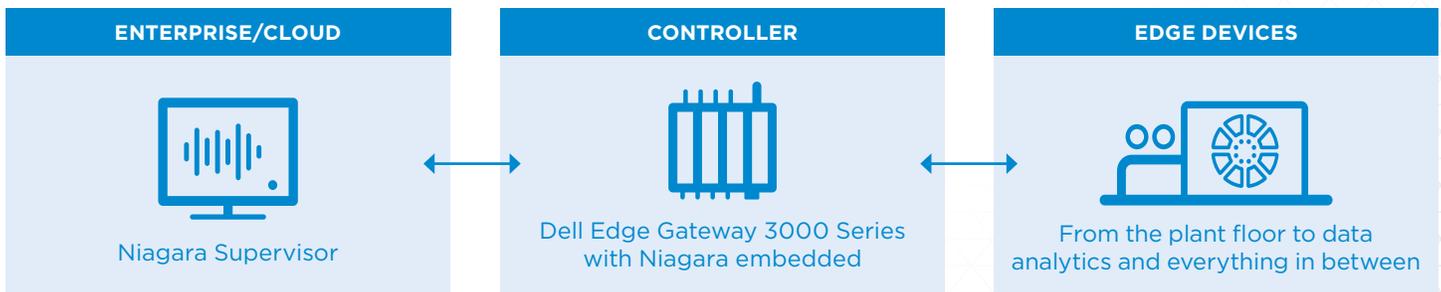# niagara-based
IIoT solution

PRODUCT DEFINITION

Tridium offers manufacturers an Industrial Internet of Things (IIoT) technology solution developed in collaboration with Dell and Intel Corporation. The solution features the Niagara Framework®, Tridium's open technology platform, running on the Dell Edge Gateway 3000 Series with dual-core Intel Atom® processors. This, Tridium's first, Niagara-based digital transformation solution for plant floor applications offers discrete manufacturers the ability to connect to diverse edge data sources, receive insights from the data and achieve desired outcomes at an accelerated rate.

The Niagara-based IIoT solution is developed for use in plant floor environments made up of highly diverse data sources, including legacy PLCs, edge sensors, ERP systems and even sheets of paper attached to a clipboard. The solution is designed to improve overall plant floor efficiency by consuming data normalized by the Niagara Framework and delivering industry standard KPIs and analytical insights, with no additional programming required.

The Niagara 4 Supervisor allows multiple IP-based controllers and field devices to be networked together. It serves real-time graphical information to standard web-browser clients and provides server-level functions.

These functions include centralized data logging/ trending, archiving to external databases, alarming, dashboarding, system navigation, master scheduling, database management and integration with other enterprise software applications through a variety of interface standards, including OPC UA. Also, it provides a comprehensive graphical engineering toolset for application development.

Dell Edge Gateways based on Intel® processors are intelligent devices designed to aggregate, secure, analyze and relay data from diverse sensors and equipment at the edge of the network. These gateways bridge both legacy systems and modern sensors to the internet, helping users get business insights from the real-time, pervasive data in machines and equipment. Headless, fanless and around 1 kg (2.2lbs), the 3000 Series is Dell's compact, low-power gateway. Engineered with an industrial-grade form factor and solid-state drive, the Dell gateway can reliably run 24x7 with long life at extended temperatures. The right-sized 3000 Series offers wide connectivity via Wi-Fi, Bluetooth LE, optional cellular mobile broadband 3G or 4G LTE for select countries, or 10/100 Ethernet, including Power over Ethernet (PoE).

ENTERPRISE/CLOUD	CONTROLLER	EDGE DEVICES
Niagara Supervisor	Dell Edge Gateway 3000 Series with Niagara embedded	From the plant floor to data analytics and everything in between

