Data Analytics with MATLAB

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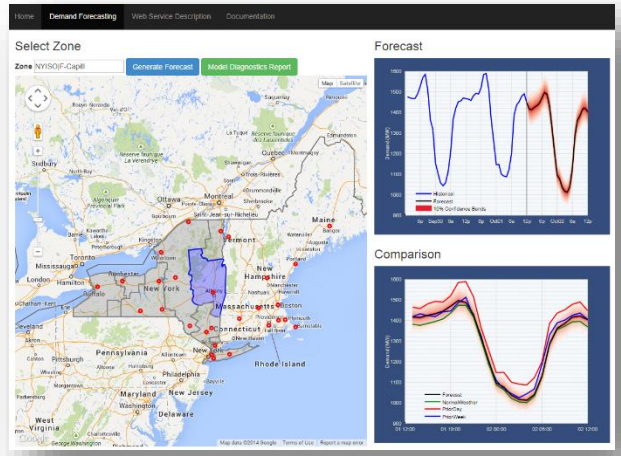

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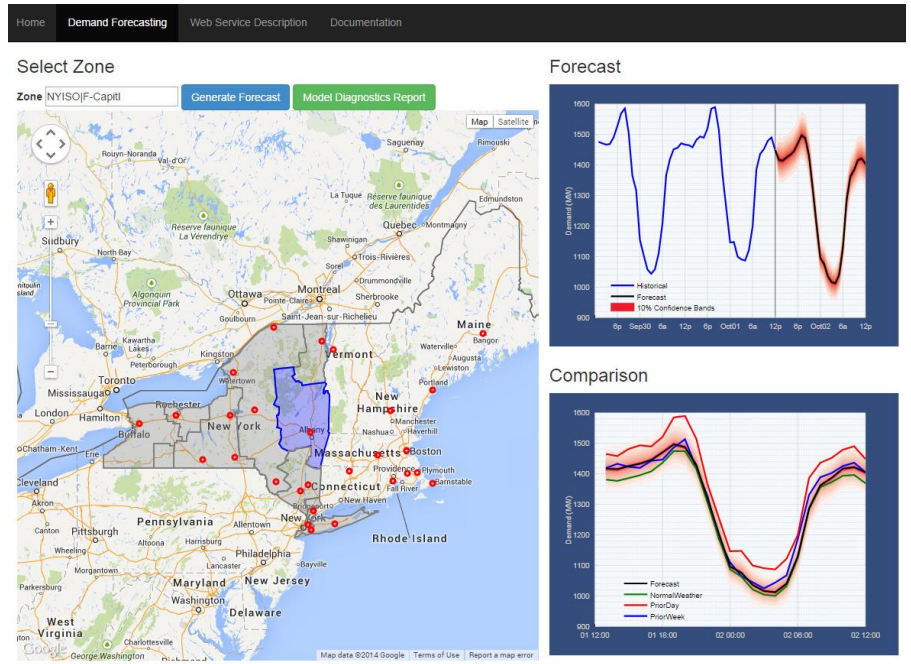
Case Study: Day-Ahead Load Forecasting

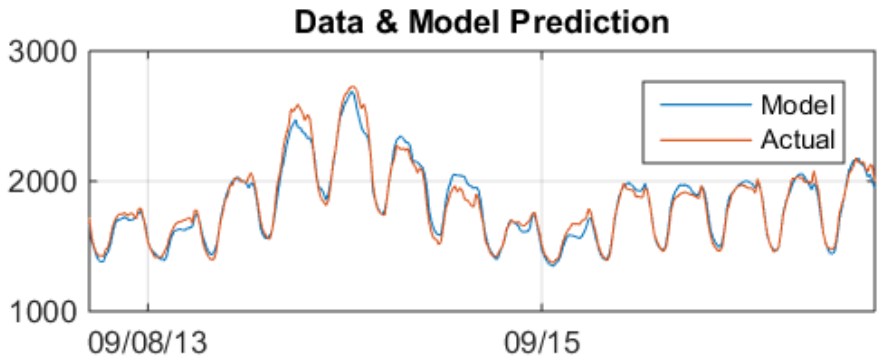
Goal:

