



SDM Backbone as an Alternative to SPDM

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Knowledge capture is a key objective for SDM

- NAFEMS Business Value Whitepaper provides a definition of SDM as follows:

“Simulation Data Management (SDM)” is a technology which uses database solutions to enable users to manage structures of simulation and process data across the complete product lifecycle.

Knowledge capture is a key objective for SDM

- One focus of SDM adding value beyond basic data management is capturing and retaining as much information and knowledge from the simulation data and how this data is generated as is feasibly possible.
- For data from multiple sources the key is ... as much **as is feasibly possible**

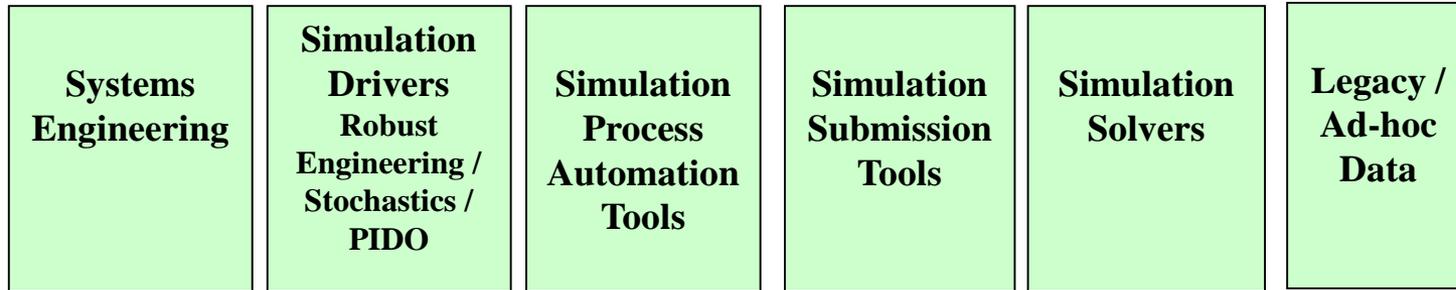
Three main approaches exist

- Three main approaches for capturing information beyond simulation data exist:
 1. **“SPDM”** – Simulation Process and Data Management, where the SDM system integrates the simulation process
 2. **“SDM Backbone”** – where simulation data management is separate from the process but communicates via a “handshake” mechanism
 3. Combination of **“SPDM”** and **“SDM Backbone”**

What is an SDM backbone?

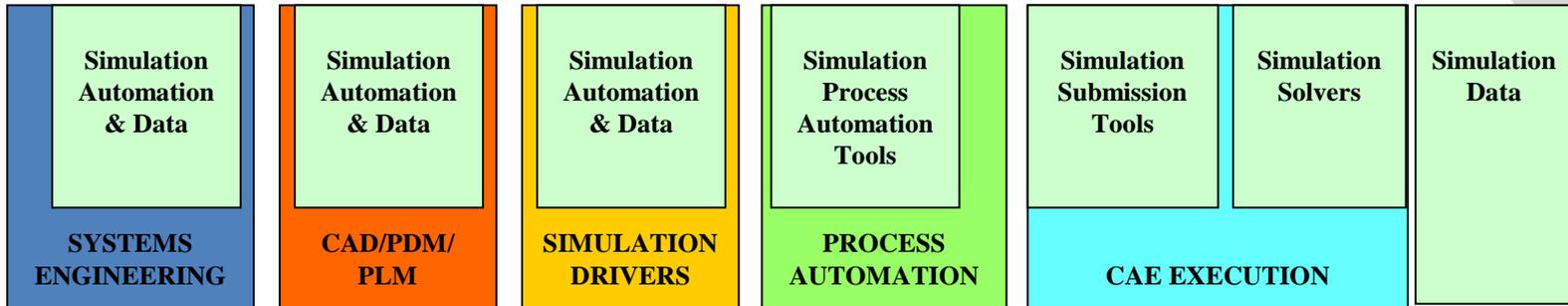
- An approach and strategy to SDM implementation and not a specific product from a specific vendor
- A Simulation Data Management (SDM) architecture independent of how the data is created.

