Microsoft | SAP

SAP Solutions on Azure: The Trusted Path to Intelligent Manufacturing

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The Advent of Intelligent Manufacturing

In the digital age, cloud computing has become one of the manufacturer's most essential tools for long-term market success. Enterprise-ready cloud platforms like Microsoft Azure are lowering the barriers to digital transformation and delivering the technology foundations to power a new breed of intelligent manufacturer. These future leaders are perceptive, agile, and responsive in ways that have never been possible before, redefining the business of manufacturing and helping to unleash a new wave of industrial innovation.

To thrive in today's world, manufacturers are faced with several uniquely modern challenges. Business customers expect them to deliver great products in the moment, turning on a dime to meet fast-changing consumer needs at high quality and low cost. Skill gaps and talent shortages for new manufacturing jobs erode workforce productivity and threaten economic performance. Factories that still use traditional, manual production methods struggle to adapt and compete in fast moving and highly competitive markets. These are tough challenges, but companies who take them on successfully will open new opportunities for growth and gain a powerful edge over rivals.

With decades of shared experience providing best-in-class digital solutions for enterprises, Microsoft and SAP are in a unique position to help manufacturers claim the promise of the future. Our products are already trusted by companies around the world to run the business, while our growing cloud partnership is putting the power of digital transformation within reach for manufacturers of all sizes. Along with the proven security and reliability of Azure for SAP solutions, the two companies are delivering the trusted path to intelligent manufacturing.

As of April 2019,
72%
of SAP clients were already moving to the cloud

> " Building on our long-time partnership, Microsoft and SAP are harnessing each other's products to not only power our own organizations, but to empower our enterprise customers to run their most mission-critical applications and workloads with SAP S/4HANA on Azure.
>
> **Satya Nadella,** *CEO, Microsoft*

Microsoft

Key Trends in Manufacturing

Data-powered enterprises bring intelligence to every corner of the business

While consumers today enjoy the benefits of personalized data feeds wherever they go, enterprises have been slower to harness the value of their own data assets. Traditional IT solutions with walled-off or inaccessible data stores have prevented them from gaining a complete view of the business. Now, with increasing adoption of modern and highly integrated cloud platforms, the data-powered enterprise has begun to emerge.

Today's innovative manufacturers are unlocking the value of data by tearing down silos and driving intelligence into every part of their operations. By combining data from all sources—whether human or machine, internal or external, or from new or legacy business systems—they can read the heartbeat of the business in a way that has never been possible before. AI-enhanced data processing techniques applied to pooled data can provide immediate insights on supply chain problems, quality fluctuations, logistics bottlenecks or even changes in market sentiment or customer demand. These capabilities give companies the digital instincts to manage change effectively and thrive in even turbulent business climates.

$3.71T
When fully integrated, new technologies could create up to $3.7 trillion of global GDP by 2025.[1]

76%
expected increase in worker production as a result of AI.[2]

#1
Predictive analytics is the #1 use case for artificial intelligence for enterprises across manufacturing.[2]

70%
expected increase in demand for products and services as a result of AI.[2]

Microsoft
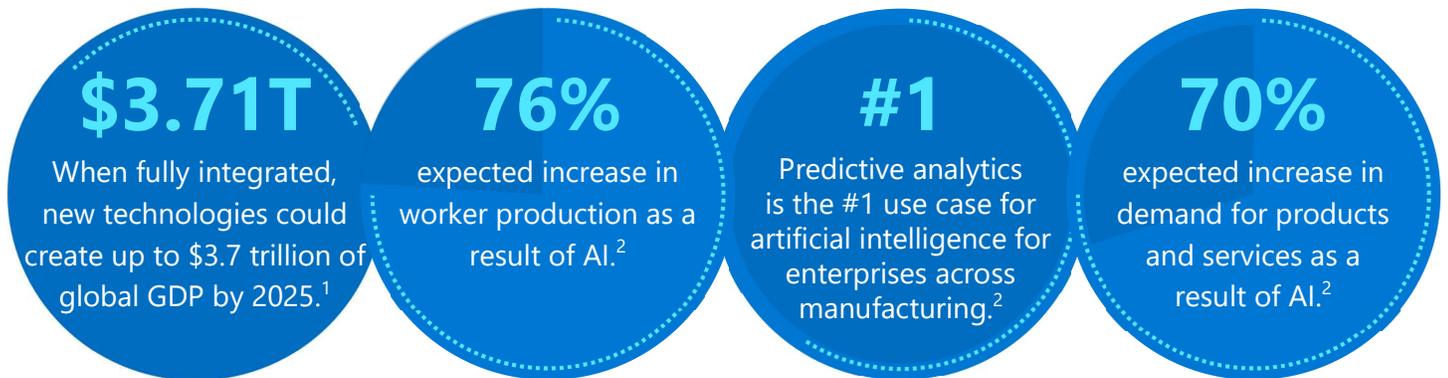
The emergence of the smart factory empowers new levels of productivity and business performance