- Implement a tool for ***easy*** and ***accurate*** computation of day-ahead system load forecast

Requirements:

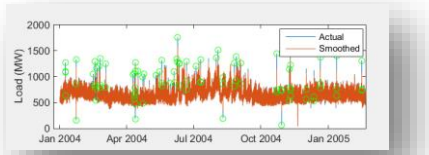
- Acquire and clean data from multiple sources
- Accurate predictive model
- Easily deploy to production environment

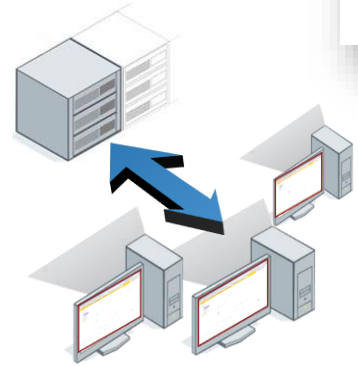




Challenges with Data Analytics

- Aggregating data from multiple sources
- Cleaning data
- Choosing a model
- Moving to production

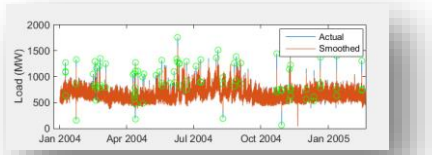




Challenges with Data Analytics

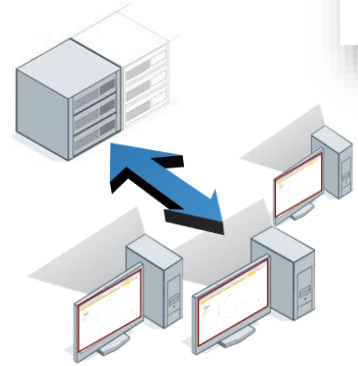
✓ Aggregating data from multiple sources

✓ Cleaning data



- Choosing a model

- Moving to production

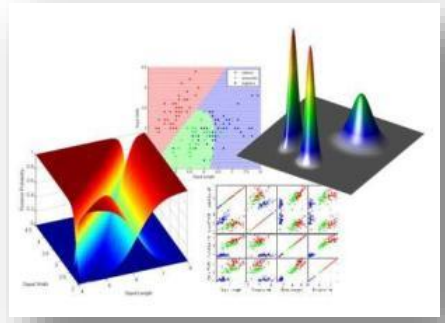


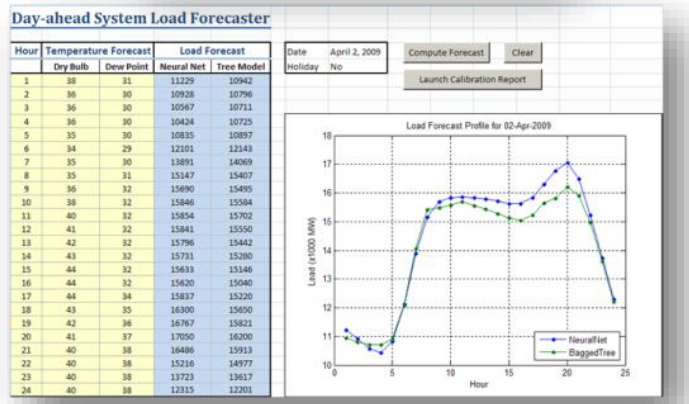
Machine Learning

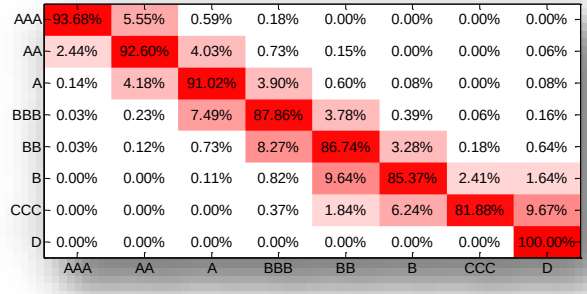
Characteristics and Examples

- Characteristics
  - Too many variables
  - System too complex to know the governing equation
    (e.g., black-box modeling)

