

Edge Programmable Industrial Controller



**OPTO 22**  
The Edge of Automation.™



# This is EPIC.

The world's first  
Edge Programmable Industrial Controller

## groov EPIC processor

Real-time, open-source Linux® OS

Industrial quad-core ARM® processor

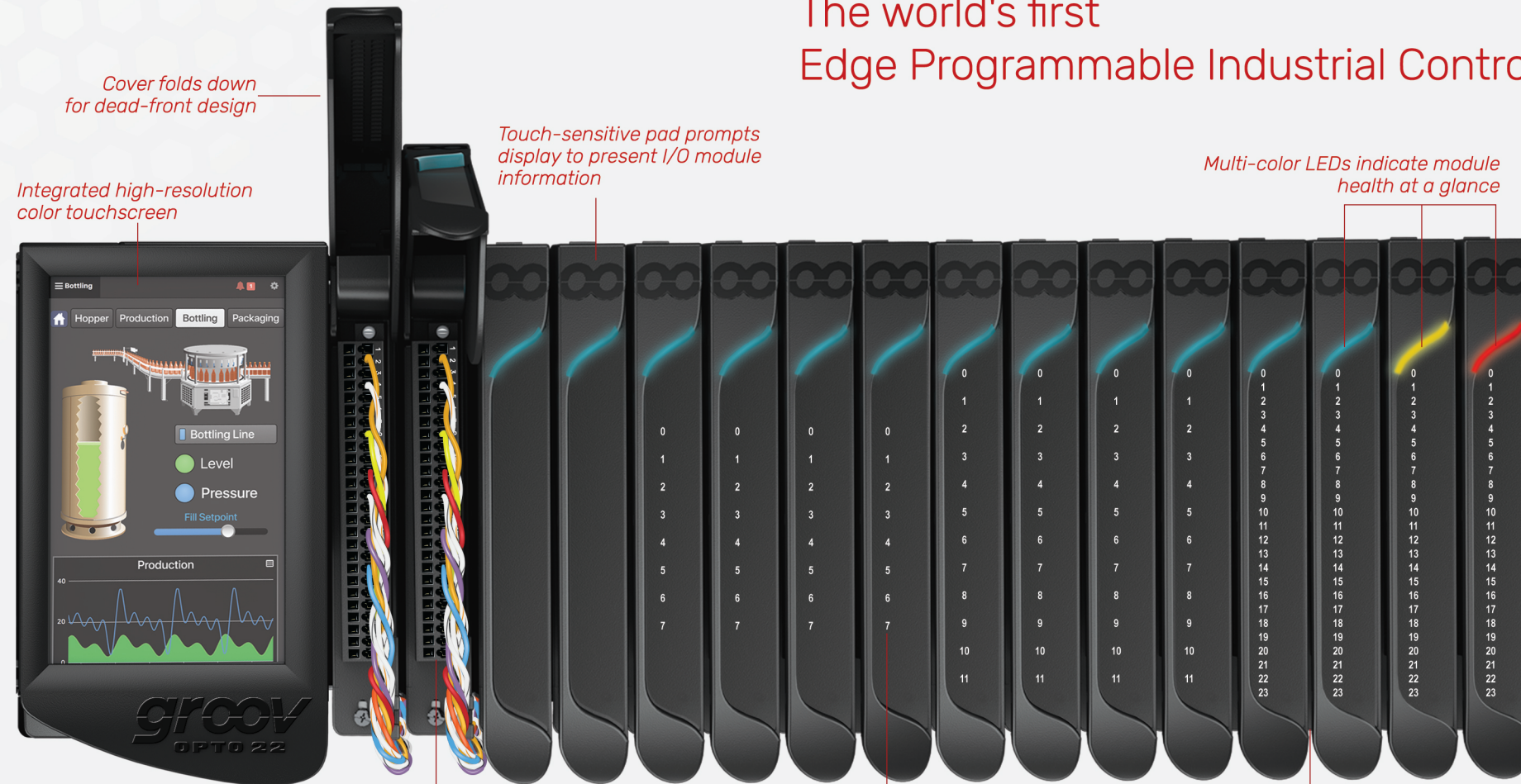
Configuration, troubleshooting, and  
HMI on touchscreen or remotely  
through web browser

