



Digital Engineering Information Exchange Working Group (DEIXWG): Standards Framework (SF) Sub- Group Path forward

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DEIX-SF Lead

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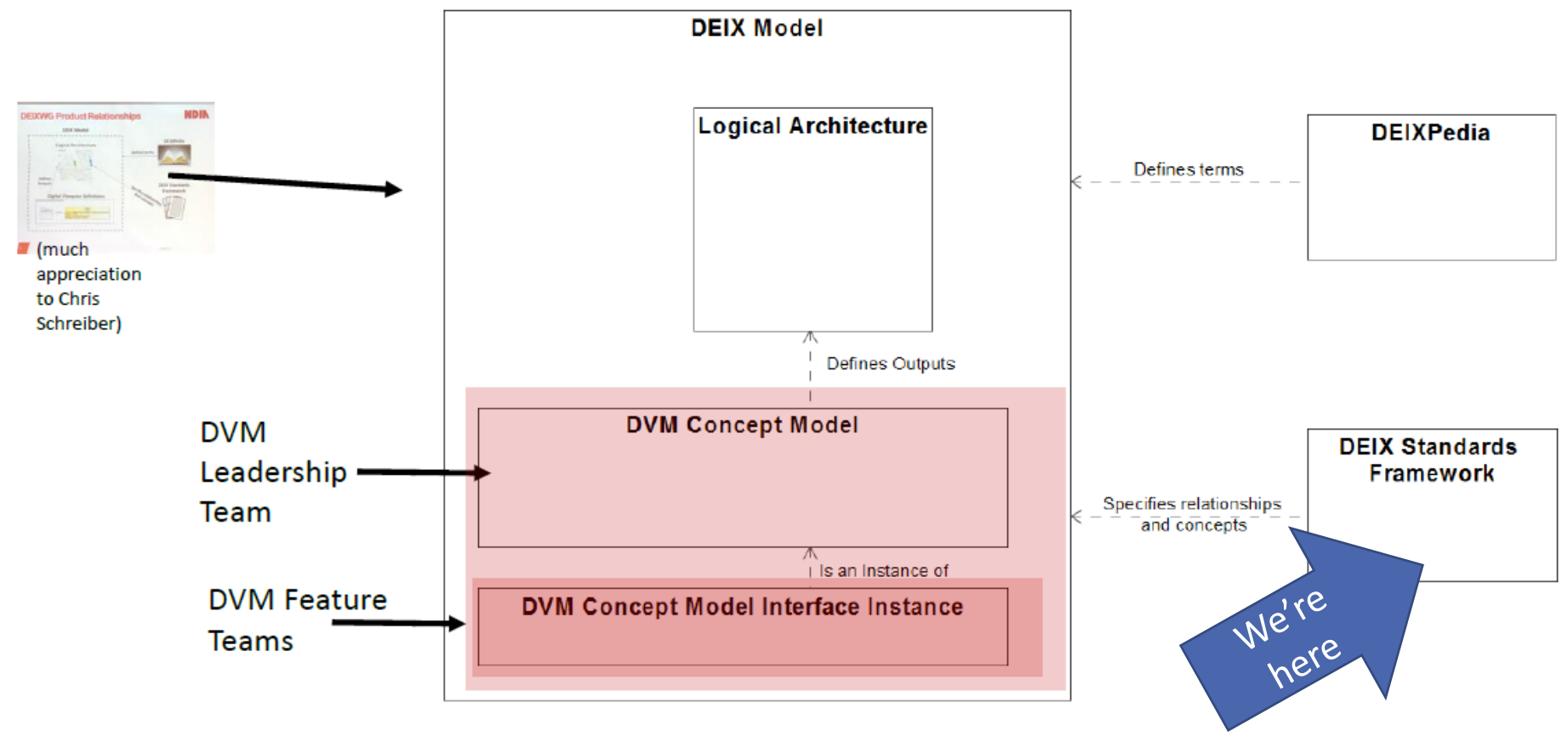
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Inter-relationship between DEIX WG Product teams





