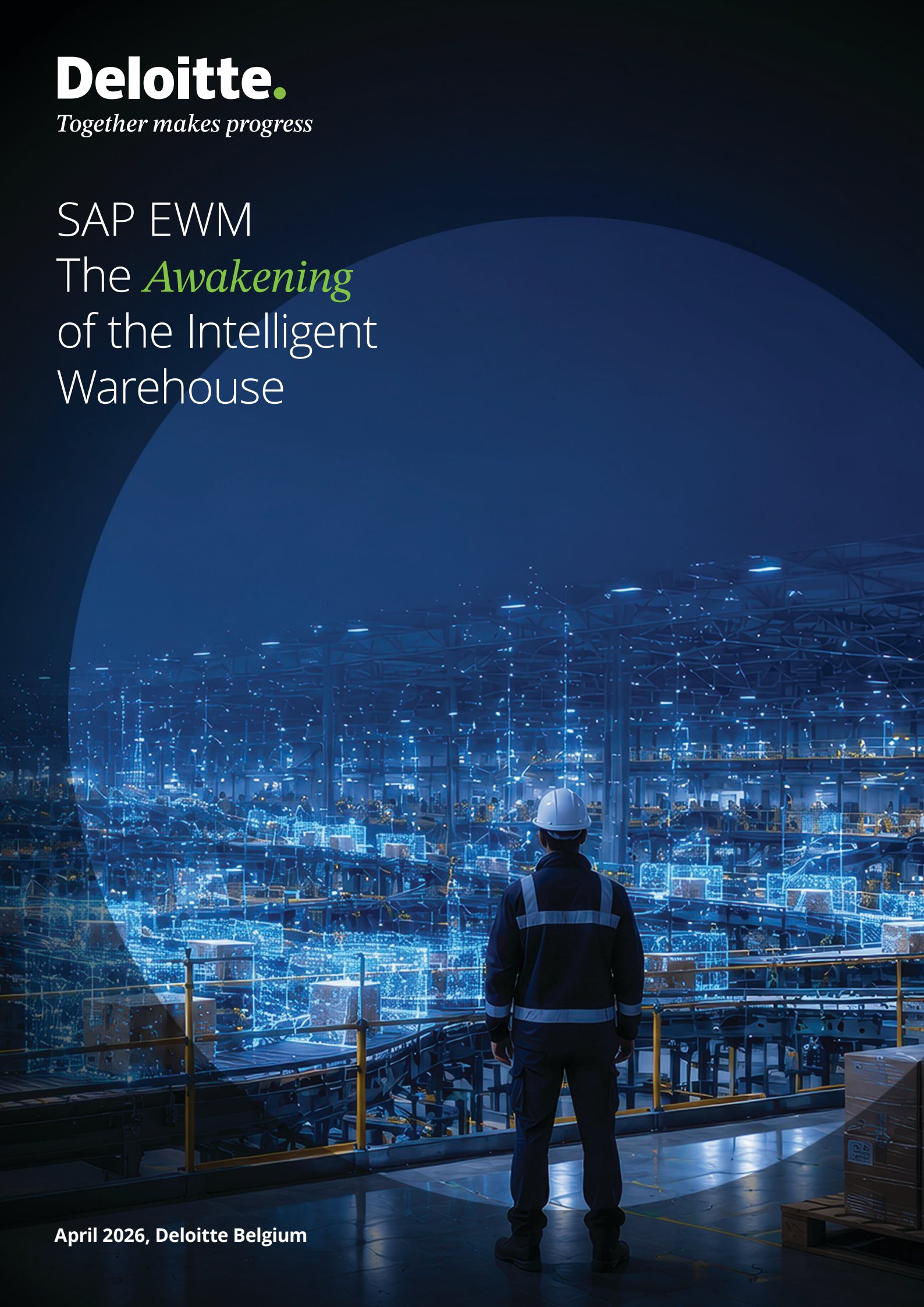
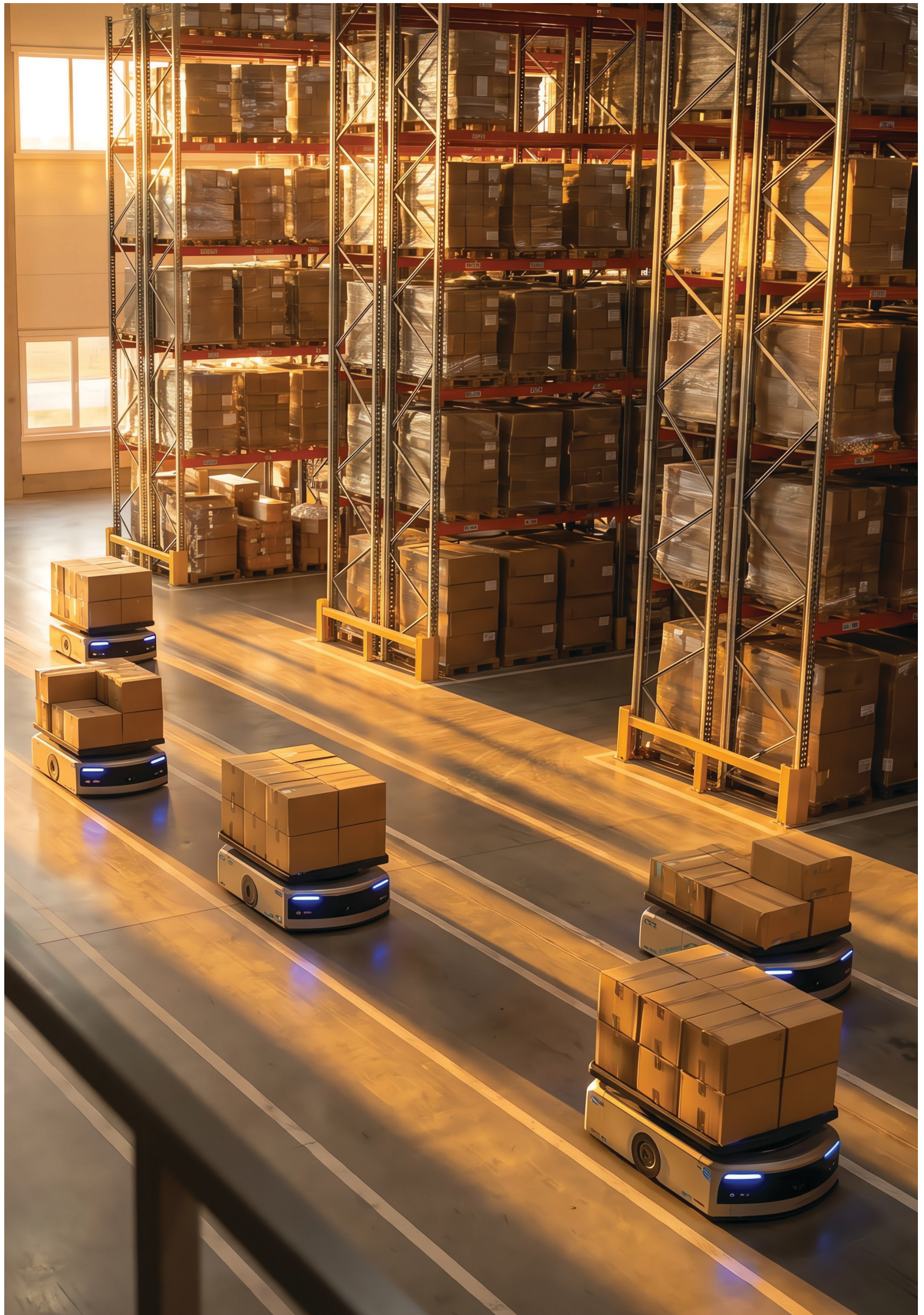


SAP EWM
The *Awakening*
of the Intelligent
Warehouse





Introduction

This paper looks at the twenty year technological trajectory of SAP Extended Warehouse Management (EWM), demonstrating its fundamental paradigm shift from the transactional-focused early days of 2005 to the AI-infused roadmap of 2026. In practice, this move was from an 'Operational System of Record', mainly enforcing pre-defined rules, to an 'Agentic Intelligent System' able to perceive context, suggest actions and truly generate value.

Remaining critical, we must separate the buzz from the baseline by clearly stating that while the foundation for autonomous agents is technically present, the practical reality today is more one of 'augmented' operations rather than truly 'autonomous' ones. Furthermore, these capabilities are not universally guaranteed; emerging architectural dependencies suggest that access to this new intelligence will be increasingly dictated by deployment strategy.



The Evolution of Logic

For decades, the Warehouse Management System has been viewed primarily as the ‘execution arm’ of the supply chain.

While upstream systems like the S/4HANA ERP, SAP Transportation Management (TM) or even Integrated Business Planning (IBP) handled the macro-planning, EWM was more of the digital ledger to enforce and register the executionary result. The sheer volume of high-fidelity operational data (scans, timestamps, movements) that ultimately sat idle or, at most, was used for retrospective error-handling, made it a ‘sleeping giant’.

