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# The Open Source Linear State Estimator

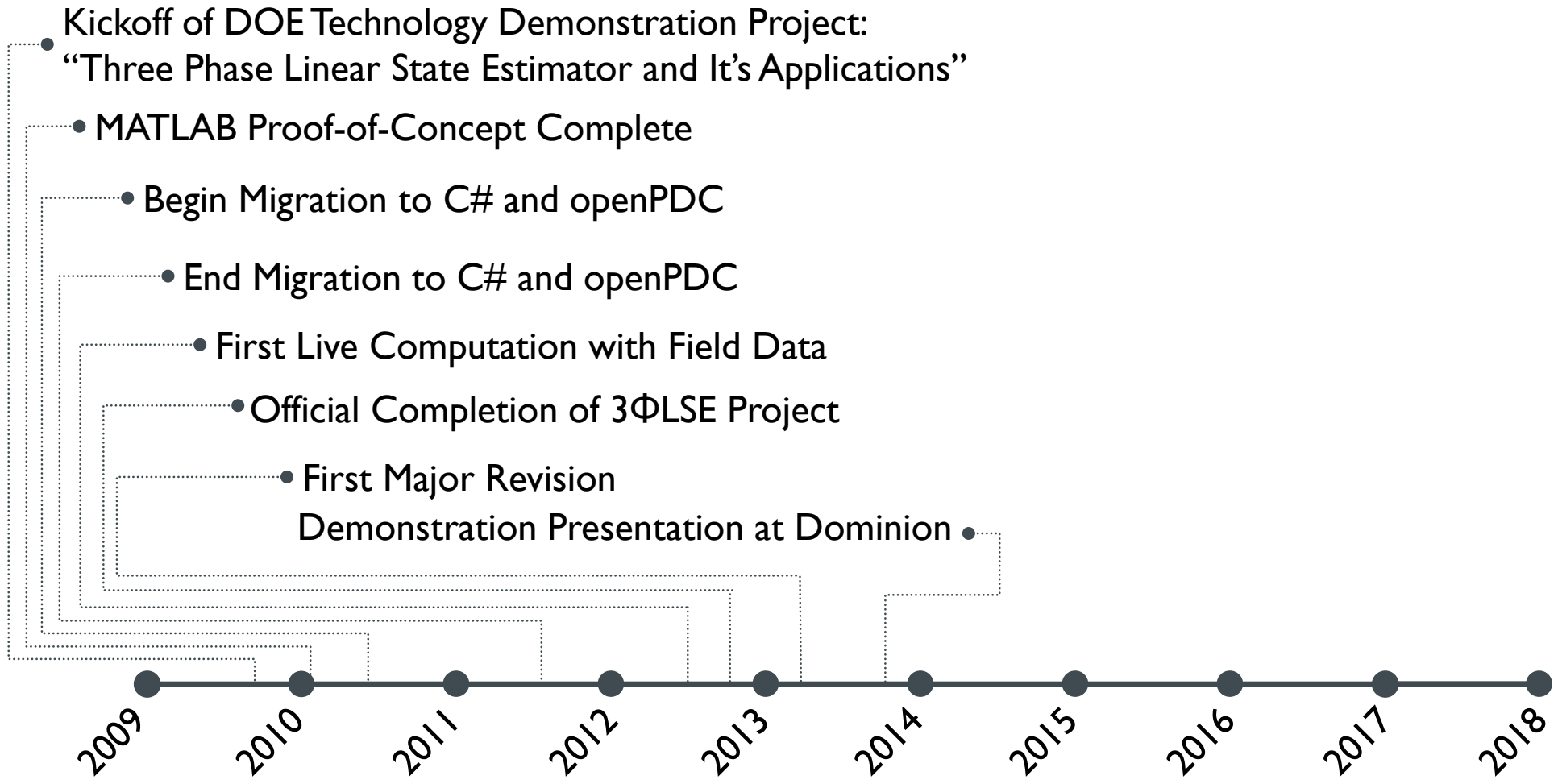
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**openECA Summit at Dominion Energy Virginia**

