

Oracle Inventory Replenishment I, Release 11i

Student Guide

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Preface

Profile

Before You Begin This Course

Before you begin this course, you should have the following qualifications:

- Working experience with Oracle Applications navigation
- Working experience with Oracle Inventory, Release 11i

Prerequisites

- Familiarity with Oracle Inventory enterprise structures, such as units of measure and organizations
- Create and maintain items
- Create inventory controls, such as locators and lots
- Perform inventory transactions, such as inter-organization transfers, and return material authorizations (RMAs)

How This Course Is Organized

Oracle Inventory Replenishment I is an instructor-led or NetClass course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

Related Publications

Oracle Publications

Title	Part Number
<i>Oracle Inventory User's Guide, R11i</i>	<i>A83505-01</i>
<i>MRP and Supply Chain Planning User's Guide, R11i</i>	<i>A82939-01</i>

Additional Publications

- System release bulletins
- Installation and user's guides
- *read.me* files
- *Oracle Magazine*

Typographic Conventions

Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The <i>algorithm</i> inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: <code>debug.set ('I', 300);</code> Directory: <code>bin (DOS), \$FMHOME (UNIX)</code> Filename: Locate the <code>init.ora</code> file. Password: User <code>tiger</code> as your password. Pathname: Open <code>c:\my_docs\projects</code> URL: Go to <code>http://www.oracle.com</code> User input: Enter <code>300</code> Username: Log on as <code>scott</code>
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address (<i>but</i> Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do <i>not</i> save changes to the database. For further information, see <i>Oracle7 Server SQL Language Reference Manual</i> . Enter <code>user_id@us.oracle.com</code> , where <i>user id</i> is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish. This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.

Convention	Element	Example
Arrow	Menu paths	Select File—> Save.

Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	When-Validate-Item
Lowercase	Column names, table names	SELECT last_name FROM s_emp;
	Passwords	DROP USER scott IDENTIFIED BY tiger;
	PL/SQL objects	OG_ACTIVATE_LAYER (OG_GET_LAYER ('prod_pie_layer'))
Lowercase italic	Syntax variables	CREATE ROLE <i>role</i>
Uppercase	SQL commands and functions	SELECT userid FROM emp;

Typographic Conventions in Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select Invoice > Entry > Invoice Batches Summary.
2. (M) From the menu, select Query > Find.
3. (B) Click the Approve button.

Notations :

(N) = Navigator

(M) = Menu

(T) = Tab

(I) = Icon

(H) = Hyperlink

(B) = Button

Typographical Conventions in Help System Paths

This course uses a “navigation path” convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

(Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.
2. Under the General Ledger entry, expand Journals.
3. Under Journals, select Enter Journals.
4. Review the Enter Journals topic that appears in the document frame of the help system window.

Getting Help

Oracle Applications provides you with a complete online help facility.

Whenever you need assistance, simply choose an item from the Help menu to pinpoint the type of information you want.

To display help for a current window:

1. Choose Window Help from the Help menu, click the Help button on the toolbar, or hold down the Control key and type 'h'.

A web browser window appears, containing search and navigation frames on the left, and a frame that displays help documents on the right.

The document frame provides information on the window containing the cursor. The navigation frame displays the top-level topics for your responsibility, arranged in a tree control.

2. If the document frame contains a list of topics associated with the window, click on a topic of interest to display more detailed information.

3. You can navigate to other topics of interest in the help system, or choose Close from your web browser's File menu to close help.

Searching for Help

You can perform a search to find the Oracle Applications help information you want. Simply enter your query in the text field located in the top-left frame of the browser window when viewing help, then click the adjacent Find button.

A list of titles, ranked by relevance and linked to the documents in question, is returned from your search in the right-hand document frame. Click on whichever title seems to best answer your needs to display the complete document in this frame. If the document doesn't fully answer your questions, use your browser's Back button to return to the list of titles and try another.

Oracle Inventory Replenishment I, Release 11i

Chapter 1

Oracle Inventory Replenishment I

Oracle Inventory, Release 11i

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Objectives

After completing this module, you should be able to do the following:

- **Explain how to use online help for replenishment**
- **Describe focus and statistical forecasting**
- **Describe forecast rules**
- **Describe Oracle Inventory replenishment**
- **Describe Oracle Inventory replenishment methods**

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Agenda

Agenda

- **Course Overview**
- **Overview of Oracle Inventory Planning and Replenishment online help**
- **Overview of Oracle Inventory forecasting**
- **Overview of Oracle Inventory replenishment planning**

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Agenda

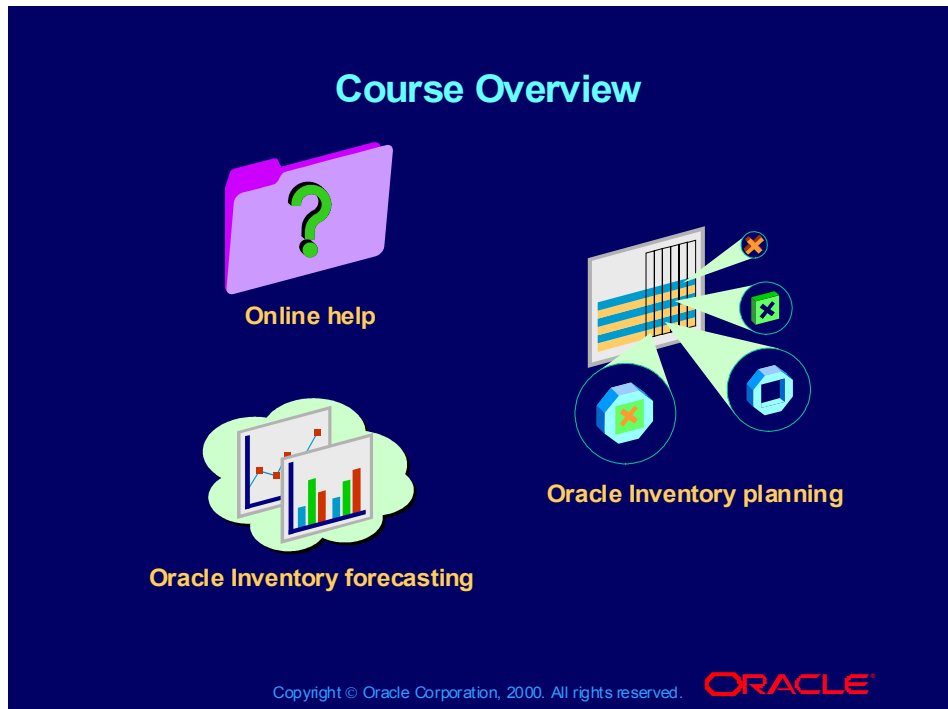
Agenda

- **Overview of this module**
- Overview of Oracle Planning and Replenishment online help
- Overview of Oracle Inventory forecasting
- Overview of Oracle Inventory replenishment planning

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Course Overview



Course Overview

This module provides an overview of Oracle Inventory forecasting and replenishment methods and explains how to log into and use Oracle Inventory Planning and Replenishment online help.

Agenda

Agenda

- Overview of this module
- Overview of Oracle Planning and Replenishment online help
- Overview of Oracle Inventory forecasting
- Overview of Oracle Inventory replenishment planning

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Using Oracle Applications Help Within a Window

Using Oracle Applications Help Within a Window

Any window launched from the Oracle Navigator links to online help.

To access online help, select **Help > Window Help** from the menu bar. Oracle Applications Help window appears and includes detailed information about the window that you opened. This information includes step-by-step instructions for entering information into each field in the window.

Note: The Library topic contains help for products.

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Help Note

You can launch Oracle Help using the toolbar “?” icon only from a window that is open from the Navigator.

Searching Oracle Applications Help

Searching Oracle Applications Help

1. From any window within an Oracle Application select **(M) Help > Window Help**.
The Oracle Applications Help window opens.
2. In the Find Field, enter your search criteria, enclosed in quotation marks, and then click the Find button.
A list of topics matching your search criteria appears.
3. In the Find field, highlight the desired topic, and then click Find.
4. Select a topic to view detailed information.

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How to Get Help about Performing Searches

For extra help on how to perform searches, select Search Instruction for Help when you access the online help search window.

Review Question

Review Question

You must navigate to a specific window or form before you can use the online search feature.

- 1. True**
- 2. False**

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Review Question Solution

You must navigate to a specific window or form before you can use the online search feature.

1. True
2. False

The answer is False. You can use the online help search feature immediately after you log into Oracle Applications.

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Agenda

Agenda

- Overview of this module
- Overview of Oracle Planning and Replenishment online help
- **Overview of Oracle Inventory forecasting**
- Overview of Oracle Inventory replenishment planning

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Overview of Oracle Inventory Forecasting

Overview of Oracle Inventory Forecasting

Inventory forecasting is the process of extrapolating the expected demand of an item over a number of periods in the future.

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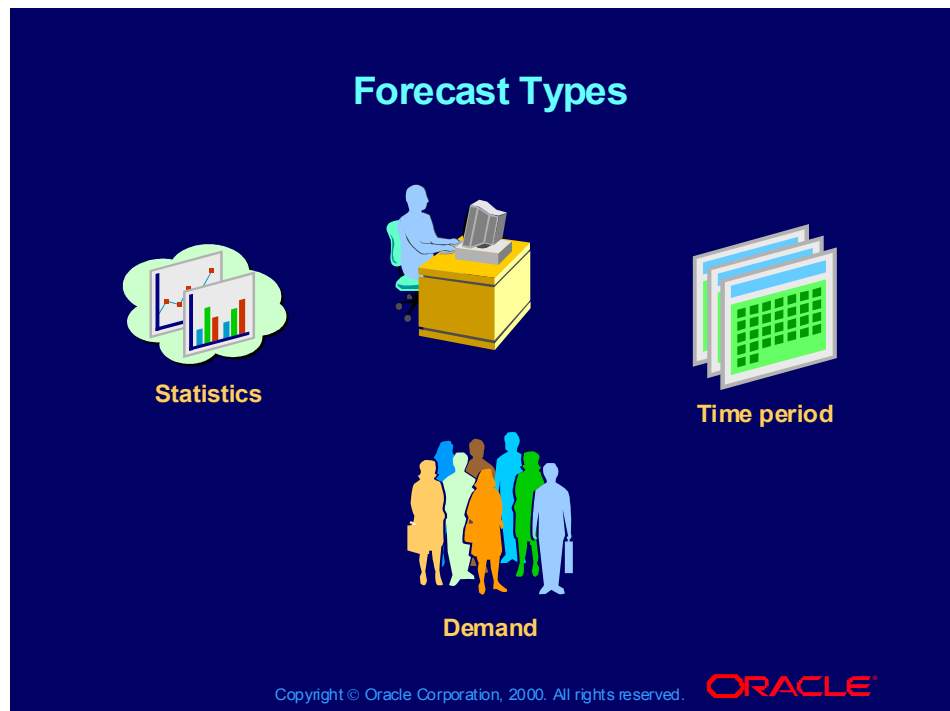
Describing Inventory Planning and Forecasting

Forecasts generated by Oracle Inventory are based on historical transaction activity only. When creating a forecast, you can select the type of transactions that you want to use. You can also specify how far into the future that you want to forecast demand.

After you complete a forecast, you can use it to determine reorder-point planning. You can also load forecasts into the master schedule, which is a component of the Oracle Material Requirements Planning (MRP) application.

Note: If you install only Oracle Inventory, you can manually create forecasts. Manually created forecasts can be based on transaction activity other than historical data.

Forecast Types



Describing Forecast Types

Forecast generation uses mathematical algorithms to calculate a prediction of future demand. You can calculate estimated future demand for items using historical data and focus or statistical forecasting techniques. You can create multiple forecasts and group complimenting forecasts into forecast sets. Oracle Inventory supports the following forecast types:

- Focus
- Statistical

Focus forecasting enables you to simulate various methods of calculating demand so that you can select the best forecasting model. *Statistical forecasting* enables you to use detailed history and applies weighting factors to exponentially smooth the data. Statistical forecasting also enables you to apply exponentially weighted trend and seasonality factors to predict demand.

You typically use Focus forecasting to produce single period forecasts, whereas you can use Statistical forecasting to forecast any number of periods into the future.

Accessing Forecasting Help

Use the following navigation path to access online help about Oracle Inventory Forecasting:



(Help) Oracle Inventory > Inventory Planning and Replenishment > Overview of Inventory Planning and Replenishment > Forecasting

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Focus Forecasting

Focus Forecasting

- 1** Forecast = actual demand in the same period of the previous year
Example: Demand for April 2000 = Demand April 1999
- 2** Forecast = actual demand in the previous period this year
Example: Demand for April 2000 = Demand for March 2000

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Describing Focus Forecasting Methods

Focus forecasting simulates five forecast methods to determine the best forecasting model to use. An example of each focus forecast method is shown in this slide and on the following pages. Each method generates a forecast for the current period based on demand from previous periods.

Note: If not using daily time buckets, focus forecast methods 1 and 4 require at least one year of historical data. When you use daily time buckets, a week is used instead of a year in calculating Models 1 and 4. Fifty-two week years are presumed in yearly calculations with weekly time buckets. This means that the same week last year is taken to be the week fifty-two weeks before the current week.

Focus-Forecasting (continued)

Focus-Forecasting (continued)

- 3 Forecast = (actual demand in previous period this year + actual demand two periods ago this year) / 2

Example: Demand in April 2000 = (March 2000 + February 2000) / 2

- 4 Forecast = actual demand in the same period last year × (actual demand in the previous period this year / actual demand in the previous period before the same period last year)

Example: Demand for April 2000 = Demand in April 1999 × (March 2000 / March 1999)

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Focus-Forecasting (continued)

5 Forecast = actual demand in the previous period this year ×
(actual demand in previous period this year / actual demand
two periods ago this year)

Example: Demand for April 2000 = Demand for March 2000 ×
(Demand for March 2000 / Demand for February 2000)

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Using Focus Forecasting

Using Focus Forecasting

Last Year Demand

Jan	Feb	Mar	Apr
220	210	250	260

This Year Demand

Jan	Feb	Mar	Apr
270	255	290	???

Focus forecasting assumes that the forecasting method that worked best the previous period will work best for the current period.

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Determining the Best Forecast Method

The system uses the absolute percentage error (APE) to determine the best forecasting method to use. The APE is the difference between the actual demand and the forecast associated with the actual demand. You calculate the APE using actual and forecast demand. Oracle Inventory selects the model with the smallest APE to calculate the current period forecast.

The following formula determines the APE:

$$\text{APE} = (|\text{actual demand} - \text{forecast demand}|) / \text{actual demand}$$

Note: Focus forecasting provides a one-period forecast. If you request a focus forecast for multiple periods, then Oracle Inventory uses the forecast of the first period for all of the forecast periods in the request. If actual demand is available for the current period, then you can recompile the focus forecast to update the forecast.

Focus Forecasting Example

Focus Forecasting Example

Actual demand history for years 2000 and 2001

Forecast Year	January	February	March	April
2000	220	210	250	260
2001	270	255	290	???

Question: Using Focus forecasting methods, what is the forecast for April 2001?

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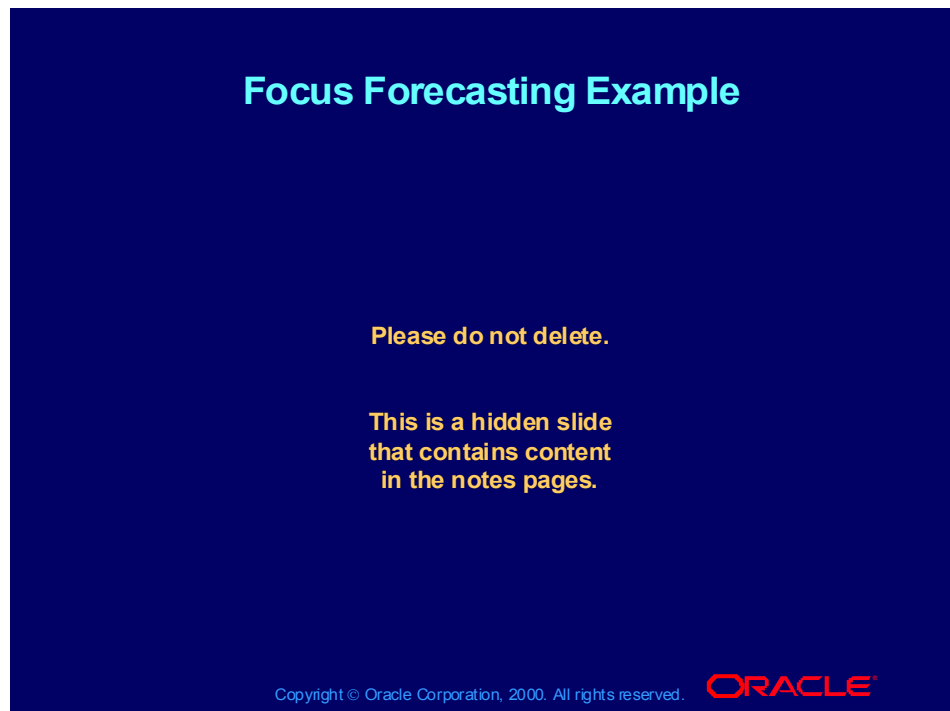
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Example of Focus Forecasting

To evaluate which forecasting model produced the best forecast last period, the absolute percentage error (APE) is calculated for the five forecasts. The forecast model with the smallest APE is then chosen to calculate the forecast for the next period.

Forecast Model	March 2001 Forecast	March 2001 Actual	Error (APE)	April 2001 Forecast
1	250	290	14%	260
2	255	290	12%	290
3	263	290	9%	273
4	304	290	5%	302
5	241	290	17%	330

Focus Forecasting Example



Example of a Focus Forecasting (continued)

In this example, Forecast Model 4 represents the best model for April of 1997, because the APE associated with this forecast is only 5 percent compared to the higher APEs for Models 1, 2, 3 and 5.

To determine the best forecast model to use, you would first, calculate the forecast and APE for March 2001 for each of the five focus forecasting methods. Then, to forecast demand for April 2001, select the focus forecast method that yielded the smallest APE (in this example, Method 4).

Note: This example shows the calculation for Method 4 only.

Forecast = actual demand in the same period last year \times (actual demand in the previous period this year / actual demand in the previous period before the same period last year)

Calculating the Forecast and APE for Model 4

$$\begin{aligned}\text{March 2001} &= \text{March 2000} \times (\text{February 2001} / \text{February 2000}) \\ &= 250 \times (255 / 210) \\ &= 303.57142, \text{ rounded to } 304\end{aligned}$$

APE for model 4:

$$\begin{aligned}\text{APE} &= (|\text{actual demand} - \text{forecast demand}|) / \text{actual demand} \\ &= (|290 - 304|) / 290 \\ &= 0.05 \text{ or } 5\%\end{aligned}$$

Calculating the Demand Forecast for April 2001

Because 5% is the smallest error of the five models, you would select Model 4 to calculate the April 2001 forecast.

$$\begin{aligned}\text{April 2001} &= \text{April 2000} \times (\text{March 2001} / \text{March 2000}) \\ &= 260 \times (290 / 250) \\ &= 301.6000 \text{ or } 302\end{aligned}$$

Note: Results have been rounded to the nearest whole number.

Statistical Forecasting

Statistical forecasting uses exponential smoothing to extrapolate demand from previous periods. The statistical forecast methods that you can use with Oracle Inventory include the following:

- **Exponential smoothing (ESF)**
- **Trend-enhanced forecast (TEF)**
- **Season-enhanced forecast (SEF)**
- **Trend- and Season-enhanced forecast (TSEF)**

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Exponential Smoothing Forecast (ESF)

Exponential Smoothing Forecast (ESF)

$$\begin{aligned} \text{ESF}_t &= \text{ESF}_{t-1} + \alpha \times (A_{t-1} - \text{ESF}_{t-1}) \\ &= \alpha \times A_{t-1} + (1 - \alpha) \times \text{ESF}_{t-1} \end{aligned}$$

Where:

α = Primary smoothing factor ($0 \leq \alpha \leq 1$)

ESF_t = Smoothed forecast at the end of period t

A_t = Actual demand for period t

A_{t-1} = Actual demand for the previous period t

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Describing the Exponential Smoothing Forecast (ESF)

Exponential smoothing uses the forecast from the prior period and adds an adjustment to obtain the forecast for the next period. With ESF, demand is forecast by averaging all of the past periods of actual demand. This forecasting method weighs more recent data to give it greater influence over the forecast results than older data.

You can calculate the current period forecast by using a weighted average of the most recent and forecasted demand. The alpha factor, also called the smoothing constant, is multiplied by the forecast error to determine the adjustment. You can specify an alpha factor between zero and one. The larger the alpha factor, the less impact the older data has on the new forecast.

The current forecast is equal to the old forecast, plus a portion of the forecast error from the previous period. You can use this method when trend or seasonality patterns do not exist.

Exponential Smoothing Forecast Example

Exponential Smoothing Forecast Example

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Example of Exponential Smoothing Forecasting

This example shows the ESF calculations for three different values of alpha (α) for period 9 of a 9 period time frame.

Period t	Actual Demand A_t	$\alpha = 0.9$	$\alpha = 0.5$	$\alpha = 0.1$
1	200			
2	220	200	200	200
3	120	218	210	202
4	230	130	165	194
5	260	220	198	197
6	270	256	229	204
7	290	269	249	210
8	270	288	270	218
9	Forecast	272	270	223

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The forecast for period 9 for $\alpha = 0.9$ is calculated:

$$ESF_t = \alpha \times A_{t-1} + (1 - \alpha) \times ESF_{t-1}$$

$$\begin{aligned} ESF_9 &= 0.9 \times A_8 + (1 - 0.9) \times ESF_8 \\ &= 0.9 \times 270 + 0.1 \times 288 \\ &= 271.8 \end{aligned}$$

As shown in the table, actual demand for period 3 was abnormal, but otherwise the trend is upward. With a higher alpha the forecast reacted more strongly to the third period, and produced a very low period 4 forecast, but was also faster to correct itself and adjust for the trend. By period 9, the period that this example is forecasting, the abnormal period 3 has only a minor effect on the forecast. All three forecasts become more accurate when they have more historical data upon which to draw.

Note: ESF always lags behind the trend by at least one period.

Trend-Enhanced Forecast (TEF)

Trend-Enhanced Forecast (TEF)

$$\beta_t = \alpha \times A_{t-1} + (1 - \alpha) \times \text{TEF}_{t-1}$$

$$R_t = \beta \times (B_t - B_{t-1}) + (1 - \beta) \times R_{t-1}$$

$$\text{TEF}_t = B_t + R_t$$

Where:

α = Primary smoothing factor ($0 \leq \alpha \leq 1$)

β = Trend smoothing factor ($0 \leq \beta \leq 1$)

A_{t-1} = Actual demand of period t

B_t = Base value computed at the end of period t

R_t = Trend value computed at the end of period t

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Describing the Trend-Enhanced Forecast (TEF)

For longer-range forecasts, you can use the trend-enhanced forecast to estimate the amount of persistent change in basic demand from period to period.

TEF is based on the exponential smoothing factor (α), but also considers the trend (β).

Both the exponential smoothing and trend values closer to zero are weighted towards the past trend and values closer to one are weighted more heavily towards the current trend.

Trend-Enhanced Forecast Example

Trend-Enhanced Forecast Example

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Example of Trend-Enhanced Forecasting

This example shows the effect of adding the trend enhancement to the ESF calculation. With the Trend-enhanced forecast, you can reflect the current trend in a forecast.

Period t	Actual Demand A_t	Forecast Base B_t	Trend Index R_t	Forecast Demand TEF_t
1	200			
2	220	200		
3	120	210	20	230
4	230	175	15	190
5	260	210	17	226
6	270	243	18	261
7	290	266	19	284
8	270	287	19	306
9	Forecast	272	17	305

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Assuming an alpha (α) value of 0.5 and a beta (β) value of 0.1, The trend-enhanced forecast for period 9 is derived by performing the following calculations:

- Determining base value
- Updating the trend index
- Adding the two for the period 9 trend-enhanced forecast

Determining the Base Value

$$B_t = \alpha \times A_{t-1} + (1 - \alpha) \times TEF_{t-1}$$

$$\begin{aligned} B_9 &= 0.5 \times A_8 + (1 - 0.5) \times TEF_8 \\ &= 0.5 \times 270 + 0.5 \times 306 \\ &= 288 \end{aligned}$$

Updating the Trend Index

$$R_t = \beta \times (B_t - B_{t-1}) + (1 - \beta) \times R_{t-1}$$

$$\begin{aligned} R_9 &= 0.1 \times (B_9 - B_8) + (1 - 0.1) \times R_8 \\ &= 0.1 \times (288 - 287) + 0.9 \times 19 \\ &= 17.2 \end{aligned}$$

Trend-Enhanced Forecast Example



Example of Trend-Enhanced Forecasting (continued)

Adding the Base and Trend Index to Determine the Period 9 Trend Forecast

Recall that the calculated base value was 288 and the trend index was 17.2.

$$TEF_t = B_t + R_t$$

$$TEF_9 = B_9 + R_9$$

$$= 288 + 17.2$$

$$= 305.2 = \text{Period 9 Forecast}$$

Season-Enhanced Forecast (SEF)

Season-Enhanced Forecast (SEF)

$$B_t = \alpha \times (A_{t-1} + S_{t-1}) + (1 - \alpha) \times B_{t-1}$$

$$S_t = \gamma \times (A_{t-1} B_t) + (1 - \gamma) \times S_t$$

$$SEF_t = B_t \times S_t$$

Where:

α = Primary smoothing factor ($0 \leq \alpha \leq 1$)

γ = Seasonal index-smoothing constant ($0 \leq \gamma \leq 1$)

A_{t-1} = Actual demand for period t

B_t = Base value computed at the end of period t

S_t = Adjusted seasonal index for period t , one period ago

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Describing the Season-Enhanced Forecast (SEF)

You can use seasonality indexes to indicate the degree of seasonal variation for a product. You can specify a seasonality factor to estimate how much demand during the season will be above or below the average demand for the product.

Values closer to zero give more weight to past seasonal indexes, and values closer to one give more weight to current seasonal indexes. This method produces a more consistent pattern of seasonal demand from period to period, over the course of the forecast.

You can use SEF to track changes in demand that result from annual promotions and expected peaks in demand. For example, you might use SEF to track the demand of children's clothing purchases at the beginning of the school year versus the demand for children's clothing at other times of the year.

Season-Enhanced Forecast Example



Example of Season-Enhanced Forecasting

With highly seasonal goods, such as winter clothing, holiday cards and decorations, you should take seasonal demand variations into consideration. To do this, you must first enter seasonality indices for each period indicating how much demand during the period is above or below average. A seasonality index of 2 indicates that demand during this period is twice the average demand.

Therefore an index of 0.5 indicates that demand during this period is half the average demand; 1 means that the demand is average during this period. If the average seasonality index entered is not equal to 1, then Oracle Inventory normalizes the indices so that the average seasonality indices do equal 1.

The same kind of logic that is used for adjusting for trend in the TEF is used to adjust for the seasonal variations. Demand is first desasonalized by dividing by the seasonality index for that period, and then exponential smoothing is used to produce a new base value. The base value is then multiplied by the seasonal index for the period being forecasted to produce the season-enhanced forecast (ESF).

Period t	Actual Demand A_t	Old Season Index S_t	Forecast Base B_t	Forecast Demand SEF_t	New Season Index S'_t
1	200	1.05			
2	220	1.00	190	190	1.05
3	120	0.65	200	130	0.63
4	230	0.95	195	296	1.02
5	260	1.05	210	221	1.11
6	270	1.10	223	245	1.13
7	290	1.15	230	265	1.18
8	270	1.15	238	273	1.15
9	Forecast	1.10	237	260	

This table shows an example of season-enhanced forecasting. Note how the expected drop in period 3 also produced a drop in the forecasted for period 3.

Season-Enhanced Forecast Example



Example of Season-Enhanced Forecasting (continued)

To determine seasonality index, you perform the following calculations:

- Adjust the last period's seasonality index
- Calculate the forecast base value
- Multiply by the period 9 seasonality index

This example assumes a smoothing constant (α) of 0.5 and a seasonality factor (γ) of 0.3.

Adjust the Last Period's Seasonality Index

$$S'_t = \gamma \times (A_t / B_t) + (1 - \gamma) \times S_t$$

$$\begin{aligned} S'_8 &= 0.3 \times (A_8 / B_8) + (1 - 0.3) \times S_8 \\ &= 0.3 \times (270 / 238) + 0.7 \times 1.15 \\ &= 1.14536 \end{aligned}$$

Calculate the Forecast Base Value

$$\begin{aligned} B_t &= \alpha \times (A_{t-1} / S_{t-1}) + (1 - \alpha) \times B_{t-1} \\ B_9 &= 0.5 \times (A_8 / S_8) + (1 - 0.5) \times B_8 \\ &= 0.5 \times (270 / 1.14536) + 0.5 \times 238 \\ &= 236.86687 \end{aligned}$$

Multiply by the Period 9 Seasonality Index

$$SEF_t = B_t \times S_t$$

$$SEF_9 = B_9 \times S_9$$

$$= 236.8667 \times 1.10$$

$$= 260.55356$$

Note: After determining period 9 results, you can recalculate period 9's seasonality index and then forecast for period 10.

Trend- and Season-Enhanced Forecast (TSEF)

Trend- and Season-Enhanced Forecast (TSEF)

$$B_t = \alpha \times (1 + S_{t-1}) + (1 - \alpha) \times (B_{t-1} + R_{t-1})$$

$$R_t = \beta \times (B_t + B_{t-1}) + (1 - \beta) \times R_{t-1}$$

$$S_t = \gamma \times [(A_{t-1} B_t + R_t)] + (1 - \gamma) \times S_t$$

$$TSEF_t = (B_t + R_t) \times S_t$$

Where:

α = Smoothing constant for the average ($0 \leq \alpha \leq 1$)

β = Smoothing constant for the trend ($0 \leq \beta \leq 1$)

γ = Seasonal index-smoothing constant ($0 \leq \gamma \leq 1$)

A_{t-1} = Actual demand of period t

R_t = Trend value computed at the end of period t

S_t = Adjusted seasonal index for period t , one period ago

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Describing the Trend- and Season-Enhanced Forecast (TSEF)

The Trend- and Season-Enhanced forecast combines the trend and seasonal methods to incorporate both types of demand. With TSEF, you specify a trend factor, as well as a seasonality index.

Trend - and Season-Enhanced Forecast Example

Trend - and Season-Enhanced Forecast Example

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Example of Trend- and Season-Enhanced Forecasting

Despite the seasonal adjustments made in the SEF, a trend element remained as seen in the gradual increase in the forecast base, B. The TEF and the SEF can be combined to derive a trend- and season-enhanced forecast (TSEF). The TSEF uses all three smoothing factors: alpha (α), beta (β), and gamma (γ).

Period t	Actual Demand A_t	Old Season Index S_t	Forecast Base B_t	Trend Index R_t	Forecast Demand TSEF _t	New Season Index S'_t
1	200	1.05				
2	220	1.00	190		190	1.05
3	120	0.65	200	10	137	0.63
4	230	0.95	201	9	199	0.99
5	260	1.05	221	10	242	1.07
6	270	1.10	236	11	272	1.10
7	290	1.15	247	11	296	1.14
8	270	1.15	255	10	306	1.11
9	Forecast	1.10	254	9	290	

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As with the Season-enhanced forecast, you calculate the new period 8 seasonality index as soon as period 8 actual demand is determined.

To calculate the trend- and season-enhanced forecast for period 9, you perform the following calculations:

- Calculate the period 8 seasonality index
- Calculate the period 9 base value
- Calculate the new trend factor
- Add the base and trend factors together and multiply by the seasonality factor to get the period 9 trend- and season-enhanced forecast

For this example, assume the following values:

- Smoothing constant, $\alpha = 0.5$
- Trend smoothing constant, $\beta = 0.1$
- Seasonality smoothing constant, $\gamma = 0.3$

Trend - and Season-Enhanced Forecast Example

**Trend - and Season-Enhanced Forecast
Example**

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in the notes pages.

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Example of Trend- and Season-Enhanced Forecasting (continued)

Calculating the Period 8 Seasonality Index

$$\begin{aligned} S'_t &= \gamma \times [A_t / (B_t + R_t)] + (1 - \gamma) - S_t \\ S'_8 &= 0.3 \times [A_8 / (B_8 + R_8)] + (1 - 0.3) - S_8 \\ &= 0.3 \times [270 / (255 + 10)] + 0.7 - 1.15 \\ &= 1.11066 \end{aligned}$$

Calculating the Period 9 Base Value

$$\begin{aligned} B_t &= \alpha \times (A_t / S'_{t-1}) + (1 - \alpha) \times (B_{t-1} + R_{t-1}) \\ B_9 &= 0.5 \times (A_8 / S'_8) + (1 - 0.5) \times (B_8 + R_8) \\ &= 0.5 \times (270 / 1.11066) + 0.5 \times (255 + 10) \\ &= 254.04935 \end{aligned}$$

Calculating the New Trend Factor

$$\begin{aligned} R_t &= \beta \times (B_t - B_{t-1}) + (1 - \beta) \times R_{t-1} \\ R_9 &= 0.1 \times (B_9 - B_8) + (1 - 0.1) \times R_8 \\ &= 0.1 \times (254.04935 - 255) + 0.9 \times 10 \\ &= 8.90494 \end{aligned}$$

Calculating the Period 9 Trend- and Season-Enhanced Forecast

$$\text{TSEF}_t = (B_t + R_t) \times S_t$$

$$\text{TSEF}_9 = (B_9 + R_9) \times S_9$$

$$= (254.04935 \times 8.90494) \times 1.10$$

$$= 289.24972$$

Review Question

Review Question

Your company produces gardening tools for the Northern United States and wants to use forecasting to estimate demand. Which of the following statistical forecasting methods might you use to forecast demand for this situation?

- A. Exponential smoothing forecast (ESF)**
- B. Focus forecast**
- C. Trend-enhanced forecast (TEF)**
- D. Season-enhanced forecast (SEF)**

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Review Question Solution

Your company produces gardening tools for the Northern United States and wants to use forecasting to estimate demand. Which of the following statistical forecasting methods might you use to forecast demand for this situation?

- A. Exponential smoothing forecast (ESF)
- B. Focus forecast
- C. Trend-enhanced forecast (TEF)
- D. Season-enhanced forecast (SEF)**

The correct answer is D. Because the market that you for these tools is in a part of the US that experiences all four seasons, using the season-enhanced forecast specifically considers the seasonality of demand for gardening tools.

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Review Question Solution

Your company produces gardening tools and wants to use forecasting to estimate demand. Which of the following statistical forecasting methods would you use to forecast demand for this situation?

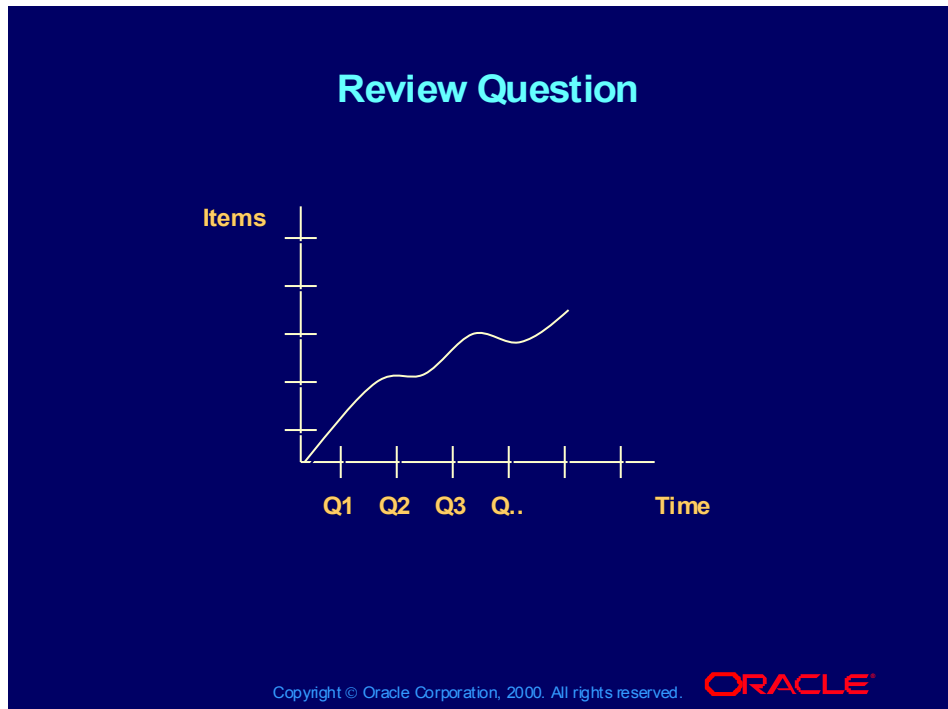
- A. Exponential smoothing forecast (ESF)
- B. Focus forecast
- C. Trend-enhanced forecast (TEF)
- D. Season-enhanced forecast (SEF)**

The correct answer is D. Using the season-enhanced forecast specifically considers the seasonality of demand for gardening tools.

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Review Question

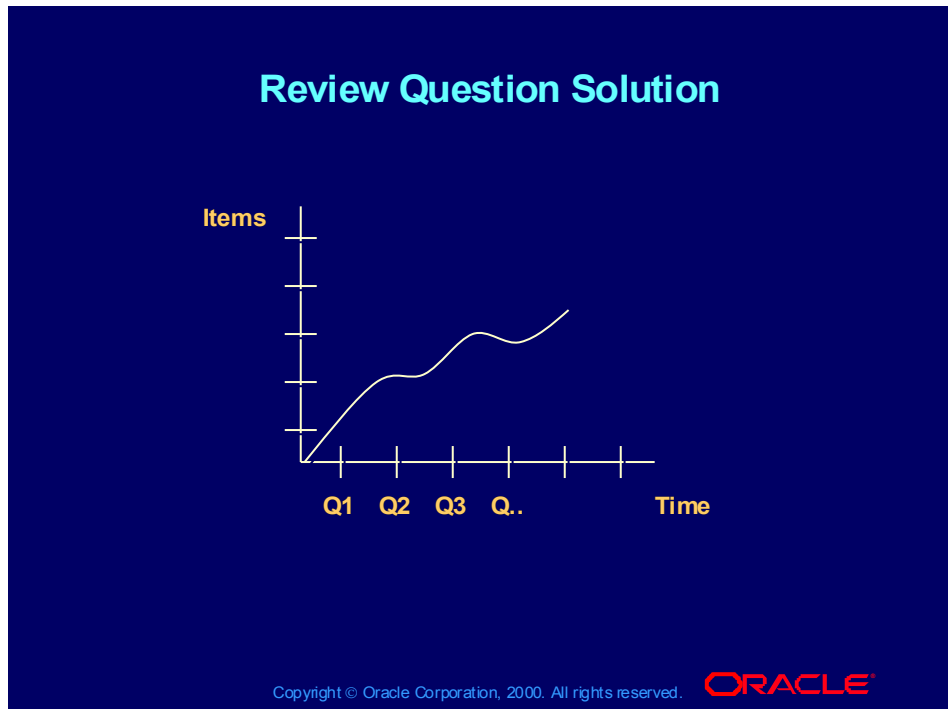


Review Question

The purchasing trend for a particular item is increasing each quarter, as shown in the graph above. Which of the following forecasting methods would be the best method to use to predict demand for future quarters?

- A. Exponential smoothing forecast (ESF)
- B. Focus forecast
- C. Trend-enhanced forecast (TEF)
- D. Season-enhanced forecast (SEF)

Review Question Solution

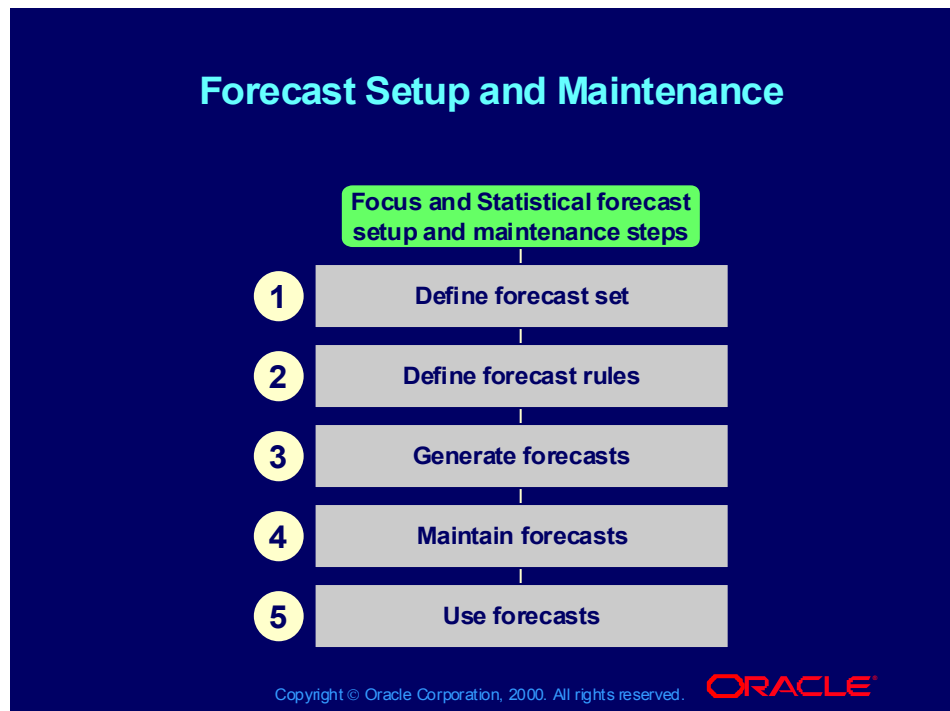


Review Question Solution

The purchasing trend for a particular item is increasing each quarter, as shown in the graph above. Which of the following forecasting methods would be the best method to use to predict demand for future quarters?

- A. Exponential smoothing forecast (ESF)
- B. Focus forecast
- C. Trend-enhanced forecast (TEF). Although you could select other forecasting methods, this example specifically addresses a trend in demand pattern.**
- D. Season-enhanced forecast (SEF)

Forecast Setup and Maintenance



Accessing Forecast Help

For an overview about the forecast setup components, access the online help topic: Overview of Forecasting.

(Help) Oracle Inventory > Inventory Planning and Replenishment > Forecasting

Accessing Forecast Setup Help

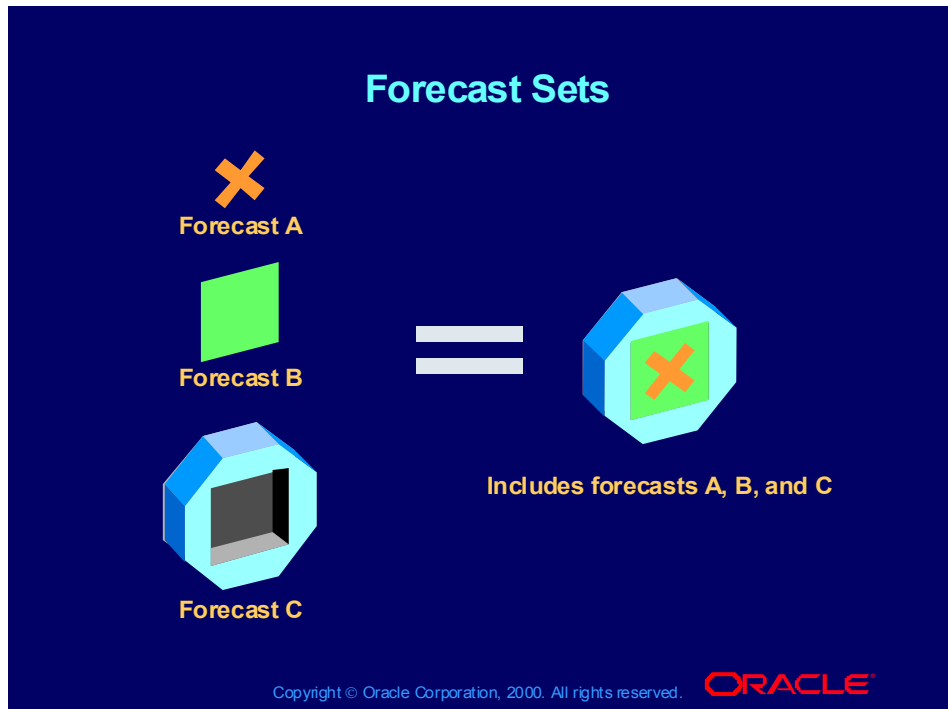
For instructions on how to set up forecast rules, access the following online help topic:

(Help) Oracle Inventory > Inventory Planning and Replenishment > Forecasting

The Overview of Forecasting topic appears. To access instructions on how to set up a forecast, scroll to the bottom of the page and click the “Defining a Forecast” link.

The Defining a Forecast topic appears. Follow the instructions provided to set up a forecast.

Forecast Sets



Describing Forecast Sets

Before you define forecast rules and forecasts, you should first define a forecast set. Forecast sets group together complimenting forecasts. The forecast set also holds a number of parameters that are applicable to all forecasts in the set.

Note: A forecast can be associated with only one forecast set, although multiple forecasts may be associated with one set.