- Examples
  - Pattern recognition *(speech, images)*
  - Financial algorithms *(credit scoring, algo trading)*
  - Energy forecasting *(load, price)*
  - Biology *(tumor detection, drug discovery)*

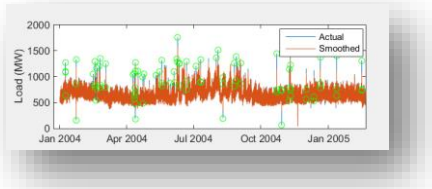


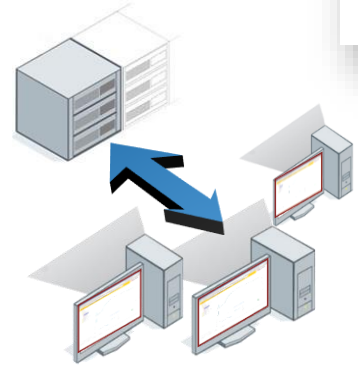




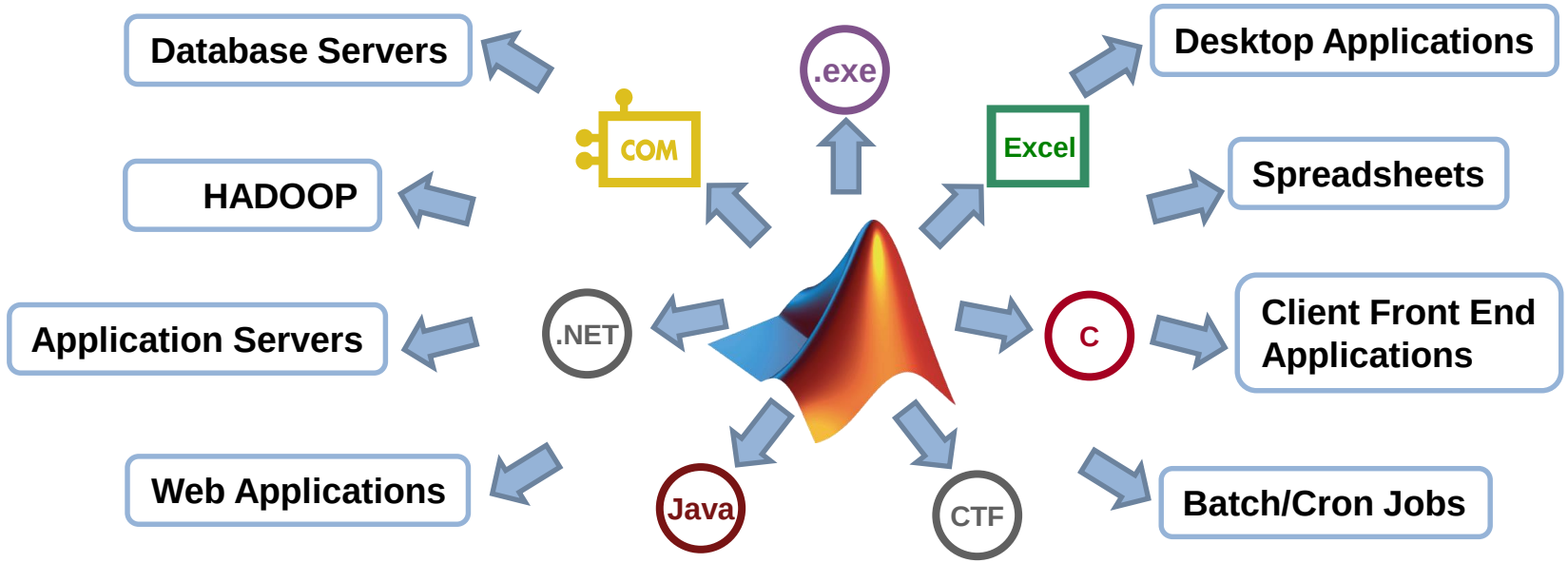
Challenges with Data Analytics

- ✓ Aggregating data from multiple sources
- ✓ Cleaning data
- ✓ Choosing a model
- Moving to production



