface.

Value
- Models created in minutes, not weeks
  - By automating the process, RWE can respond to changing market conditions almost immediately, and the costs for creating and updating models are 10% to 20% of what they were.
- 100% accurate results delivered
  - By integrating the Java package built from MATLAB with SAP, RWE has a stable production system that delivers the same accurate results throughout the organization.
- Technical expertise applied to core business goals

For more information:
http://www.mathworks.com/tagteam/65950_91888v00_RWE_2010_final.pdf

“With MATLAB, we can apply nonlinear option pricing and perform much more complex computations, which lowers our risk exposure and reduces the amount we have to spend on options.” - Dr. Norbert Tönder, RWE
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