powered by

niagara framework®

HARDWARE FEATURES & SPECIFICATIONS

	Dell Edge Gateway 3001 Model	Dell Edge Gateway 3002 Model
Dimensions	125 mm wide x 125 mm high x 51 mm deep (4.9 x 4.9 x 2 inches).	
Form factor	Fanless and headless (video port on 3003 only). Mounting optimized for 75x75mm VESA, wall (standard) mounting and DIN-rail mounting. Additional mounting options include perpendicular DIN-rail mount, quick-release DIN-rail mount, and cable management control bars for standard mounting	
Weight	1 kg +/- 0.02 kg (2.2lbs +/- 0.04lbs)	
Processor Speed / Cache	Intel Atom® processor E3805 dual core 1.33 GHz / 1 MB	Intel Atom® processor E3805 dual core 1.33 GHz / 1 MB
Operating system	Ubuntu Core 16 or Microsoft® Windows® 10 IoT Enterprise LTSB 2016 (only with 32 GB eMMC).	
Memory	2 GB, DDR3L – 1066 MHz	
Drive/Storage	Industrial-grade Micro-SD card: 8GB / 16GB / 32 GB / 64 GB (Contact Dell OEM Sales for larger options.) Embedded multi-media controller (eMMC): 8GB standard / 32GB option with WWAN.	
I/O (Per Model)	1 x 10/100 Fast Ethernet (RJ-45) with PoE (15.4W) Serial Interfaces: 2 x RS-232/422/485. GPIO Multi-function I/O: 0-5V, 8 channel, independently programmable, DAC, ADC. Optional ZigBee module.	2 x 10/100 Fast Ethernet (RJ-45). Main port supports PoE (15.4W) Wireless PAN: Bluetooth Low Energy and integrated zigbee/802.15.4 module for mesh networking. CANbus / Controller Area Network (CAN2.0 A/B/FD) 1Mbps (CAN2.0), 5Mbps (CAN-FD).
I/O (All models)	USB: 1x USB 2.0, 1x USB 3.0 Integrated MEMS: Accelerometer, Pressure, Temperature and Humidity Integrated GPS Wireless LAN: 2.4GHz, 802.11b/g/n/Bluetooth Low Energy 4.0 Integrated zigbee module on 3002 model; optional zigbee on 3001 and 3003 models WWAN/Cellular: 3G or 4G LTE for select countries, US/Canada 4G LTE with AT&T or Verizon (WWAN card is factory installed only) Antenna ports for: Wi-Fi/BLE/GPS, 3G or 4G (zigbee antenna port on 3002 model only)	
Power Input	DC-IN or Power over Ethernet (PoE). System power protection. Enables low-power use (ignition wake, wake onLAN). DC-IN accepts 12/24 V car power system (12V-57V wide DC input); supports transient low-voltage states(battery crank) ≥6 VDC. Ignition input supports power on/standby/hibernate at 9-32 VDC witha 5-sec delay. Wake up events: alarm, LAN, USB, ignition or direct ignition. PoE is 10/100 Mbps and connects via 8-pin RJ45 port; features full-controller compliance with IEEE 802.3.af-standard for maximum 15.4 W, with power up to 48 V over existing Ethernet infrastructure, no modification-srequired. Standard IEEE 802.3 Ethernet interface provided for 100BASE-TX and 10BASE-T applications (802.3, 802.3u, and 802.3ab, 802.3x) 9014 bytes jumbo frame support. PoE supports wakeon LAN.	
Accessories/Ecosystem	Optional accessories include flexible mounting options; pre-certified Wi-fi, GPS, and WWAN antennas (zigbee antenna on 3002); Phoenix connectors for serial, CANBus and power; industrial uSD storage options up to 64GB.	

3001 Model

3002 Model

	Dell Edge Gateway 3001 Model	Dell Edge Gateway 3002 Model
Temp without airflow*	Operating: -30°C to 70°C Non-Operating: -40°C to 85°C	Operating: -30°C to 70°C Non-Operating: -40°C to 85°C
Temp with 0.7 m/s airflow*	Operating: -30°C to 75°C	Operating: -30°C to 75°C
Relative Humidity	Operating: 10% to 90% (non-condensing) @ 40°C Non-operating: 5% to 95% (non-condensing) @ 40°C	
Vibration	Operating: 0.26 Grms profile (5 Hz with 0.0002 G2/Hz and 350 Hz with 0.0002 G2/Hz) 2 minutes per axis. Non-Operating: 1.54 Grms profile (10 Hz with 0.003 G2/Hz, 20 Hz with 0.01 G2/Hz, and 250 Hz with 0.01 G2/Hz) 60 minutes per axis.	
Thermal Shock	150 cycles at system level at spec limits (-40, 85C); min. 20C/min ramp and 10 min dwells	
Shock	Non-Operating: MIL-STD-810G, Method 514.7, Procedure 5 (Shock) - 160G with 2msec pulse duration in all axis Operating: MIL-STD-810G, Method 514.7, Procedure 1 (Shock) - 40G with 2msec pulse duration in all axis	
EMC	CE,FCC	
Safety	61010-1, 61010-2-201 & 60950-1. (IEC/EN/UL/CSA61010-1 and IEC/ EN/UL/CSA61010-2-201.)	
Altitude	Operating: –15.20 m to 5000 m (–50 ft. to 16,404 ft.) [NOTE: maximum operating temperature is derated 1°C/305 m (1000 ft.) above sea level altitude.] Non-Operating: –15.20 m to 10,668 m (–50 ft. to 35,000 ft.)	
Ingress Protection	IP50, IEC 60529	
Vertical Certification	Marine Use CE DoC MED Directive 96/98/EC IACS E-10 IEC 60945 Class A and Class B, Rail (Rolling Stock) Use CE DoC Rolling Stock Directive 2008/27/EC, Vehicle (eMark Certification) E24, Aircraft RTCA-DO160G (Note: Vertical Certification for system only, additional certification may be required in final production environment (enclosure, power, etc)	
Device-level security	Trusted Platform Module (TPM) 2.0; Secure Boot, BIOS password and I/O port disablement. Intrusion switch connector.	
Manageability	Dell Edge Device Manager (EDM) is a cloud-based manageability suite, sold separately. EDM supports Dell IoT products for both Windows and Linux operating systems.	
Warranty	Commercial services vary. Limited hardware warranty[1] with mail in service; Optional ProSupport with Advanced Exchange[2] after remote diagnosis, contracts up to 5 years. Custom warranties available. Restrictions apply.[3]	
Configuration Services	Image load, BIOS customization, Laser Etching, Asset tagging and reporting. Custom configuration services available. Restrictions apply.[3]	
Financing/Leasing	Dell Financial Services offers low rates financing for Dell and non-Dell Technology, and flexible lease-to-own options. Even extend terms to your customers. (Subject to product availability, credit approval, and regional regulations.)	
OEM / Co-branding	OEM-Ready version available: From bezel to BIOS to packaging, your Edge Gateways can look and feel as if they were designed and built by you. Inquire about customized OS, memory, storage options. For more information, visit www.dell.com/oem	