In recent years, competitive disruption has forced manufacturers to consider how they can use modern technology to fundamentally reimagine factory operations. Consumer expectations of faster and more personalized offerings has brought a whole new level of complexity to manufacturing, forcing even large companies to become as nimble and dexterous as a startup.

Intelligent manufacturers are learning to meet these challenges by fully leveraging their end-to-end business data, interconnected operations and cutting-edge technologies like AI, machine learning, and IoT to create highly flexible digital smart factories. These factories of the future use intelligent self-optimizing processes with the ability to detect inefficiencies and error patterns without human intervention, helping continuously maintain peak line velocity and output quality. They tap external customer and market signals to predict demand and adjust production flows on the fly, enabling more direct models of responsive and personalized manufacturing.

17-20%
Manufacturers are seeing an average 17-20% productivity gain from smart factories.[3]

91%
of innovative discrete manufacturers say that machine learning is very important to achieve their digital transformation goals.[4]

57%
increase on average of the contribution of machines and algorithms to specific tasks by 2022.[5]

Microsoft

The convergence of IT and OT gives organizations end-to-end operational visibility and control

Even as enterprises have become increasingly digitized in recent years, operational technology (OT) in manufacturing has lived in a silo, with machines continuing to be managed by human input. With the advent of the Industrial Internet of Things (IIoT), that has now started to change.

Today, the machines that do the physical work of manufacturing are being upgraded with smart sensors and controls to bring them into the digital world. These connected assets can communicate status and receive input directly, providing new ways for teams to monitor and automate production lines. Device signals can report on equipment health and maintenance needs or help identify efficiency problems either at the individual machine level or in the interactions between machines over an end-to-end production workflow. By incorporating this operational data with existing IT systems and line-of-business applications, manufacturers gain an integrated view of the production landscape and fine-grained control over the physical processes that determine factory performance.

20%
Potential increase in production capacity by integrating IT systems with OT.[6]

90%
of manufacturers will leverage real-time equipment and asset performance data to self-diagnose issues and trigger service intervention to avoid unplanned downtime by 2021.[7]

