MATLAB EXPO 2019

Fit für die MATLAB EXPO

Eine kurze Einführung in MATLAB

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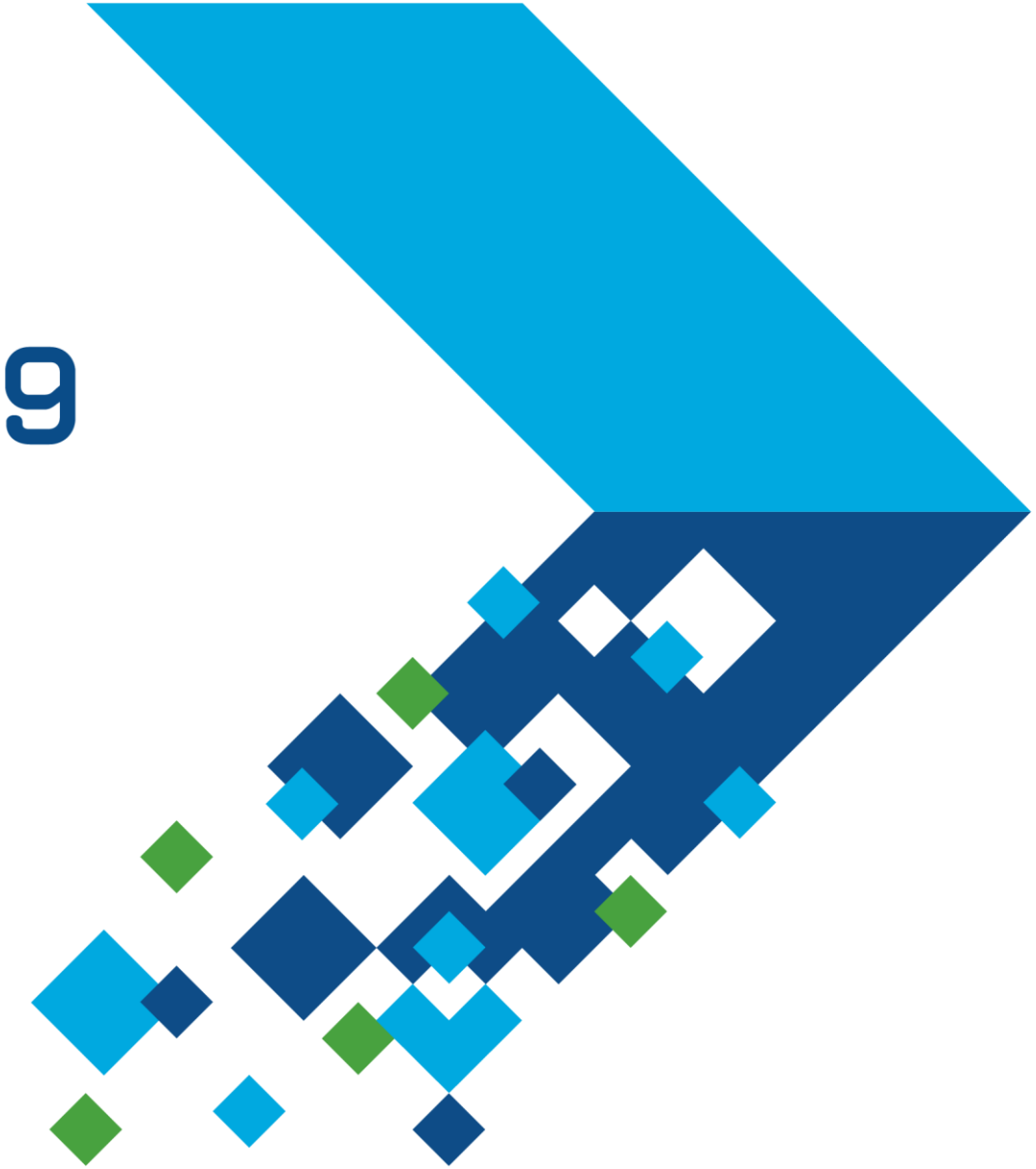
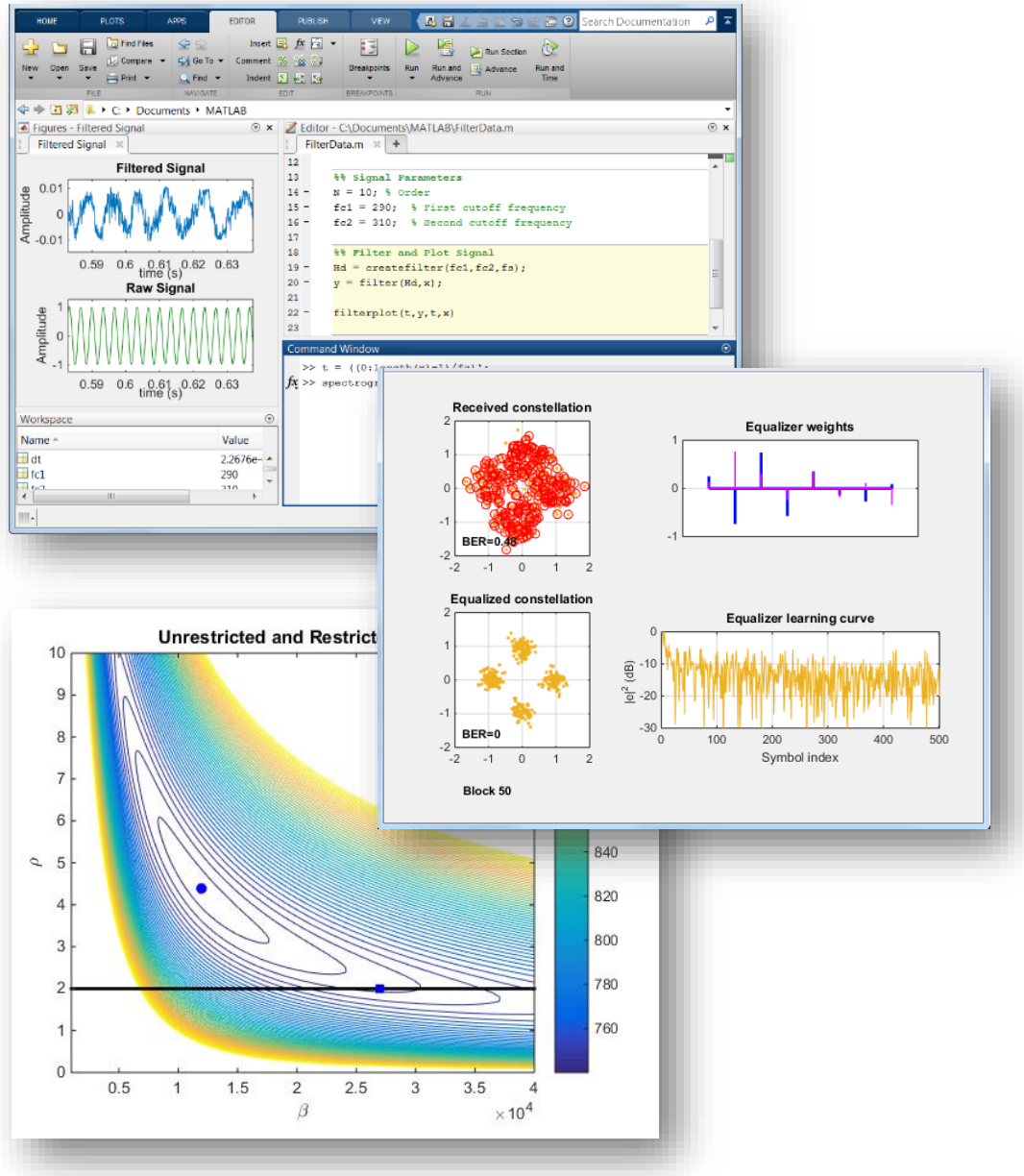
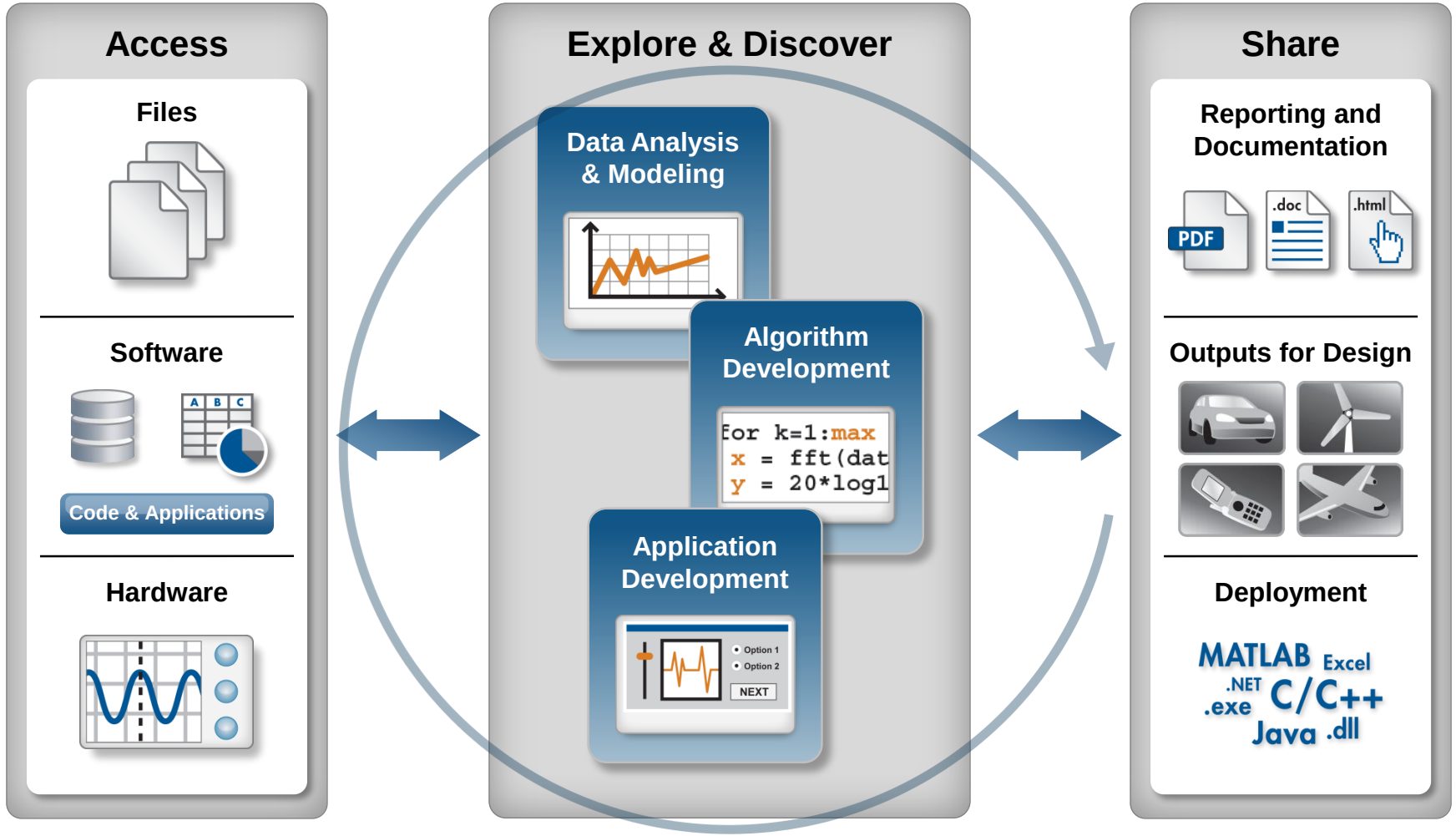


What is MATLAB?

- High-level language
- Interactive development environment
- Used for:
  - Numerical computation
  - Data analysis and visualization
  - Algorithm development and programming
  - Application development and deployment



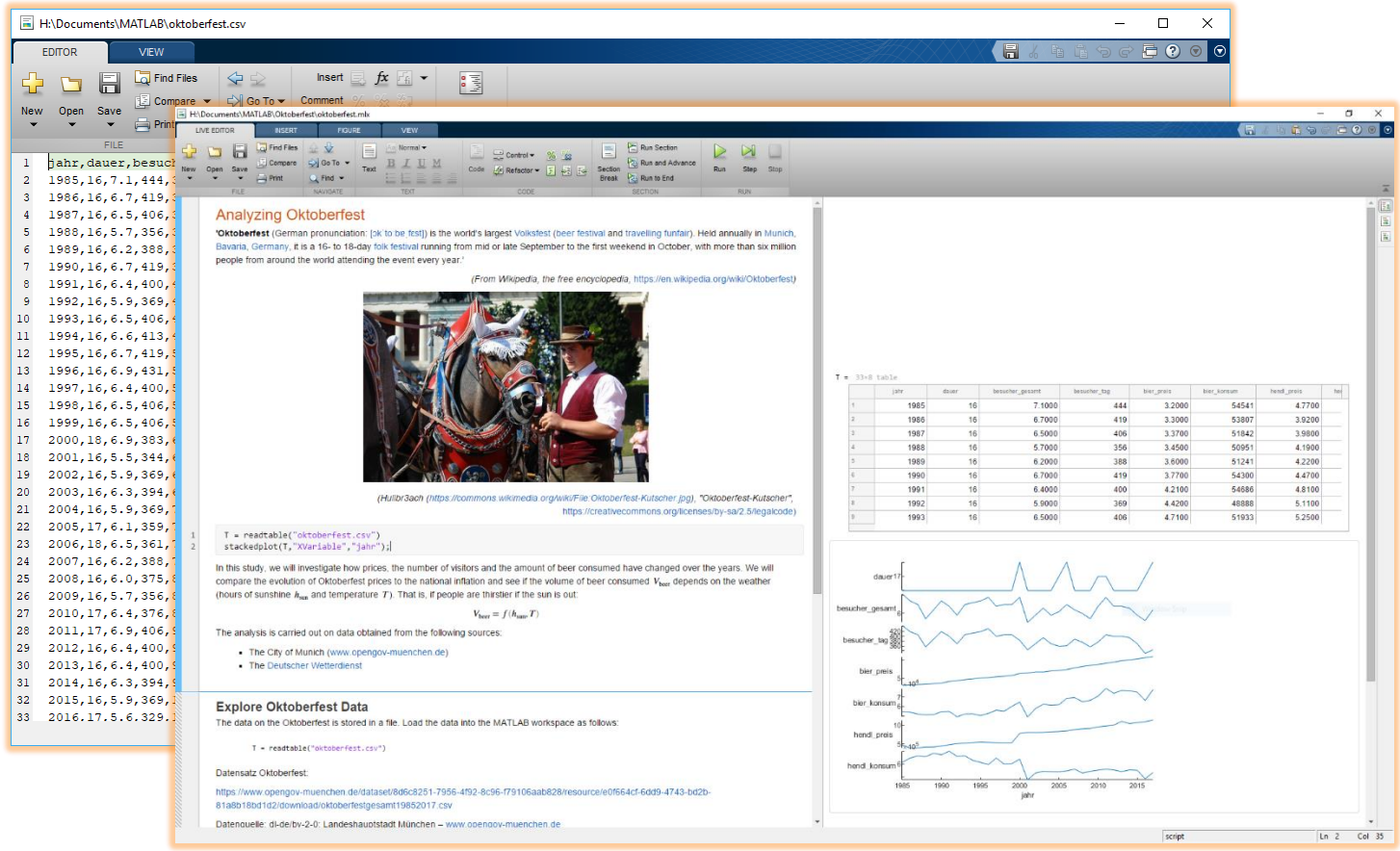
Technical Computing Workflow



Demo: Analyzing Oktoberfest

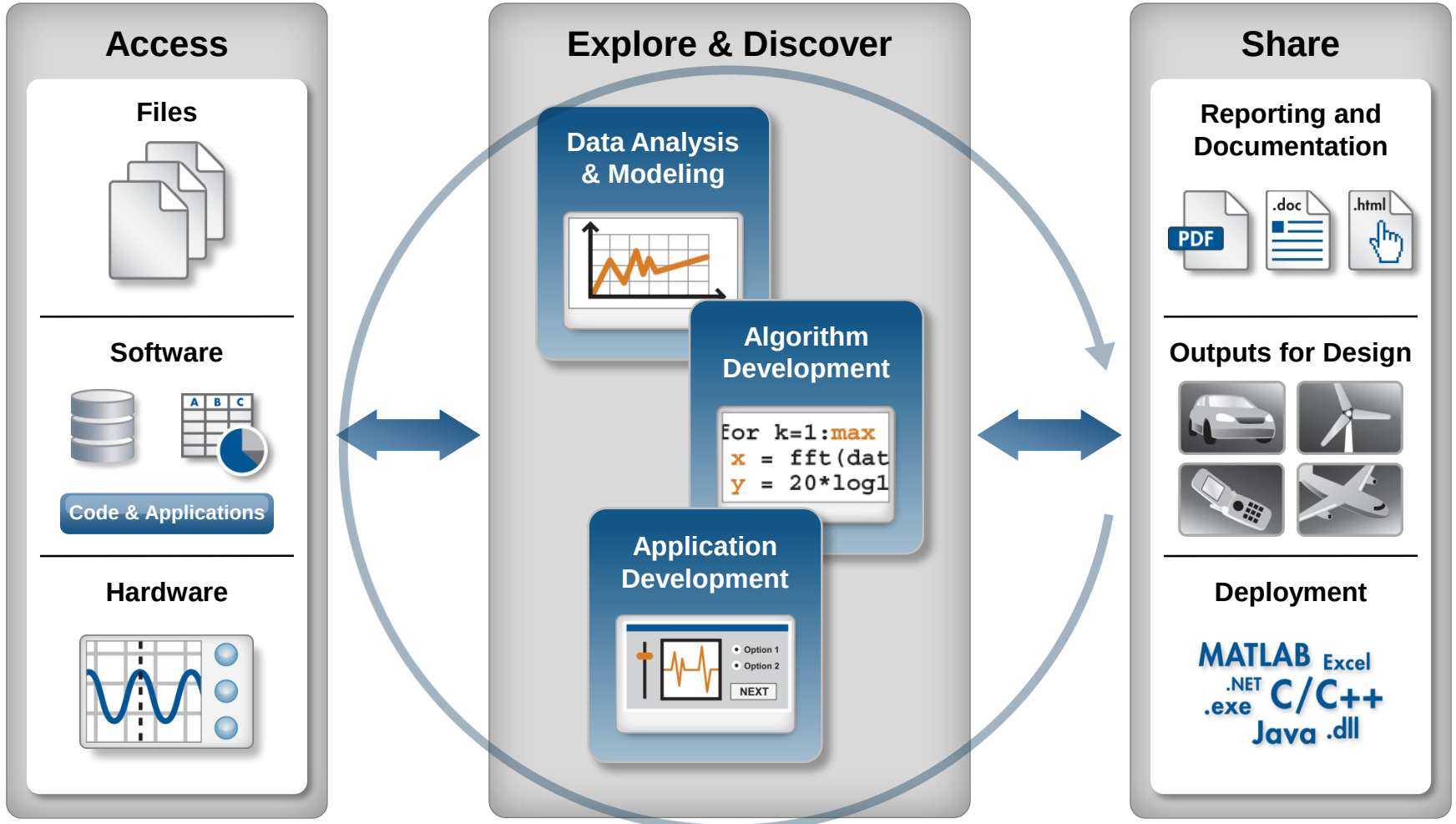
- Do visitors to Oktoberfest drink more in sunny weather?

- Approach:
  - Access data in a csv file
  - Organize data
  - Explore the data interactively
  - Automate analysis
  - Present analysis interactively
  - Document results



Live Demo

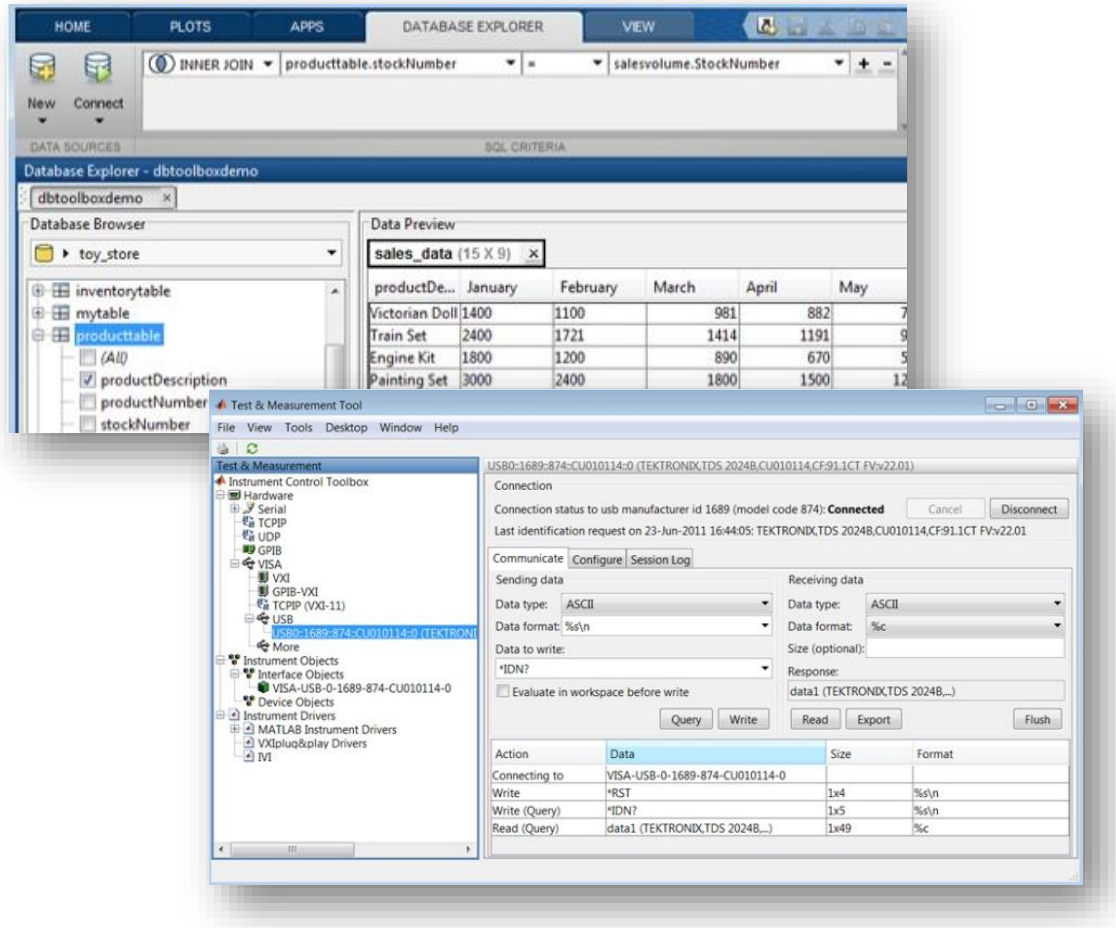
Technical Computing Workflow



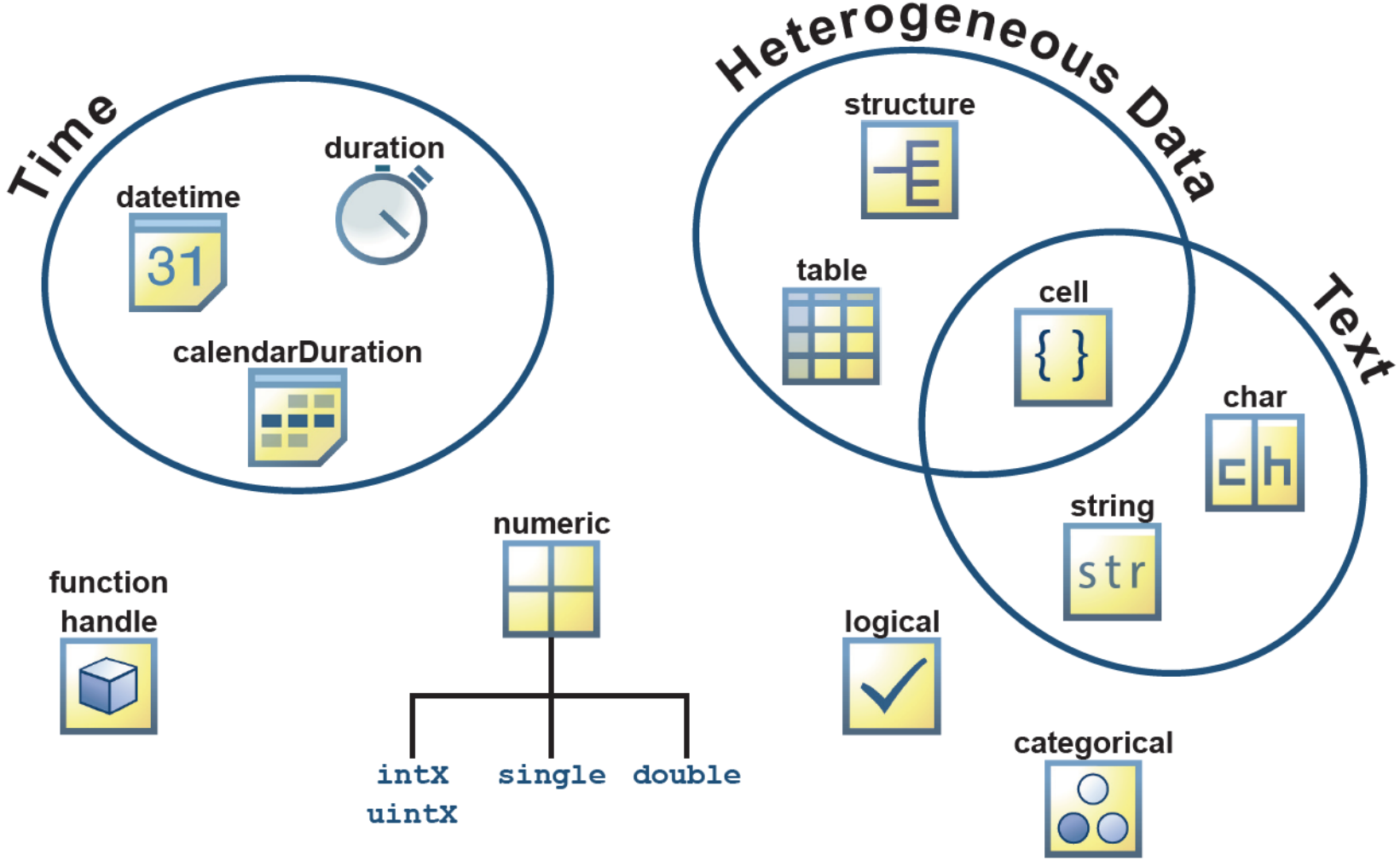
Accessing Data from MATLAB

Access | Explore & Discover | Share

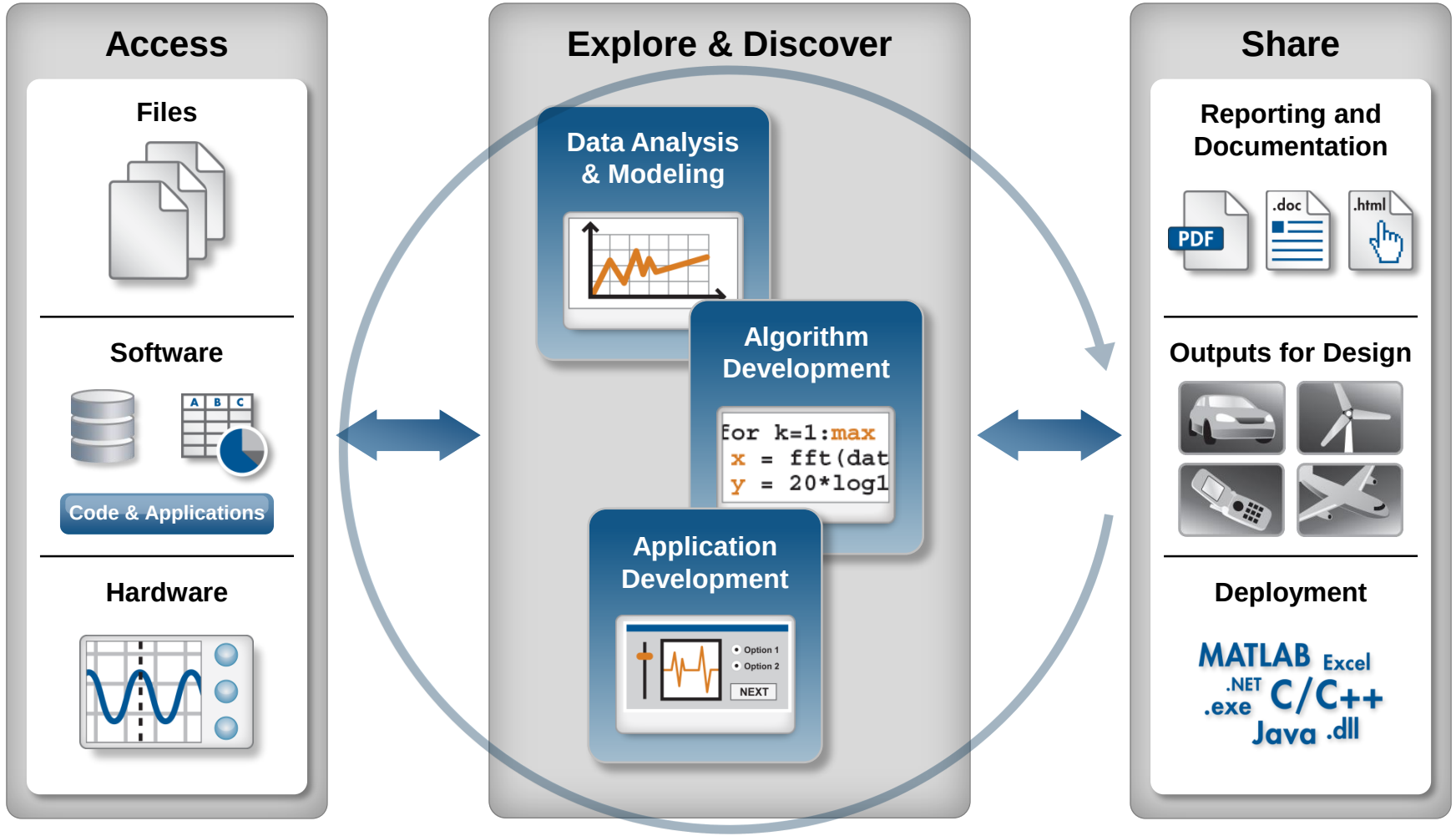
- Files
  - Spreadsheet, text, or binary
  - Audio and video, image
  - Scientific formats and XML
- Applications and languages
  - C/C++, Java, FORTRAN
  - COM, .NET, shared libraries
  - Databases (*Database Toolbox*)
- Measurement hardware
  - Data acquisition hardware *(Data Acquisition Toolbox)*
  - Stand-alone instruments and devices *(Instrument Control Toolbox)*



Organize Data in MATLAB



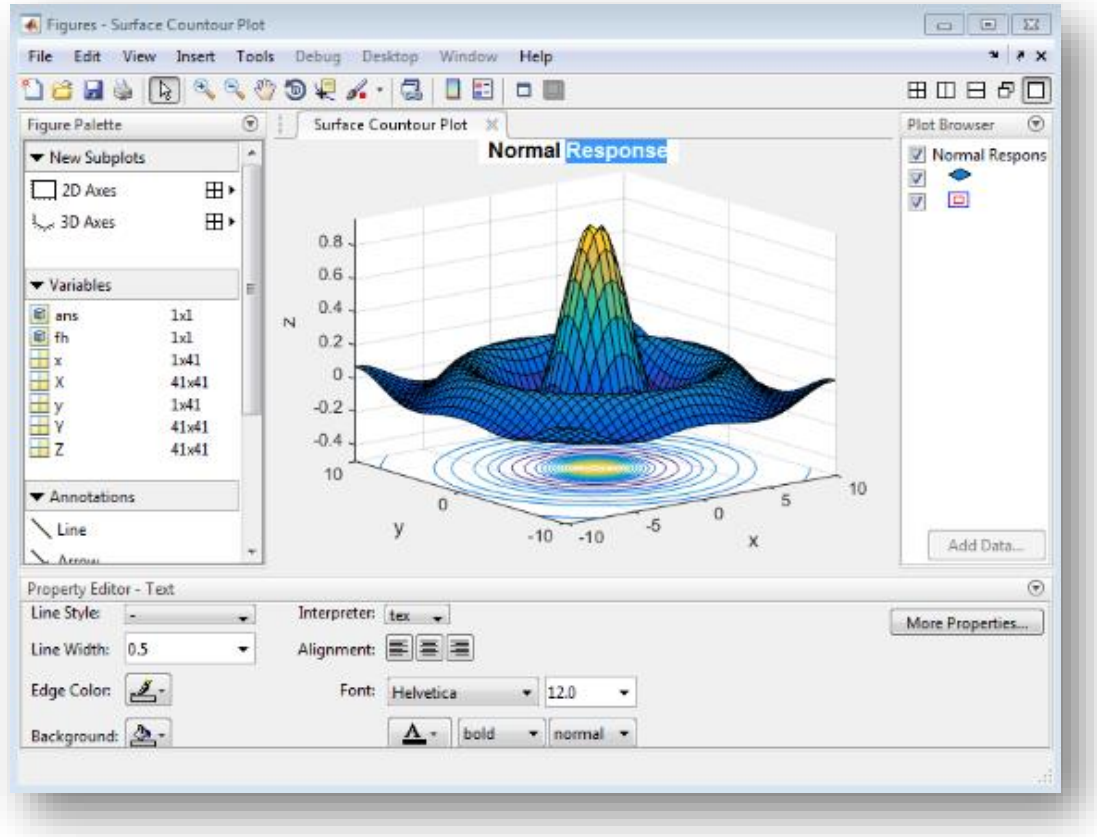
Technical Computing Workflow



Data Analysis and Visualization in MATLAB

Access | **Explore & Discover** | Share

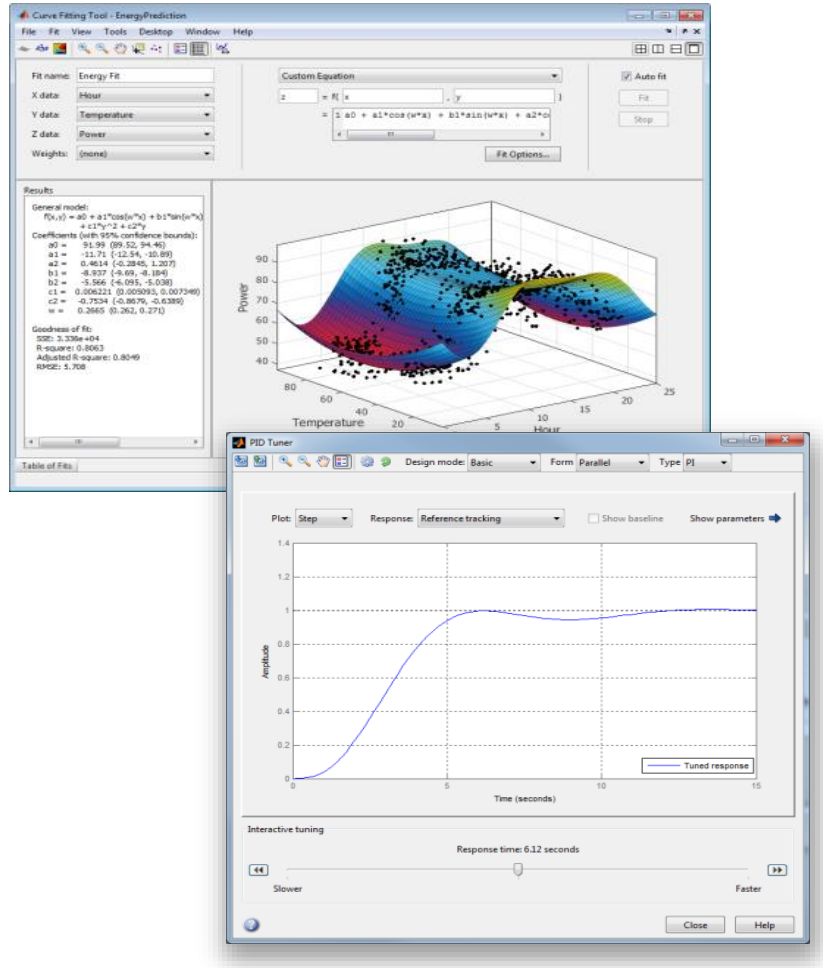
- Built-in engineering and mathematical functions
  - Interpolation, filtering, smoothing, Fourier analysis
- Extensive plotting capabilities
  - 2-D, 3-D, and volume visualization
  - Tools for creating custom plots



