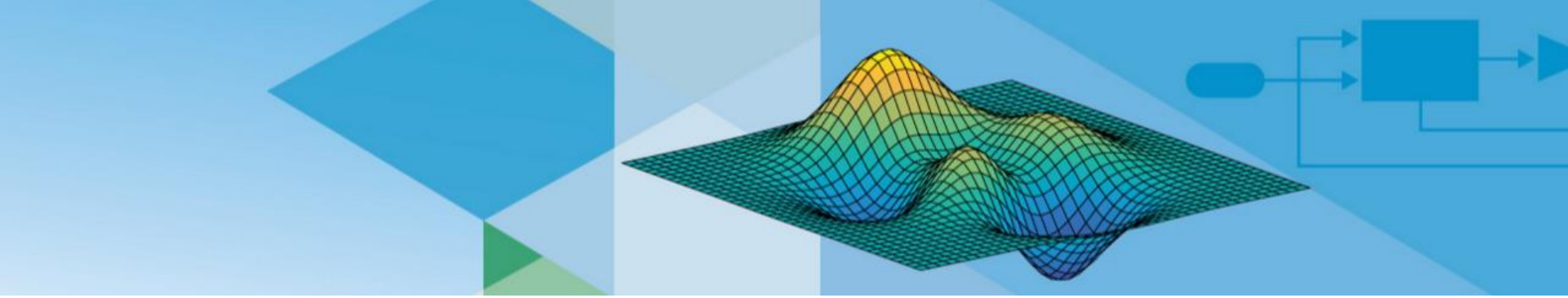


Simplifier la mise en production d'applications MATLAB

MATLAB EXPO 2016

Marc Wolff
Application Engineer – MathWorks
marc.wolff@mathworks.fr

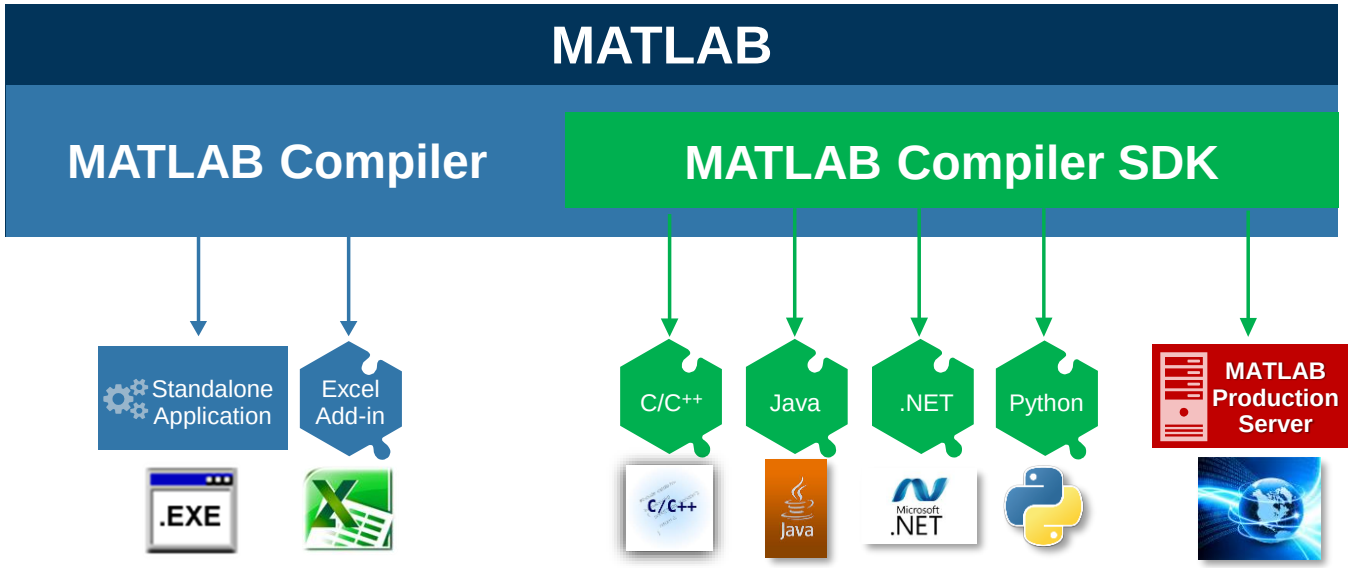
What if you could turn a MATLAB application into…

- … an interactive standalone application?
- … a headless batch application for generating reports?
- … software components providing computing features?
- … Web-based analytics dashboards?

