The Manufacturer's Ultimate Guide

How to Realize Maximum Value from Cloud ERP and MES

And Why You Need a Platform to Do That

FUUZ™

CONNECT. TRANSFORM. EXTEND.

What's Inside

The Connection

Between Cloud and Data–Driven Manufacturing

53.1%

of organizations chose cloud over on-premise software[1]

76.5%

of organizations that selected cloud ERP used a SaaS model

60%

of organizations experienced budget overruns with their ERP implementation

When manufacturing businesses make the commitment to invest in cloud ERP (Enterprise Resource Planning), or an MES (Manufacturing Execution System) they are seeking a way to automate processes and access data for quality control and continuous improvement. Data-driven manufacturing is not a new idea but it goes by different names: Smart Factory, Smart Manufacturing, the Industrial Internet of Things (IIoT) and Industry 4.0. Bottom line, no matter how many names we give it, the purpose is the same: to capture data using cloud technology, to connect physical production with people and machines which are then connected with business management processes and software. And it's about one thing more. Achieving the mythic pinnacle — a connected ecosystem.

> "The cause of the increased budget overruns this year could have been the increase in the percentage of organization performing an upgrade.
>
> In our experience, an upgrade can leave an organization with functional gaps that can only be filled by the purchase of additional technology."
>
> Panorama Consulting, 2021 ERP Report

Your Guide

to Industry 4.0 Manufacturing Vocabulary

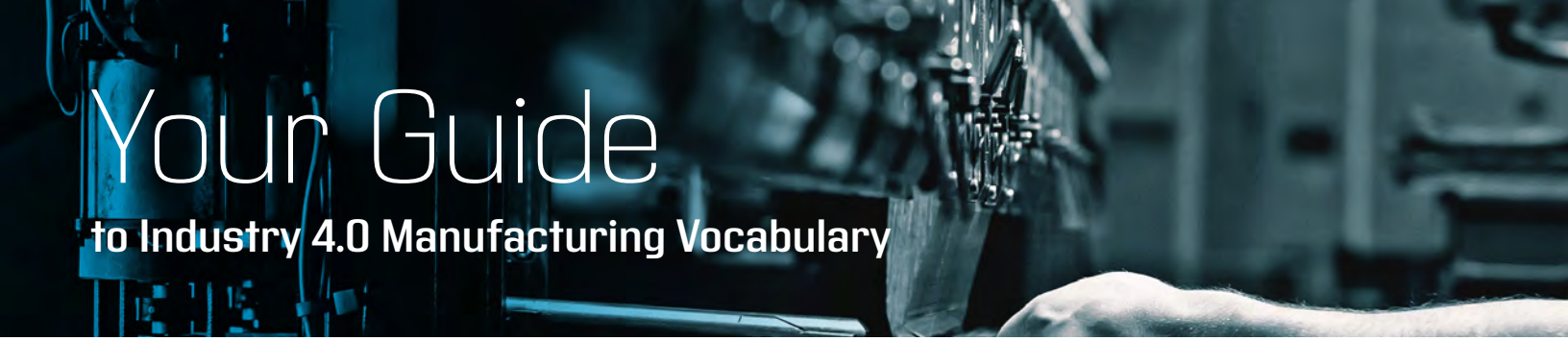
It's tough to keep up with the language used in an evolving technology environment. Here's a quick vocabulary guide to refresh your memory.[5]

Industrial Internet of Things Industry 4.0

We first started hearing about the "Internet of Things" in the late 1990s. Kevin Ashton, often called the Father of IoT, defines it this way: "The IoT integrates the interconnectedness of human culture – our 'things' – with the interconnectedness of our digital information system – the internet." It relates to the billions of physical devices collecting, storing and sharing data.

The Industrial Internet of Things (IIoT), also called Industry 4.0, refers to a fourth industrial revolution. It relates to the use of those billions of physical devices connected to the internet in a business setting to optimize industrial processes.

The watchwords are: sensors, wireless networks, big data, artificial intelligence and analytics, among others. It refers to the collection of data points across such industrial devices as PLCs, Weigh Scales, scanners, RFID readers, GPS and Bluetooth. It comes down to the connections between people, machines, ERP and MES solutions, and more.



Your Guide

to Industry 4.0 Manufacturing Vocabulary

Smart Factories

A “smart factory” is a broad term that can be applied to any manufacturing venue that has become digitized to collect data using technologies such as: GPS, RFID sensors, cloud and edge computing, robotic process automation, artificial intelligence and machine learning, vision systems, and augmented/virtual reality systems, among many others.

Digital Thread

The digital thread concept relates to the communication framework that underpins a smart factory and its delivery of a complete, real-time view of an asset’s data throughout its lifecycle. A digital thread traces every data point in a product’s life, from design to performance to maintenance and including supply chain and all related operational processes used to manufacture it. The promise of the digital thread includes real-time insights, more accurate and timely decision-making, optimized productivity, streamlined quality, efficiency and innovation.

Integrated Dev/Ops

Continuous integration and delivery are paramount. They are fundamental features of a robust operations platform. These tools provide a streamlined yet structured methodology that enhances functionality that business users can deploy.