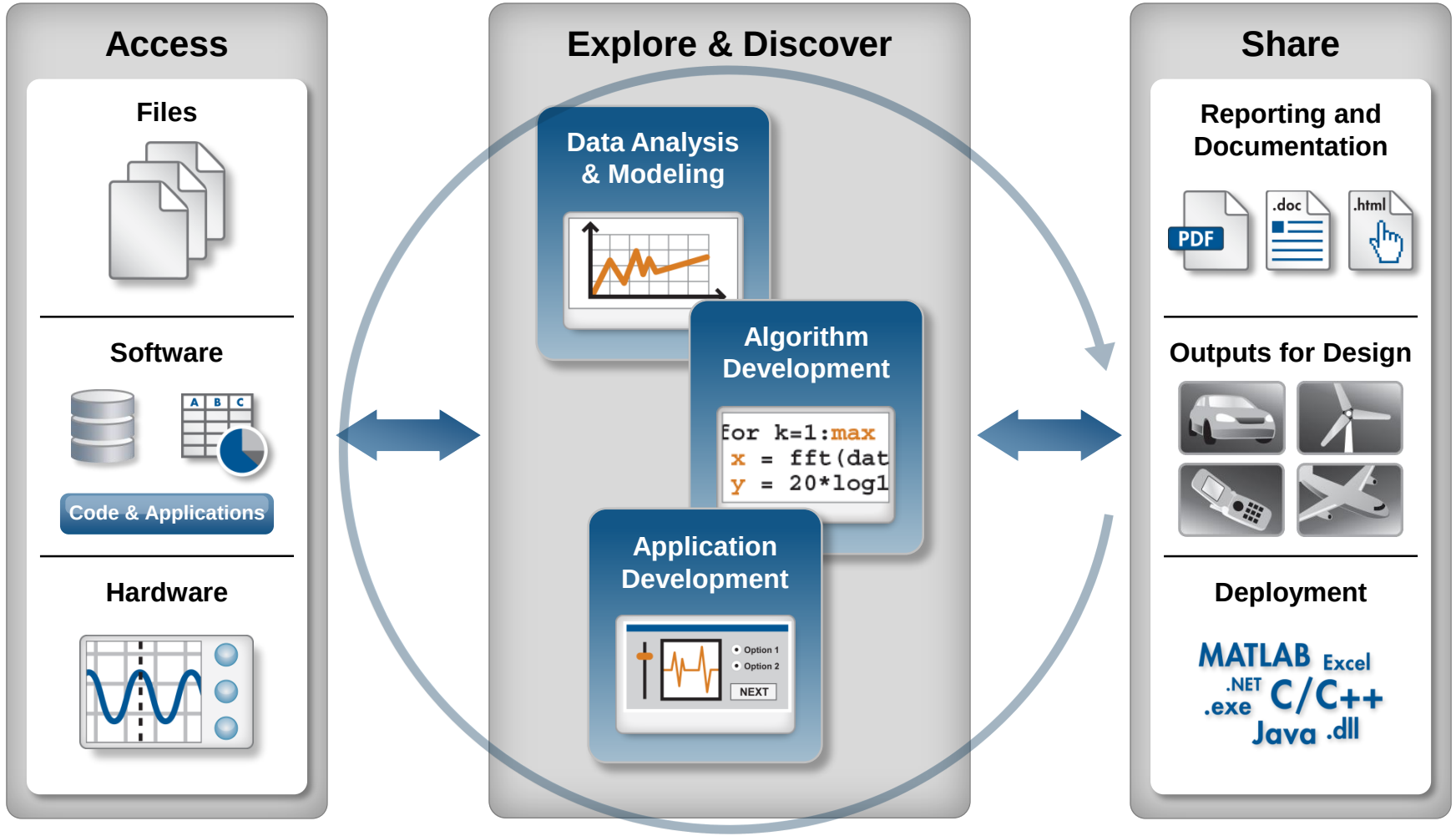
Expanding the Capabilities of MATLAB

Access | **Explore & Discover** | Share

- MathWorks add-on tools for:
  - Math, statistics, and optimization
  - Control system design and analysis
  - Signal processing and communications
  - Image processing and computer vision
  - Parallel computing and more…
- Partner products provide:
  - Additional interfaces
  - Domain-specific analysis
  - Support for niche applications