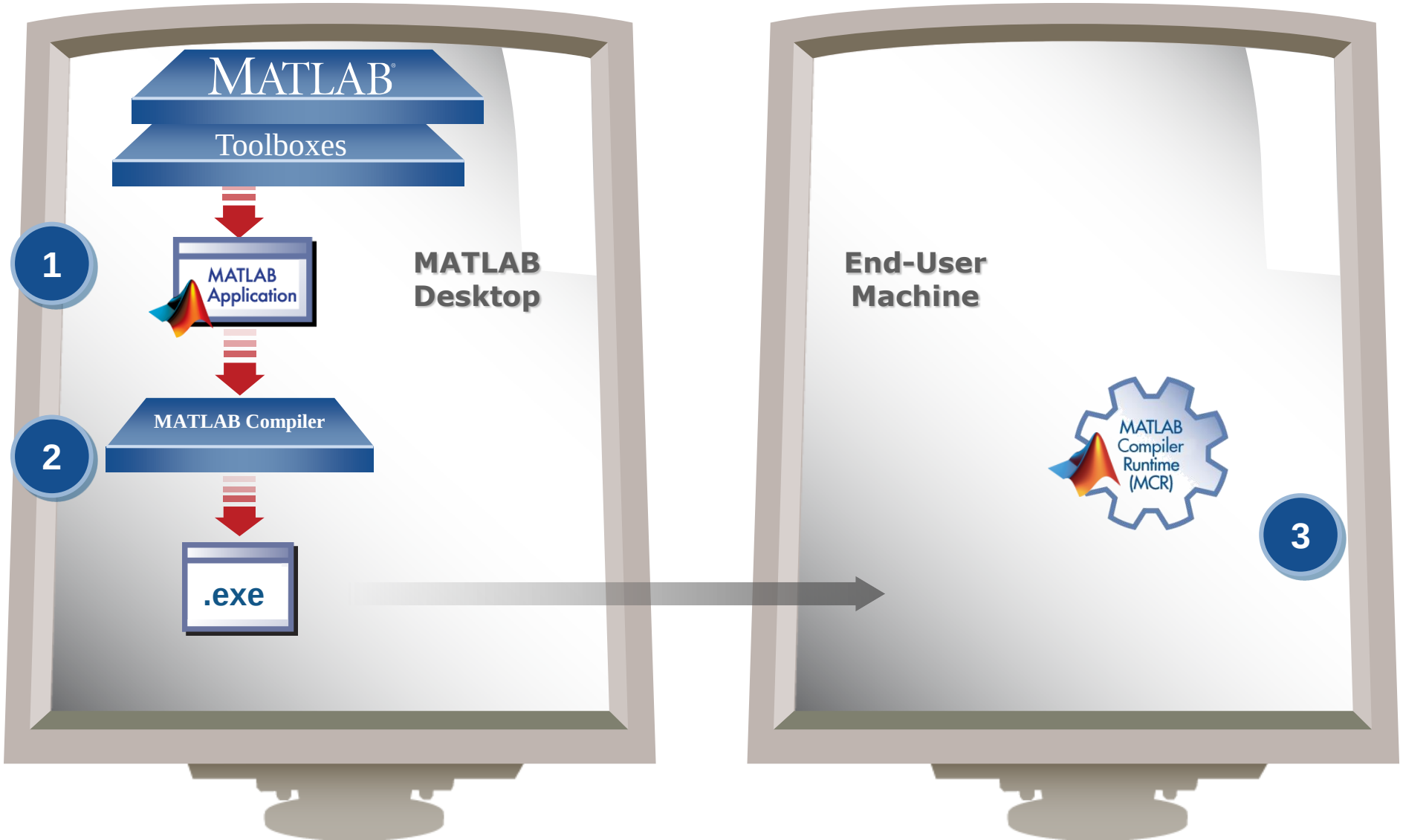


Deployment Highlights



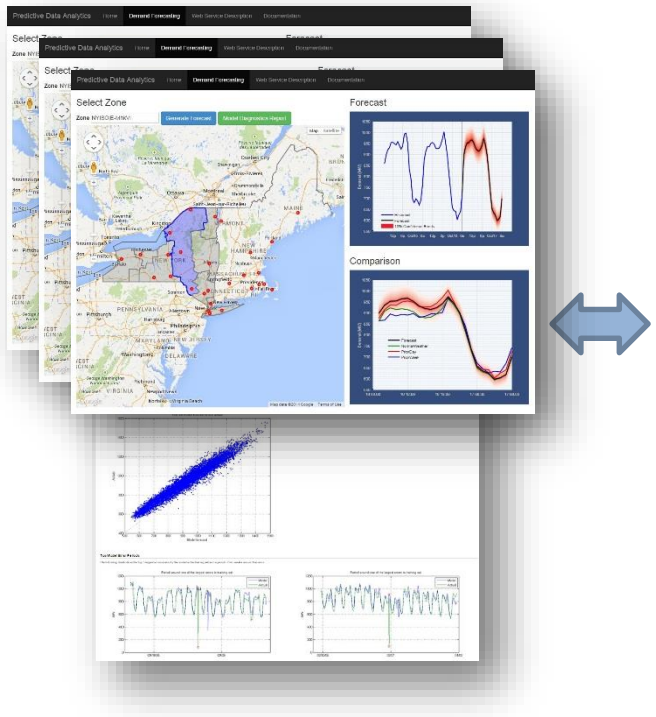
- Royalty-free deployment
- Point-and-click workflow
- Unified process for desktop and server apps