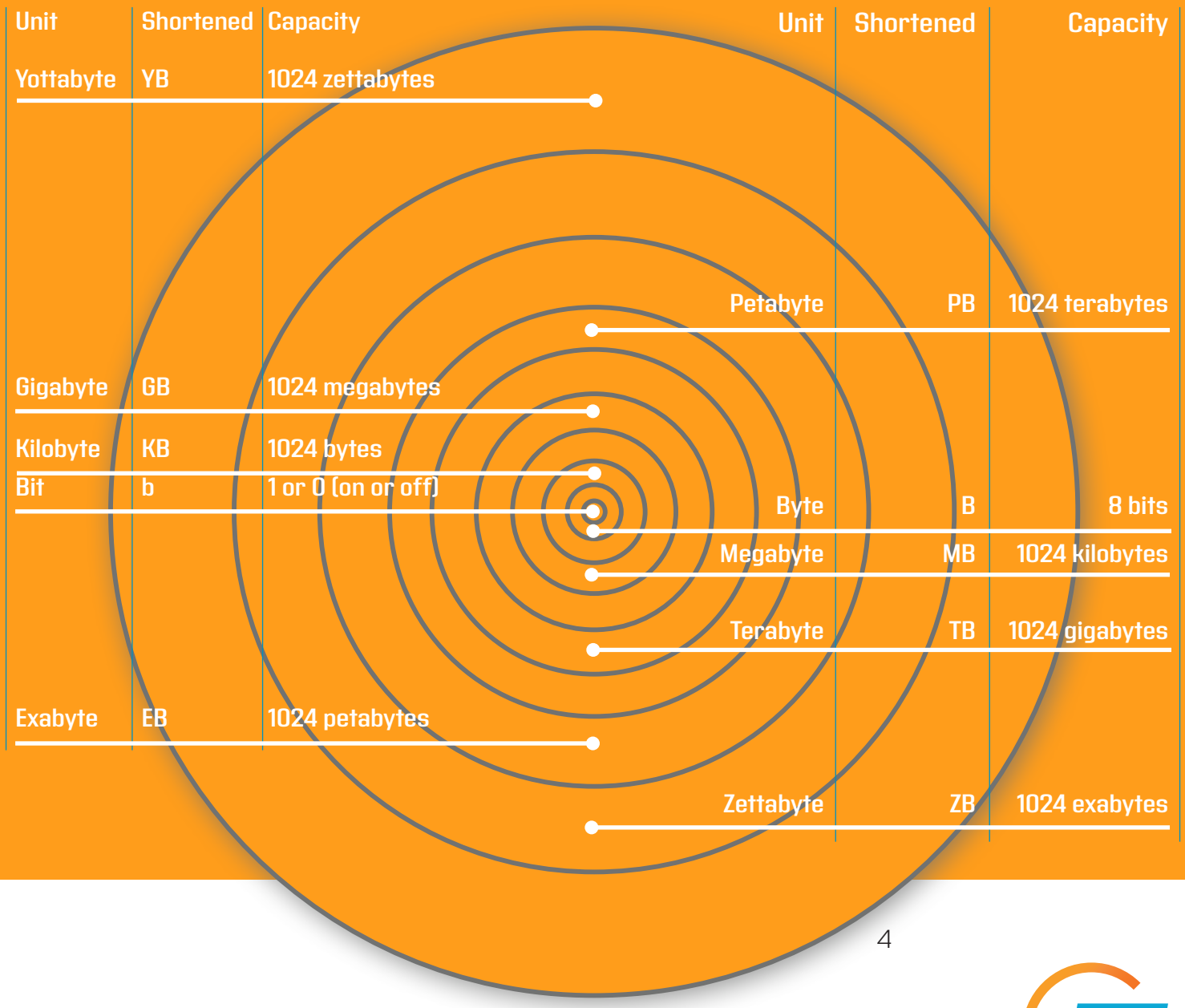
Integrated Dev/Ops ensures that users have total continuity across the enterprise no matter what new solutions or enhancements are made to the platform. The big takeaway is that integrated Dev/Ops is the opposite of versioned software that requires upgrades and costly re-implementations.

Is Big Data

Still a Big Deal?

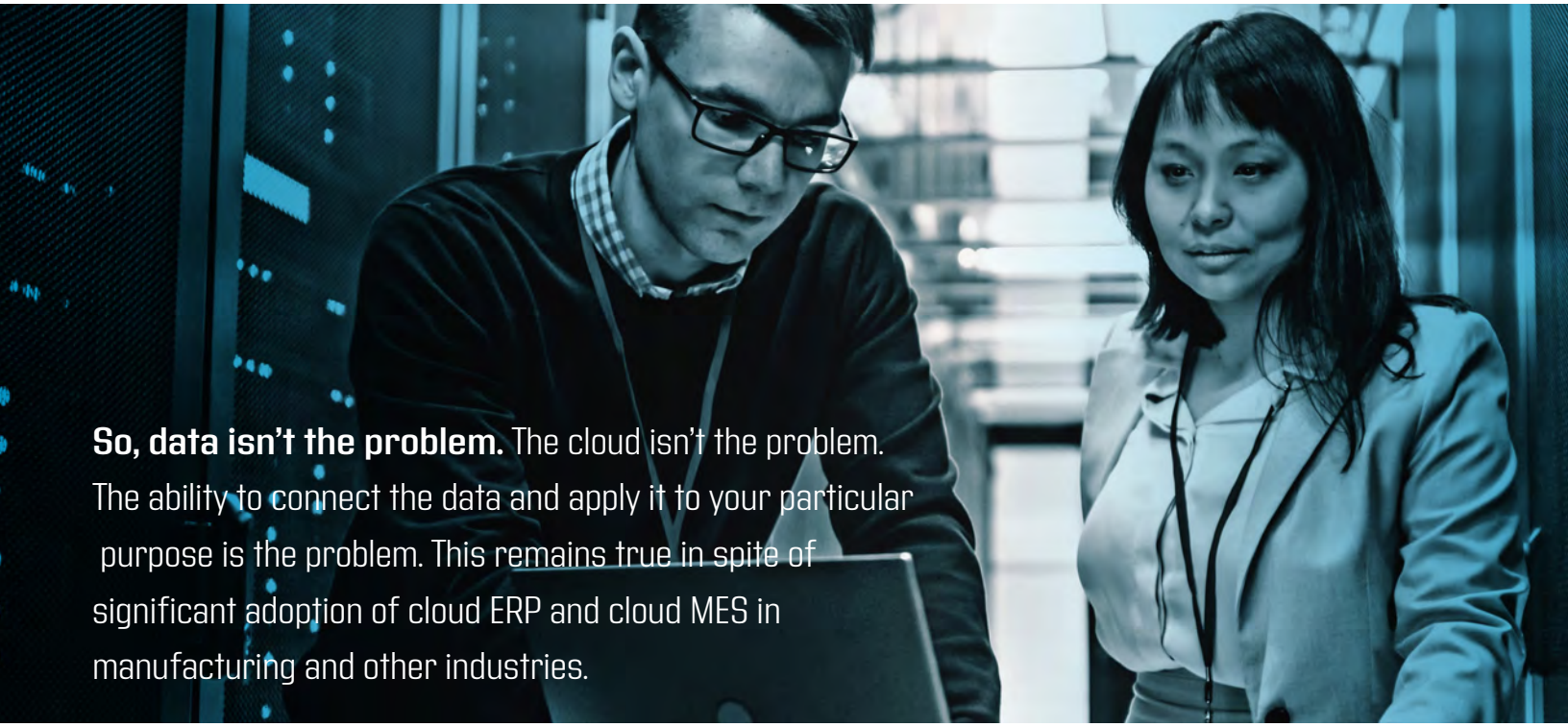
Big data, a buzz word since the early 90s, refers to very large groups of data (data sets) that require more processing power than onsite servers can provide. And yes, big data is a big deal. If manufacturers are to extract value from data of any size, predictive analytics for example, they need a cloud platform to keep pace with the velocity, the volume and the variety of data.

Factories are expected to add 22 zettabytes of data daily.[3]



The 7 Benefits

of Cloud Computing



So, data isn't the problem. The cloud isn't the problem. The ability to connect the data and apply it to your particular purpose is the problem. This remains true in spite of significant adoption of cloud ERP and cloud MES in manufacturing and other industries.

Before we look ahead to the future of cloud ERP and MES, let's take a moment to appreciate the enduring value of these enterprise systems. This value manifests itself in seven key characteristics.

1. Digitized:

The conversion of analog (paper-based) processes into digital business processes that leverage cloud technology and application innovation.

2. Standardized:

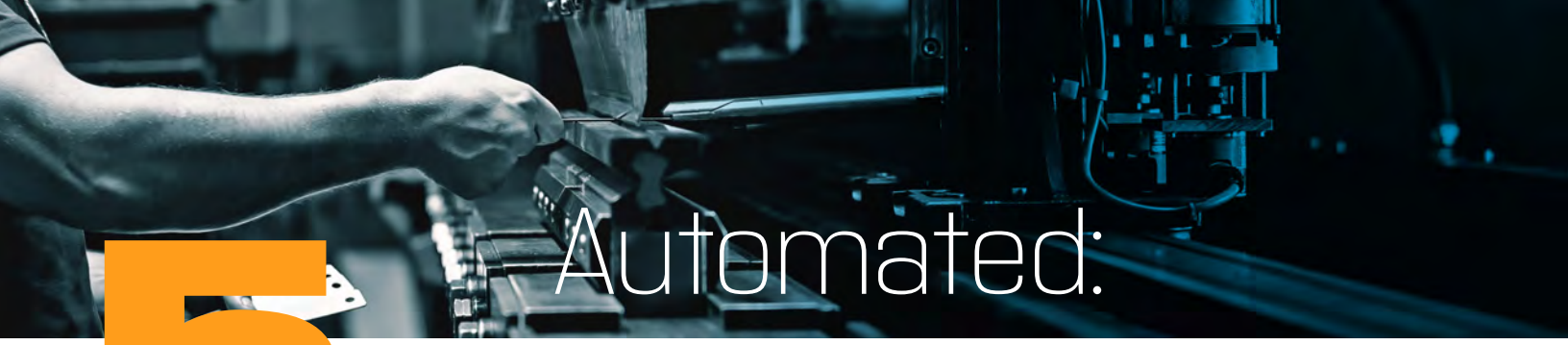
Consistent workflows are followed on a single, cloud-based platform. Complex information is organized and presented in a consistent format.

3. Transparent:

Current status is visible to all authorized users. A centralized repository of data provides real-time visibility into production, inventory, scheduling and more.

4. Collaborative:

Manufacturers and their supplier partners are familiar with Electronic Data Interchange (EDI), which became widespread in the 1990s. EDI SaaS (Software as a Service) enabled automated, paperless sharing of business documents between one company and another or among multi-plant facilities.



5. Automated:

An automatic exception-driven process provides early warning on everything from over-scheduling of machines and their operators and change orders from a customer, to anticipated inventory shortfalls and resource bottlenecks that require revised scheduling, both up and downstream.