… without any MATLAB license for end users?

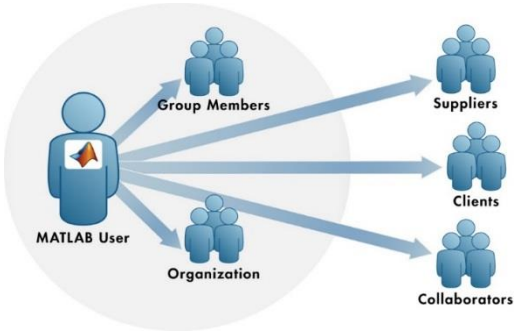
What if you could turn a MATLAB application into…

- … an **interactive standalone application**?
- … a **headless batch application** for generating reports?
- … **software components** providing computing features?
- … **Web-based analytics dashboards**?



Benefits of compiling MATLAB applications

- **Share and deploy MATLAB applications**
  - Compiled MATLAB applications can be sold
  - **Royalty-free** distribution



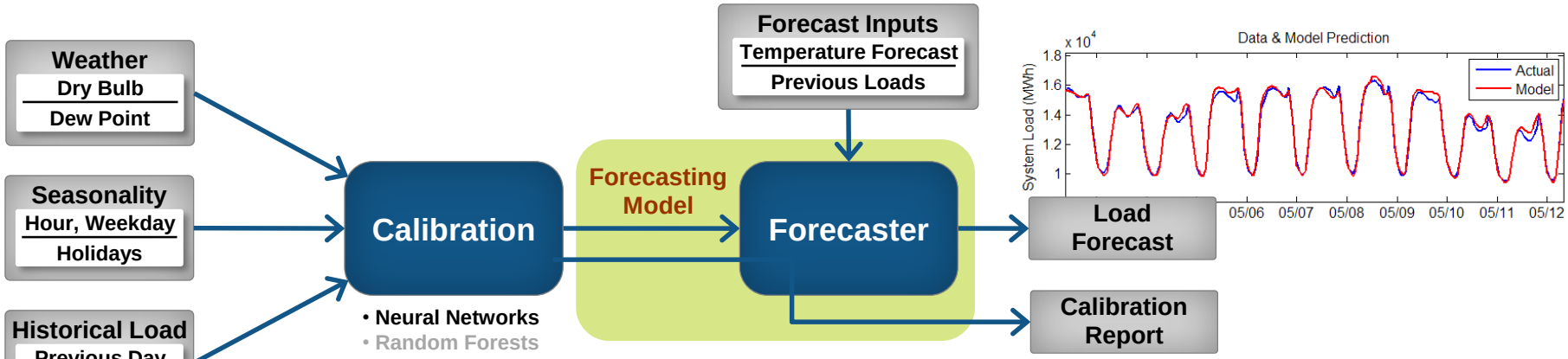
- **Without sharing the application's code**
  - Domain experts maintain ownership of ideas, algorithms and applications
  - Protect your intellectual property
- **Without recoding the application in another language**
  - Recoding is error-prone and time consuming
  - Testing is even more time consuming

Example #1

Building a Standalone Application and its UI

Load Forecasting Example

- Tool for easy and accurate computation of day-ahead system load forecast
- Used by operators in power plants to adjust electricity production



Compile the Forecaster to make it available to end users (operators)

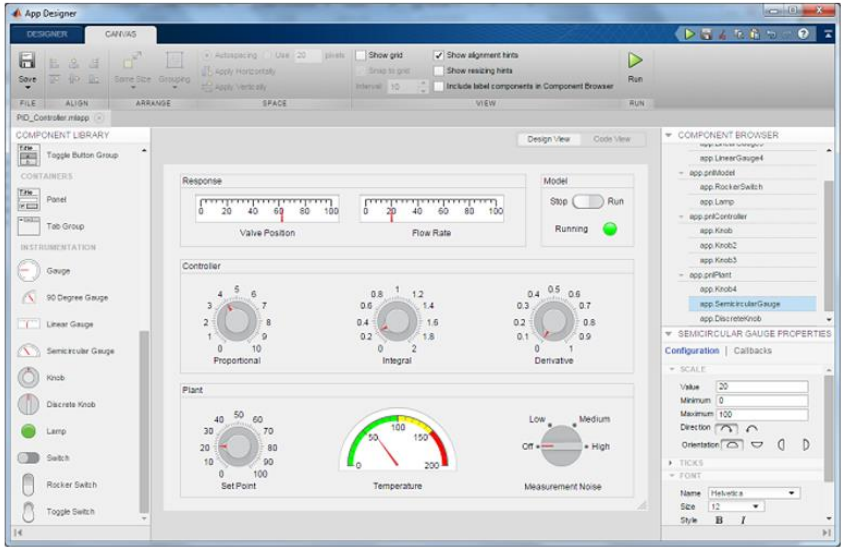
Creating UIs

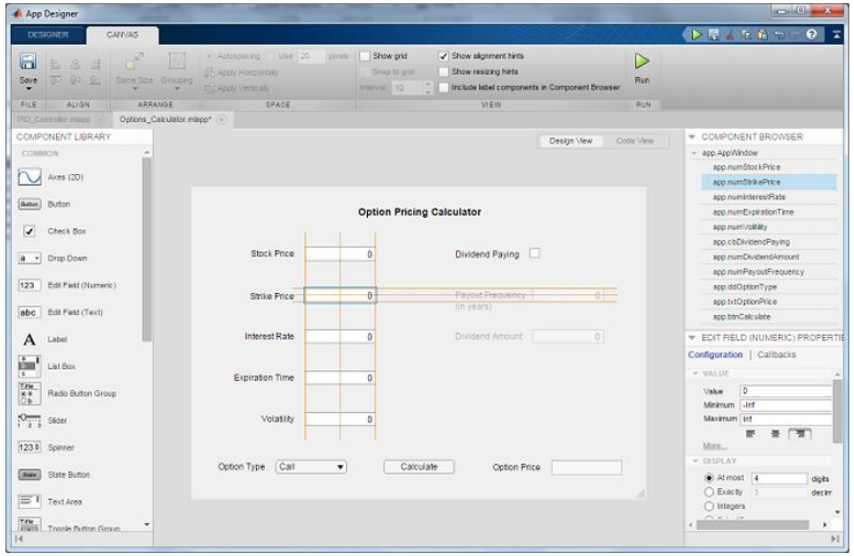
- Interactively with **GUIDE**: create the layout of visual components and program the app behavior

