

MVL-supported Virtual Instrument Specifications

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DESY

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Objectives

- Visualization and control of T&M-specific functions from a remote site and mastered by the MVL framework
- Integration of the T&M-specific data-flow into the MVL framework (optionally)

Virtual Instruments: Use Cases

Analog / Digital I/O

T&M Instrument

(With/without integrated PC Operating System)

(Vendor-specific) Application Software

VNC Server / Web Server

Virtual Instruments: Use Cases

Analog / Digital I/O

T&M Instrument

Data Bus Interface (e.g. GPIB, RS232, TCP/IP)

External Data Bus Link

(Generic) Instrument Driver Software

Instrument-specific Application for Instrument Control and Data
Visualization / Data Integration

VNC / Web Server

User Survey: User Activities

Virtual-instrument specific **user activities**:

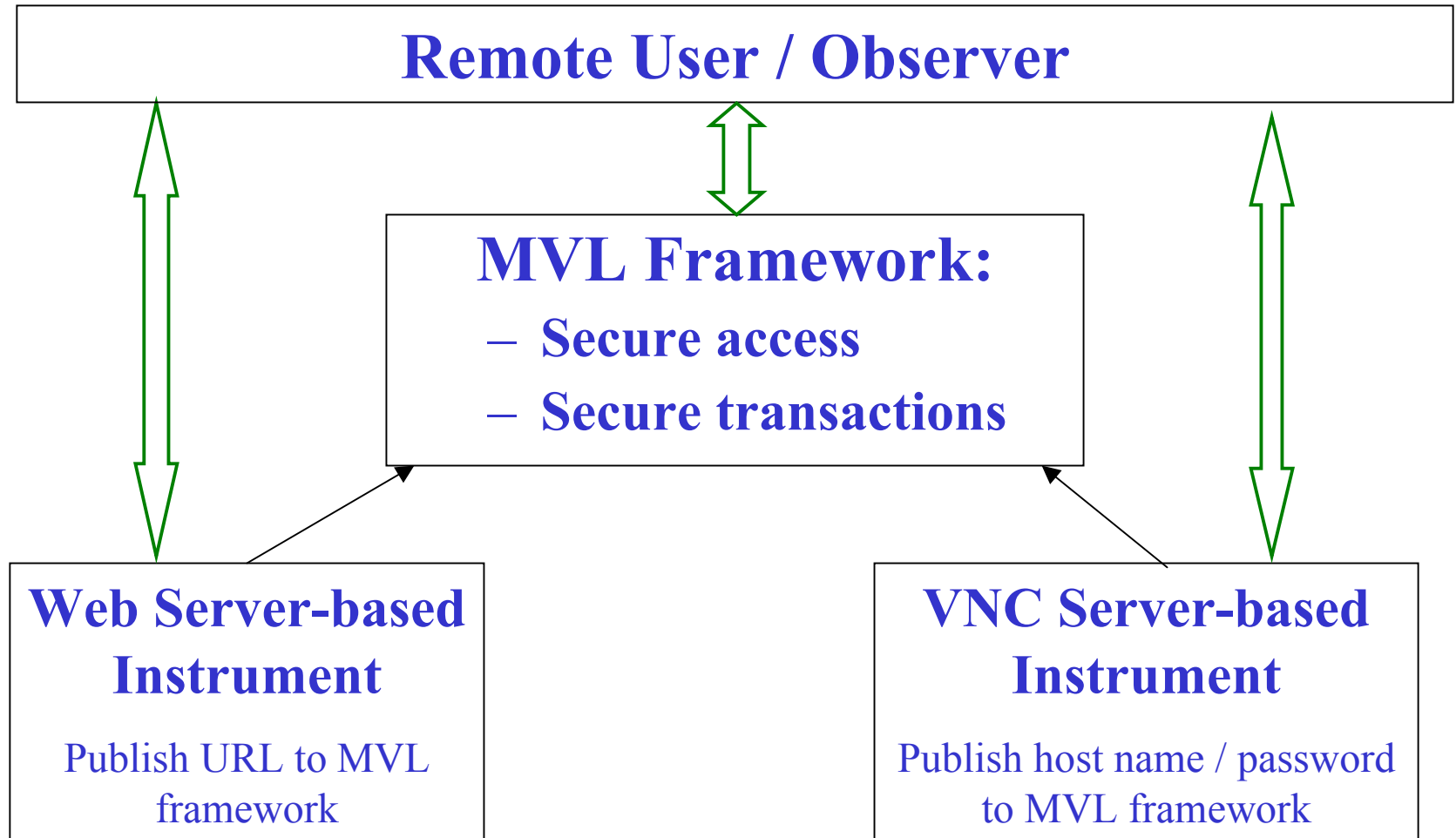
1. Expert-supervised component commissioning and troubleshooting (✓ ✓)
2. Teamwork-based component tuning and optimization (✓ ✓)
3. Expert-assisted repair (✓ ✓)

User Survey: User Specifications

Virtual-Instrument specific **user specifications**:

1. Mobile set-up, easy to use, start-up and run (✓ ✓)
2. Common data, desktop and information sharing (✓ ✓)
3. Web-based instrument access and control (✓ ✓)
4. Secure user authentication and authorization, transparent transaction control (? ?) ⇒ **MVL framework**

Secure Instrument Integration



Generic Instruments: IVI Standard

Avoid:

Bus-specific data bus driver

Vendor-specific instrument driver

Industry standard for generic instrument drivers:

Interchangeable Virtual Instrument (IVI)

Foundation, 1998

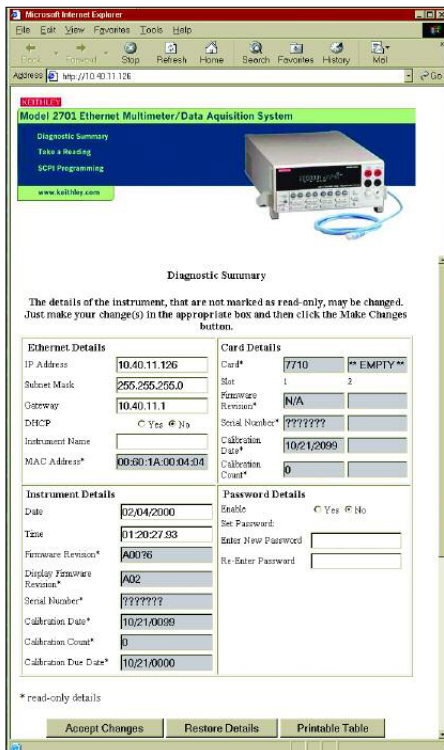
> 100 supported instruments and/or instrument families

Generic Instruments: Test Device

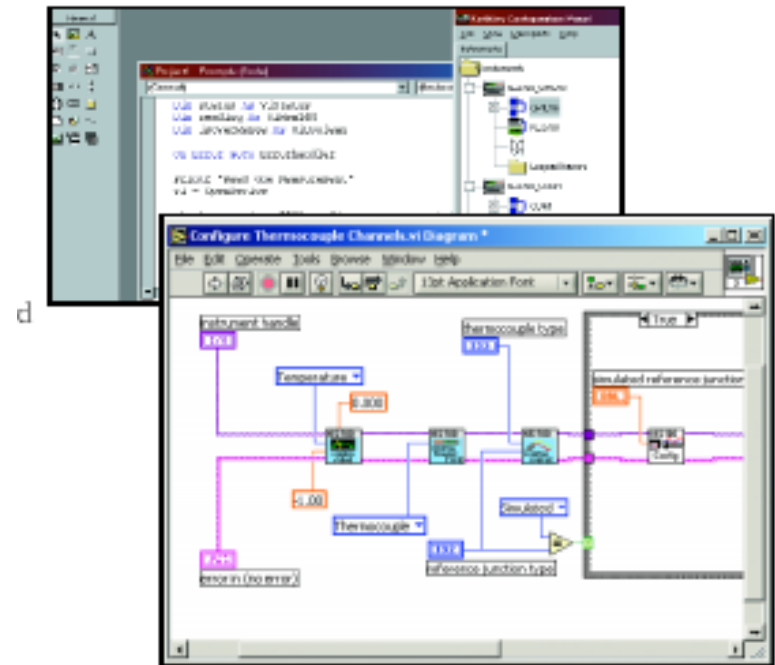
Test device: Digital Multi Meter with input switching