6. Secure:

Access is restricted to authorized users and all data is encrypted. And, unlike on-premise servers, information is automatically backed up in the cloud, protecting data in the event of fire, flood or other natural disasters.

7. Analytical:

The ability to create reports and dashboards enables real-time monitoring of the health of your business. Things like: order discrepancies, quality assurance (QA), Overall Equipment Effectiveness (OEE), insight into worker time per job, cash flow and any back-office operation, to name a few.

Why Cloud

ERP and MES Implementations are Actually Installations

Look at it from the perspective of the cloud ERP provider. They have this great, soup-to-nuts enterprise software with modules built for specific industries. But what the ERP industry calls implementation is really an installation of comprehensive and complex software. The installation includes training for its users and help with getting the ERP software launched.

Of course, ERP providers also map the way work gets done inside their customers' businesses. The starting point is often a mix of spreadsheets and point solutions that require extensive process evaluation and complicated project management prior to the go-live launch of the new ERP software.

But in spite of all the planning and managing, ERP software cannot meet the specific needs of each unique business. It wasn't built for that purpose. ERP software was built to serve large, well, enterprises.

Almost every business needs to digitalize key processes such as finance, human resources and customer relationship management (CRM). It's no surprise then, that ERP providers focus their software development on these key operational areas of the business because it's a huge, global market.


The global ERP software market size is expected to reach USD 93.34 billion by 2028, exhibiting a CAGR of 9.2% during the forecast period. (2020-2026) [5]

The Illusive

ERP Implementation

If ERP installation is the norm, what does an implementation look like? It looks expensive, time-consuming and illusive, particularly for manufacturing businesses. Though all of the major ERP players, NetSuite, SAP, Epicor, Plex, Infor and QAD, to name a few, offer industry-specific modules, it isn't feasible for these companies, and others like them, to offer complete, in-depth solutions that meet all of the needs of every industry. And so it was that ERP implementations developed a bad reputation.

The Point

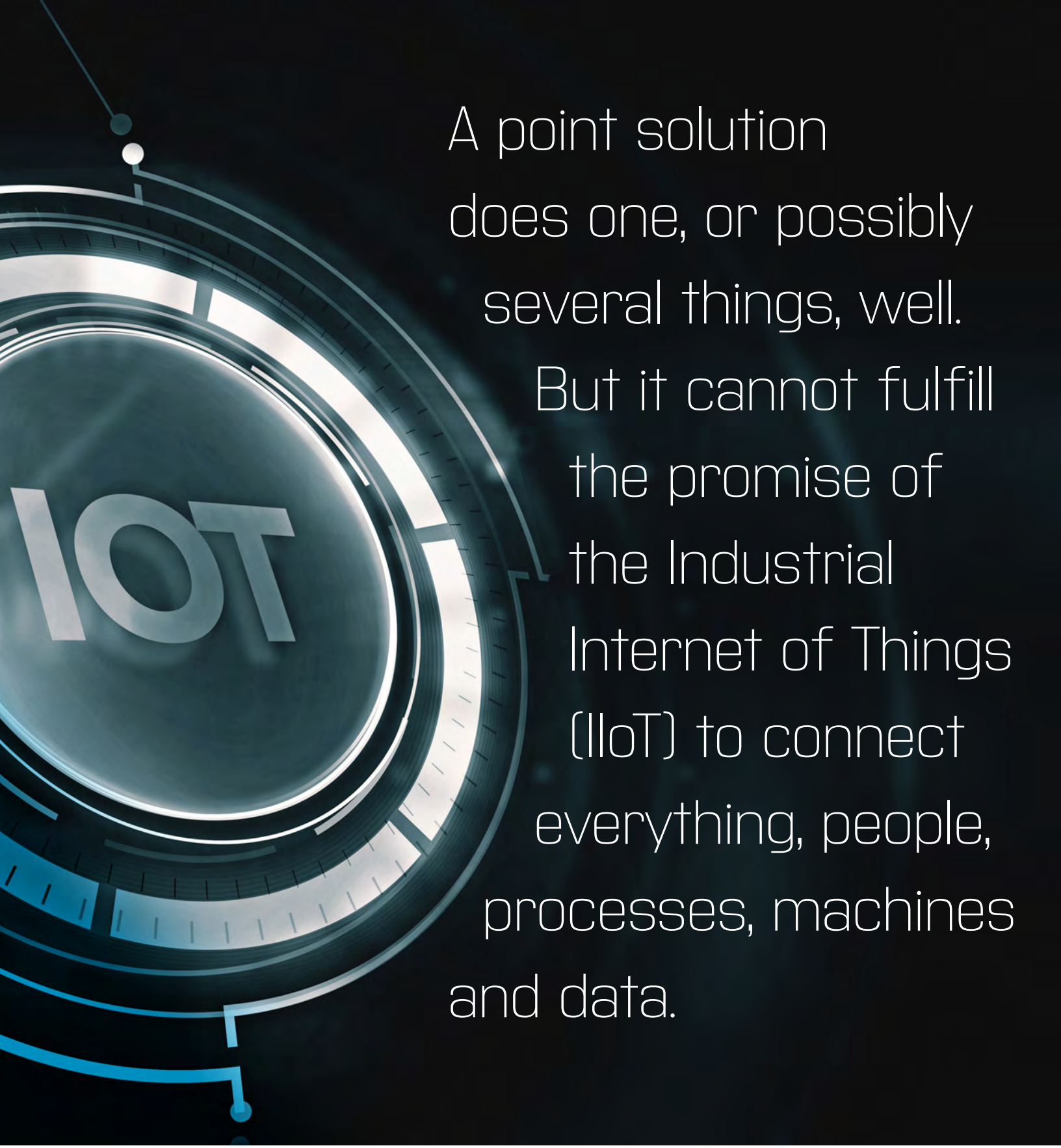
of High–Performance ERP Isn't a Point Solution

Cloud ERP is the polar opposite of a point solution. It is a big solution built to solve the most common problems that the majority of mid–market and large businesses face: inefficient manual processes, information siloes, disconnected or out of date software, and the absence of real–time data; essential to forecasting, increasing efficiencies and running a more profitable business.

Seeing an opportunity to fill the space between a customers' disappointment with their ERP system and their desire to tailor the solution to meet more specific needs, other software makers positioned themselves as point solutions.

Point solutions are supplemental apps, also known as ERP or MES bolt–ons. They are built to do a specific thing. For example, there are apps that connect your RFID handheld scanners to a printer, to automate the printing of RFID–encoded labels that recipients can scan to upload the associated data.

This is a useful solution. But when a business continues to add point solutions in search of the perfect fix, the solution environment becomes too complicated, unwieldy and ultimately, counterproductive.



A point solution does one, or possibly several things, well. But it cannot fulfill the promise of the Industrial Internet of Things (IIoT) to connect everything, people, processes, machines and data.

Why an

Applications Platform is the Future ERP and MES

Just like Goldilocks when she committed home invasion on the bear family, point solutions are too small and ERP is too big. This leaves businesses, particularly manufacturing and industrial businesses, with their very specific challenges in search of the just-right solution.

Cloud ERP, which was widely adopted in the early-to-mid 2000s was a big leap forward. It will continue to be a driving force of innovation for years to come even as the next generation of innovation is waiting in the wings, ready to make its debut.

Give a big round of applause to the unified applications platform where developers can build applications quickly and connect those apps to other apps, all of which connect to people, processes, machines and data.

The applications platform is just about the best thing to ever happen to small and mid-sized manufacturing businesses. Particularly for businesses who may not have a Dev/Ops team. Why? Because an applications platform also offers no-code tools so that business execs or salespeople can write the applications they want using a WYSIWYG editor.

Your Guide

to Applications Platform Vocabulary

An innovation comes with new terms and its own descriptive language.

Here's a crash course in the vocabulary of applications platforms.[6]

Your Guide

to Applications Platform Vocabulary

Applications platform

Some are calling "digital applications platforms" the new ERP. Forrester reports that digital applications platforms "integrate orders and production schedules with shop floor execution, elevating operational tech–nologies like digital twin and internet of things (IoT) to a business level and enabling manufacturers to satisfy their customers' insatiable demand for speed and choice while balancing profitability."[7]

A recent article from TechTarget states that an applications platform operates across five principal areas:

- Development tools
- Execution services
- Data services
- Operating systems
- Cloud services

Your Guide

to Applications Platform Vocabulary

Integrated Developer Environment (IDE)

Software developers use an integrated developer environment for building and testing new software applications into a single graphical user interface (GUI). It might include various tools for writing and editing code, compiling, building automations and testing/debugging software applications, among others.

Event–Driven Architectures (EDAs)

EDAs are software models that revolve around "events." In event programming, an event results from an action taken by a user – programmers write code that is executed when different events occur. In general terms, examples of events include user actions, sensor outputs and messaging, among others.

Your Guide

to Applications Platform Vocabulary

Digital Toolchains

Quite simply a digital toolchain is a group of programming tools IT developers use to carry out complex tasks or create software. Sometimes these tools are activated in sequence, so that output from one tool becomes input for the next and so on.

Integrated Dev/Ops

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Integrated Dev/Ops ensures that users have total continuity across the enterprise no matter what new solutions or enhancements are made to the platform. The big takeaway is that integrated Dev/Ops is the opposite of versioned software that requires upgrades and costly re–implementations.

Back to T.O.C.

In 2022

Forrester Predicts

At least one–third of enterprises will focus on Event–Driven Architecture.

Global cloud app spending will reach $226.9 billion.

Cloud platform services will reach $70 billion.

50% of enterprise development teams will shift to consolidated Dev/Ops toolchains.

50% of enterprises will rely on these toolchains, which will essentially become another platform as a service.[8]

Back to T.O.C.

Digital

Evolution is the New Digital Transformation

As the second decade of the 21st century began, the fundamentals of digitized processes were in place. Searching for a way to rapidly create and deploy process-specific applications, Dev/Ops teams led the evolutionary shift to an Event-Driven Applications (EDA) platform. Rather than a succession of one-off fixes to large problems, the platform would serve as the home base for the development of very specific applications that connect to other applications, including ERP and MES software.

Instead of monolithic ERP or fixed MES solutions, businesses are moving toward a unified platform approach. A platform connects existing ERP and other business technologies that would not traditionally work together. This extends business possibilities and transforms the way that companies, especially those with complex production processes, do business.

The purpose of an applications platform is to act as a foundation. Users can install existing software, like ERP or MES solutions. But users can also use the platform to build applications to meet their specific business needs.

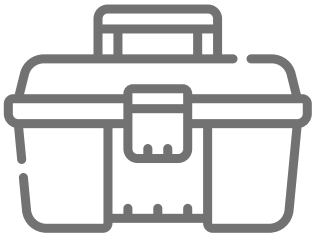
ERP and MES were built to be transformational, to change the fundamentals of business processes from analog (paper-based processes) to digital. The platform enables rapid development of applications that can solve problems particular to that business. It bridges the gap between enterprise software and all of the things the business needs to connect: business processes, people and machinery and other software.

