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Reading Sample

This sample chapter will cover key parts of operational procurement, including self-service procurement, requirements processing in SAP S/4HANA, purchase order processing, service purchasing and confirmation, as well as purchase order collaboration. The chapter closes out with instructions for configuring these key areas, including instructions for setting up machine learning-based procurement and integration with SAP SuccessFactors.

"Operational Procurement"

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Chapter 5

Operational Procurement

Operational procurement concerns the day-to-day buying activities of a business or government entity. Much of operational procurement is unplanned or partially planned, low-value, high-volume activity. Operational procurement therefore comprises the procurement activities that keep an organization running. Also known as "indirect procurement", operational procurement comprises procurement activities that keep an organization running.

Unlike in other procurement activities, which typically include a trained buyer using a tool with some degree of familiarity and training, many organizations permit any employee to create a requisition for an operational or indirect procurement item. This poses a challenge for the solution used, as the baseline training for the solution and familiarity with any process may be next to nil for the average user in operational procurement. Prior to SAP S/4HANA, such as in SAP ERP 6.0, the system supported operational procurement by leveraging existing document frameworks designed for heavy-duty buying activities between suppliers and the firm or government entity. Just navigating the screen of a transaction like ME21N could quickly frustrate an untrained user accustomed to today's online shopping experiences. The challenge for business software providers in this area of procurement is to provide as close to a consumer-grade user experience as possible in operational procurement, without compromising the procurement controls and methodologies of the organization.

This chapter will cover key parts of operational procurement, including self-service procurement, requirements processing in SAP S/4HANA, purchase order processing, service purchasing and confirmation, as well as purchase order collaboration. Finally, this chapter will close out with high-level configuration pointers and steps for these areas. The next section looks to define operational procurement.

5.1   What Is Operational Procurement?

Operational procurement supports the day-to-day processes of an organization via tactical procurement of services and materials, often by a casual user purchasing for a department's needs or even their own role-specific ones. For example, a casual user may need to order a new laptop or IT equipment in order to perform their job. An office

manager may need to order office supplies to keep an office stocked with paper, toner, and other supplies. These types of purchases can be driven by various parts of the organization in high-frequency, low-value orders.

From the onset, the mismatch of a complex solution designed to support complex purchasing for direct procurement and the casual, untrained user looking to conduct operational procurement was sure to cause issues. There is nothing inherently wrong with having large amounts of detail in a **Purchase Order** or **Requisitioning** screen in a system used for heavy-duty industrial manufacturing. Often, this level of functionality is quite necessary—say, for Electronic Data Interchange (EDI) activities with a supplier or for complex items vital to the production process. But having complex, professional, buyer- and engineer-centric screens makes purchasing for the casual user a bit more cumbersome than optimal. Many of these screens can make it downright frustrating for an untrained user trying to order mundane supply items like pens and paper, as each field can issue a hard-to-understand warning message or hard-stop error, incorrect entries quickly negate the entire document's validity, and multiple tabs and steps have to be completed—all this for a simple order that costs perhaps $10. Using SAP S/4HANA for this kind of procurement often is akin to having to use an airplane cockpit and all of its controls to steer a bicycle. A casual user accustomed to sleek, online shopping experiences will quickly tire of trying to navigate a corporate procurement system designed to support direct procurement.

One approach to operational procurement is to take the process out of ERP systems. Cloud solutions such as SAP Ariba Buying for SAP S/4HANA and on-premise solutions such as SAP Supplier Relationship Management (SAP SRM) are examples of this approach. This allows a system to mask all of the complexity and the procurement options that aren't applicable to a simple transaction, distilling for the user what is necessary to find items and create orders with the fewest clicks, entries, and headaches possible. This approach, especially in cloud-based applications, works very well for simplifying the UX and allowing even the most casual and untrained user to find what he's looking for and order it without calls to the helpdesk or frustration. However, early in the transaction, these operational procurement systems are already dependent upon ERP, even if their UIs appear independent.

First, calls need to be made from the procurement system back to the "mothership" ERP system to find out if the user is purchasing via a correct financial object in the finance and controlling system. Finance has to support a number of functions in SAP S/4HANA, so it can't be moved into a standalone procurement solution without bringing all the other dependent modules with it or leading to an expensive, "interface spaghetti" scenario. The users themselves need to be managed in real time; terminated employees can't be allowed to continue to make purchases on behalf of a company or government entity. For this, the purchasing system requires real-time updates from the HR system or a user-management system that deactivates users throughout the landscape immediately when they leave the company or government entity.

There also is the question of efficiency and avoiding unnecessary stock to consider. What if the user is looking for an item already held and available in a company or government entity warehouse? If the operational procurement system and/or buyer cannot check this prior to assigning a source of supply and issuing a PO, excess stock may be purchased instead of consuming existing stock. Excess stock causes waste, inefficiency, and, most alarmingly for a business, expense. If checking for existing stock needs to be a manual process step in a procurement system, buyers are focusing on performing manual tasks that could be automated in an integrated system, rather than strategic procurement activities that generate exponentially more savings and value for the firm or government entity. These issues pose a conundrum for operational procurement in SAP S/4HANA: running operational procurement directly in SAP S/4HANA can be quite difficult for casual users and from an IT landscape perspective, but it's also the ideal place for procurement in many cases because all of the dependent modules and integration topics are already covered.

The main stumbling block to operational procurement has always been usability and UI issues, as well as transactional volumes. An ERP system supporting operational procurement needs to be intuitive to use, minimize transaction steps while remaining flexible and capable of handling a diverse set of transactions, support catalog content, and support heavy volumes of low-dollar transactions, all while making the most of an ERP system's native integrations with associated modules. Incidentally, these are the driving forces behind SAP S/4HANA Sourcing and Procurement's embrace of operational procurement as a core ERP process. SAP S/4HANA Sourcing and Procurement supports the operational purchaser across self-service requisitioning, requirement processing, PO processing, service purchasing and entry, and PO collaboration.

Requisitions can be created directly by a user via a self-service procurement process or from a system/business process occurring in a module in SAP S/4HANA, such as an MRP run in which defined reorder points trigger the creation of a requisition—a bill of materials (BOM)—that requires an additional item to be ordered as part of the materials list or a project systems requirement generated from what's called a *network* in project systems. A network in project systems tells the user what tasks need to be performed in sequence by a certain time. Automated procurement processes typically used in the procurement of items needed in production, known as *direct procurement*, will be discussed in Chapter 6. The focus in self-service requisitioning is on user-driven requisitioning, which is more typically found in indirect procurement.

As illustrated in Figure 5.1, self-service procurement is part of the requisition-to-pay process flow. The requisition is the first document in the procurement chain that eventually leads to a purchase order and/or contract, as well as follow-on documents, such as order confirmations, advance shipping notifications (ASNs), goods/service receipts (GRs), and invoices.
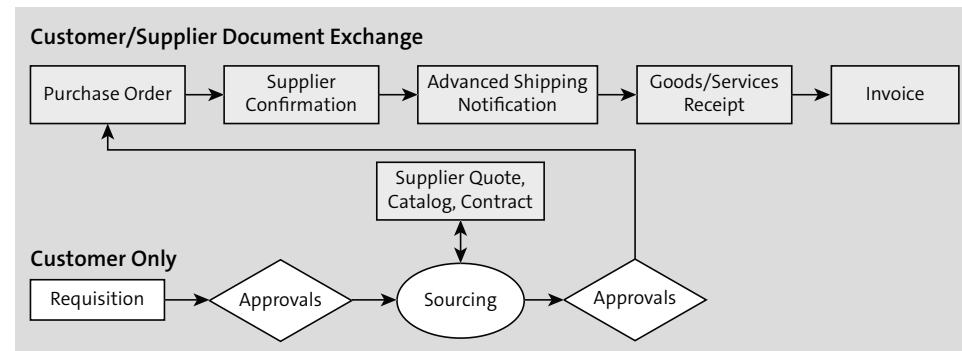
Figure 5.1 Operational Procurement: Requisition-to-Pay Process Flow

There are three main types of procurement conducted in operational procurement: stock, consumables, and external services. All of these types of procurement can be used in other procurement scenarios. Stock procurement is typically used for direct procurement activities, such as the ones discussed in the next chapter, but you can purchase and take into inventory items such as office supplies and equipment that qualify as operational indirect items as well. Consumable items are directly in the wheelhouse of operational procurement. A *consumable item* is typically an indirect item that is consumed and replenished on an ongoing basis, often by the consumers themselves. Pens, paper, coffee for the office kitchen, and other types of consumables may be ordered by the office manager or directly by an employee who notices that the office needs more of a consumable good. Consumables often do not require a goods receipt or a valuated goods receipt used primarily for inventory management processes and valuations, as these consumable purchases are petty at an individual level. In aggregate, however, consumable purchasing can be quite significant for an organization, and a level of management in the system may thus be desirable, if not a necessity.

External services procurement is the procurement of services to be delivered by individuals or groups who are not employees of the organization, but only involved to deliver that particular scope of work. These services can support the direct side of the equation, but they can also comprise cleaning or gardening services for the grounds of the office, for example, making these external services indirect. Although an office manager may set up the purchasing documentation for external services relating to the office, a project manager may need to directly set up the purchasing framework for consultants being hired to support a project.

The defining feature for operational procurement and for stock, consumable, and external procurement is that these types of procurement do not necessarily require a trained, dedicated buyer to initiate the requisition. The demand and consequent requesting in the system may come from the employee directly. When it does, this type of procurement is squarely in the category of operational procurement, and it follows that the solution provided in system to support this activity must support its untrained and barely

trained users in a way that makes self-service procurement possible and even enjoyable. This is the goal of SAP S/4HANA with self-service procurement.

5.2   Self-Service Procurement

In SAP S/4HANA Sourcing and Procurement, users can create a requisition and identify appropriate sources of supply via a consumer-grade UX—that is, a UX like that users would find in their personal online shopping experiences (see Figure 5.2). Self-service requisitioning is completely supported with a UI built on SAP Fiori, with tiles and step simplification to enable a completely different UX from that found in traditional ERP requisitioning.
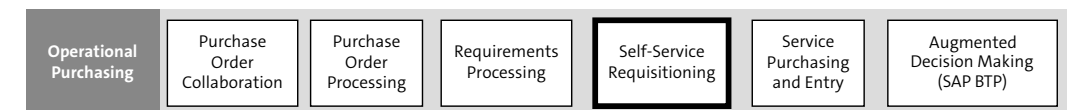
Figure 5.2 Self-Service Requisitioning in SAP S/4HANA Sourcing and Procurement

Requisitions are internal documents a corporation or government entity uses to lay claim to a service or material—essentially, a formalized request for a supply or service. Requisitions can be created with or without a source of supply and with or without a material master or service master number.
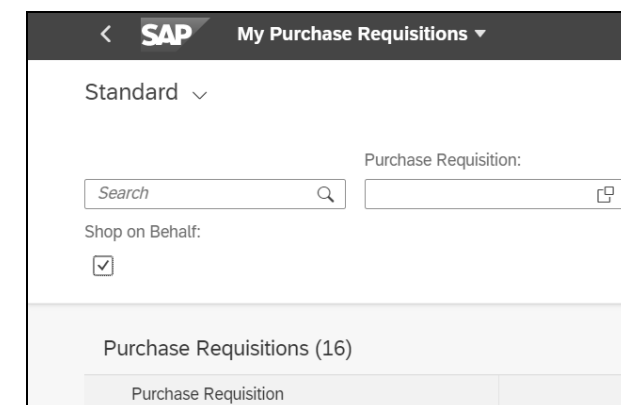
Figure 5.3 Shop on Behalf Requisition Functionality

There are a number of key innovations around simplification and speed for self-service procurement in SAP S/4HANA. Most importantly, one-click ordering is the predominant concept in this area, as personified in the new UI. The content search and dynamic filtering is built on SAP S/4HANA, allowing for vast performance improvements and usability over traditional ERP-based requisitioning. You can access catalog content like a punchout catalog in the SAP Ariba Catalog area, a third-party punchout catalog, as

well as catalog content loaded directly into SAP S/4HANA. Loading and indexing catalogs in SAP S/4HANA allows for cross-catalog search directly in system. Finally, there is a catalog solution package created by SAP Consulting called the *lean catalog*, extending the native catalog functionality further in SAP S/4HANA and building upon the integration advantages of catalogs maintained in SAP S/4HANA directly. You also have *shop on behalf* flexibility, where a user can select from a group of users when creating a requisition and order something on behalf of a colleague, as shown in Figure 5.3.

In the following sections, we'll look at some of the functionality available for self-service procurement.

5.2.1   Creating a Requisition or Shopping Cart in SAP S/4HANA

In Figure 5.4, the screen is simplified down to the bare essentials for creating a requisition. Either a user elects to use a catalog to find the item or, if the item isn't found in a catalog, the user can describe it. Note that the SAP Ariba Catalog solution can be embedded in this view, creating a seamless catalog experience even when the user is punching out to a catalog area.