The Need for DEIX-SF

- No industry-wide agreement on standards or conventions to enable a universal exchange of digital artifacts between buyers and suppliers in a global supply chain
- Challenges:
 - **NO STANDARDS:** No agreed conventions for entities that want to participate in a digital engineering ecosystem to share or exchange their engineering information
 - **COMPETING STANDARDS:** Many related industries, professional disciplines, and open communities have competing, duplicative, or inconsistent standards for information exchange
 - **COMPLEXITY:** Difficulty in achieving dominant standards naturally with the degree of diversity among model information, stakeholders, and interrelationships



The Product Development Project:
Develop Digital Engineering Information Exchange Standards Framework (DEIX-SF)
Project Lead: Celia Tseng



- **The Effort:** Create a framework for official standards related to Model-Centric Information Exchanges
 - **SEARCH sources and repositories** for information exchange standards
 - **IDENTIFY needs for standards** to facilitate seamless exchanges of model-centric digital artifacts
 - **REVIEW existing standards** for content for relevance to needs for standards.
 - **ANALYZE relevant standards** to determine acceptability, overlaps, and gaps
 - **CREATE a standards hierarchical framework** and references to acceptable standards
 - **RECOMMEND to INCOSE Standards Committee** modifications or new standards to fill gaps or meet needs
- **Need Volunteers for Encyclopedia Products:**
 - **RESEARCHERS** to search and identify relevant standards
 - **ANALYSTS** to analyze relevant standards for relevance, applicability, and needs
 - **STANDARDS AND POLICY EXPERTS** to advise product team and broker information & relationships

For More Information Go To OMG MBSE Wiki:

<http://www.omgwiki.org/mbse/doku.php>

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Product Description: The DEIX-SF

- Think of National Building Information Model Standard (NBIMS)
- Hierarchal expression of engineering information exchange standardization
 - Needs Analysis for Standards
 - Subset of Standards Organizations' repositories
 - Summarize Literature review of relevant standards
 - Results of Gap Analysis
 - Recommendations
- Notional Outline
 - Hierarchy of Needed Standards
 - Catalog of Relevant Standards
 - Requirements to fill Gaps
 - Recommendations to INCOSE Standards Committee
 - Proposed Engagement Plan for Standards Organizations

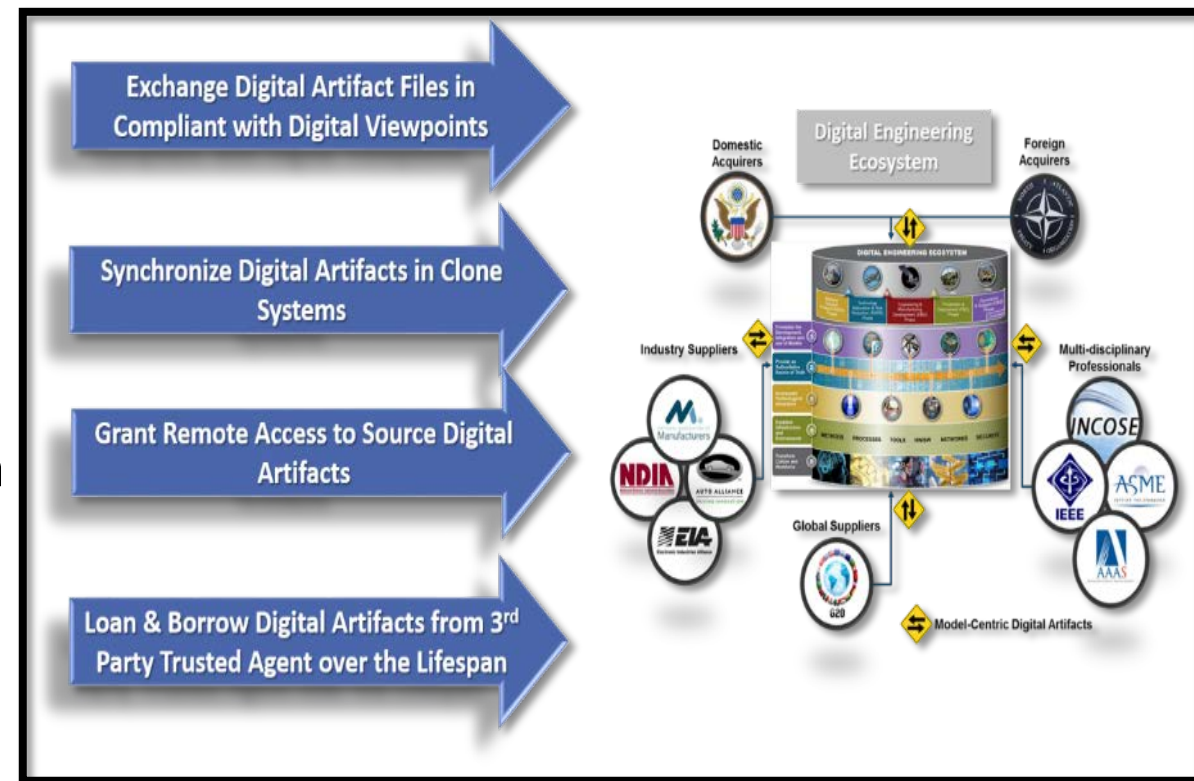
The Standards Framework Document Tree Related to Exchanging Digital Artifacts



Approach for DEIX – SF initial draft



- Standards reviewed and cataloged by use case from modes of Digital Engineering Exchange:
 1. Exchange Digital Artifact Files/ Information
 - Organized By Use Cases from DEIX-DVM, with categories in Systems Engineering “RFLP” (requirements, functional, logical, physical)
 2. Synchronize Digital Artifacts in Clone System
 3. Grant remote access to Source Digital Artifacts
 4. Load and borrow Digital Artifacts from 3rd party Trusted Agent



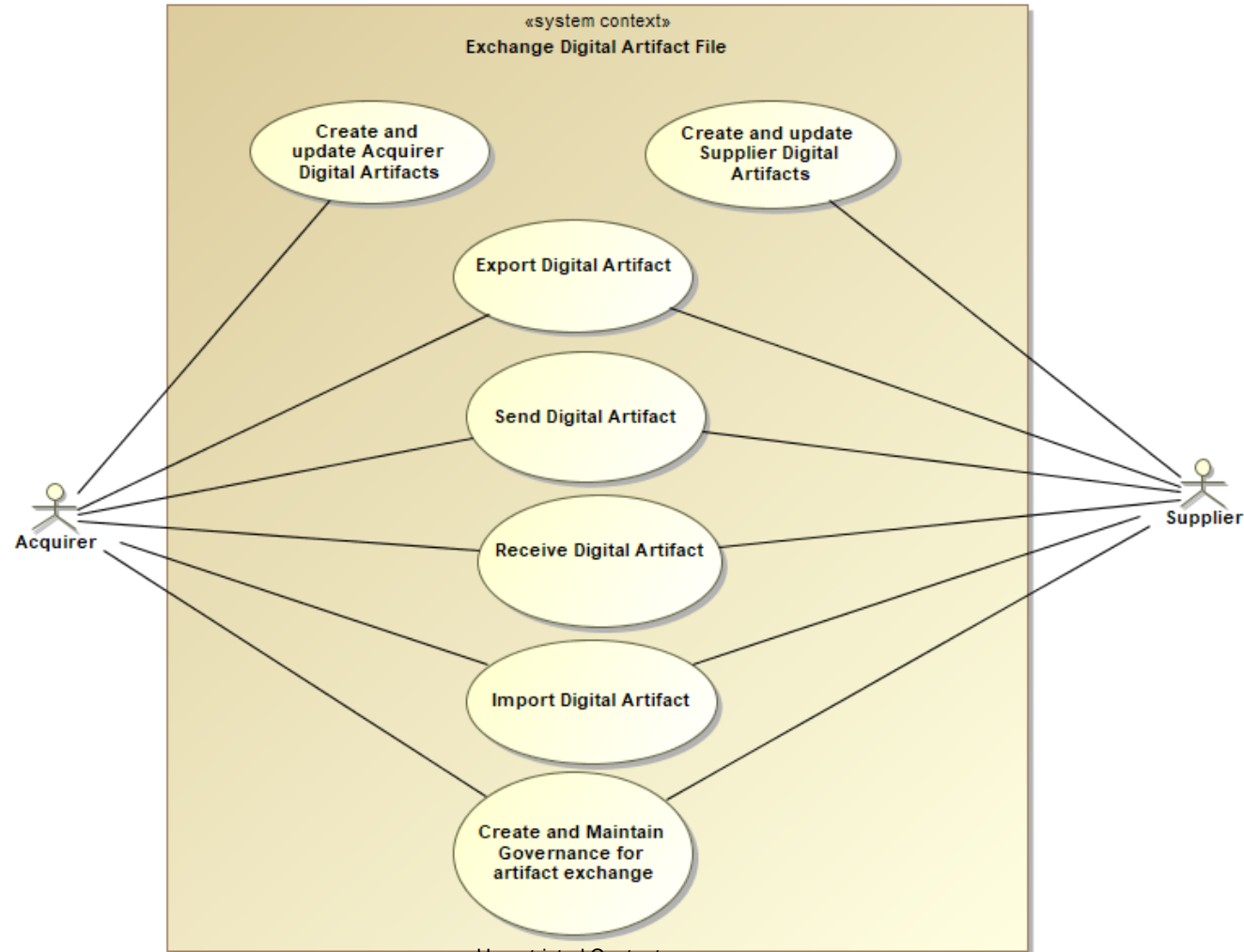


Exchange Digital Artifact Files



- Allows the owners to transfer MBE information files with the use of computer network technologies or delivery of digital media formats.
- Stakeholders and the owners maintain the configuration control of their own files and take responsibility for the use and decisions made with their files.
- Parties will agree on the content and file formats before the transfer, and each requests can be separate transactions.

Exchange Digital Artifact Files Use Case



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Applicable Standards for Exchange Digital Artifact Files



- There are definitely established standards for this mode but they tend to be domain-specific so there is not a single standard that attempts to address all of the domains together.
 - ReqIF: A fairly mature, and proven, requirements data exchange standard. It needs some improvement which are being worked last I checked, but it's usable in its current release state.
 - ProSTEP: A fairly mature, proven, and well-backed standard for engineering design data exchange (primarily mechanical CAD data but it's begun to expand to other data).
 - Metadata standard (XMI, MoSSEC), language (SysML) and ontologies standards (OWL, DEIX-DVM) enables with proper exchange of data export/import, but currently work in progress.