An Applications

Platform is Like...

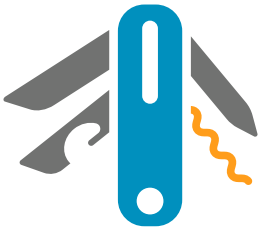
Your Smartphone

Think of an applications platform in the same way you think of IOS or An–droid. You get a new smartphone and it comes with a core set of things like a clock or a calendar. You use the app store to implement or install the things that you need to make yourself useful, or not, depending on the app. If you're all about TikTok or Instagram, you're going to put those apps and others on your phone. That's the concept of an applications platform.



A Tool Box

You can also think of the platform as the box where you put all of your software development tools. You've got the flathead and the Phillips–head screwdrivers, the wrench and so on. The very best applications platforms provide the equivalent of a mechanics tool set for an IT professional or CIO. This lets an IT person be a carpenter one day and a car mechanic the next.

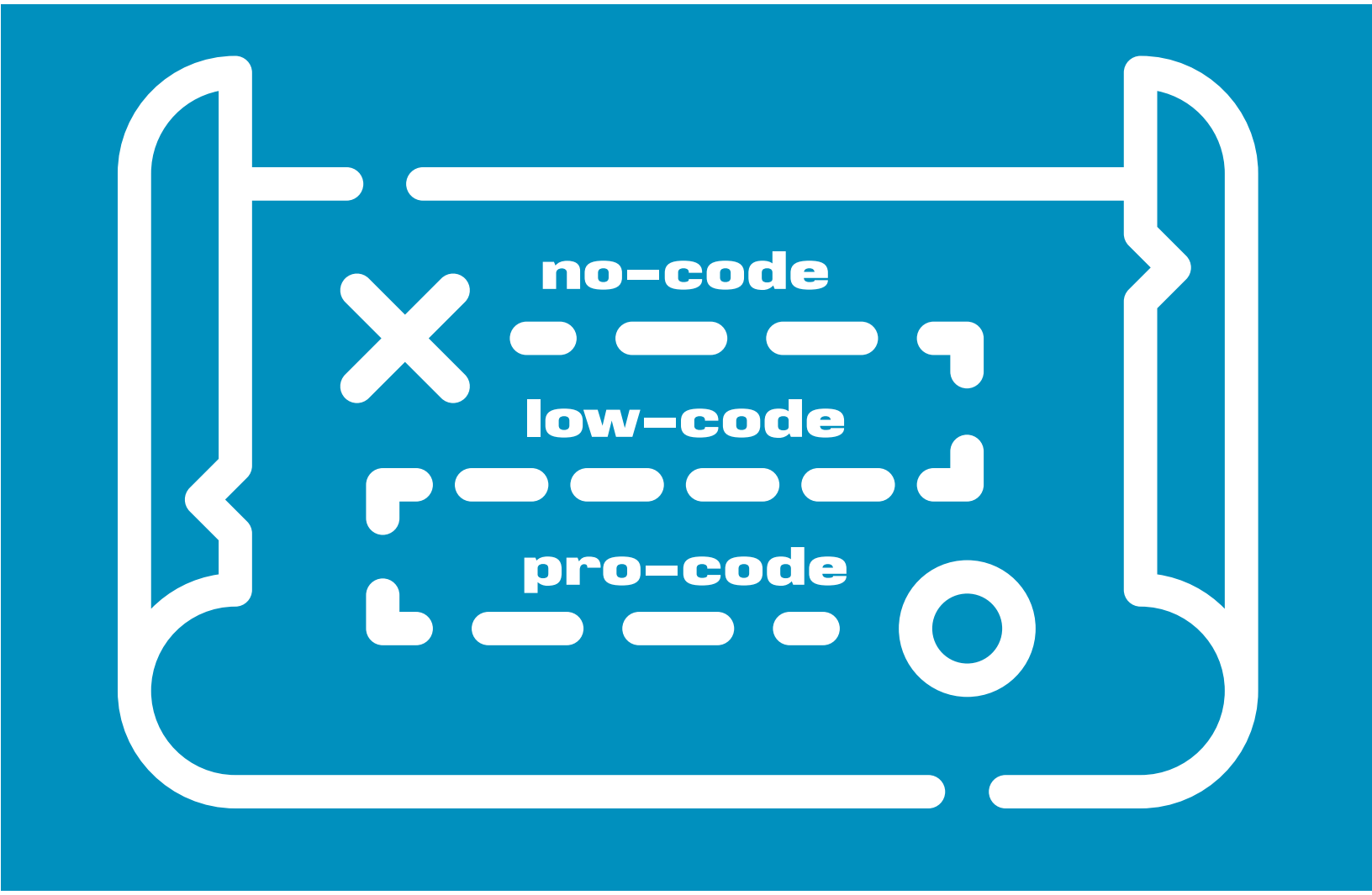


A Swiss Army Knife

In a way, an applications platform is also like a Swiss Army knife. It has all of the implements a developer needs in one place, a single, real–time environment. A unified applications platform enables software developers to integrate separate things (pro–cesses, people, machines, data and other software). Equally important, a unified platform approach enables the creation of flexible applications that fulfill very specific needs without the limitations of legacy enterprise systems.