Categorizing EWM as a pure ‘execution’ system may be too strict as it has always possessed ‘micro-planning’ capabilities like wave management or resource management. But this intelligence was based on static rules, so to understand where the AI potential of 2026 comes from, we must understand the decade-long architectural strategy that will awaken this giant.

The Transactional Era

2005-2014

In the initial decade of EWM (versions 5.1 to 9.1), the primary objective was enabling a broad 'process coverage'. Originally running on the Supply Chain Management platform and later becoming available as a standalone solution on the Netweaver Stack, the focus was mainly on digitizing the physical reality of the warehouse

The logic in this era was binary: A put away strategy does not 'think', it follows a strictly sequenced search order. It is robust but rigid to changes, requiring a consultant to manually reconfigure it when change is required. This era laid the groundwork by digitizing the inventory concepts through a solid foundation of processes and a structured data model. The latter was, however, trapped in a transactional state.



The Analytical Foundation

2015-2019

The mid-2010s marked the first important architectural shift with the introduction of SAP HANA as an in-memory platform. By moving data processing into memory, SAP could suddenly perform heavy calculations on top of the transaction execution, unlocking the ability to move from just recording history to analysing it in real-time

Leveraging SAP HANA's built-in Predictive Analysis Library (PAL) meant labour management didn't have to rely on the traditional static (picking item A always takes X seconds) Engineered Labour Standard (ELS) values anymore.

Instead, historical data could be used to predict future work. Based on statistical regression back then, this was the ancestor of machine learning (ML)-based labour planning as we know it today.

Another important architectural shift in this era was EWM moving from its Netweaver Stack to the 'ERP platform', now S/4HANA, where the introduction of Core Data Services (CDS) eliminated the need for ETL layers, drastically simplifying access to flattened data.

Turning the operational database into a real-time analytics lake allowed for the first operational KPI dashboards, with products like 'SAP Smart Business for EWM' and the Fiori Warehouse KPI app, visualizing what was happening in the warehouse. Though effective for 'monitoring', these tools were still passive, relying on human intelligence to distinguish the signal from the noise.



Extended Optimizations

2020-2023

As EWM matured within the S/4HANA stack, specialized engines running complex mathematical problems were introduced. The most common, SAP Business Technology Platform (BTP), is set up as a side-car that allows the complexities to be offloaded while keeping the ERP core stable and clean. Inherently a cloud SaaS platform, BTP leverages infinitely scalable resources to unlock the performance capabilities custom solutions require. Its decoupled architecture supports not only ABAP, but also modern programming languages, providing a convenient plug-and-play bridge to enhance the SAP ecosystem with scalable, high-performance components. With these optimization engines, we can now move beyond just reporting or monitoring and towards a first level of 'deterministic intelligence'.

Key examples of this principle are 'SAP Warehouse Insights' and 'intelligent slotting'.

SAP Warehouse Insights is a side-car application running on BTP that tackles the 'Traveling Salesman Problem'. By understanding the warehouse layout and its known travel paths, as well as being aware of the real-time resource location and open warehouse orders (WO), SAP Warehouse Insights continuously optimizes the best resource-to-warehouse order assignment, effectively reducing travel time and optimizing WO execution.

The AI-assisted intelligent slotting is an embedded scenario running within the Intelligent Scenario Lifecycle Management (ISLM) framework, a native part of the S/4HANA stack, and as it is local does not need BTP. Like the existing ML-based slotting functionality, existing master data, historical movements, demand and other information is used to automatically propose ideal put away and removal master data settings. Though a technical transition, ISLM puts slotting on a more future-proof framework enabling model selection (beyond just PAL), easier model training, maintenance and monitoring throughout its life cycle.

While only specific applications are within the scope of this paper with its focus on EWM-specific out-of-the-box solutions, it is worth mentioning that these are, in essence, mere examples; tip-of-the-iceberg implementations of what BTP as a platform allows. Additionally, partners can build custom solutions and offer them through the SAP store marketplace, allowing for easy extension beyond SAP out-of-the-box capabilities.



The Generative Leap

2024 - present

With the introduction of AI and Large Language Models (LLMs) and their onboarding onto the BTP platform, BTP's capabilities extend from a gateway to cloud scalable resources - ideal for complex calculations - a platform capable of reasoning. While BTP now provides access to the most popular external LLMs through SAP AI Core, the introduction of SAP Joule marks the transition where the system moves from understanding patterns (ML) to understanding intent (GenAI). In this broader ecosystem, Joule is functionally the most prominent integration, acting as SAP's specific AI 'front end'.

'AI' in the world of SAP is synonymous with Joule. Joule shouldn't be seen as just a chatbot, it is an AI frontend and orchestration layer on BTP that supports a user by interpreting its intent and facilitates its execution through 'skills' to navigate solutions.

- **Navigational (available)**

"Take me to the inbound monitor."

- **Informational (available)**

"How do I create a physical inventory document?"

- **Transactional (emerging)**

"Release the wave for the Brussels truck."

Classic modules like finance or procurement are typically the first to get decent transactional coverage. But there is no doubt that, inherent to SAP's Cloud solutions, a regular update cadence will shortly facilitate guaranteed and solid coverage of generic Joule skills for EWM.

While these generic skills form a good base, the real value for EWM is to be found in EWM Line-of-Business (LoB) specific skills, where the present-day (January 2026) status quo remains premature and mostly focused on basic navigation and summarization of stock.

The current roadmap however, shows that new skills will be introduced in the upcoming quarters (e.g. Q1 2026 Planned: Joule functions integrated in warehouse inbound processes), starting a shift from 'simple query' to execution

Advanced community-led proof of concepts, like Warehouse Workload Analysis (Dalm 2025), where Joule detects a bottleneck and autonomously suggests moving labour resources, are providing a sneak peek of the true potential. These could very well be the first signs of the EWM 'sleeping giant's' awakening.

Crucially, this demonstrates that the technically available possibilities of BTP today already reach far beyond what the limited out-of-the-box cases may suggest. Because Joule is essentially a subset of these BTP capabilities, AI solutions are not constrained by it; requirement-specific solutions can be built in BTP making use of AI through AI Core. Pushing this architectural freedom further, tailored AI solutions could even be conceived directly between third-party platforms and S/4HANA EWM, without making use of BTP at all.

Works Cited

Dalm, Tim. "AI-Driven, Joule-Enabled Warehouse Resource & Operations Management for SAP EWM on S/4 HANA 2023." *Supply Chain Management Blog Posts by SAP*, September 10, 2025. <https://community.sap.com/t5/supply-chain-management-blog-posts-by-sap/ai-driven-joule-enabled-warehouse-resource-amp-operations-management-for/ba-p/14212193>





The Cloud Mandate

Just as optimization calculations were previously offloaded to preserve the Core, Joule now offloads reasoning.

This architectural evolution - positioning EWM as the stable 'transaction engine' and the Cloud as the indefinitely scalable 'brain' - creates an implicit cloud dependency. This shift inevitably introduces an 'innovation hierarchy' across SAP's product line, prioritizing those who can connect to the brain over those who cannot. This not solely about technical connectivity; it is also about product scope.

The general principles are clear:



Public Cloud Edition

The Public Cloud Edition acts as the accelerator for AI. Because it lives in an SAP controlled environment and is the most standardized in nature, it provides the ideal conditions for the rapid and regular introduction of new Joule skills. That said, while Public Cloud users may obtain AI first, the warehousing scope is so standardized that it largely lacks complex warehouse scenarios to apply it to.



Private Cloud Edition (RISE)

The Private Cloud Edition (RISE) currently offers the 'innovation sweet spot'. It combines the full functional scope of the classic on-premise solution with the SAP Managed Cloud Infrastructure required to integrate natively with BTP and Joule. Consequently, Private Cloud Edition is positioned to offer the broadest range of EWM-specific AI solutions – deep enough to handle true complexity yet connected enough to natively leverage the AI reasoning engine.



S/4HANA On-Premise

S/4HANA On-Premise faces a different reality. While equally equipped with the ISLM framework and technically capable of connecting to BTP – giving it access to AI tools like AI Core – native integration of Joule remains restricted, requiring workarounds like SAP Build Work Zone instead of direct Fiori integration. Furthermore, SAP explicitly states that Joule functionality and other AI-enabled features are 'exclusive' to its cloud editions. This appears to be less of a technical constraint and more of a strategic choice: a deliberate (and likely increasing) "feature gap" designed to 'guide' customers seeking the latest AI intelligence toward the cloud reality. While equally equipped with the ISLM framework and technically capable of connecting to BTP – giving it access to AI tools like AI Core – native integration of Joule remains restricted, requiring workarounds like SAP Build Work Zone rather than direct Fiori integration. Furthermore, SAP explicitly states that Joule functionality and other AI-enabled features are 'exclusive' to its cloud editions. This appears to be less of a technical constraint and more of a strategic choice: a deliberate (and likely increasing) "feature gap" designed to 'guide' customers seeking the latest AI intelligence toward the cloud.