Simulation Data comes from multiple sources



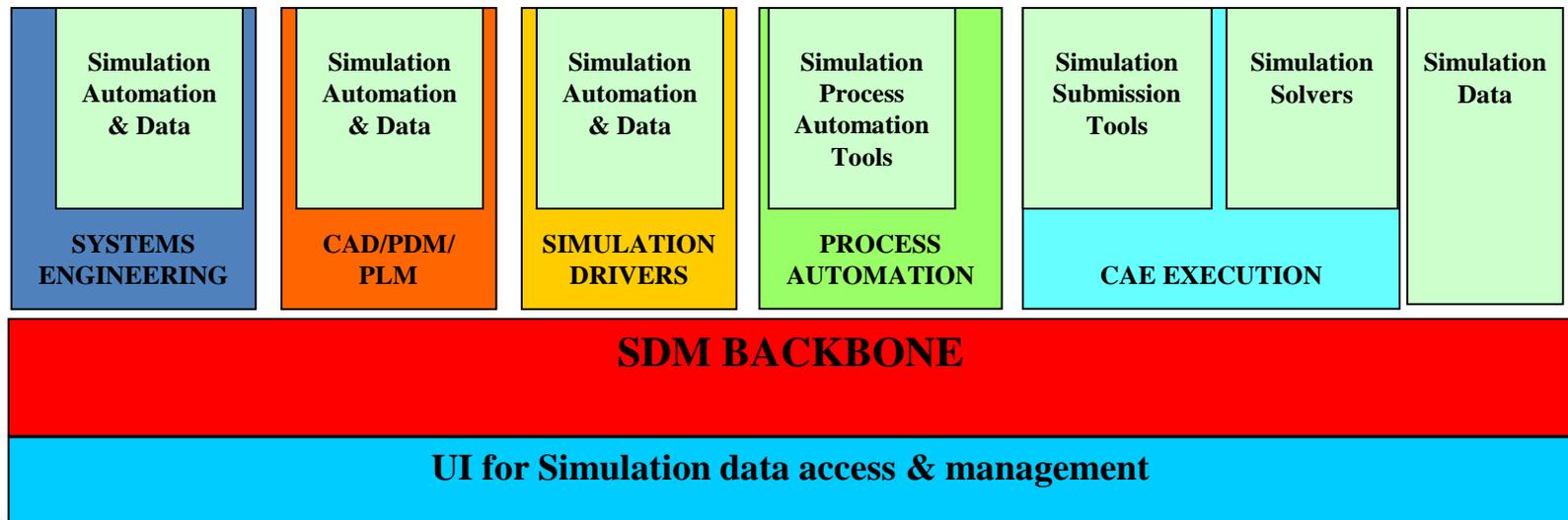
- Legacy and Ad-hoc data exists in all organizations and cannot be regenerated just for the purpose of managing data
- Replacing existing process automation tools requires a massive re-validation effort
- Simulation Drivers and Systems Engineering are not practical for encapsulation into SDM

