Power System Modeling Basics

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CIM users group

This summary presentation is drawn from material that is presented in greater detail in the following document available free of charge from EPRI:

Using the Common Information Model for Network Analysis Data Management

A CIM Primer Series Guide

5 BIG Facts about Network Modeling

1. Power Grid Model

- Defines how the network is built.
- 95% of all model data
- Created asynchronously from studies.
- Shared by all studies.
- Past, present network:
  - Defined by construction process.
  - Validated by state estimation.
- Plans:
  - Defined as result of TSO planning process.
  - Submitted by other participants.

2. Steady State Hypothesis

- Defines specific steady-state condition for the network.
- Varies with the kind of study.
- Some data come from specialized sources. For example…
  - Load forecasting
  - Market outcomes
- Most data created by the participants in the analytical process.
- Input or outcomes of one case are used in setup of other similar cases.

3. Distributed Model Authority

- Grid ownership is split among many different entities.
- Analytical models are assembled from their contributions.

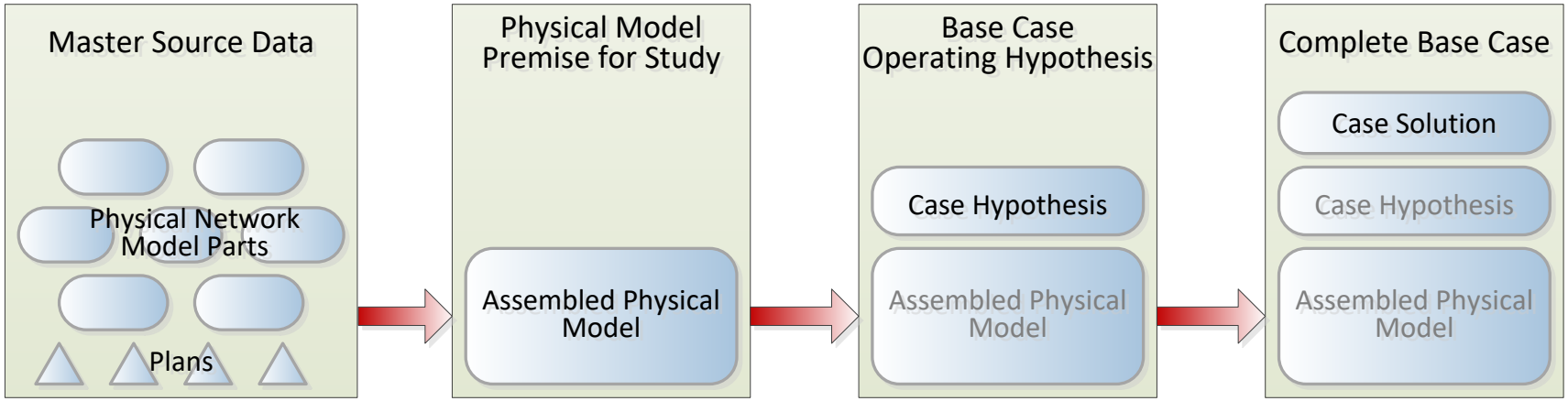
4. Time

- The physical model has a time dimension.
- Studies are based on points in time.
- The entire picture evolves as new decisions are made.

