GE
Intelligent Platforms

AXIS

advanced integrated multiprocessor software

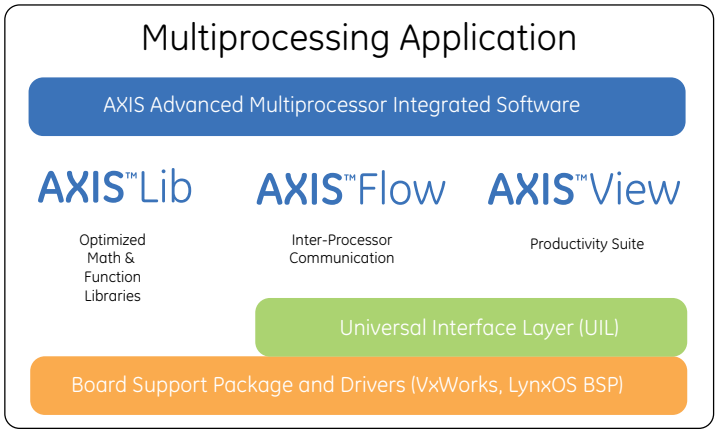
imagination at work

AXIS Software Development Tools for Application Engineers.

AXIS is a full suite of integrated software development tools. It is designed to simplify the process of creating DSP applications based on multiprocessor platforms.

AXIS gives developers the tools they need to be more productive, and largely frees them from the complexities of the underlying hardware architecture.

AXIS tools allow engineers to focus attention on the area where they are domain experts—the application. After all, the time and energy they spend dealing with low-level platform details only slows the development process.



AXIS fills a critical need, because although traditional real-time operating system tool-chains do contain some productivity elements (IDE for instance), there is still a gap between these tools and the application domain. This gap is bridged by AXIS middleware from GE Intelligent Platforms.

AXIS-Advanced Multiprocessor Integrated Software

The AXIS software architecture consists of three integrated elements:

AXIS™Flow
Interprocessor Communications

AXIS™View
Multiprocessor Productivity Tools

AXIS™Lib
DSP Libraries

Although they are individual toolsets, they are designed to work together as a single environment. Together, they can cut the time needed to map the application to the system, run it, test performance, and then remap until the desired result is achieved.

Declare Independence from your Hardware and Operating System

In addition to simplifying application development, AXIS creates a layer of abstraction between the application and the hardware and operating system. This independence offers the added benefits of portability and scalability.

Performance

High throughput, low latency, reconfigurable communications; able to scale and adapt to support the most demanding of data intensive applications. Optimized libraries delivering the maximum performance for the specific application.

Portability

AXIS is processor and OS independent, and supports industry standards. This allows for the creation of applications which can more easily be moved from current hardware to future platforms. For applications with long life cycles, this portability provides an invaluable sense of flexibility and peace of mind.

Scalability

AXIS is specifically designed to simplify the task of moving an application from the development units to production units, and then to deployment. Of equal importance, AXIS offers the developer the ability to reconfigure or scale the system, depending on the application needs, by adding or subtracting processing elements as needed. This scalability brings with it the knowledge that changing hardware and changing application needs will not result in extra development and rework time.

Simplicity

The AXIS development environment ensures ease of use while hiding the complexities of the underlying hardware architecture. System visualization increases productivity and performance, and positionless communications provides consistency between tasks, processors, boards and systems.

AXISView: Multiprocessor Productivity Tools.

AXISView is a suite of graphical software tools that aids the developer of sophisticated multiprocessor applications by making the process of analysis and implementation of algorithms and data flow as convenient as possible.

AXIS ADVANCED INTEGRATED MULTIPROCESSOR SOFTWARE

ConsoleView

ConsoleView allows the developer to manage multiple console windows from a single AXIS window. Commands can be directed to individual nodes or groups of nodes via a simple user interface.

HardwareView

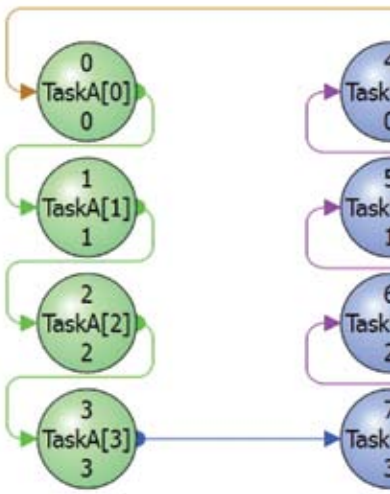
HardwareView provides a unique capability that enables the developer to visualize the multiprocessor system, examine its configuration and monitor sensors.

ApplicationView

ApplicationView allows the developer to build an application in terms of tasks, and AXISFlow communications channels between those tasks, and to view a graphical representation of this. The communication configuration code and application template are automatically generated. AXISView allows the application to be easily rescaled for different hardware configurations, and to be redistributed among the processors for load balancing of the application.

RuntimeView

RuntimeView then allows the application to be monitored. The load on system resources (such as CPU usage and communication channel bandwidth) is displayed. This allows the developer to easily identify performance bottlenecks.



ApplicationView allows developers to vi

EventView

The application can be instrumented and monitored in EventView to identify and diagnose bugs, as well as to evaluate its real-time performance and find any discrepancies in timing across the multiprocessor system.

HealthView

Results from GE's BIT (Built-In Test) software can be displayed and the BIT configuration changed via the GUI.

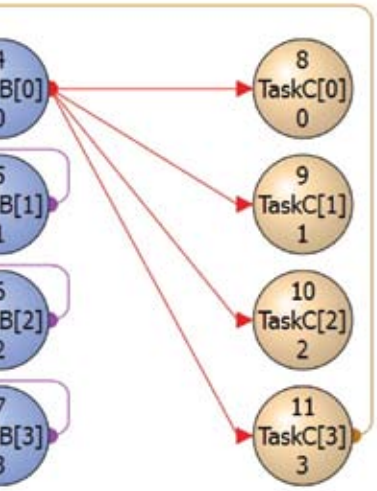
AXISRun

AXISRun is used to streamline the process of loading and running an application across multiple nodes, making the development cycle as easy as possible.

Performance Optimized Interprocessor Communications

AXISFlow

AXISFlow is an interprocessor communications software module, offering high throughput, low latency, reconfigurable interconnects that facilitate data transport between tasks, processors, boards, and systems. Processing elements can be integrated for seamless scalability to meet the requirements of the most demanding applications. AXISFlow is processor, RTOS, and fabric independent, ensuring future flexibility. It can operate in standalone mode or as an integrated element within AXIS Advanced Multiprocessor Integrated Software environment.



sualize complex Mappings and Channels.

Optimized High Performance Libraries

AXISLib-RSPL - Performance Optimized Signal Processing Library

AXISLIB DSP, math and function libraries are available for a range of CPU architectures including INTEL, NVIDIA and PowerPC processors. These software modules are designed to accelerate the development of complex, real-time, sensor processing algorithms by providing hundreds of optimized run-time libraries tuned for maximum performance. AXISLib DSP functions can be optimized to meet or exceed the most demanding performance benchmarks to address expanded mission profiles for the deployed system. AXIS software enables system integrators to demonstrate increased capability to the end user minimizing risk and time to deployment.

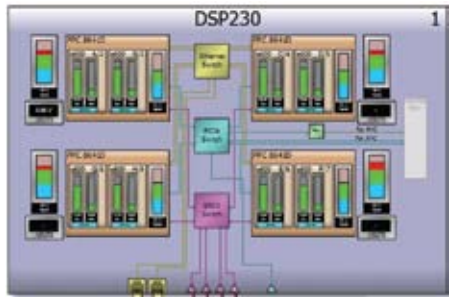
Shortened development cycles enable our customers to deliver better performance and increased flexibility to counter and neutralize evolving threat landscapes as they emerge.

AXISLib modules are available with standard VSIPL and RSPL APIs in order to maximize application portability and performance. AXISLib-VSIPL libraries are available for the latest INTEL with SSE3 and SSE4, NVIDIA CUDA / OpenCL enabled platforms as well as PowerPC e600 Altivec architectures to support the widest range of requirements for SwaP (Size, weight and power) optimized, rugged systems. The GE RSPL API is hand crafted for efficient, low overhead execution of the DSP and math function libraries while the VSIPL wrapper supports the industry standard core 1.0 profile for increased portability.

These AXIS software modules give the application developer the ability to produce real-time code quickly without having to master the complexities of the underlying hardware. AXISLib is supplied under a standard software maintenance agreement providing updates and support with separate licenses for the deployed run-times. These modules can run stand alone in the customer application or they can be called as part of the AXIS Quick Start frame work which accelerates application development by providing example applications and leveraging the AXISFlow interprocessor communication middleware via PCIe, Serial RapidIO and Ethernet switched fabrics providing any node to any node data and system scaling across multiple processor payload boards.

AXISLib-VSIPL - Performance Optimized Vector Signal Image Processing Library

This is a high performance software module, compliant with the VSIPL Core



HardwareView depiction of GE's DSP230.

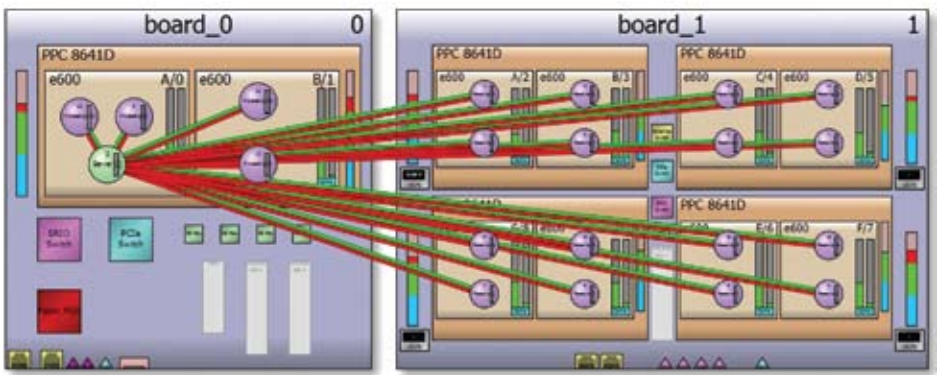
1.0 profile, implementing over 512 Vector, Signal and Image Processing functions.

Designed to operate in a standalone mode, or as an integral software module within the AXIS environment. The library is highly optimized with hand-coded algorithms for all AltiVec processors, taking maximum advantage of the processor pipeline and SIMD architecture of the AltiVec vector processing unit.

This gives application developers the ability to quickly produce real-time code with minimal knowledge of the underlying processor architecture.

AXISLib-CL - Signal and Vector Processing Library

AXISLib-CL provides a generic implementation of the RSPL and VSIPL libraries. It runs on a range of processors including those from Freescale and Intel®. This allows users to easily move applications to the latest CPU architectures to achieve the new levels of performance required to meet the challenges of expanding operational demands. Because it provides application portability between platforms and consistency across data types, processors and operating systems, engineering development is accelerated and new technology insertion made easier.



RuntimeView allows visualization of real-time applications.

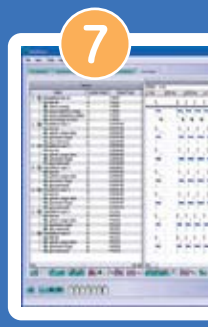
AXIS

AXIS is a modular architecture that puts control in the engineer's hands. It can cut development time, reduce project costs and shorten time to market. It offers benefits that reach from the initial stages of system design all the way through hardware and software changes at the later stages of the application life cycle.

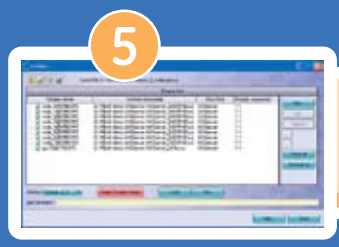
Don't just imagine – see for yourself, try the AXIS demo at:
http://www.ge-ip.com/axisdemo

Download AXISLite Free

Obtain AXISLite, a free limited-functionality download, at:
http://www.ge-ip.com/axisdemo



EventView

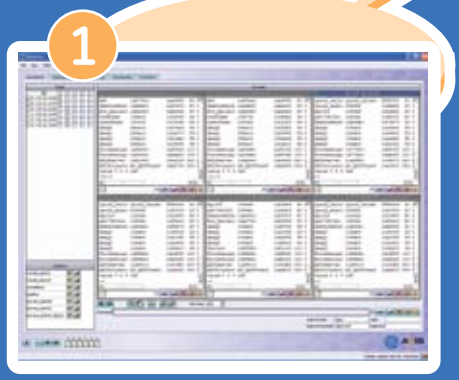


AXISRun

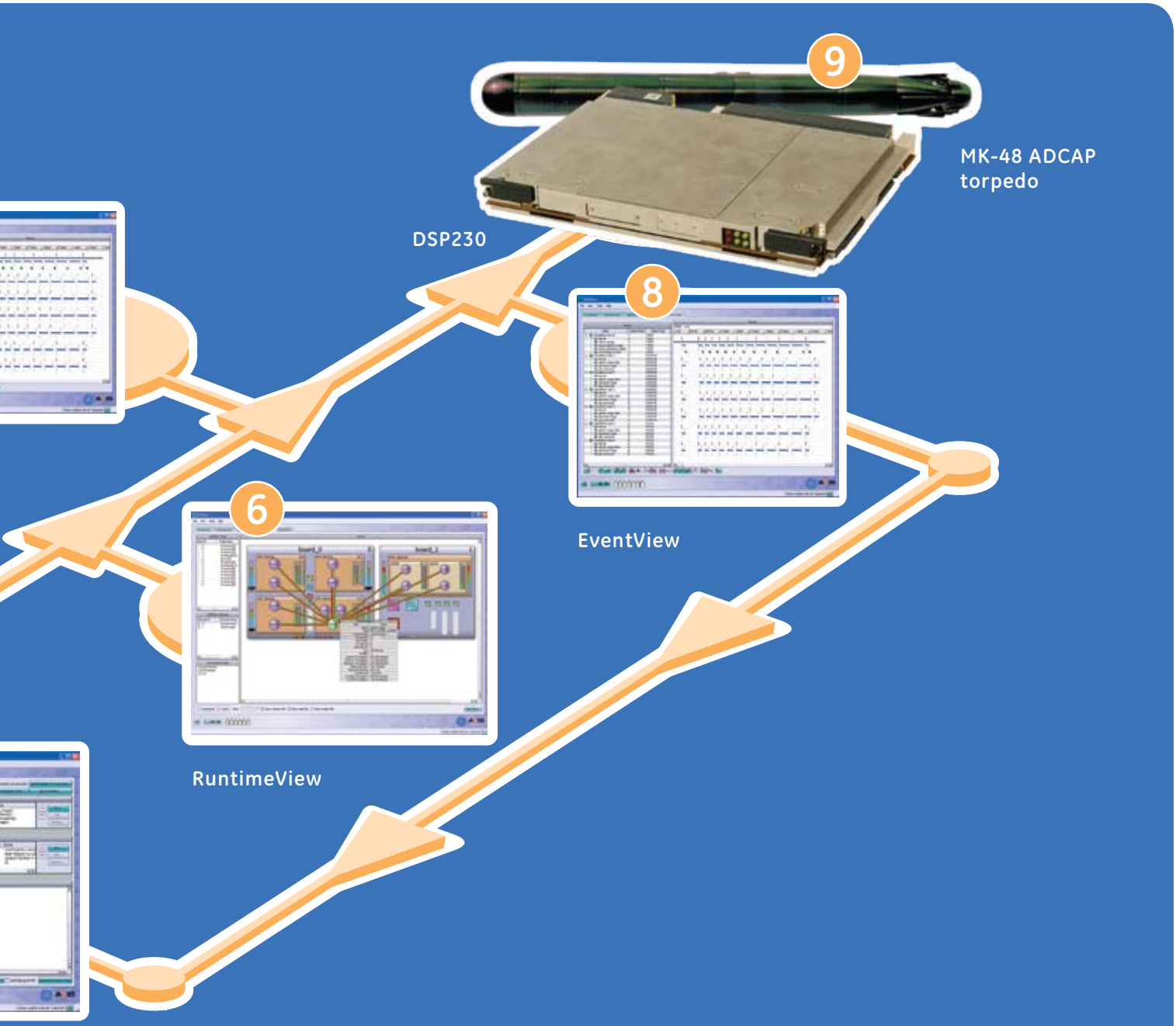
AXISLib-RSPL, VSIPL
and CL Libraries

ApplicationView

HardwareView



ConsoleView



1 **Initialize the system**
Quickly configure all nodes in the system

2 **Check system configuration**
Automate system configuration validation

3 **Maximize algorithm performance**
Identify opportunities for improvement

4 **Map application to system**
Place tasks for best performance

5 **Run the application**
Download and run on multiple nodes with two clicks

6 **Determine bottlenecks**
Locate and resolve bottlenecks in data flow and task performance

7 **Measure real-time performance**
Profile runtime data across entire system

8 **Rescale the application**
Move the application to larger or smaller systems

9 **Migrate to a new system**
Reduce future life cycle support issues

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