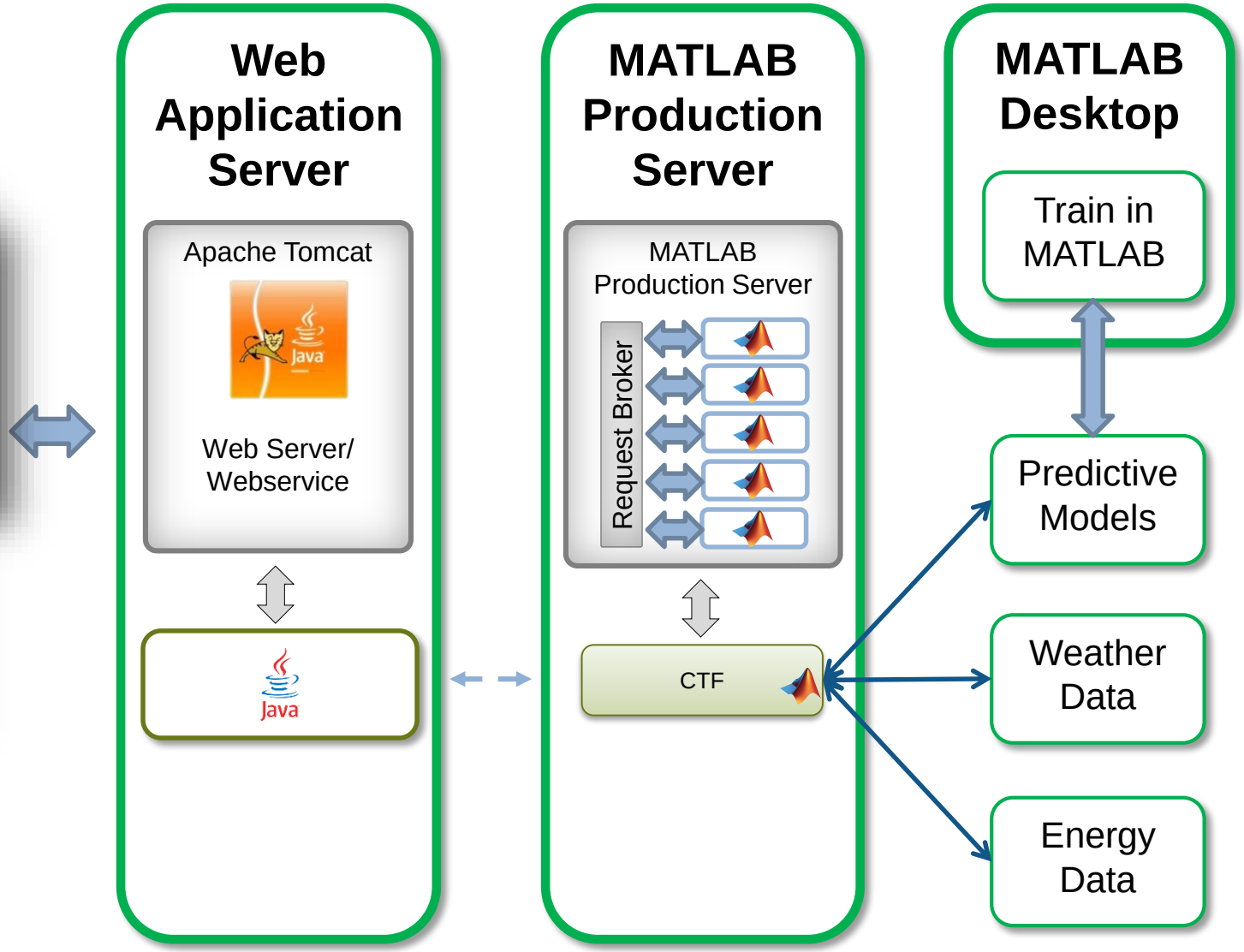
Deploying Applications with MATLAB



Deployed Analytics

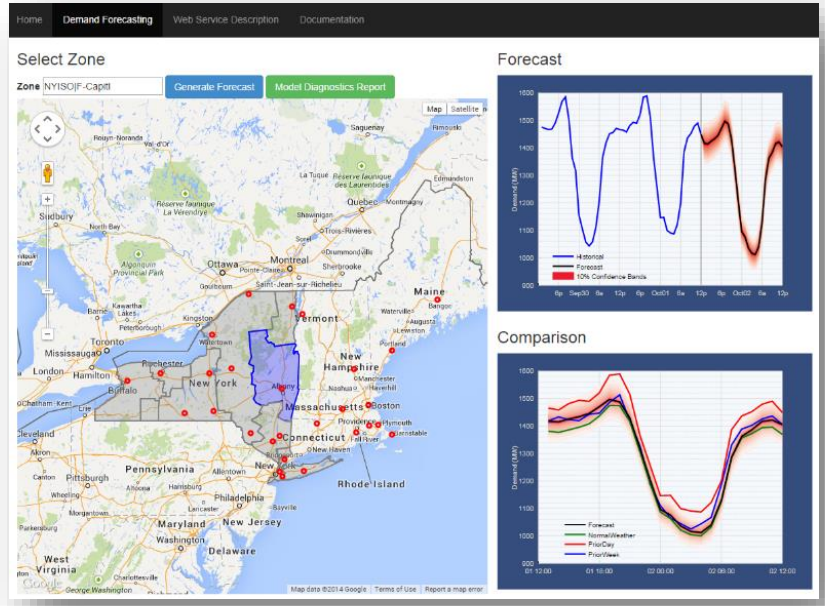
MATLAB Production Server





Key Takeaways

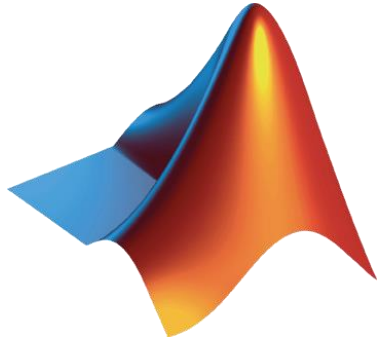
- Data preparation can be a big job; leverage built-in MATLAB tools and spend more time on the analysis



- Rapidly iterate through different predictive models, and find the one that's best for your application

- Leverage parallel computing to scale-up your analysis to large datasets

- Eliminate the need to recode by deploying your MATLAB algorithms into production



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