Generic Instruments: Test Software



DMM IVI Driver



Web Diagnostic Tool

Generic Instruments: IVI Classes

IVI Instrument Classes	Commissioning, Trouble-shouting	Tuning, Optimization	Repair
Oscilloscope	√	√	√
Digital Multi Meter	√	√	√
Spectrum Analyzer	√	√	√
Digital I/O Switch	√	√	-
Power Meter	-	√	-
Function Generator	-	-	√
Signal Generator	-	-	√
Power Supply	-	-	√

MVL-supported VI: Proposal

- Oscilloscope
- Spectrum Analyzer
- Digital Multi Meter
- Digital I/O Switch

Functions and attributes to be implemented ?

VI: Oscilloscope

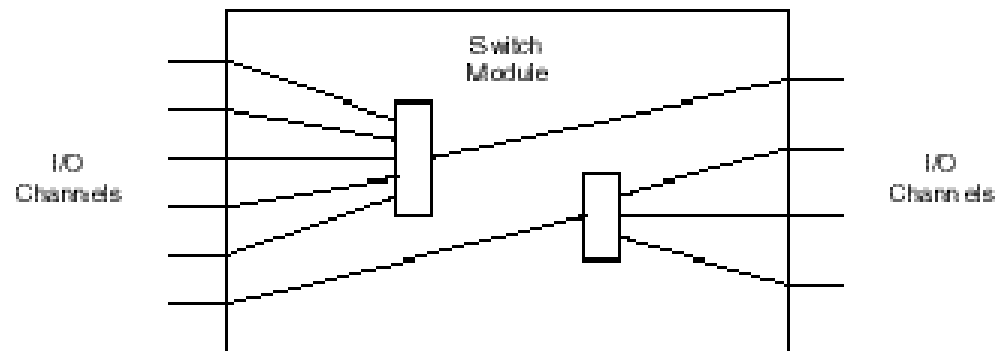
- Configuring for a typical waveform acquisition (setting the channel, the acquisition mode and the triggering conditions, ...)
- Initiating the waveform acquisition
- Returning a waveform
- What else? Waveform measurements?

VI: Digital Multi Meter

- Configuring for a typical measurement (setting the measurement function, desired range, desired resolution, trigger source)
- Initiating the measurement
- Returning a measured value
- What else? Multiple input / multiple trigger functionalities?

VI: Digital I/O Switch

- Creating and destroying paths on a typical switch module



- What else? Trigger / timer functionalities?

VI: Spectrum Analyzer

- Configuring for a typical sweep
- Initiating a sweep
- Returning an array of measured values
- What else? Marker functionality?

To Do: VI Integration

Deliverables:

- Finalizing the conceptual design of virtual instrument integration based on
 - VNC / Web Server
 - MVL-integrated single-sign-on user access

Milestone(s):

- 31.10.05

To Do: IVI-based VI

Deliverables:

- Getting familiar with the IVI approach and the test instrument
- Defining a list of MVL-supported generic virtual instruments based on IVI class-compliant drivers
- Defining a list of supported instrument-specific functions and attributes

Milestone(s):

- 31.10.05

To Do: IVI-based VI

Deliverables:

- Implementation (LabView) of virtual instruments
- Integration of virtual instruments into the MVL framework

Milestone(s):

- 1. Step: 30.5.06
- 2. Step: 30.5.07