*Notes:

- Ambient temperature specification is based on free air environment and recommended mounting
- 2.5inches (63.5mm) open space around the device is recommended for air circulation.
- Actual maximum operating temperature depends on many variables including airflow, mounting, orientation, and software applications.
- Temperature measured at the center of exposed heatsink base surface shall not exceed 83C.

Find more info online at dell.com/IoTgateway

TRIDIUM

SOFTWARE FEATURES & SPECIFICATIONS

NIAGARA-BASED IIOT SOLUTION KEY FEATURES

Data is collected, combined and filtered for ease of consumption, part traceability and delivery of visual edge analytics.

- Data collection and storage
- Part traceability
- Recipe management
- Smart digitized paper forms
- Statistical Process Control charts
- Manufacturing KPIs (OEE, RTY, COPQ)
- Defect analytics
- Real-time and historical trending

PLATFORM REQUIREMENTS FOR NIAGARA

- **Processor:** Intel® Xeon® and Intel Atom® or Intel® silicon CPU E5-2640 x64 (or better), compatible with dual- and quad-core processors
- **Operating System:** Ubuntu Core 16, Windows 7 Professional/Enterprise/Ultimate (32 and 64 bit), Windows 8.1 Professional/Enterprise/Ultimate (32 and 64 bit), Windows 10 (32 and 64 bit), Windows Server 2012 R2 (SP2) Standard/Enterprise, Windows Server 2016, Red Hat Enterprise Linux 7.4
- **Memory:** 6 GB minimum, 8 GB or more recommended for larger systems
- **Hard Drive:** 4 GB minimum, more recommended depending on archiving requirements
- **Display:** Video card and monitor capable of displaying 1024 x 768 pixel resolution or greater
- **Network Support:** Ethernet adapter (10/100 Mb with RJ-45 connector)
- **Connectivity:** Full-time high-speed ISP connection recommended for remote site access (i.e., T1, ADSL, cable modem) and IPv6 compliant

Niagara 4 Supervisors may run acceptably on lower-rated platforms, or may even require more powerful platforms, depending on the application, number of data points integrated, data poll rate, number of concurrent users, performance expectations, etc. Platform requirements for older versions of Niagara Supervisors are included in the release notes for each particular version.

Ready to put the power of Tridium's Niagara-based IIoT solution — with Dell and Intel technology — to work in your plant? Contact your sales rep today to get started.

NIAGARA SUPERVISOR FEATURES

HTML5 and Java-enabled user interface (UI); JavaScript data interface library included (BajaScript)

Supports an unlimited number of users over the internet/intranet with a standard web browser (depending on the host PC resources)

Optional enterprise-level data archival using SQL, MySQL or Oracle databases, and HTTP/HTML/XML, CSV or text formats

"Audit Trail" of database changes, database storage and backup, global time functions, calendar, central scheduling, control and energy management routines

Sophisticated alarm processing and routing, including email alarm acknowledging

Access to alarms, logs, graphics, schedules and configuration data with a standard web browser

Niagara follows industry best practices for cyber security, with support for features such as strong, hashed passwords, TLSv1.2 for secure communications and certificate management tools for authentication

HTML-based help system that includes comprehensive online system documentation

Supports multiple Niagara-based stations connected to a local Ethernet network or the internet

Provides online/offline use of the Niagara Framework® Workbench graphical configuration tool and a comprehensive Java Object Library

Optional direct Ethernet-based driver support for most Open IP field bus protocols (see supported drivers document)

SUPPORTED DRIVERS

Many open protocol IP drivers are included with Niagara 4. Others can be purchased separately. For an up-to-date list of supported drivers, visit our resource library on tridium.com.

TRIDIUM

tridium.com

Locations and customer support, worldwide

Headquarters	Support		
North America	*North America & Latin America*	*Europe, Middle East & Africa*	*Asia Pacific*
1 804 747 4771	1 877 305 1745	44 1403 740290	8610 5669 7148