$15T
IoT is projected to create $15 trillion in global GDP by 2030.[8]
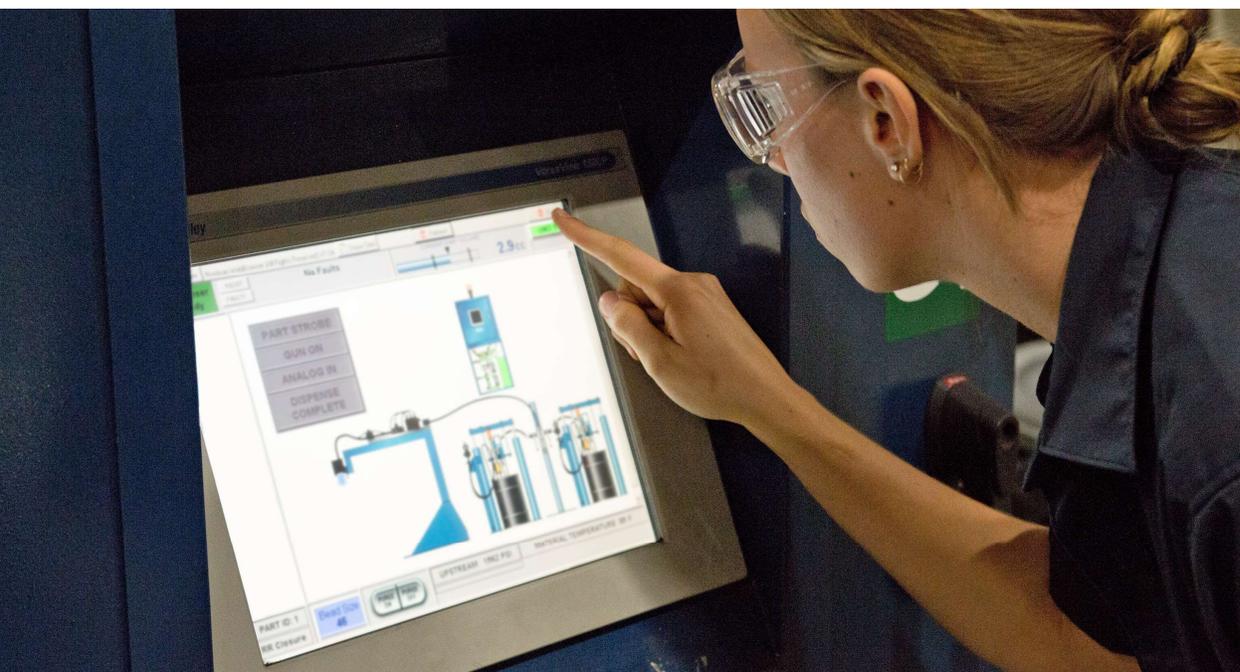
The new digital workplace is changing the game for employee development and productivity

In today's world, manufacturers navigating the twin forces of automation and digitization are facing a crisis developing a talent pool that meets their business needs. A lack of interest in manufacturing career paths among new workers and a shortage of modern skills create gaps that reduce workforce productivity and lower business performance. At the same time, repetitive work continues to be the norm in many traditional manufacturing roles, resulting in low employee engagement and high levels of attrition.

To build the next-generation industrial workforce, organizations are creating a cycle of empowerment that ensures its people thrive at every phase of the employment lifecycle. Better branding of modern manufacturing job experiences and more open recruitment processes help nurture diverse and sustainable talent pipelines. Employee development models that use AI to predict training needs and assistive digital tools to augment skills help companies get more value from their human resources. Immersive user experiences driven by machine learning and intelligent automation put real-time guidance at user fingertips and foster a more creative work environment. These and other strategies are helping manufacturers grow a committed and future-ready workforce to compete effectively in the digital age.

60%

of manufacturers will have empowered shop floor workers with augmented reality, intelligent apps and cobots by 2021.[9]

75%

of manufacturers will provide their service teams access to searchable video content through mobility and wearables by 2021.[10]
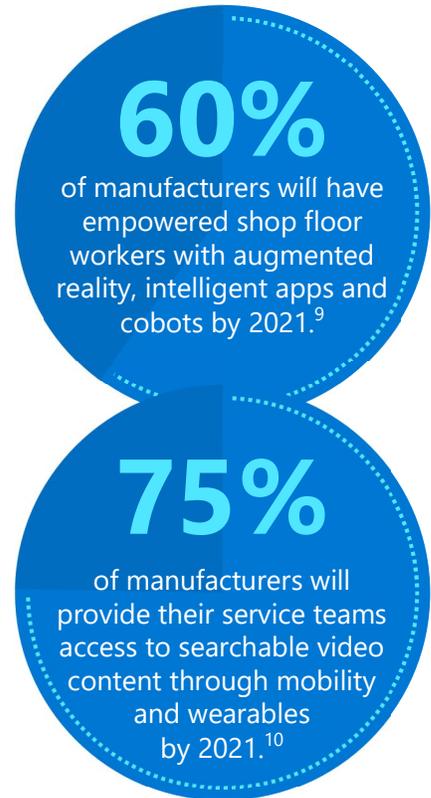
# The Business Case for Cloud-Enabled Manufacturing

The forces driving digital transformation in the manufacturing sector today present an existential threat to producers who can't evolve quickly enough to keep pace. Yet legacy systems and infrastructure built for a previous era are too limited and inflexible to support modern intelligent manufacturing imperatives. Companies need a new platform for operating the business that gives them the insight and agility to outmaneuver rivals. At the same time, they need to know that the value to be gained from cloud migration will make the significant investments needed worthwhile.

Microsoft and SAP are providing a compelling path to manufacturing transformation with state-of-the-art, data-driven intelligent technologies provided through SAP solutions on Azure. By migrating SAP to Azure, enterprises can modernize their operating strategy and increase competitiveness through jointly optimized cloud services that help them achieve several key goals:

- Engage workers with digitally enhanced experiences that improve productivity and fill skill gaps

- Leverage IoT tools to integrate physical factory assets with digital operations and improve production outcomes

- Integrate core manufacturing data from SAP with other 3rd party and external data to unlock powerful insights from across the business and value chain

- Deploy AI and machine learning tools to create autonomous and self-optimizing processes

- More quickly identify growth opportunities and increase focus on innovation

A Forrester study published in 2019 found that organizations who migrate SAP to the Azure cloud typically can expect more than a 100% return on investment within 3 years. These and other findings from the study can be seen in the table below. They present an exciting picture of the long-term business value manufacturers can gain through digital transformation with SAP solutions on Azure.

Quantitative Value Assessment

Three-year risk adjusted financial impact summary*

$7.2M: Avoided cost of on-premises hardware

$3.3M: Faster time-to-market for SAP releases

$3.1M: Avoided cost of overprovisioned hardware

$1.2M: Reallocation of IT staff managing SAP

$1.1M: Avoided cost of physical data center space

$15.9M

$7.9M

Benefits   Costs

$8.0M NPV

102% ROI

9 Month PAYBACK

4 months
Average delay avoided per SAP release

50% Reduction in staff required to manage SAP infrastructure by Year 2

50% Reduction rented data center requirement by Year 2

100% Reduction of SAP release delays due to rapid spin-up of test environments to correct delay-causing errors

*Forrester, The Total Economic Impact of Microsoft Azure for SAP, March 2019

The Three Pillars of Intelligent Manufacturing Transformation

01

The Intelligent Supply Chain

The demands on industry in the current digital climate have exposed significant weaknesses in traditional manufacturing materials planning and supply chain management methods. Modern manufacturers need something new—a next generation platform that gives them situational awareness and actionable insights across the value chain in real time. Companies who migrate SAP to the Azure cloud upgrade to an intelligent supply chain that helps them improve operational efficiency, get products to market faster, and synchronize global supply chain processes.

Improve efficiency:
Leverage data to make supply chain operations seamless

With data from SAP and other core systems pooled into Azure Data Lake, companies can use Azure analytics and Power BI dashboards to monitor supplier status, inbound materials flows and logistics in real time. Through Azure, they can overlay operating status with external data such as road closures or inclement weather to predict problems before they can impact production schedules or customer deliveries. And by connecting market and demand impulses to resource planning, they can improve forecasting and deliver more tailored customer service.

Accelerate product cycles:
Tap 360˚ insights to get to market faster

With SAP solutions on Azure, manufacturers can use powerful Microsoft analytics tools to uncover sales trend and customer preference insights that help them continuously optimize production targets and revenue. By expediting planning cycles in coordination with supplier networks and logistics providers, teams can get products to market faster and deliver tailored product variants at scale. Azure process orchestration helps manage the back-end workflows automatically, so the right products are always being produced for the right customers at the right time.

Standardize processes:
Achieve consistency across global operations

Large multi-national organizations have their own unique challenges unifying business platforms and keeping processes synchronized across regions. With SAP solutions on Azure, companies gain a holistic view of their global operating landscape to enable more standardized supply chain management governance. And large or small manufacturers alike can benefit from Azure's global footprint, giving them the ability to instantly spin up new SAP workloads in-region to run test marketing campaigns or pursue local growth opportunities.

DAIMLER

Daimler AG is digitally transforming its business, from vehicle design to core business systems, using the cloud. Daimler replaced its companywide procurement system—used to manage 400,000 global suppliers—with a software as a service system running in Microsoft Azure. The new system, which involves the SAP S/4HANA database, SAP Supplier Relationship Management, and the Icertis Contract Management platform, was operational in just three months, can be updated daily, and costs 50 percent less than the previous system.

"We could only update our previous purchasing system a couple of times a year. With NPS running in Azure, we can issue updates every day if necessary."

Dr. Stephan Stathel: *Operations Lead for New Procurement System and Team Lead for the Build2Run Team, Daimler AG*

Microsoft

02

The Factory of the Future

In today's hyper-competitive environment, companies who fall behind the digital curve can quickly lose ground to more nimble rivals. There are few places that is more true than in manufacturing, where industrial production has long relied on machine processes and manual labor to get work done. To gain a sustainable edge, manufacturers need a new breed of connected and self-managing factory that bridges the physical and digital worlds to transform plant productivity.

Operate a connected factory:
Bring physical manufacturing assets into the digital world

Companies who run SAP solutions on Azure can merge operational data with their IT landscape to dramatically increase production flexibility, With integrated Azure IoT and SAP Leonardo IoT services, they can combine business data from SAP with device telemetry data from the plant floor to the network edge. They gain an integrated view of operations and better control over physical production processes. State-of-the-art AI and ML solutions from Microsoft and SAP help enable autonomous workflows that reduce human intervention while improving quality and performance.

Maintain uptime:
Use machine intelligence to keep production lines humming

New sensor-equipped smart machines are giving manufacturers the ability to read live status or detect anomalous behavior patterns between plant floor equipment. Using Azure cloud-based monitoring and management, organizations can get up-to-the-minute intelligence on asset function and health, enabling predictive maintenance and servicing that avoids breakdowns and lost productivity.

Optimize performance:
Gather closed-loop learnings that drive business results

With Azure IoT Edge, companies can bring intelligence to every physical asset, providing a complete view of their extended operating landscape. Integrated management of these resources from within SAP and Azure ensure that business rules are applied consistently, and endpoint performance data can be fed through machine learning algorithms to drive continuous improvement. Azure robotic process automation supports human-like decision making that makes business processes more efficient and reduces errors.

Global industrial thread company Coats has supplied the world with thread and related products for more than 260 years. Coats keeps its manufacturing infrastructure on the cutting edge and has now done the same with IT. The company has enhanced operational performance and cut costs by moving its datacenters to Microsoft Azure and migrating its production database from Oracle to SAP HANA on Azure. For customers, these changes mean better software tools to help their own manufacturing, easier ordering, and speedier product deliveries. Its current digital transformation includes using Internet of Things (IoT) devices to optimize factory performance and enhance environmental monitoring. Coats chose Microsoft Azure IoT solutions to build its IoT systems, and this resulted in a quick deployment and tangible benefits—the company is right on track to hit its productivity and environmental stewardship goals.

"By running SAP HANA on Azure, we've boosted performance, cut costs, and opened up exciting avenues of innovation and optimization for our global business."

Helge Brummer, *VP of Global Technology and Solutions, Coats*

Microsoft

03

The Modern Workforce

The realities of the modern world have fundamentally reshaped what manufacturers need to build the workforce of the future. To succeed requires a new set of human resources competencies that balances the personality and aspirations of today's workers with the need to cultivate talented and engaged employees who can deliver strong on-the-job results. Companies who run SAP solutions on Azure can leverage a deep bench of joint technology solutions to achieve these goals.

Augment skills:
Leverage a new generation of tools to create breakout worker performance

AI-enhanced tools and development resources from Microsoft and SAP help companies create experiences that guide them and provide personalized learning support. Integration with back-end business logic helps keep workers focused on the most important tasks to improve on-the-job performance. On the shop floor, conversational AI and mixed reality devices like Microsoft HoloLens can give workers powerful new ways to interact with intelligent machinery, improving process control and production line efficiency.

Deliver intelligence:
Put in-context insights at every employee's fingertips

In the Azure environment, Microsoft business analytics tools applied to SAP data can give workers real time, role-specific insights, enabling more impactful decision making. Microsoft Power Automate, Power Apps, and Power BI can be used to create customized workflows, apps and business insight reports without having to write any code. Azure Chatbots can help users interact with SAP in a more conversational way, and along with Azure Cognitive Services, with a personalized touch. Globally distributed groups can collaborate via Teams while corporate data is protected through Azure Active Directory.

Unleash innovation:
Transform employee creativity into a valuable strategic resource

Manufacturers can gain a powerful edge by using Microsoft and SAP AI-driven automation to eliminate mundane tasks and re-direct human resources towards more rewarding pursuits. Purpose-built machine learning algorithms can be used to make processes more self-optimizing and autonomous, freeing workers to drive greater innovation while dramatically improving business results.

