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Examining the Role of Context in Data Interoperability

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Abstract

Current approaches to achieving interoperability are primarily based on finding mismatches, by identifying the gaps and clashes between systems. While useful, this presentation argues that they alone are insufficient, and that a different approach—one focused on the intended context for the desired operational capabilities, in contrast to gaps, or clashes—is necessary. This would simplify the interoperability problem, and lead to greater flexibility in accommodating new and unanticipated requirements. This presentation describes how an understanding of context allows one to bound the scope of the interoperability problem to just those aspects that are critical to a particular mission thread. By elevating the mission thread to the same level of visibility as the constituent systems, we are able to clearly see the impact of context on interoperability. The presentation uses a simple mission thread (and representative systems) to illustrate these concepts, and shows how category theory (a branch of abstract mathematics) can be used to reason about interoperability in a specified context, as well as the impacts on interoperability of a change in context.

Biography

Jim Smith is a Senior Member of the Technical Staff at the Carnegie Mellon Software Engineering Institute. For the past several years, Jim was a member of the Research, Technology, and Systems Solutions Program, where he conducted research into system of systems interoperability and governance. Now, as part of the Acquisition Support Program, Jim works with different acquisition program offices to help transition SEI research into practice.

Jim has over 20 years of experience developing, acquiring, fielding, and using a variety of United States Department of Defense systems. He has authored numerous technical papers, reports, and conference presentations, and is a co-developer of the SEI System-of-Systems NavigatorSM process and the Interoperable Acquisition tutorials. Jim has a BS and MS in electrical engineering; he is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA), and is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM).