



MONASH University

Information Technology

FIT 3138

Real-Time Enterprise Systems

Lecture 5

ERP in Production and  
Supply Chain Management

# Objectives

**Describe the steps in the production planning process of a high-volume manufacturer such as Fitter Snacker**

**Describe Fitter Snacker's production and materials management problems**

**Describe how a structured process for Supply Chain Management planning enhances efficiency and decision making**

**Describe how production planning data in an ERP system can be shared with suppliers to increase supply chain efficiency**

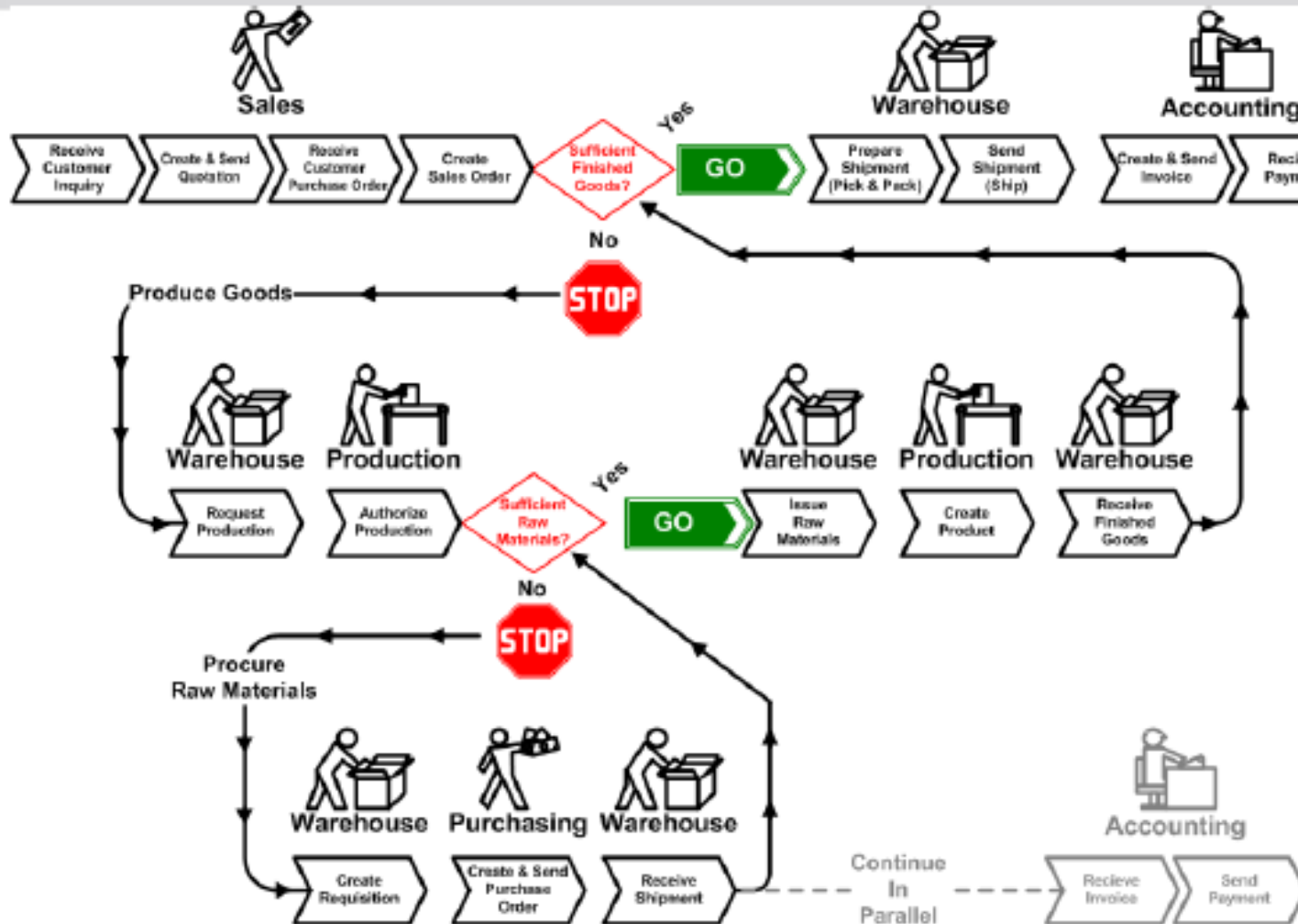
# Introduction

- Supply Chain Management (SCM) in an ERP system
- Fitter Snacker is part of a supply chain
- FS's SCM problems and how ERP can help fix them

# Integrated Processes

## Fulfillment + Procurement + Production

# An Overview



### Scenario

- ✓ Make to order
- ✓ Procure to order
- ✓ Customer order triggers fulfillment
- ✓ Lack of inventory of bikes triggers production
- ✓ Lack of inventory of RM triggers procurement

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Source: Magal and Word, *Essentials of Business Processes and Information Systems*, Wiley, 2009

# Production Overview

- To meet customer demand efficiently, Fitter Snacker must:
  - Develop a forecast of customer demand
  - Develop a production schedule to meet the estimated demand
- ERP system is a good tool for developing and executing production plans
- Goal of production planning is to schedule production economically

# Production Overview (cont'd.)

## Three general approaches to production

### Make-to-Stock (Push?)



***Make-to-stock*** items: made for inventory (the “stock”) in anticipation of sales orders

### Make-to-Order (Pull?)



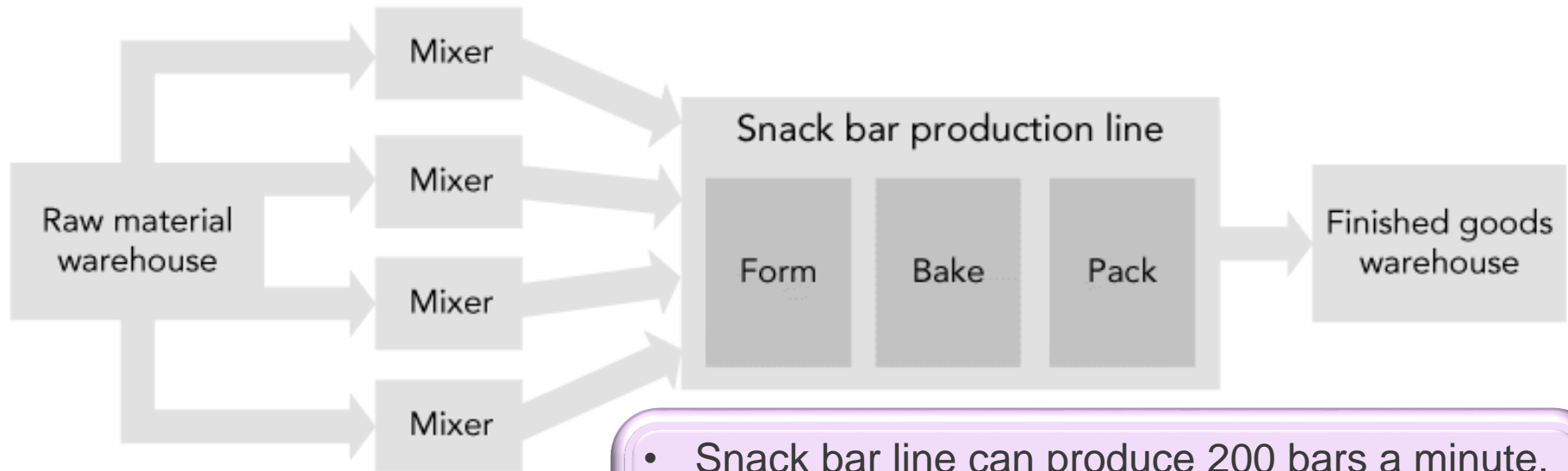
***Make-to-order*** items: produced to fill specific customer orders