Simulation Data comes from multiple environments



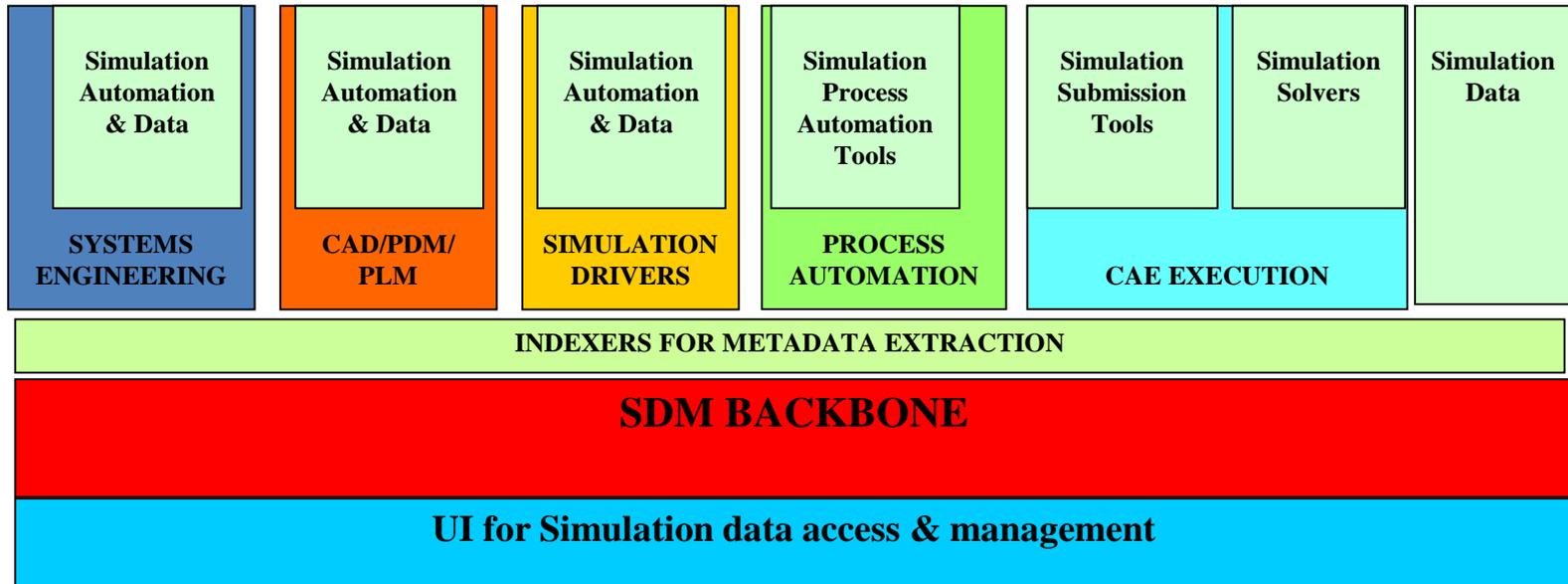
What is an SDM backbone?

- An “SDM Backbone” is a common repository independent of the simulation data source that allows for the simulation execution to store simulation data and related metadata as appropriate.



Getting the metadata

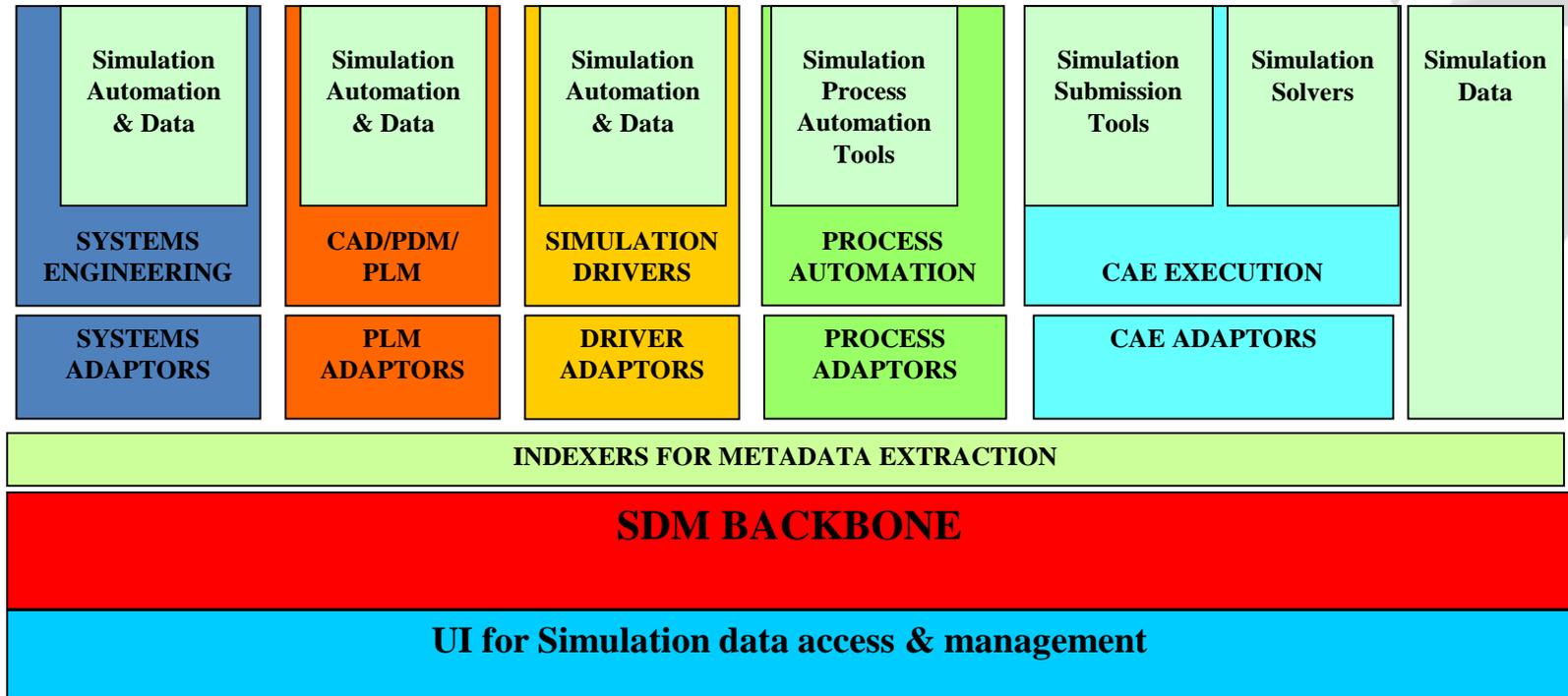
- Start with automated metadata extraction from simulation data files (indexers)