R2016a

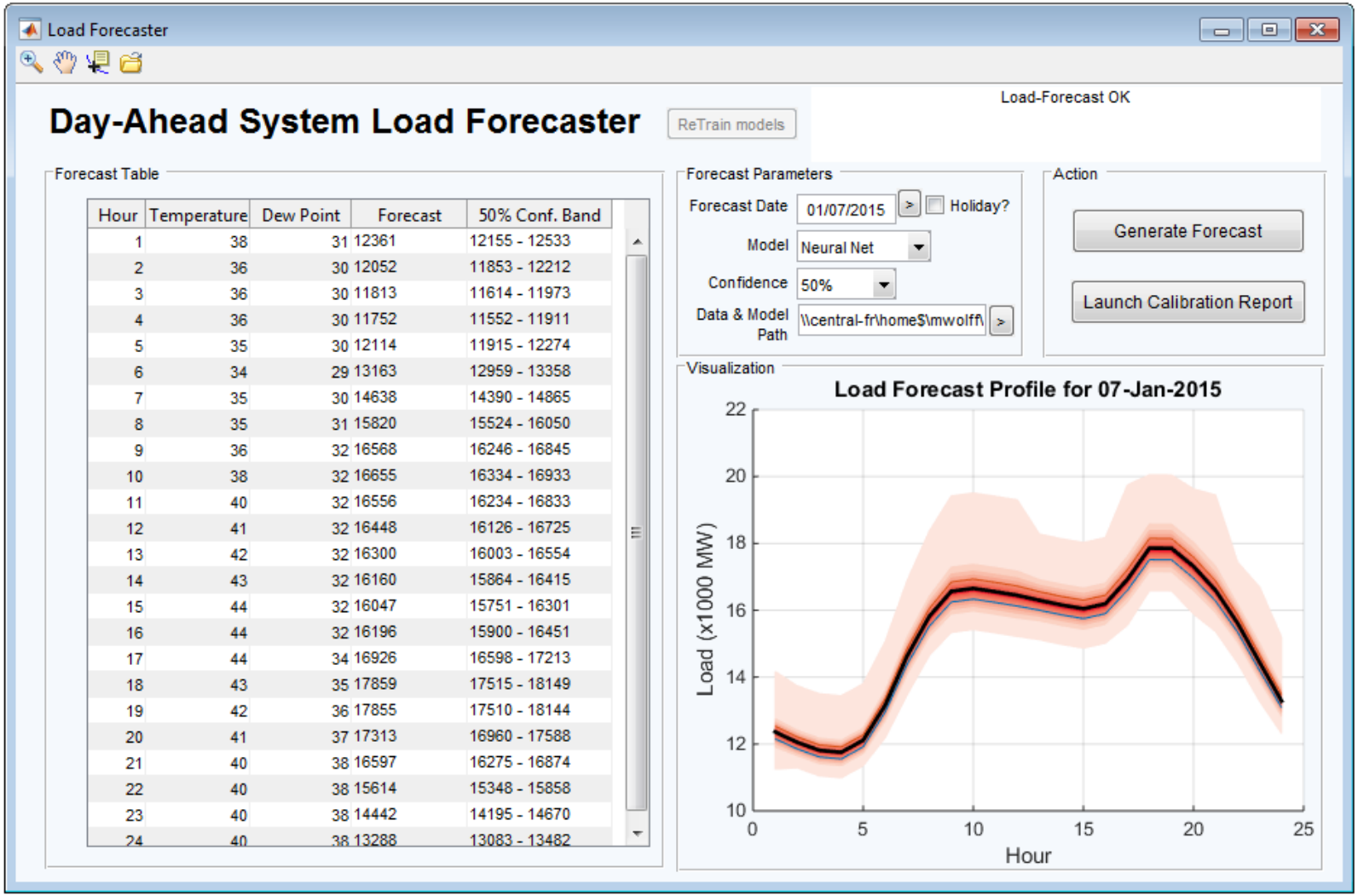
- Interactively with **App Designer**
  - Same concept as GUIDE
  - New set of components
  - Alignments hints
  - Generates object-oriented code that is easier to modify and maintain
  - Graphics limited to lines and points for now