Dual, independent Gigabit Ethernet network  
interfaces for designing secure systems

Dual USB ports for serial communications,  
touchscreen monitors, or Wi-Fi adapters

HDMI output for optional external monitor

Wide -20 to 70 °C operating  
temperature range



Cover folds down  
for dead-front design

Integrated high-resolution  
color touchscreen

Touch-sensitive pad prompts  
display to present I/O module  
information

Multi-color LEDs indicate module  
health at a glance

## groov I/O

4 to 24 channels per module

4, 8, or 16 position stainless-steel chassis

Hot-swappable I/O

Multi-featured analog output with voltage,  
current, and loop sourcing in one module

Analog inputs offer 20-bit resolution  
at 0.1% accuracy over span

DC outputs: load switching at 0.4 amps  
per channel @ 70°C

AC outputs: load switching at 0.5 amps  
per channel @ 70°C; blown-fuse detection

AC/DC outputs: mechanical relay at  
5 amps per channel @ 70 °C

Channel-to-channel isolation available

UL Hazardous Locations approved and  
ATEX compliant

**Guaranteed-for-life I/O**

## groov I/O module

Spring-clamp removable  
connector with captive  
hold-down screw

Single module  
retention screw  
and strain relief  
tab

## What is EPIC?

**Edge** – Collect, process, view, and exchange data where it's produced—at the edge of the network. Securely share data among databases, cloud services, Allen-Bradley® and Siemens® PLC systems, and other equipment, using tools like Ignition Edge® by Inductive Automation®, Node-RED™, and MQTT. Visualize data on the integral touchscreen, an external HDMI monitor, or from any web browser or mobile device.

**Programmable** – Options for control programming include flowcharting with PAC Control™ or IEC-61131-3 standard languages with CODESYS. Secure shell access lets you build your own custom-developed applications with Python, C/C++, and other languages and run them on an open, Linux-based automation system.

**Industrial** – From plant floors to remote sites, the edge demands industrially hardened equipment—like a wide operating temperature range, solid-state drives, UL Hazardous Locations approval, and ATEX compliance.

**Controller** – Reliable real-time control—with flowchart, Ladder Diagram, Function Block Diagram, Structured Text, Sequential Function Charts, and custom programming options—plus guaranteed-for-life I/O provide the solid base for all other functions.

Learn more about *groov* EPIC. Speak to an application engineer at 800-321-OPTO, email us at [systemseng@opto22.com](mailto:systemseng@opto22.com), or visit us on the web at [opto22.com](http://opto22.com).

**groov**  
**EPIC**

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*groov* Manage is the central command to your *groov* EPIC® system, helping you configure, troubleshoot, and commission your *groov* EPIC processor, I/O modules, and network interfaces. You can use this browser-based application locally on the EPIC processor's high-resolution color touchscreen, or on your computer, smartphone, or tablet.