How to Access the Forecast Sets Window

(N) Inventory > Planning > Forecasts > Sets

Forecast Sets (Continued)

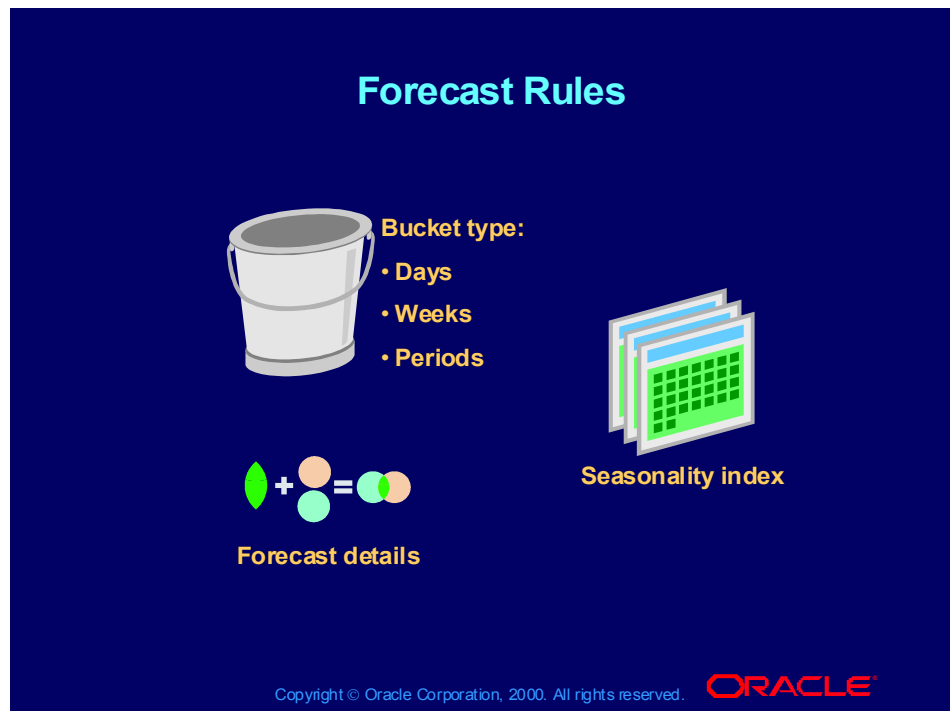


How to Set Up a Forecast and Forecast Sets

(Help) Oracle Inventory > Inventory Planning and Replenishment > Forecasting

The Defining a Forecast window opens. To set up a forecast set, access the Prerequisites section and click the “Defining a Forecast Set” link for detailed setup instructions.

Forecast Rules



Defining Forecast Rules

Before you generate a forecast, you must specify the forecast rules. Forecast rules, define the content of your forecast. These rules include specifying the following information:

Rule name and description

- Bucket type (buckets specify the time period in which your forecast refers. This time period refers to the time period that you set up when you set up the organization calendar).
- The demand sources, such as sales order shipments
- Forecast definition information, such as the forecast type (focus or statistical)
- Alpha and trend factors
- Seasonality factors, if required

How to Navigate to the Forecast Rules Window

(N) Inventory > Setup > Rules > Forecast

Forecast Rules



How to Set Up Forecast Rules

Use the following navigation path and instructions to access instructions on how to set up forecast rules.

(Help) Oracle Inventory > Inventory Planning and Replenishment > Defining a Forecast Rule

The Defining a Forecast Rule window opens.

Generating and Using Forecasts

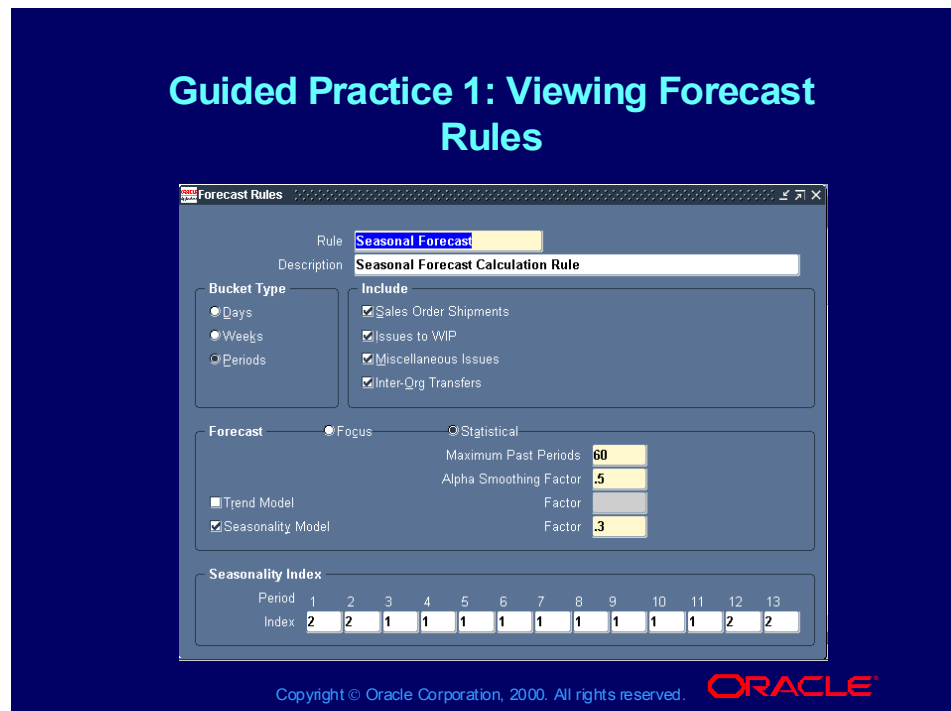
After you set them up, you can view forecast information, generate, and use forecasts. For instructions on how to generate, maintain, and use forecasts access the following online help:

(Help) Oracle Inventory > Inventory Planning and Replenishment > Forecasting

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Guided Practice 1: Viewing Forecast Rules



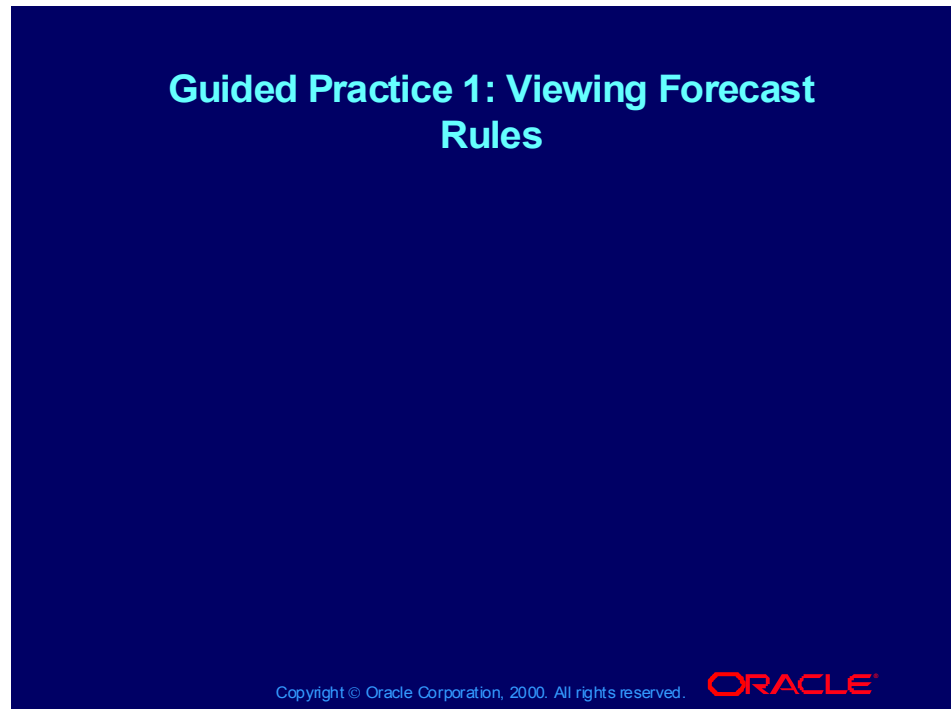
Guided Practice 1 - Viewing Forecast Rules

Purpose: In this practice you navigate to the Forecast Rules window to view the rules set up for a seasonal forecast.

When you finish this practice, exit the Forecast Rules window and return to the Oracle Inventory navigator.

1. Navigate to the Item Forecast Rules window.
 - (N) Inventory > Setup > Rules > Forecast
 - The Organizations list of values appears.
2. Select the M1 organization from the list of values, and then click the OK button.
 - The Forecast Rules window opens.
3. Press [F11] to enter query mode.

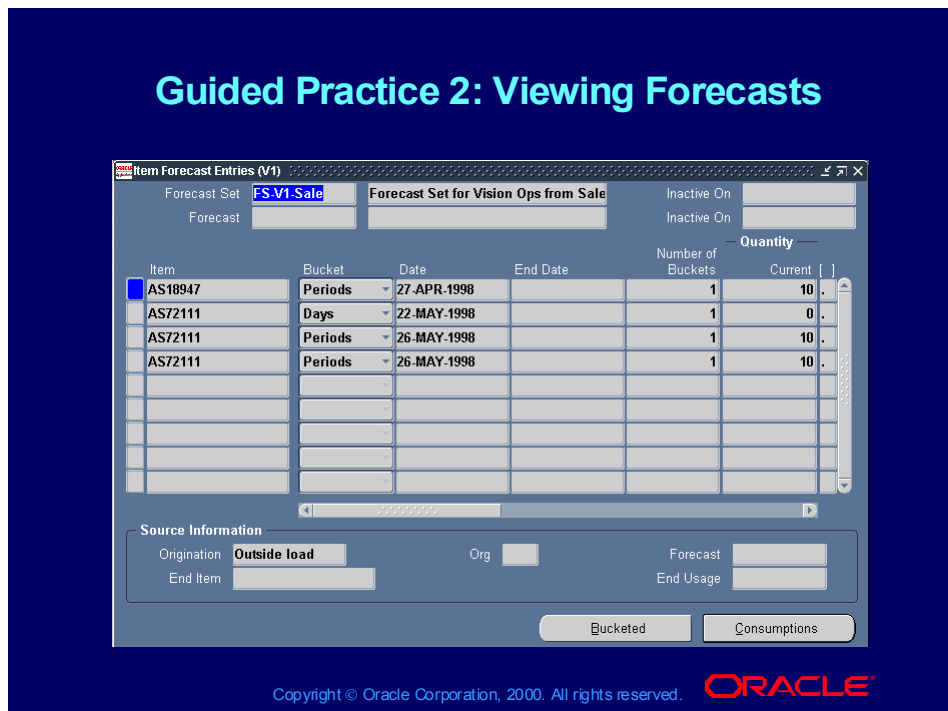
Guided Practice 1: Viewing Forecast Rules



Guided Practice 1 - Viewing Forecast Rules (continued)

4. In the Rule field, enter Season%.
5. Press [CTRL] + [F11] to execute the query.
Forecast rules for a seasonal forecast appear.
6. View the various details about the forecast.

Guided Practice 2: Viewing Forecasts



Guided Practice 2 - Viewing Forecasts

Purpose: In this practice you navigate to the Item Forecast Entries window to view a forecast.

When you finish this practice, exit the Forecast Entries window and return to the Oracle Inventory navigator.

1. Navigate to the Item Forecast Entries window.
(N) Inventory > Planning > Forecasts > View Entries
The Forecast Entries window opens.
2. Press [F11] to enter query mode.
3. In the Forecast Set field, enter FS%.
4. Press [CTRL] + [F11] to execute the query.
5. View the various details about the forecast.

Practice 1: Setting Up a Manual Forecast

Practice 1: Setting Up a Manual Forecast

Purpose: In this practice, you will use the Forecast Sets and Forecast Entries windows to set up a manual forecast. After you set it up, you access the Forecast Bucketed Entries window to view your results.

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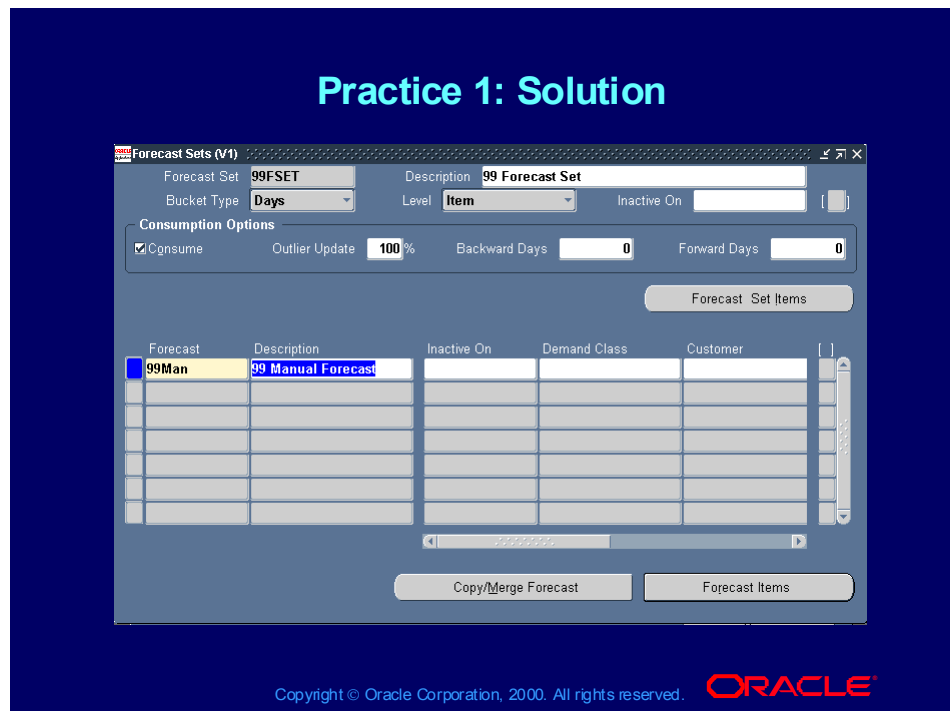
Practice 1: Setting Up a Manual Forecast

Instructions

Note: Wherever you see XX, substitute your student number.

- I. Define a forecast set using your team name XXFSET and a description of XX Forecast Set. Define a forecast name using XXFNAME with a description of XX forecast name.
- II. Enter a quantity of 3000 units per week for the next 6 weeks in the Forecast Entries window. Use your team item (XXITEM01).
- III. Use the Item Forecast Bucketed window to review and verify your forecast.

Practice 1: Solution



Practice 1 Solutions: Setting Up a Manual Forecast

Part I: Defining a Forecast Set

Define a forecast set using your team name XXFSET and a description of XX forecast set. Define a forecast name using XXFNAME and a description of XX's forecast name. Remember to save your entries.

(N) Planning > Forecasts > Sets

- Name: XXFSET
- Description: XX forecast set
- Bucket type: Weeks
- In the Forecast and forecast Description fields, enter the following information:
 - Name: XX FNAME
 - Description: XX forecast name

When you are finished, save your work.

Practice 1: Solution (continued)

Practice 1: Solution (continued)

The screenshot shows the 'Item Forecast Entries (V1)' window. At the top, there are fields for 'Forecast Set' (99FSET) and 'Forecast' (99Man). Below these is a table with columns: Item, Bucket, Date, End Date, Number of Buckets, and Quantity. The first row is highlighted with '99 ITEM01', 'Weeks', '27-NOV-2000', '08-JAN-2001', '7', and '3000'. Below the table is a 'Source Information' section with fields for 'Origination' (Manual), 'Org', 'Forecast', and 'End Usage'. At the bottom right, there are buttons for 'Bucketed' and 'Consumptions'.

Item	Bucket	Date	End Date	Number of Buckets	Quantity
99 ITEM01	Weeks	27-NOV-2000	08-JAN-2001	7	3000

Source Information

Origination: Manual Org: Forecast: End Usage:

Bucketed Consumptions

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Practice 1 Solutions: Setting Up a Manual Forecast

Part II: Entering the Forecast

Enter a quantity of 3000 units per week for the next 6 weeks in the detail screen. Use your item XXITEM01.

(N) Planning > Forecasts > Entries

- Item: XXITEM02
- Bucket: Weeks
- Date: Enter a start date that is greater than today
- End Date: Enter an end date that is approximately 6 weeks from the start date
- Current: 3000

When you are finished, save your work.

This completes the manual entry setup requirements. Now, you are ready to view the results of your forecast.

Practice 1: Solution (continued)

Practice 1: Solution (continued)

	27-NOV-2000	04-DEC-2000	11-DEC-2000	18-DEC-2000	26-DEC-2000
Original	3000	3000	3000	3000	3000
Consumed	0	0	0	0	0
Current	3000	3000	3000	3000	3000
Cum Original	3000	6000	9000	12000	15000
Cum Consumed	0	0	0	0	0
Cum Current	3000	6000	9000	12000	15000

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Practice 1 Solutions: Setting Up a Manual Forecast

Part III: Viewing the Results of Your Forecast

Use the Forecast Bucketed Entries window to view the results of your setup.

(N) Planning > Forecasts > Entries > (B) Bucketed

Use the scroll bar to view the dates and associated forecast information.

When you are finished close any open forecast windows and return to the Oracle Inventory Navigator.

Agenda

Agenda

- Overview of this module
- Overview of Oracle Planning and Replenishment online help
- Overview of Oracle Inventory forecasting
- Overview of Oracle Inventory replenishment planning

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Overview of Inventory Planning

Overview of Inventory Planning

Time to replenish

How much?

- Min-Max planning
- Reorder-point planning
- Kanban replenishment
- Replenishment counting

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Overview of Oracle Inventory Replenishment Planning

Using the Oracle Inventory application, you can set up the following types of inventory replenishment plans:

- Min-Max planning
- Reorder-point planning
- Kanban replenishment planning
- Replenishment counting (for non-quantity tracked replenishment)

After you select the replenishment method that you want to use, Oracle Inventory concurrent programs populate the requisition interface.

Oracle Inventory planning interfaces with Oracle Purchasing, and indirectly with Oracle Order Management.

Online Help for Inventory Replenishment

The Oracle Inventory application provides extensive online help about replenishment planning. To access help about replenishment planning, use the following navigation path:

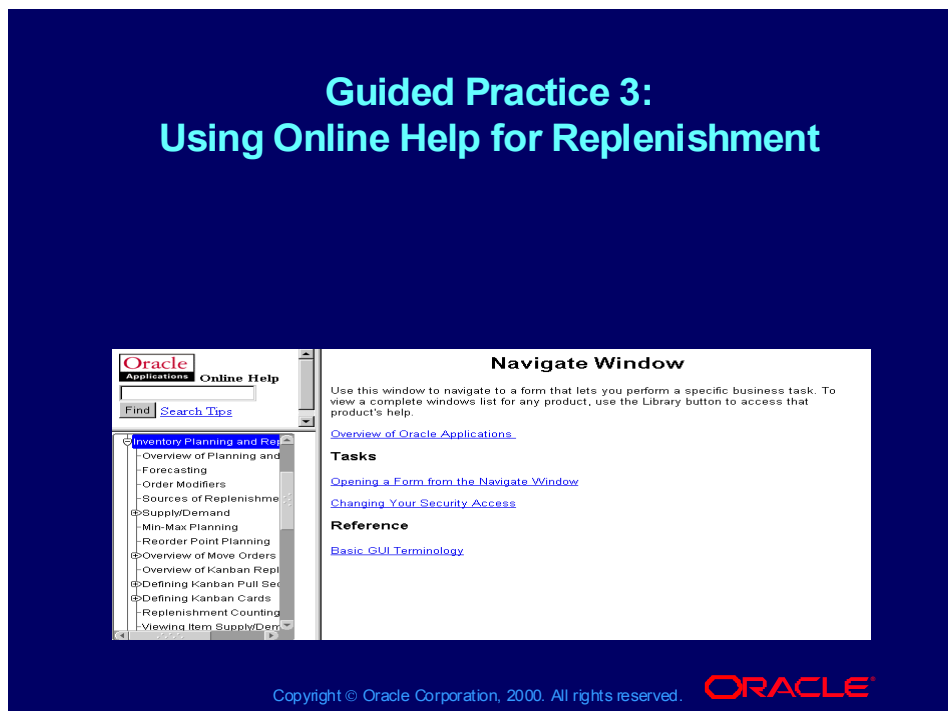


(Help) Inventory Planning > Overview of Planning

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Guided Practice 3: Using Online Help for Replenishment



Guided Practice 3 - Using Online Help for Replenishment

In this guided practice, you navigate to the online help for Oracle Inventory. After accessing the main help window, this practice explains how to access help specifically about inventory planning.

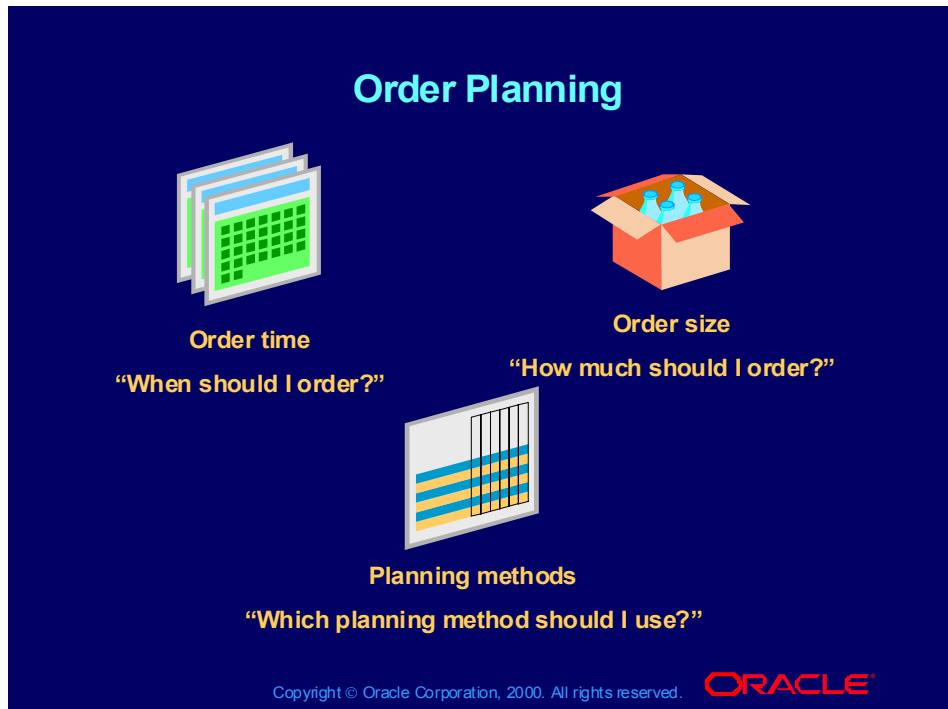
1. Using your student userid and password, log into Oracle Inventory.
2. From the Oracle Inventory Navigator, click the Window Help icon located on the toolbar.
3. Use the following navigation path to access specific help about replenishment.

(Help) Oracle Inventory > Inventory Planning and Replenishment

The Oracle Applications Help window appears in a separate browser window.

4. After you access the help for Inventory Planning, briefly explore the variety of help links.
5. When you are finished, close the Help window to return to the Oracle Inventory Navigator.

Order Planning



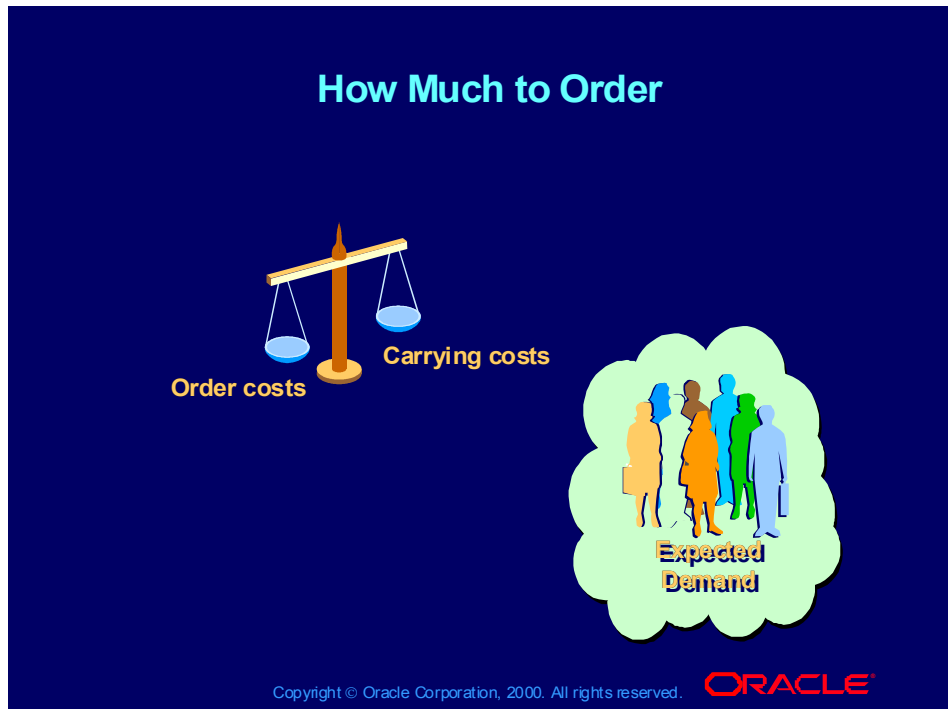
Describing Replenishment Considerations

Before you replenish your inventory, you should consider the following

- Order time
- Order size
- Planning method

Typically, you should order when the on-hand quantity plus incoming supply minus demand is less than the specified minimum inventory level. On-hand quantity refers to what you currently have in stock. Supply represents inventory coming into the organization. Demand represents the need for a particular item.

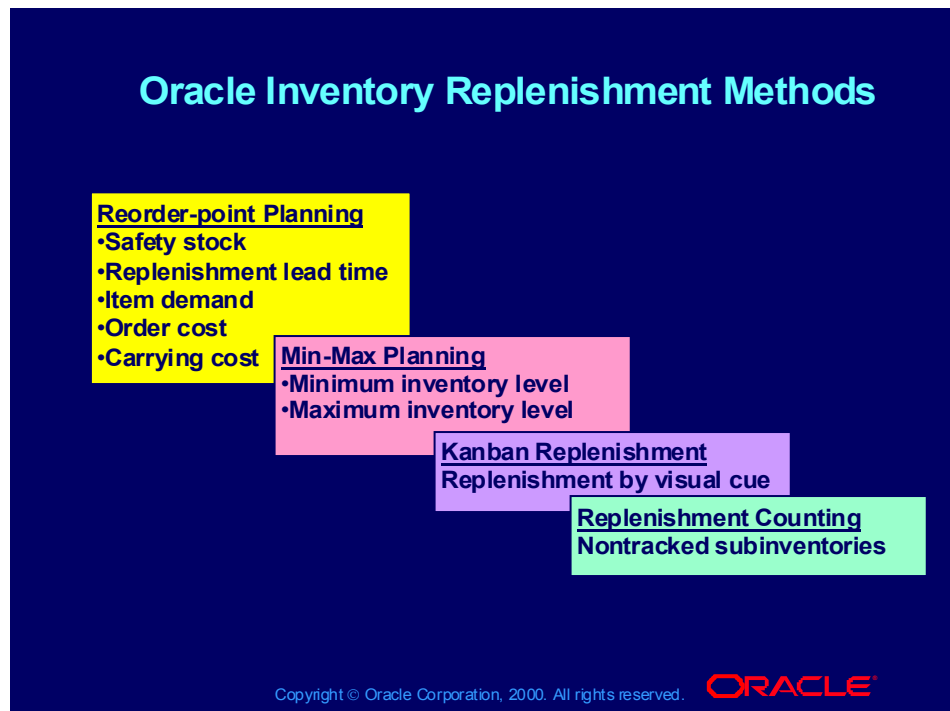
How Much to Order



How Much to Order

Typically, you should order a quantity that balances the cost of placing an order with the cost of carrying inventory, while covering expected demand. After you determine the amount to order, you can create a requisition to replenish inventory from another organization or a supplier. **Note:** Suppliers may have minimum order quantities.

Oracle Inventory Replenishment Methods



Describing Oracle Inventory Replenishment Methods

However, with Oracle Inventory, you can set up specific replenishment methods to help you decide the size, timing, and amount to order. Oracle Inventory supports the following replenishment methods:

- Reorder-Point-planning
- Min-Max planning
- Kanban replenishment
- Replenishment counting

Replenishment Methods Levels

Replenishment Methods Levels

Planning Method	Organization	Subinventory
Reorder-point	Yes	No
Min-Max	Yes	Yes
Replenishment Counting	No	Yes
Kanban	N/A	N/A

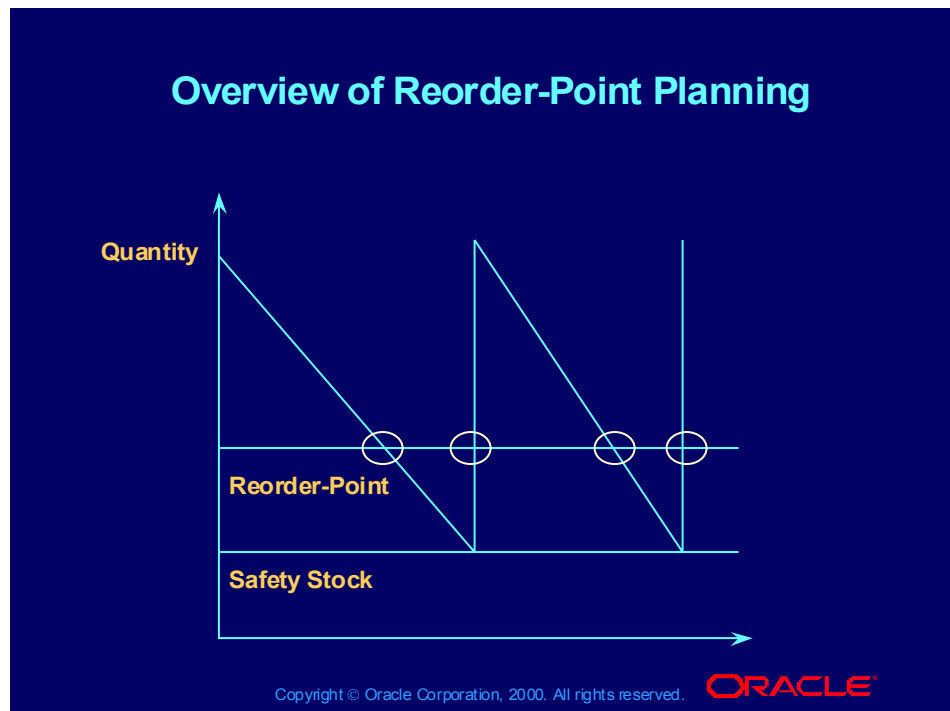
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Describing Oracle Inventory Replenishment Methods (continued)

Based on the replenishment method that you select, you can perform replenishment planning at the organization or subinventory level. The table in the slide summarizes the levels at which you can perform a specific replenishment method.

Overview of Reorder-Point Planning



Reorder-Point Planning Overview

As shown in the graphic, with Reorder-point planning, you order a quantity when the quantity falls to a predetermined reorder-point. Ideally, it is best to reorder at some point before inventory levels fall into the safety zone. Safety stock typically provides a buffer from which to fill orders, between reorder-points. At the end of the lead-time, the onhand quantity should equal the safety stock.

The essential feature of Reorder-Point planning is that it projects what the stock level will be—based on forecast demand and no visibility of sales orders—at the end of the item's lead time. This projection is then used to decide whether or not the reorder-point has been reached.

The reorder-point is calculated by adding expected demand during lead time to safety stock.

You perform reorder-point planning for the entire organization. You can use Reorder-Point planning for items under independent demand. That is, demand for items (or materials) that are independent of the demand for other items (or materials). When you define an item, you can specify Reorder-Point planning as the inventory planning method.

Accessing Reorder-Point Planning Help

Accessing Reorder-Point Planning Help

To access Reorder-point planning help log into the Oracle Inventory application, and select the Help icon from the Navigator toolbar.

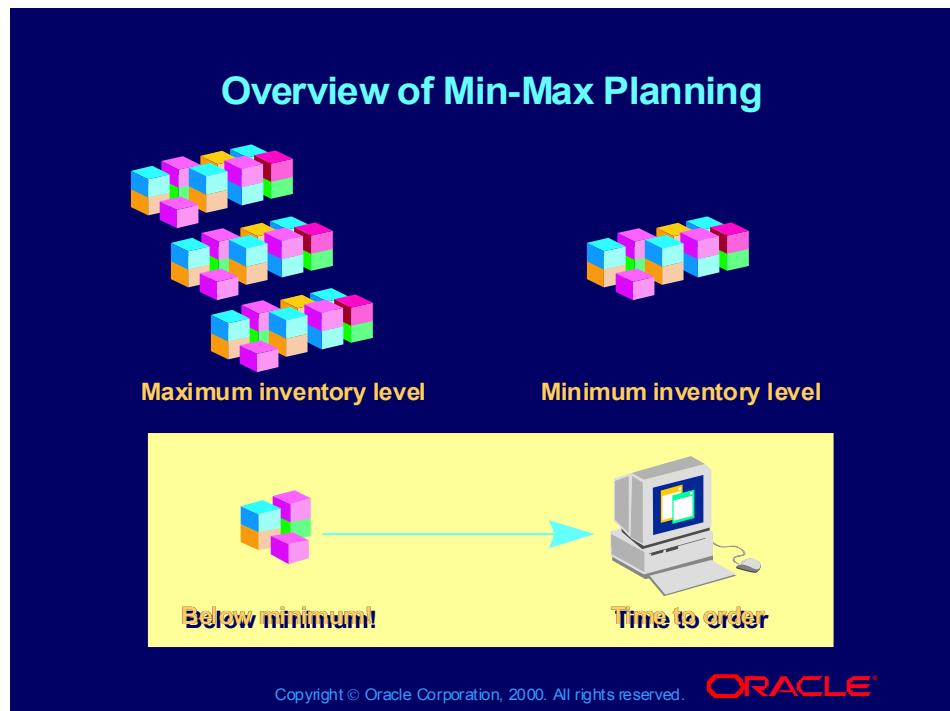


(Help) Oracle Inventory > Inventory Planning and Replenishment > Reorder-Point Planning

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Overview of Min-Max Planning



Min-Max Planning Overview

Min-Max planning is a method of inventory planning that determines how much to order based on user-defined minimum and maximum inventory levels. In contrast to Reorder-Point planning, Min-Max planning is not based on demand projections and does not consider lead-time.

With Oracle Inventory, you can perform Min-Max planning at the both the organization and the subinventory levels. To perform organization-level Min-Max planning for an item, you must specify organization-level minimum and maximum quantities.

Min-Max planning is typically used to control low value inventory items that do not need great control.

To perform subinventory-level Min-Max planning for an item, you must specify subinventory-level minimum and maximum quantities.

Accessing Min-Max Planning Help

Accessing Min-Max Planning Help

To access Min-Max planning help log into Oracle Inventory, and select the Help icon from the Navigator toolbar.



(Help) Oracle Inventory > Inventory Planning and Replenishment > Min-Max Planning

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Overview of Kanban Replenishment

Overview of Kanban Replenishment

Conveyance Kanban
Part No. A6758
Container Capacity: 50 each
To work center: J888 Stock Location: A-90
From work center: J999 Stock Location: A-38

Production Kanban
Work Center: A-38
Part number to be produced: A6758
Container Capacity: 50 each
Storing stock location: A-89
Materials required: Material no: 2222/Part No. A8796

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Describing Kanban Replenishment

Kanban is a means of supporting pull-based replenishment in manufacturing systems. A kanban system is a self-regulating pull system that leads to shorter lead times and reduced inventory. Kanban systems are typically applied to items with relatively constant demand and medium-to-high production volume.

