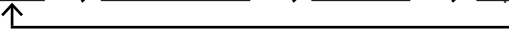


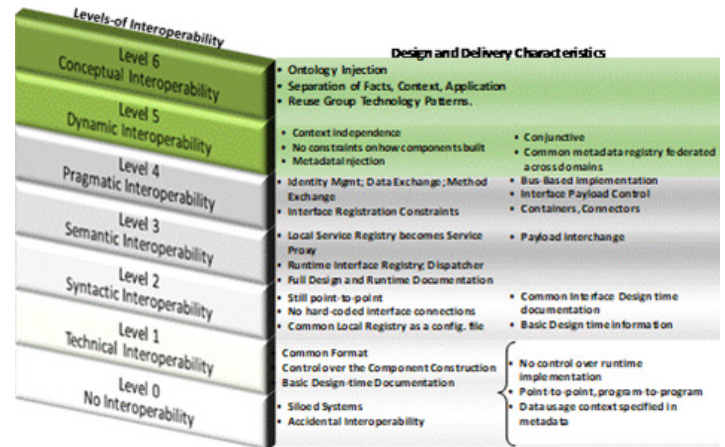
AUDIENCE:

Architects and Engineers. Responsible for the solution. Ease of design and delivery motivated. Want design patterns, principles, and existing software components. UML/SysML trained. Time reduction and Quality oriented. Viability of solution oriented. Testable. Continuous delivery of Model → Generate Code → Add Code → Import code preferred. Continuous delivery. Maintainability.



WHAT IS INTEROPERABILITY?

Interoperability is a feature of software and hardware components that enables assembly of different configurations of component within or across organizations so that different capabilities can be enabled. There is no single way of enabling interoperability, nor is there a single outcome that can be declared as “THE” interoperability solution. Interoperability can range from file sharing systems, like EDI (Electronic Data Interchange); to autonomously deployed components from different sources that discover each other during execution, like a SWARM of semi-autonomous but collaborating Unmanned Aerial Vehicles. This range of Interoperability capabilities is specified as *Levels of Interoperability* that include sets of *Design and Delivery Characteristics* that deliver resultant capabilities. Each *Level of Interoperability* builds-upon and adds-to characteristics and capabilities of the previous level. In the graphic on the right, Level 6 Interoperability builds-upon and adds-to the *Design and Delivery Characteristics* in Level 5; and Level 5 builds-upon and adds to Level 4; etc. The selection of an *interoperability level* is based upon alignment of requirements with desired capabilities and outcomes. this results in the architecture used, components included, and services delivered: sometimes simple file sharing Interoperability is perfectly acceptable.



How all this works is depicted and described on the next page. For example, in **Activity (3)** Select the Tolk et.al Interoperability Framework is specified and *Level 4 – Pragmatic Interoperability* is selected. This results in the selection of specific services in **(4) Specify**. Note that only some of the available services are needed. This reduces the amount of engineering to be performed and improves quality. Finally, activities (1) through (6) correspond to activities in a Project Plan of Interoperability MSProject “*template*” used for project plans for (1) reviewing existing systems or (2) delivery of a new system.

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VALUE PROPOSITION FOR ENGINEERS

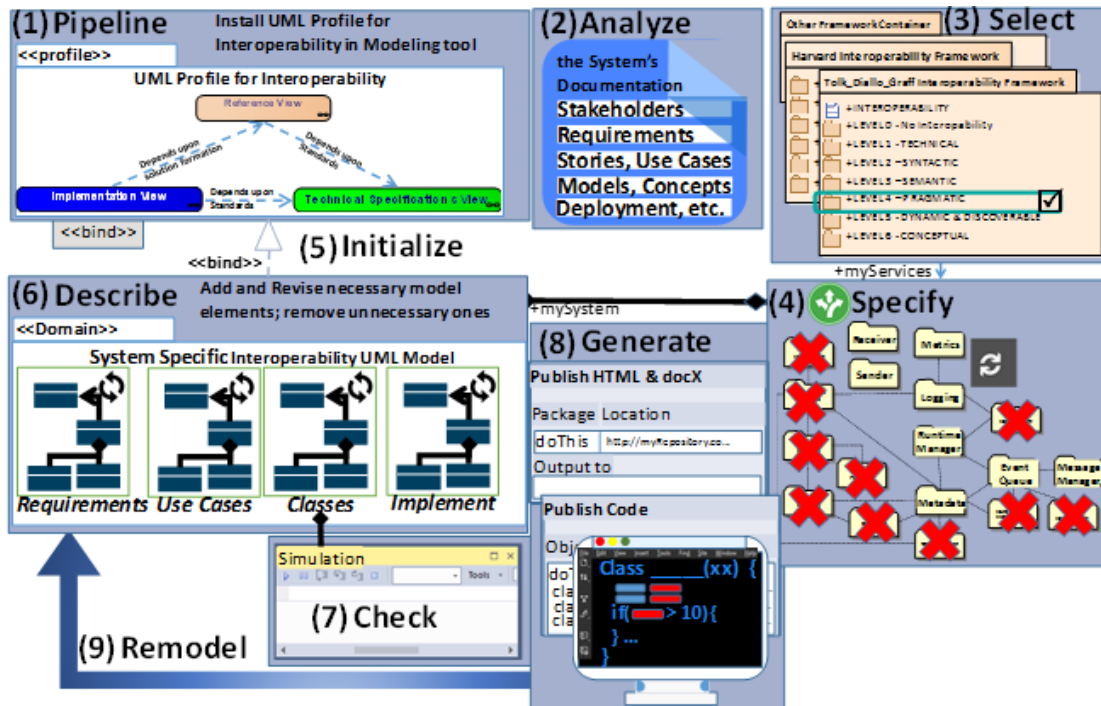
Value Proposition	How Addressed by Interoperability
Standardized, simplified SDL	UML Profile for Interoperability. Standardized Model based systems delivery process.
Reduce Risk	Better use case to outcome alignment; use pre-constructed, tested, reusable components.
Requirements to Delivery traceability	UML Profile for Interoperability contains built in trace of Requirement to Use Cases to Business Objects to UML Packages and Classes to Deployment components.
Quicker time to Delivery	Assemble and modify approach reduces time to delivery. Not Create-from-Scratch delivery. Not COTS compromise. Best of both.
Simple to use	Profile based; Standard Inheritance, includes, & overriding/overloading.; Code delivery.
Standards Organization support	Standards organization supported; able to support multiple Enterprise Architectures.
Common Engineering approach	Usage of UML and SysML for engineering improves access to labor as well as.
X-Platform Interoperability	Use the Interoperability Profile to generate code to multiple kinds-of environments.
X-Organizational Boundaries	Kinds-of Interoperability promote service usage and integration across organizational boundaries; Lego-block like solution formation from a software catalog.
Enables Security	Model-based threats and weakness, Security Patterns built in; Cyber Ecosystem friendly.
Surety of delivery	Testable, Model-checking, full simulation supported before code completion.

OTHER INTEROPERABILITY STAKEHOLDERS

Decision Makers. Managers and executives. Concerned with risk, cost, and ROI/ROA. Want to know how interoperability can support both strategic and tactical objectives. Generally, not concerned with technical details except that affordable and qualified personnel are readily available.

Project Managers. Usually PMBOK trained and PMP certified. Manages execution details and plans. Constrained by availability of personnel to participate and deliver interoperability. Driven to reduce risk and confirm validation and verification. Has overall responsibility for cost management of solutions.

ENGINEERED OUTPUTS BY PROJECT ACTIVITY



- (1) **Pipeline:** Create a Development or Review Existing System project in modeling tool. Collect required documentation (e.g., RFP, Responses, existing models, requirements, etc.).
- (2) **Analyze:** Outcomes, business objectives, users, success measures, and other attributes in the documentation. Identify missing info.
- (3) **Select:** Interoperability Framework and Interoperability level that is consistent and expressive of the analysis done in (2).
- (4) **Specify:** A detailed list of UML Profile packages are selected that detail the selected framework's interoperability level.
- (5) **Initialize:** Models, Elements, and Procedures and other relevant

- items from patterns for the selected UML Profile components.
- (6) **Describe:** Detailing. Model elements updated, removed, or added. Missing/Added/Updated model elements detailed delivery applied.
- (7) **Check:** Quality, Consistency, and Validation/Verification checks applied. Do (6) and (7) iteratively. Publish results as required by the review schedule.
- (8) **Generate:** Website; Documentation (e.g., Word document); and code for the system. Continue coding in the IDE of choice.
- (9) **Remodel:** Import code back into the model; remodel; recheck; revise the model. Do (6) and (7) iteratively then Regenerate.

WANT TO LEARN MORE?

Contact us at info@omg.org or go to uml.standardscoordination.org and click on 'Interoperability'.

ABOUT OMG

The Object Management Group is an international, open membership, not-for-profit computer industry standards consortium. OMG Task Forces develop enterprise integration standards for a wide range of technologies and an even wider range of industries. OMG's modeling standards enable powerful visual design, execution and maintenance of software and other processes. Visit www.omg.org for more information.



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