RioTinto

For 144 years, Rio Tinto has pioneered automated innovation in mining. But because its business faces constant pressure from gyrating commodities prices, Rio Tinto relentlessly seeks new efficiencies. The company moved its huge SAP estate to Microsoft Azure and is digitally empowering its 55,000 employees with highly secure mobile access to business information through Microsoft 365 Enterprise. With these cloud advances, Rio Tinto is moving faster, saving money, improving decisions, and better engaging employees.

"With SAP running in Azure, we can deploy needed infrastructure faster and thus respond faster to pricing volatility in commodities, exchange rate fluctuations, and business needs."

Steve Somerville: *Head of Enterprise IT Services, Rio Tinto*

Microsoft

Microsoft with SAP Powers Intelligent Manufacturing

For the aspiring intelligent manufacturer, the path to the future starts with a proven cloud platform capable of powering complex industrial operations at global scale. This modern digital foundation must offer a seamlessly integrated environment for applications, processes and data that enables new levels of insight and business agility, helping manufacturers unleash innovation across the organization.

SAP solutions on Azure help transform insights into innovation

Intelligent manufacturers who transform with SAP solutions on Azure gain both a trusted platform to run the business and powerful catalyst to shorten the cycle of innovation. By connecting core business processes with modern digital networks, they escape the constraints of yesterday's static and outdated experiences while simultaneously gaining the agility to experiment and explore.

For SAP customers, the power of Azure is in its ability to bring a comprehensive understanding of the business into focus. Organizations can tap sources as diverse as internal ERP and CRM systems and external markets and social networks to create a rich, centralized data repository in Azure Data Lake. Azure big data processing and AI-powered analytics can help them detect patterns and draw deeper meaning from data, such as customer sentiment that varies by region, sales trends that signal over- or under-served markets, or reports of regional distribution or quality issues. Companies can then transform these insights into actionable intelligence that help fine tune the business in specific channels or segments or identify new growth opportunities.

Modern Microsoft and SAP technologies like AI, IoT, augmented reality and cognitive services help clients create totally new, irresistible customer and employee experiences that improve retention and increase performance. And with over 1,000 pre-built integrations, out-of-the-box SAP HANA services and apps built by Microsoft, SAP and partners, enterprises have access to a huge pool of solutions for every business need.

SAP solutions on Azure gives manufacturers the modern foundation to unlock their inner start-up and infuse intelligence into everything they do. Companies can deploy adaptive strategies that continuously learn and optimize, helping them deliver the best products and services faster than rivals and build a sustainable performance advantage.
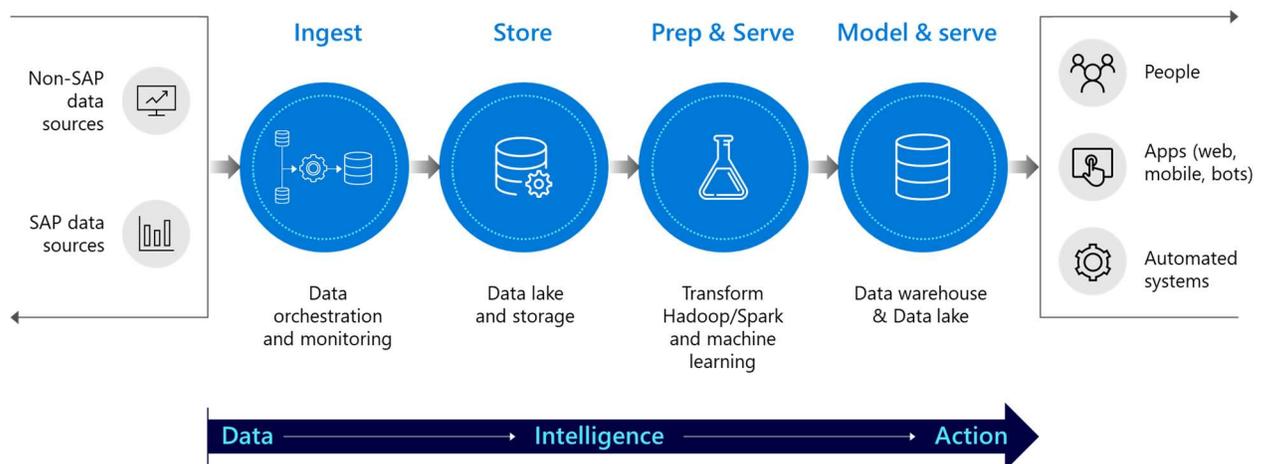
Azure helps manufacturers turn data into insights into intelligent action