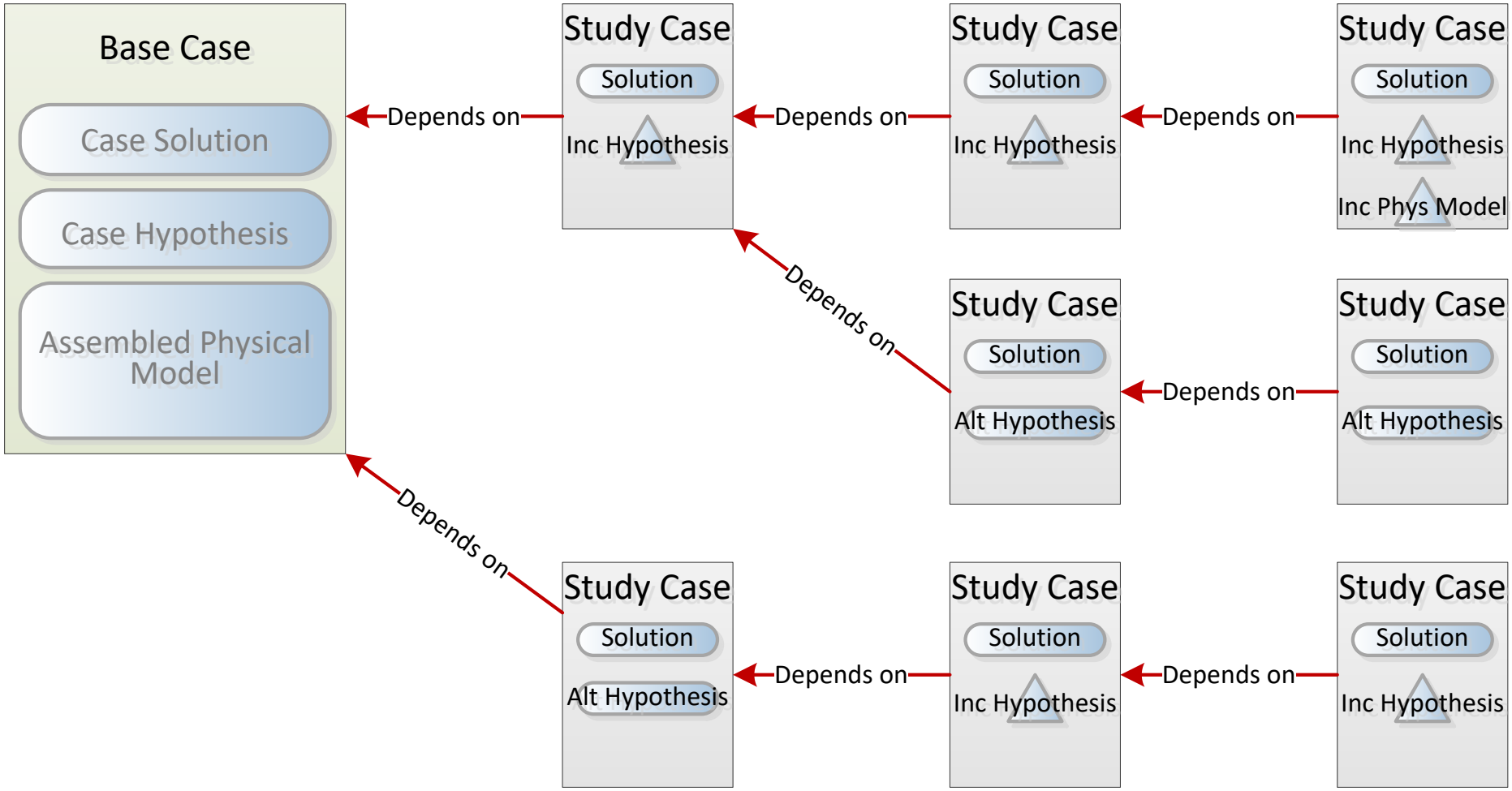
5. Object Identification

- Local naming conventions and requirements conflict.