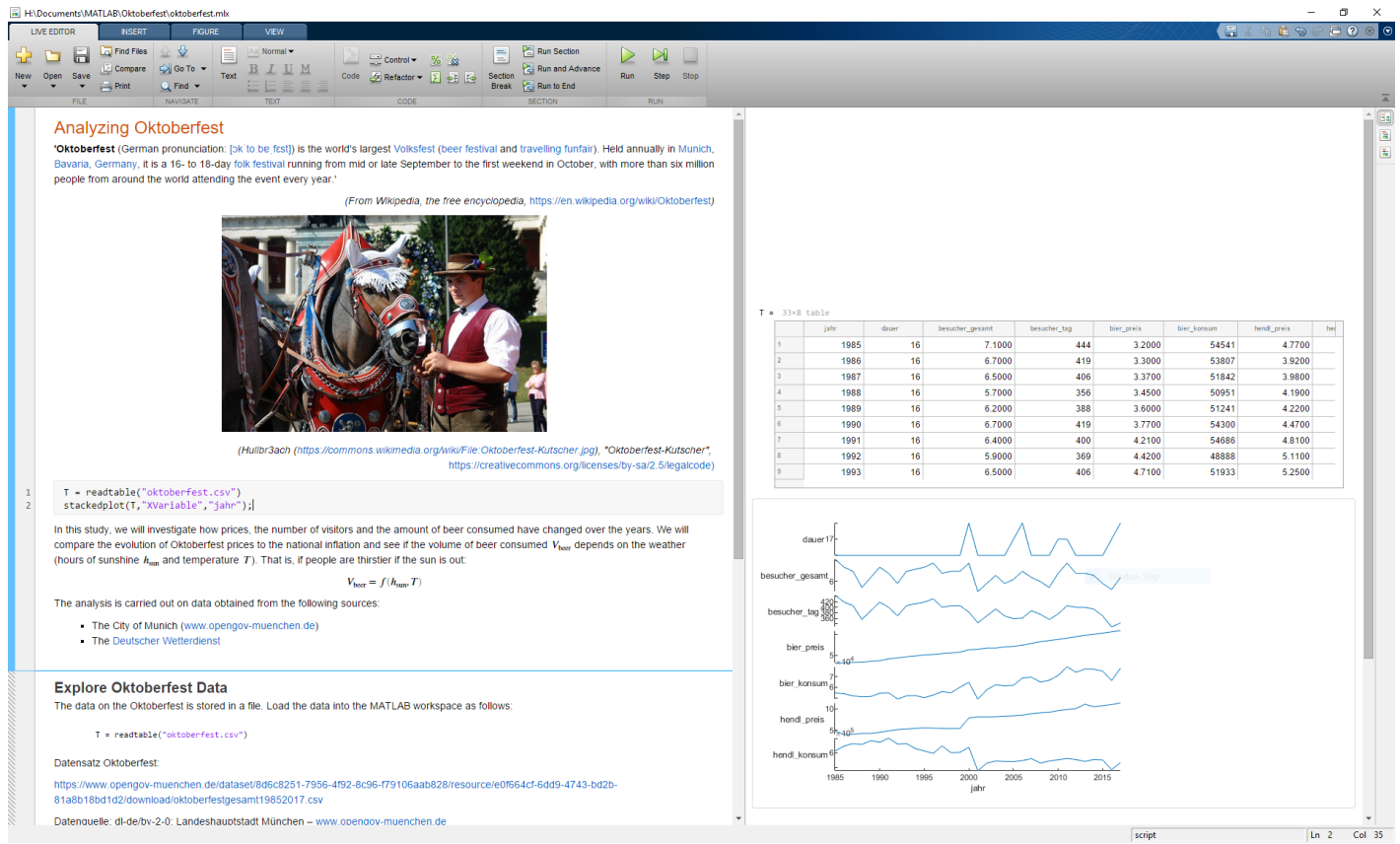


Technical Computing Workflow



Live Scripts – Interactive Documents

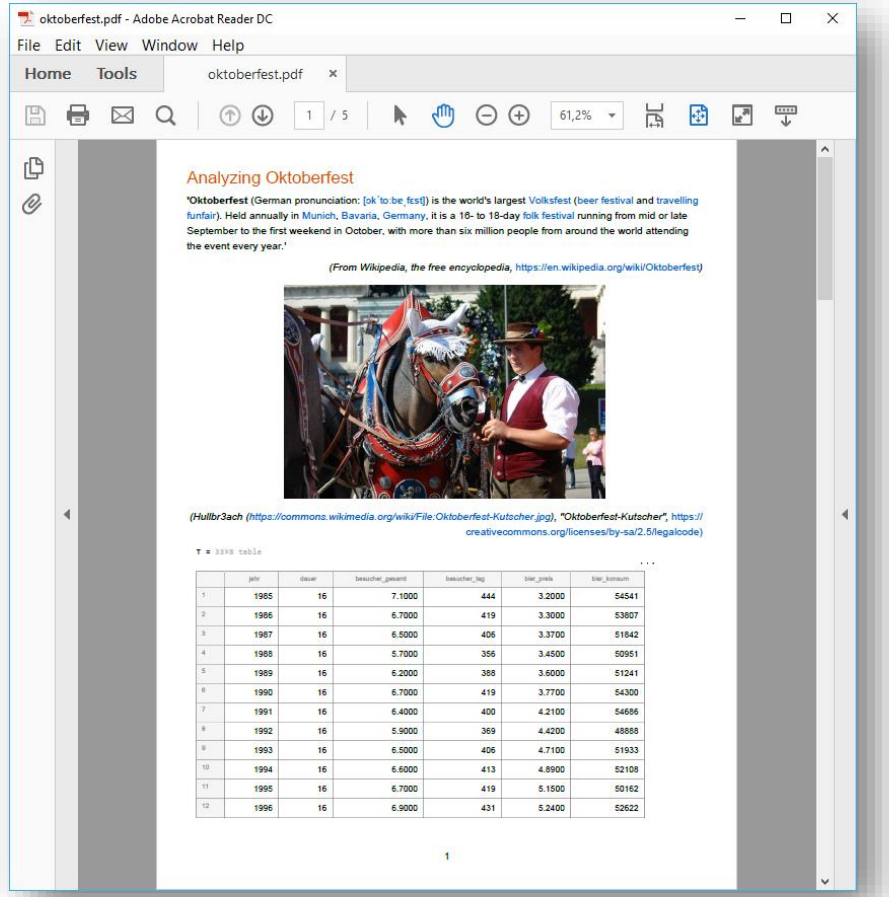
- Structured document
- Executable MATLAB code
- Results
- Formatted text



Sharing Results from MATLAB

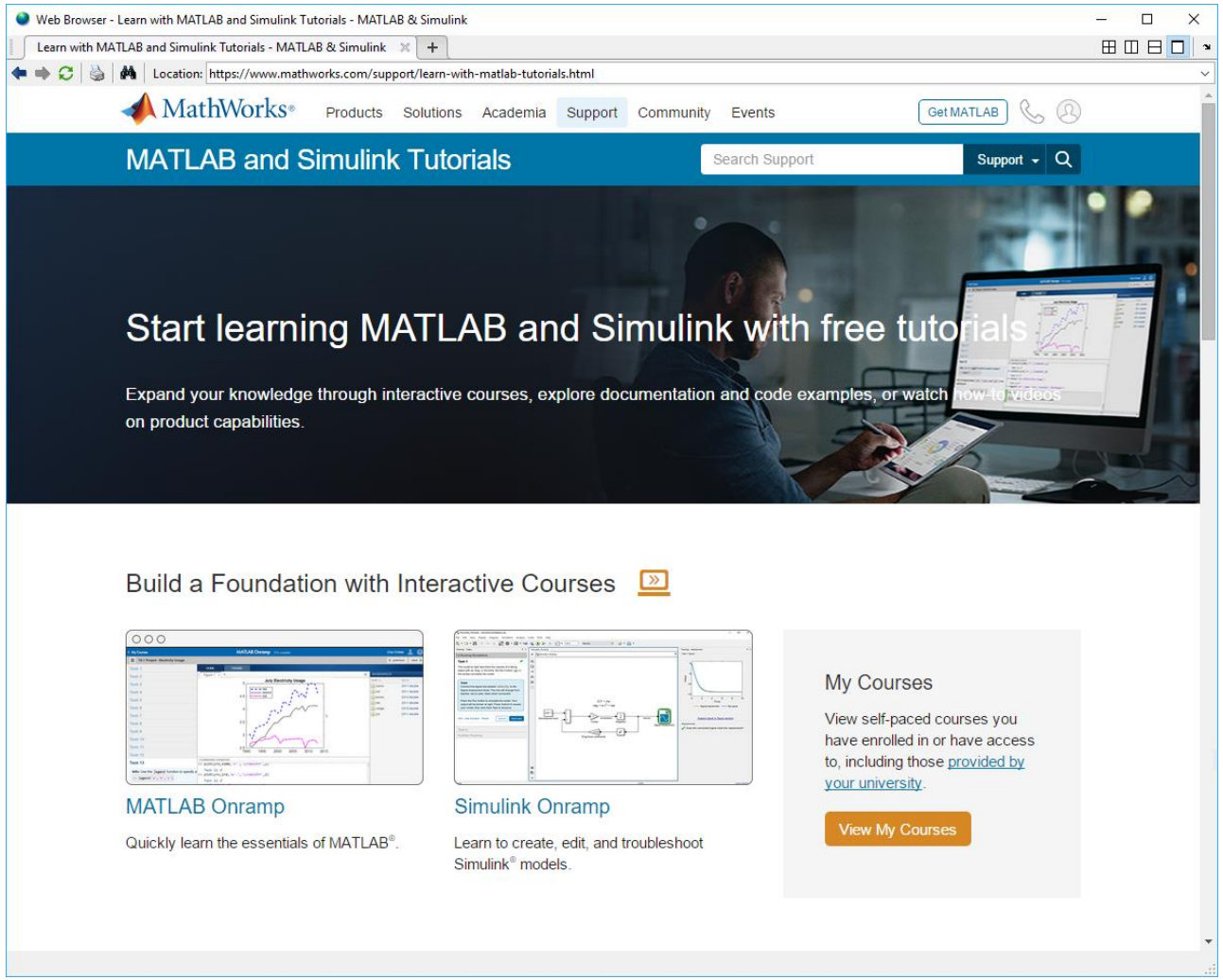
Access | Explore & Discover | **Share**

- Automatically generate reports
  - Save Live Script as PDF, HTML, LaTeX
  - Publish MATLAB files
  - Customize reports using MATLAB Report Generator
- Package as an app or a custom toolbox
- Deploy applications to other environments



Learn more (about) MATLAB

- Documentation
- Webinars
- Training



https://www.mathworks.com/support/learn-with-matlab-tutorials.html

Questions?

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