

2012



solutions **GUIDE**

Software Frameworks

Automation Infrastructure Technology

Security Solutions

Energy Management

Drivers



Training






TRiD!UM

Tridium is the global leader in software frameworks, open platforms, automation infrastructure technology and device-to-enterprise integration solutions.

Our technologies extend connectivity, integration and interoperability to the millions of devices deployed in the market today and empower manufacturers to develop intelligent equipment systems and smart devices that enable collaboration and communication between the enterprise and edge assets.

Our customers are manufacturers, systems integrators and end-users worldwide involved in the Building Automation, Security, Residential, Energy, Telecom, M2M and Medical industries who embrace our technology to develop smart devices, connect machines-to-machines and deliver pervasive automation solutions.

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software
FRAMEWORKS

Tridium's software frameworks are used to develop device-to-enterprise applications, Internet-enabled products and automation solutions. A software framework is a universal, reusable software platform used to develop applications, products, and solutions. Software frameworks include support programs, compilers, code libraries, scripting language, an application programming interface (API) and tool sets that bring together all the different components to enable development of a project or solution. Using software frameworks facilitates the development process and offers multiple benefits including:

- Shorter design cycles
- Speed to market; faster time-to-value
- Lower costs
- Minimized risk
- Ease of adoption
- A more efficient process for development
- Comprehensive tool set
- Ability to design technically and philosophically to any specification
- Creates more features and functionality
- Increases product quality
- Uses fewer resources
- Greater customer satisfaction
- Leverages existing ecosystem

Niagara^{AX} Framework[®]



Niagara^{AX} resolves the challenges associated with open systems, integration and interoperability by integrating diverse systems and devices – regardless of manufacturer, or communication protocol – into a unified platform that is easily managed and controlled over the Internet. A scalable solution, Niagara^{AX} increases the functionality and value of “smart devices and systems” by connecting real-time operational data to the people and systems that manage business enterprises.

Niagara is available in the following formats:

- AX JACE[®]
- AX Supervisor[®]
- AX SoftJACE[®]
- NPM Module





AX JACE[®]

To integrate diverse systems, a physical connection to a device's network is required. The Java Application Control Engine (JACE[®]) is the mechanism that provides this connectivity to systems. By connecting common network protocols such as LonWorks, BACnet, and Modbus, along with many proprietary networks, a unified system without seams emerges. Scalability and reliability concerns are avoided with the unique distributed architecture that a network of JACE's creates.



AX SUPERVISOR[®]

The AX Supervisor[®] is a flexible network server used in applications where multiple Niagara^{AX} based controllers will be networked together. The AX Supervisor serves real-time graphical information displays to standard Web-browser clients and provides server-level functions such as centralized data logging, archiving, alarming, real-time graphical displays, master scheduling, system-wide database management and integration with enterprise software applications. It is available for 32 and 64 bit Windows platforms as well as Red Hat Linux 5 platforms.



SMALL BUILDING SUPERVISOR[®]

For smaller installations, the Small Building Supervisor[®] offers the full functions of the Niagara Framework, but limits the number of Niagara-based connections. The Small Building Supervisor can be run on 32 and 64 bit Windows based PCs as well as Red Hat Enterprise Linux 5 based PCs. Also, the Small Building Supervisor can be upgraded to a full AX Supervisor if the installation outgrows the limit of three Niagara-based connections.



AX SOFTJACE[®]

Complete real-time control, dynamic graphics and multiprotocol integration capabilities of the Niagara^{AX} Framework on the hardware of your choice. The AX SoftJACE[®] makes it easy to address unique application needs such as rack mounting, extended temperature ranges and industrial packaging in a Windows environment.

The SoftJACE provides all of the capabilities of a programmable controller, multi-protocol adapter, network manager, Web server (with optional Web User Interface), data logger and alarm system in a single software solution. The AX SoftJACE communicates with external devices utilizing Ethernet-based protocols, and currently supports the industry's most common standard protocols: OPC, BACnet IP, Modbus TCP, oBIX, XML, SNMP and SOX (Sedona).



