Goals of the IVI Foundation

Hardware Interchangeability

- To simplify the task of replacing an instrument from a system with a similar instrument
- To preserve test software when instruments become obsolete
- To simplify test code reuse from design validation to production test

Quality

- To improve driver quality
- To establish guidelines for driver testing and verification

Software Interoperability

- To provide an architectural framework that allows users to easily integrate software from multiple vendors
- To provide standard access to driver capabilities such as range checking and state caching
- To simulate instruments and develop test system software when instruments are not physically available
- To provide consistent instrument control in popular programming environments

DC Power Supply Digital Multi Meter Function Generator/Arb Oscilloscope

Membership Benefits

- Influence the development of instrument class standards
- Participate in and access future architectural standards
- Share ideas with developers, users, system integrators and vendors
- Access source code for shared components
- Participate in interoperability sessions
- Network with test and measurement industry leaders

For more information, contact:

Bob Helsel, Director of Services
PO Box 1016
Niwot, CO 80544-1016

Phone: 303-652-2585
Fax: 303-652-1444
Email: bob.helsel@ivifoundation.org
Web: www.ivifoundation.org

The IVI Foundation was formed in 1998 and officially incorporated in 2001. Its membership includes end-users, instrument vendors, software vendors, system suppliers, and system integrators, who are dedicated to promoting standard specifications for programming instruments to help users building high performance test systems.

IVI™ Foundation

Power Meter RF Signal Generator Spectrum Analyzer Switch

A consortium founded to promote specifications for programming test instruments that simplify interchangeability, provide better performance, and reduce the cost of program development and maintenance.

In today's world, two factors hinder efficient test system setup and support: 1) the high cost of developing and maintaining test system software and, 2) rapidly evolving technology. The IVI Foundation addresses these needs through new driver technology:

- IVI drivers define a new level of quality, completeness, usability, and functionality that reduces the cost of test system development and ownership.
- IVI drivers simplify upgrading or replacing components in complex test systems intended to be used over a long period of time;

IVI Driver Architecture

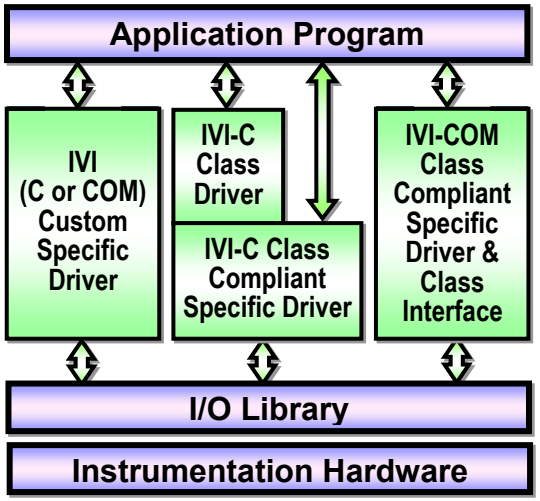
IVI drivers provide many *inherent capabilities* that go beyond those of traditional instrument drivers. The IVI specifications have been developed to enable drivers with a consistent and high standard of quality, usability, and completeness. The specifications define advanced features such as instrument simulation, state caching, automatic range checking, and multithread safety. In addition, IVI Foundation members have cooperated to provide common software components that ensure multi-vendor system compatibility. *IVI custom specific drivers* support only these inherent capabilities and *instrument specific capabilities* that are not standardized upon by the foundation and that are unique to a particular instrument.

In addition to these inherent capabilities, IVI drivers can comply with an instrument class specification to support the foundation's goal of instrument interchangeability. These drivers include:

- *Base class capabilities* common to most instruments in a class (e.g., edge-triggered acquisition on a scope);
- *Class extension capabilities* that represent more specialized features of an instrument class (e.g., TV or width trigger on a scope).

IVI class-compliant specific drivers contain inherent capabilities, base class capabilities, as well as class extension capabilities that the instrument supports.

To achieve interchangeability, users program to an *IVI class interface* available through an IVI class-compliant specific driver or a separate *IVI class driver*.



To support all popular programming languages and development environments, IVI drivers provide either a C or a COM API. Driver developers may provide both interfaces as well as interfaces optimized for specific development environments.

All IVI drivers communicate to the instrumentation hardware through an I/O Library. The VISA library is used for the GPIB and VXI buses, while other buses can either utilize VISA or another library.

Future work includes Measurement and Stimulus Subsystems and Signal Interfaces to provide interchangeability in more specialized and complex situations where the current architecture is insufficient. Additional efforts are underway to pursue the use of IVI drivers in Microsoft .NET environments.

IVI Class Specifications

To enable interchangeability, the foundation creates IVI class specifications that define the base class capabilities and class extension capabilities for some of the most popular instrument classes. There are thirteen instrument classes defined:

- Digital multimeter (DMM)
- Oscilloscope
- Arbitrary waveform/function generator
- DC power supply
- AC power supply
- Switch
- Power meter
- Spectrum analyzer
- RF signal generator
- Upconverter
- Downconverter
- Digitizer
- Counter/timer

Future work includes defining additional class specifications and extending the scope of current specifications to cover more instrument functionality.

IVI Conformance

IVI drivers that conform to and are documented according to the IVI specifications may display the IVI conformance logo for easy identification.