## ➡ PAC Control

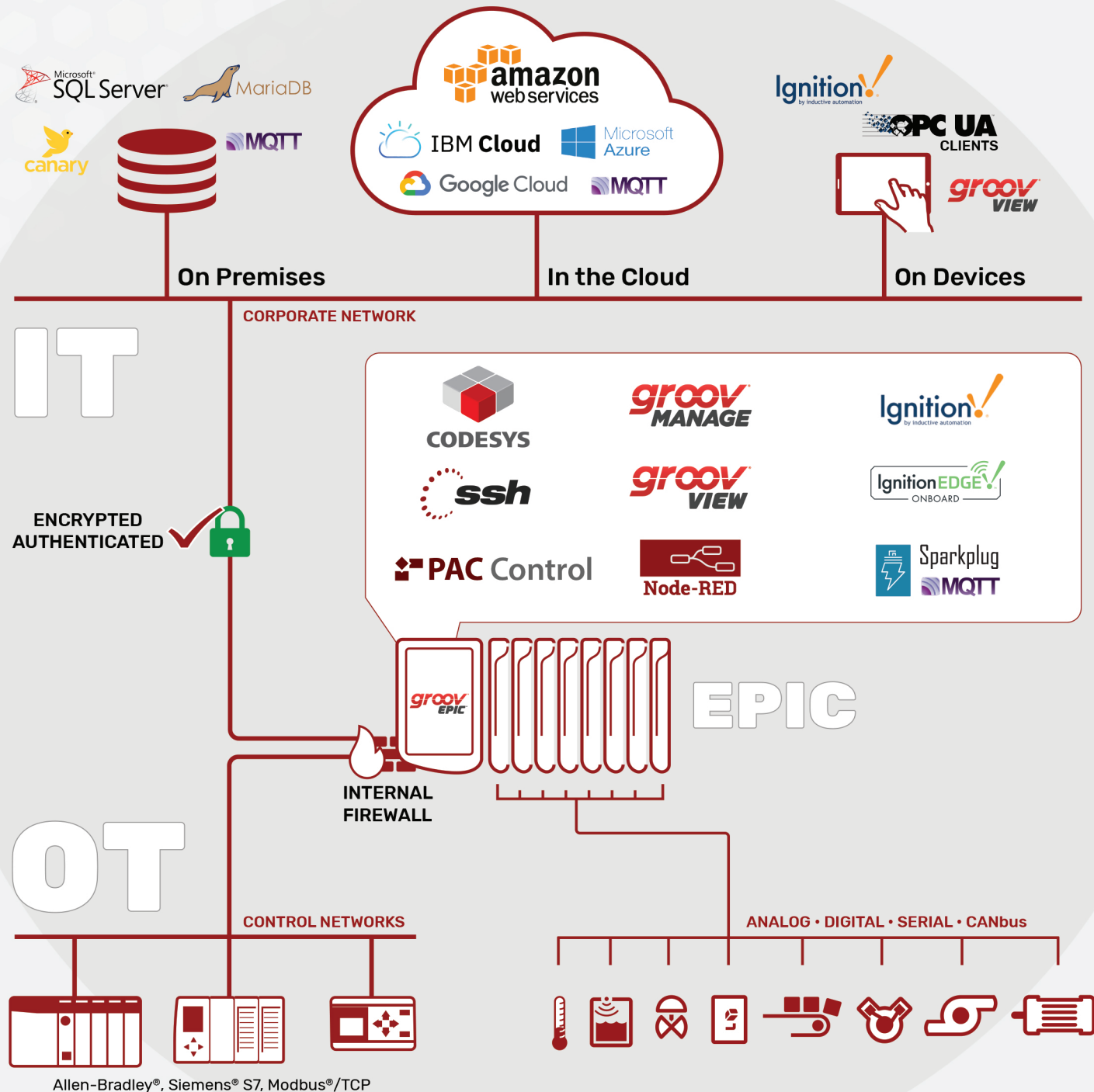
PAC Control, part of the PAC Project Software Suite, is an intuitive tool for programming industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications. Flowchart-based with optional scripting, PAC Control lets you create and debug control programs and then download and run them on a *groov* EPIC processor.



Use CODESYS® Development System V3 to create IEC 61131-3 compliant control programs that run on a *groov* EPIC processor. You can choose among Function Block Diagram (FBD), Structured Text (ST), Sequential Function Charts (SFC), and Ladder Diagram (LD). And you can expand functionality even more using products from the CODESYS Store.



Build your own custom applications using languages you know like Python, C/C++, and others, and run them on an open, Linux®-based automation system with Secure Shell access.



Use *groov* View to build operator interfaces to monitor and manage your system from the EPIC processor, and from any device with a web browser. User authentication and data encryption keep systems secure. *groov* View has easy drag-drop-tag construction, no tag or user limits, and includes trends, events, and user notifications.



*groov* EPIC extends the Ignition® Platform to the edge of your network, eliminating the need for a Microsoft Windows computer. Run Ignition directly on the EPIC processor and gain access to data on Allen-Bradley®, Siemens®, and Modbus®/TCP PLCs and devices with the built-in OPC UA server and drivers. Choose either Ignition Edge® or full Ignition, both products of Inductive Automation®. Utilize the full array of Ignition modules including MQTT, database support, reporting, MES connectivity, and more.



Improve communications efficiency and reduce reliance on IT networking resources with MQTT, a secure, lightweight transport protocol with a publish/subscribe architecture that decouples devices from applications. The Sparkplug payload definition for industrial applications also manages field device states for easier implementation.



Build simple data flows to wire together databases, cloud applications, and APIs using Node-RED. This open-source, multi-platform IIoT development tool gives you a large library of 600+ prebuilt nodes, so you can leverage existing software code and use it directly in your applications.





# groov EPIC™ Architecture Example using MQTT/Sparkplug B

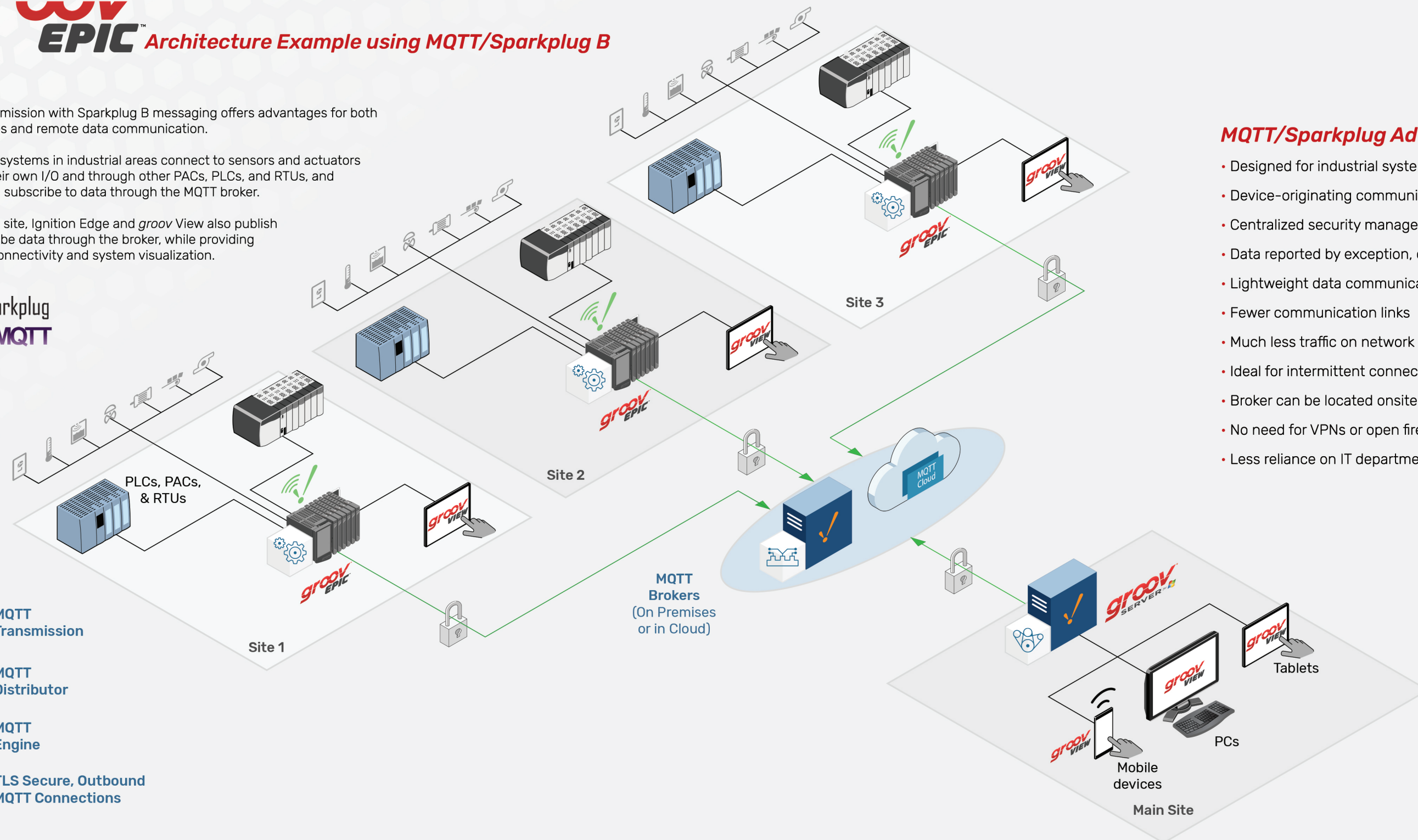
MQTT Transmission with Sparkplug B messaging offers advantages for both on-premises and remote data communication.

groov EPIC systems in industrial areas connect to sensors and actuators through their own I/O and through other PACs, PLCs, and RTUs, and publish and subscribe to data through the MQTT broker.

At the main site, Ignition Edge and groov View also publish and subscribe data through the broker, while providing database connectivity and system visualization.



-  MQTT Transmission
-  MQTT Distributor
-  MQTT Engine
-  TLS Secure, Outbound MQTT Connections



## MQTT/Sparkplug Advantages

- Designed for industrial systems
- Device-originating communications
- Centralized security management at broker
- Data reported by exception, on change only
- Lightweight data communications
- Fewer communication links
- Much less traffic on network
- Ideal for intermittent connections
- Broker can be located onsite or offsite
- No need for VPNs or open firewall ports
- Less reliance on IT departments



# Product Overview

## groov EPIC® Processors

GRV-EPIC-PR1 Edge Programmable Industrial Controller

## groov EPIC Chassis

GRV-EPIC-CHS0 Processor and power supply only mounting chassis  
GRV-EPIC-CHS4 4-module analog/digital/serial mounting chassis  
GRV-EPIC-CHS8 8-module analog/digital/serial mounting chassis  
GRV-EPIC-CHS16 16-module analog/digital/serial mounting chassis

## groov EPIC Power Supplies

GRV-EPIC-PSAC Power supply, 110-240 VAC  
GRV-EPIC-PSDC Power converter, 24-48 VDC  
GRV-EPIC-PSPT Pass-through power adapter, 10-15 VDC

## Software

Note: *groov* Manage, *groov* View, PAC Control Runtime, and Node-RED are included with the GRV-EPIC-PR1. CODESYS Runtime, Ignition Edge, and Secure Shell are pre-installed, but require a license (order part number shown below):

GROOV-LIC-CRE *groov* EPIC activation key for CODESYS Runtime  
GROOV-LIC-EDGE *groov* EPIC activation key for Ignition Edge  
GROOV-LIC-SHELL *groov* EPIC activation key for Secure Shell access

## groov Discrete Input Modules

GRV-IAC-24 AC input, 24 ch, 85-140 VAC  
GRV-IACS-24 AC input, 24 ch, 85-140 VAC, on/off state only  
GRV-IACI-12 AC input, 12 ch, 85-140 VAC, ch-to-ch isolation  
GRV-IACIS-12 AC input, 12 ch, 85-140 VAC, ch-to-ch isolation, on/off state only  
GRV-IACHV-24 AC input, 24 ch, 180-280 VAC  
GRV-IACHVS-24 AC input, 24 ch, 180-280 VAC, on/off state only  
GRV-IACIHV-12 AC input, 12 ch, 180-280 VAC, ch-to-ch isolation  
GRV-IACIHVS-12 AC input, 12 ch, 180-280 VAC, ch-to-ch isolation, on/off state only  
GRV-IDC-24 DC input, 24 ch, 15-30 VDC  
GRV-IDCS-24 DC input, 24 ch, 15-30 VDC, on/off state only  
GRV-IDCI-12 DC input, 12 ch, 10-30 VDC, ch-to-ch isolation  
GRV-IDCIS-12 DC input, 12 ch, 10-30 VDC, ch-to-ch isolation, on/off state only  
GRV-IDCIFQ-12 DC input, 12 ch, 2.5-30 VDC, ch-to-ch isolation  
GRV-IDCSW-12 DC input, 12 channels, switch status  
GRV-IACDCTTL-24 AC/DC input, polarity insensitive, 24 channels, 2-16 V AC/DC  
GRV-IACDCTTLS-24 AC/DC input, polarity insensitive, 24 channels, 2-16 V AC/DC, on/off state only

## groov Discrete Output Modules

GRV-OAC-12 AC output, 12 ch, 12-250 VAC  
GRV-OACS-12 AC output, 12 ch, 12-250 VAC, on/off state only  
GRV-OACI-12 AC output, 12 ch, 12-250 VAC, ch-to-ch isolation  
GRV-OACIS-12 AC output, 12 ch, 12-250 VAC, ch-to-ch isolation, on/off only  
GRV-ODCI-12 DC output, 12 ch, 5-60 VDC, ch-to-ch isolation  
GRV-ODCIS-12 DC output, 12 ch, 5-60 VDC, ch-to-ch isolation, on/off only  
GRV-ODCSRC-24 DC output, 24 ch, 5-60 VDC, sourcing  
GRV-OMRIS-8 AC/DC output, 8 ch, mechanical relay, 0-250 VAC/5-30 VDC, 5 A



## groov Analog Input Modules

GRV-IICTD-12 Analog input, 12 ch, temperature, ICTD  
GRV-IMA-24 Analog input, 24 ch, configurable input ranges of 4-20 mA, 0-20 mA, -20 mA to +20 mA  
GRV-IMAI-8 Analog input, 8 ch, ch-to-ch isolation, 0-20 mA, field or chassis-powered loop  
GRV-IRTD-8 Analog input, temperature (RTD) or resistor, 8 channels  
GRV-ITMI-8 Analog input, 8 ch, thermocouple or mV, ch-to-ch isolation  
GRV-ITM-12 Analog input, thermocouple or mV, 12 channels  
GRV-ITR-12 Analog input, 12 ch, temperature/thermistor or resistor  
GRV-IV-24 Analog voltage input, 24 ch, 8 configurable input ranges from  $\pm 1$  to  $\pm 160$  VDC  
GRV-IVI-12 Analog voltage input, 12 ch, configurable input ranges from  $\pm 1.25$  to  $\pm 160$  VDC, ch-to-ch isolation  
GRV-IVIRMS-10 Analog RMS voltage input, 10 channels, 0-300 VAC/VDC, channel-to-channel isolation

## groov Analog Output Modules

GRV-OVMAILP-8 Analog output, 8 ch, voltage or current, ch-to-ch isolation, field or chassis-powered loop  
GRV-OVMALC-8 Analog output, 8 ch, voltage or current, chassis-powered loop

## groov Serial Modules

GRV-CCANI-2 Serial communication, 2 ch, CAN, ch-to-ch isolation  
GRV-CSERI-4 Serial communication, 4 ch, RS-232 or RS-485, ch-to-ch isolation

## groov Accessories

GRV-TEX-26F6 26-wire cable for *groov* I/O modules. Straight-through; no common terminals. Flying leads

## groov RIO

A family of intelligent, independent I/O units that can work as remote I/O units through PAC Control strategies, Node-RED flows, CODESYS applications, and custom control programs:

GRV-R7-MM1001-10 Remote I/O; 8 multi-signal, multifunction channels; 2 form C electromechanical relay output channels

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# OPTO 22

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