Azure brings agility and scale to any SAP enterprise

One of the hallmarks of high performing enterprises is the ability to manage through change while staying true to long term strategic priorities. For issues both small and large—from supply shortages to quality problems to shifting market sentiment—SAP solutions on Azure help manufacturers navigate business turbulence with ease. AI-backed Azure analytics applied to SAP data can help companies detect and quickly address adverse conditions as they occur, avoiding more serious problems downstream. With surround insights from external market and social data, they can sense evolving demand and growth opportunities before competitors do so they can get to market faster with the products customers want.

Agility also means having a flexible IT infrastructure that can scale to meet changing needs. With datacenters in more regions than anyone, Azure provides the global reach with local presence manufacturers need to support their growing business. Organizations can spin up or spin down capacity instantly, slashing time to market and lowering barriers to regional product innovation.

As the industry's most performant and scalable cloud platform, Azure has a proven track record running the most demanding production SAP workloads. With many of the latest generation SAP applications including HANA, S/4HANA and SAP Cloud Platform already certified on Azure, companies gain the full power, security, and flexibility of the Azure cloud for all of their most business-critical use cases.

Enterprise-grade SLAs	Up to 12TB SAP HANA certified VMs	High performance storage options

Microsoft

SAP solutions on Azure deliver strong security and business continuity

As digital steward for many of the world's biggest global brands, Microsoft is strongly committed to delivering true enterprise-class security and business continuity in the cloud. The company invests more than $1 billion annually on cloud security, and offers a state-of-the-art, enterprise grade security architecture that sets the standard for data privacy and confidentiality. More than 90 international and industry-specific compliance certifications are supported for SAP solutions on Azure, including critical data protection regulations like GDPR and HIPAA. Widespread 3rd party support for Azure Active Directory gives enterprises uniform identity management across business applications to foster secure and seamless team collaboration.

From the earliest stages of cloud migration, Microsoft and SAP take an active role in supporting customers' transformation goals. We offer extensive programs and tools to help clients fast track planning, proof-of-concept development, training and certification. Joint planning workshops with Microsoft, SAP and select partners help manufacturers map priorities and outcomes to a clear plan with timelines. During migration, Azure Backup and Site Recovery with integrated support for SAP HANA provide data protection, continuous availability and recovery services to ensure minimal business disruption.

> 3,500	> $1B	> 8 trillion	> 90
global cybersecurity experts on staff	annual investment in cloud security	security threats tracked daily	compliance certifications with SAP
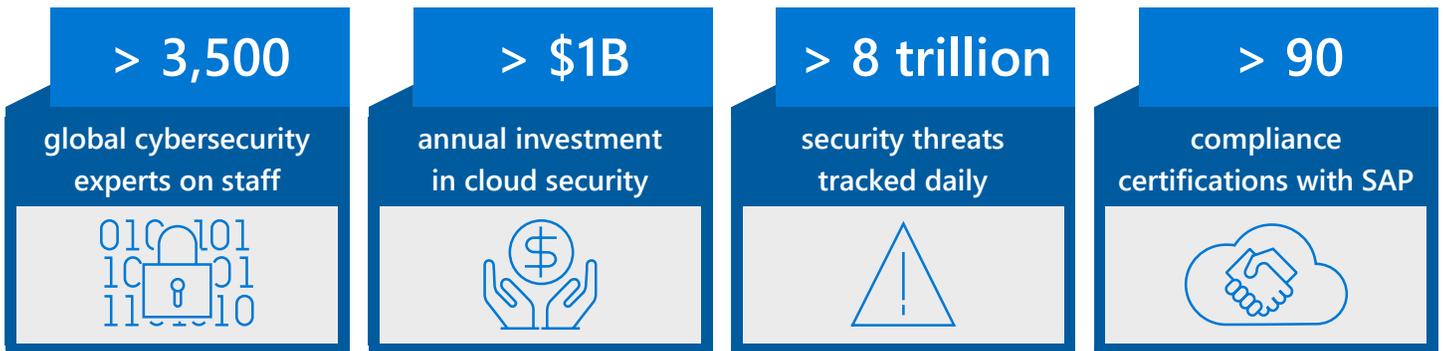
Microsoft