What to Look for

When You're Ready to Look for an Applications Development Platform



Begin your search with the idea that the very best applications platforms offer a no-code, low-code and pro-code approach to building new applications. This broadens the potential of the platform to serve different kinds of users: the IT professional, the casual HTML coder and the business executive who want to script their own apps using a drag and drop Graphical User Interface (GUI) that enables app development without complex scripting or database design.

The Top 7 Questions

You Should Ask an Applications Platform Provider Before Buying

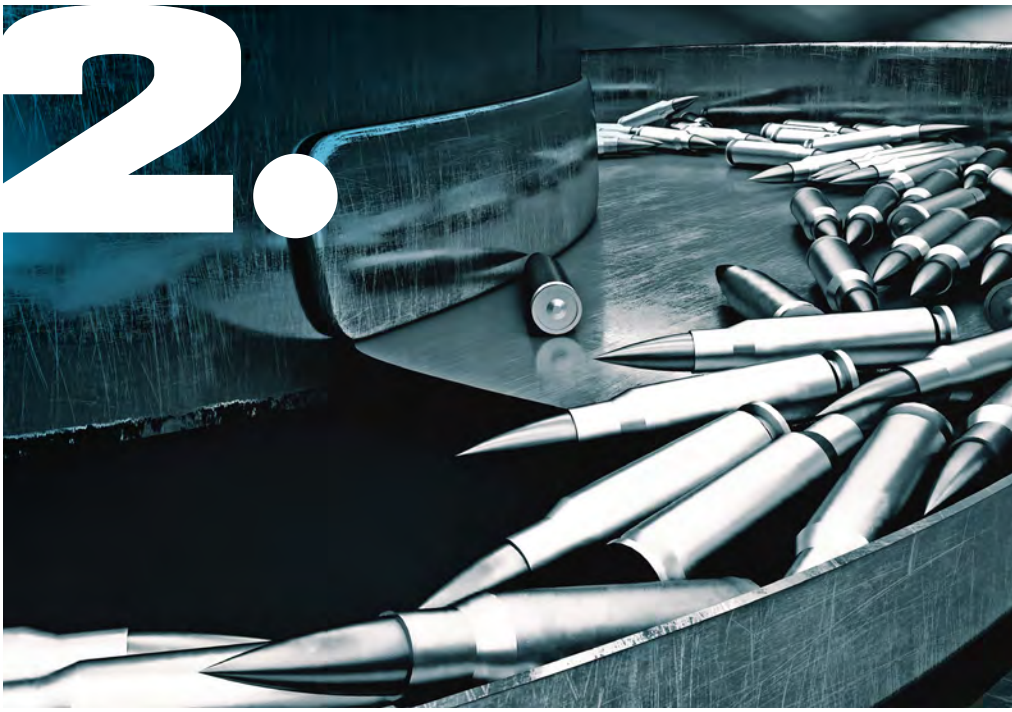
1. Do the people behind the platform have a deep understanding of my industry?

They should. In order to develop apps, particularly for manufacturing and industrial businesses, the platform provider should have in-depth understanding of plant floor operations and how they intersect with business software such as Finance, HR and CRM.

2. Does the platform come with pre-built apps?

It should. Look for features like these:

- no-code, low-code, pro-code scripting capabilities.
- A robust database designer with no-code, low-code capabilities.
- A document designer that enables the creation of any type of document from a barcode label and a packing slip to an invoice and so on.
- A dashboard designer that collects data on the platform and data pulled from other systems integrated on the platform.

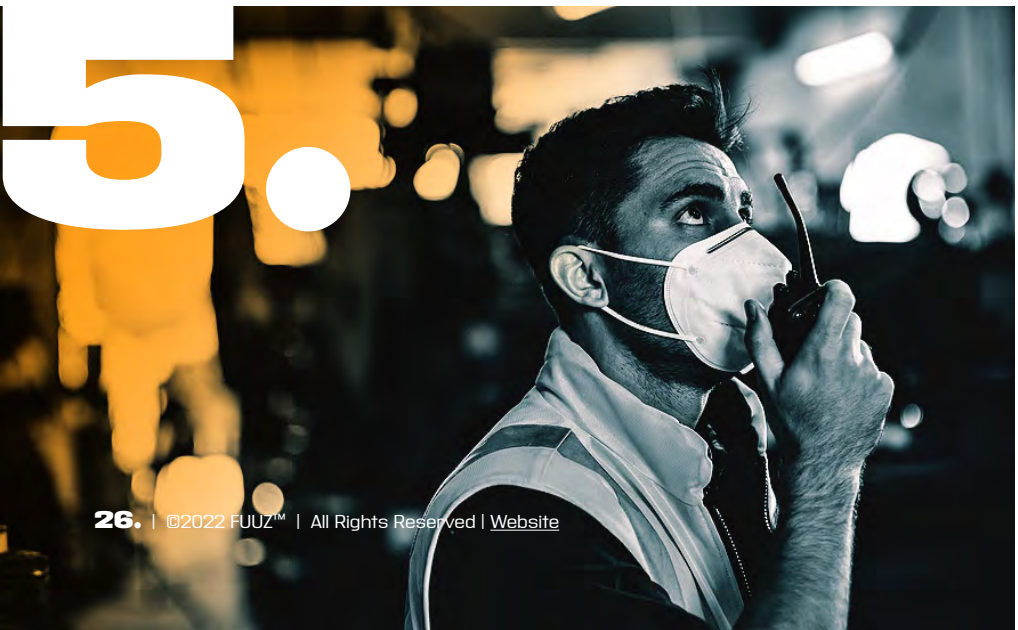


Does the platform include a fully–integrated device gateway without relying on third party applications?