NIAGARA^{AX} WORKBENCH

The Niagara Workbench AX is a “one-tool” solution for managing JACE, Niagara^{AX} Supervisor and Sedona Framework device databases which enables the user to build an application using the “wire sheet” format for creating control logic. It also is a graphical user interface for the Niagara^{AX} Supervisor providing the building operator with a full function tool to monitor and manage a network of JACEs in a building, campus or region using graphics and command “widgets” for fast, easy access to important operational data. It also acts as an alarm console with alarm instructions, if required, to manage equipment failures quickly. Viewing long term data is easy with Workbench with the ability to display collected trend data in a graphical or column format. System administrators also use Workbench to manage system access by creating user categories and access levels appropriate to the individual user that needs information on building operations, but not allowing access to things they don’t need.



Sedona Framework™

The Sedona Framework™ is an open source development framework that provides a complete software platform for developing, deploying, integrating and managing intelligent device applications. The Sedona Framework in conjunction with the Niagara^{AX} Workbench provides a single-tool environment to distribute decision making control and manageability to any device and brings intelligence and connectivity to the network edge and back. The Sedona Framework allows manufacturers to quickly and easily build their own device-to-Internet applications, rather than having to build their own applications or use the complex and difficult embedded programming tools that exist today.



SEDONA FRAMEWORK WORKBENCH

Sedona Workbench is a software tool used for the development, deployment, integration, and management of Sedona embedded devices. Capable of being installed on Windows platforms, the Sedona Workbench software uses a graphical “wire sheet” tool for development of Sedona Framework embedded applications. Sedona Workbench makes the job of provisioning easier by helping users manage and update firmware for Sedona Framework enabled devices. Sedona Workbench provides the user with a single software tool for managing their project; reducing installation and commissioning time. Users already accustomed to Niagara Workbench will quickly become familiar with the Sedona Workbench environment, allowing them to begin deploying Sedona Framework based solutions without the need for additional software training. With its graphical application development tool, device management functions, and intuitive user interface, Sedona Workbench is ideal for Sedona Framework application developers.



hardware
PLATFORMS



NPM-2 & NPM-6

The NPM-2 & 6 are compact, embedded controller server platforms that combine integrated control, supervision, data logging, alarming, scheduling and network management functions with Internet connectivity and Web serving capabilities. They are designed for OEMs to develop and market custom Niagara^{AX} control devices in a variety of applications.




JACE[®]-2 CONTROLLER

The JACE[®]-2 is ideal for smaller facilities, remote sites and for distributing control and monitoring throughout large facilities. Optional input/output modules can be plugged in for applications where local control is required. Supports a wide range of field buses for connection to remote I/O and stand-alone controllers.

250MHz Power PC processor, 64 MB RAM/64 MB Flash (Flash expandable to 128MB), (2) 10/100 MB Ethernet ports, (1) RS-485 serial port, (1) RS-232 serial port, NDIO port and (2) communication card option slots Standard features include Niagara station and Web User Interface. Standard drivers include oBIX Client/Server and Niagara Network (Fox) Client/Server. The JACE[®]-2 is designed for DIN rail mounting.



JACE[®]-6 CONTROLLER




The JACE[®]-6 serves data and rich graphical displays to a standard Web browser via an Ethernet LAN or remotely over the Internet or dial-up modem. In larger facilities, multi-building applications and large-scale control system integrations Niagara^{AX} Supervisor software can be used to aggregate information (real-time data, history, alarms, etc.) from large numbers of JACEs into a single unified application.

The unit supports a wide range of field busses for connection to remote I/O and standalone controllers. Optional input/ output modules can be plugged in for applications where local control is required.

524MHz Power PC processor, 128 MB RAM/128 MB Flash (Flash expandable to 256MB), 2)10/100 MB Ethernet ports, (1) RS-485 serial port, (1) RS-232 serial port, NDIO port and (2) communication card option slots. Standard features include Niagara station and Web User Interface. Standard drivers include oBIX Client/Server and Niagara Network (Fox) Client/Server. The JACE-6 is designed for DIN rail mounting.



JACE®-7 CONTROLLER



The JACE®-7 is a high performance JACE that fits between the JACE-6 and the JACE-NXT. The unit follows the design style of our JACE-2/6 series and is ideal for any facility needing a JACE with more resources. The JACE-7 is also capable of supporting multiple appliances on the same platform such as building automation and energy management.