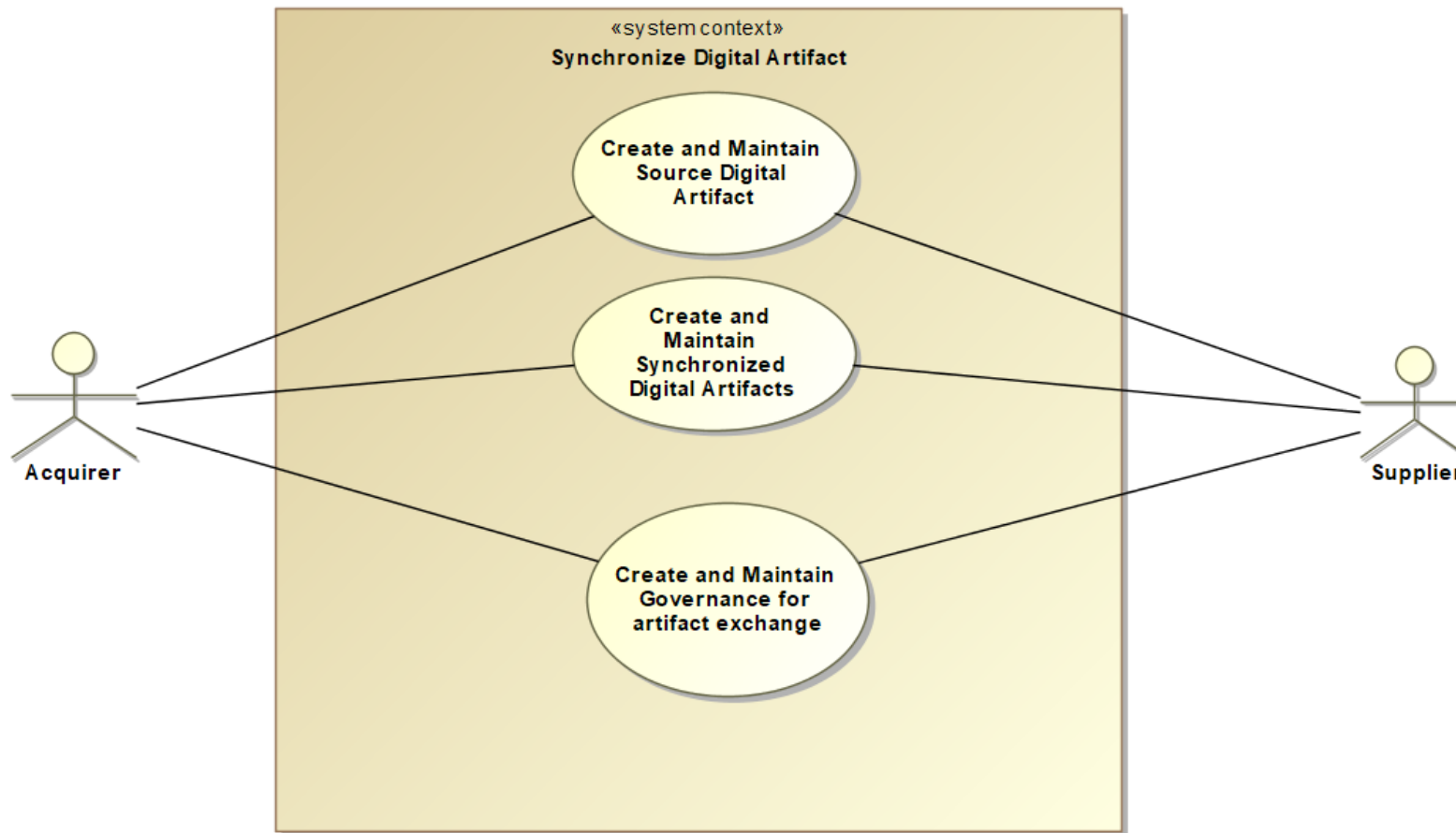


Synchronize Digital Artifacts in Clone System



- The synchronization use case allows the MBE information owners and creators to have one or more stakeholders with static versions, dynamic versions, interactive versions, or replicate versions of the MBE information.
- The parties agree to frequency and type of MBE information that they synchronize with its stakeholders' systems.
- The MBE Information files may allow either unidirectional or bidirectional file synchronization.

Synchronize Digital Artifacts Use Case





Applicable Standards For Synchronize Digital Artifacts



- No MBSE-specific standards to support this use case
- Data Distribution Service (DDS) from OMG is a machine to machine standard that enable scalable data exchange using publish-subscribe pattern.
- Some Tool vendors provide vendor-specific capabilities in this area:
 - TaskTop (ALM integration)
 - OpsHub (ALM integration)
 - PROSTEP (PLM integration)

