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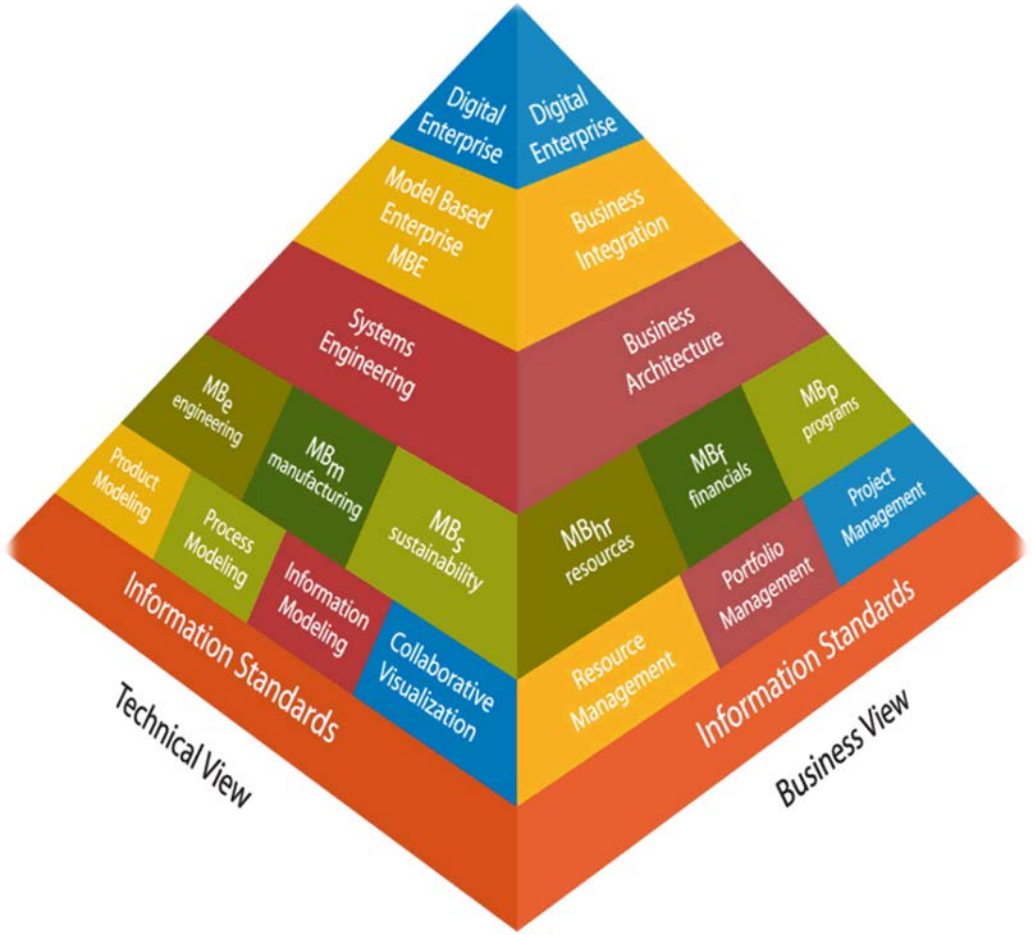
INTEROPERABILITY RESEARCH THRUST