The JACE-7 is designed to provide high performance control functions in a convenient din-rail mounted package. The JACE-7 can be accessed by remote web browser, over a local intranet, via the internet, or remotely via an optional GPRS Modem card.

667 MHz 440Epx Power PC processor; requires Niagara^{AX} Release 3.5 or higher. 1 GB DDR 2 333 MHz RAM (industrial-grade, sourced from Tridium). (1) GB NAND Flash memory on board for database storage, (2) 1 Gigabit Ethernet ports; (2) USB 2.0 ports (for future application use) and (1) RS-232 and one isolated RS-485 ports. Internal battery backup and (2) JACE communication slots for optional JACE communication interface card use.



JACE®-2-XPR CONTROLLER

An embedded controller/server platform designed for remote monitoring and control applications. The unit combines integrated control, supervision, data logging, alarming scheduling and network management functions, integrated I/O and optional GPRS modem connectivity with Internet connectivity and Web serving capabilities.

IBM Power PC platform @ 250MHz, 128 MB SDRAM and 64 MB Serial Flash, 128 KB Static RAM, (2) 10/100 MB Ethernet ports, (1) RS-232 Port, (1) RS-485 non-isolated port, (1) socket for optional communications card, (1) socket for optional GPRS modem, onboard 16 point I/O.



JACE®-6-XPR CONTROLLER

The JACE®-6-XPR provides for quick turn installations at low costs and is ideal for both finished as well as unfinished spaces. This JACE brings the benefits of the Niagara^{AX} to new construction, retrofits and new markets such as large scale, high density residential buildings, multi-use residential/commercial villages, or multiple retail/restaurant chain stores and is ideal for managing and controlling energy applications. The JACE-6-XPR-24 incorporates a processor board with onboard I/O and universal power supply housed in an easy to mount, easy to access stylized chassis.

AMCC PowerPC 440 @ 524 MHz processor with math coprocessor and 256 MB SDRAM and 128 MB Serial Flash. Supports open and legacy protocols, communications board socket for optional communications card and built-in 24 volt AC/DC power supply. Onboard 16 point I/O integral GPRS modem with Wyleless SIM available for remote access via Wyleless ISP service. Battery backup, (2) Ethernet Ports – 10/100 Mbps (RJ-45 Connectors); (1) RS 232 Port (RJ-45 connector), (1) RS 485 non isolated port, (1) socket for optional communication cards and (1) USB port for future use.



JACE®-NXT CONTROLLER

The JACE-NXT is a powerful embedded controller built with the full functions of the Niagara Framework® suite and provides a total building automation solution. Users can seamlessly integrate LonWorks®, BACnet®, Modbus®, OPC®, oBIX, and other standard protocols with legacy systems to deliver a unified real-time controls network. The suite includes a browser-based graphical user interface, allowing users to view and manipulate underlying systems without the need for dedicated workstations or client software.

The JACE-NXT combines greater computing power with 2-Gigabyte DDR3 RAM standard, 2-Gigabyte Flash drive or optional hard drive, and a fast 1.2 GHz Celeron processor in a fan-less enclosure.

The JACE-NXT-AX-FL offers increased reliability with no moving parts, and an integral UPS power supply. This superior computing and processing power makes it ideal for installations where large amounts of archives and graphics are required. Additionally, because it has a PC processor platform with a hard disk and is offered with embedded Microsoft™ Windows XP, the JACE-NXT is perfect for organizations whose IT policies dictate Microsoft products or when applications such as OPC require a Windows-based operating system. This unit is available with either Tridium R2 or AX software.



SECURITY JACE®-2 CONTROLLER

The Security JACE®-2 stand-alone, Web-Based 2 door access control system within a single embedded controller. It requires no head-end PC as do conventional access control systems, and supports up to 2,500 personnel records. It is also configured to expand up to 16 total card readers.

Connections for 2 Card Readers, 6 Supervised Inputs, 4 Form C Relay Outputs, and 3 Digital Inputs. Includes 128 MB RAM/64 MB Flash, (2) 10/100 MB Ethernet ports, (1) RS-485 serial port, (1) RS-232 serial port and (2) communication card option slots. Contains removable screw terminal connectors and status indication LEDs. The Security JACE®-2 is designed for DIN rail mounting.



SECURITY JACE[®]-6 CONTROLLER

The Security JACE[®]-6 is a stand-alone, Web-Based 2 door access control system within a single embedded controller. The unit requires no head-end PC as do conventional access control systems. The Security JACE-6 supports up to 20,000 personnel records and 50,000 transactional history records, and provides expansion for up to 32 total card readers.

Connections for 2 Card Readers, 6 Supervised Inputs, 4 Form C Relay Outputs, and 3 Digital Inputs. Includes 256MBRAM/128MB Flash, (2) 10/100 MB Ethernet ports, (1) RS-485 serial port, (1) RS-232 serial port and (2) communication card option slots. Contains removable screw terminal connectors and status indication LEDs. The Security JACE[®]-2 is designed for DIN rail mounting.



SEDONA FRAMEWORK WIRELESS DEVELOPMENT KIT

The Sedona Framework Wireless Development Kit is a convenient tool for developing and testing applications for Sedona Framework enabled Jennic wireless devices. The kit includes a Sedona Framework enabled Jennic wireless module and provides a variety of input and output connections that may be used to simulate real world control applications. The kit consists of the Developer board with a Jennic wireless module, a USB wireless adapter, a power supply and a cable for Serial connection to enable debugging. Also included is a copy of the Sedona Framework Workbench™.



PERIPHERALS



NDIO-16 INPUT/OUTPUT MODULE



The IO-16 Input/Output Module allows JACE controllers to extend monitoring and control applications to include inputs and outputs located at the JACE. The module supports a mix of analog and digital inputs and outputs - (8) universal inputs, (4) relay outputs, and (4) analog outputs.

The module provides (16) IO points per device, (8) universal inputs - Type 3 (10k) Thermistors, 0-100K ohm, 0-10 vdc, 0-20 mA with external resistor, (4) relay outputs (Form A contacts, 24 VAC @ .5 amp rated), (4) analog outputs (0-10 vdc). The NDIO-16 contains removable screw terminal connectors and status indication LEDs. Intended for DIN rail mounting.



NDIO-34 INPUT/OUTPUT MODULE

The IO-34 Input/Output Module allows JACE controllers to extend monitoring and control applications to include inputs and outputs located at the JACE. The module supports a mix of analog and digital inputs and outputs - (16) universal inputs, (10) relay outputs, and (8) analog outputs.

The module provides (34) IO points per device, (16) universal inputs - Type 3 (10k) Thermistors, 0-100K ohm, 0-10 vdc, 0-20 mA with external resistor, (10) relay outputs (Form A contacts, 24 VAC @ .5 amp rated), (8) analog outputs (0-10 vdc). The NDIO-34 contains removable screw terminal connectors and status indication LEDs. The NDIO-34 also contains an on-board 24V AC/DC power supply. Intended for DIN rail mounting.

PERIPHERALS



NRIO-16-485 REMOTE INPUT/OUTPUT MODULE

The IO-16-485 Remote Input/Output Module allows JACE controllers to extend monitoring and control applications to include inputs and outputs that are remotely located up to 4,000 feet from the JACE. The module supports a mix of analog and digital inputs and outputs - (8) universal inputs, (4) relay outputs, and (4) analog outputs. Connection to IO-16-485 modules is established via an industry standard RS-485 multi-drop communications bus. Depending upon the application and JACE model selected, up to (16) IO-16-485 devices can be utilized on a single JACE supporting a total of up to 256 I/O points.

The module provides (16) IO points per device, (8) universal inputs - Type 3 (10k) Thermistors, 0-100K ohm, 0-10 vdc, 0-20 mA with external resistor, (4) relay outputs (Form A contacts, 24 VAC @ .5 amp rated), (4) analog outputs (0-10 vdc) and up to (16) remote IO-16-485 modules max per JACE (limit of 4 on a JACE-2 and JACE-202- XPR). Power Options are direct connect (Pin compatible) with the NPB-PWR-UN power supply. Modules can be powered directly from select JACE models with 15VDC outputs. External 12-15 VDC power supply. DIN rail or surface mounting.

PERIPHERALS



SEC-R2R REMOTE INPUT/OUTPUT MODULE

The SEC-R2R enables the Security JACE-2 or Security JACE-6 to add additional card readers, supervised inputs, relays and digital inputs remotely located up to 4,000 feet from the Security JACE.