To create a requisition for an operational procurement item or service, a user logs into the My Purchase Requisitions—New app, which deprecates the Create Purchase Requisitions app as of SAP S/4HANA 2022, and types in the item in the search bar. If the desired item doesn't appear in the search results, the user can search using a different term or create a descriptive item by selecting the **Create Item** option (see Figure 5.4).
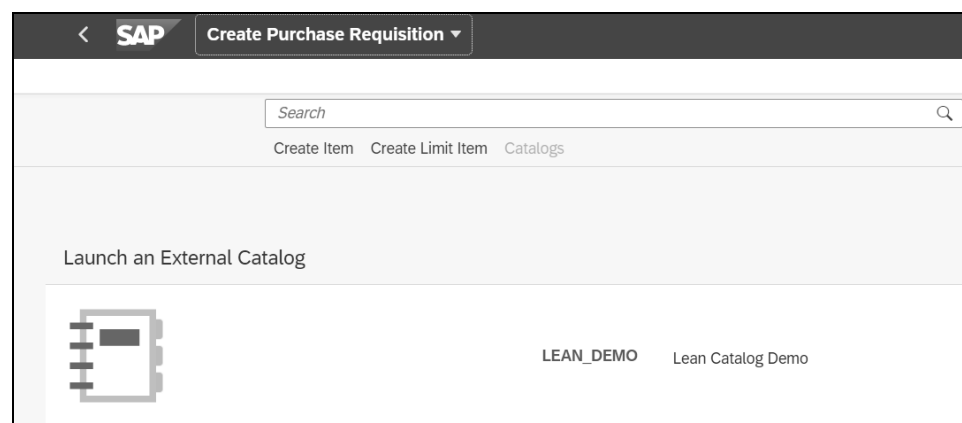
Figure 5.4 SAP S/4HANA Sourcing and Procurement: Create Requisition App

You can also order hierarchical line items. These can be activated in SAP S/4HANA 2022 and later and allow for both material and service items to be set up in a hierarchical manner. You can also order catalog items. Going into the lean catalog, you can select from numerous items and categories as shown in Figure 5.5. Note that once the supplier is assigned, the system can check automatically for trade compliance based on the

item selected and supplier being used. Presumably, in a catalog item this has already been validated and the items featured in the catalog are compliant.
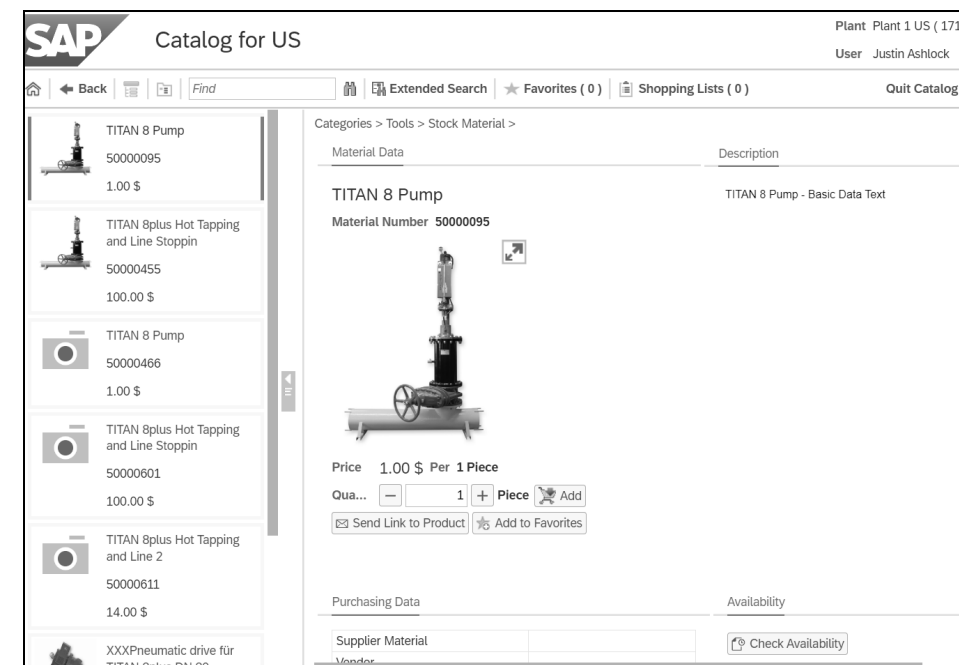
Figure 5.5 Lean Catalog Shopping

Once the user has selected or described an item, she is ready to order the items in the shopping cart (see Figure 5.6).
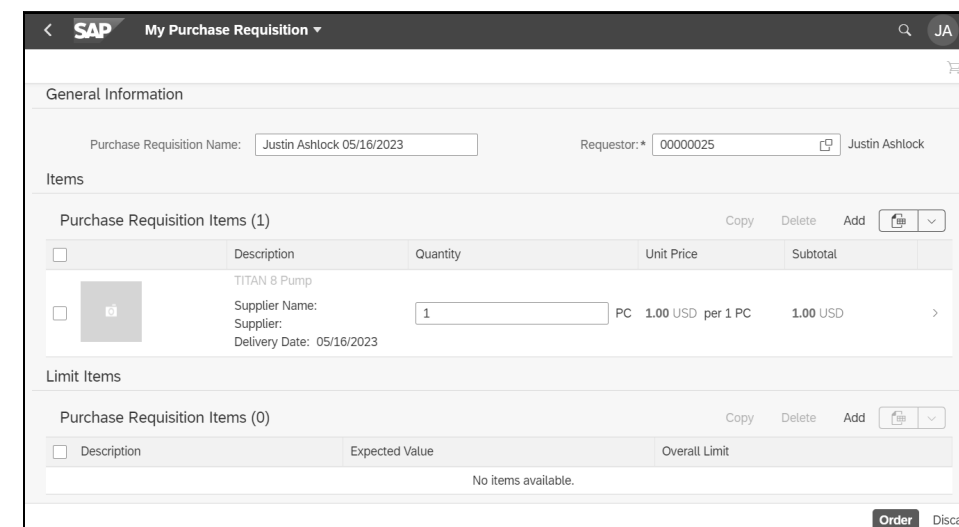
Figure 5.6 Selecting Item in Create Purchase Requisition

You can now order this item by clicking the **Order** button. After clicking **Order**, the user receives confirmation and a requisition number (see Figure 5.7).
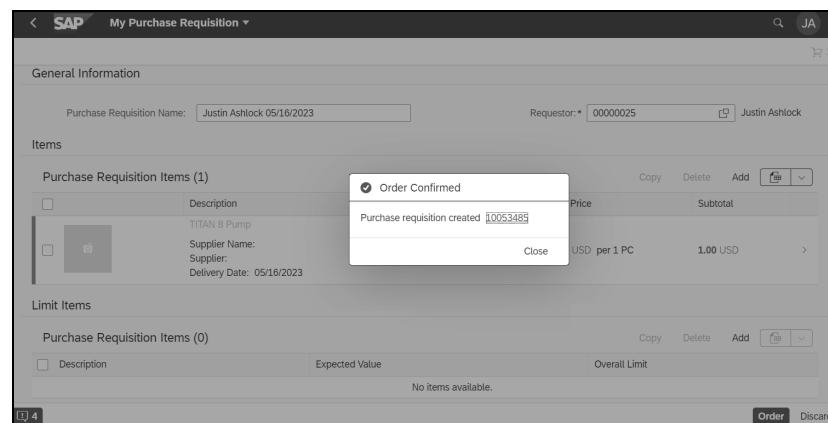
Figure 5.7 Ordered Shopping Cart with Requisition Number

> **Note**
>
> This requisition creation process went from a multistep, data-entry-intense process in SAP ERP to a couple of steps, with one data entry step to define the item required and pointing to and clicking the corresponding item in the catalog in SAP S/4HANA—in essence, achieving or exceeding parity with a consumer shopping experience online (here, the user didn't have to enter credit card information or define a shipping address).

5.2.2   Carbon Footprint Tracking

Many countries, and even states/regions, are beginning to demand carbon footprint tracking and management from the organizations operating within its borders. Procurement comprises the supply chain activities of an organization and is thus uniquely suited to contribute in these efforts. Not only should an organization understand what it is producing internally, but an organization also needs to understand the overall impacts of its supply chain activities. SAP has released a number of tools for tracking and, presumably, minimizing an organization's carbon footprint, including SAP Sustainability Footprint Management and SAP Product Carbon Footprint Analytics. These solutions will be detailed further in Chapter 15.

5.2.3   Advanced Intercompany Sales

As of SAP S/4HANA 2022, advanced intercompany sales provides a shared view of purchase and sales orders for two companies, automating the customer and supplier invoice process and supporting valuated stock in transit as in Figure 5.8.
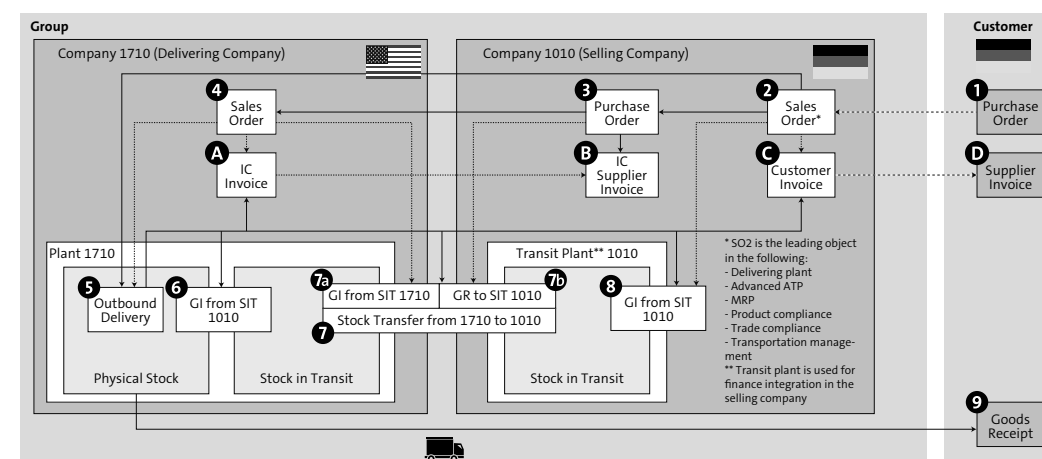
Figure 5.8 Advanced Intercompany Processing: Process Overview

5.2.4   Confirmation and Return Delivery

After a PO has been issued to the supplier and the goods/services have been delivered to the customer, a goods and/or services receipt often is required by the customer to process an invoice. During the goods receipt process, the customer verifies whether the correct goods/services have been delivered and whether the right quantity has been delivered, and also defines the good for inventory management if flagging, such as perishable/nonperishable, is required. As of SAP S/4HANA 2022, you also have OData APIs available for connecting to external systems for goods receipts and confirmations.

To create a goods receipt entry that can be used for a three-way match with the PO and invoice documents (see Figure 5.9), you need to reference the PO number on your goods receipt. As of SAP S/4HANA 2022, there are two goods receipts apps in SAP S/4HANA that have been deprecated/replaced:

- Confirm Receipt of Goods (replaced by Confirm Receipt of Goods—New)
- Post Goods Movement

Your options and apps for goods receipts now include the following:

1. **Manage Purchase Orders app**
   You can create a confirmation directly in the Manage Purchase Orders app as shown in Figure 5.9.
2. **Post Goods Receipt for Purchase Order/Purchasing Document app**
   This app allows you post for goods receipts for standard POs, stock transfer orders (STOs), and scheduling agreements (SAs). Additional functionality includes checking to see if the goods referenced are still within their shelf life range, preventing acceptance of goods that have already expired, and the ability to create GRs referencing vendor consignment stock.
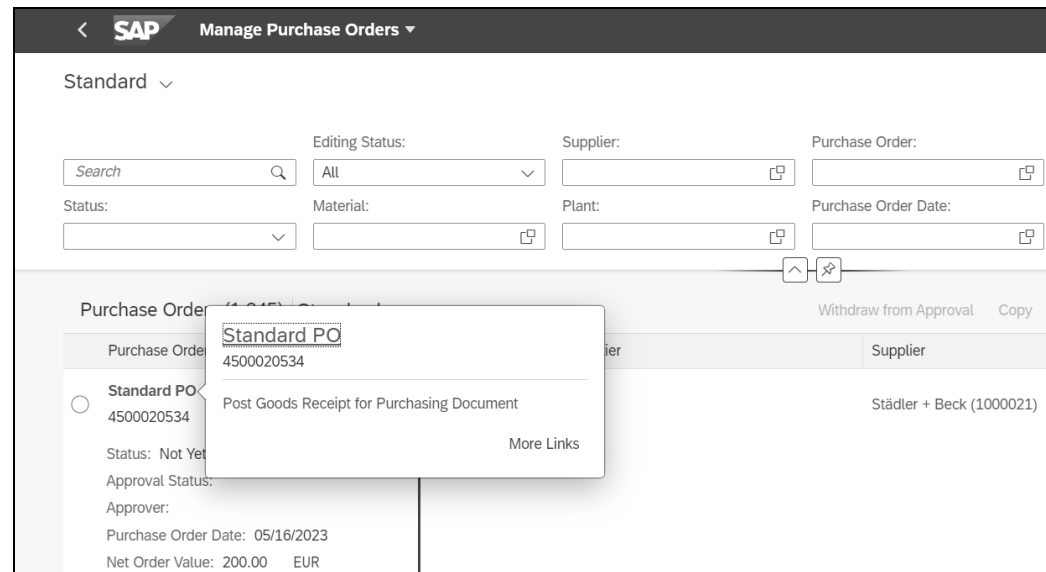
Figure 5.9 Post Goods Receipts for Purchasing Document

3. **Post Goods Receipt for Inbound Delivery app**
   You can use this app to reference inbound deliveries in goods receipts, posting to different cost centers where required to distribute costs at time of receipt. You can create and edit batches out using this app, allowing for batch management during this step in the process. For subcontracting, this app also has an area for referencing component information, as well as whether components exist for a referenced material. A quantity change at the header level is cascaded proportionally down to the item level.

Multiple goods receipts can be entered against a single PO or even a single line item. This is typically done when items are being distributed among several plants and storage locations or items are being received into different classifications, such as in a quarantine or quality review status.

The *movement type* is a three-character key in SAP used to differentiate between goods movements, including transfer orders and issues between plants and storage locations. The most prevalent movement type is *101*, which is a basic goods receipt for a purchase order. Movement types thus play an important role in inventory management and automatic account determination/posting. Goods receipts can be both *valuated*, generating accounting documents and postings, or *nonvaluated*, merely confirming that an item was received but not generating accounting documents/postings.

Goods receipts can be created in the Post Goods Receipt for Purchase Order—New app by searching for the PO, selecting the goods/quantity received, defining the receipt type, and then clicking **Post**, as shown in Figure 5.10.
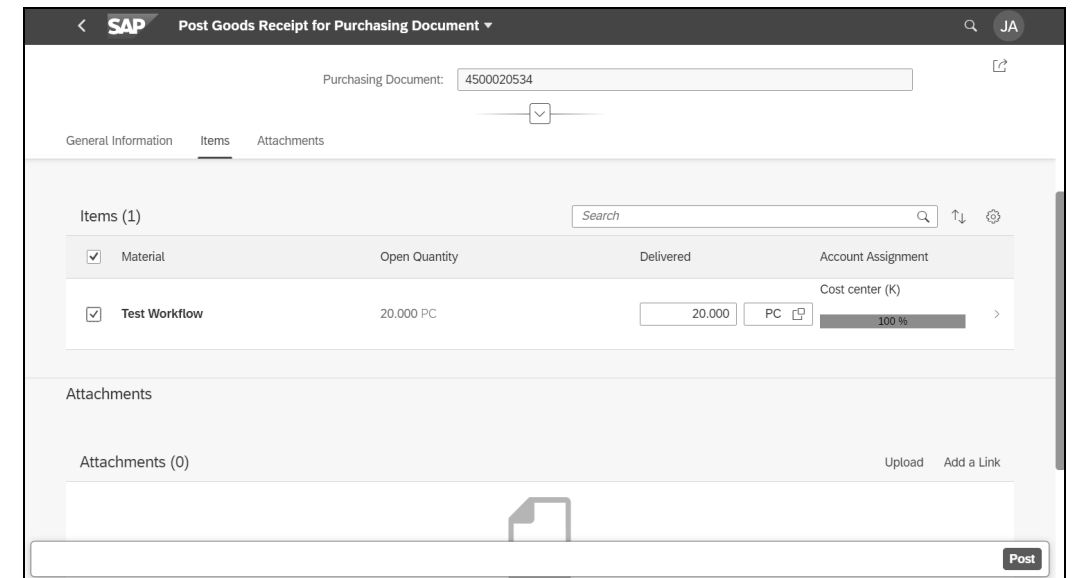
Figure 5.10 Post Goods Receipt for Purchase Order

Once a goods receipt is posted, you can click the material document number and review the general information, item, process flow and any attachments as in Figure 5.11.
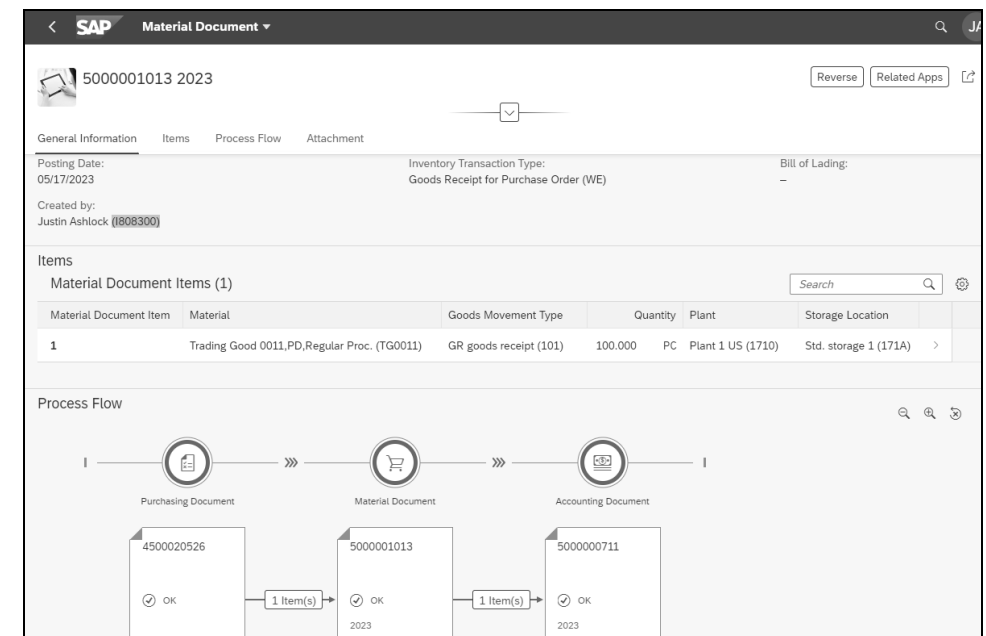
Figure 5.11 Goods Receipt Document

Valuated goods receipts are particularly relevant when purchasing assets, when depreciation runs in asset management sometimes can start the minute the good is taken into receipt. Using a valuated goods receipt approach allows for finance to realize the tax savings of depreciation in a more efficient manner, rather than waiting for the invoice posting to occur. Valuation defaults are often set at the business partner level or for the PO type. If valuation is required—that is, if the PO is flagged for valuated goods receipt—then the goods receipt will generate an accounting document in addition to the material document (see Figure 5.12). Creation of a goods receipt can initiate the following documents and updates in SAP S/4HANA:

- **Update of PO and PO history**
  The goods receipt updates both the open quantities in the PO and the **PO History** tab with a **Goods Receipt Document** link.

- **Update of inventory and value**
  The goods receipt updates the stock quantities in inventory management areas, as well as any changes in valuation of said stock.

- **Update of stock and consumption accounts**
  The goods receipt triggers accounting updates.

- **Notification of goods receipt to the supplier**
  You can send an (optional) notification to the person ordering and/or the supplier upon goods receipt via the system.

- **Printing of a goods receipt slip**
  In some paper-oriented receiving operations, a further hard copy of the receipt is required.

- **Transfer requirement sent to warehouse management**
  If warehouse management is active, a goods receipt can also trigger a transfer request to move the newly received item into the warehouse.

- **Quality inspection**
  If the item received first needs to be inspected, prior to being placed into general availability stock, a goods receipt can trigger these activities in quality management.
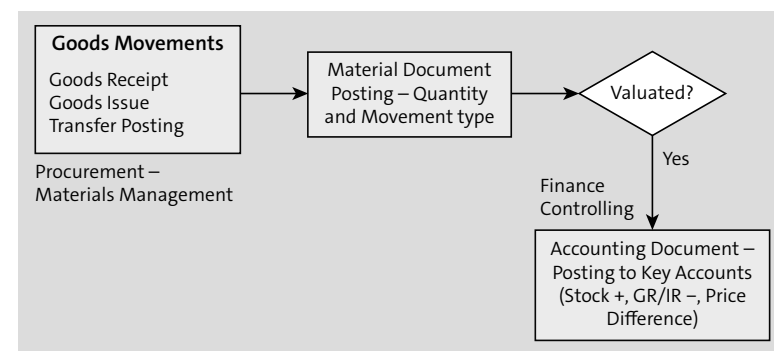
Figure 5.12 Goods Receipt: Document Postings

Return delivery can also be initiated directly in the Return Delivery app. Alternatively, you can reverse the entire goods receipt directly in the GR document itself as shown in Figure 5.13.
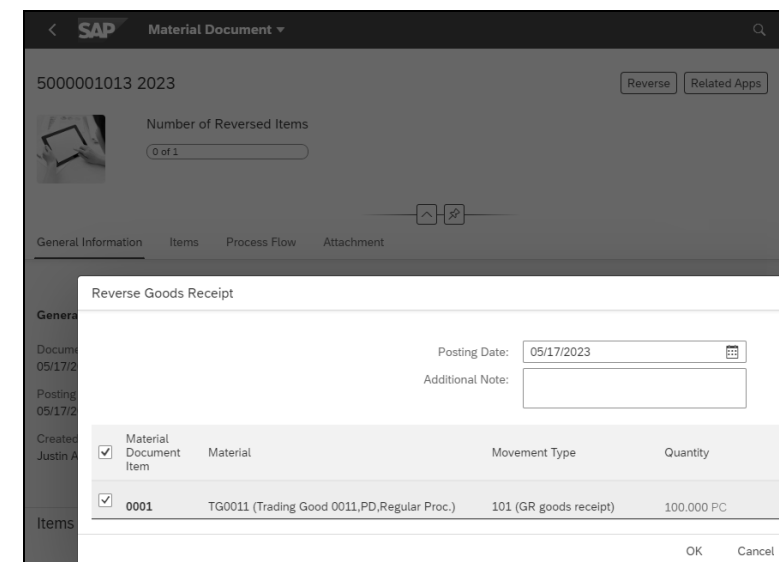
Figure 5.13 Reverse Goods Receipt

The self-service requisitioning functionality supports return deliveries for employees via the My Purchase Requisitions app, in which you select **Return**. It will then show you the return reasons.

Self-service requisitioning in SAP S/4HANA provides an integrated UX for requesting, reviewing, receiving, and returning. If you lose the session during the transaction, a draft of the document you were working on when you lost connectivity is created automatically and retrieved automatically upon return. This proactive connectivity extends to other parts of the process in SAP S/4HANA as well. Instead of having to click the **Refresh** button on a list or grouping, SAP S/4HANA updates these dynamically.

5.2.5 Shopping Cart versus Requisition-to-Pay and Migrating SAP SRM Shopping Carts

Shopping carts are essentially requisitions with a more user-friendly name and, hopefully, UI. The term was first used at SAP for SAP SRM, but it's now used in SAP S/4HANA requisitions, as outlined earlier. Any requisition processes that begin to rival a consumer UX in their simplicity and usability will typically take the label *shopping cart processes*.

We reviewed the shopping cart/requisitioning process in SAP S/4HANA in Section 5.2.1, but there's also a shopping cart concept in SAP SRM. Much of SAP SRM's shopping cart

functionality and simplification has been replicated in SAP S/4HANA. Many SAP customers are evaluating their SAP SRM implementations during the move to SAP S/4HANA and finding this to be an opportune time to migrate from SAP SRM, given the new, streamlined functionality available in the SAP S/4HANA core and in the SAP cloud solutions available today, as well as in SAP Ariba Buying for SAP S/4HANA and SAP Ariba Buying and Invoicing. This section covers the conversion process at a high level from SAP SRM shopping carts to SAP S/4HANA.

SAP SRM functionality has been built out substantially in SAP S/4HANA Sourcing and Procurement for the self-service procurement scenario. In addition, running SAP SRM in the one-client scenario embedded within SAP S/4HANA is not an option like it was with SAP ERP. In a one-client SAP SRM scenario, your options for moving to SAP S/4HANA are to reimplement SAP SRM and connect it to SAP S/4HANA either in the classic or extended classic scenario (see Table 5.1). You can also reimplement in a stand-alone scenario, but this isn't typical if you already have finance running in SAP ERP.

SAP SRM Deployment Option	Classic	Extended Classic
Multiple SAP backends	Migration optional (restrictions apply)	Migration optional (restrictions apply)
Single SAP S/4HANA backend	Migration optional	Migration optional (restrictions apply)
One client	Migration (or reimplementation on different SAP SRM scenario, such as classic) mandatory	N/A

Table 5.1 SAP SRM Deployment Scenarios and SAP S/4HANA

The other (recommended) option is to use this SAP S/4HANA transition to migrate your SAP SRM users, processes, and open documents into SAP S/4HANA. SAP provides informational SAP Note 225146 for this approach.

The first step is to complete your configuration and the setup of the self-service procurement scenario in SAP S/4HANA Sourcing and Procurement. Prior to shutting down your SAP SRM environment, you would then run report BBP_SC_MIGRATE_TO_PR in SAP SRM. You can migrate shopping carts prior to your system conversion to SAP S/4HANA, during the conversion, or before *and* during the conversion. However, the shopping cart migration report can be run multiple times as needed, so long as SAP SRM is still up and running. This means that for a one-client SAP SRM scenario with SAP ERP, the report has to run before the conversion because SAP SRM won't be available once the conversion begins. You can define which migration scenario you'll use during system conversion from SAP ERP/SAP SRM to SAP S/4HANA by using report BBP_MIGRATE_SCEN in SAP SRM.

After running the report, run follow-on report MMPUR_MIGR_EBAN in SAP S/4HANA. After this step, you can access a former SAP SRM shopping cart in SAP S/4HANA as a requisition in the self-service procurement process you have established in SAP S/4HANA and process this item further. Associated purchase orders in SAP S/4HANA also will have a linkage to the requisition created during the conversion of the shopping cart. Any PO information that wasn't transmitted to the SAP ERP being converted to SAP S/4HANA by the time of conversion will be unavailable in the new environment. Errors in processing shopping carts, for example, which failed to create a follow-on PO in SAP ERP, won't convert without the error being resolved first. These reports don't convert any of the SAP SRM workflows and customizations surrounding these shopping carts, and there may be manual steps to perform once the conversion is complete to process these shopping carts in SAP S/4HANA. Currently, these migration reports and approaches only apply to shopping carts. Any documents created in SAP SRM such as contracts, purchase orders, or receipts that haven't been transferred to SAP ERP at the time of conversion won't migrate automatically to SAP S/4HANA during the conversion. As with all conversions, the best approach is to close out as many open documents as possible prior to the conversion so as to convert the smallest number of open documents possible.

5.2.6   Workflow

SAP S/4HANA offers individual approval workflow apps for various procurement objects. These workflow apps rely on preconfigured release strategy procedures and business workflows. However, SAP S/4HANA also offers a generic workflow inbox that provides a holistic view across all workflow items. This inbox can be accessed in an application directly or via a mobile app and filtered/sorted to prioritize workflow items. Individual workflow items can be sorted and worked on in one screen while viewing the queue (see Figure 5.14). The SAP S/4HANA workflow introduces the following improvements from previous SAP ERP versions:

- Execute all tasks in one screen
- Keep work items list while processing a single work item
- Mobile approval possible
- Filter and sort list of work items
- Edit requisitions during approval (as of SAP S/4HANA 1909)

As of SAP S/4HANA 1909, there is also a new app called Manage Workflow for Purchase Requisitions. This app enables the user to simulate and create workflows for purchase requisitions, as well as add deadlines and identify workflows that are past due. Figure 5.15 shows a new workflow being created in this app.
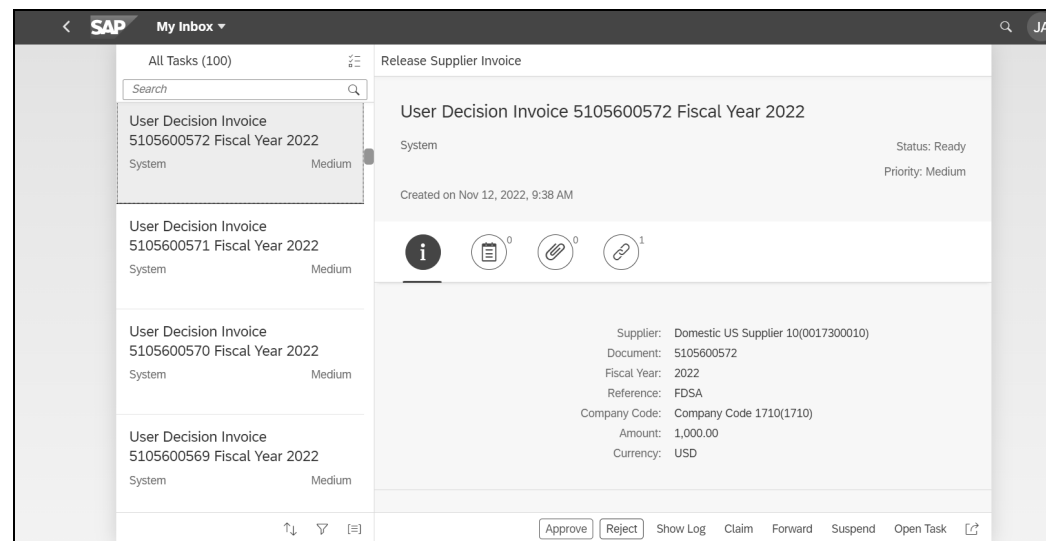
Figure 5.14 Workflow Inbox in SAP S/4HANA
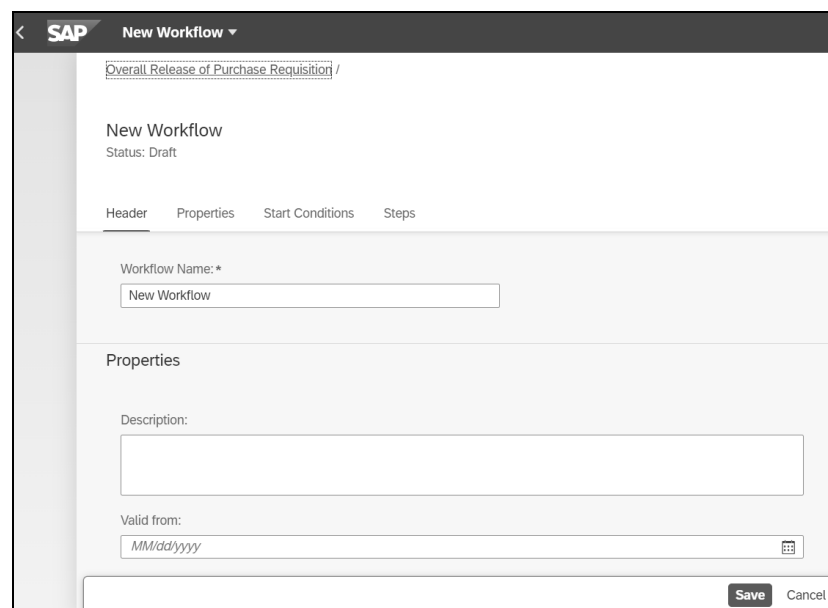
Figure 5.15 Manage Workflow for Purchase Requisitions: New Workflow

5.2.7   Machine Learning–Based Purchasing Functionality via SAP Business Technology Platform

Machine learning has been described as a data-driven process of discovery, where instead of forming a hypothesis and then examining the data to find supporting patterns, a machine analyzes the data first and derives patterns and, ultimately, hypotheses

from this data organically. One of the most exciting areas of innovation for SAP S/4HANA Sourcing and Procurement is driven by machine-learning capabilities in SAP BTP. SAP BTP provides the "platform as a service" or PaaS infrastructure foundation to keep your SAP S/4HANA digital core clean, while deploying additional functionality in the landscape such as machine learning and artificial intelligence capabilities. The next sections will detail these machine-learning capabilities in SAP S/4HANA, with further configuration steps outlined in Section 5.7. Now we'll discuss some of the key machine-learning functionality supported by SAP BTP for SAP S/4HANA Sourcing and Procurement via this approach:

- **Image-based buying**
  Image-based buying identifies related images in a catalog or multiple catalogs linked via cross-catalog search to provide recommendations to the user of similar items based on the current selection. For example, if the user searches for a particular part, provided there is an image of this part, another similar or identical part can be displayed in the recommendations. At its most evolved, this functionality could allow for a scan of an image to then locate similar items in the catalog, without the user having to enter the metadata (name, description, etc.) in the search.

- **Intelligent approval workflow**
  An intelligent approval workflow analyzes approval pattern history for requisitions based on price, source of supply, material group, approvers, value thresholds, and other data points, identifying requisitions en masse, meaning the approver can approve a group of suggested requisitions without individual review, and/or via automated approval, whereby approvals occur without human intervention.

- **Predictive analytics for contract consumption in procurement**
  A purchaser can train a predictive model using this functionality to review purchase orders, expiring contracts, historical purchasing data, and contract consumption based on historical contract usage to derive a more accurate picture for advanced planning and contract negotiations.

- **Proposal of new catalog item or material group**
  During creation of a free text item in a requisition, the system can propose a catalog item and/or a material group based on previous system usage.

For any of these machine-learning features, you'll need to configure connections to SAP BTP and subscribe to the procurement assistant. This functionality also requires SAP S/4HANA batch processes to load data into SAP BTP for analysis, with the insights then being sent back to SAP S/4HANA via the procurement assistant functionality.

SAP S/4HANA Sourcing and Procurement also has several robotic process automations (RPAs) available via SAP Intelligent RPA Store. RPAs provide prebuilt content to accelerate the deployment of new functionality and automation of processes, detailed at *https://store.irpa.cfapps.eu10.hana.ondemand.com/#/explore/order=last-updated%2Cdesc/businesses=sourcing-and-procurement/search=S%252F4HANA*. Specifically, RPAs for sourcing and procurement comprise the following:

- Create Purchase Requisitions from Excel (48M)
- Aging Analysis of Supplier Invoices with Pay-when-Paid Terms (7OH)
- Mass Creation of Purchase Orders (6VW)
- Mass Confirmation of Purchase Orders (48K)
- Mass Maintenance of Quality Info Records (6NX)
- Mass Maintenance of Work Packages and Work Items for Projects (4J1)
- Manage Catalog Items from Excel (529)
- Upload Supplier Invoices from Email Attachments (4HZ)
- Create Purchase Requisitions from Excel (48M)
- Manage Source Lists from Excel (4TK)
- Mass Creation of Business Partner (4MZ)
- Business Partner Master Data Check (4FB)
- Manage Purchasing Info Records from Excel (4W3)

5.3   Requirements Processing in SAP S/4HANA Sourcing and Procurement

Requirements processing (see Figure 5.16) refers to the buyer activity of sorting through various requirements in need of adjustments and/or sources of supply. The main thrust in most procurement organizations is to focus requirements-processing activities on the more strategic procurement items and to automate, using intuitive designs, workflows, and catalog content, to create touchless, issue-ready purchase orders.

| Operational Purchasing | Purchase Order Collaboration | Purchase Order Processing | Requirements Processing | Self-Service Requisitioning | Service Purchasing and Entry | Augmented Decision Making |

Figure 5.16 Requirements Processing

Once a requisition is created, depending upon the workflow settings in the system, the requisition either is sent for approval or, if under the workflow thresholds for a given value, can be converted directly to a PO. The requisition then goes into a buyer's queue for sourcing if it contains a descriptive item or is converted to a PO directly by the buyer or automatically via a batch process if it contains only catalog items. A buyer typically takes the order from here, using one of the following SAP S/4HANA apps to convert the requisition to a PO:

- Automatic Creation of Purchase Orders from Requisition
- Assign and Process Purchase Requisition
- Create Purchase Order via Purchase Requisition

- Release Reminder Purchase Requisition
- Manage Purchase Requisitions—Professional
- Process Purchase Requisitions (see Figure 5.18)

With the Automatic Creation of Purchase Orders from Requisitions app (see Figure 5.17), the buyer can begin converting sourced requisitions en masse to POs.

Figure 5.17 Automatic Creation of Purchase Orders from Requisitions

After selecting various criteria (here, **Per Company Code** and **Per Contract**), the buyer then executes the job to create purchase orders from all the available and completed requisitions matching the chosen criteria.

Traditionally in SAP ERP, a buyer has to run a search using selection criteria, review the list and manually check for sources, assign the supplier, and then move the order into a batch queue. The batch job is then run either at a set interval or manually to create an actual purchase order.

The requirements processing area is streamlined in SAP S/4HANA to one screen, with prebuilt search criteria that pull in all requisitions. The options allow the buyer to dynamically change the search criteria; generate proposed sources of supply automatically based on PIRs, source lists, or contracts/agreements; and then enter direct creation of the purchase order once the source of supply has been defined—all from one screen, as shown in Figure 5.18.

Figure 5.18 Process Purchase Requisitions

Requirements processing in SAP S/4HANA has the following improvements compared to previous versions of SAP ERP:

- Dynamic search and filtering and automatic proposal of search help values
- Ability to change search parameters easily in the same screen
- Automatic proposal of available info records or agreements
- Direct creation of purchase orders

If a buyer wishes to drill into any particular requisition, simply clicking a link takes him into the header of the requisition. Rather than inundating the user with a bunch of tabs and tangential information, the revised screen focuses on the essentials of item, quantity, price, material group, plant, and delivery date.

If further information is required, the user can drill further into the line-item levels (see Figure 5.19). Here, **General Information**, **Quantity Date**, **Valuation**, **Account Assignment**, **Source of Supply**, **Status**, **Contact Person**, **Notes**, and **Delivery Address** links move you down the page to the applicable information area without needing to open a new tab.

A buyer also has the option to create an additional purchase requisition in the Requirements Processing app. This allows a buyer to jump from the Requirements Processing app to create a new requisition and then resume work in the Requirements Processing app seamlessly.

Next, let's discuss processing purchase orders directly in SAP S/4HANA.

Figure 5.19 Purchase Requisition Line-Item Drill Down

5.4   Purchase Order Processing

Traditionally, purchase order creation and processing in SAP ERP (see Figure 5.20) involves entering numerous data points in the purchase order form, checking the document, identifying errors and further required data, tracking this missing data down, entering it and then checking again, and finally, when the document shows no further error messages, ordering. Another approach is to convert a requisition or use an existing purchase order as a template. Here too, any errors identified have to be researched and corrected prior to issuing the purchase order.
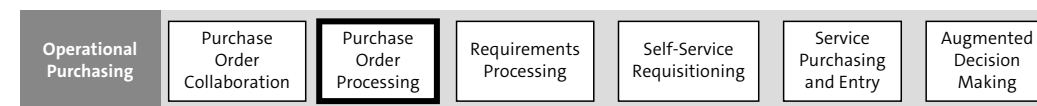
Figure 5.20 Purchase Order Processing in SAP S/4HANA Sourcing and Procurement

Purchase order processing in SAP S/4HANA has been updated: there's now a centralized screen that allows for drilling down into further detail of items sequenced based on data relevance, as well as automatic population of required fields based on the materials, suppliers, and templates selected. Possible field entries are also restricted in SAP S/4HANA during the PO process. This reduces the time spent chasing down errors and entering associated data and ultimately accelerates the timeline from initiation to completion. As Figure 5.21 shows, the Create Purchase Order app in SAP S/4HANA allows the user to focus on the important and mandatory fields in the purchase order

while providing tabs for the more detailed areas of the document. The top part of the screen provides the PO header information, the middle shows the items, and the bottom shows the item details.
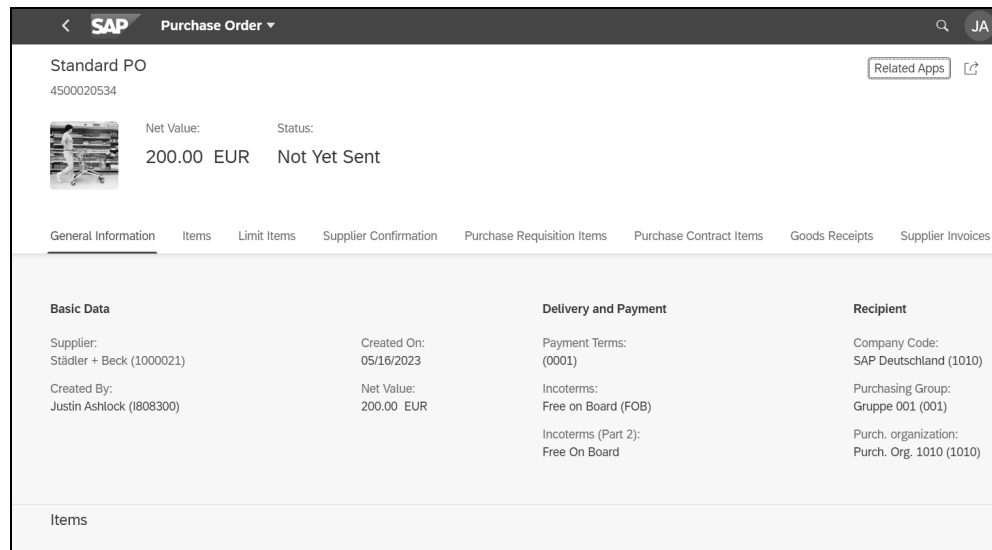
Figure 5.21 Purchase Order Header

Additional filter criteria are available in **Procurement Overview**, allowing for specifying the **Purchasing Organization**, **Material, Material Group**, **Display Currency**, **Supplier**, **Purchasing Category**, and **Purchasing Group** as shown in Figure 5.22.
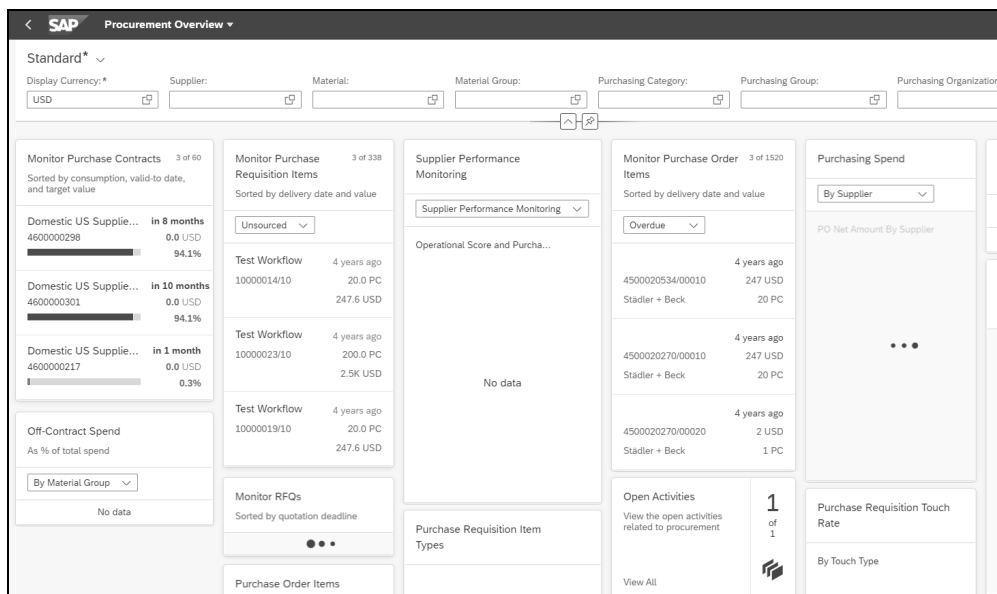
Figure 5.22 Purchasing Overview with Filter Criteria

Other feature updates to the PO processing area of SAP S/4HANA Sourcing and Procurement include incoterms, short text change options, and attachments. *Incoterms* refers to payment, delivery, and other terms that define when the obligation and risk shift from supplier to customer during the transfer of goods/services. Incoterm specifications are now available at both the header and the item level. This means that if one item in a purchase order should require different incoterms than the rest, you can set this at the item level. You can also change the short text for a PO, which was previously not an option. Attachments to an SAP S/4HANA purchase order can be accessed from all of the purchase order apps in SAP S/4HANA Sourcing and Procurement.

5.5   Service Purchasing and Service Confirmation

Service purchasing and entry in Figure 5.23 doesn't refer solely to SAP S/4HANA Sourcing and Procurement functionality in this process. Although the user still has services procurement capabilities similar to those used when purchasing a material in SAP S/4HANA Sourcing and Procurement, there is also SAP Fieldglass integration. SAP Fieldglass is a cloud-based vendor-management system (VMS) used to manage services procurement and external workforce programs. For external service procurement and service-supplier management, SAP Fieldglass invoices are integrated with SAP S/4HANA, and further integration is to be offered in later releases.
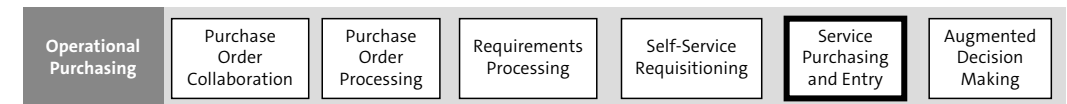
Figure 5.23 Service Purchasing and Entry

The service procurement capabilities within the SAP S/4HANA core include simplified service procurement, with SAP Fiori apps for Service Entry Sheet and Service Confirmation (Figure 5.24).
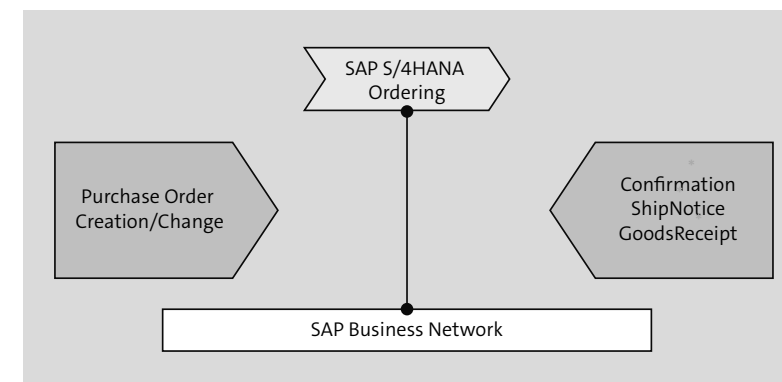
Figure 5.24 Services Document Integration with SAP Business Network

5.6   Purchase Order Collaboration

Upon creation of a PO, the PO can be issued to a supplier via SAP Business Network and/or via EDI, email, or other transmission methods supported in SAP S/4HANA. Suppliers often connect to SAP Business Network and use this as an integration layer to receive their purchase orders directly into their systems via their EDI linkage, rather than setting up a point-to-point EDI integration going out to the network to process these orders.

As mentioned in Chapter 1, PO collaboration is not something that can be done adequately in SAP ERP or even in SAP S/4HANA alone; an interaction between the supplier and buyer needs to take place, and documents need to be exchanged without compromising the security of the core SAP S/4HANA environment. Point-to-point solutions such as supplier self-services suffer from the maintenance aspects and training/change management required for the supplier base. The point-to-point model doesn't scale well, as each additional supplier represents additional calls and emails to the help desk, all of which place the onus on the buyer's organization. For a point-to-point solution to be economical, it has to scale to encompass many suppliers and high document volumes. This is where a network like SAP Business Network can take over the heavy lifting aspects of infrastructure, supplier onboarding, and support and allow the buyer to focus on the value-added activities within collaboration.

SAP Business Network is the main approach for true PO collaboration, as it allows the supplier to receive and work with the purchase order, confirming items or proposing changes to delivery dates and potential quantities. SAP S/4HANA provides out-of-the-box integration with SAP Business Network. SAP Business Network handles well over $5 trillion in annual transactions among millions of participants. Invoicing will be covered in Chapter 11, but for now note that PO collaboration is covered with this integration with SAP Business Network, as well via traditional processes of document exchange such as email, fax, and EDI.

> **Note**
>
> SAP S/4HANA Cloud offers best practices for integration with SAP Business Network, which differs slightly from the on-premise standard integration and includes more documents from the invoice/payment part of the process. There are also further best practice integration points with SAP Ariba Strategic Sourcing Suite, which will be detailed further in Chapter 9.
>
> This best practice approach for SAP S/4HANA Cloud integrations also includes invoice documents from SAP Fieldglass.

5.7   Configuring Operational Procurement

This section outlines the general configuration steps required to set up self-service operational procurement processes in SAP S/4HANA Sourcing and Procurement. As discussed earlier, self-service procurement can be used for stock items, consumables, and/or external services. For stock items and services, this same baseline configuration for self-service procurement can support these scenarios to a degree. Stock items also require a material master, which is discussed in more detail in Chapter 4 and Chapter 6.

5.7.1   Self-Service Procurement Requisitioning

As with all configuration guides, this section is to be used as a reference to support your particular requirements and project. Prior to beginning configuration, you should always ensure you have researched the latest configuration and version-level guidance online and verified that you have met the requirements to begin configuration. Also, note that traditional workflow, report, interface, conversion, enhancement, and form (WRICEF) objects are beyond the scope of this configuration section and book in general; these are project-specific and typically require some development to realize. For the baseline configuration of the self-service procurement scenario, the steps are as follows in SAP S/4HANA:

1. Create employee data. For a user to access the appropriate areas of the organization structure and system functionality for self-service procurement, you must first create an employee record and assign it in the organization structure.

   In SAP Human Capital Management for SAP S/4HANA, an employee record is comprised of *infotypes*, information units used to store specific employee master data. To create an employee, use Transaction PA30. For procurement activities, Infotypes 0001 (organizational assignment) and 0105 (system user name and communication information, such as email and address) are mandatory.

2. Create an assignment (position) for the employee in the organization structure via Transaction PPOMA.

3. Assign a business partner to the position. BUP003 is the employee business partner role.

4. Maintain attributes mandatory for procurement activities as per Table 5.2.

Mandatory Attributes	Default Value
Document Type: Can be configured in customizing under IMG menu path **Materials Management • Purchasing • Purchase Requisition • Define Document Types**	BSART
Company Code	BURKS

Table 5.2 Mandatory Procurement Activity Attributes

Mandatory Attributes	Default Value
Cost Center	COSTCENTER
Catalog: Allows the employee to access predefined catalogs	CATALOG
Purchasing Organization	EKORG
Purchasing Group	RESPPGRP
Account Assignment Category: **Asset**, **Cost Center**, **Sales Order**, **Order**, and **Network** are supported	KNTTP
Material Group	MATKL
Currency	WAERS
Plant	WERKS

Table 5.2 Mandatory Procurement Activity Attributes (Cont.)

Catalogs

Catalog options in SAP S/4HANA include *punchout catalogs*, in which a user clicks on the catalog link and accesses a catalog outside of the SAP S/4HANA system, selects an item or items, and then returns with the items to the shopping cart. There is also an internal search bar within the SAP S/4HANA requisitioning app, which allows for searching for available internal catalog items within SAP S/4HANA. A user can also search across catalog data in this search bar from multiple catalogs, provided the catalog data has been loaded in the SAP S/4HANA system. Finally, as referenced in previous chapters, there is a consulting solution from the SAP Consulting delivery team called the *lean catalog*, which enables a more extensive internal catalog.

Punchout Catalogs

To set up a punchout catalog, you need to configure the web service to access the catalog. To create a catalog link (webservice), go to **Materials Management • Purchasing • Environment Data • Web Services: ID and Description**. For typical webservice configuration values, see Table 5.3.

Sequence Number	Name of Parameter for Webservice	Value of Parameter for Webservice
10		https://s1.ariba.com/Buyer/Main/ad/content-Punchin/OCIPunchinDirectAction
20	PunchinId	NAME/USER ID
30	PunchinPassword	PASSWORD

Table 5.3 Webservice Configuration Values

Sequence Number	Name of Parameter for Webservice	Value of Parameter for Webservice
40	Realm	APCProduction-T
50	Full Name	S4 HANA Catalog
50	UniqueName	S4HANA
	EmailAddress	EMAIL ADDRESS
60	DefaultCurrency	USD
70	UserLocate	US
80	ModifyURL	FALSE
90	User.Address.UniqueN	OCI_DEFAULT
100	Hook_URL	Return URL

Table 5.3 Webservice Configuration Values (Cont.)

SAP S/4HANA requires a *hook URL* to be maintained with the type set as Return URL. If you wish to keep some parameters secure from catalog vendors, you can leverage the MMPUR_OCI_PARAMETERS BAdI.

You can also maintain catalog web services via the Settings for Web Services app as of SAP S/4HANA 2022 (see Figure 5.25).
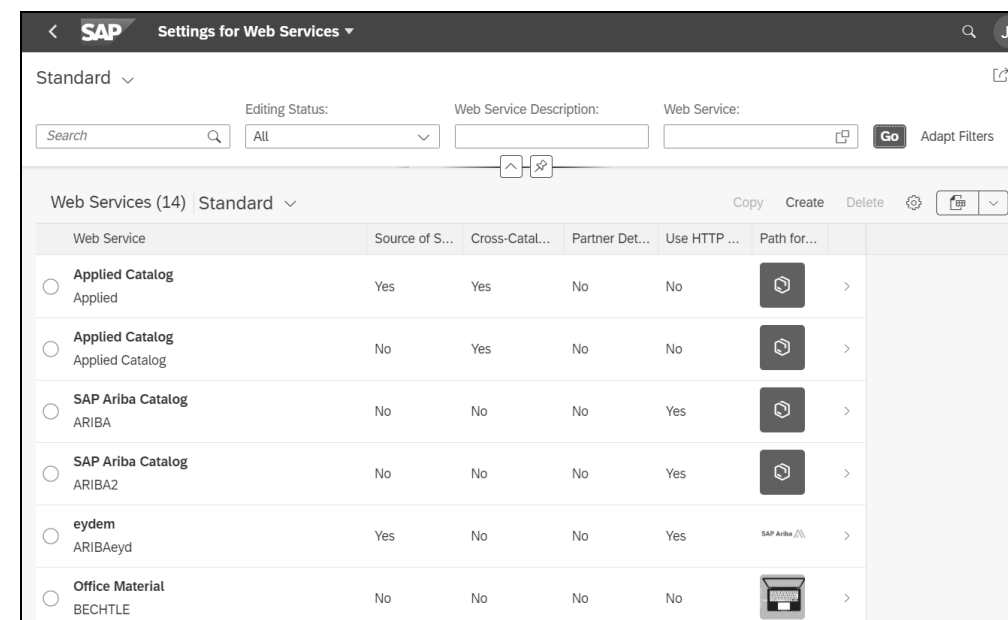
Figure 5.25 Settings for (Catalog) Webservices

Internal Catalog

To create and/or manage items in the internal catalog within SAP S/4HANA, go to the Manage Catalog Items app, select **Create**, and enter the item data as shown in Figure 5.26.
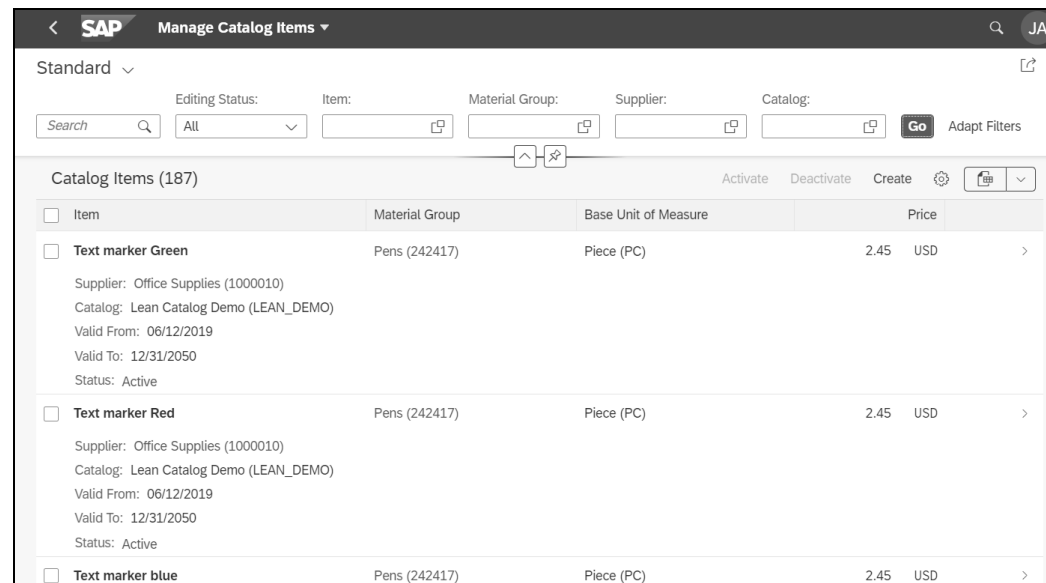
Figure 5.26 Manage Catalog Items

As in the new item screen in Figure 5.27, you can then enter detailed information on the item, including organization structure and lead times, as well as reference an image.
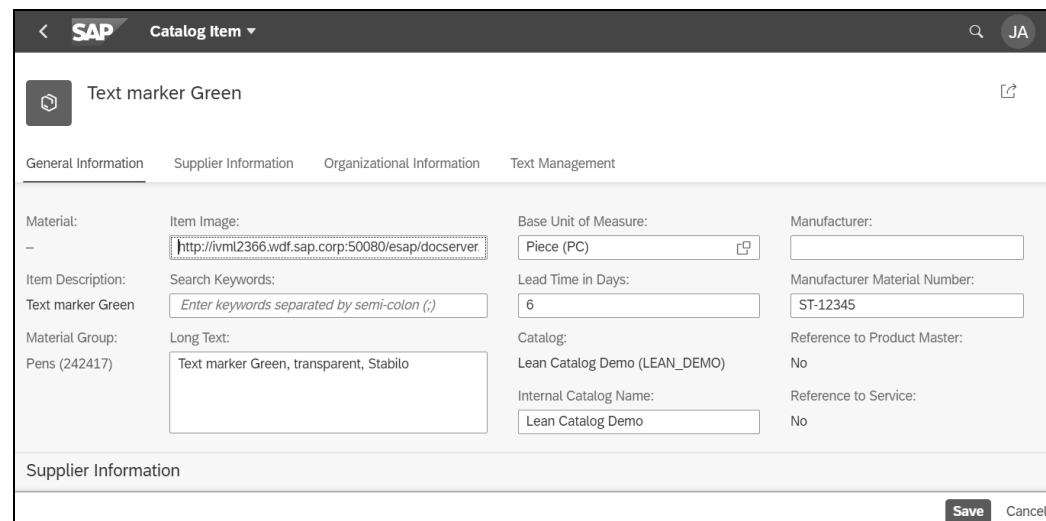
Figure 5.27 Create Catalog Item

Lean Catalog

The lean catalog is a consulting solution from SAP Consulting that provides the following:

- A web application for product searches and selection
- An editing cockpit for creating your catalog product range
- Supplier material as a new business object to store supplier content
- An import manager for importing catalog items from files delivered by your suppliers
- A product relation tool to manage any kind of linkages between your SAP materials, supplier materials, or a mixture of both

The lean catalog leverages Open Catalog Interface (OCI) or the cross-catalog search capabilities in SAP S/4HANA, detailed in the next section, to allow for detailed search and selection of catalog items. You can search for products using a keyword search, a hierarchical search, or an advanced search as in Figure 5.28.
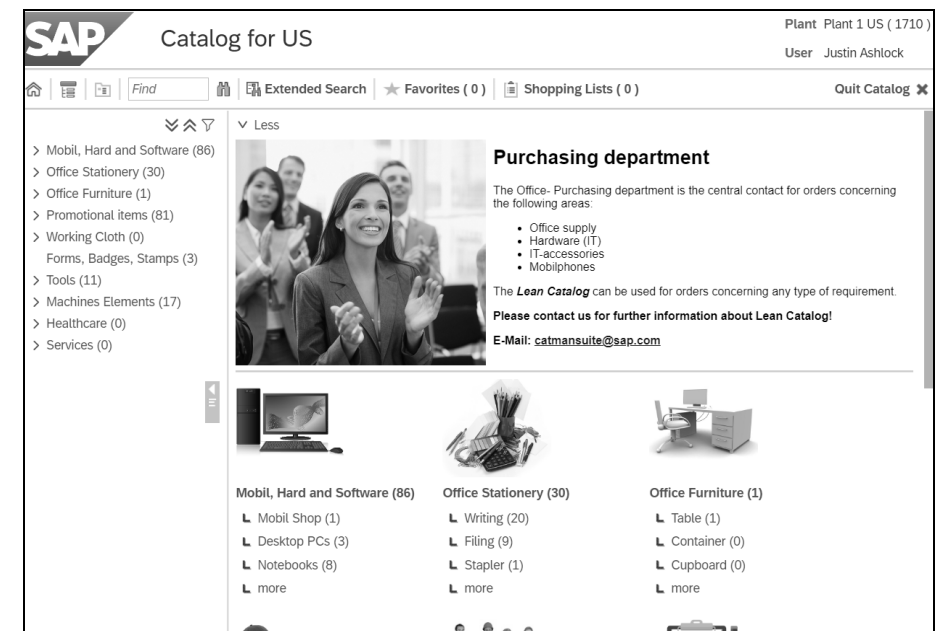
Figure 5.28 Lean Catalog

Cross-Catalog Search

SAP S/4HANA now allows for cross-catalog search in the **Search** bar of the Create Requisitions app without going into each individual catalog. If you plan to use this functionality, there are some setup steps required.

As prerequisites, verify that catalog data is available in OCI 5.0 format and that your catalog suppliers can provide this as a JSON file or through an HTTP service. Catalogs and their corresponding web service IDs, as well as content management services (CMSs; for loading images and attachments), must be set up and configured in the system.

To set up cross-catalog search, complete the following steps:

1. Replicate catalog data and any required material master data to materials management staging tables.

2. Index the data for cross-catalog search.

3. Define number ranges for catalog items by entering "01" as the catalog item number range. Follow IMG menu path **Materials Management • Purchasing • Purchase Requisition • Self Service Procurement • Define Number Ranges for Catalog Items**.

4. Enter a number range for search items. Follow IMG menu path **Materials Management • Purchasing • Purchase Requisition • Self-Service Procurement • Define Number Ranges for Search Items**. Enter "01" as the attachment key number range for MMPUR_ATT.

5. Maintain a common **Currency** to enable a price filter on items. Follow IMG menu path **Materials Management • Purchasing • Purchase Requisition • Self Service Procurement • Define Settings for Cross Catalog Search** as per Figure 5.29.
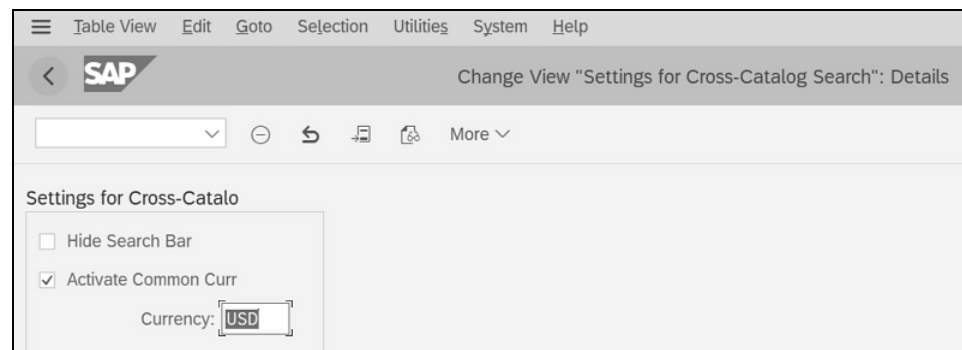
Figure 5.29 Cross-Catalog Search Settings

> **Note**
>
> After the data is extracted, if you change this setting to another common currency, you'll need to reindex and run program MM_PUR_CTLG_EXT_COM_CUR_UPD. Also, if you elect to hide the search bar, you will prevent users from accessing the internal SAP S/4HANA catalog in the Create Requisition App as they will not be able to search.

6. If you've enabled catalogs using OCI 4.0, you'll have to activate the `OCI_CATALOG` ICF service using Transaction SICF. To do so, first select menu option **Service • Host**, then select **Activate Service**. Second, ensure that every node path is set to active in */SAP/BC/REST/SAP/OCI_CATALOG*. For more information, check SAP Note 2376996.

7. Maintain additional attributes for catalogs. You can control whether a catalog is visible and whether it is used for OCI 5.0 extraction by following IMG menu path **Materials Management • Purchasing • Purchase Requisition • Self-Service Procurement •**

Define Additional Attributes for Product Catalog Categories. Enter a webservice and maintain the attributes. Select the **Don't Show** checkbox if you don't wish to display the catalog. Select the **OCI Extraction** checkbox if you want to import data from this catalog using the catalog data import (see Figure 5.30).

Figure 5.30 Maintaining Catalog Attributes for Display and OCI Extraction

8. Indexing and embedded search configuration is typically conducted by a technical resource with Basis-level access to the system. Embedded search in SAP S/4HANA Sourcing and Procurement leverages SAP NetWeaver Enterprise Search, a search solution providing unified and secure real-time access to enterprise data and data from within and outside of an organization. SAP NetWeaver Enterprise Search returns data from SAP systems and other search providers and allows direct access to the associated applications and actions. Embedded search is the enterprise search component for SAP NetWeaver Application Server (AS) ABAP and serves as the search platform using the SAP HANA engine, connecting via RFC destinations, URLs, and/or repository addresses to outside search providers and data sources. Refer to SAP Note 1164979 and *help.sap.com* for configuration guidelines. For self-service requisitioning, SAP NetWeaver Enterprise Search includes business templates and indexes via search object connectors to enable search and access of both supplier catalogs and material master data from materials management.

9. For search templates, the SAP S/4HANA administrator needs to create one search template for each business connector, which then delivers the result data in a predefined form as per the attributes in the template. These templates are not delivered by default in an SAP S/4HANA environment and require activation on the admin's part. You can mass-activate search templates using Transaction ESH_COCKPIT. To do so, select **Switch to Modeler** and go to the software component MM-PUR-REQ. Under this component you will find the templates listed in Table 5.4.

Search Template	Description
MM_PUR_CTLG_SRH	Search results model (catalog item data)
MM_PUR_CTLG_ATTCH	Images and attachments
MM_PUR_CTLG_ATTRB	Attributes
MM_PUR_CTLG_CUST_FLD	Customer fields
MM_PUR_CTLG_PRC_CON	Converted price data (prices in different exchange rates)
MM_PUR_CTLG_SRCHTRM	Search terms

Table 5.4 Search Templates in MM-PUR-REQ

10. Select a search template, then click the **Create Connector** button and the search object connector will be created.

Cross-catalog search is enabled in SAP S/4HANA by importing and syndicating data from catalog items and material masters into a single repository of SAP S/4HANA tables for search, indexing the data, and then leveraging embedded search APIs to drive the item search queries. For more information on the tables, see package VDM_MM_PUR_CATALOG. Table 5.5 lists the associated key tables.

Table	Description
MMPUR_CAT_ITM	Main data for catalog items
MMPUR_CAT_PRCONV	Price converted to common currency
MMPUR_CAT_LNGTXT	Long text
MMPUR_CAT_DSCTXT	Description
MMPUR_CAT_PRCSCL	Price scales
MMPUR_CAT_ITM_SRH	Search items description
MMPUR_CAT_MGPTXT	Material group text
MMPUR_CAT_ATMAIN	Attachments main
MMPUR_CAT_ATTCHM	Attachments
MMPUR_CAT_ATTHMB	Thumbnail attachment
MMPUR_CAT_ATHTXT	Attachment text
MMPUR_CAT_ATTRB	Attributes for catalog items

Table 5.5 MMPUR_CAT Tables

Figure 5.31 shows the steps involved in preparing data for cross-catalog search.
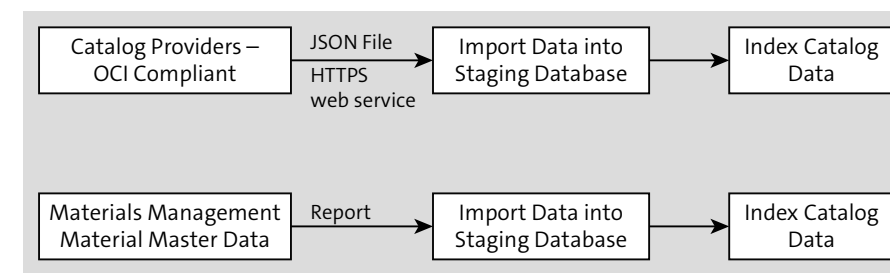
Figure 5.31 Preparation for Cross-Catalog Search in SAP S/4HANA

OCI data maintained by catalog providers can be imported as a JSON file or HTTPS webservice, while material master data can be extracted using reports. Starting with OCI 5.0, multiple customer fields are supported for import. You can maintain the customer fields in INCLUDE structure MMPUR_CA_INCL_CAT_ITM of table MMPUR_CAT_ITM.

The CMS must be configured to extract and store images in an SAP S/4HANA catalog scenario. This is cross-client configuration and requires appropriate authorization. The content management repository is MMPUR_CAT_CONTENT and the contents are maintained in table MMPUR_CAT_CNTNT. Follow these steps to maintain a physical storage path and the HTTPS requirement for loading images:

1. Follow IMG menu path **SAP NetWeaver • Knowledge Management • Settings in Knowledge Warehouse System • Content Management Service • Define Content Repositories**.

2. In the **Content Repository** field, select **MMPUR_CAT_CONTENT** and click **Edit**.

3. In the **Phys. Path** field, enter the physical path determined for storing the files in your system landscape, then select the HTTPS requirement in the fields for both the frontend and backend.

4. The ABAP server or other servers hosting images need to be configured in the web dispatcher. The system administrator needs to configure the system in such a way that any URL containing the term *imageloader* should be redirected to where the images are loaded. For importing OCI 5.0-compliant catalogs via JSON or a report/webservice approach, you must have the MMPUR_CAT_CONTENT_MGMT role assigned.

Import JSON File

To import a file via JSON, follow these steps:

1. Add the catalog webservice ID or existing catalog webservice ID and select **Import Action Applicable File**. In the **Import File/URL** field, provide the path of the file to be imported. Select the **Import Image** checkbox if images are to be imported. In the

Image Folder field, enter the path for the folder containing images. Click the **Schedule Job** button.

2. Define the start time for the load to begin, then execute it.

Import Catalog via Webservice

To import a catalog via a webservice, follow these steps:

1. Enter Transaction MMPUR_CAT_EXT or the Schedule Import of Catalog Data app and click **Add a New Job** as in Figure 5.32. A new job screen appears.

2. Add the catalog webservice ID or existing catalog webservice ID and select **Import Action Applicable HTTP/HTTPS**. Provide the **URL**, **User Name**, and **Password** to be imported. You can also provide a transaction ID and requested page if you want to resume a stalled transaction.

3. Select the **Import Image** checkbox if you want to import images, and provide the folder path to the folder containing the images. If using a proxy server, BAdI MMPUR_ CAT_PROXY_INFO needs to be implemented.

4. Click the **Schedule Job** button. Define the start time for the load to begin and execute it.
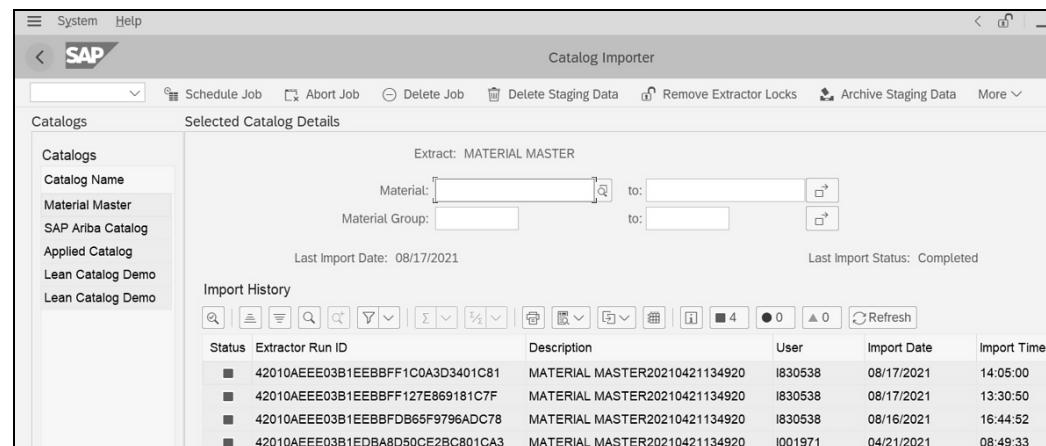
Figure 5.32 Catalog Importer

5. Select the **Reschedule Delta** indicator for activating a delta import. The indicators are described further in Table 5.6.

Importing Type	Value of Indicator	Remarks
Full or initial load	**Reschedule Delta**: OFF	Use when you're importing data into a catalog the first time. All catalog items are added to tables.

Table 5.6 Reschedule Delta Indicators

Importing Type	Value of Indicator	Remarks
Delta load	**Reschedule Delta**: ON	Use when you want to change data or add additional items to an already imported catalog.

Table 5.6 Reschedule Delta Indicators (Cont.)

6. Table 5.7 contains some user-exit BAdI options to support meeting requirements outside of the standard content-management capabilities in SAP S/4HANA.

SAP S/4HANA BAdI (Enhancement)	Description
MMPUR_CATALOG_ENRICH_DATA	The ENRICH_ITEM_DATA enhancement spot provides access to catalog item data, search terms, attributes, price scales, images, and customer fields.
MM_PUR_CTLG_BDI_SRH	Influence search behavior using this BAdI. Standard search behavior searches more relevant columns first and then organizes these in the results.
MMPUR_CATALOG_ENRICH_DATA	The MMPUR_CATALOG_TRANSFER enhancement spot allows items selected in a catalog to be enriched when transferring to the user's requisition in SAP S/4HANA Sourcing and Procurement.
MMPUR_CAT_PROXY_INFO	You can use the MM_PUR_CAT_PROXY_INFO enhancement spot to specify proxy server settings to access the internet.
MMPUR_CAT_CLL_ENRICH	You can use the MMPUR_CAT_CLL_ENRICH enhancement spot to transfer additional parameters to a webservice, such as a product catalog or a vendor list.
BD_MMPUR_REQ_APPR_PRV	You can use the ES_MMPUR_REQ_APPR_PRV enhancement spot to modify the approver data, such as displaying the approver name on the user interface of the My Purchase Requisition app.

