REMBRANDT – The Remote Beam Instrumentation and Network Diagnosis Tool

T. Hoffmann, H. Bräuning
GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany

Abstract

Beam instrumentation devices and associated data acquisition components for the coming FAIR accelerators will be distributed over a large area and partially installed in inaccessible radiation exposed areas. Besides operation of the device itself, like acquisition of data, it is mandatory to control also the supporting LAN based components like VME/µTCA crates, front-end controllers (FEC), middleware servers and more. Fortunately many COTS systems provide means for remote control and monitoring using a variety of standardized protocols like SNMP, IPMI or iAMT.

REMBRANDT, the REMote Beam instRumentation And Network Diagnosis Tool, is a Java framework, which allows the authorized user to monitor and control remote systems while hiding the underlying protocols and connection information such as IP addresses, user-IDs and passwords. In addition to monitoring the device state (like voltage and current load), the main features are the remote power switching of the systems and the observation of the FEC’s boot process via protocols like reverse telnet or iAMT Serial-Over-LAN. REMBRANDT is designed to be extensible with new protocols.

Monitoring and Control of:
- 24 different DAQ types
- ca. 1000 channels
- ca. 400 DAQ systems
- 17 electronic rooms + many local niches

Remote Actions:
- Monitoring e.g. Hardware, Fan, Volt/Amp, Temp.
- Power Cycle
- Reset
- Boot Observation console output e.g. PXEboot
- Logging e.g. user access, settings
- Diagnosis e.g. warning, errors

Supported Hardware:
- VME Crate (Wiener, Elma)
- MTCA.4 Crate (NAT MCH)
- Industry PC (eg. Kontron KISS)
- High Voltage Systems (ISEG, CAEN)
- NIM Crate (Wiener)
- Modular CPUs (VME, µTCA)
- LAN Devices

Complemented by:
- IP-KVM Switches remote access via USB/VGA/IP
- Terminal Server remote access on consoles (RS232)
- Hardware Database & Barcode System

Supported Protocols:
- iAMT SOL (Serial-over-LAN): AMTTERM to JAVA [2]
- iAMT (INTEL Active Management Technology): JAVA Web-services
- IPMI (Intelligent Platform Management Interface): VERAX IPMI lib [3]
- Telnet: Apache Commons Net lib [4]
- SSH: Jcraft ssh2 lib [5]
- Ping

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Graphical User Interface


The REMBRANDT Server Monitor. Top: Online access time measurements for timeout optimization. Bottom: General server status overview.


References: