Whitepaper

To Harness the Power of AI, Tackle the First Mile

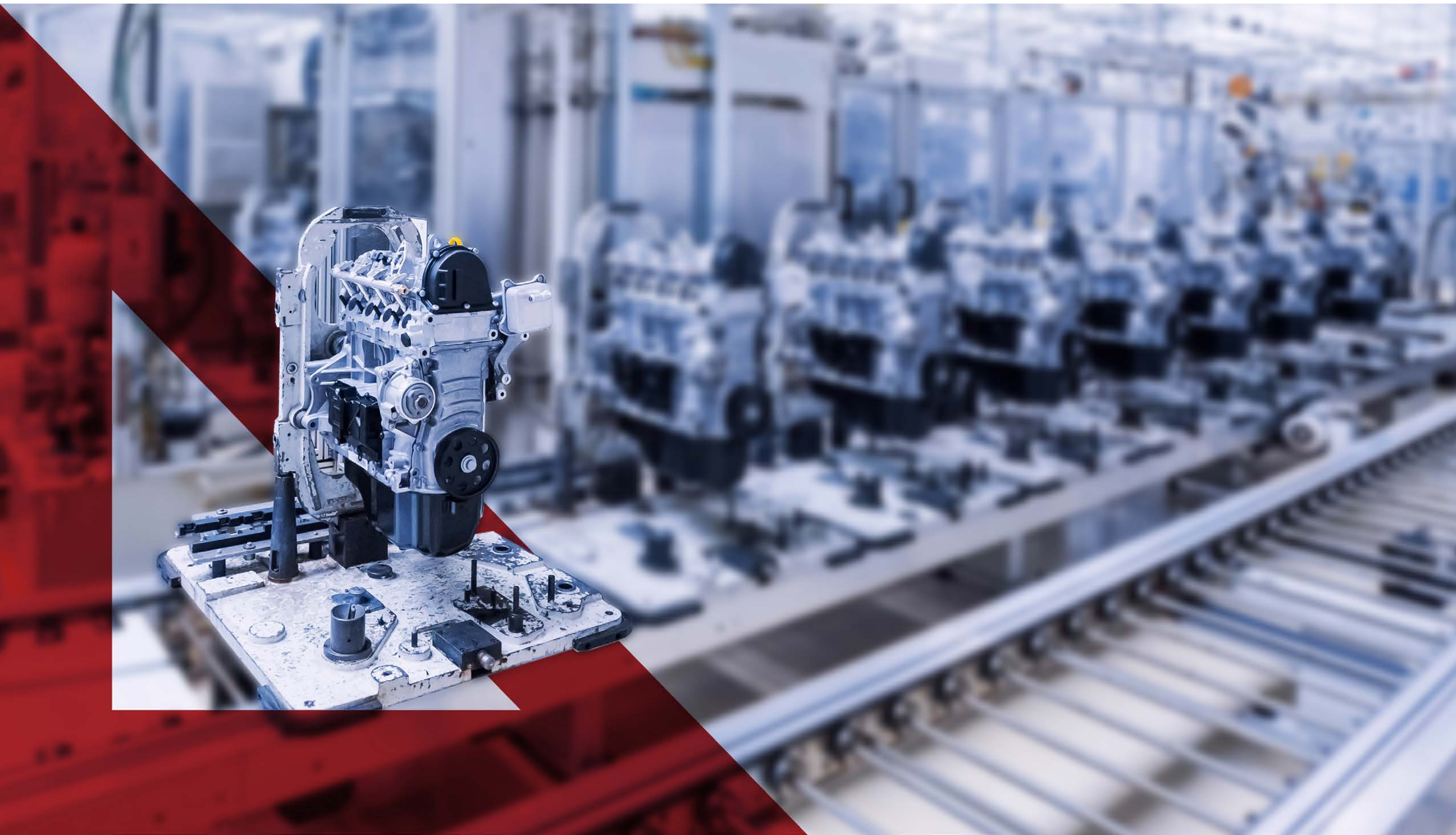
Out of the box solutions move data easily and securely from operations to IT

The trade journals are abuzz with talk of Artificial Intelligence (AI) for industrial applications. AI platforms help tie together, analyze, and contextualize data from every corner of an enterprise. They give organizations a big picture view of how their business is performing. They drive value by empowering people in various parts of the organization to make decisions benefiting the business.

That buzz is heard in factory control rooms, head offices, and boardrooms, too. Industrial enterprises are busy figuring out what problems they can solve with AI to add value. The sales office wants new efficiencies for handling orders, shipping, and purchasing. Facilities management wants AI to improve plant safety and product quality. Accounting wants to reduce costs and eliminate waste. Line operators want to optimize forecast maintenance to ensure maximum uptime.

Before AI, these process improvements were hard to identify. Decision-makers had to sift through heaps of data manually or compare outcomes across a range of programs to find efficiencies and places to optimize. Now, modern AI systems can collect and analyze data quickly – even on the fly. They're designed to deliver powerful results quickly. As such, they can be easy investments to make and justify. Information Technology (IT) departments are right to be enthusiastic about their potential.

There's just one problem. To leverage the full benefit of AI, you need the proper foundation. You need data from every part of your operation, including foundational systems. That includes data from your factory floor, your remote stations, your legacy equipment. You need data from the all-important first mile of your industrial process.



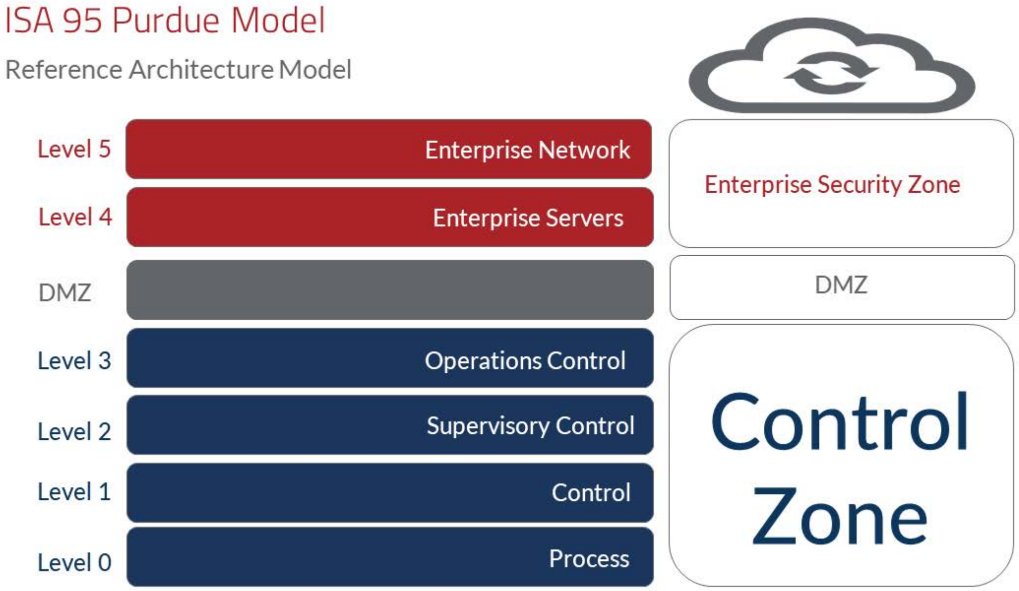
Crossing the Foundational First Mile

For many organizations, these applications and control systems have been in operation for a long time – 10, 15, 25 years – or more. Acquiring data from these systems can be a challenge.

In principle, it's not the age of the equipment. Even modern facilities have a first mile that needs crossing. To illustrate, consider the six-layer Purdue Model, an established blueprint for building secure industrial control systems.

The architecture is divided into six layers: a lower "Control Zone" which comprises the most critical OT functions, and an upper "Enterprise Security Zone, which consists of two layers for IT functions. The two areas are separated by a protective barrier, called the Demilitarized Zone (DMZ).

The first mile covers Levels 0-2 This is where an organization measures its flow of oil or gas, the amount and pressure of water going through pipes, or the number of widgets passing by a counter.



Process systems, such as motors and sensors, are at Level 0. Control systems, such as Programmable Logic Controllers (PLCs), are at Level 1. Human supervisory systems enter the system at Level 2, such as the SCADA systems that operators and decision-makers use. Level 3 is for operations control systems. These systems gather data from the levels underneath and sent it through the DMZ to the IT layers above.

AI capabilities lie in the DMZ, on Level 4, which comprises databases and servers, and Level 5, for networking and cloud connectivity. The AI application might be on a server managed by the IT department (DMZ or Level 4), with its own data models and machine learning algorithms. Or it could be in the cloud, with data models drawing information from other systems through the organizations. Processes at the Enterprise levels perform top-level analysis to connect the dots across the organization. They're plugged into accounts payable, accounts receivable, and order processing, to contextualize the data and make decisions that benefit the organization.

SECURING THE FIRST MILE – RIGHT OUT OF THE BOX

Whether you're running antiquated machines or brand-new equipment, data from below needs to move to enterprise levels above. But it needs to move securely, reliably, and with high data integrity.

As an example, let's say a plant has a widget production line with a rate counter that's been running smoothly for 15 years. The production line communicates with the rate counter through an Input/Output (I/O) device using Modbus TCP/IP. Now the plant wants to push this count data upstream for use in leading-edge AI applications, but the Modbus communication protocol doesn't meet modern security standards. Data sent over a network via Modbus runs the risk of being changed or compromised. At the same time, the organization has no desire to change its current application.

Red Lion's FlexEdge® Intelligent Edge Automation Platform, powered by Crimson configuration software is designed to connect organizations to their data. It makes first mile processing as simple and secure as possible.

By plugging in a FlexEdge device, the plant can shield its existing application without changing the existing setup. Two sets of FlexEdge features help the plant access its first mile widget counts and transmit it to levels above:

◦ Protocol Conversion:

Red Lion's proprietary Crimson software converts up to 20 protocols from over 300 supported drivers. Whatever your Level 0 application, the FlexEdge can be plugged in to speak to it easily, creating a communication gateway to other levels.

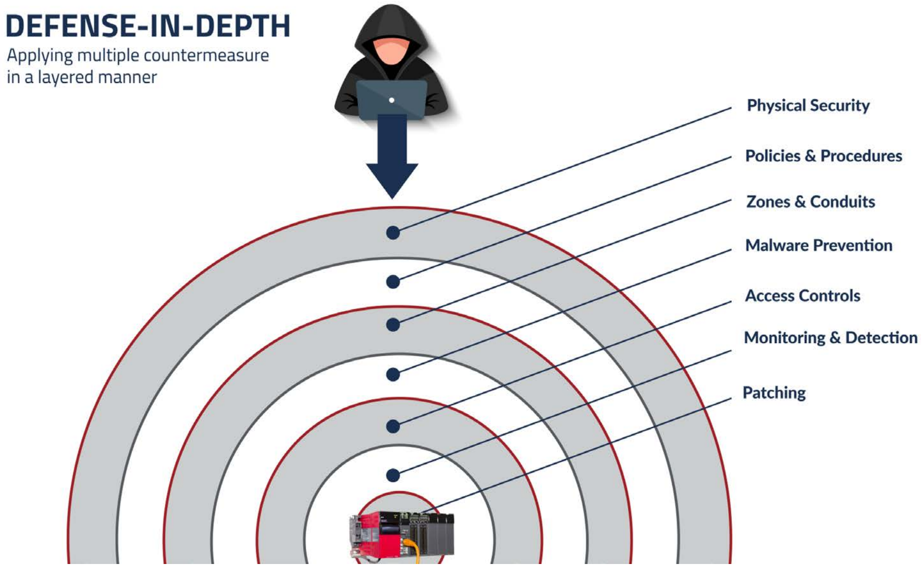
◦ Advanced Cyber Security Features:

A range of security options keeps collected data secure for transmission to upstream destinations. These include stateful firewall, access control list (ACL), packet filtering, VPN connections, Activity Directory (LDAP) integration and RADIUS authentication.

With a rugged, all-in-one platform, embedded industrial data can be captured reliably, then sent securely to any other destination on the network. That could be a SCADA package, a PLC on the network, a data historian application, or an IT-managed SQL server. The FlexEdge also connects any proprietary or outdated protocols to open standards such as OPC UA and MQTT.

THE FIRST MILE: YOUR DEEPEST DEFENSE

The ISA/IEC 62443 standards for OT cybersecurity, which reference the Purdue Model, are crucial for industrial organizations. A key principle of the standard series is the Defense-in-Depth strategy (see below), which layers security approaches on top of each other.



Cyberattacks can come from multiple directions – malicious software, an on-site hacker with a personal laptop, or a sophisticated infiltration attempt by a nation state. Adopting a layered strategy is the best way to protect industrial applications against would-be attackers – starting with the deepest layer.

IT departments have been applying these cybersecurity principles for years at the enterprise level. However, IT often has a different view on legacy technology than OT. IT routinely swaps out laptops and PCs every three to five years. For IT, cybersecurity updates often come embedded within that new hardware. As a result, IT specialists don't always grasp the needs and challenges of their counterparts in OT, who have valid reasons for keeping reliable applications around for a long time. To align their needs and objectives with IT, they need surer footing to navigate today's cybersecurity requirements and quality solutions to bring to the table.

Platforms like Red Lion's FlexEdge make it easier for OT to meet enterprise standards on security. By developing a deeper understanding of these principles, OT operators and control engineers can align their systems with everything AI has to offer without putting their organizations at risk.

For more on the FlexEdge All-In-One Edge Platform, visit www.redlion.net

About Red Lion

Red Lion is focused on being THE Industrial Data Company™. We empower industrial organizations around the world to unlock the value of data by developing and manufacturing innovative products and solutions to access, connect and visualize their information. Red Lion's global manufacturing and support facilities serve customers in factory automation,alternative energy, oil and gas, power and utilities, transportation, water and wastewater industry segments. We provide scalable solutions for cloud connectivity, edge intelligence and asset management, industrial Ethernet switches and industry leading panel meters and operator panels, to make it easy for companies to gain real-time data visibility that drives productivity.

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