Microsoft and SAP: A partnership of trust for intelligent manufacturing transformation

As two of the world's most respected technology innovators, enterprises have been relying on Microsoft and SAP for longer than most others have been in business. The companies have decades of combined experience partnering with global industry leaders to develop joint solutions that meet their unique needs. Today, many SAP applications including SAP HANA, S/4HANA, Commerce Cloud, Success Factors and SAP Cloud Platform (SCP) are certified on Azure and already powering operations for thousands of organizations around the world. In addition to joint product offerings, the partners have teamed on a range of technology initiatives in areas like IoT, advanced UX, and integrated services for custom SaaS application development that help customers open new paths to business innovation.

In October of 2019, Microsoft and SAP took another major step together, announcing a preferred cloud partnership to simplify and accelerate our customers' transition to the cloud. Under the new agreement, SAP will lead with Azure when recommending public cloud migration to SAP ERP and SAP S/4HANA customers. The initiative closely aligns the companies' go-to-market strategies for manufacturing, and will feature joint solution blueprints, reference architectures, development roadmaps and other shared resources to help clients get started. An ecosystem of global Strategic Services Partners will be on hand to help plan, prioritize and implement projects.

The Microsoft and SAP alliance is a game changer that lowers barriers and puts the full potential of digital transformation within reach. Our integrated and optimized platform gives companies everything they need to meet the imperatives of intelligent manufacturing head-on. But global manufacturers trust Microsoft and SAP as much for what the platform can offer tomorrow as what it does today. With a durable partnership and growing focus on tailored industry solutions, companies who run SAP solutions on Azure will enjoy the fruits of both companies' ongoing shared investments for years to come.

Proving our own technology

Microsoft and SAP showcase the value of our joint platform every day by using each other's technology to run our own business critical operations. Microsoft has been running SAP and S/4HANA for finance, HR and supply chain management for the last 20+ years. SAP has chosen Azure to run its own internal systems, including those based on S/4HANA.

> SAP's decision to select Microsoft Azure as its preferred partner... reflects our commitment to a customer-first mindset and supporting their cloud transformation... it takes co-selling to a whole new level.

Judson Althoff, *Executive Vice President, Microsoft*

> SAP and Microsoft have a long history of working together to support our common customers' most mission-critical systems. Recently, we agreed to deepen our partnership to give our common customers a clear, unified path to transform their business. Together, we are powered to deliver intelligent, agile and innovative solutions in the cloud.

Adaire Fox-Martin, *Executive Board Member, Customer Success, SAP*

Microsoft

Microsoft

Conclusion

The path to intelligent manufacturing starts in the cloud, and no cloud platform is more widely trusted by global organizations running SAP than Microsoft Azure. SAP solutions on Azure provide an integrated business platform that helps unlock priceless operational insights, gain unprecedented agility, and deliver breakout business performance. From empowered workers to a responsive supply chain to a new generation of autonomous smart factory, manufacturers can give customers what they want when they want it, building lasting relationships and durable brand value. SAP solutions on Azure help manufacturers achieve the full promise of their digital future.

To learn more, visit the SAP Solutions on Azure web site, or register to attend one of our available webinars:

- An Introduction to SAP on Azure

- IT Lessons From Migrating SAP Workloads to Azure

Ready to get a closer look at what SAP solutions on Azure can do for your organization? Contact your Microsoft account executive to discuss next steps or explore one of these other valuable resources:

- Schedule a visit at your local Microsoft Technology Center. MTCs offer an immersive experience that showcases how SAP solutions on Azure can support your unique transformation goals.

- Ask your account executive about a free Migration Assessment to discover how you can get more out of your current SAP landscape and build a phased migration plan.

Endnotes

[1] https://www.tandfonline.com/doi/full/10.1080/23311916.2017.1389831
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