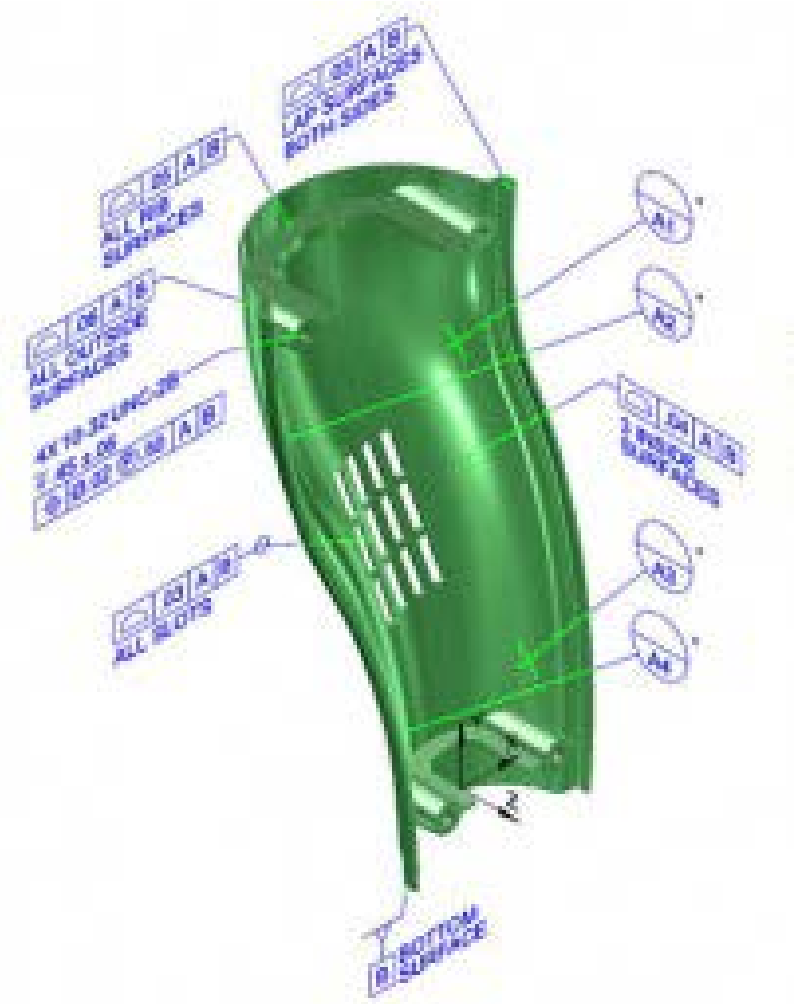
Framing the Problem

- The foundation for a **model-based enterprise** is provided by a **model-based product definition**
- The product model functions as a central repository for all technical and business product definition data
- Drives all product and facility development processes and activities throughout the product lifecycle
- Ideal model representation would bridge organizational cross-functions (finance, engineering, and manufacturing…)