It should. The value of a native gateway is that it allows users to connect with their industrial equipment, people, file folders – literally any source of digital information that is behind your firewall.

Does the platform come with pre–built connectors to my existing software?

It should. Pre–built connectors enable you to inject functionality directly into the business applications your staffers already know and use. This feature eliminates the need for additional software training and additional logins and it reduces administration time.



Does the platform include a browser extension?

It should. A browser extension enables platform users to login to software implemented on the platform without the need for additional login credentials. A time–saving feature with aggravation–reduction benefits.

Back to T.O.C.

The Top 7 Questions

You Should Ask an Applications Platform Provider Before Buying

Does the platform resolve the problems I have with my existing ERP or MES?

It should. An applications platform enables rapid development of apps that can extend your existing solutions and personalize them to meet your business's unique needs.

Should an applications platform be delivered as a multi–tenant cloud?

Yes, it should. The value of a multi-tenant cloud platform is that every user gets the same software updates at the same time. Cloud applications that are not multi-tenant isolate your instance of the software. The result is that software updates and patches come at a much slower pace, increasing the possibility of system downtime and complicating the administration of different versions in use across the business. Multi-tenant matters. And not every cloud is multi-tenant.

Look for Pre-Built

and Extensible Industry-Specific Applications Like These:

IoT/IIoT Integrations

Machine Monitoring

PLC Integrations

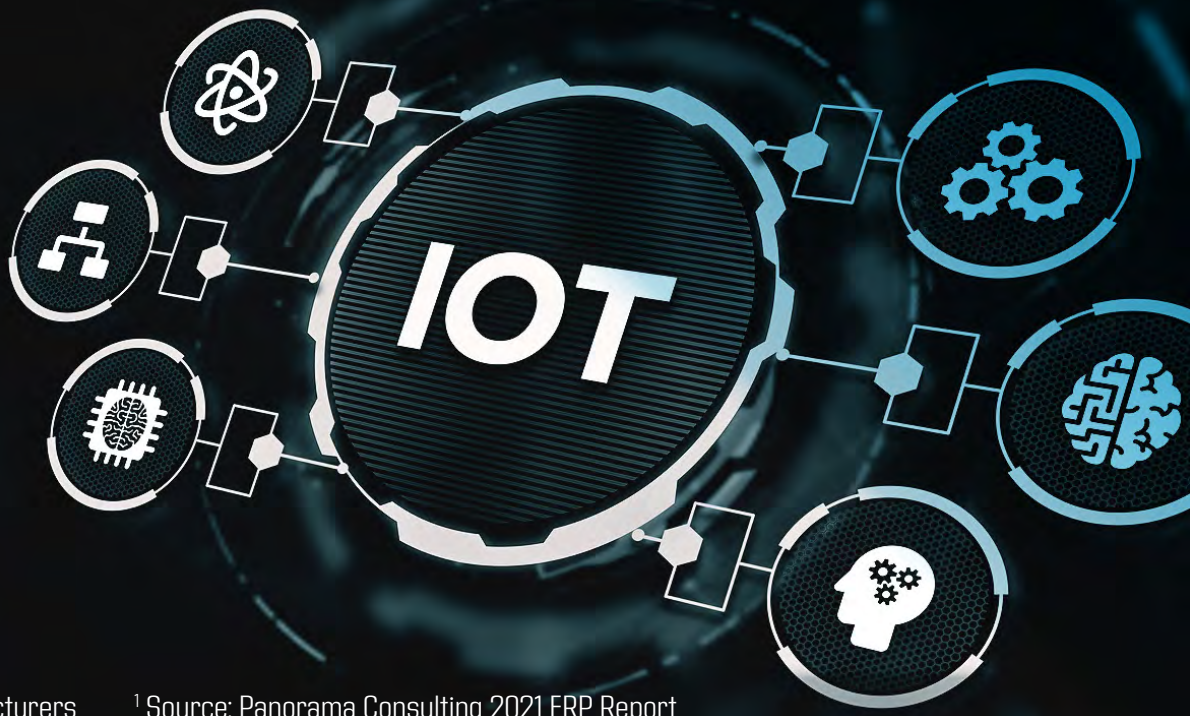
Manufacturing Execution

iPaas Integrations

Warehouse Management

Transportation Management

Mobile Apps



We hope you find The Manufacturers Ultimate Guide useful as you explore the potential of a no-code, low-code, pro-code applications platform to fulfill the promise of IIoT and connect, every part of your business: people, processes, machines and existing software like, but not limited to, ERP or MES software.

[1] Source: Panorama Consulting 2021 ERP Report

[2] Source: The National Institute of Standards and Technology (NIST)

[3] Source: World Economic Forum

[4] Source: Data Storage Solutions Review

[5] Source: Globe Newswire

[6] Source: TechTarget Alexander S. Gillis, Definition: Application Platform

[7] Source: The Forrester Report, Stephen J. Bigelow, September 2020

[8] Source: Forrester, The Global SaaS Landscape 2019 – 2022

Fuuz™, from MFGx, is a no-code, low-code, pro-code applications platform that delivers Industry 4.0 to manufacturing businesses across industries. With rapid deployment of stand-alone apps and connectors to existing software, businesses can capture data, connect processes, people and machines — all in a single platform ecosystem.

Get in touch. We're here to help.

FUUZ™
CONNECT. TRANSFORM. EXTEND.