



Intelligent Goods Receipt Using SAP's Business Technology Platform

As a central hub for logistics operations, the warehouse is more critical than ever. However, more and more businesses are moving warehouses closer to their manufacturing facilities due to today's complex geopolitical realities. The rapid growth in the volume of goods handled at these facilities is posing a range of new challenges in warehouse management.

The task of managing this increased volume can be daunting for many warehouses—particularly if they still rely on outdated legacy systems and manual processes. Human error is clearly a factor here in addition to the excess time and resources required. With fierce competition and skyrocketing consumer demands on today's marketplace, such inefficiencies can adversely impact warehouse performance and responsiveness.

The advance of industry 4.0 has put more and more businesses on the path to digital transformation. Digital warehouses are no longer simply a competitive advantage but an operational necessity. As market dynamics and consumer behavior evolve, warehouses have to adapt to keep up with efficiency and productivity demands. That means using digital tools to significantly reduce labor-intensive tasks, minimize human error and increase both the speed and accuracy of their operations.

According to the 2025 World Economic Forum, rapid advances in artificial intelligence, quantum computing and blockchain are driving the technology transformation that will propel industry into the so-called 'intelligent age'. We can expect AI to supercharge existing warehouse management solutions in this new age, making operations smarter, more efficient and safer.

This paper focuses on the ways AI can help improve the goods receipt process in today's warehouses. Every day, issues from incorrect shipment quantities or materials sent by the suppliers to the wrong packaging can complicate logistics workflows. Manually processing each delivery note takes time and can lead to errors. In this paper, we outline an AI-powered solution built the SAP Business Technology Platform (BTP) that addresses some of the key challenges of the goods receipt process.

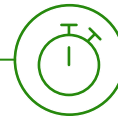
Common challenges in inbound receiving

Inbound receiving at the warehouse involves a series of steps from unloading and sorting to inspection and storage of incoming goods, processes that can be challenging due to:

Incorrect shipments



Sometimes warehouses inadvertently accept shipments that do not match the original purchase orders. These discrepancies, whether in quantity or quality, can cause operational bottlenecks and inefficiencies.



Delayed unloading

Critical for understanding the environment and avoiding collisions, sensors may rely on ultrasonic, infrared or laser sensors as well as cameras designed to navigate and detect objects.

Quality control issues



Determining the quality and condition of incoming products can be labor-intensive and error-prone.



Misplaced items

When items are not stored in the correct location, it can be difficult to retrieve them when needed.

Improper documentation

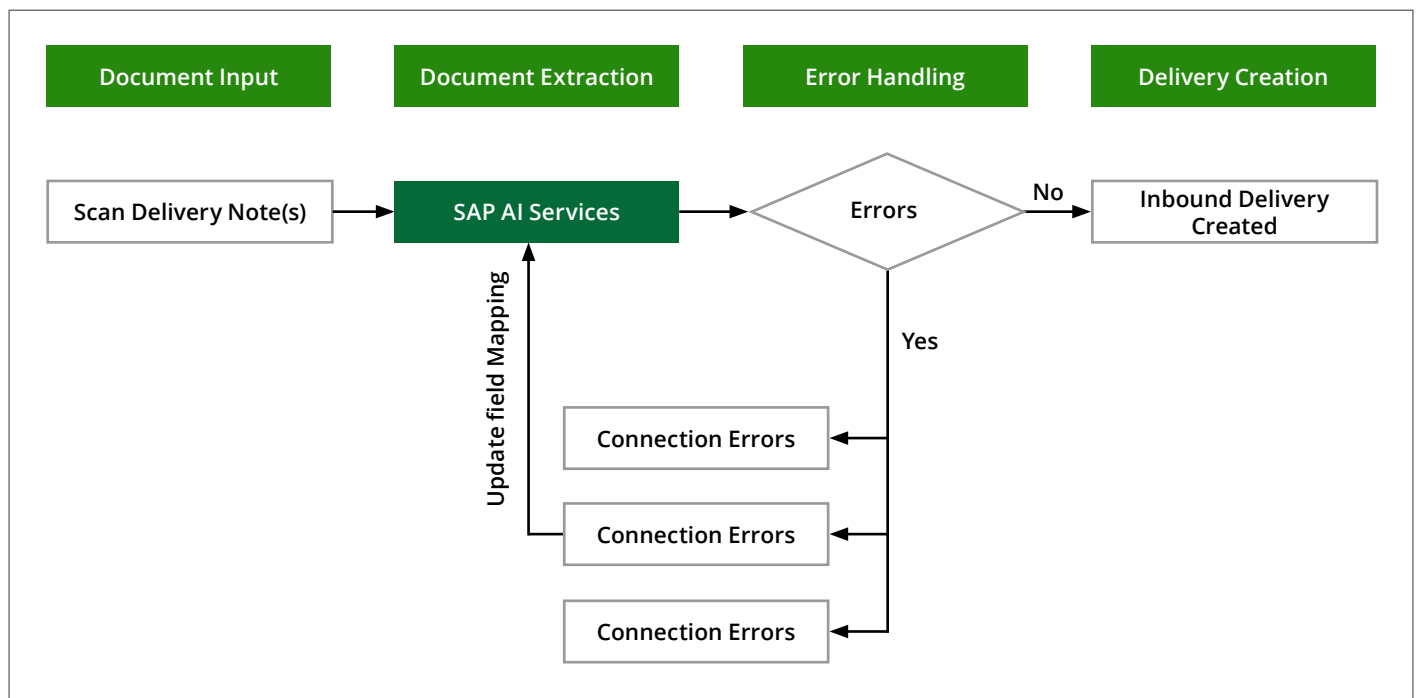


Errors in the documentation of inbound shipments can lead to cost overruns and unnecessary delays

Introduction to Intelligent Goods Receipt

Intelligent Goods Receipt leverages Document Information Extraction (DIE) as an AI service on SAP BTP to process large amounts of documents from delivery notes and bills of lading to unloading lists received from suppliers or sending warehouses—and it is the engine for the application known as Intelligent Goods Receipt. SAP S/4 HANA creates an inbound delivery order using the

information extracted from delivery documents, which simplifies the process for warehouse operators by reducing manual effort and eliminating inaccuracies in shipment quantities and materials as well as other human errors. This prevents delays caused by trucks waiting in the yard and reduces unloading times at the dock, making the overall process faster and more secure.



Solution approach

There are four key steps to this solution:

Document entry

In this step, the warehouse clerk responsible for goods receipt scans the delivery note (Lieferschein), unloading list or bill of lading provided by the truck driver, which may vary in format, size, font color, language or number of pages.

Document Information Extraction

The Document Information Extractor (DIE) processes the scanned document, using SAP's AI tool to extract any machine-readable data from the document and export it to a JSON file. The extracted information is mapped according to the requirements of the relevant API and sent to SAP S/4 HANA for to create an inbound delivery.

