This chapter showcases one approach to setting up a monthly network inventory planning process. It introduces some key performance indicators for inventory planning and optimization and walks you through the inventory planning process steps in SAP IBP for inventory.

“Measuring Inventory Performance”

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The Authors

Lei Wang, Sanchit Chandna, Jeroen Kusters, Atul Bhandari

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Chapter 8
Measuring Inventory Performance

Inventory planning usually affects a company in several ways, such as determining its cash flow and its profit margins particularly for those that have an over-reliance on fast turnovers of materials and goods. Therefore, inventory planning is an important aspect of any business’s success, as we’ll discuss in this chapter.

In this chapter, we’ll use the fictitious ABBFI company to showcase an approach to setting up a monthly network inventory planning process. In the detailed case study, we’ll introduce some key performance indicators for inventory planning and optimization. Then we’ll look at more details of how ABBFI’s inventory team can perform the inventory planning process steps in SAP IBP for inventory, which we introduced in Chapter 7.

8.1 Example Supply Chain for Inventory Planning

In this section, we will introduce an example supply chain for AB Breakfast Inc. (ABBFI), which we’ll reference throughout the rest of the chapter. We’ll introduce the company’s fully centralized approach to inventory planning and its inventory center of excellence (CoE) team.

ABBFI makes and sells products in three categories—cereals, breakfast protein bars, and frozen breakfast—in four different regions—North America, Europe, Asia, and Oceania. The global supply chain network of ABBFI is shown in Figure 8.1.

The finished products are manufactured and may be copacked in three plants: Puerto Rico, Poland, and the Philippines. From there, they’re shipped to the different distribution centers (DCs) in each region, which in turn ship the finished products to ABBFI customers (typically grocery stores). The sourcing relationships are shown in Figure 8.1 with arrows.
Each finished product has a BOM that shows its ingredients and packaging materials and respective quantities of each. Ingredients and packaging materials are in turn sourced from external suppliers unique to each plant.

ABBFI has a fully centralized approach to inventory planning. Its network inventory planning process contains the following steps:

1. **Inventory targets review**
   In this step, the inventory targets are calculated simultaneously for the end-to-end network. The results are reviewed and finalized by a central team. The targets review contains the following steps:
   - Validate data inputs
   - Review inventory plan
   - Assess inventory drivers
   - Update inventory plan
   - Perform what-if analysis requests

2. **Inventory planning collaboration**
   In this step, the central team communicates the finalized inventory plan from the previous step to the supply planners and other end users. Ad hoc change requests from end users are reviewed and approved or rejected. This collaboration contains the following steps:
   - Report planning decisions to end users
   - Respond to what-if analysis requests from end users
   - Engage regional teams with planning questions

3. **Inventory performance review**
   The goal of this step is to have a feedback loop based on historical inventory performance to continuously improve on the first two steps. The performance review follows these steps:
   - Review historical inventory performance key performance indicators (KPIs) and metrics
   - Review projected inventory KPIs

ABBFI has an inventory CoE team consisting of one or more inventory analysts and support from supply chain IT analysts. This team is responsible for the inventory planning process. That is, the team provides an end-to-end network view of the ABBFI supply chain and determines the inventory targets across the board. It validates the drivers for the inventory targets and analyzes the data quality of such drivers. It also performs scenario analyses that can be tactical (impact of demand uptick) or strategic (impact of increasing the customer service level, adding or closing a plant or DC, etc.).

We defined the planning tasks for inventory planning and optimization in Chapter 7. In the next few sections, we’ll showcase how ABBFI’s CoE team can perform these steps in SAP IBP for inventory, supported by dashboards, charts, planning views, custom alerts, and more. As we do so, we’ll emphasize how the inventory optimization steps fit into the entire supply chain planning process in terms of input and output integration points. We’ll cover more data flows and integration topics for SAP IBP for inventory in Chapter 10.

As shown in Figure 8.2, a global demand plan as an outcome of long- to mid-term demand planning and short-term demand sensing, together with segmented product information from, say, ABC-XYZ segmentation, is fed as an input into inventory optimization. In the end, an optimal inventory plan resulting from inventory optimization fits into the supply review process of sales and operations planning by specifying optimal inventory targets for the process. (More details of inventory planning in sales and operations planning were covered in Chapter 7.) Moreover, the optimal inventory targets are fed to external operational planning and execution processes to support, for example, the replenishment order process.
For collaboration, the team is responsible for communicating the inventory plan to end business users by region (inventory managers) and by region and product category (supply planners, customer service representatives, S&OP users). The CoE team responds to any questions and what-if requests from end users and collaborates with them to finalize an inventory plan. (We’ll cover more details of SAP IBP’s what-if capabilities in Chapter 9.) In the end, any adjustments made by end users to the recommended plan are documented with reason codes and measured.

This team is also responsible for publishing a report of the company’s inventory health periodically relative to the inventory plan, both historically (based on actuals) and forward-looking (based on projected inventory). We’ll cover some key performance indicators for inventory planning and optimization in the next section.

The inventory planning collaboration and inventory performance indicators steps of the process are typically performed on an ad hoc basis during the month, as analyses are requested by end users and/or supply chain leaders.

Optionally, some companies may choose to have more than one CoE team separated by region (e.g., ABBFI may have a CoE team responsible for North America and a second team responsible for Europe and Asia-Pacific [APJ]). However, best practice is to have one CoE team, perhaps virtually located. Some companies have successfully extended the role of central demand planners to demand and inventory planners. This is because of two recent trends:

- Increased automation from statistical forecasting and demand-sensing tools (such as SAP IBP for demand) and implementation of S&OP tools (such as SAP IBP for sales and operations) reduce the effort required for demand planners to create forecasts.

### 8.2 Key Performance Indicators for Inventory Optimization

In this section, we’ll discuss some key performance indicators for inventory optimization before detailing the individual steps of the inventory planning process.

A **key performance indicator (KPI)** is a measurement of the performance within a given area toward a specific goal. By giving an organization clear milestones to hit every week, quarter, or year, KPIs help greatly in eliminating guesswork. Much has been written about commonly used inventory KPIs, their purposes, their traits, and how to calculate them in best practices.

**Note**


Some commonly used inventory KPIs including the following:

- Inventory turnover or days of supply
- Average days to sell inventory
- Average inventory
- Inventory holding costs
- Service level by stock-out probability, fill-rate percentage, on-time delivery, or perfect order rate
- Lead time
- Inventory accuracy

SAP IBP provides rich analytics features to build different analytics charts and group them into a dashboard. Figure 8.3 shows an example dashboard that can be built in SAP IBP with some inventory planning and optimization KPIs.
8 Measuring Inventory Performance

8.3 Validate Input Quality

Note
A Gartner research note discussed building performance indicators for inventory health evaluation (see Gartner research note ID G00325925, by Pukkila, at https://www.gartner.com/doc/3729917/build-capability-inventory-health-assessment; a subscription is required). This research note suggested that comparison of an item’s current inventory against its own or other products’ historical levels (e.g., inventory turns) is considered a lagging metric. It offers little insight about opportunities to improve inventory performance relative to future demand.

Some of the recommendations for KPIs are as follows:

- Develop visibility into future independent and dependent product demand across the end-to-end supply chain. In Chapter 6, we noted that the future independent and dependent product demand are calculated across the supply chain in SAP IBP for inventory for raw materials, work in process, and finished goods.
- Establish coverage objectives for inventory SKUs (product-location combinations). In Chapter 6, we covered some details about the inventory target outputs in days of supply.
- Develop reporting capabilities to assess the health of current inventory holdings by comparing them with the future product requirements. All the calculations of the performance indicators of inventory health assessment in the research note can be configured in SAP IBP in a straightforward manner. Note that in SAP IBP such reports can be configured both historically based on actuals and forward-looking based on projected inventory.

In the next few sections we’ll focus on the steps in the inventory planning process performed by ABBFI’s CoE team.

8.3 Validate Input Quality

In the first step of the process, the CoE team reviews the quality of the input data prior to the production batch job run of the inventory operators. This task is often overlooked in companies, but it’s important because of the garbage in, garbage out issue: if input data quality is poor and not identified, the CoE team may end up spending cycles on root-cause analysis of nonintuitive inventory recommendations.
SAP IBP provides dashboarding and analytics capabilities in the web UI that can be leveraged for quality review.

There are several inventory drivers (inputs), and a single dashboard to determine the quality of all the drivers may not be usable. As discussed in Chapter 6, safety stock due to demand variability, safety stock due to supply variability, and safety stock due to service variability provide the breakdown of total safety stock for demand variability over exposure periods, lead time variability, and impact of imperfect upstream service level, respectively, in relative units. End users may want to see these values as percentage contributions to support root-cause analysis. We call this the uncertainty index. It can be calculated via the configuration shown in Listing 8.1 by introducing three new calculated key figures with base planning level WKPRODLOC.

\[
\text{SAFETYSTOCKDEMANDVARPCT @ REQUEST} = \frac{\text{SAFETYSTOCKDEMANDVAR @ REQUEST}}{\text{RECOMMENDEDSAFETYSTOCK @ REQUEST}}
\]

\[
\text{SAFETYSTOCKSERVICEVARPCT @ REQUEST} = \frac{\text{SAFETYSTOCKSERVICEVAR @ REQUEST}}{\text{RECOMMENDEDSAFETYSTOCK @ REQUEST}}
\]

\[
\text{SAFETYSTOCKSUPPLYVARPCT @ REQUEST} = \frac{\text{SAFETYSTOCKSUPPLYVAR @ REQUEST}}{\text{RECOMMENDEDSAFETYSTOCK @ REQUEST}}
\]

Listing 8.1 Calculation for Uncertainty Index Key Figures

By maintaining the calculation at the request level, SAP IBP will aggregate the numerator and denominator separately first, then take the ratio.

The uncertainty index groups the input drivers into three different dashboards: demand, forecast error, and supply. It’s important to keep the dashboards at a simple and easy-to-understand level. Detailed analysis can be achieved by starting from the higher-level analytics and drilling down to the details, which is well supported by SAP IBP analytics and Excel. This helps standardize the templates and the work across the CoE team and end users while allowing for deep analysis by power users.

Before we look closer at the dashboard examples ahead, Figure 8.4 will show how to navigate to the list of dashboards available in the web UI via the Dashboards SAP Fiori app, found on the home page.

The first input-quality dashboard reviewed by the ABBFI CoE team focuses on demand. An example of such a dashboard is shown in Figure 8.5.

Inventory analysts can determine and validate the largest market by volume, the largest product category by region, and the distribution of demand volume by product and location for a given product category and region quickly. They can deep-dive into any information by clicking the chart in the dashboard and drilling down by any parameter. For example, say that you notice from the last chart in the dashboard that Frosted Cereal in the US East region has a high demand in the month of March. By selecting the corresponding bar and clicking the drill-down option (downward-pointing arrow) in the Chart menu, you can look closer to see the demand by week in that month, as shown in Figure 8.6.
8.3 Validate Input Quality

The second input-quality dashboard focuses on the forecast error analytics for inventory optimization (see Figure 8.7). An inventory analyst can rank the finished products by the forecast error (or accuracy), as shown in Chart 1, and drill down into the product-location granularity in Chart 2. Chart 3 shows the weekly historical forecast and sales for her favorite product-location, and she can also look at the heat maps for overforecasting and underforecasting bias in Chart 4 and Chart 5.
8.4 Review Inventory Plan

In this section, we’ll show how the CoE team can review the inventory plan recommendations from the inventory operators using SAP IBP dashboards and analytics. This is done once the inventory operators have been run as part of a production batch job and after the input-quality dashboard review. These templates also can be shared with end users such as inventory managers and planners with suitable predefined visibility filters. Also, any user can further drill down into the template dashboards by using his favorite attributes as filters.

We recommend that the first dashboard for inventory plans be identical to the first input-quality dashboard for demand, except that demand is replaced by recommended safety stock cost, as shown in Figure 8.9.

Figure 8.9 Inventory Plan Review Dashboard for Safety Stock Summary

Note that SAP IBP dashboards and analytics charts support user filters and visibility filters. By keeping the dashboards at an aggregate attribute level and combining them with the use of filters, the CoE team can break up its work. We recommend that inventory operators be scheduled to run automatically at a certain frequency. The CoE team is responsible for completing the input-quality-review step before the operators run.

Figure 8.8 Input-Quality Dashboard: Supply Parameters
In the dashboard shown in Figure 8.9, the inventory analyst can quickly determine and validate the largest safety stock region by cost, the largest safety stock product category by region, and the distribution of safety stock cost by product and location for a given product category and region. She can deep-dive into any information by clicking on the chart in the dashboard and drilling down by any parameter. For example, you might notice from the last chart in the dashboard that Frosted Cereal in US East has high safety stock in the month of March and want to get more details.

Figure 8.10 Inventory Plan Review Dashboard for Safety Stock Distribution

The second dashboard for reviewing inventory plans should focus on distribution of safety stock by location type (DCs vs. plants), by product family (finished goods vs. ingredients vs. packaging), by driver of safety stock (demand variability vs. lead time variability vs. service variability), and by weeks in cost and days of coverage. This is shown in Figure 8.10.

Figure 8.11 shows the third dashboard, which we recommend for reviewing inventory plans. It shows the distribution of the min-max levels (safety stock and target inventory position) and forms of inventory.

Figure 8.11 Inventory Plan Review Dashboard for Forms of Inventory

After reviewing the inventory plan by region or by product family in a high level of the hierarchy, the CoE team can drill down to detailed results in planning views to understand the drivers of any specific inventory target recommendations or big changes from the last cycle run in the next step.

8.5 Assess Inventory Drivers

In this section, we’ll discuss some Excel templates that the CoE team can use as planning views for root-cause analysis to explain the inventory target recommendations from inventory operators. Root-cause analysis in the context of this section is a
systematic process to identify the inventory drivers for holding inventory. The goal of the step is to help the CoE team link the inventory drivers to any specific inventory target recommendations or big changes from the last cycle run.

We'll make changes to the EPM formatting sheet associated with the planning view (https://bit.ly/2BoeXWg) and add a corporate logo as examples of how to standardize the Excel templates. You can then modify the content of the Excel planning view using the provided standard Excel template. Some ideas for creating an Excel template are as follows:

- Highlight the header row (e.g., use a black background and bold white font).
- Display applied Excel filters on the header row using an Excel formula:
  
  ```excel
  =SOP_Filter_Name&" ("&SOP_Filter_Criteria_Count&" criteria):"&"&IFERROR(INDEX(SOP_Filter,1),"")&"&IFERROR(INDEX(SOP_Filter,2),"")
  ```
- Display the user information on the header row using an Excel formula:

  ```excel
  ="User: ":EPMUser()&"  |  Planning Area: ":IFERROR(SOP_Planning_Area,"Offline")&" &Template: ":IFERROR(SOP_Template_Name,"none")
  ```
- Display the last time the planning view was refreshed using an Excel formula:

  ```excel
  =" Last Refresh: ":IFERROR(YEAR(SOP_Refresh_Timestamp)&"-"&TEXT(SOP_Refresh_Timestamp,"MMM")&"-"&DAY(SOP_Refresh_Timestamp)&"&TEXT(SOP_Refresh_Timestamp,"HH:MM:SS"),"Offline")
  ```

- Use Excel's freeze panes feature, which allows a row or column to lock in place, making it always visible when scrolling vertically or horizontally through an open document. You can freeze the header row as well as the attribute columns. Format the data using the EPM formatting sheet.

In our example, we've highlighted the header row, used Excel filters on the header row, used the freeze panes feature, and formatted the data. We call the resulting template Analysis View (Figure 8.12). The top two rows also show the current user, when the view was last refreshed, and information from the SAP IBP filter applied. Finally, for attributes as key figures, we display the current period value in default format but gray out all the other periods to signal to the user that inventory operators read the current period value only for such input key figures.

Then, you can save this as a standard Excel template for any user by clicking on Template Admin in the IBP tab, selecting Templates followed by Add, and providing a name for the template.

Next, to display the content of the planning view, click New View in the IBP tab and select From Template, which brings up the Create New Planning View from Template Excel window box. Select the previous template in the Template dropdown selector. Then use the following selections for each section:

- The Planning Level is a combination of product description (or ID) and location (or ID).
- For Time Settings, utilize a calendar week bucket ranging from the current week to the current week plus the planning horizon (this can be shortened).
- Use a product description (or ID) Filter; you can save frequently used filters.
- We recommend that the Key Figures in Table 8.1 be used in the Analysis View template.
- Use the default Layout.

Finally, click on OK.

<table>
<thead>
<tr>
<th>Type</th>
<th>Key Figure ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>IOFORECAST</td>
<td>Weekly forecast or consumption of a product at a location for a customer group</td>
</tr>
<tr>
<td>Input</td>
<td>IOFORECASTERROR</td>
<td>Weekly customer forecast error coefficient of variation as a normalized measure of demand forecast variability</td>
</tr>
</tbody>
</table>

Table 8.1 Key Figures to Use in Analysis View Template
### 8.5 Assess Inventory Drivers

This view provides sufficient information to the user for an initial root-cause analysis. In most scenarios, this view is sufficient to explain the safety stock recommendations of the inventory operator (80/20 rule—that is, 80% of the effects come from 20% of the causes). In the remaining scenarios, this view will yield information about further avenues of investigation. ABBFI doesn’t have multiple sourcing; for a company in which multiple sourcing is common, the Analysis View template can be enhanced by adding another Excel worksheet and creating an Excel planning view that shows the sourcing details, as shown in Figure 8.13. In this example, we added the ship-from location and source ID to the planning level. The key figures in this view are restricted to lead time, lead time variability, lot sizes, sourcing quota (inputs), and the calculated internal service level (output). This Excel planning view is useful in addition to the previous one, not in isolation.

**Table 8.1 Key Figures to Use in Analysis View Template (Cont.)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Key Figure ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>SAFETYSTOCKLOTSIZE</td>
<td>Analytical output that informs the user of how much additional safety stock would be needed if the lot size was reduced to zero</td>
</tr>
<tr>
<td>Output</td>
<td>IOSAFETYSTOCKDAYSOFSUPPLY</td>
<td>Analytical output that provides the recommended safety stock in days of supply in terms of future coverage</td>
</tr>
</tbody>
</table>

Figure 8.13  Sourcing Details Planning View Added to Analysis View Template
8.6 Finalize Inventory Plan

In this section, we’ll discuss how to enable end users to finalize inventory plan recommendations for the products and locations that they manage. We’ll discuss how planners can be allowed to propose changes with reason codes and how inventory managers can review the proposed changes before approving or rejecting them. The configuration setup was discussed in Chapter 3.

First, create an Excel template called Days Coverage Alert that contains two sheets. In the first sheet, labeled Days Coverage Alert Indicator, you want to see only those product-locations for which the recommended safety stock in days is out of range (see Figure 8.14). Use the following settings in the Excel planning view setup:

- **Time Settings**
  - Month: current month to planning horizon

- **Planning Level**
  - Location and product description

- **Key Figures**
  - Alert safety days out of range

- **Layout**
  - Default

- **Filter**
  - Default

- **Alerts:**
  - **Base Calculation**
    - Alert safety days out of range
  - **Highlighted Key Figure**
    - Inventory optimization safety stock (days) in red

**Note**
You can go to the Edit View screen to add/modify the alerts under the Alerts section. We’ll explain how to configure the alert key figures used in the current section in the next section.

In our case study example, you can see that the recommendation is out of range from March 2018 to July 2018 for some of the products in New Zealand.

Next, the Finalize Plan sheet highlights scenarios in which safety stock is below the minimum value in red and above the maximum value in blue. Use the following settings in the Excel planning view setup:

- **Time Settings**
  - Month: current month to planning horizon

- **Planning Level**
  - Location and product description

- **Key Figures**
  - Minimum safety stock (days) (IOMINSAFETYDAYS), IO safety stock (days) (IOSAFETYSTOCKDAYSOFSUPPLY), maximum safety stock (days) (IOMAXSAFETYDAYS), propagated demand (PROPAGATEDDEMANDMEAN), recommended safety stock (RECOMMENDEDSAFETYSTOCK), planner safety stock quantity (override) (PLANNERADJUSTEDSAFETYSTOCK), inventory manager override approval (MANAGERAPPROVEOVERRIDE), final safety stock quantity (FINALSAFETYSTOCK)

- **Layout**
  - Default

- **Filter**
  - Default

- **Alerts:**
  - **Alert 1:**
    - **Base calculation**
      - Alert safety days below minimum
    - **Highlighted Key Figure**
      - Inventory optimization safety stock (days) in red
8 Measuring Inventory Performance

- Scenario
  Baseline

- Version
  Base version

  - Alert 2:
    - Base calculation
      Alert safety days above maximum

- Highlighted Key Figure
  Inventory optimization safety stock (days) in blue

- Scenario
  Baseline

- Version
  Base version

In Figure 8.15, you can see that for Chocolate Bar, the safety stock at four days is below the minimum value at six days; for Egg Burrito, the safety stock at 14 days is above the maximum value at 10 days.

**Figure 8.15 Detailed Alert Indicator in Days Coverage Alert Template**

Next, imagine you open the Analysis View template with filter values set to Chocolate Bar and Egg Burrito for products and New Zealand for location (see Figure 8.16). You can see right away that the forecast error coefficient of variation (CV) is much lower for Chocolate Bar (31%) than for Egg Burrito (89%) in New Zealand. This explains when the safety days of coverage is higher for Egg Burrito than Chocolate Bar and why it's outside the range provided as an input: because it was based on a 50% forecast error CV. Note that in both cases the recommended safety stock is primarily due
to demand variability and determined by reviewing the safety stock due to demand variability key figure relative to the recommended safety stock key figure.

**Figure 8.16 Analysis View for Chocolate Bar and Egg Burrito in New Zealand**

You can further validate this by changing the filter to Pancakes in New Zealand, which has a forecast error CV of 50% and for which the recommended safety stock of seven days is within the range of six to 10 days (see Figure 8.17).

**Figure 8.17 Analysis View for Pancakes in New Zealand**

Finally, say that you decide not to change the safety stock of Egg Burrito because lowering it may impact customer service level negatively. However, imagine that you override the safety stock quantity for Chocolate Bar to 350 units from March 2018 to July 2018. For the inventory manager’s benefit, you can document this change by entering a comment. Enter “Temporarily increasing safety stock until minimum...”

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8.6 Finalize Inventory Plan

- Scenario
  Baseline

- Version
  Base version

- Highlighted Key Figure
  Inventory optimization safety stock (days) in blue

- Scenario
  Baseline

- Version
  Base version

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safety stock (days) is adjusted to reflect forecast error CV.” in the Comment field, then click the Save button (see Figure 8.18).

Assume that you’re the inventory manager. You’ve used the Change History report to review the changes and are now ready to approve the planner’s override in the Finalize Plan sheet. You decide to approve the override for March and April, but not for May to July because you would like the planner to readjust the minimum safety stock (days) level by the end of March. You can approve the override by entering the same value in the Inventory Manager Override Approval key figure row and clicking the Save Data button in the IBP tab in Excel. You’ll be prompted to enter a reason for the approval. Enter a message in the Comment field and click the Save button, as shown in Figure 8.19. Once you save these changes, the final safety stock key figure is automatically updated. We will explain how to configure this review and approval process in the next section.

Finally, the CoE team is responsible for creating a summary report of the changes to the recommendations using the Change History report. This report is available via the Change History SAP Fiori app in the web UI. It includes a summary of the reasons for changes, the cost impact of the changes, and a list of follow-up action items. It’s also recommended to provide this summary by planner and inventory manager, location region, and business unit.

**Figure 8.18 Increasing Safety Stock for Chocolate Bar in New Zealand**

We also recommend enabling change history on the Planner Safety Stock Qty (OVERRIDE) key figure (in the Planning Area and Details configuration screen for Key Figures) so that the manager can use the Change History report in SAP IBP to review all the changes and the impact to cost.

In this section, we’ll introduce two options to create and manage custom inventory alerts in SAP IBP. One is through alert key figures, and the other is through the Custom Alert app in SAP IBP. Note that the second option requires a license for SAP Supply Chain Control Tower.

### 8.7.1 Inventory Alerts Key Figures

As we discussed in the previous section, the CoE team and the end users (planners and inventory manager) will want to review the safety stock recommendations and finalize the plan. Typically, they have minimum and maximum safety days as a business rule at an aggregate level—say, product category and location type levels. For example, ABBFI’s finished goods planners in New Zealand have minimum and maximum safety days policies of six days and 10 days, respectively. In this section,
we’ll discuss how to add a configuration to alert users when safety stock recommendations may be out of the minimum-maximum range suggestions and allow planners to provide override recommendations for review by the inventory manager.

First, configure the minimum and maximum safety stock days at the WKPRODLOC planning level, with Disaggregation Mode set to Copy Value so that users can set these values at any aggregated level (month, product family, location region, etc.; see Figures 8.20 and 8.21).

![Figure 8.20 Configuration for Minimum Safety Stock (Days)](image)

![Figure 8.21 Configuration for Maximum Safety Stock (Days)](image)

Next, configure three alert key figures to show when the recommended safety stock in days is out of range, when it’s specifically below the minimum, and when it’s specifically above the maximum (see Figure 8.22, Figure 8.23, and Figure 8.24, respectively).

Configure these calculated key figures at the WKPRODLOC planning level, with aggregation Mode set to Max. The calculations at the base planning level are as follows:

- **Safety stock out of range**
  
  \[
  \text{ALERTSAFETYDAYS} @ \text{WKPRODLOC} = \begin{cases} 1 & \text{if } \text{IOSAFETYSTOCKDAYSOFSUPPLY} @ \text{WKPRODLOC} < \text{IOMINSAFETYDAYS} @ \text{WKPRODLOC} \\ 1 & \text{if } \text{IOSAFETYSTOCKDAYSOFSUPPLY} @ \text{WKPRODLOC} > \text{IOMAXSAFETYDAYS} @ \text{WKPRODLOC} \\ \text{null} & \text{otherwise} \end{cases}
  \]

- **Safety stock below the minimum**
  
  \[
  \text{ALERTSAFETYDAYSMIN} @ \text{WKPRODLOC} = \begin{cases} 1 & \text{if } \text{IOSAFETYSTOCKDAYSOFSUPPLY} @ \text{WKPRODLOC} < \text{IOMINSAFETYDAYS} @ \text{WKPRODLOC} \\ \text{null} & \text{otherwise} \end{cases}
  \]

- **Safety stock above the maximum**
  
  \[
  \text{ALERTSAFETYDAYSMAX} @ \text{WKPRODLOC} = \begin{cases} 1 & \text{if } \text{IOSAFETYSTOCKDAYSOFSUPPLY} @ \text{WKPRODLOC} > \text{IOMAXSAFETYDAYS} @ \text{WKPRODLOC} \\ \text{null} & \text{otherwise} \end{cases}
  \]
Finally, configure a key figure for planners to provide a safety stock quantity override recommendation (Figure 8.25), a key figure for the inventory manager to approve the planners’ overrides (Figure 8.26), and a final safety stock key figure set to the override when approved and to the recommended safety stock otherwise (Figure 8.27).

![Alert Key Figure for Safety Stock Days below Minimum Value](image1)

**Figure 8.23** Alert Key Figure for Safety Stock Days below Minimum Value

![Alert Key Figure for Safety Stock Days above Maximum Value](image2)

**Figure 8.24** Alert Key Figure for Safety Stock Days above Maximum Value

Configure the first two as **Stored** and **All Editable** key figures at the WKPRODLOC planning level, with **Aggregation Mode** set to **Sum**. The final safety stock key figure is configured as a **Calculated** key figure at the WKPRODLOC planning level, with **Aggregation Mode** set to **Sum**. The calculations at the base planning level are shown in Listing 8.2.

```
FINALSAFETYSTOCK @ WKPRODLOC =
IF(ISNULL("MANAGERAPPROVEOVERRIDE@WKPRODLOC"),
"RECOMMENDEDSAFETYSTOCK@WKPRODLOC",
IF(ISNULL("PLANNERADJUSTEDSAFETYSTOCK@WKPRODLOC"),
"RECOMMENDEDSAFETYSTOCK@WKPRODLOC","PLANNERADJUSTEDSAFETYSTOCK@WKPRODLOC"))
```

**Listing 8.2** Calculations at Base Planning Level for Safety Stock Override Recommendation

![Key Figure for Planner’s Safety Stock Override Quantity](image3)

**Figure 8.25** Key Figure for Planner’s Safety Stock Override Quantity

![Key Figure for Inventory Manager to Approve Overides](image4)

**Figure 8.26** Key Figure for Inventory Manager to Approve Overides
8.7.2 Inventory Alerts through Custom Alerts Application

Planners need to monitor and analyze the demand, inventory, and supply plans every day, but going through all the products/locations can be very time-consuming. There are several business situations in which planners need to identify, report, and resolve exceptions. Managing such exceptions efficiently and on time is critical for supply chain processes in any organization. To facilitate these tasks, custom alert functionality in SAP IBP can be used. Planners can identify exceptional situations using custom alerts and resolve them using cases.

Custom alerts are used to find important or critical supply chain issues such as inventory shortages, a demand supply imbalance, or any unexpected changes in inventory levels. Planners can fine-tune the criteria for alert generation to mitigate issues in the supply chain. Custom alerts are integrated with cases in SAP Supply Chain Control Tower, which facilitates the tracking and resolution of supply chain problems.

As shown in Figure 8.28, there are three apps in SAP IBP through which custom alerts are managed:

- Define and Subscribe to Custom Alert
- Custom Alerts Overview
- Monitor Custom Alerts

Figure 8.28 Custom Alerts App in SAP IBP

Let’s walk through how to define and subscribe to custom alerts to warn users of large safety stock changes from the last cycle:

1. Open the Define and Subscribe to Custom Alerts app by choosing the corresponding tile on the SAP Fiori launchpad.

2. Choose the + icon (on the bottom-left side of the screen) as shown in Figure 8.29.

3. In the Information section, enter the following data, as shown in Figure 8.30:
   - **Name**: “Safety Stock Change from Last Cycle”
   - **Description**: Alert users on large safety stock changes from last cycle run

Figure 8.29 Add New Alert

Figure 8.30 Define and Subscribe to Custom Alerts
8 Measuring Inventory Performance

8.7 Create Custom Inventory Alerts

- Minimum Consecutive Periods
  One (week)
- Severity
  Medium
- Version
  Base version
- Excel Template
  <Your Excel template> (e.g., Inventory Optimization 220 Planning Result)

4. In the Alert Rules section, enter the following data, as shown in Figure 8.31:

- Group Condition
  Select All Rule Groups are Satisfied

- Rule Group 1
  - Rule 1
    Final Safety Stock (from IO) > 120% Final Safety Stock Last Cycle (for IO)
  - Rule 2 (use the + icon to add a new rule)
    Final Safety Stock (from IO) < 80% Final Safety Stock Last Cycle (for IO)

- Condition
  Select Any Rule Is Satisfied

---

Figure 8.30 Information Section for Alert Creations

<table>
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<th>INFORMATION</th>
<th>ALERT RULES</th>
<th>MACHINE LEARNING RULES</th>
<th>METRICS</th>
<th>DISPLAY OPTIONS</th>
<th>SHARING</th>
<th>SUBSCRIPTIONS</th>
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<td>Excel Template:</td>
<td>IO.Optimization.220.Plan Result</td>
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</table>

Figure 8.31 Alert Rules for Alert Creation
5. In the **Metrics** section, enter the following data, as shown in Figure 8.32:
   - Final Safety Stock (from IO)
   - Final Safety Stock Last Cycle (for IO)
   - Recommended Safety Stock and Safety Stock Adj. (from IO)

6. In the **Display Options** section, enter the following data, as shown in Figure 8.32:
   - Target UoM
     - EA
   - Target Currency
     - Blank
   - Default Chart Type
     - Bar
   - Complementary Charts
     - Blank

7. In the **Sharing** section, enter the following data, as shown in Figure 8.32:
   - Users
     - Blank
   - User Groups
     - "YOURIOUSERGROUP"

8. Subscribe to custom alert definitions and add filters if needed to restrict or further customize the alerts that will be triggered.

9. Click **Save**.

The Custom Alerts Overview app gives planners a graphical summary of alerts. Planners can use the Custom Alerts Overview app to view a summary of current alerts in the form of a bar chart, and the alerts are clustered by subscriptions and either severity or category. The overview allows you to visualize which alerts will be triggered if the Monitor Custom Alerts app is executed. Planners can use filters to prioritize which alerts need to be processed first.

The Monitor Custom Alerts app allows users to calculate on-the-fly alerts to which they are subscribed to and display them in a comprehensive chart or table. With custom alerts, planners can analyze the charts and metrics to identify and resolve potential issues. They can also create a new alert or link an existing case to an alert to follow up on issues, delegate them, and resolve them. They can also filter custom alerts by case. Figure 8.33 shows the Custom Alerts Overview and Monitor Custom Alerts apps.

---

**Figure 8.32** Metrics, Display Options, Sharing for Alert Creation

**Figure 8.33** Custom Alerts Overview and Monitor Custom Alerts
8.8 Summary

In this chapter, we used the fictional ABBFI company to demonstrate how to execute the monthly inventory plan setup step by step in SAP IBP, from validating input to reviewing and root-cause analysis of inventory targets to proposing changes to finalizing the inventory plan. We discussed how to use analytics tools such as Excel templates, analytics charts, dashboards, and custom alerts to evaluate the success of the recurring inventory planning process. We noted some important references for commonly used inventory KPIs and inventory health assessments. In the next chapter, we’ll focus on SAP IBP’s what-if capabilities and show you how to evaluate the impact and sensitivity of the inventory drivers on your organization’s inventory investment and strategy.
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- **2.1.1 Demand Forecast**
- **2.1.2 Lead Time**
- **2.1.3 Order Cycle**
- **2.1.4 Variability**
- **2.1.5 Service Level Target**

## 2.2 Breakdown of Variability Drivers

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- **2.2.2 Lead Time Variability**
- **2.2.3 Service Variability**

## 2.3 Additional Factors that Influence Inventory

- **2.3.1 Service Level Type**
- **2.3.2 Replenishment Strategy**
- **2.3.3 Stocking Policy**
- **2.3.4 Sourcing Decisions**
- **2.3.5 Bill of Materials**
- **2.3.6 Lot Size and Economic Order Quantities**
- **2.3.7 Inventory Holding Cost**

## 2.4 Summary

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- **3.1.2 Master Data Type**
- **3.1.3 Time Profiles**
- **3.1.4 Planning Area**
- **3.1.5 Planning Levels**
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- **3.9.2 Creating a New Planning View**

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Lei Wang is the director of product management, supply chain, at SAP and the product owner for the underlying supply chain algorithm library beneath SAP IBP for inventory and SAP IBP for demand. He has over a decade of experience in the research and development of enterprise inventory and service optimization solutions.

Sanchit Chandna is a manager for Deloitte Consulting LLP with over nine years of experience in the design and implementation of SAP supply chain solutions. He has deep knowledge of SCOR processes and is an expert in SAP IBP and SAP APO. Currently, he is working with multiple SAP IBP customers as a subject matter expert.

Jeroen Kusters is a senior manager for Deloitte Consulting LLP with over 10 years of supply chain planning experience. Since 2013, his focus has been on SAP Integrated Business Planning; he works closely with SAP to drive new functionality enabling best-practice supply chain planning business processes.

Atul Bhandari is the senior director of predictive supply chain analytics at SAP and product owner for SAP Integrated Business Planning for inventory. He has over a decade of experience in helping companies adopt inventory optimization and demand-sensing capabilities.

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