Kanbans represent replenishment signals that are manual and highly visible, such as a color-code card that moves with the material, a light that goes on when replenishment is required, or an empty bin that is moved to the supply location to trigger replenishment.

Kanban systems typically provide support for external devices, such as bar code readers to read kanban cards and trigger a replenishment signal.

Kanban System Features

Kanban systems include the following characteristics:

- Close cooperation between the using company and the supplying company
- Short re-supply lead times
- Relatively small quantities reordered at a time
- Relative frequent ordering

Accessing Kanban Planning Help

To access Kanban planning help log into Oracle Inventory, and select the Help icon from the Navigator toolbar.



(Help) Oracle Inventory > Inventory Planning and Replenishment > Overview of Kanban Replenishment

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Overview of Replenishment Counting

Overview of Replenishment Counting

Replenishment Counting is a method of ordering items for nontracked inventories. With this method of replenishment, you can perform counts for nontracked subinventories and then direct Oracle Inventory to check these counts against the minimum quantities that you specified.

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Describing Replenishment Counting

A nontracked subinventory is an expense subinventory for which Oracle Inventory does not maintain on-hand quantity information. When you move valued material to a nontracked subinventory, Oracle Inventory automatically charges the appropriate expense account, and discards that quantity. Nontracked subinventories typically store items of low value, such as office stationary. Other nontracked subinventories might include hospital drug trolleys, where there is no opportunity to record accurate and timely issue transaction information.

Accessing Replenishment Counting Help

Accessing Replenishment Counting Help

To access replenishment counting help log into Oracle Inventory, and select the Help icon from the Navigator toolbar.



(Help) Oracle Inventory > Inventory Planning and Replenishment > Replenishment Counting

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Replenishment Method Selection

Replenishment Method Selection

Consider the following information when determining the replenishment method to use:

- Supply sources (shown in the table)
- Document created during replenishment
- Demand Sources – Although not listed in the table, demand sources might include the following:
 - Sales orders
 - Forecasts

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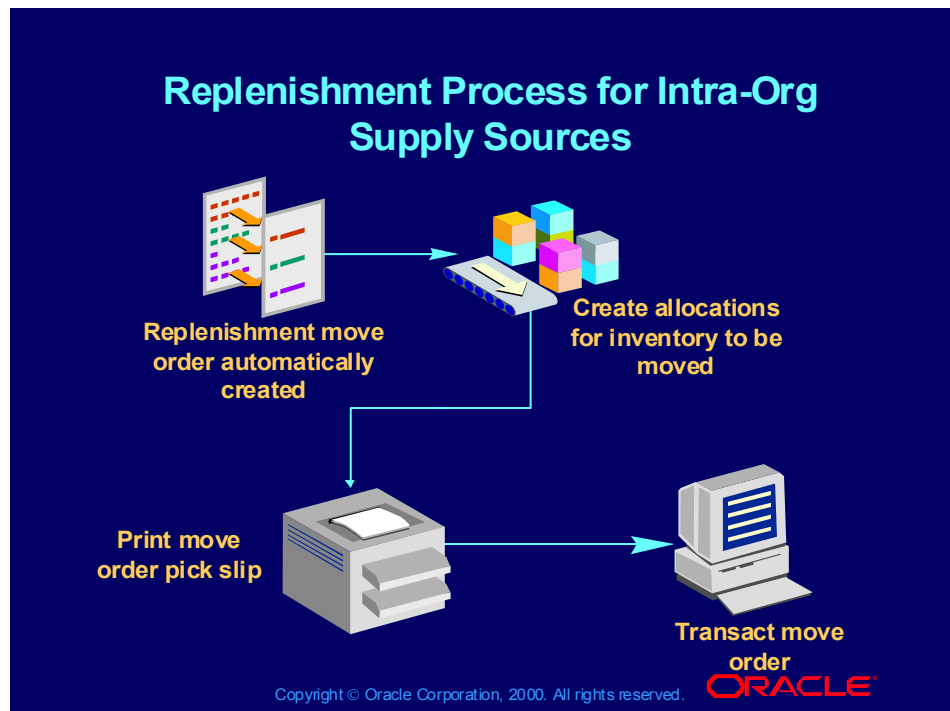
Deciding which Replenishment Method to Use

The following table provides a cross reference matrix that shows the demand source and document created for each of the replenishment methods discussed in this module.

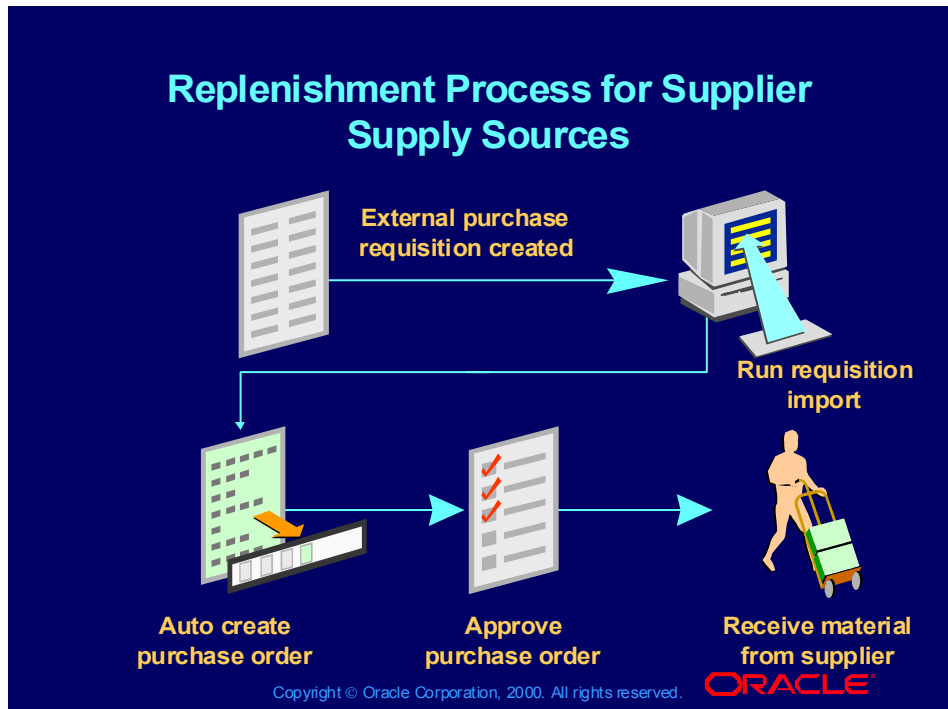
Supply Source Type	Inter-Org	Intra-Org	Supplier	Production
Doc Created	Internal requisition	Sub inventory transfer move order	Purchase requisition	Work order
Min-Max	Y	Y	Y	Y
Reorder Point	Y	N	Y	Y
Kanban	Y	Y	Y	Y
Replenishment count (subinventory replenishment)	Y	Y	Y	N

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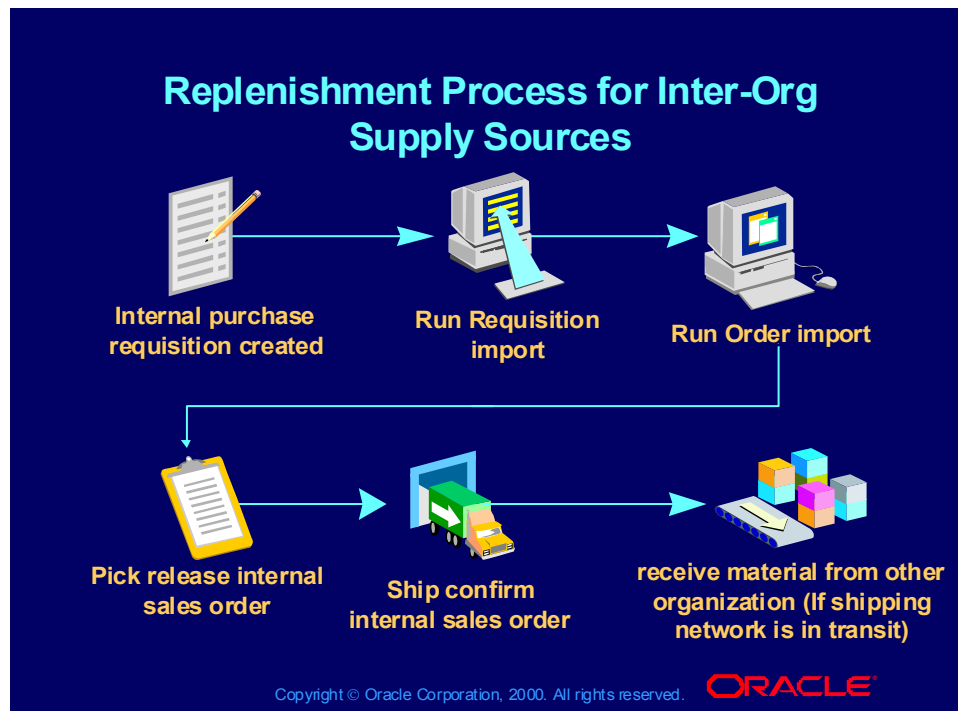
Replenishment Process for Intra-Org Supply Sources



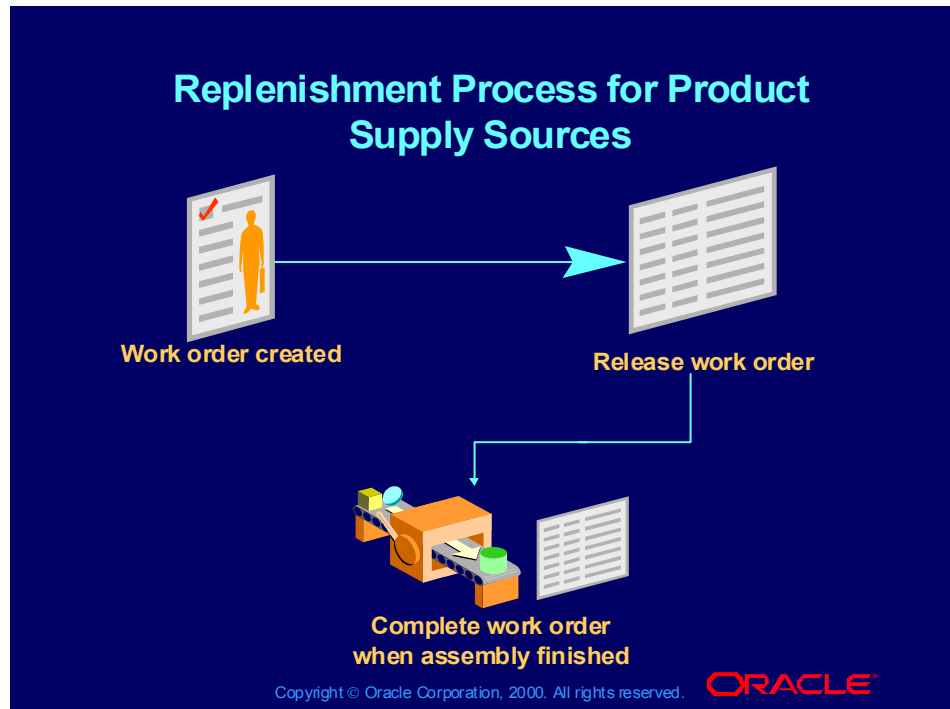
Replenishment Process for Supplier Supply Sources



Replenishment Process for Inter-Org Supply Sources



Replenishment Process for Product Supply Sources



Summary

In this module, you should have learned how to:

- **Use online help**
- **Describe focus and statistical forecasting**
- **Describe forecast rules**
- **Describe Oracle Inventory replenishment**
- **Describe Oracle Inventory replenishment methods**

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