The module provides connections for 2 Card Readers, 4 Supervised Inputs, 2 Form C Relay Outputs and 2 Digital Inputs. Contains removable screw terminal connectors and provides relay and status indication LEDs.



PERIPHERALS



SEC-RIO REMOTE INPUT/OUTPUT MODULE



Extends the Security JACE-2 or Security JACE-6 to add additional supervised inputs, relays and digital inputs remotely located up to 4,000 feet from the Security JACE.

The module provides connections for 8 Supervised Inputs, 8 Form C Relay Outputs and 2 Digital Inputs. Contains removable screw terminal connectors and provides relay and status indication LEDs.



LON OPTION CARD

The LON Option Card is an optional plug-in communications card for LonWorks™ based control devices and it is compatible with the JACE-2, JACE-6, JACE-7, JACE-2-XPR, and JACE-6-XPR series products. It provides Lon FTT10A compatible communications with remote unitary, VAV, and other similar controllers. Connection to the LonWorks network is via a 2-terminal Weidmuller style connector. This card provides one Lon FTT10A port on a single plug-in card that occupies one option card slot in a JACE-2, JACE-6, JACE-7, JACE-2-XPR, and JACE-6-XPR series product.



PERIPHERALS




RS-485 OPTION CARD



The RS-485 Option card is an optional plug-in communications card for enabling communications to remote control devices that use RS-485 network communications at baud rates up to 115.2KBps over a two-wire network. This card provides two electrically isolated RS-485 ports on a single plug-in card that occupies one option card slot in a JACE-2, JACE-6, JACE-7, JACE-2-XPR, and JACE-6-XPR series product. The network termination is provided by Weidmuller style 3-terminal connectors.



RS-232 OPTION CARD



The RS-232 Option Card is a plug-in communications card for enabling communications to remotely control a device that uses RS-232 network communications at baud rates up to 115.2KBps. The connection is provided via a 9 pin D-style connector. This card provides one RS-232 port on a single plug-in card that occupies one option card slot in a JACE-2, JACE-6, JACE-7, JACE-2-XPR, and JACE-6-XPR series product.

PERIPHERALS




SRAM OPTION CARD

This is an optional plug-in card with an integrated SRAM module that offers controlled station shutdown during power failures without using a battery. Installing the SRAM card in a JACE and removing the battery minimizes JACE maintenance and raises the ambient temperature operating range. This is a single plug-in card that occupies one option card slot in a JACE-2, JACE-6, JACE-7, JACE-2-XPR, and JACE-6-XPR series product.





GPRS MODEM OPTION CARD




The GPRS Modem option allows JACE[®]-2, JACE[®]-6, and JACE[®]-7 series controllers to communicate via cellular communications where connectivity to an Internet Service Provider (ISP) is unavailable or may not be practical. The GPRS Modem also allows these controllers to integrate with other system components via VPNs (Virtual Private Networks) for system expansion by combining LAN/WAN connectivity with cellular connectivity.

In addition, the GPRS Modem allows for quick deployment of a Niagara^{AX} solution in places previously not accessible and gives system integrators the ability to quickly provide temporary monitoring and alarming services, monitor critical control strategies on a temporary basis and instantly provide a controlled environment during construction, before the LAN/WAN is installed.

PERIPHERALS



SEDONA FRAMEWORK JENNIC WIRELESS OPTION CARD



The Sedona Framework Jennic Wireless Option Card is part of a family of wireless devices that enables developers to implement embedded wireless systems using the Sedona Framework with 6LoWPAN networking stack and IEEE802.15.4. The option card is wireless and enables the integration into a JACE, a network of Sedona Framework-based devices over the 802.15.4, 6LoWPAN wireless network. This module has a maximum distance capability of up to 1 km (line of sight, your mileage may vary depending on the building layout and materials involved).

2.4GHz IEEE802.15.4 compliant with 6LoWPAN network, plugs into standard JACE-2, JACE-6, JACE-7 or JACE-XPR series option card socket and 16 MHz, 32 bit RISC processor with 96 Kb RAM, 192 Kb ROM. Diagnostic indicator LEDs provided for visual indication of operation and antenna included. Niagara Workbench release 3.4.52 or higher is required. An optional antenna extension cable is available for relocating antenna outside metal enclosures.