- Programmatically with `uicontrol`





Load Forecasting App



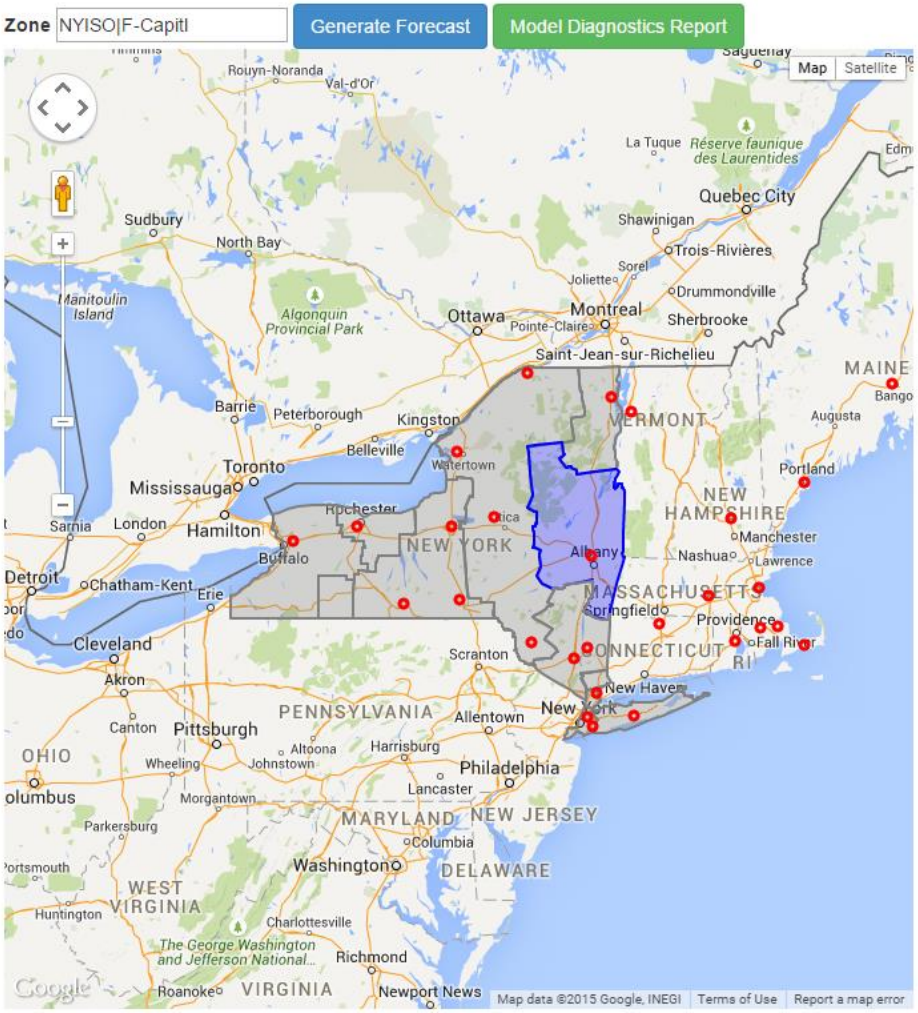
Hour	Temperature	Dew Point	Forecast	50% Conf. Band
1	38	31	12361	12155 - 12533
2	36	30	12052	11853 - 12212
3	36	30	11813	11614 - 11973
4	36	30	11752	11552 - 11911
5	35	30	12114	11915 - 12274
6	34	29	13163	12959 - 13358
7	35	30	14638	14390 - 14865
8	35	31	15820	15524 - 16050
9	36	32	16568	16246 - 16845
10	38	32	16655	16334 - 16933
11	40	32	16556	16234 - 16833
12	41	32	16448	16126 - 16725
13	42	32	16300	16003 - 16554
14	43	32	16160	15864 - 16415
15	44	32	16047	15751 - 16301
16	44	32	16196	15900 - 16451
17	44	34	16926	16598 - 17213
18	43	35	17859	17515 - 18149
19	42	36	17855	17510 - 18144
20	41	37	17313	16960 - 17588
21	40	38	16597	16275 - 16874
22	40	38	15614	15348 - 15858
23	40	38	14442	14195 - 14670
24	40	38	13288	13083 - 13482