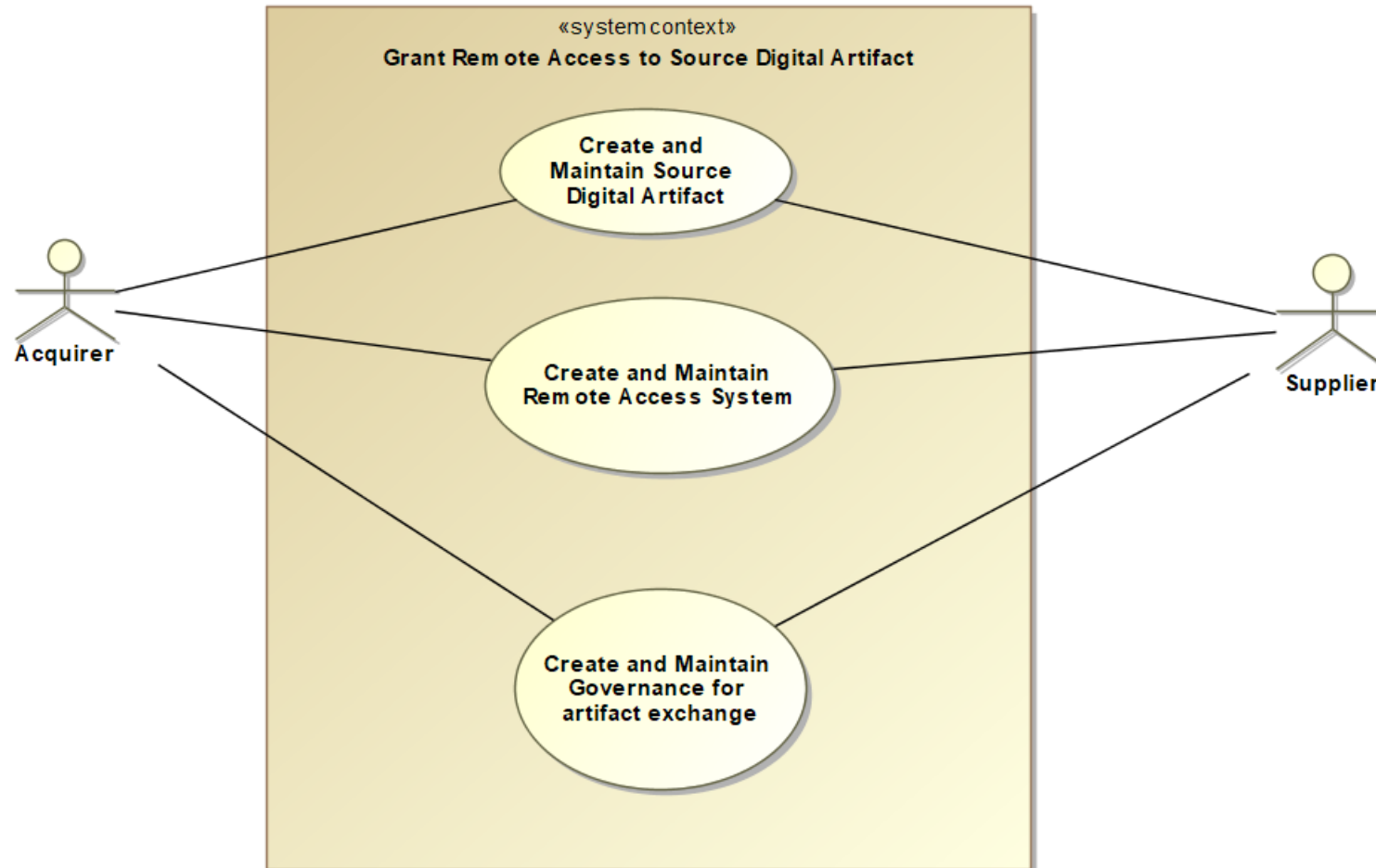


Grant Remote Access to Source Digital Artifacts



- Gives stakeholders the ability to review the original MBE information in its native location by way of remote or onsite access to MBE information files and software.
- Under the Access Use case, the creators and owners maintain the primary source of the MBE information as an authoritative source of truth.
- The owners also, have authority to enter into binding agreements on the type and scope of access granted to its stakeholders.
 - The access may include the ability to interactively manipulate, modify, or copy any MBE established by agreed terms and conditions.

Grant Remote Access to Source Digital Artifacts Use Case





Applicable Standards for Grant Remote Access to Source Artifacts



- Open Services for Lifecycle Collaboration (OSLC) is the prevailing standard for the linked data integration approach in the engineering domain using the remote access approach.
 - Doesn't provide governance for the data exchange specifically though.