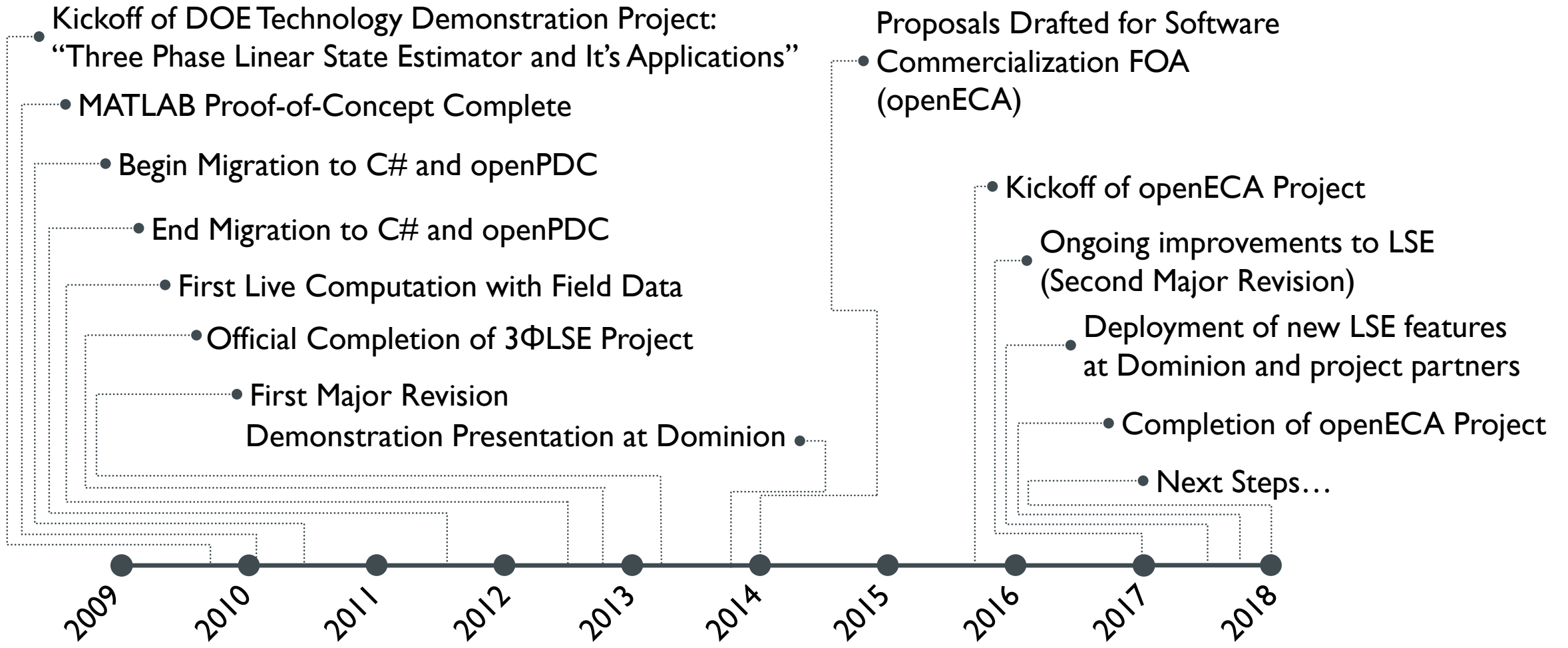
November 8, 2017

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# History of the Open Source Linear State Estimator



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# Everything is Different with openECA