Getting the metadata

- Add extensions to environment where the simulation data is created to allow for data & metadata handshake with SDM Backbone (Adaptors)
 - Drop box type approach (ie. PLMXML)
 - API access to SDM Backbone to allow direct put/get of data and metadata (including relationships)

Getting the metadata



Getting the metadata

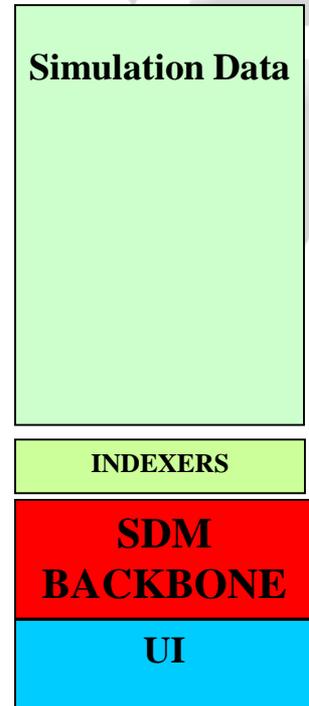
- Using Indexers and Adaptors allows for getting simulation knowledge from the source as a function of the source
- Adaptors require extensions to current environments/appllications
- Using Adaptors avoids the issue of revalidating simulation processes

Getting the metadata

Simulation Data only

1. Simulation data transferred to SDM backbone
2. Indexer is automatically run creating metadata
3. No relationship information

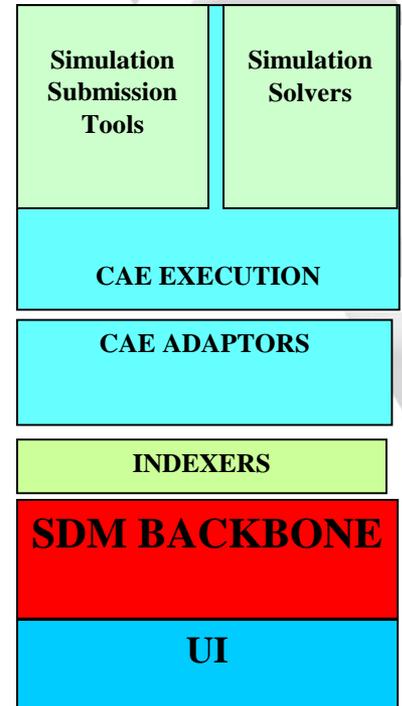
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Dimensionality	3
Model file	auto.op2
Number Of Elements	8450
Number Of Nodes	8836
Solution Date	07/18/06
Solution Time	
Solution Type	Vibration
Solver Name	NASTRAN