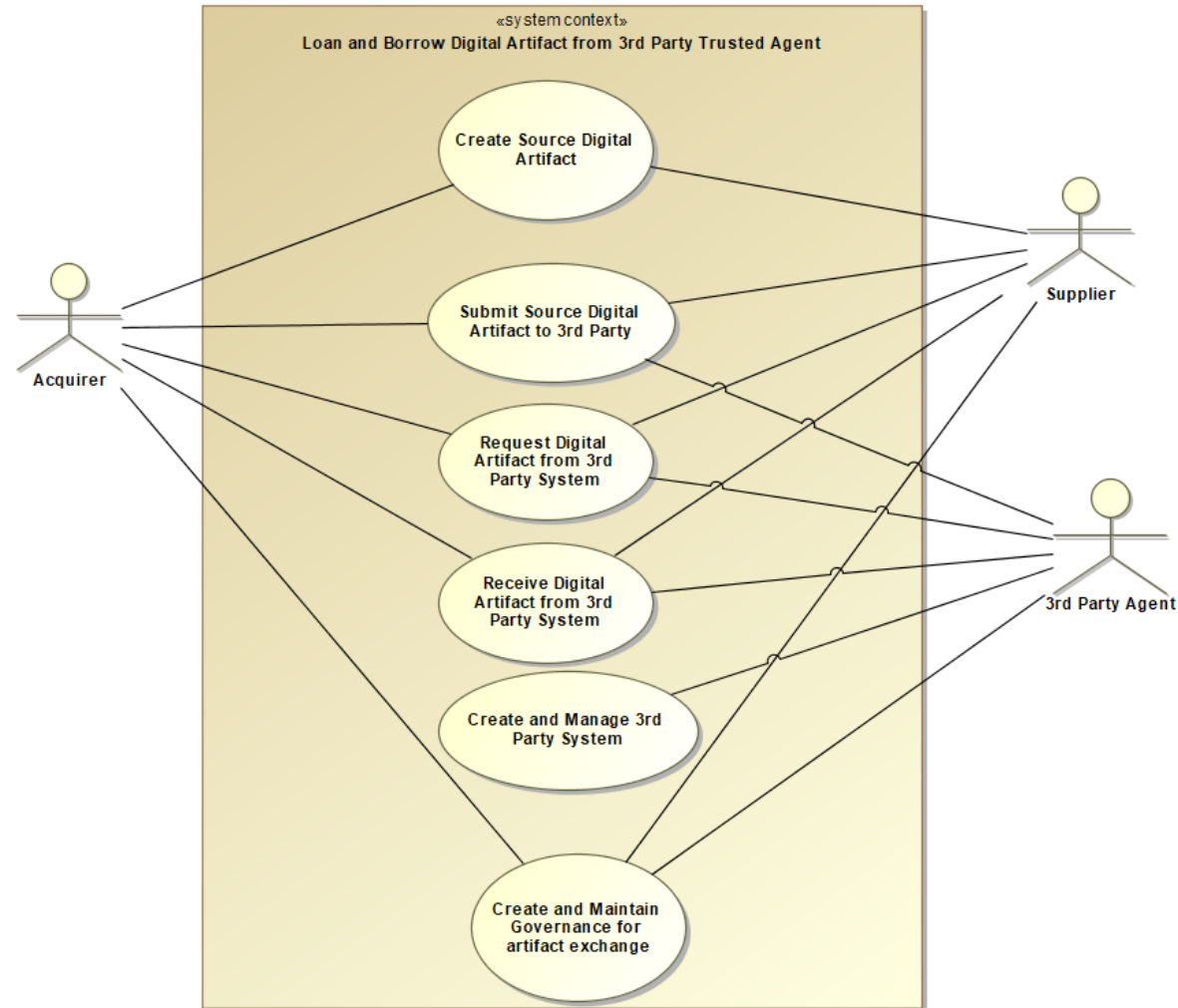


Loan and borrow Digital Artifacts from 3rd party Trusted Agent



- Allows that MBE information owners to deliver all MBE and related software to a trusted third party that can manage access, transfers, or synchronizations in perpetuity.
- This allows the stakeholders to subscribe to services for accessing MBE information during the lifespan of the products or systems, and in some cases, beyond the system's lifespan for historical reference or reuse in other systems.
- Owners may receive royalties and all parties that use the MBE information release them from any liability associated with the future use of the information.

Loan and borrow from 3rd party Trusted Agent Use Case



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Applicable Standard for Loan and borrow from 3rd party Trusted Agent Use Case



- No specific standards for 3rd party management, but there are a few standards that enables this.
 - LOTAR: allows long term archiving and retrieval
 - The Data Distribution Service (DDS™): an API standard that uses Data-centric publish-subscribe approach for data-centric data model.
 - PLM standards - similar but not MBE-specific.



Next Steps



- Need volunteers to continue reviewing standards and identifying gaps.
- Refine Use Cases for each Information Exchange modes.