Table 5.7 Available BAdIs for Influencing Purchasing in SAP S/4HANA Sourcing and Procurement

5.7.2   Machine Learning–Based Procurement Functionality

Machine learning (ML) uses customer-specific history to build/train a model and make predictive recommendations and decisions. In SAP S/4HANA, there are two types of machine learning capabilities available: embedded ML and side-by-side machine learning. Embedded ML uses SAP Analytics Cloud and classic algorithms such as clustering, classification, and regression to drive output. Embedded ML is not run as a sidecar approach in SAP S/4HANA as the computing requirements are lower than in side-by-side ML.

Side-by-side ML is used for more complex scenarios and deep learning for image and language application, which require larger amounts of computing power. Side-by-side ML applications are run on SAP BTP. Much of this functionality used to be run in conjunction with SAP Leonardo, a platform that was deprecated in June 2020. Since then, many of the ML applications have been embedded in SAP S/4HANA or based on SAP BTP, depending on their computing requirements and load.

Machine learning apps and functionality available in SAP S/4HANA split along whether they are embedded or sidecar, and whether they leverage SAP Predictive Analytics integrator 2.0, now called Intelligent Scenario Lifecycle Management (ISLM). ISLM provides a unified interface for the consumption of ML. ISLM and non-ISLM procurement scenarios are listed in Table 5.8.

Scenario	Scenario Name	Functionality	Type	ISLM Scenario
Predictive scenario for blocked invoices with quantity variance	MMIV_INVC_QTY_BLCK	In case of blocked invoice items that are relevant for a cash discount, the system predicts in the payment block section. Based on data records of past goods receipts from the supplier, the system indicates whether the goods receipt can probably be expected.	Embedded	ISLM
Consumption data for slow- or nonmoving materials	MMSLO_CONSUMPTION_02	Activating this scenario allows the system to use historical data to calculate a predicted future consumption value over the next three months for slow-moving stock.		ISLM
Stock level data for slow- or nonmoving materials	MMSLO_STOCK_LEVEL_02	Activating this scenario allows the system using historical data to calculate a predicted future stock value over the next three months for slow-moving stock.		ISLM

Table 5.8 ISLM and Non-ISLM Machine Learning Procurement Scenarios

Scenario	Scenario Name	Functionality	Type	ISLM Scenario
Quantity contract consumption	QTY_CONTRACT_CNSMPN	This scenario calculates the predicted consumption date for a contract in order to avoid stockouts and rushed renegotiations due to expired contracts.		ISLM
Reduce off-contract spend		ML algorithms are used for the proposal of options for materials without purchase contracts to reduce the off-contract spend.	Side by side	Non-ISLM
Material group proposal		In this scenario using machine learning algorithms, free text data of the purchase orders is trained to predict the group code for a material. It helps the purchaser to select from the proposed material group while creating purchase requisitions or purchase.	Side by side	Non-ISLM
Catalog item proposal		In this scenario using machine learning for proposing the creation of catalog items, SAP S/4HANA will help procurement organizations in a significant way to reduce their free text orders and therefore their process costs.	Side by side	Non-ISLM

Table 5.8 ISLM and Non-ISLM Machine Learning Procurement Scenarios (Cont.)

Scenario	Scenario Name	Functionality	Type	ISLM Scenario
Intelligent approval of purchase requisitions		An ML scenario is used to analyze the approval pattern history for the purchase requisitions based on price, source of supply, material group, approvers, attachments, and so on, and provide recommendations for a mass automated approval.	Side by side	Non-ISLM
Images-based purchasing		In this scenario, machine learning algorithms are used to learn the required features and propose images of the catalog items for creating a new purchase requisition.	Side by side	
Supplier delivery prediction		This scenario includes predicting the PO delivery date for purchase order items. With this information, you get a forecast based on your company's empirical data if a goods receipt can be successfully completed in time.	Embedded	ISLM
Contract consumption		This scenario includes a prediction of the contract consumption date to minimize or eliminate production delays due to stockouts from expired contracts. Also provides real-time data analysis with drilldown capabilities.	Embedded	ISLM

Table 5.8 ISLM and Non-ISLM Machine Learning Procurement Scenarios (Cont.)

The first step in setting up machine-learning functionalities is establishing a connection to SAP BTP.

Image-Based Buying

Complete the setup steps for scope item Schedule Export of Catalog Item Images for Machine Learning (3UH) and activate the SAP Intelligent Insights for Procurement Integration communication scenario, **SAP_COM_1054**. Next, log into the SAP S/4HANA Configuration GUI and go to **SPRO • Materials Management • Purchasing • Self-Service Procurement • Define Machine Learning Scenarios** and then follow these steps:

1. Choose **New Entries**, select **Image-Based Buying**, and ensure the **Activate the Scenario** checkbox is checked. Save your changes.
2. Next, map the RFC destination to the machine-learning scenarios by entering Transaction SM30 in SAP S/4HANA. Choose table view MMPUR_MLFND_CNF and add the entry as follows:
   - **Outbound Service ID**: Image-based buying
   - **Activate**: Yes
   - **RFC Destination:** Enter the RFC destination created in the previous steps
3. Choose **Save**.

Next, make the search bar available in the cross-catalog search settings by following **SPRO • Materials Management • Purchasing • Purchase Requsition • Define Cross Catalog Search** and unchecking the checkbox for **Hide Cross Catalog Search Bar**.

Finally, schedule the job to upload data for machine learning.

Next, schedule the jobs to upload/export data to SAP BTP, ensuring the user running the job has authorization SAP_BR_BPC_EXPERT:

1. Log into your SAP S/4HANA web UI.
2. Choose the **Schedule Export of Catalog Item Images for Machine Learning** app tile under **Job Scheduling for Purchasing**.
3. Choose **New**. Under **Job Template**, choose **Training Data for Image-Based Buying**, and select the corresponding catalog containing these images. Enable fine-tuning if the catalog has clean data for training.
4. Set **Start Immediately** in **Scheduling Options** according to your requirements.
5. Choose **Schedule**.
6. Monitor the application log on the **Application Jobs** page to check the status of the training job.

For more on setting up and tuning this functionality, review the SAP Best Practices at *https://s-prs.co/500324*.

Intelligent Approval Workflow

In these steps, you activate the intelligent approval workflow:

1. Follow **SPRO • Materials Management • Purchasing • Purchase Requisition • Flexible Workflow • Activate Intelligent Approval of Purchase Requisitions**.

2. In **Machine Learning Configurations**, select **Change View** then **New Entries**. Choose **Scenario 1 Intelligent Approval for Purchase Requisitions** and enter the values as follows:
   - **Activate**: Yes
   - **Number of Attempts**: 3
   - **Calculation Currency:** Your preferred currency or USD

Next, map the RFC destination to the machine-learning scenarios by following path **SPRO • Materials Management • Purchasing • Intelligent Insights for Procurement**. Select **Edit** to change the **Maintain RFC Destination for Machine Learning Services** details screen. Add the values as follows:

- **Outbound Service ID:** Intelligent approval for purchase requisition
- **Activate:** Yes
- **RFC Destination:** Enter the RFC destination created in the previous steps

Next, schedule the jobs to upload/export data to SAP BTP, ensuring the user running the job has authorization SAP_BR_BPC_EXPERT:

1. Log into your SAP S/4HANA web UI.

2. Choose the **Schedule Transfer of Purchase Requisitions for Intelligent Approval** app tile under **Job Scheduling for Purchasing**.

3. Choose **New**. Under **Job Template**, choose **Upload Records for Purchase Requisition Intelligent Approval**.

4. Set **Start Immediately** in **Scheduling Options** according to your requirements.

5. Choose **Schedule**.

6. Monitor the application log on the **Application Jobs** page to check the status of the training job.

Create a second job for **Upload Records (Failed during Inference) for PR Intelligent Approval**. If you encounter issues during configuration, you can create a ticket referencing component MM-FIO-PUR-REL.

For more on setting up and tuning this functionality, review the SAP Best Practices at *https://s-prs.co/500326*.

Predictive Analytics for Contract Consumption in Procurement

In this machine-learning functionality, the setup steps are different from the others. An analytics specialist conducts the predictive model training leveraging the Quantity Contract Consumption app (F2012), with either the SAP_BR_BUYER or the SAP_MM_BC_PUR_

STRATEGY and SAP_BR_BUYER authorizations assigned. Once you have activated the predictive model, you will need to schedule the SAP_MM_PUR_PAI_CTR_CONSUMP job to consume the predictions in the frontend app in SAP S/4HANA 1909. In cloud versions with this functionality, this SAP_MM_PUR_PAI_CTR_CONSUMP job runs weekly and does not require scheduling.

For more on setting up and tuning this functionality, review the SAP Best Practices at *https://s-prs.co/500327*.

Proposal of New Catalog Item or Material Group

SAP S/4HANA will also make recommendations for adding items to the catalog based on ordering trends in the system. If an item is ordered repeatedly as a free text item, you will see a recommendation in the Manage Catalog Item Recommendations app to create a catalog item for this order. Follow path **SPRO • Materials Management • Purchasing • Purchase Requisition • Self-Service Procurement • Define Machine Learning Scenarios** to reach the screen shown in Figure 5.33.
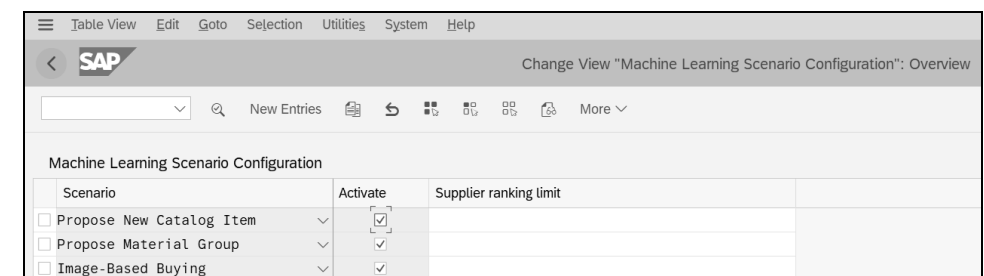
Figure 5.33 Define Machine Learning Scenarios

Here you can activate either recommendations by item or by material group, or both, by clicking **New Entries** and maintaining threshold hits, training data period (in days), and supplier ranking limit, and then checking the **Activate** checkbox, as shown in Figure 5.34.
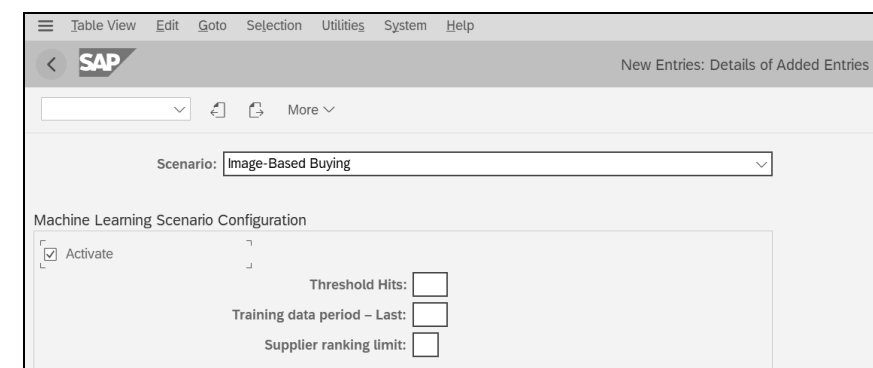
Figure 5.34 Image-Based Buying Details

After activating these scenarios in SAP S/4HANA and having Basis create and configure an OAuth 2.0 client, you need to schedule jobs to export the data and train the model.

To schedule the export job, use the following steps:

1. Log into your SAP S/4HANA system web UI.
2. Search for the **Schedule Export of Purchase Orders** tile as in Figure 5.35.
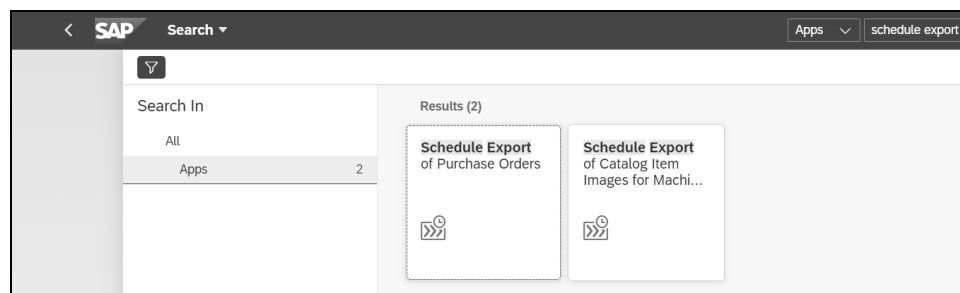
Figure 5.35 Schedule Export of Purchase Documents

3. Choose **Create**.
4. Under **Job Template**, choose the **Training Data for Free Text** template as in Figure 5.36.
5. Set **Start Immediately** in **Scheduling Options** according to your requirements.
6. You can choose **Define Recurrence Pattern** if you want to schedule the job frequency.
7. Enter a **Company Code** and **Plant**.
8. Choose a **Schedule**.
9. Monitor the background job on the **Application Jobs** page.
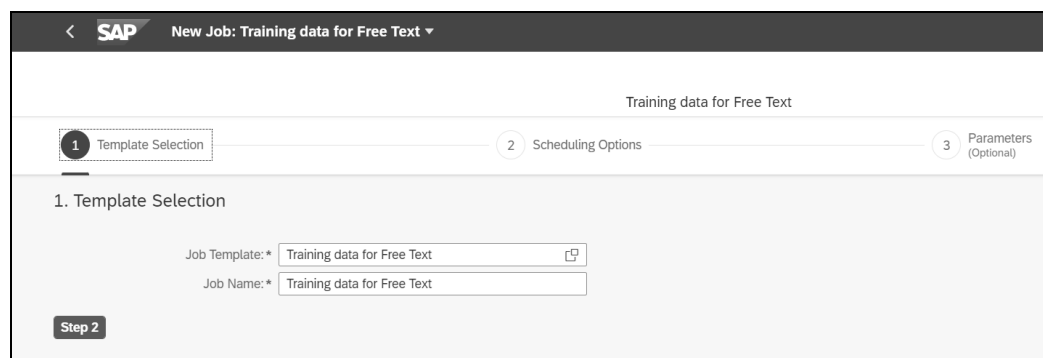
Figure 5.36 Training Data for Free Text

Next, schedule job `SAP_MM_REDUCE_FTXT_ML_JOB_STATUS` using Transaction SM36 in SAP GUI to update the status of the training job training the model executed in SAP S/4HANA.

