

IEEE Standard for Distributed Interactive Simulation—Communication Services and Profiles

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Abstract: Communication services to support information exchange between simulation applications participating in the Distributed Interactive Simulation (DIS) environment are defined. These communication services describe a connectionless information transfer that supports real-time, as well as non-real-time, exchange. Several communication profiles specifying communication services are provided.

Keywords: communication service, Distributed Interactive Simulation, simulation network, protocol data units (PDUs), multicast

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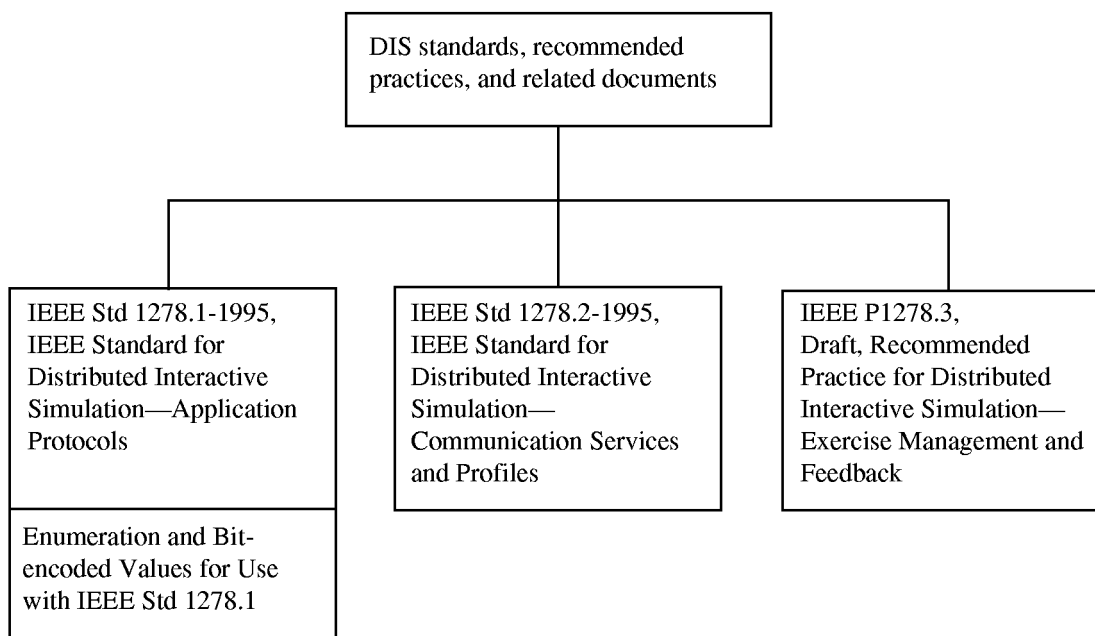
Introduction

(This introduction is not part of IEEE Std 1278.2-1995. IEEE Standard for Distributed Interactive Simulation—Communication Services and Profiles.)

Distributed Interactive Simulation (DIS) is a government/industry initiative to define an infrastructure for linking simulations of various types at multiple locations to create realistic, complex, virtual worlds for the simulation of highly interactive activities. This infrastructure brings together systems built for separate purposes, technologies from different eras, products from various vendors, and platforms from various services, and permits them to interoperate. DIS exercises are intended to support a mixture of virtual entities with computer-controlled behavior (computer generated forces), virtual entities with live operators (human in-the-loop simulators), live entities (operational platforms and test and evaluation systems), and constructive entities (wargames and other automated simulations). DIS draws heavily on experience derived from the Simulator Networking (SIMNET) program developed by the Advanced Research Projects Agency (ARPA), adopting many of SIMNET's basic concepts and heeding lessons learned.

In order for DIS to take advantage of currently installed and future simulations developed by different organizations, a means had to be found for assuring interoperability between dissimilar simulations. These means were developed in the form of industry consensus standards. The open forum (including government, industry, and academia) chosen for developing these standards was a series of semi-annual Workshops on Standards for the Interoperability of Distributed Simulations that began in 1989. The results of the workshops have been several IEEE standards. These standards provide application protocol and communication service standards to support DIS interoperability. In addition, IEEE P1278.3, Draft, Recommended Practice for Distributed Interactive Simulation—Exercise Management and Feedback, provides user guidelines for setting up and conducting a DIS exercise.

The relationship between the component documents comprising the set of IEEE DIS documents is shown in the figure below. Used together, these standards and the recommended practice will help to ensure an interoperable simulated environment.



The interoperability components addressed by these standards and the recommended practice are:

- a) Application protocols
- b) Communications
- c) Exercise management and feedback

IEEE Std 1278.1-1995 defines the format and semantics of data messages, also known as Protocol Data Units (PDUs), that are exchanged between simulation applications and simulation management. The PDUs provide information concerning simulated entity states, the type of entity interactions that take place in a DIS exercise, and data for management and control of a DIS exercise. IEEE Std 1278.1-1995 also specifies the communication services to be used with each of the PDUs. These services are defined in IEEE Std 1278.2-1995 .

An additional, non-IEEE document is required for use with IEEE Std 1278.1-1995. This document is entitled *Enumeration and Bit-encoded Values for use with IEEE Std 1278.1*, and is available from the Tactical Warfare Simulation and Technology Information Analysis Center at the Institute for Simulation and Training of the University of Central Florida.

IEEE Std 1278.2-1995 defines the communication services required to support the message exchange described in IEEE Std 1278.1-1995. In addition, IEEE Std 1278.2-1995 provides several communication profiles that meet the specified communications requirements.

Together IEEE Std 1278.1-1995 and IEEE Std 1278.2-1995 provide the necessary information exchange for the communications element of DIS.

IEEE P1278.3, Draft, Recommended Practice for Distributed Interactive Simulation—Exercise Management and Feedback provides guidelines for establishing a DIS exercise, managing the exercise, and providing proper feedback. This recommended practice is used in conjunction with IEEE Std 1278.1-1995 and IEEE Std 1278.2-1995.

Revisions are anticipated to each of these standards and the recommended practice within the next few years to clarify existing material, to correct possible errors, and to incorporate new material. Future versions of these documents will contain information concerning additional interoperability components that are currently in the process of being defined.

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