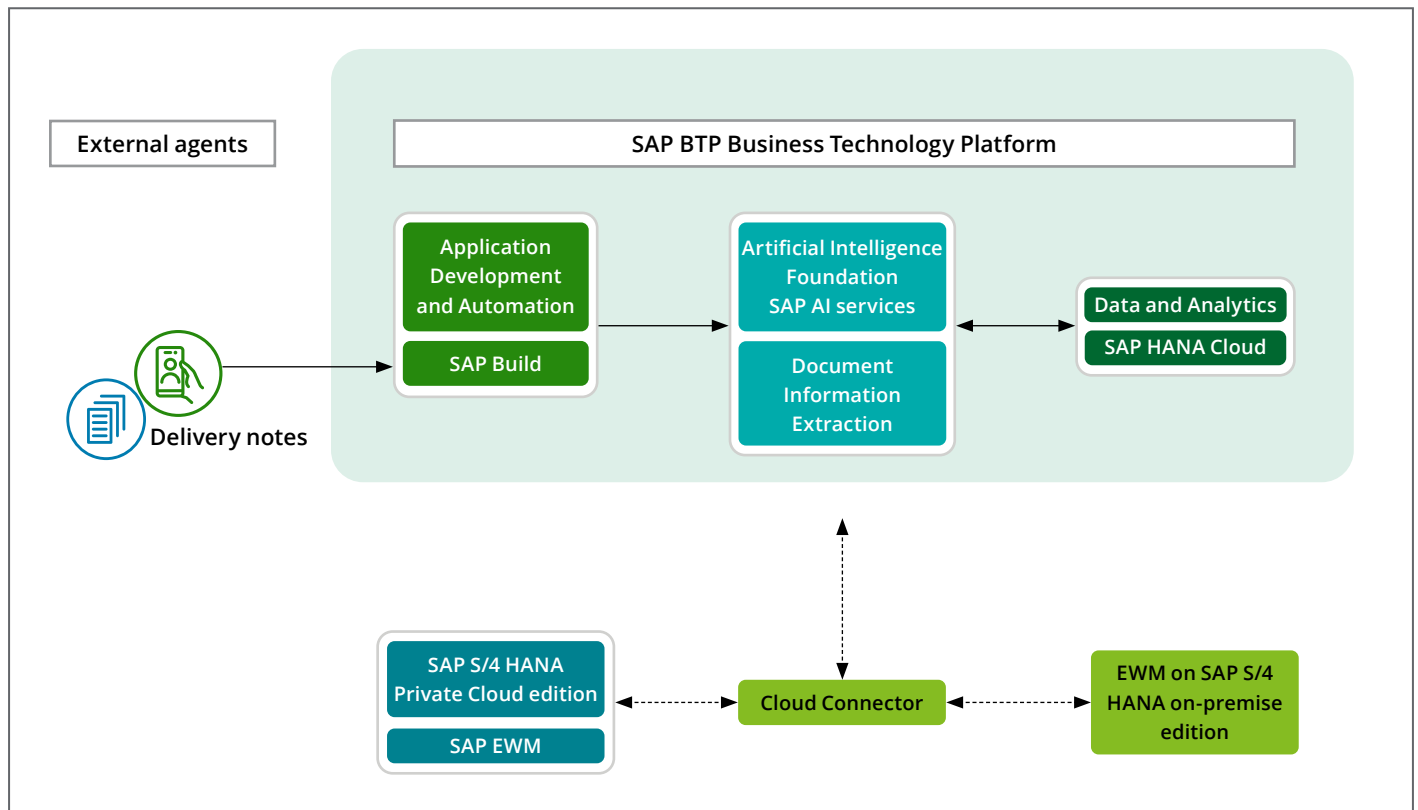
Error handling

Errors still may occur when the extractor processes these documents. We have outlined the different error categories in the following table, but it is up to each company to determine the most appropriate next step.

Error Type	Description	Possible resolution
Connection error	This may indicate a network failure that renders the application server inaccessible or temporarily unavailable.	Contact your local technical support team.
Extraction error	This occurs when a specific unknown or unreadable field appears on the document, for example the vendor tax ID or another customer-specific identifier needed to create an inbound delivery.	Contact your IT department to update this specific field in the Document Information Extractor service.
Processing error	Some of the information provided by the extractor may contain errors, for example, incomplete data, spelling errors on the document, unknown or invalid data such as incorrect material numbers or units of measure.	Define a detailed procedure for resolving each type of processing error. For example, a material number that was extracted incorrectly due to a printing issue or a typing error by the vendor will have to be corrected manually. In certain other cases, you might need to contact the respective supplier or carrier.

Inbound delivery: Once the system has extracted and processed all the required information from the delivery documents, SAP S/4 HANA creates an inbound delivery by matching the extracted information with relevant predecessor documents such as an SAP purchase order or stock transport order. You can integrate this process with the Transportation Management application in SAP S/4 HANA, which creates a consignment order on the basis of the extracted information in SAP TM followed by an inbound delivery in S/4 HANA, or activate specific custom settings to automate follow-on steps from automatic packing to posting goods receipts in SAP's Extended Warehouse Management.

Solution architecture



The solution described above is completely configured on **SAP BTP**. We develop the front-end application with **SAP Build**, a development and automation solution for business applications with a comprehensive suite of low-code, pro-code and generative AI tools, to develop the front-end application. Its user-friendly drag and drop features help build apps faster and integrate them seamlessly with other services on BTP. Another option is to develop traditional Fiori Apps directly in SAP S/4 HANA using UI5 technology.

The **Artificial Intelligence Foundation** toolkit is at the core of BTP and focuses on responsible AI, data security and compliance with industry standards. AI Foundation offers a comprehensive range of **large language models (LLMs)** to help detect and extract information from delivery documents in any format and language with the DIE application.

Cloud Connector is an application that establishes a secure connection between SAP BTP and your on-premises systems. As described above, the front end and the DIE are located on BTP to scan the document and extract the information. The API call from SAP S/4 HANA maps the extracted fields to create an inbound delivery.

SAP HANA Cloud is a multi-model database management system that allows you to store your extracted data in the SAP HANA cloud, which may be necessary in some cases, e.g., to enable the warehouse operator to confirm the results before creating the inbound delivery.

Powered by Deloitte's Business Agents Platform (BAP)

The Business Agents Platform (BAP) is Deloitte's management, monitoring, delivery and distribution platform for AI Agents that offers tools, best practices and easy-to-set-up use cases from our AI services practice. By expanding the BTP technology stack and enhancing it with the lifecycle-focused features on BAP, you have a comprehensive AI management system that combines Deloitte's industry-leading practices and methodologies with cutting-edge technology to expedite your AI journey and deliver significant business benefits.

We designed the BAP as a single point of entry for working with AI agents to meet companies' needs in today's evolving AI landscape. Its goal is to enable and support your end-to-end AI journey, whether you are looking to develop, orchestrate, scale or deploy your AI agents across the enterprise, as well as monitor and generate insights with built-in analytics tools. All of this makes it easier to access and adopt AI technologies in your business and drive AI innovation for a successful future. BAP is built on the robust architecture of SAP BTP, enabling secure and seamless

integration into your existing SAP IT landscape. Because the integration is so seamless, you can develop and deploy AI agents much faster and reduce the time to value for any solution. The ability to distribute AI agents across the enterprise makes them secure and easily accessible for anyone with the right permissions.

From development to go live and operation, Deloitte's Business Agents Platform supports all phases of the Intelligent Goods Receipt process. Working with AI agents is much easier thanks to BAP's embedded LLMs, the links to required SAP data sources and the tools to build the process logic. After go-live, BAP becomes the deployment point providing access to the Intelligent Goods Receipt feature to manage versioning and implement new tools in the future.

The Deloitte Business Agents Platform isn't just a platform; it's a valuable partner in your company's AI growth story. With BAP, you can rest assured that you have the tools you need to embrace the rapid evolution of SAP technologies and AI features and secure a solid position in the market of the future.

Benefits

This solution addresses most of the challenges in goods receipt that we outlined in the previous section of this paper, including the following:

Accuracy

Document scanning reduces the chance of human error in data entry. The system automatically extracts and compares data, ensuring high data accuracy, and uses real-time material numbers, quantities and other information to automate inbound delivery creation in SAP S/4 HANA.

Flexibility

Companies can process inbound documents received from their suppliers in any format, ideal for global operations and a variety of suppliers and document types.

User friendly

All the warehouse clerk needs to do is scan the document and the system handles the rest, which means less training effort and less risk of operator error.

Faster processing and cost efficiency

Reducing the manual effort that goes into processing each delivery document will also lower overall operational costs.

Seamless integration

The system maps the extracted data and sends it directly to SAP S/4 HANA to create an inbound delivery, streamlining operations and ensuring data is always consistent across systems.

Why Deloitte

Deloitte's alliance with SAP continues to go from strength to strength. To name just a few of the highlights in 2024, we won three SAP Pinnacle Awards in the categories of Sales Success, Delivery Quality and RISE with SAP (also for delivery quality). Deloitte and SAP also recently joined forces to drive AI and cloud innovation through our AI@SAP Center of Excellence in Walldorf. This facility is focused on helping our clients unlock the full potential of their SAP transformations by integrating the features they need to create an

AI-powered business. Our worldwide network of subject-matter experts offers a wide range of services in and around SAP BTP. By leveraging leading industry practices, championing cutting-edge features and drawing on lessons learned in prior transformations, Deloitte delivers tailored solutions that meet every customer's needs. Our innovative AI-driven solutions help businesses make the most of their enterprise data and accelerate their digital transformation journey.

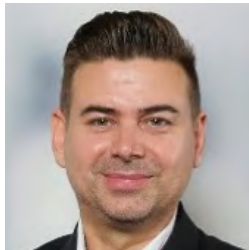


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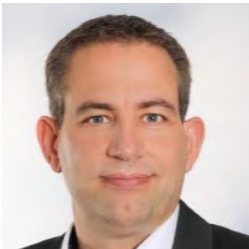


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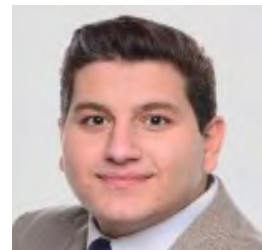


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