Z-WAVE OPTION CARD

The Z-Wave Option Card allows wireless Z-Wave communications on the JACE-2, JACE-6, and JACE-7 series controllers. Z-Wave is a mesh network protocol which eliminates the need for a direct connection between the JACE and the end device. Using mesh protocol, an intermediate device can route communications between the central controller and end device, creating a robust network with extensive coverage for up to 232 nodes. The option cards are available for US (908.42 MHz) and European (868.42 MHz) standard frequencies.





APPLICATIONS

APPLICATIONS



ENTERPRISE SECURITY



Niagara Enterprise Security is an open architecture framework for security device manufacturers. Built on Niagara^{AX}, Niagara Enterprise Security extends the intelligent building concept into physical security management with a comprehensive, open system that integrates all common building functions – environmental control, intrusion detection, access control, lighting and energy management systems. The Enterprise Security product line offers a variety of solutions allowing the system to grow as a facility expands. The system can support sites ranging from a single location with sixteen or less card readers to a multi-site corporation with up to 250 locations. Regardless of system size, all security management is achieved via a Web-Based application requiring only an Internet browser at the operator location.

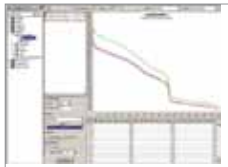
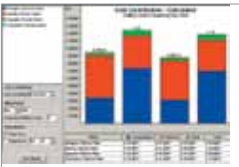
APPLICATIONS



NIAGARA ENERGY SUITE

The Niagara Energy Suite is an intelligent, Web-based energy infrastructure that provides greater visibility into the energy consumption patterns of buildings, equipment and systems.


The solution is a flexible suite of applications that enable users to connect, monitor and gather up-to-date energy information. It includes tools to analyze and aggregate loads, benchmark facilities and determine how building characteristics such as size, equipment type, schedules and climate correlate with energy.



APPLICATIONS



NIAGARA METERING GATEWAY 1.0



Tridium's Niagara Metering Gateway 1.0 is a web-based metering management tool that allows you to quickly and easily network pulse or smart energy meters together to facilitate the aggregation of data to an enterprise-level solution. The Metering Gateway communicates with any Niagara-based or oBIX-compliant energy management application, enabling users to process and display data using most enterprise solutions.



DRIVERS

DRIVERS

A variety of drivers are available that are compatible with the Niagara^{AX} Framework.

OPEN DRIVERS

BACnet	KNX/EIB	Lon	M-Bus
Modbus	oBIX	OPC	SOX (Sedona)
SNMP	Z-Wave	Open ADR	

LEGACY DRIVERS

Tridium has an extensive library of legacy drivers. More information is available upon request from Tridium, Inc.

ADDITIONAL DEVELOPMENT TOOLS

The Niagara^{AX} Framework has open development tools that have allowed independent developers to create drivers for use by the Niagara Community.

- Flex Driver
- Serial Driver Framework

VIDEO DRIVERS

- AXIS IP Cameras
- Dedicated Micros Video
- Honeywell Rapid Eye
- Milestone Video



WORKSTATIONS



BACnet OPERATOR WORKSTATION (OWS)

The BACnet OWS provides the AX Supervisor with the ability to view, monitor, and control BACnet devices or objects over IP or Ethernet, or through a BACnet router to any BACnet media. Niagara^{AX} provides the ability to learn and manage devices, points, schedules, alarms, and logs.



WORKSTATIONS



BACnet ADVANCED WORKSTATION (AWS)

The BACnet AWS provides the AX Supervisor with the abilities included in BACnet OWS as well as advanced management tasks such as backup and restore and object creation and deletion.






TRAINING

TRIDIUM[®]

UNIVERSITY

Tridium offers world class technical training through a variety of classes covering the broad spectrum of Niagara-based products. We pride ourselves in providing a high level of intensive, hands-on and applications-oriented technical training. The goal of each of our training sessions is to support the desire to achieve the technical expertise necessary to effectively support a client base.

- 
- TCP Training
 - Developer Training
 - End-User
 - Energy Services
 - Enterprise Security

For more information or to register online, please visit www.tridiumuniversity.com, call 804.747.4771 or email training@tridium.com.

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