Simulation and Test

Return to Applications

There is an increasing demand to make Modeling & Simulation and Test environments more realistic and sophisticated. data_distribution_service_dds provides the high throughput, low latency, real-time data connectivity that is needed to support an increasingly varied and wide range of complex scenarios. DDS enables reusability and interoperability between models and simulators in Live Virtual Constructive simulation.

Create a Case Study **WWW WWW...** (e.g., My NASA Project) →

Hardware-in-the-Loop (HWIL)

Return to Applications

- ☐ **[nick]Please Review**

Hardware-in-the-loop (HWIL) simulation is a type of real-time simulation. You use HWIL simulation to test your controller design. HWIL simulation shows how your controller responds, in real time, to realistic virtual stimuli. In HWIL simulation, you use a real-time computer as a virtual representation of your plant model and a real version of your controller.

Figure 1: The figure shows a typical HWIL simulation setup.

Teledyne, Brown Engineering

Return to Applications

Hardware-in-the-loop (HWIL) Modeling and Simulation Framework for Missile Defense Applications data_distribution_service_dds is providing reliable, highly scalable, real-time data sharing for the U.S. Department of Defense (DoD) mda osf which is being developed by Teledyne Brown Engineering.

Source: Broken Link

Audi

Return to Applications

Your car is probably the most compute-intensive thing that you own. It will have at least 40-50 Electronic Control Units (ECUs) for a recent economy vehicle and well over 100 for a top of the range car. In the past, each of these ECUs had one dedicated function to perform. This evolved over time and most of the ECUs now perform more than only one single function or group of functions. Despite this evolution of ECU use, there is still an increasing need to reduce the number of ECUs and the cabling between them with the ultimate aim of increasing fuel economy and reducing CO2 emission,

whilst providing the customer even greater functionality in the car. These additional demands are being met by a shift towards functional integration and communication between ECUs and between the car and its environment. This is one of many more reasons why the future of automotive test is becoming distributed and interconnected. Furthermore our test systems have to evolve as fast as the car functionality to encompass this change. To address these challenges Audi founded a pre-development department for test systems, which currently develops a real-time capable bus system based on rti DDS for the future test systems.

Source: RTI: The Future of Automotive

Training and Simulation

Return to Applications

The aim of simulation is to produce and control animated images, sound reproduction, and device feedback in a manner as realistic and responsive as the real world, and chasing this ideal has constantly pushed the industry forward in many different ways. Individual simulators have adopted techniques such as multi-processor systems, high performance graphics cards and distributed sensors and actuators to approach the desired objective.

Source: Simulator design using open standards

Simulation Technologies

Return to Applications

NASA

Return to Applications

NASA is developing the concepts related to holodeck simulation systems using today’s technologies and is investigating the benefits that it could provide to tele-presence, mission planning, and training activities. As part of the project, NASA required a DDS middleware solution that allowed real-time, scalable and robust information exchange between different parts of the system.

Source: RTI: Modular Open Systems Approach for Affordability

Korean Combat Training Center

Return to Applications

Simulation settings require real time data distribution, communication, and analysis. CoreDX DDS provides all this and more:

Dynamic Discovery

> Adding new systems is easy with CoreDX DDS. CoreDX DDS Dynamic Types allows the run time creation and determination of data_distribution_service_dds topics and data types. This technology eases integration challenges, enables flexible bridging between disparate systems, and reduces static memory usage.

Low latency

> DDS provides exceptionally low latency and sustained high throughput numbers across all supported hardware architectures.

High Reliability

> Systems that use DDS to communicate can do so independent of a server or service, and independently of each other. They do not rely on each other's systems to send and process information. A publisher can still publish information even if there is no subscriber seeking the information, or if a subscriber becomes "lost" for any reason. A subscriber can search for other publishers if the publisher it is getting information from fails or is lost.

Source: Twin Oaks COmputing: Simulation

Test and Measurement

Return to Applications

Test and Measurement focuses on dedicated equipment for analysis, validation, and verification of electronic device measurement, mechanical systems, and end products. As complexity of measurement tasks increases, providers are required to develop innovative products with higher accuracy and resolution and flexible system expandability to keep up with technological progress.

Common Test and Measurement Applications: * Aerospace and Defense * Automotive Electronics * Electronic Function * Radar and Broadband Signal Capture * Research and Development

Benchtop instruments are conventionally employed in the test and measurement industry. Modular instrumentation (PXI platform, Digitizers/Oscilloscope), as an open architecture can, however, provide enormous benefits of compact footprint, high density, high throughput, and flexibility, enabling configuration of design verification systems based on different testing requirements. For long-term investment, the PXI platform simplifies upgrades and conserves long-term cost of ownership, easily satisfying challenges in the field.

High System Throughput The PXI PC-based solution provides advantages of the latest high performance processors, reducing post-processing time. The PXIe backplane bus utilizes the PC industry's PCI Express® Gen2 technology, greatly increasing throughput and reducing latency. This technology helps transfer data between modules and controller at higher speeds, reducing test time especially for data and transaction intensive test applications.

Flexibility and Scalability PXI is an open standard defined by the PXI Systems Alliance, ensuring that modules from different vendors can be used together. In addition, by integrating the bus into the backplane of the chassis, it is possible to continuously scale systems, with PXI trigger & synchronization function, enabling simultaneous precision multi-channel sampling.

Smaller Footprint Aside from taking advantage of Moore's Law of integration and miniaturization, removal of redundant functions in an integrated system takes precedence. PXI removes redundancy and can save up to 80% of the space of traditional systems, expanding flexibility of function and minimizing upgrade complexity and cost.

Source: Adlink: Test And Measurement

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