Creating a Base Case

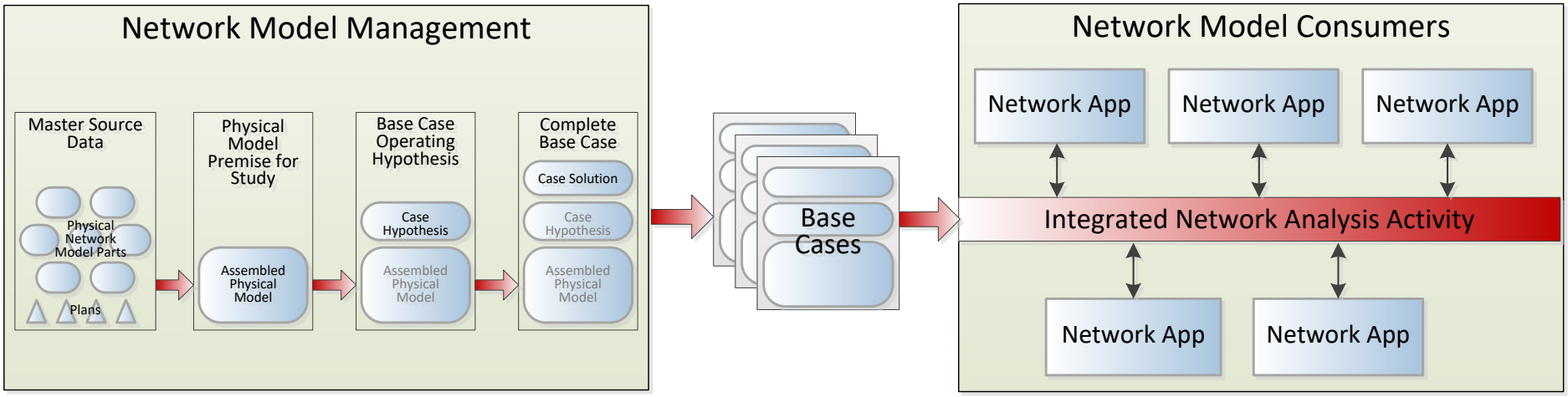


Study Cases Derived from a Base Case



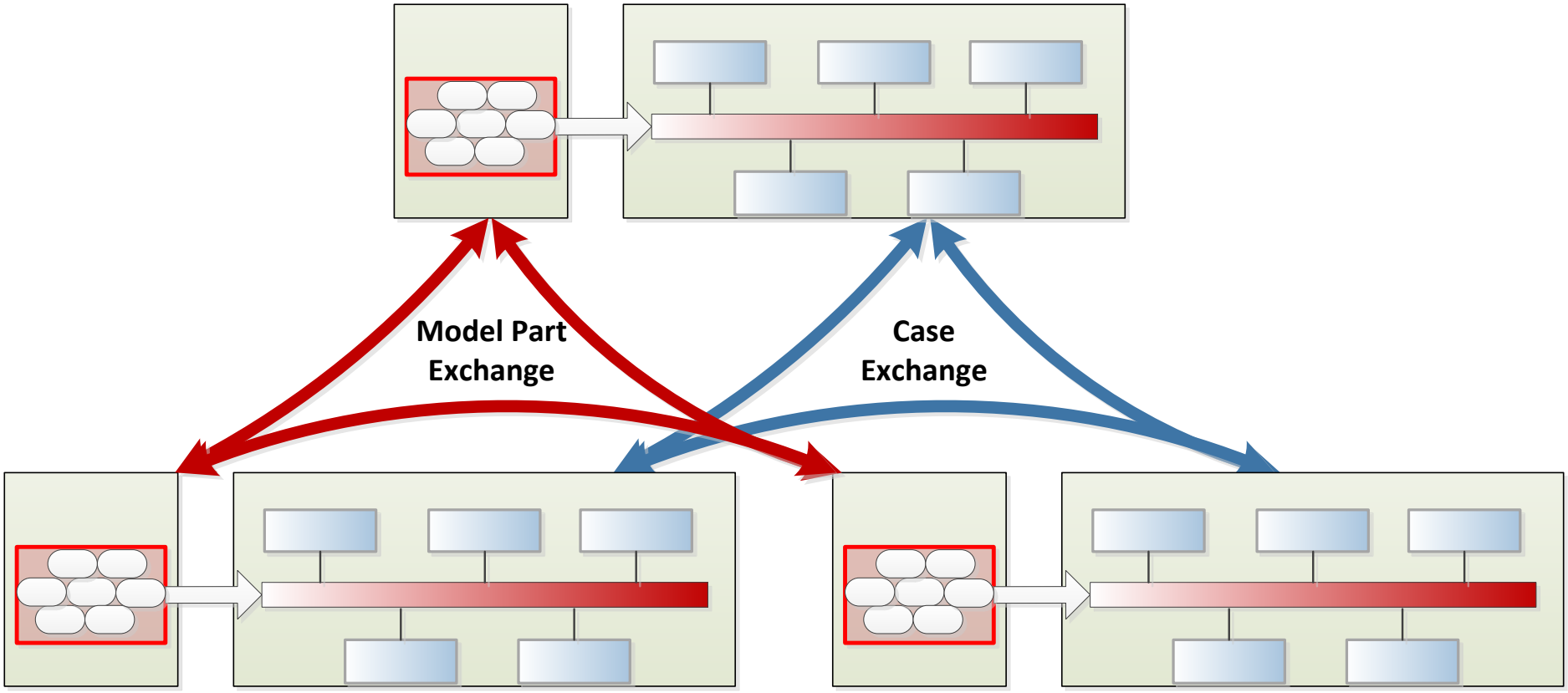
Within an Engineering Entity:

+ Base Case Development from Shared Master Sources
+ Feeds Multiple Network Model Consumers

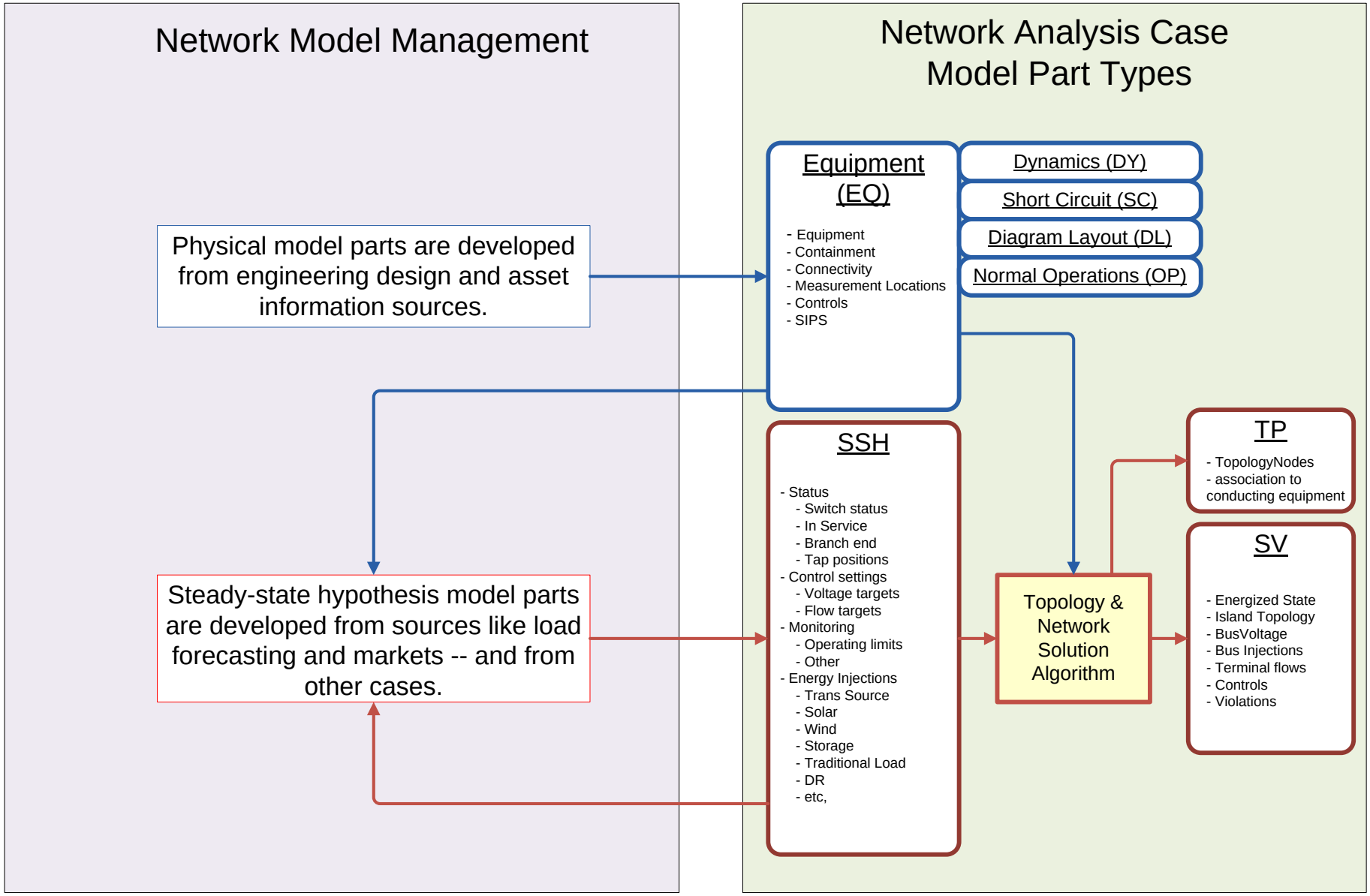


Coordination Among Engineering Entities

+ Model Part Exchange among Master Sources
+ Case Exchange among Analytical Processes