Example #2

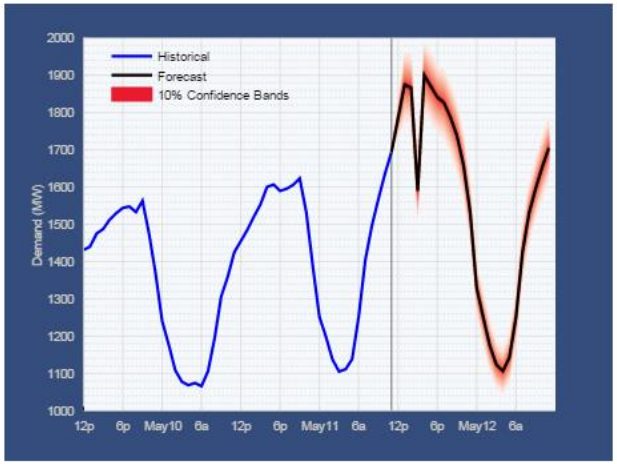
Run MATLAB Analytics from a Web Interface

Load Forecasting Dashboard

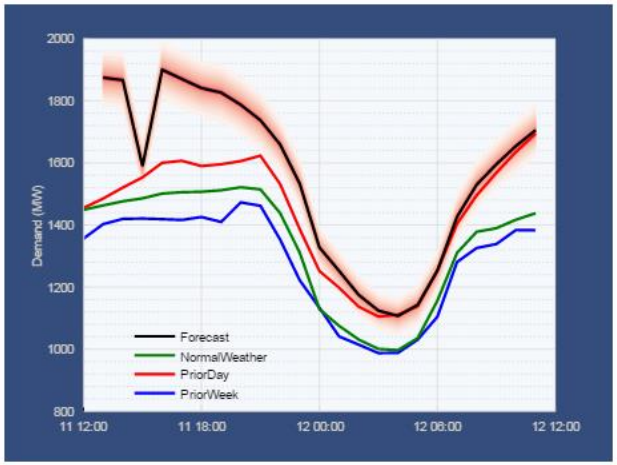
Select Zone



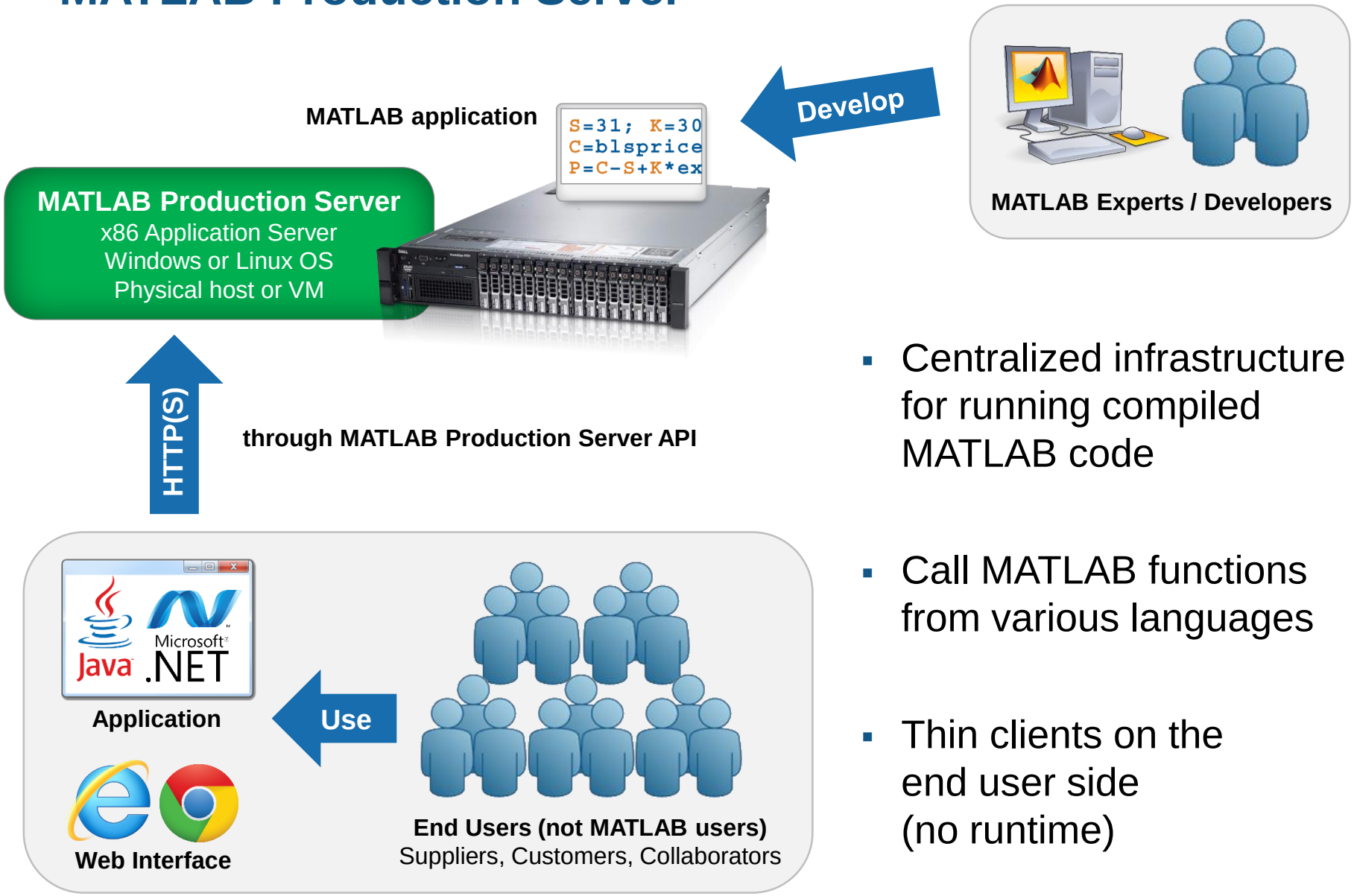
Forecast



Comparison



MATLAB Production Server

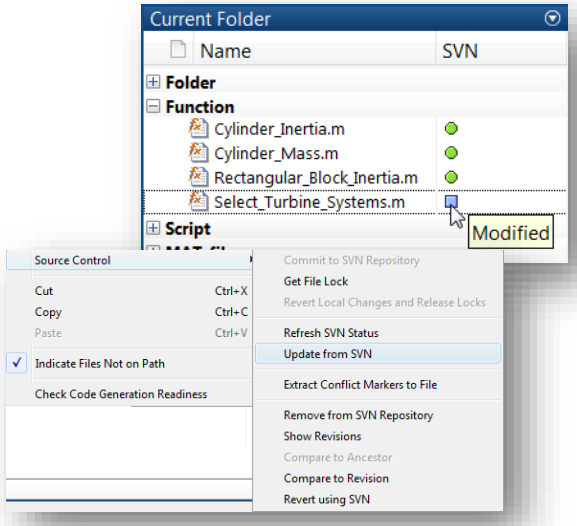


- Centralized infrastructure for running compiled MATLAB code
- Call MATLAB functions from various languages
- Thin clients on the end user side (no runtime)

Key Takeaways

Code Quality & Industrialization Process

- Use **error handling** (e.g. try/catch statements)
- **OOP** makes your code easier to maintain and modify
- **Source control** integration since R2014b
  - Manage your code from within the MATLAB Desktop
  - Supports GIT and Subversion (SVN)



- **Unit test** framework introduced in R2014b
  - Perform unit tests directly in MATLAB
  - Supports report generation and publishing
  - Can be used in combination with continuous integrations tools like Jenkins

Key Takeaways

- MATLAB is not limited to prototyping
- With very little effort, MATLAB applications can be used in production environments under different forms
  - Standalone executables, with or without UI
  - Software components (e.g. Java classes)
  - Excel add-ins
- Royalty-free distribution