Getting the metadata

CAE Execution Environment

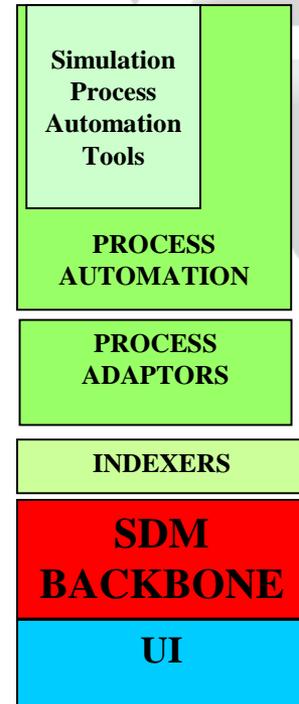
1. Simulation data transferred to SDM backbone by CAE Adaptors
2. Indexer is automatically run creating metadata
3. Metadata including limited relationship information can be transferred to SDM backbone by CAE Adaptors



Getting the metadata

Process Automation

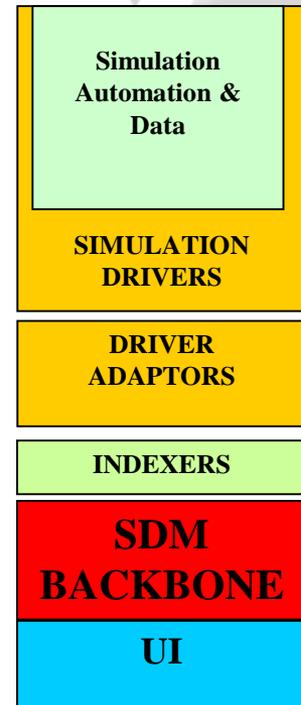
1. Simulation data transferred to SDM backbone by Process Adaptors
2. Indexer is automatically run creating metadata
3. Metadata including process and relationship information can be transferred to SDM backbone by Process Adaptors



Getting the metadata

Simulation Drivers

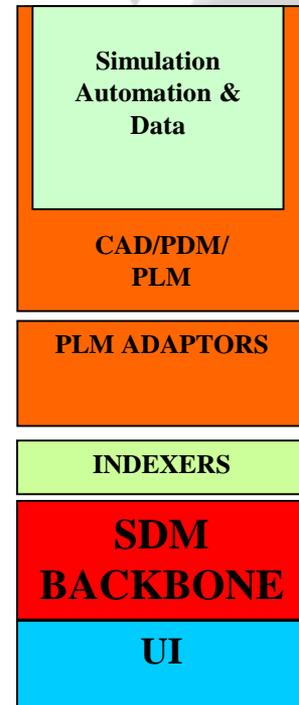
1. Simulation data transferred to SDM backbone by Driver Adaptors
2. Indexer is automatically run creating metadata
3. Metadata including more comprehensive metadata can be transferred to SDM backbone by Driver Adaptors



Getting the metadata

CAD/PDM/PLM Environment

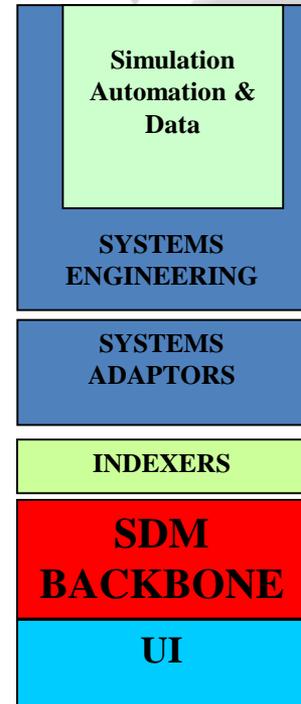
1. Simulation data transferred to SDM backbone by PLM Adaptors
2. Indexer is automatically run creating metadata
3. Metadata including design info & simulation metadata can be transferred to SDM backbone by PLM Adaptors



Getting the metadata

Systems Engineering

1. Simulation data transferred to SDM backbone by Systems Adaptors
2. Indexer is automatically run creating metadata
3. Metadata including requirements, system info & simulation metadata can be transferred to SDM backbone by Systems Adaptors



SDM backbone

- An “SDM Backbone” is a common repository independent of the simulation data source that allows for simulation data and appropriate related metadata.