How can Deloitte help?

Whether you are executing a foundational delivery or defining a forward-looking AI strategy, we can assist you with:

Architectural Strategy & Platform Selection

Deployment & Upgrade Advisory

Navigating the pivotal cloud vs on-premise decision by evaluating your specific warehouse complexity, TCO expectations, and strategic roadmap to guide product selection and define a clear upgrade path.

Clean Core Strategy

Assessing your existing custom code footprint and providing practical guidance on transitioning to upgrade-safe extension patterns, ensuring your foundation is architecturally ready for future intelligence.

:

The Analytical Foundation & Extended Optimizations

Operational Visibility & Analytics

Moving beyond passive, standard Warehouse Monitor by designing and implementing real-time dashboards and embedded analytics pipelines that turn your operational data into actionable insights.

BTP Solution Design & Build

Conceptualizing and building custom, side-by-side extensions natively on BTP for capabilities that exceed SAP's out-of-the-box offerings, delivering the complex optimizations and deterministic intelligence your specific use cases require.

Deloitte has been at the forefront of SAP EWM since its earliest inception. Having accompanied our clients through the entire technological journey described in this paper, we possess the deep, hands-on experience needed to support you at any stage of your logistics transformation.

Foundation & Migration Execution

End-to-End Migration Services

Facilitating the full transition from legacy LE-WM or older EWM setups to the latest S/4HANA EWM. From underlying database upgrades to technical execution, regression testing, to hyper care, we ensure that you will land on a modernized, future-proof platform.

The Generative Leap & AI Realization

AI Innovation Labs & Business Case

Exploring what AI can tangibly do for your warehouse today through 'art-of-the-possible' workshops, assessing your data fidelity, pinpointing high-ROI use cases, and building the business case to justify investment.

AI Solution Realization & Joule Strategy

Designing the secure connectivity needed to bridge your systems to the cloud, implementing native Joule skills, or designing your own bespoke AI pipelines utilizing any supported LLM to fully realize an intelligent warehouse.

With Joule, the platform is finally capable of reasoning over the data it once only recorded. The 'sleeping giant' of warehouse data has finally awoken.

Conclusion: The Architecture of Intelligence

The evolution of SAP EWM has not been random; it has been a deliberate architectural course. Each step – from HANA providing the memory, to S/4HANA and CDS organizing the data, to BTP allowing access to cloud-resources – has led to an AI-ready foundation. With Joule, the platform is finally capable of reasoning over the data it once only recorded. The ‘sleeping giant’ of warehouse data has finally awoken.

However, this readiness immediately brings a new divide. While the foundational tools are available to all, the current, native, out-of-the-box AI use cases are exclusively reserved for the cloud ecosystem. This divide is an artificial ‘negative’ differentiation - a commercial manoeuvre designed to steer customers toward the cloud rather than a legitimate technical constraint. While on-premise customers are excluded from the pre-packaged Joule frontend, they retain the full power of the underlying BTP platform. Consequently, they possess the technical freedom to build their own integrated AI solutions to achieve, or even exceed, standard results. The ‘Intelligent Warehouse’ is no longer just a software question, but an architectural one.

For organizations already operating within the cloud ecosystem, the recommendation is clear: evaluate these emerging native features, adopt them where they deliver immediate operational value, and leverage tools like SAP Build to engineer proprietary AI extensions directly into Joule, ensuring a singular, centralized user experience.

For those evaluating their next move, the current AI disparity must be viewed critically. The practical gap is considerably thinner than marketing suggests, with the majority of EWM AI capabilities still in their infancy. An ERP deployment strategy must not be blinded by the short-term allure of pre-packaged features. The decision should remain firmly anchored in foundational business realities: evaluating the shift from perpetual, cap-ex-driven licensing to recurring op-ex subscription models and carefully weighing long-term vendor lock-in against the need for deep systemic control, unrestricted third-party extensibility, and total cost of ownership. Ultimately, while AI is the undeniable catalyst for the intelligent warehouse, it should not become a compulsory trade-in for your architectural freedom - especially when the tools to build that exact intelligence, and our partner expertise to help you realize it, remain fully at your disposal.

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