Finally, have your security team assign standard template PROC_CATALOGITEMPRO-POSAL to the designated procurement users who will access the functionality.

For more on setting up and tuning this functionality, review the SAP Best Practices at *https://s-prs.co/500328*.

5.7.3   Requirements Processing

To set up requisitions for requirements processing, you will need to set up the document type(s) and number range(s). First, you will need to define number ranges to which to tie the document types by following **SPRO • Materials Management • Purchasing • Purchase Requisition • Define Number Ranges** as in Figure 5.37.
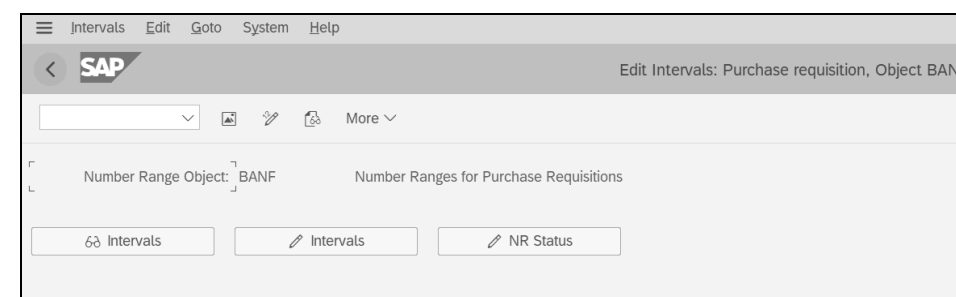
Figure 5.37 Define Number Ranges

After maintaining your number range, or multiple number ranges if you intend to have multiple types of requisitions, maintain the requisition document types by following **SPRO • Materials Management • Purchasing • Purchase Requisition • Define Document Types** as shown in Figure 5.38.
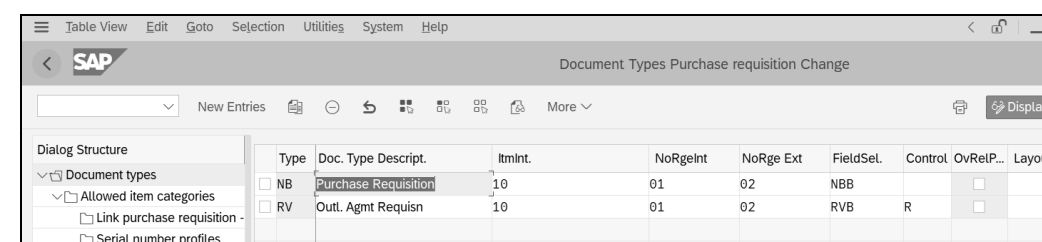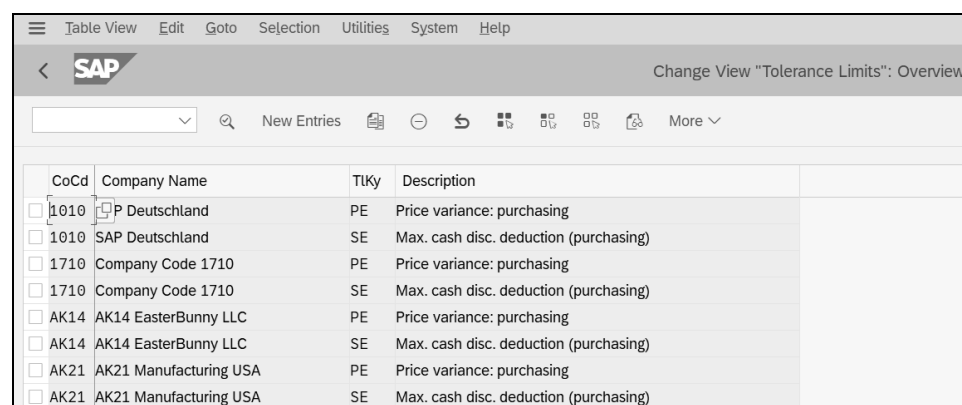
Figure 5.38 Define Requisition Document Types

In this transaction, you maintain the document type and assign it to a number range, as well as define whether the requisition doc type is an external one (originating from outside the SAP S/4HANA system—in SAP Ariba, say) or an internally generated requisition, created directly in SAP S/4HANA.

5.7.4   Purchase Order Processing

Similar to requisition configuration, in order to create and process purchase orders, you must maintain the number ranges and document types by following **SPRO • Materials Management • Purchasing • Purchase Order • Define Number Ranges** and **SPRO • Materials Management • Purchasing • Purchase Requisition • Define Document Types**. There are several additional configuration options available, such as tolerance definition for price variance. Here you can set thresholds for price variance by following **SPRO • Materials Management • Purchasing • Purchase Order • Set Tolerance Limits for Price Variance**, as in Figure 5.39.

Figure 5.39 Setting PO Tolerance Limits for Price Variance

Note that the tolerance settings are typically made at the company code level and include both a lower and an upper limit.

5.7.5   Purchase Order Collaboration

Purchase order collaboration, whereby the supplier logs into a supplier portal, reviews the purchase order, confirms the order, and moves on to processing/delivering the requested quantities, is facilitated via SAP Business Network. For SAP S/4HANA operational procurement integration with SAP Ariba, the main applicable scenario is the natively supported purchase order/invoice integration with SAP Business Network. There are a number of resources available to support you with the install and deployment of this integration for SAP S/4HANA Cloud, public and private editions.

The integration is native within SAP S/4HANA and can be established using guided configuration within SAP Activate or via the SAP Ariba account settings. While the SAP Best Practice Explorer was deprecated, some of these best practices are available at *https://content-discovery.int.sap/serv-supp-l1*. The building block to implement for the self-service procurement scenario in SAP S/4HANA is the Automation of Source to Pay with the Ariba Network—42K,

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which is further described at *http://s-prs.co/v500334*. This building block allows you to do the following:

- Electronically transmit approved purchase orders to your suppliers via SAP Business Network for Procurement.
- Allow your suppliers to confirm orders automatically.
- Convert digital ASNs sent by your suppliers electronically to SAP Business Network into inbound deliveries in SAP S/4HANA.
- Automatically transmit goods receipt to suppliers in SAP Business Network for Procurement.
- Allow your suppliers to submit invoices, receive status updates, and receive payment advices electronically in SAP Business Network.
- Trigger payment runs upon receipt of supplier invoices in SAP S/4HANA accounts payable.
- The Business Network Configuration Guide for Automation of Source-to-Pay with Ariba Network (42K) provides configuration of logon credentials to SAP Business Network and mapping of org structure elements such as company codes to SAP Business Network IDs.

Once you've configured the logon credentials and mappings from SAP S/4HANA to your SAP Business Network via Best Practice 42K (which is replacing J81) subscription, you'll invite and (in the event that they aren't already transacting on the network) onboard your suppliers in SAP Business Network to begin transacting in your SAP S/4HANA instance. SAP provides a dedicated supplier onboarding team to support this process.

All integrations with SAP Business Network, whether SAP S/4HANA Cloud, private edition or SAP S/4HANA Cloud, public edition, leverage guided configuration, best practices, and SAP Activate to support the solution. For SAP S/4HANA Public Cloud, the solution approach uses native direct web services for integrating to and from SAP Business Network. The 42K building block materials include the following:

- A process model, outlining the process between SAP S/4HANA Cloud and SAP Business Network
- A test script, for validation for integration implementation
- A configuration guide, for step-by-step instructions on implementation

5.7.6   SAP SuccessFactors

SAP SuccessFactors integration with both SAP S/4HANA and SAP S/4HANA Cloud has a similar integration framework and approach as that for SAP Ariba, based on predefined integration scenarios that you evaluate, activate, and deploy in your environment.

SAP S/4HANA Integration with SAP SuccessFactors Employee Central

SAP S/4HANA integrates with SAP SuccessFactors by leveraging predefined configuration and integration scenarios (see Figure 5.40). This integration is webservice-based and can be scheduled as a middleware job.
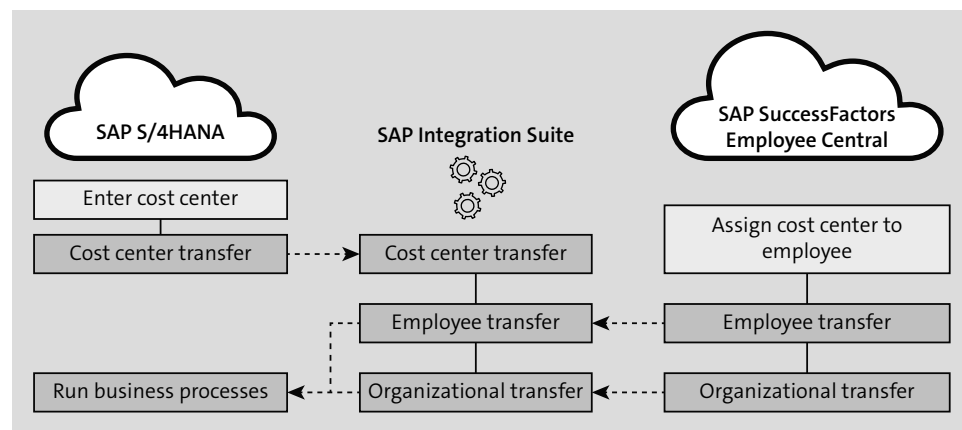
Figure 5.40 Integrating SAP S/4HANA with SAP SuccessFactors Employee Central

The manual process entails creating or identifying a cost center first in SAP S/4HANA. This is a manual step. The cost center is then transferred to SAP SuccessFactors and assigned to the employee. The employee and/or organizational data is transferred back to SAP S/4HANA automatically via batch processing. The configuration is available at *https://rapid.sap.com/bp/#/RDS_EC_S4*. This includes overview documentation, scope documentation, and the following accelerators:

- A sales supplement, an overview of the package and business value
- A customer presentation, slides on the scope of integration
- A demo script, for communicating the scope and functionality
- A delivery supplement, providing important information about the delivery of the solution
- Service and one-page slides, slides defining the solution and scope (*one-pagers*)
- Software and delivery requirements, a list of prerequisites for the deployment of the solution
- The solution scope and scope documents
- A project schedule, a schedule for the project including roles/skills required
- SAP Notes, providing additional documentation for package and implementation

SAP S/4HANA Cloud Integration with SAP SuccessFactors Employee Central

SAP SuccessFactors can also integrate with SAP S/4HANA Cloud using the same approach of best practices, building blocks, and SAP Activate contained in Best Practice

package 1FD, Employee Integration—S/4HANA Enablement. The required efforts are slightly more varied, and therefore involved, than with the SAP Business Network packages. Upon completion of the integration, an employee from SAP SuccessFactors is realized as a business partner in SAP S/4HANA. Data from SAP SuccessFactors can be used to populate the employee data in SAP S/4HANA, such as the following:

- Basic employee information (person, name, employee)
- Communication information, such as email, phone, and fax
- Payment information with payment method and bank account
- Employee status
- Employment percentage
- Working hours per week
- Job title
- Job information, business unit, division, and department
- Cost center assignment

As with on-premise SAP S/4HANA integrations, from a process standpoint, you first establish or identify the cost center in SAP S/4HANA, public edition, then transfer this cost center to SAP SuccessFactors Employee Central and assign an employee, and then transfer the employee record back over to SAP S/4HANA (see Figure 5.41). The transfer processes are automated process steps, whereas the cost center assignment is manual.
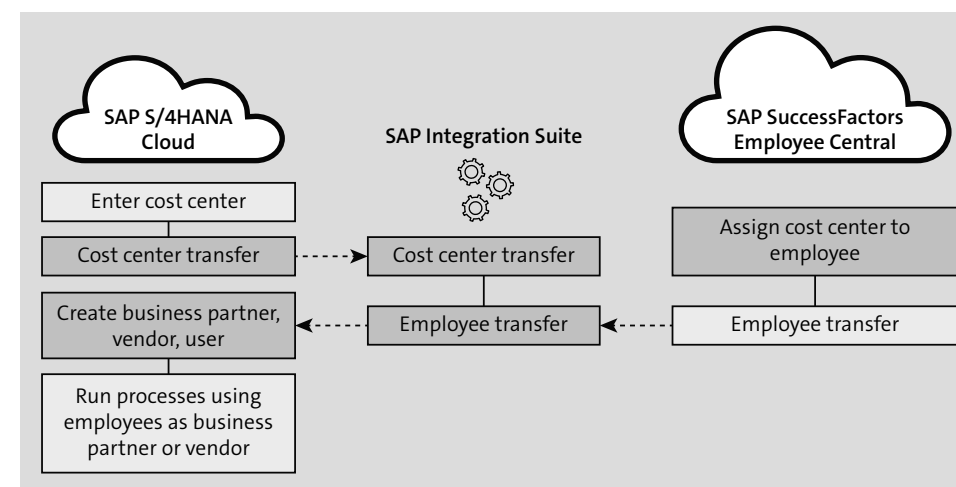
Figure 5.41 Integrating SAP S/4HANA Cloud, Public Edition with SAP SuccessFactors Employee Central

As of SAP S/4HANA 2022, the SAP Migration Cockpit app allows you to upload employee and organizational data from SAP ERP and non-SAP systems into SAP S/4HANA Cloud,

private edition via a file upload using a staging approach. For SAP systems, you can also use a direct import approach.

More on SAP SuccessFactors Employee Central integration building blocks and integration information is available in Best Practice 1FD, where you'll find the latest integration information, as well as the following:

- A process diagram that outlines the integration approach
- A test script for verification of implementation
- Process model BPMN2

5.8   Summary

Operational procurement has been updated in SAP S/4HANA Sourcing and Procurement, both at the UI level with the SAP Fiori app–based approach for key transactions and views, and in terms of internal catalog functionality. More recently, additional machine learning and generative artificial intelligence functionality has been added. Although many of the core requisitioning transactions are simplified for the casual user, SAP S/4HANA Sourcing and Procurement retains some of the old favorites for PO creation in the advanced options of the apps to support complex ordering processes created by professional buyers with multiple data points and references. Many of these processes and options are required by direct procurement for its types of purchase orders. Now, the next chapter will dive deeper into automated and direct procurement topics.

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3 Organizational Structure

4 Master Data

5 Operational Procurement

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> Configure purchasing, sourcing, invoicing, evaluation, and more
> Run your sourcing and procurement processes in SAP S/4HANA
> Optimize your procurement operations with embedded analytics

3rd edition, updated and revised

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