***Assemble-to-order*** items: produced using a combination of make-to-stock and make-to-order processes

# An Example: Fitter Snacker's Manufacturing Process

- Fitter Snacker uses make-to-stock production



- Snack bar line can produce 200 bars a minute, or 12,000 bars per hour
- Entire production line operates on one shift a day
- Capacity: number of bars that can be produced

# Fitter Snacker's Production Problems

Fitter Snacker has problems deciding *how many* bars to make and *when* to make them



## Communication problems

- FS's Marketing and Sales personnel do not share information with Production personnel
- Production personnel find it hard to deal with sudden increases in demand
  - >> Might cause shortages or stockout



## Inventory problems

- Production manager lacks systematic method for:
  - >> Meeting anticipated sales demand
  - >> Adjusting production to reflect actual sales



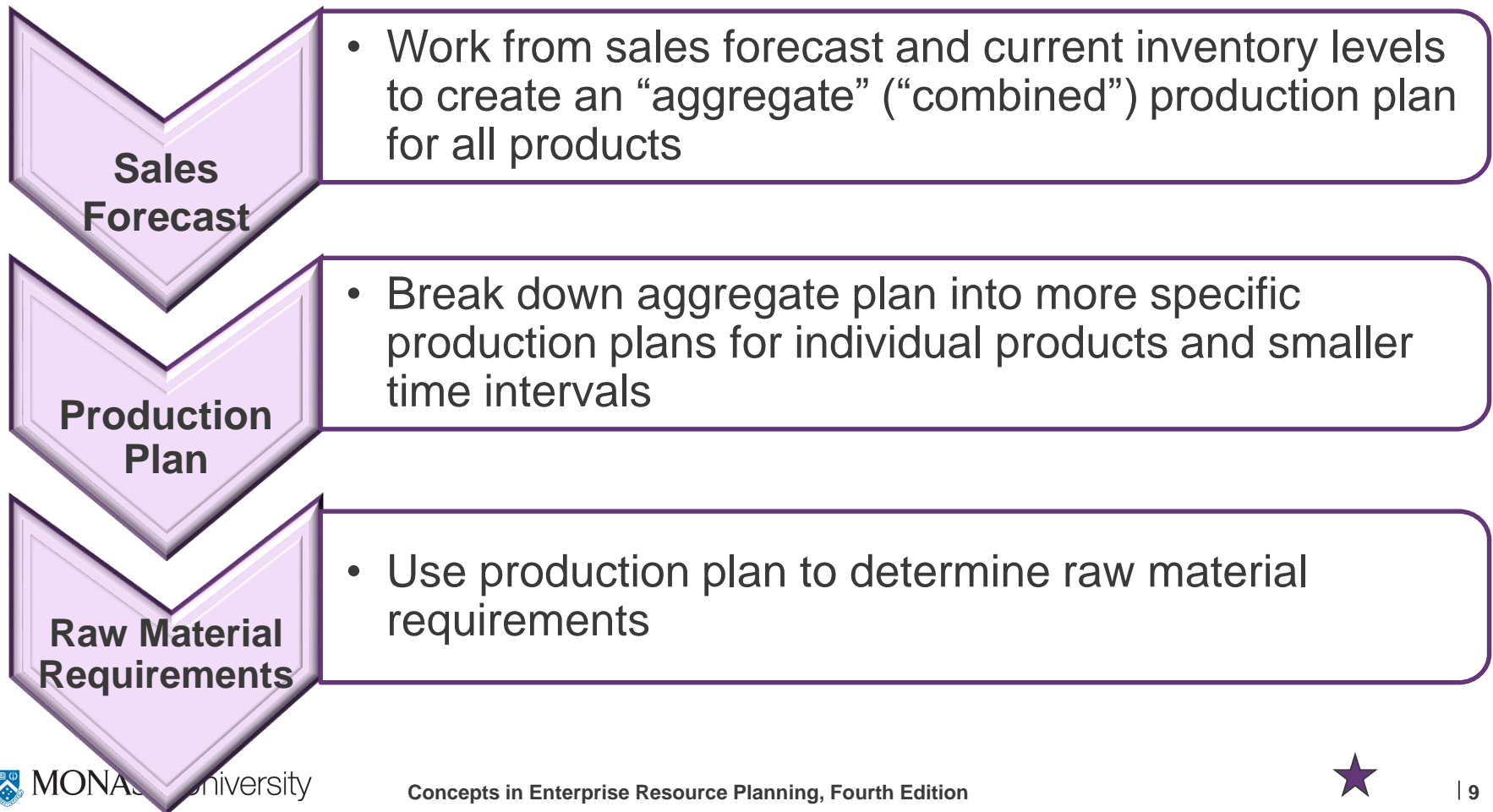
## Accounting and purchasing problems

- **Standard costs:** normal costs of manufacturing a product
- Production and Accounting must periodically compare standard costs with actual costs and then adjust the accounts for the inevitable differences



# The Production Planning Process

Three important principles for production planning:



# The SAP ERP Approach to Production Planning

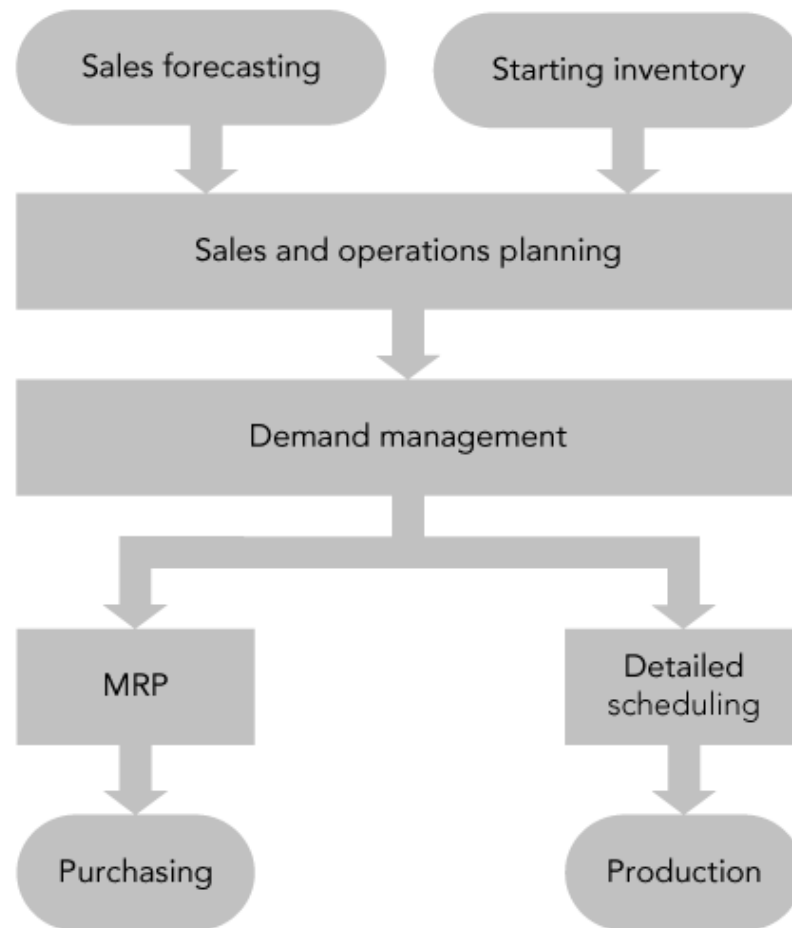


Figure 4-2 The production planning process



# Sales Forecasting

- SAP's ERP system takes an integrated approach
  - Whenever a sale is recorded in Sales and Distribution (SD) module, quantity sold is recorded as a consumption value for that material
- Simple forecasting technique
  - Use a prior period's sales and then adjust those figures for current conditions
- In SAP ERP, sales forecast can be made using:
  - Historical sales data from the Sales and Distribution (SD) module
  - Input from plans developed in Controlling (CO) module
- CO module
  - Profit goals for company can be set
  - Sales levels needed to meet the profit goals can be estimated

# Sales Forecasting – An example

Sales forecasting		Jan.	Feb.	March	April	May	June
Previous year (cases)		5734	5823	5884	6134	6587	6735
Promotion sales (cases)						300	300
Previous year base (cases)		5734	5823	5884	6134	6287	6435
Growth:	3.0%	172	175	177	184	189	193
Base projection (cases)		5906	5998	6061	6318	6476	6628
Promotion (cases)							500
Sales forecast (cases)		5906	5998	6061	6318	6476	7128

Fitter Snacker's sales forecast for January through June

To make a forecast for Fitter Snacker:

The previous year's sales data is used in combination with marketing initiatives to increase sales

Forecast: Historical Values

Historical values

Period	Val. fld	Corr.value	F	C
M 09/2011	6214	6214	<input type="checkbox"/>	<input type="checkbox"/>
M 08/2011	6326	6326	<input type="checkbox"/>	<input type="checkbox"/>
M 07/2011	6501	6501	<input type="checkbox"/>	<input type="checkbox"/>
M 06/2011	6434	6434	<input type="checkbox"/>	<input type="checkbox"/>
M 05/2011	6286	6286	<input type="checkbox"/>	<input type="checkbox"/>
M 04/2011	6133	6133	<input type="checkbox"/>	<input type="checkbox"/>
M 03/2011	5883	5883	<input type="checkbox"/>	<input type="checkbox"/>
M 02/2011	5822	5822	<input type="checkbox"/>	<input type="checkbox"/>

Forecasting


Correct

Sales provided from SD module

Field where planner can "correct" the sales value

- Historical sales screen allow planner to correct sales values
- Do not account for external factors, such as unusual weather
- Sales figures forecasting represent best estimate of demand

Figure 4-7 Historical sales figures in SAP

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Concepts in Enterprise Resource Planning, Fourth Edition

13

**Forecast: Model Selection**

**Periods**

☒ Period intervals

Forecast From 10/2011 To 10/2012

Historical data From 10/2006 To 09/2011

☐ No. of periods

No. of forecast periods 0

No. of historical values 60

**Forecast execution**

☐ Constant models ☐ Seasonal models

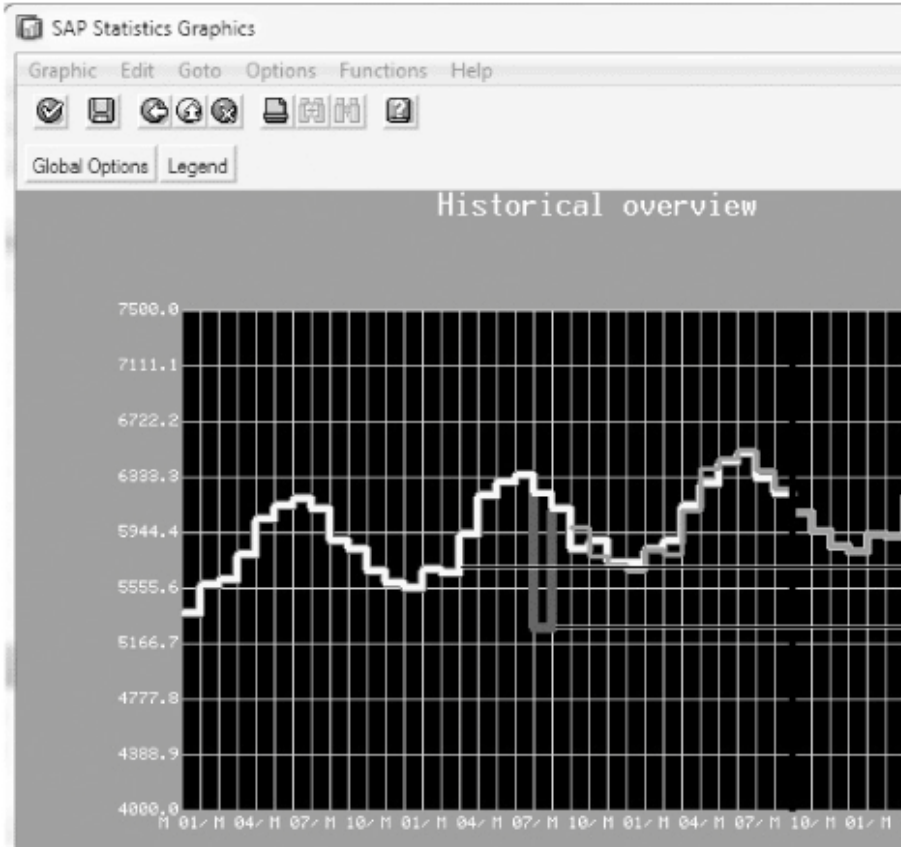
☐ Trend models ☐ Season. trend models

☒ Aut. model selection ☐ Historical

**Forecast parameters**

Profile SAP

Forecasting Historical... Forecast profile... Version... X



Forecasting model options in SAP ERP

Forecasting results presented graphically in SAP ERP

# Overview

Process of demand planning – derives a future demand program from past demand figures and begins with SOP

MPS -Independent requirements -

MRP - Net requirements calculation to determine whether a material shortage exists

## Planning: Overview

SAP

Logistics information system

Sales orders from Sales order Management – certain order by a certain date

LIS

Sales Operation Planning (SOP)

Sales

Demand Management

Material Reqmts Planning (MRP)

Production Execution

Production execution is the processing of manufacturing orders through to manufacturing

© SAP AG 2006

# Sales and Operations Planning

- Sales and operations planning (SOP)
  - Input: sales forecast provided by Marketing
  - Output: production plan designed to balance market demand with production capacity
    - Production plan is the input to the next step, demand management

## Fitter Snacker's sales and operations plan for January through June

Sales and operations planning		Dec.	Jan.	Feb.	March	April	May	June
1) Sales forecast			5906	5998	6061	6318	6476	7128
2) Production plan			5906	5998	6061	6318	6650	6950
3) Inventory		100	100	100	100	100	274	96
4) Working days			21	20	23	21	21	22
5) Capacity (shipping cases)			6999	6666	7666	6999	6999	7333
6) Utilization			84%	90%	79%	90%	95%	95%
7) NRG-A (cases)	70.0%		4134	4199	4243	4423	4655	4865
8) NRG-B (cases)	30.0%		1772	1799	1818	1895	1995	2085



# Sales and Operations Planning (cont'd.)

- **Rough-cut planning:** common term in manufacturing for aggregate planning
  - Disaggregated to generate detailed production schedules
- Once SAP ERP system generates a forecast, the planner can view the results graphically
- Rough-cut capacity planning applies simple capacity-estimating techniques to the production plan to see if the techniques are feasible

# Sales and operation plan with rough-cut capacity calculation in SAP ERP

**Change Rough-Cut Plan**

Characteristic

Prod.group/material: NRG Plant: PT

Version: A00 Active version Active

Planning table	Un	M 11/2011	M 12/2011	M 01/2012	M 02/2012	M 03/2012	M 04/2012	M 05/2012	M 06/2012
Sales	CS	6377	6417	6457	6497	6536	6576	6616	6656
Production	CS	6377	6417	6457	6497	6536	6576	6616	6656
Stock level	CS								
Target stock level	CS								
Days' supply	***								
Target days' supply	***								

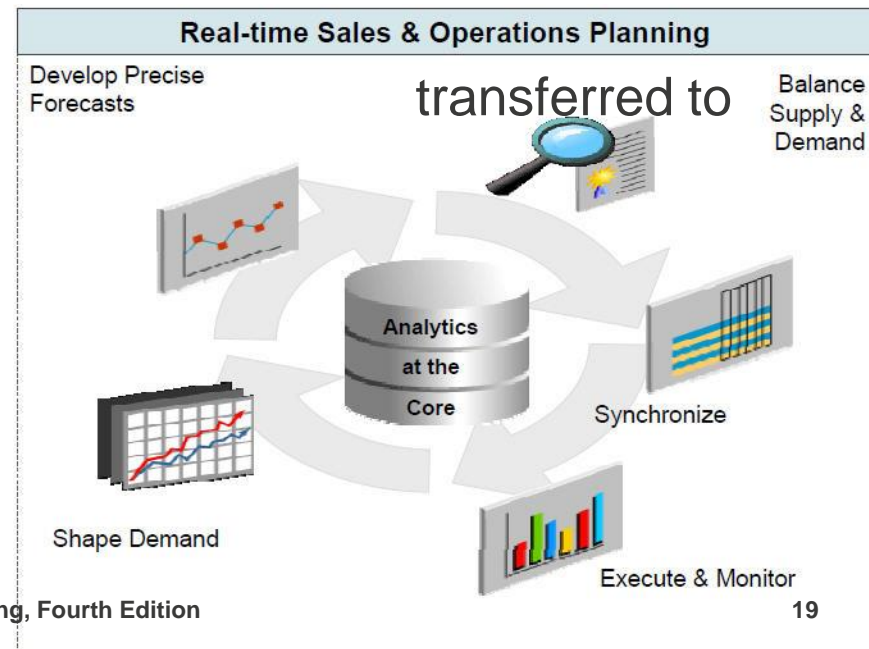
  

Resource load	Un	M 11/2011	M 12/2011	M 01/2012	M 02/2012	M 03/2012	M 04/2012	M 05/2012	M 06/2012
BAKELINE PT 001	***								
Available capacity	H	152	168	168	160	176	168	176	168
Capacity Reqmt	H	153	154	155	156	157	158	159	160
Capacity load	%	100	91	92	97	89	93	90	95

Caution: overload in period M 11/2011

# Sales and Operations Planning (cont'd.)

- Disaggregating the sales and operations plan
  - Companies typically develop sales and operations plans for product groups
  - SAP ERP system allows any number of products to be assigned to a product group
  - Sales and operation plan disaggregated
    - Production plan quantities specified for the group are the individual products that make up the group



# Product group structure in SAP ERP

Product groups Edit Goto Extras System Help

Display Product Group: Members (Materials)

Hierarchy graphic Versions... Master data... Product grp. graphic

Product group NRG GROUP NRG-A and NRG-B Group

Plant PT Fitter Snacker Plant

Base Unit CS

Member number	Plnt	Unit conv. Short Text	Aggr.fact.	Proportion	UoM MTyp	V M Fx
F100	PT	1	1	70	CS	<input type="checkbox"/>
		NRG-A			FERT	
F110	PT	1	1	30	CS	<input type="checkbox"/>
		NRG-B			FERT	

NRG group consists of 70% NRG-A bars and 30% NRG-B bars

# Stock/Requirements List (for NRG-A bars) after disaggregation

Stock/Requirements List as of 22:28 hrs

Show Overview Tree

Material: F100 NRG-A  
Plant: PT MRP type: PD Material Type: FERT Unit: CS

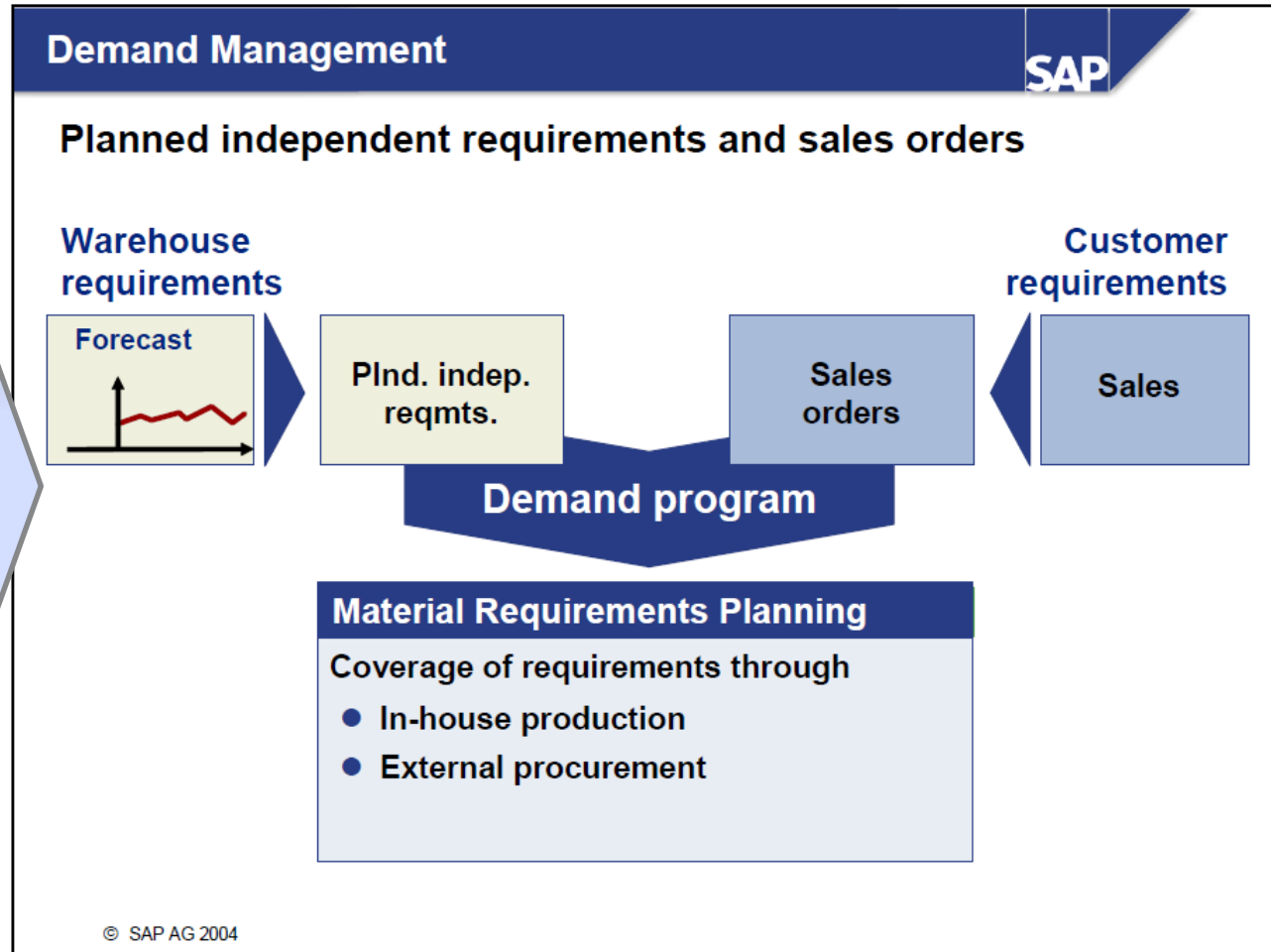
A...	Date	MRP ...	MRP element data	Reschedul...	E...	Receipt/Reqmt	Available Qty
	10/25/2011	Stock					389
	11/01/2011	IndReq	VSF			4,464-	4,075-
	12/01/2011	IndReq	VSF			4,492-	8,567-
	01/02/2012	IndReq	VSF			4,520-	13,087-
	02/01/2012	IndReq	VSF			4,548-	17,635-
	03/01/2012	IndReq	VSF			4,575-	22,210-
	04/02/2012	IndReq	VSF			4,603-	26,813-
	05/01/2012	IndReq	VSF			4,631-	31,444-
	06/01/2012	IndReq	VSF			4,659-	36,103-
	07/02/2012	IndReq	VSF			4,687-	40,790-
	08/01/2012	IndReq	VSF			4,715-	45,505-
	09/04/2012	IndReq	VSF			4,743-	50,248-
	10/01/2012	IndReq	VSF			4,771-	55,019-

Anticipated demand for NRG-A bars from sales and operations plan

# Demand Management

DM creates a forecast of market demand for the products you sell. Forecast is based on customer contracts, planned sales orders and other demands.

Planned independent requirements are warehouse requirements. Eg in make to stock you initiate the purchase of materials without waiting for sales orders



# Demand Management

- Links the sales and operations planning process with detailed scheduling and materials requirements planning processes
- Output: **master production schedule (MPS)**
  - Production plan for all finished goods
- For Fitter Snacker, MPS is an input to detailed scheduling, which determines what bars to make and when to make them

# Demand Management - Example

	Week 1	Week 2	Week 3	Week 4	Week 5	
Demand management	1/3–1/7	1/10–1/14	1/17–1/21	1/24–1/28	1/31	2/1–2/4
Monthly demand NRG-A	4134	4134	4134	4134	4134	4199
NRG-B	1772	1772	1772	1772	1772	1799
Working days in week	5	5	5	5	1	4
Working days in month	21	21	21	21	21	20
MPS NRG-A	984	984	984	984	1037	
Weekly demand NRG-B	422	422	422	422	444	

Demand management	Jan 3	Jan 4	Jan 5	Jan 6	Jan 7
Monthly Demand NRG-A	4134	4134	4134	4134	4134
NRG-B	1772	1772	1772	1772	1772
Working days in month	21	21	21	21	21
MPS NRG-A	197	197	197	197	197
Daily demand NRG-B	84	84	84	84	84

Fitter Snacker's production plan for January: The first five weeks of production are followed by a day-by-day disaggregation of week 1



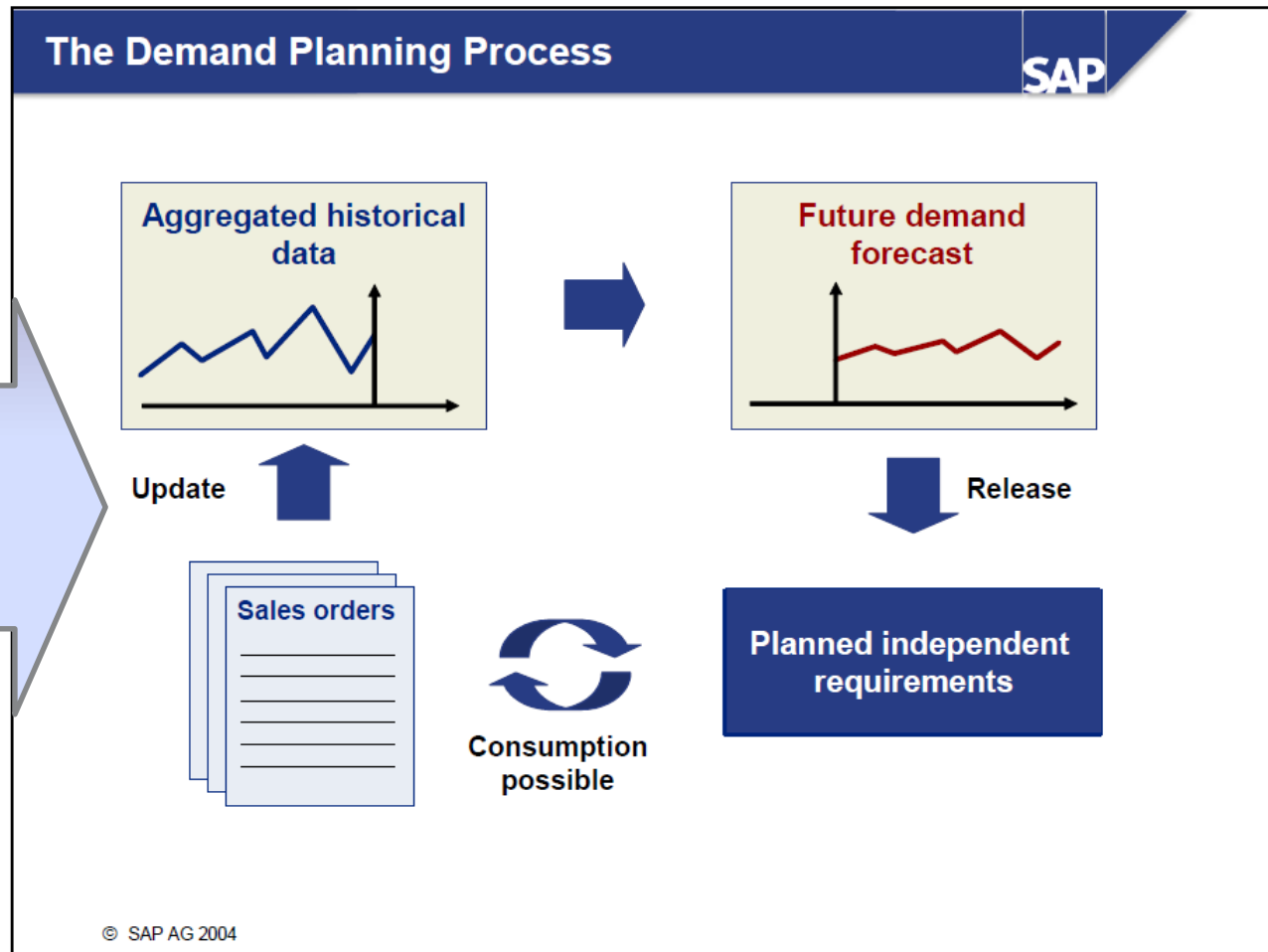
# Demand Planning Process

Past sales order quantities form a basis for the forecasting of future demands.

One off events such as trade fairs can be included in the forecast.

The demand plan is released as a planned independent requirement.

These form the basis for purchasing and production planning.