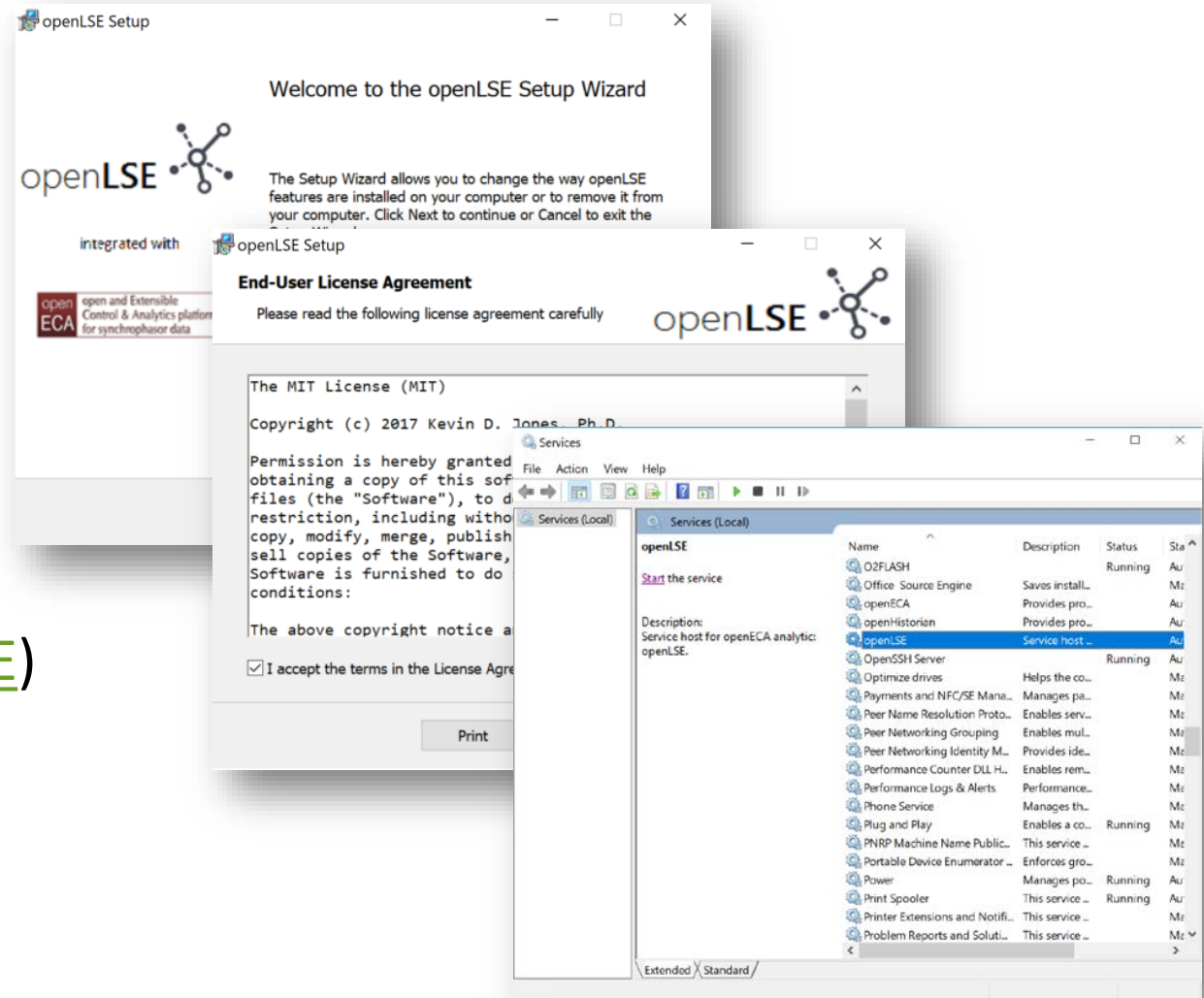
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- I have synchrophasor data, both streaming and historical, provided directly to my development environment
- Directly compile deployable applications
- openECA APIs enable automation of complex analytic configuration
- Include several technology solutions to bridge the skills gap
- Now I've been able to use the openECA and its constituent technologies to move the LSE forward.



# Primary Updates to the Linear State Estimator

- Provisioned with an easy installer package
- Deployable as a real-time service (<https://github.com/kdjones/openLSE>)