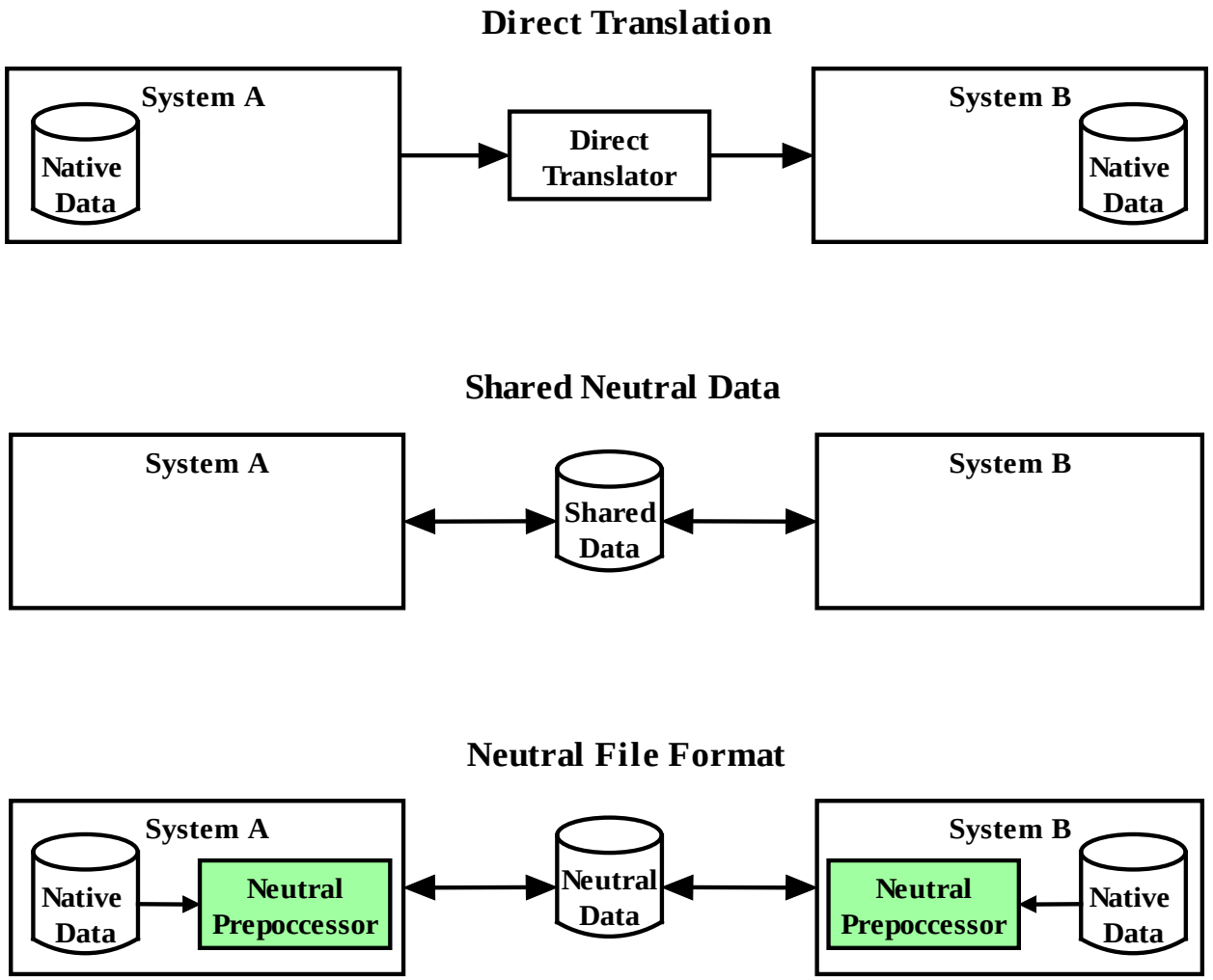


Framing the Problem

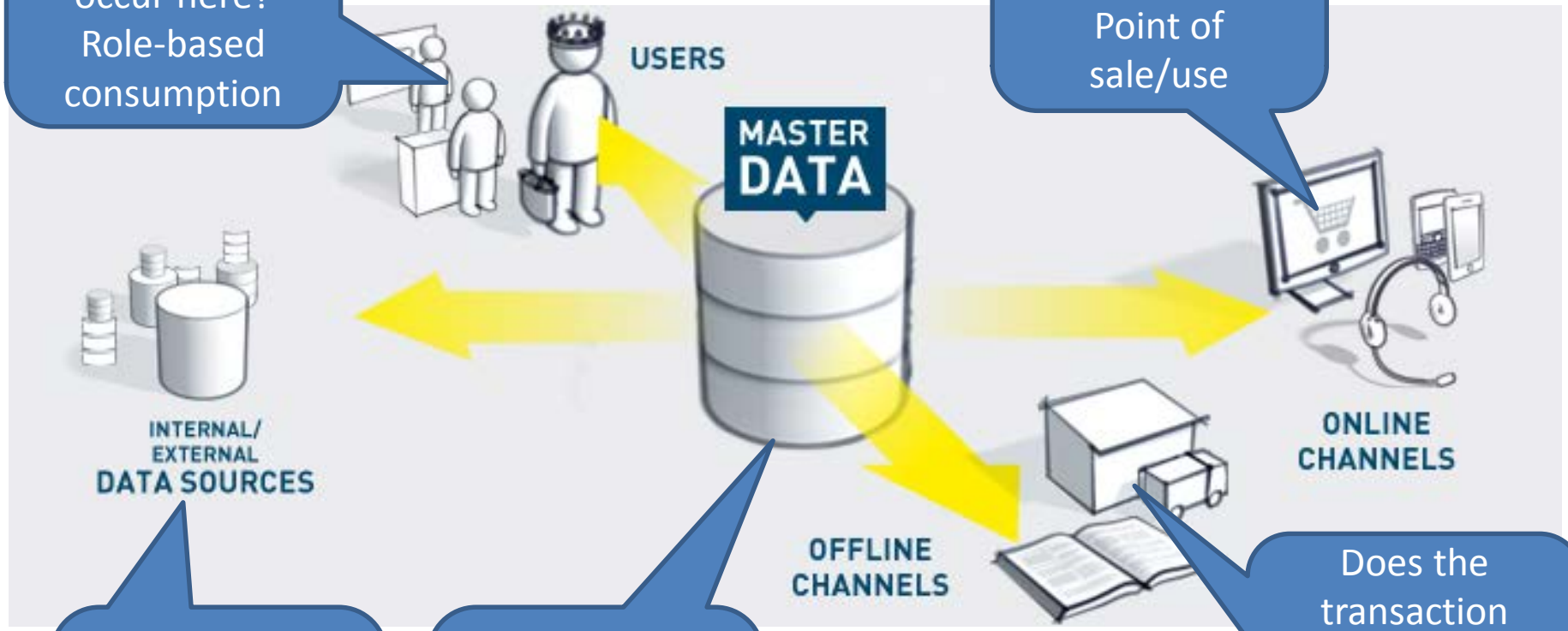
- The **author** is the originator of the digital product representation or any other derivation of the digital product definition
- The **consumer** is the end user of the digital product representation or any of its derivations; the form that the consumed data takes varies with the organizational role of the consumer
- However, the model is more than geometry. It includes **behavior** and **performance** information, as well as other **attributes**.