# Materials Requirements Planning (MRP)

- Determines required quantity and timing of the production or purchase of subassemblies and raw materials needed to support MPS
- **Bill of material (BOM):** list of the materials (including quantities) needed to make a product

Eg: The bill of material (BOM) for Fitter Snacker's NRG bars

Ingredient	Quantity	
	NRG-A	NRG-B
Oats (lb.)	300	250
Wheat germ (lb.)	50	50
Cinnamon (lb.)	5	5
Nutmeg (lb.)	2	2
Cloves (lb.)	1	1
Honey (gal.)	10	10
Canola oil (gal.)	7	7
Vit./min. powder (lb.)	5	5
Carob chips (lb.)	50	
Raisins (lb.)	50	
Protein powder (lb.)		50
Hazelnuts (lb.)		30
Dates (lb.)		70

# Materials Requirements Planning (MRP) (cont'd.)

so the lead time is the time it takes from the time we place an order on our supplier how long it takes to actually receive those materials back all right so if I place an order today to get to purchase some

- Lead times and lot sizing
  - **Lead time:** cumulative time required for the supplier to receive and process the order, take the material out of stock, package it, load it on a truck, and deliver it to the manufacturer
  - **Lot sizing:** determining production quantities and order quantities when we make this particular product or when we order this product what quantity do we order or make it in
- **MRP record:** standard way of viewing the MRP process on paper

# Materials Requirements Planning (MRP) - Example


Textbook 119-121 talks about the interpretation of this report

Oats    Lead time = 2 weeks		Week 1	Week 2	Week 3	Week 4	Week 5
MPS (cases)	NRG-A	984	984	984	984	1037
	NRG-B	422	422	422	422	444
MPS (500 lb. batches)	NRG-A	142	142	142	142	149
	NRG-B	61	61	61	61	64
Gross requirements (lb)		57,850	57,850	57,850	57,850	60,700
Scheduled receipts		44,000	44,000			
Planned receipts				88,000	44,000	44,000
On hand	29,650	15,800	1,950	32,100	18,250	1,550
Planned orders		88,000	44,000	44,000		

Figure 4-17 The MRP record for oats in NRG bars, weeks 1 through 5

# Materials Requirements Planning in SAP ERP

- MRP process creates planned orders to meet dependent requirements
- The main purposes of an MRP system are:
  - Control inventory levels : “order the right quantity of the right part at the right time”.
  - Assign the correct priorities to items.
  - Plan the capacity.
- Stock/Requirements List shows:
  - Planned orders
  - Purchase requisitions (PurRqs)
  - Purchase orders (POitem)



The output of MRP is either a *planned (production) order* or a *purchase order/requisition*.

MRP List as of 01/03/2011, 21:31 hrs

Show Overview Tree

Material: R380 Oats  
Plant: PT MRP type: PD Material Type: ROH Unit: LB

A..	Date	MRP ...	MRP element data	Reschedul...	E.. Receipt/Reqmt	Available Qty
	01/03/2011	Stock				29,650
	01/07/2011	POItem	4500000002/00010		44,000	73,650
	01/07/2011	DepReq	S200		57,850-	15,800
	01/14/2011	POItem	4500000003/00010		44,000	
	01/14/2011	DepReq	S200		57,850	
	01/21/2011	PldOrd	0000005269/STPO		88,000	
	01/21/2011	DepReq	S200		57,850	
	01/28/2011	PldOrd	0000005270/STPO		44,000	
	01/28/2011	DepReq	S200		57,850	
	02/04/2011	PldOrd	0000005271/STPO		44,000	
	02/04/2011	DepReq	S200		60,700	

The MRP list in SAP ERP

Stock/Requirements List as of 21:33 hrs

Show Overview Tree

Material: R380 Oats  
Plant: PT MRP type: PD Material Type: ROH Unit: LB

A..	Date	MRP ...	MRP element data	Reschedul...	E.. Receipt/Reqmt	Available Qty
	01/03/2011	Stock				29,650
	01/07/2011	POItem	4500000002/00010		44,000	73,650
	01/07/2011	DepReq	S200		57,850-	15,800
	01/14/2011	POItem	4500000003/00010		44,000	59,800
	01/14/2011	DepReq	S200		57,850-	1,950
	01/21/2011	PurQrs	0010000013/00010 *		88,000	89,950
	01/21/2011	DepReq	S200		57,850-	32,100
	01/28/2011	PldOrd	0000005270/STPO		44,000	76,100
	01/28/2011	DepReq	S200		57,850-	18,250
	02/04/2011	PldOrd	0000005271/STPO		44,000	62,250
	02/04/2011	DepReq	S200		60,700-	1,550

The Stock/Requirements List in SAP ERP

# Materials Requirements Planning in SAP ERP

- Planner can convert a planned order to a purchase order from Stock/Requirements List by double-clicking the planned order line

Additional Data for MRP Element

Plnd order	0000005270	External proc.	Order finish	01/28/2011	GR ProcTme	0
Order qty	44,000	LB	Order start	01/22/2011	Proc. type	F
Scrap	0		Planned opening	01/20/2011	Order type	NB

Buttons: [Check] [Go] [Edit] [Add] [-> Pur.req.] [Print] [Close]

Planned order release and receipt dates

Option to convert planned order to purchase requisition

Conversion of a planned order to a requisition

# Materials Requirements Planning in SAP ERP (cont'd.)

- Integrated information system allows Purchasing to make the best decision on a vendor based on relevant, up-to-date information
- Once Purchasing employee decides which vendor to use, the purchase order is transmitted to vendor
  - System can be configured to fax order to vendor, transmit it electronically through EDI (electronic data interchange), or send it over the Internet



# Source Overview screen for supplier selection

Source Overview for Item 00010

Material: R380 Oats

Quantity: 44,000 LB

Vendor	Name	Info/agmt.	Item	Net price	Crcy	Realistic D...	POrg	Pln
100000	Climax Cereals	5300002200		0.20	USD	11/04/2011	00PR	00:
100100	Grand Rapids	5300002300		0.20	USD	11/04/2011	00PR	00:
100200	Oshtemo Oats	5300002400		0.20	USD	11/04/2011	00PR	00:

Options to evaluate vendors

☒ Source of supply ☒ Vendor ☒ Price simulation ☒ Price simulation/all ☒ Vendor eval.

# MRP system inputs/outputs

In the MRP there are three major inputs:

- **Inventory status**

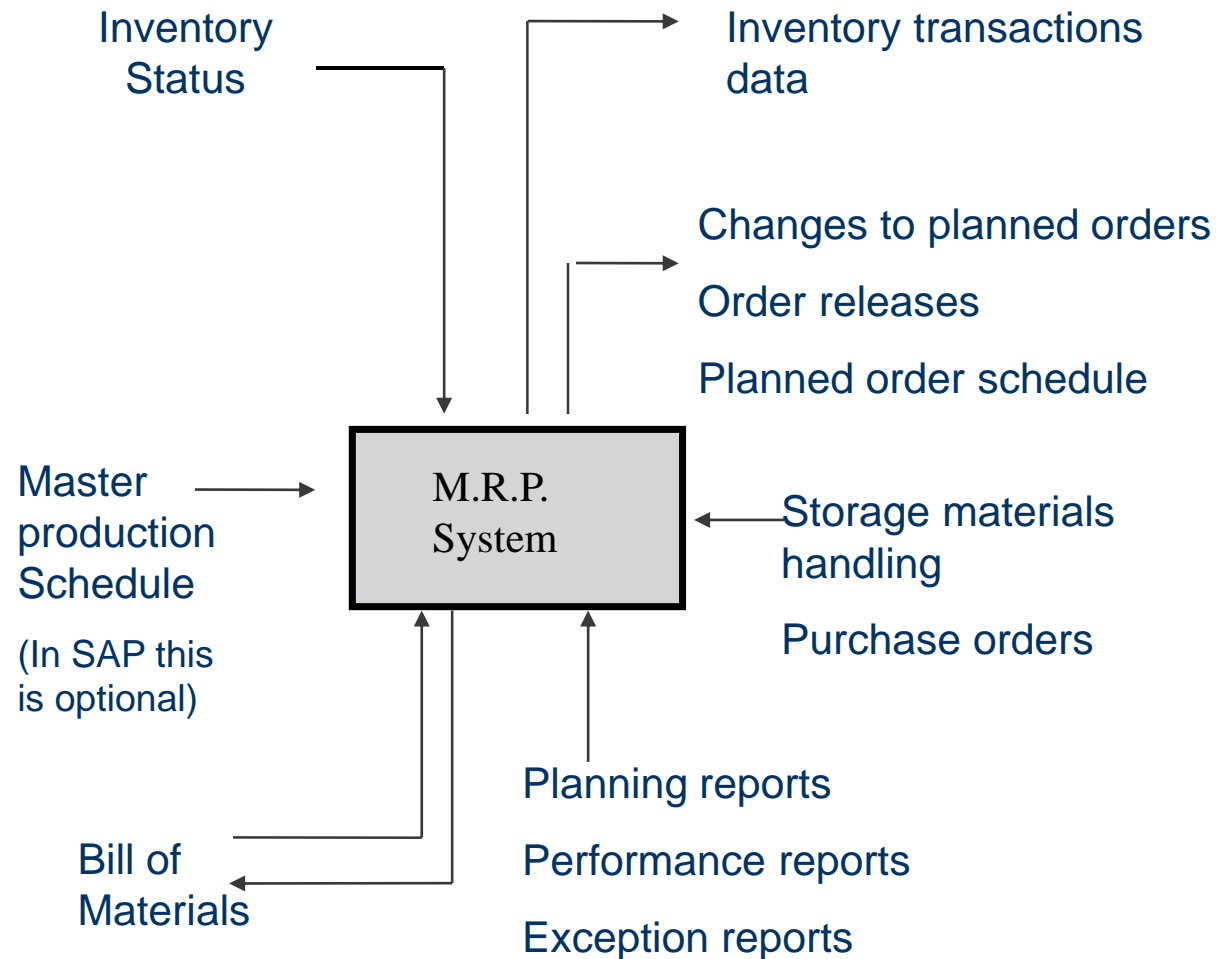
Stock of materials used in production. It is updated as stock is received from vendors and as stock is sent out to manufacture the final product

- **MPS**

Provides a diary showing which jobs will be done, the order in which they will be done, which work group or machine will do the work and when each job should start and end.

- **BOM**

Is a listing of all components, including partially assembled pieces and basic parts that make up an end product



# Detailed Scheduling

Detailed plan of what is to be produced, considering capacity and available labor

One key decision in detailed production scheduling:

- How long to make the production runs for each product

Production run length requires a balance between setup costs and holding costs to minimize total costs to the company

- Production runs should be decided by evaluating the cost of equipment setup and holding inventory

**Integrated information system simplifies this analysis**

- Automatically collects accounting information that allows managers to better evaluate schedule trade-offs in terms of costs to company



# Detailed Scheduling (cont'd.)

- Fitter Snacker uses repetitive manufacturing
- Repetitive manufacturing environments usually involve production lines that are switched from one product to another similar product

- Production lines are scheduled for a period of time, rather than for a specific number of items

**Planning Table for Repetitive Manufacturing: Change Mode**

	Un	Due	TU 11/01...	WE 11/0...	TH 11/03...	FR 11/04...	SA 11/05...	SU 11/06...	MO 11/0...	TU 11/08...	WE 11/0...
<b>Total Capacity Data</b>											
REPBKAKE /001 Repetitiv..	%		90.090	90.090	90.090	96.153	90.090	90.090	90.090	90.090	
Required - Repetitive Ba..	%		8	8	8	8	8	8	8	8	
Available- Repetitive Bak..	%		8	8	8	8	8	8	8	8	8
<b>Material Data</b>											
F100 NRG-A	***										
Available Quantity	CS	37	37	337	637	937	1087	1087	1087	1087	1087
Tot. Requirements	CS										
0001 REPBKAKE	CS		300	300	300	150					
Not Assigned	CS										
F110 NRG-B	***										
Available Quantity	CS	153	153	153	153	153	303	603	903	1203	1503
Tot. Requirements	CS										
0001 REPBKAKE	CS					150	300	300	300	300	
Not Assigned	CS										

# Providing Production Data to Accounting

- In the manufacturing plant, ERP packages do not directly connect with production machines
- Data can be entered into SAP ERP through a PC on the shop floor, scanned by a barcode reader or radio frequency identification (RFID) technology, or a mobile device
- In an integrated ERP system, the accounting impact of a material transaction can be recorded automatically

# Providing Production Data to Accounting (cont'd.)

- Once FS accepts shipment, Receiving must notify SAP ERP system of the arrival and acceptance of the material
  - Goods receipt transaction
- Receiving department must match goods receipt with purchase order that initiated it
- When receipt is successfully recorded, SAP ERP system immediately records the increase in inventory levels for the material

# Providing Production Data to Accounting (cont'd.)

The screenshot displays the SAP 'Goods Receipt Purchase Order' interface. The title bar shows 'Goods Receipt Purchase Order 4500000003 - Bret Wagner'. The left sidebar contains a 'My Documents' tree with 'Purchase Orders' (4500000003), 'Material Documents' (5000000001, 5000000000), and 'Held Data' (Blank). The main area has tabs for 'General', 'Vendor', 'Material', 'Quantity', 'Where', 'Purchase Order Data', and 'Partner'. The 'General' tab is active, showing fields for 'Document Date' (10/25/2011), 'Posting Date' (10/25/2011), 'Delivery Note', 'Bill of Lading', 'Vendor' (Oshtemo Oats), and 'HeaderText'. Below these is a table with one line item:

Line	Mat. Short Text	OK	Qty in UnE	E...	SLoc	Batch	Valu
1	Oats	<input checked="" type="checkbox"/>	44,000	LB	Raw Materials		

The 'Material' tab is also visible, showing fields for 'Material' (Oats), 'Vendor Material No.', 'Material Group' (MANTU), and 'R380'. The SAP logo is at the bottom right.

Figure 4-23 Goods receipt screen in SAP ERP  
Concepts in Enterprise Resource Planning, Fourth Edition

# ERP and Suppliers

- Fitter Snacker is part of a supply chain
  - Starts with farmers growing oats and wheat
  - Ends with a customer buying an NRG bar from a retail store
- ERP systems can play a key role in collaborative planning



# ERP and Suppliers (cont'd.)

- Working with suppliers in a collaborative fashion requires trust among all parties
  - Company opens its records to its suppliers
  - Suppliers can read company's data because of common data formats
- Advantages
  - Reductions in paperwork
  - Savings in time
  - Other efficiency improvements

# The Traditional Supply Chain

- **Supply chain:** all activities that occur between the growing or mining of raw materials and the appearance of finished products on the store shelf
- Traditional supply chain
  - Information is passed through the supply chain reactively as participants increase their product orders
  - Inherent time lags cause problems

