Future of Power Grids
Numerical Libraries Breakout

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9/19/13

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Problem Breakdown

- Data governance
  - Semantic models
  - Domain model transforms and mappings
  - Information assembly
  - Exchange patterns

- Data storage technology choices
  - Platforms – OS, JVM, languages etc
  - Variable quality of service (consistency, speed, quantity, latency, throughput, …)
  - Multi-faced data exposure.
  - Data interface tools

- Functional libraries
  - Power system domain solution components and algorithms
  - Frameworks for parallel computing
  - Core mathematical libraries – possibly tailored to special needs

- Testing
  - Test datasets
  - Certification

- Practical
  - Third party components
  - Commercial models, licensing
  - Support

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Context for Solvers – What Scope Here?

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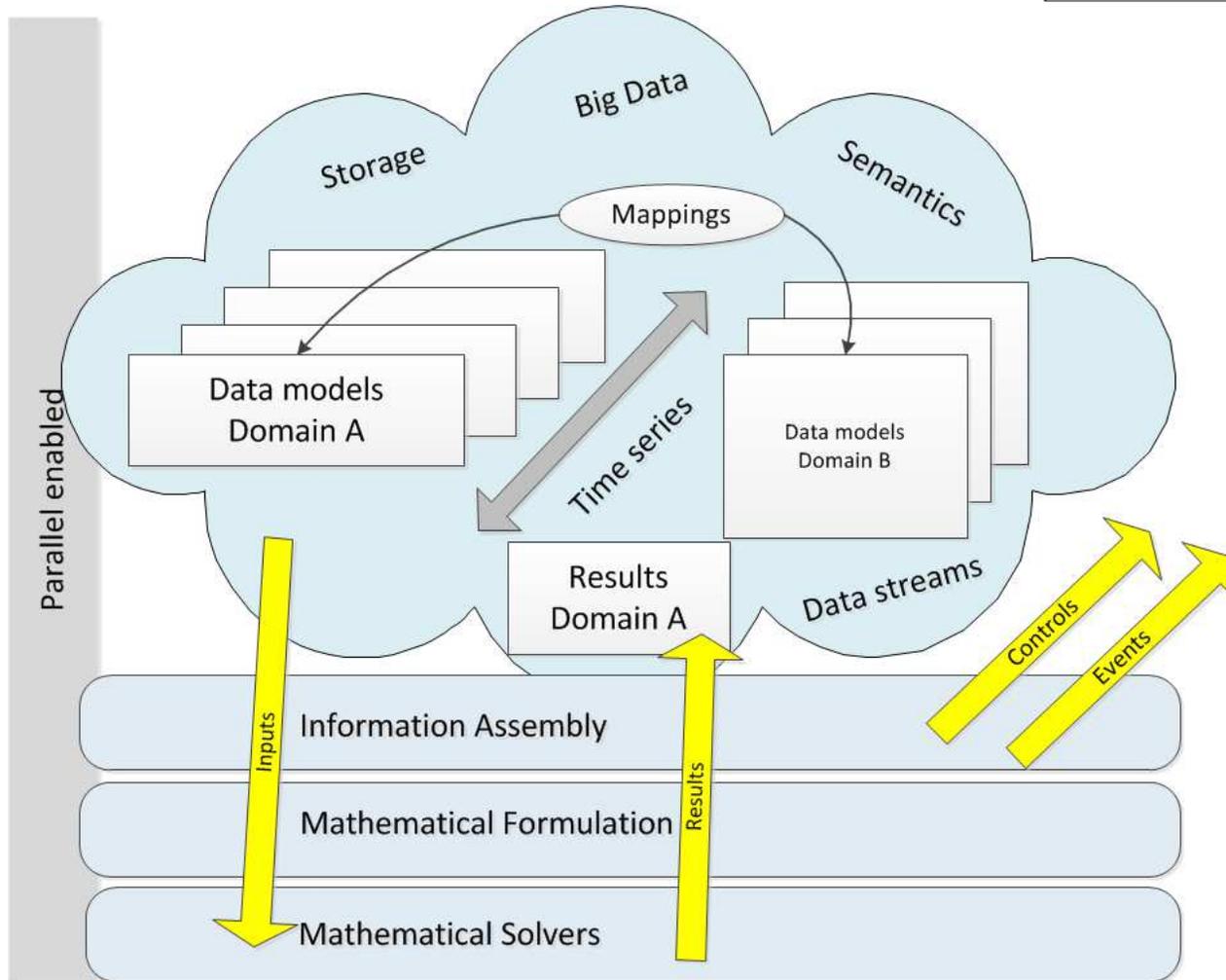
Scoping work

- What functions to target?

- What domain models to use?

- What platforms to support?

- Short term demonstrable value?