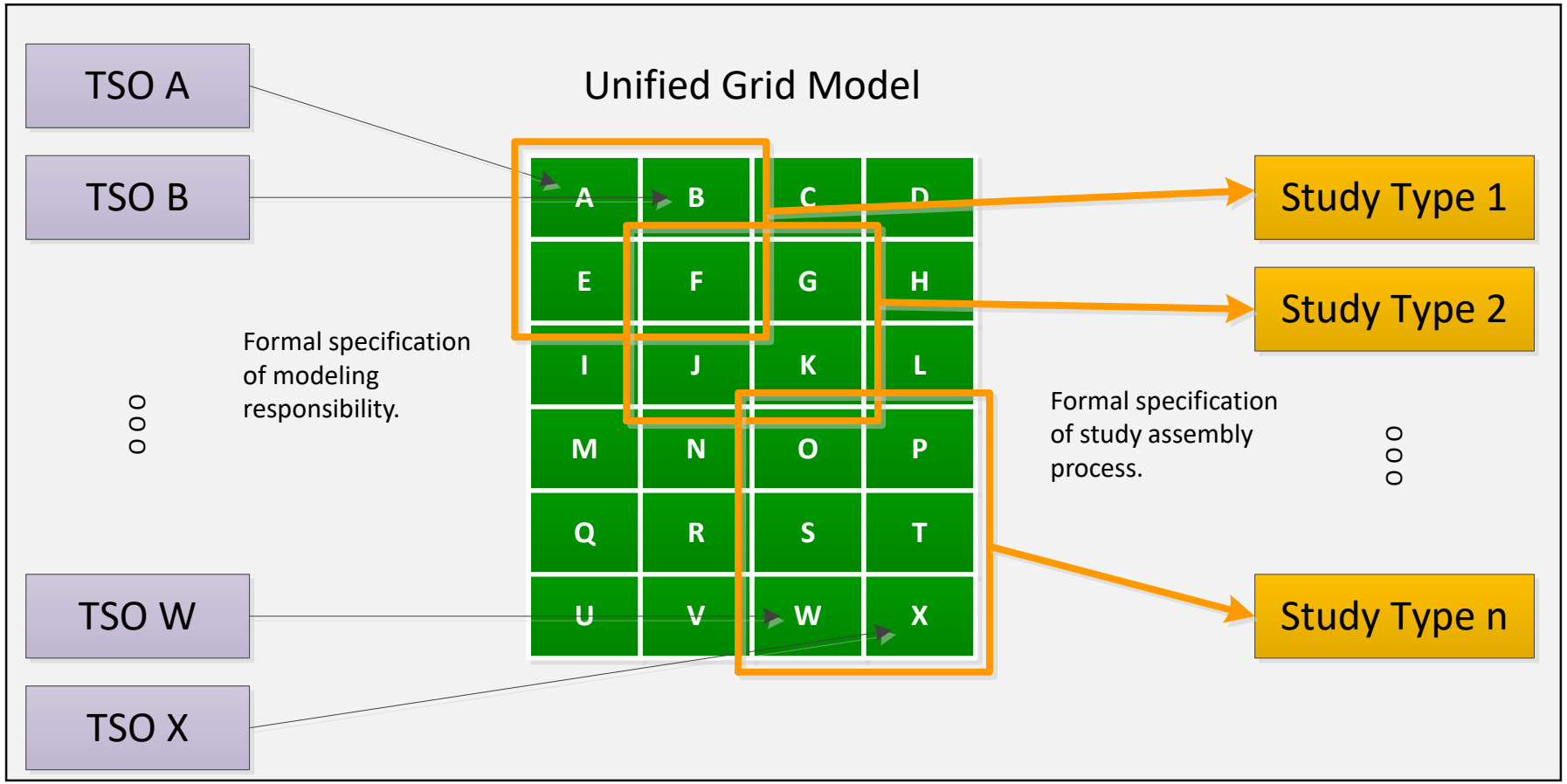


Model Part Types in a Network Analysis Case



Model Partitioning by the Responsible Source

Model parts are maintained once …



… and used in many different study case assemblies.

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