# The Traditional Supply Chain (cont'd.)

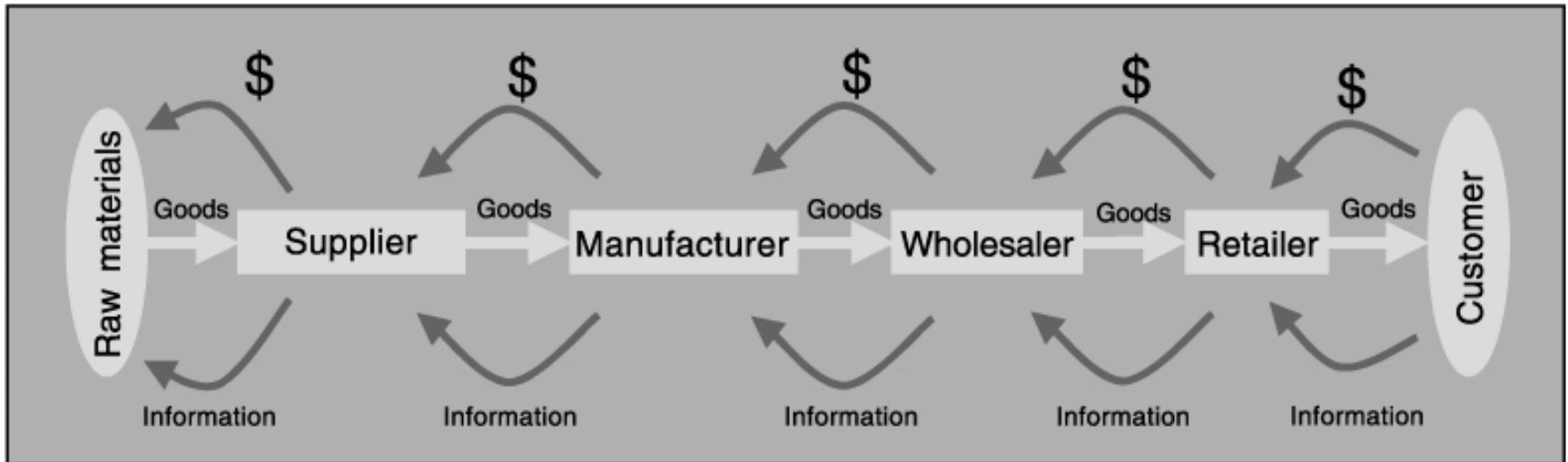
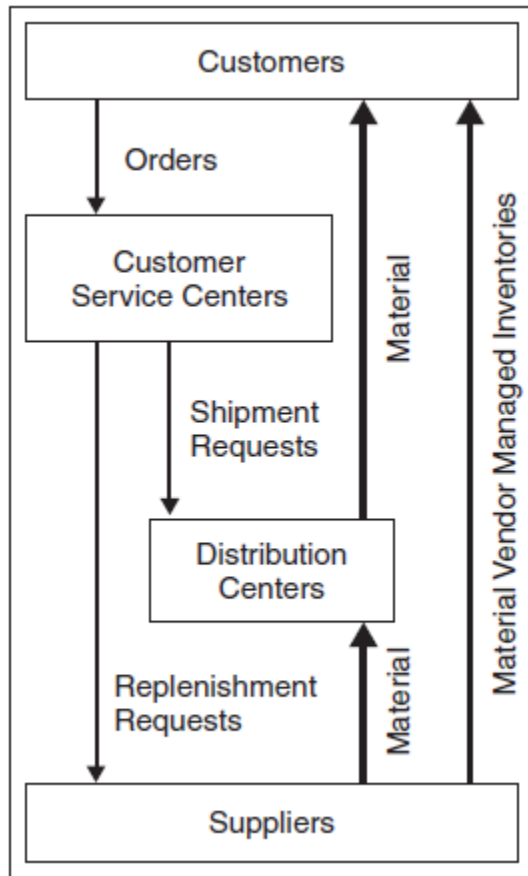


Figure 4-24 Supply chain management (SCM) from raw materials to consumer

# The Traditional Supply Chain (cont'd.)

- EDI and ERP
  - Before ERP systems were available, companies could be linked with customers and suppliers through electronic data interchange (EDI) systems
  - Well-developed ERP system can facilitate SCM
    - Needed production planning and purchasing systems already in place
  - With ERP system, sharing production plans along the supply chain can occur in real time

# Supply Chain Management



According to the *Council of Supply Chain Management Professionals (CSCMP)* definition:

Supply chain management ... “encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.”

Collaboration in Supply Chain Information. Source: Sanjay Jain, Supply Chain Management Tradeoffs Analysis, in *Proceedings of the 2004 Winter Simulation Conference*, R. G. Ingalls, M. D. Rossetti, J. S. Smith, and B. A. Peters, eds.

# ERP System and Supply Chain

- Traditionally SCM (Supply Chain Management) was not part of ERP because the domain of SCM was to link the company with external partners, whereas the focus of ERP was mainly on the internal functions of the company.
- A fully-integrated ERP system may include both CRM and SCM that provide an efficient and flexible operational environment between the company and its business partners, suppliers, distributors, customers and other stakeholders.
- SCM provides a link for services, materials, and information across the value chain of the organisation. They may include procurement, outsourcing, manufacturing flow management, order fulfilment, forecasting, etc.
- The SCM strategy must be aligned with the corporate strategy of the organization.
- A strong SCM implementation is necessary for e-Business.

# Benefits of Enterprise Application Integration

- The integration of applications is compelled by the Internet and the need to connect the different parties within the supply chain.
- EAI provides advantages through uniting disparate applications, reducing redundant data entry, merging diverse data sets, and reducing transaction costs.
- Benefits:
  - *Increased efficiency*
  - *Value of information* – redundant databases are aligned
  - *Lower costs* – lowers the cost of upgrades, etc
  - *Increased productivity*
  - *Improved customer service*
  - *Enhanced access* – EAI increases the ability to extend applications to more users from anywhere and anytime

# The Measures of Success

- Performance measurements
  - **Metrics**
  - Show the effects of better supply chain management
- **Cash-to-cash cycle time**
  - Time between paying for raw materials and collecting cash from customer
- SCM costs
  - Include cost of buying and handling inventory, processing orders, and information systems support



# The Measures of Success (cont'd.)

- **Initial fill rate**
  - Percentage of the order that the supplier provided in the first shipment
- **Initial order lead time**
  - Time needed for the supplier to fill the order
- **On-time performance**
  - If supplier agreed to requested delivery dates, tracks how often supplier actually met those dates

# Summary

- ERP system can improve the efficiency of production and purchasing processes
  - Efficiency begins with Marketing sharing a sales forecast
  - Production plan is created based on sales forecast and shared with Purchasing so raw materials can be ordered properly
- Companies can do production planning without an ERP system, but an ERP system increases company's efficiency
  - ERP system that contains materials requirements planning allows Production to be linked to Purchasing and Accounting
  - This data sharing increases a company's overall efficiency

# Summary (cont'd.)

- The successful integration of these processes together with process optimisation enable organisations to obtain value by:
  - increasing customer satisfaction,
  - increasing productivity and
  - decreasing overall operating costs
- Companies are building on their ERP systems and integrated systems philosophy to practice supply chain management (SCM)
  - SCM: company looks at itself as part of a larger process that includes customers and suppliers
  - Using information more efficiently along the entire chain can result in significant cost savings
  - Complexity of the global supply chain
    - Developing a planning system that effectively coordinates information technology and people is a considerable challenge

# End of Lecture 5

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## References:

- Ellen Monk, Bret Wagner. (2013). Concepts in Enterprise Resource Planning. (4e) Course Technology, Cengage Learning. Chapter 4
- Motiwalla, L. & Thompson, J. (2015). Enterprise systems for management. (2e) Pearson. Chapter 11