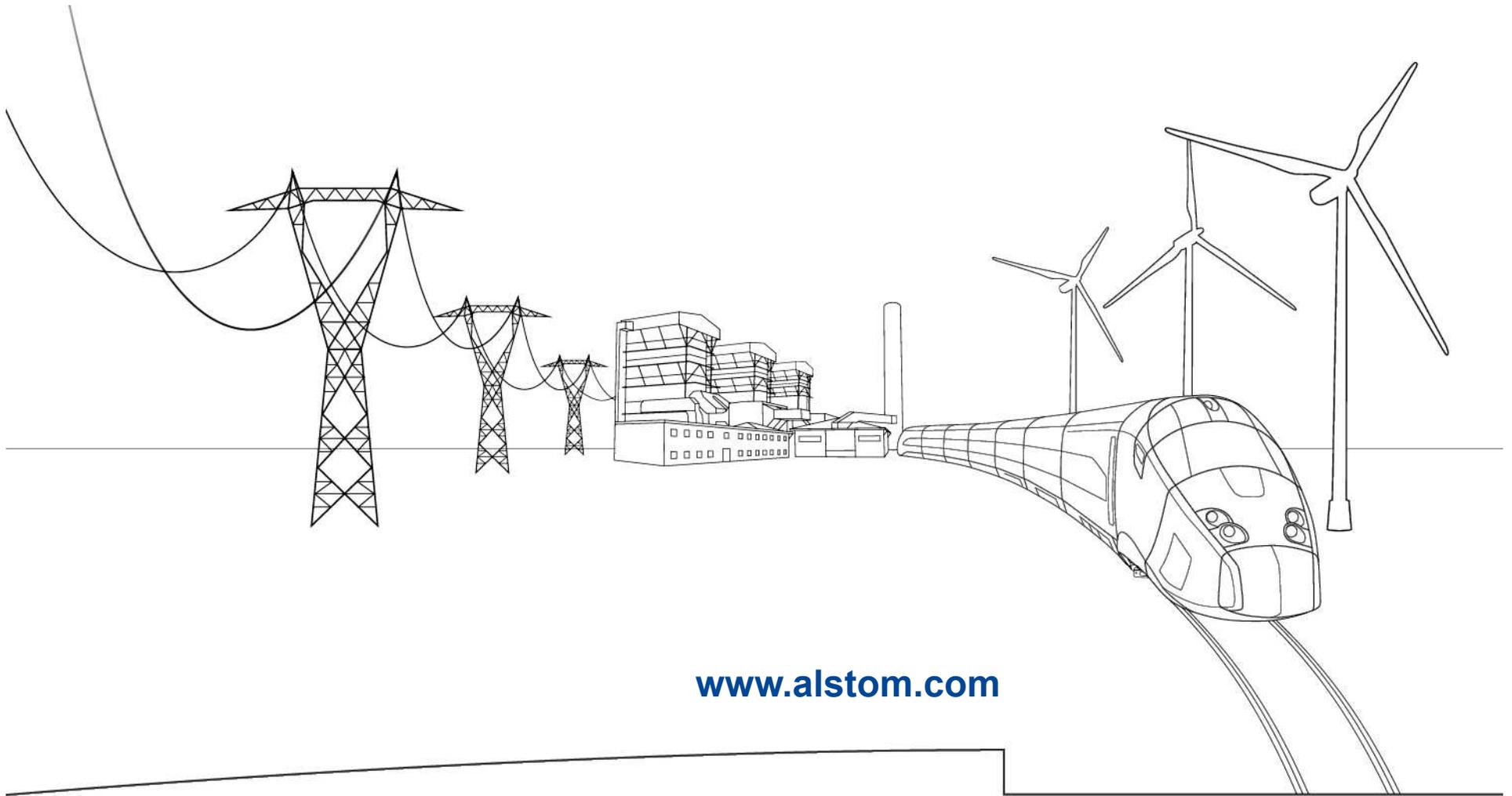**ALSTOM**

Things to consider...

- Leave room for innovation

- We have to deal with versioning (rolling upgrades, version spanning)

- Security and functional patching

- Collaboration or alignment with standards

- Reproducible/automated testing is essential and substantial

- Exposing results enables undiscovered value creation

- Speed enables use

- Dependencies should be clear and well managed

- Commercial terms matter – e.g. GPL issues

- Anything built, needs support, leverage existing and evolving

- Integration is a large cost

- Training, quality control, backup, development systems

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brainstorm

- Building the functions or the tools to build functions
  - Synergy of building tools and functions using them
- Aggregation and disaggregation common pattern
- Data marshaling tools, adaptors
- Data on inside, data on outside
- Need both schema management and instance management
- Generation of equivalents and mappings – alternate views
- Transformation and mapping (registry) – multiple schema
- Model updates (instance versioning, schema versioning)
- Time series data vs snapshots
- Value in specially optimized solvers for power system problems
  - E.g. special sparsity structures of electric grid

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Possible Outcomes

- Prioritization or plan for prioritization and value judgment

- Some ideas on low hanging fruit, short term value

- Establish organization for further collaboration

- Develop or identify models for practical roll-out of programs

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