Back up



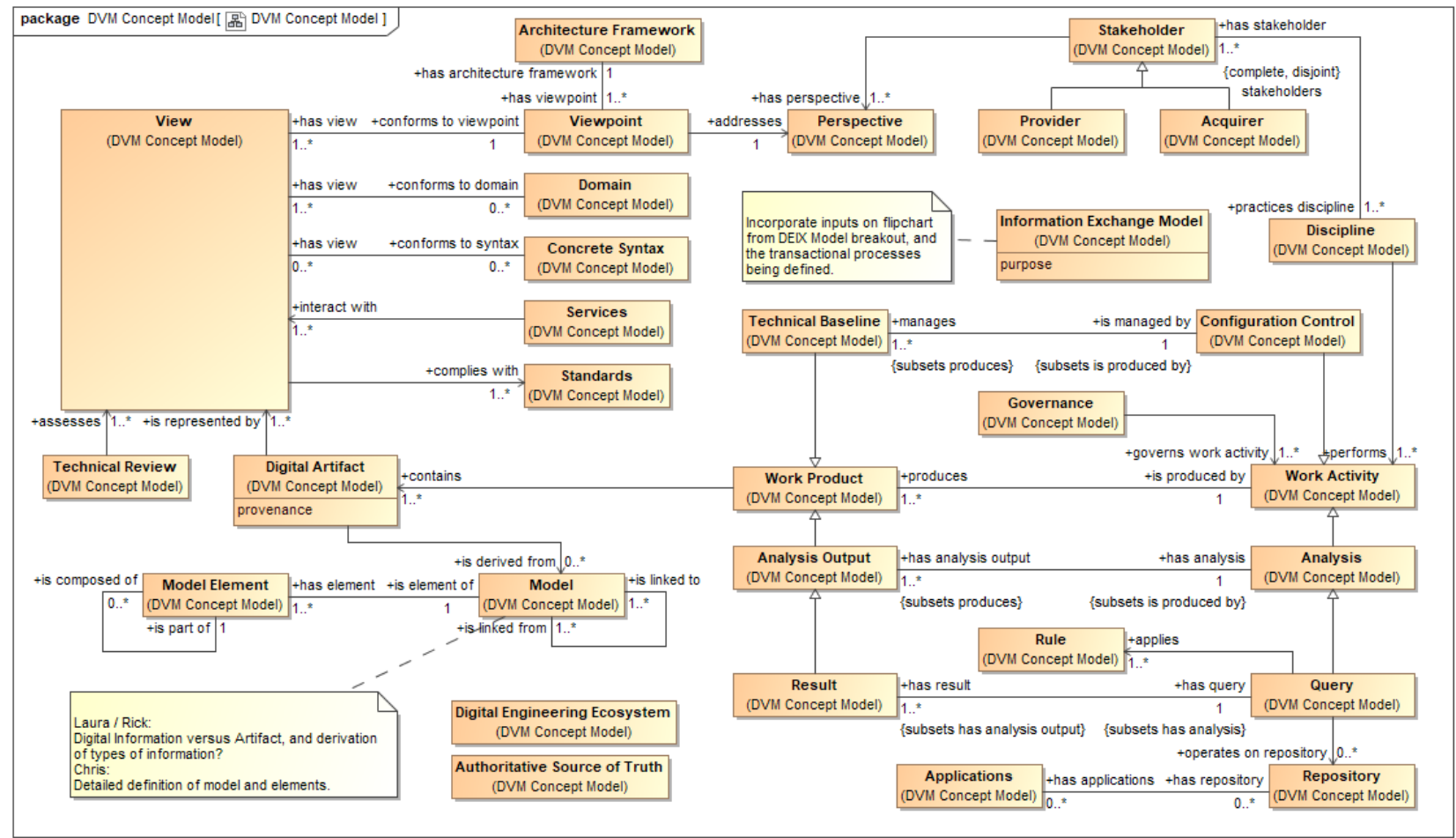


Notes on DEIX-SF scope



- Key focus is to identify key SE areas that need to be standardized to enable digital information exchange from acquirer and supplier
- The scope is on exchanging Systems Engineering work products, not the entire model base digital environment that includes other engineering disciplines.
- The scope is not about SE tool integration

Digital Viewpoint Model (DVM) Concept Model



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