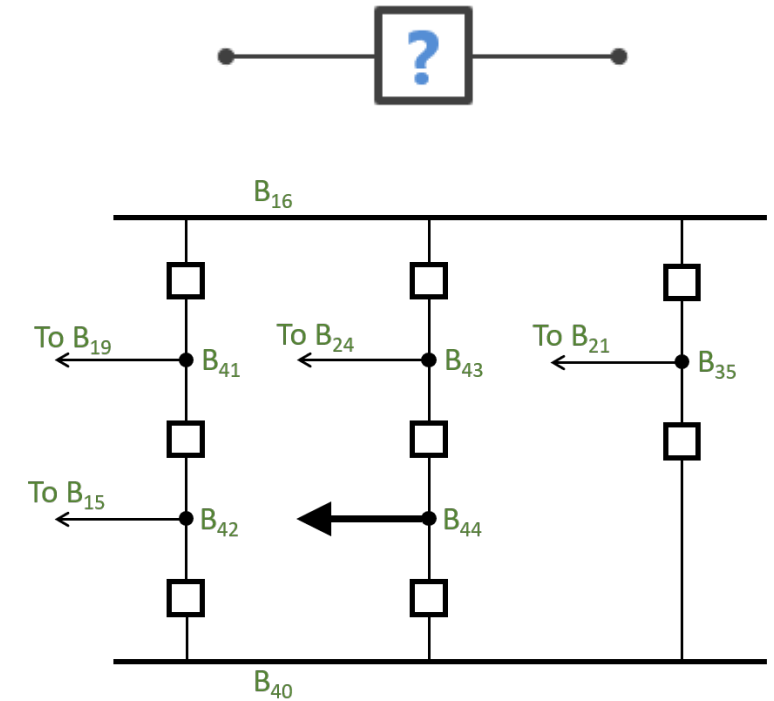
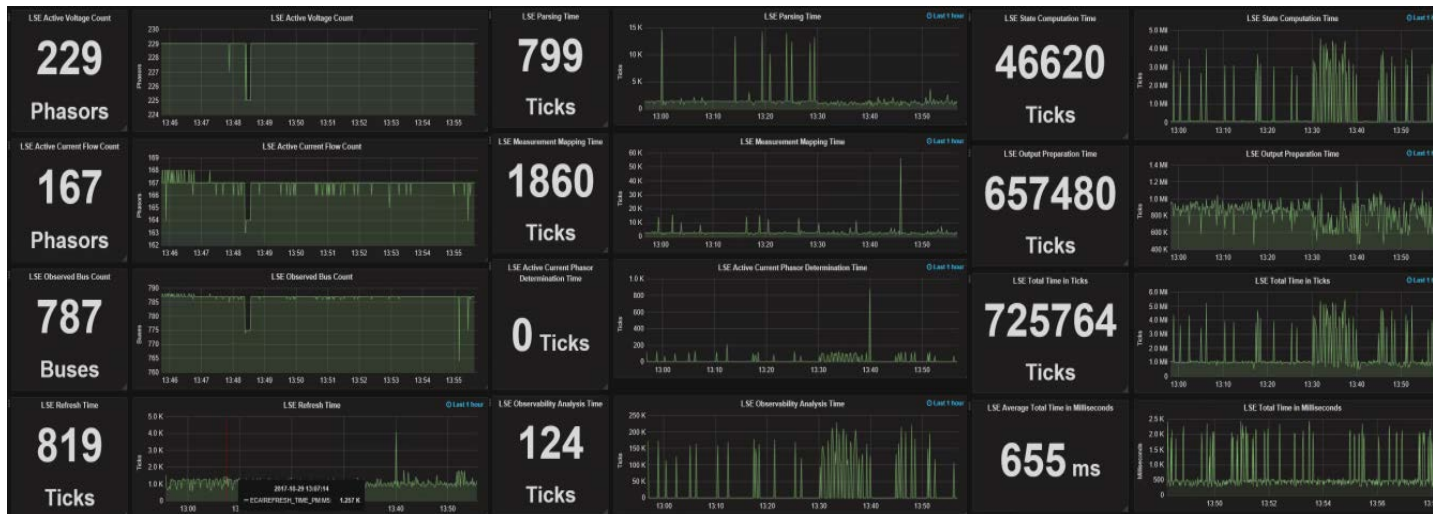


# Primary Updates to the Linear State Estimator

## ■ Integration of a Topology Estimator

- Enables use of LSE without breaker telemetry (a common hurdle to adoption)