Possible Data Exchange Options



Possible Architecture



Does the transaction occur here? Role-based consumption

Does the transaction occur here? Point of sale/use

Does the transaction occur here? Pre/post processors

Does the transaction occur here? Central repository

Does the transaction occur here? Dependent on device

Points to consider…

- Current interop products can be standalone (file in, file out) or integrated (source system, target system) or some combination thereof.
- Current interop products are typically packaged and distributed with software for all in/out format interfaces with specific input/output functionality enabled by license codes.
- A standalone interop product might be distributable in smaller packages which are specific to one input/output combination. But each package would likely have some "core" functionality overhead that cannot be reduced.
- "Interoperability App" could be a light-weight interface to data on a secure file server and heavy-weight applications running on a high-end server. Could have 3D graphics or not, depending on the App platform.

Potential items in a Statement of Work

1. Assess standard data definition
   a. Include major CAD tools
   b. Include PDM tools to the extent available
   c. Compare against known testing schemes (CAx-IF, LOTAR)
   d. Capture behavior and context
2. Propose solutions to address existing gaps
   a. Placement of the exchange
   b. Do existing alternate options present a compelling case?
   c. Ontologies/Languages
3. Incorporate validation and verification to account for variation in standards implementation by software developers
   a. Map gaps in step 1
   b. Map differences in data capture/definition between tools
   c. Recommend mitigation steps
4. Can we develop a modeling/data authoring method to mitigate shortcomings in model tools?
5. Should we develop a solution based on open-source or proprietary formats?

Potential items in a Statement of Work

6. An app-based interoperability delivery system
   - Identification of specific gaps in data sharing/exchange across the product lifecycle, including systems engineering and across functional domains (e.g., low-cost, cloud based tools that bridge product system data between electrical and mechanical systems).
   - This gap analysis will feed the “apps” framework.
   - A framework for developing, evaluating, storing, and delivering interoperability “apps” that address inadequate data movement at specific gaps between the functional areas of the product lifecycle (e.g., an “app store” hosted on manufacturingHUB architecture to serve as a store front). This framework will provide security, change/version control, and configuration management of the apps.
   - Interoperability “apps” that combine specific elements of data translation/exchange/archival standards and functional domains of the lifecycle to be used on an as-needed basis (e.g., an exchange app that moves model data between Creo and CATIA using STEP AP 242 in an electro-mechanical product assembly).