

EXPERIMENTAL INTEREST MANAGEMENT ARCHITECTURE FOR DCEE

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The Distributed Continuous Experimentation Environment (DCEE) is a permanent simulation system and facility that is being designed and assembled by the US Joint Forces Command (USJFCOM) to provide a capability to do simulation-backed experimentation without incurring heavy integration and ramp-up costs. Among the several thrusts of the DCEE system is the capability to do large-scale human-in-the-loop experiments in the spirit of the Millennium Challenge 2002 experiment, as well as very detailed representations of joint urban operations scenarios. Additionally, the DCEE system will be used in support of a number of smaller-scale experiments and training events, such as Limited Objective and Multinational Experiments.

In order to provide a system that can scale to a richer and more expansive world, we need to increase the computational power available to produce the environment. However, this leads to a classical problem of parallel computation, where the communications requirements of the system become the bottleneck, and additional computation adds no additional capacity to the system.

This paper describes the architecture that we have prototyped to address some of the problems of data communications scalability. It discusses the interest management techniques that have been used in the past, and how those experiences influenced the prototype design. It talks about the technology that provides finer resolution interest management than simulations have had in the past while allowing better scalability. It explains the limitations of the prototype system and discusses some possible approaches to addressing them. Finally, it describes some likely future requirements of the DCEE system, and talks about how the architecture would have to change in response.

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