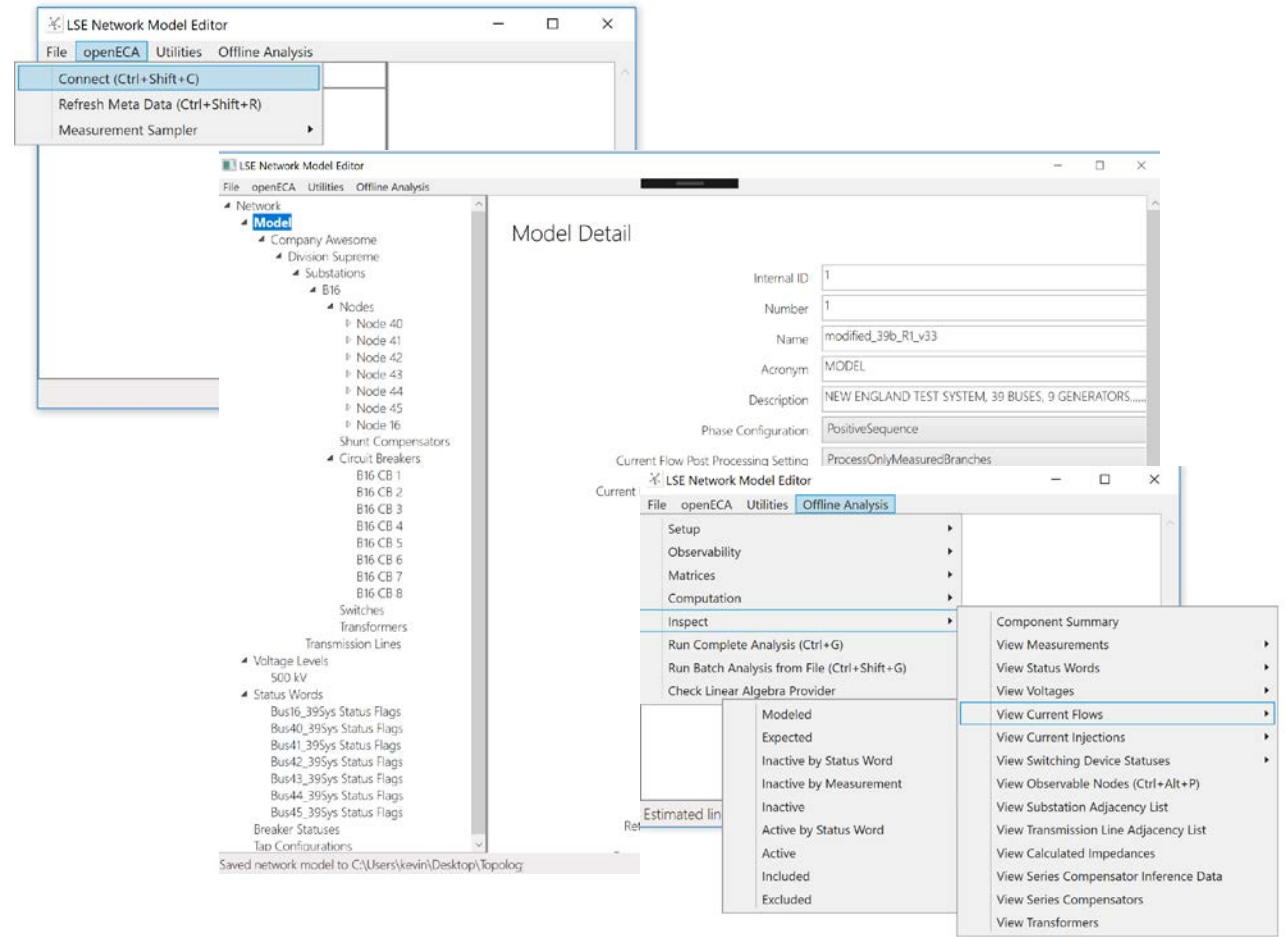
## ■ Integration with Grafana for Dashboard Vis.



# Primary Updates to the Linear State Estimator

## ■ Improvements to Network Model Editor and Offline Analysis to semi-automate the model building process

- Metadata connection to openECA for modeling automation
- Import models from GE-Alstom EMS and PSSEv33 format for semi-automated model build
- Import measurement information for semi-automated mapping
- Auto-generated \*.ecamap file for openECA
- Integrated openECA Measurement Sampler Analytic
- Merged modeling and analysis tools for better workflow



# Recap

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## Major Project Accomplishments

- Demonstrations at:
  - Dominion
  - Southwest Power Pool
  - Oklahoma Gas & Electric
- Hundreds of observable substations
- Demonstrations for Today
  - Live field data on Dominion Servers
  - Tabletop demo with ePHASORSIM

## What's Next for the LSE?

- Grow User Community
- Work with GPA to setup support mechanisms
- Scaling up as Dominion's PMU footprint continues to grow
- Performance at scale
- ...and a wish list of other features





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...my story is not unique

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