



Universidad de Oviedo



# Software Architecture and Enterprise



SOFTWARE  
ARCHITECTURE

Course 2018/2019

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# Enterprise Architectures

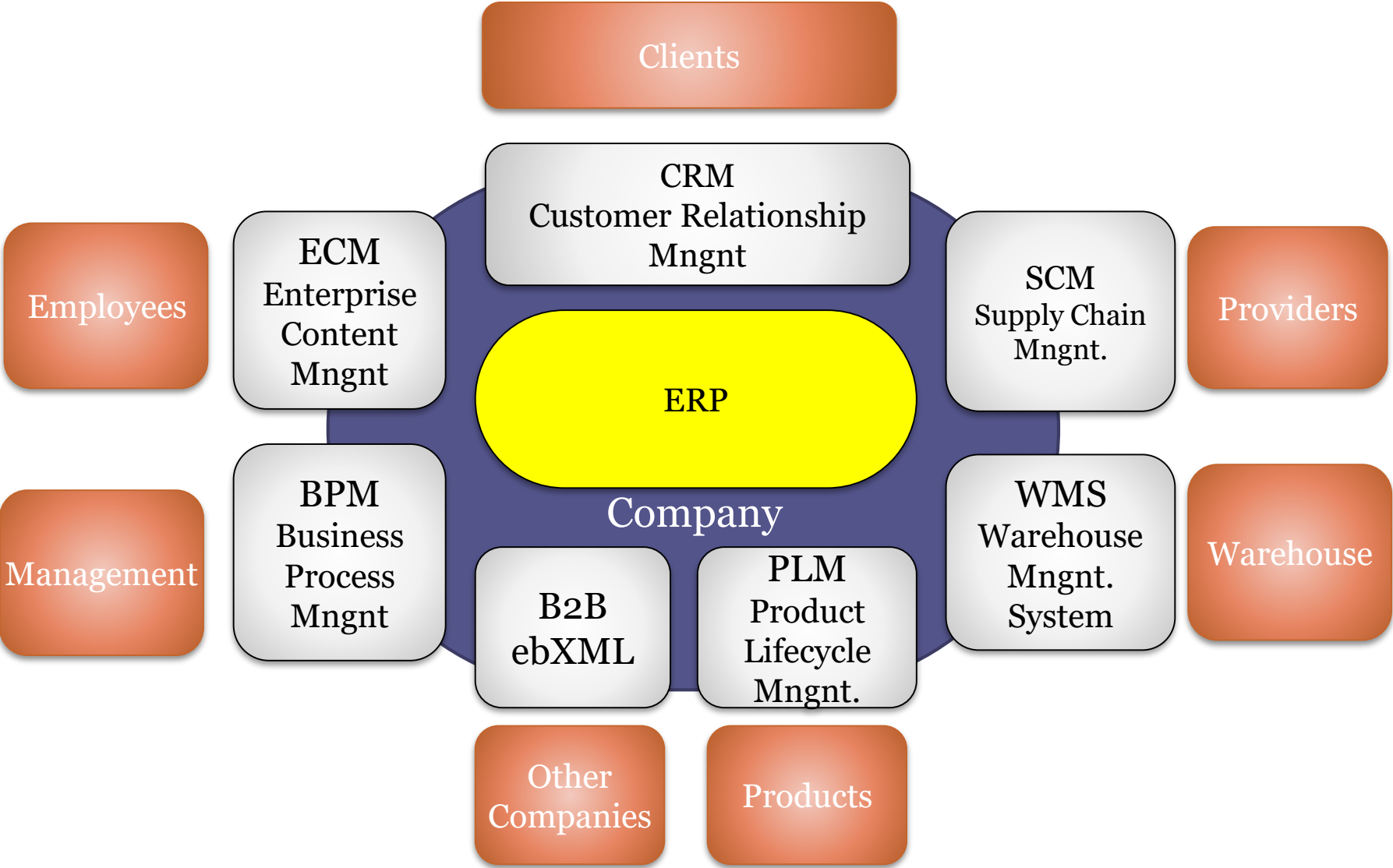
## Information Systems

### System Classification:

CRM, ERP, SCM, ECM, PLM, EAI...



# Enterprise information systems



# ERP

## ERP (Enterprise Resource Planning)

Appeared at the end 90s

2000 year increased its adoption

Enterprise Technological Structure

Central data base

Real time access

Centralized management of production, logistics, inventory, accounting, billing...

# ERP

## Advantages

Performance and quality

Reuse established  
business best  
practices

Process continuity

Information uniformity

Concept of unique and  
single data

Continuous

technological update

Decision-making support

## Challenges

Complexity:

Customization, Deployment,  
Training, etc.

Involve people

Adapt existing processes

Overestimate software  
benefits

Too much dependency on  
some specific software

High costs to change to other  
software

Adapting existing processes  
to provided processes

# ERP

## Applications

### SAP R/3

- 3 layers client/server architecture

- Based on a domain-specific language: ABAP

  - ABAP: Advanced Business Application Programming

- SAP = biggest european software company

### Other systems:

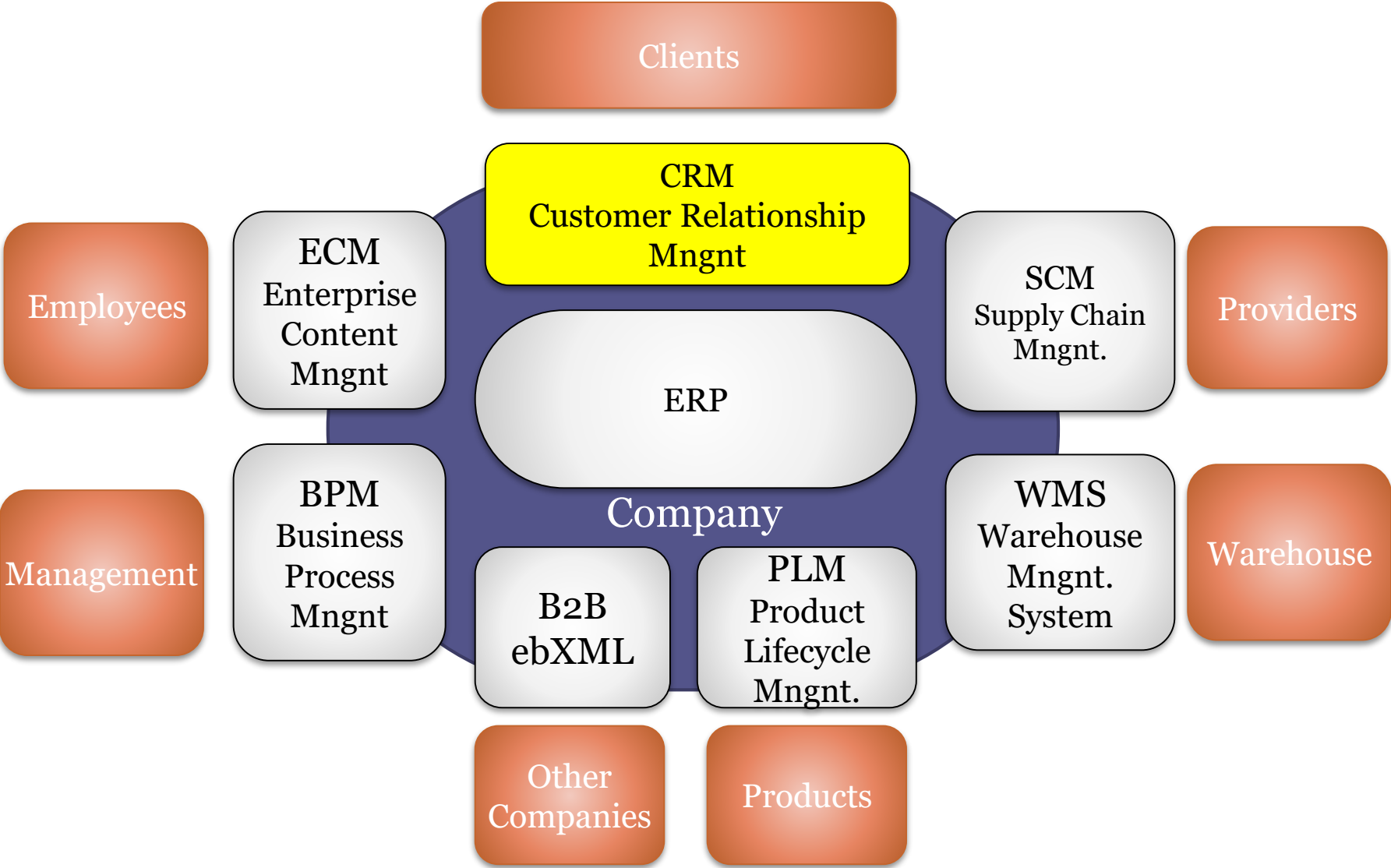
- Comercial:

  - Oracle Fusion, Microsoft Dynamics NAV, SAGE, ...

- Open source:

  - OpenERP, webERP, ...

# Enterprise information systems



# CRM - Customer Relationship Management

## CRM - Customer Relationship Management

Manage relationships between Company and clients

Client lifecycle

Acquisition - Improve - Retain

Manages interactions with current and future clients

Involves:

Sales

*Marketing*

Client service

*Call-centers*

Technical support





# CRM - Customer Relationship Management

## Advantages

Helps identify best clients

Adapt products to client needs

Anticipate needs

Keeps track of client's contacts

## Challenges

Client satisfaction

Labor cost reduction

Geographical and temporal diversity

Profile management and privacy

Social client and user communities

Combination with social networks (twitter, facebook,...)

Product reviews (Amazon, Booking,...)



# CRM - Customer Relationship Management

## Applications

Lots of CRM are integrated with ERP systems

SAP, Oracle, Microsoft CRM

Others:

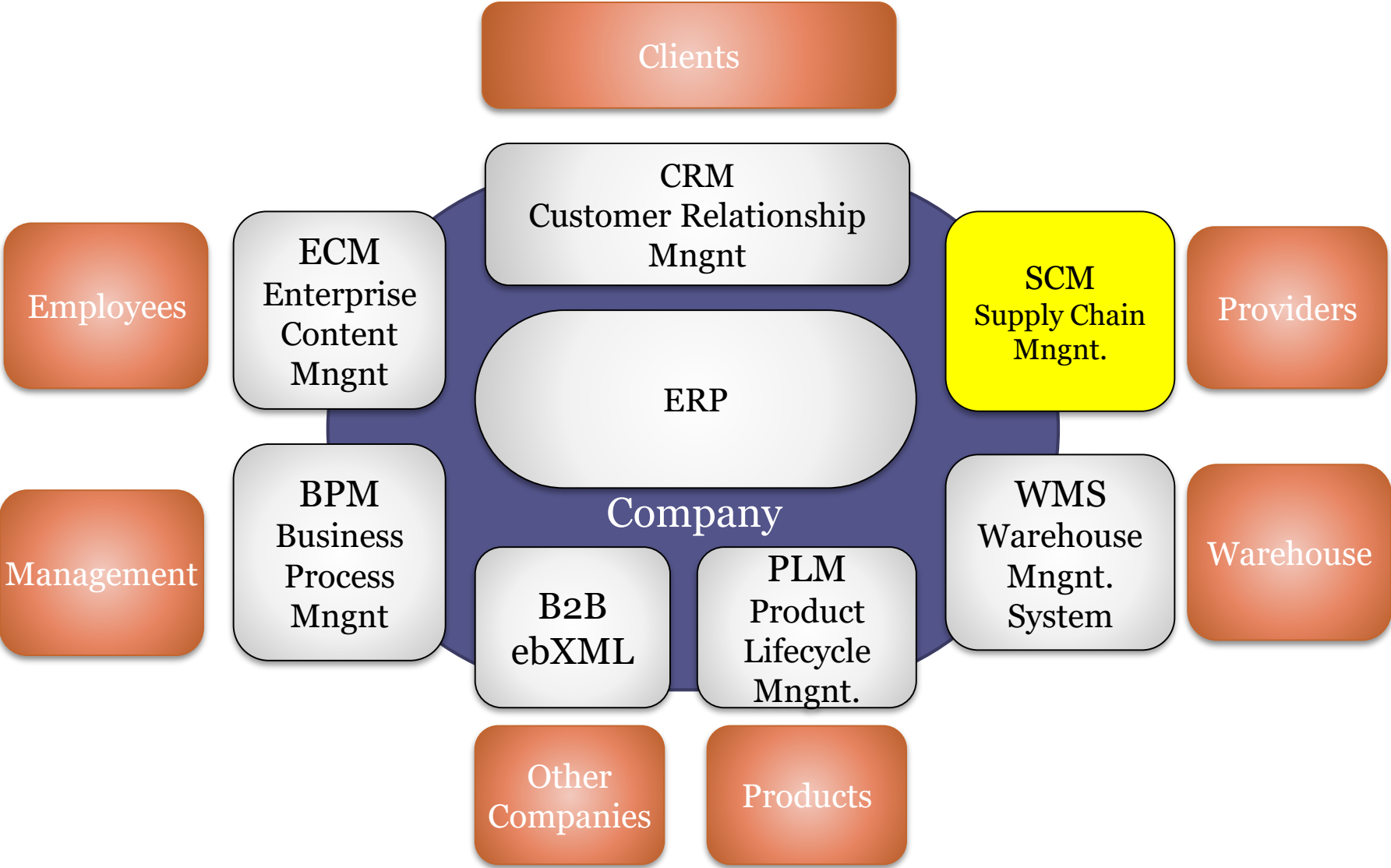
Salesforce.com

webCRM

...



# Enterprise information systems



# SCM - Supply Chain Management

## SCM - Supply Chain Management

Processing client requirements

Purchase orders management

Inventory management

Goods reception and storage

Supplies and stocks management



# SCM - Supply Chain Management

## Advantages

Forecast future demands

Inventory control

Improve business relationships

Feedback and state of each element in supply chain

## Challenges

Planning

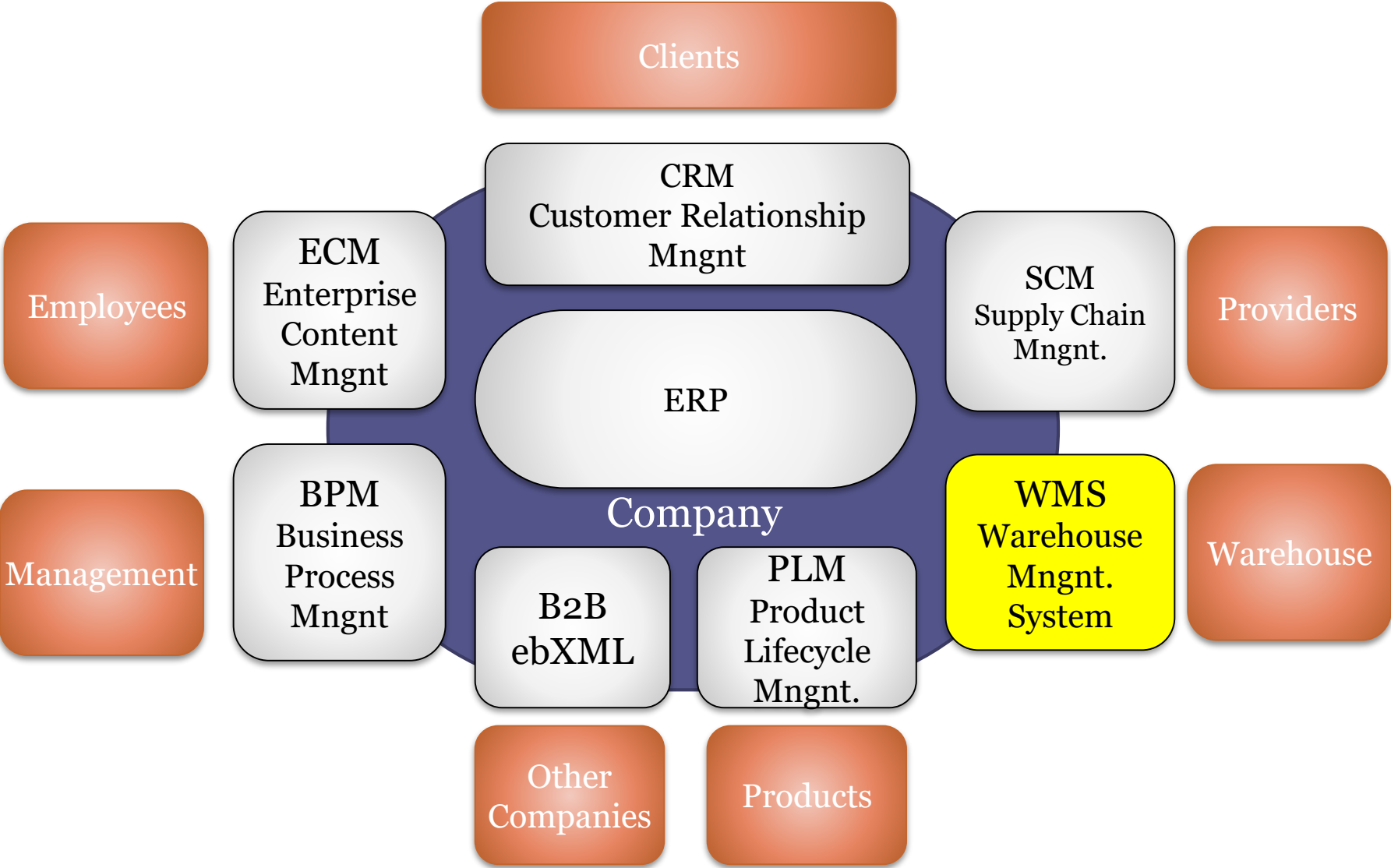
Lack of knowledge

Inaccurate forecasting demands

Lack of collaboration



# Enterprise information systems



# WMS - Warehouse Management Software

## Warehouse Management Software

Product control in warehouses

Technology for identifying products

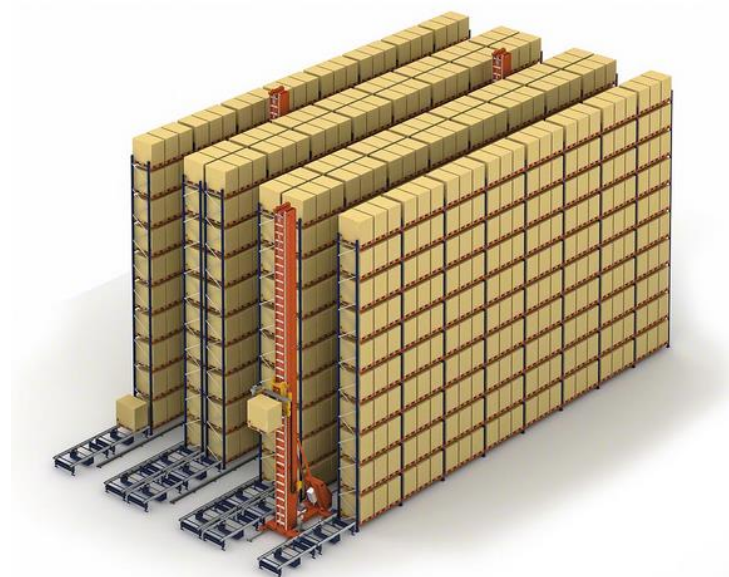
Picking, barcode scanners, RFID, etc.

Automated warehouses

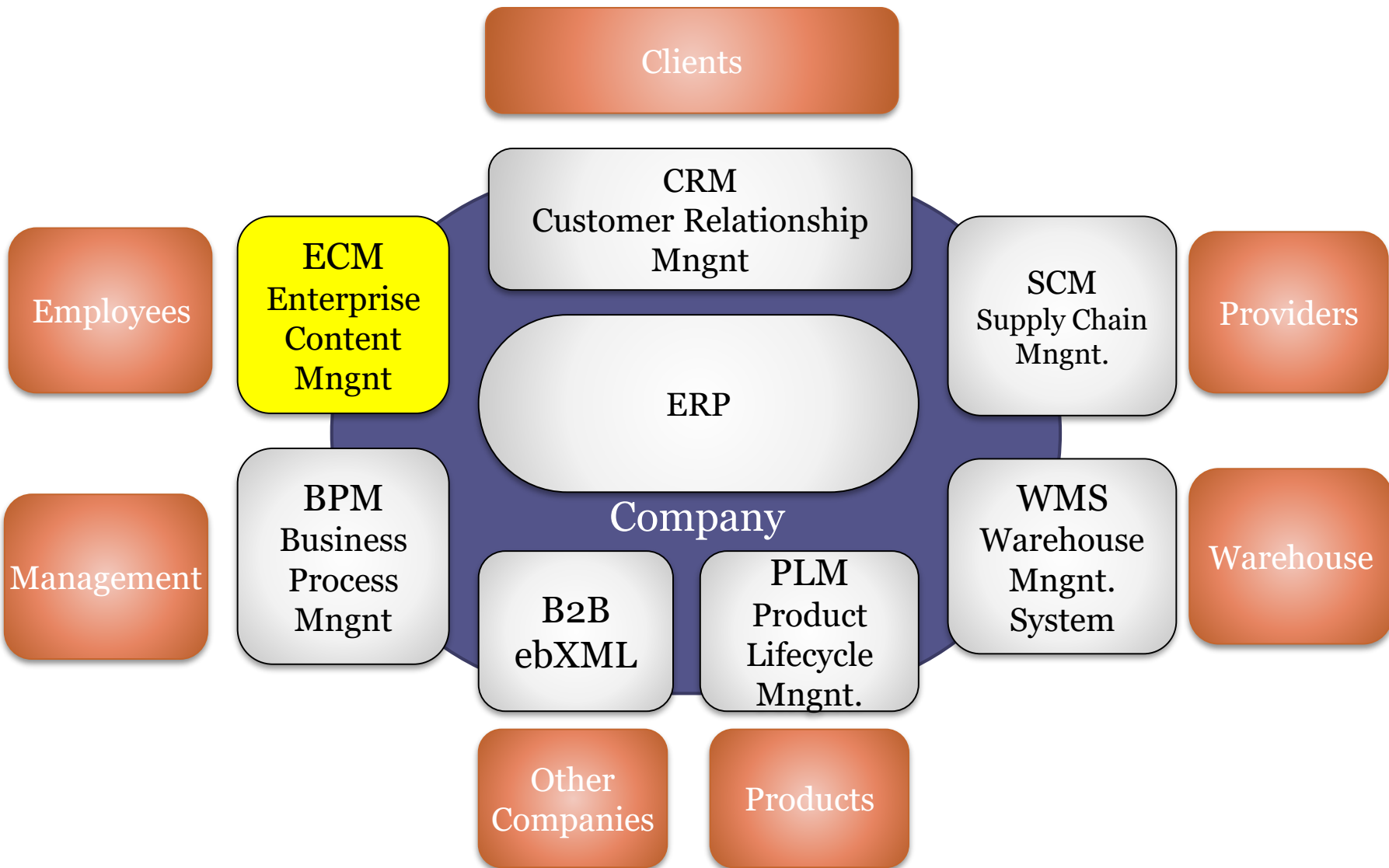
Stacker cranes, *miniloads*

Examples:

Mecalux EasyWMS



# Enterprise information systems





# ECM - Enterprise Content Management

Goal: Paperless office

Became popular in 2006

# ECM - Enterprise Content Management Components

## Capture and recognition

- Scan and obtain documents

- Character recognition: OCR, HCR, etc.

## Management:

- Document indexing

## Storage

- Document management

## Maintenance

- Security copies, archive, etc.

## Sending

- Transformation and publishing

# ECM - Enterprise Content Management Systems

Microsoft Sharepoint

Oracle Content Management

EMC Documentum

Open source

Alfresco

LogicaDOC

Plone

...

# ECM - Enterprise Content Management

## Knowledge Management

Combines unstructured information sources

## Groupware

Software for collaborative working groups

Example: Lotus Notes

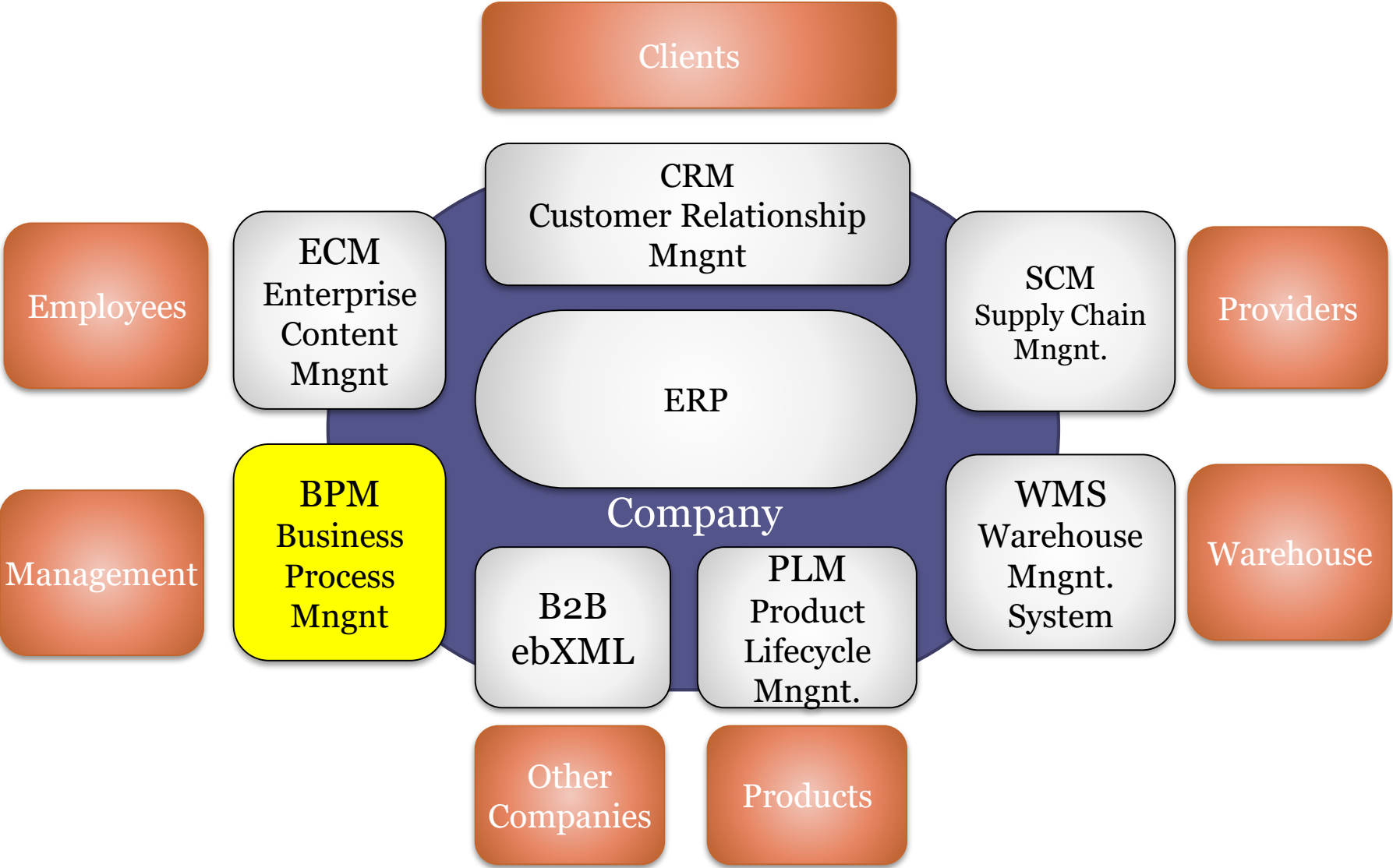
Enterprise Wikis

Example: Confluence

## Document manager

Examples: LogicalDOC, Ricoh

# Enterprise information systems



# BPM - Business Process Management

Business process:

Set of procedures or activities with a business goal

*Workflow:*

Business workflow automation

BPM:

Business process lifecycle management through workflows

# BPM - Business Process Management

Decision support systems

BI: Business Intelligence

Report creation

Data mining

Predictions and decision support

# BPM - Business Process Management

OLAP (Online Analytical Processing) tools

Multidimensional analysis (OLAP Cube)

Enables to do operations

Sums, averages, etc. over groups of data

Solutions:

Microsoft, Oracle Business Objects,...



# BPM - Business Process Management

Operational intelligence

Real-time monitoring

Balanced scorecard

Graphical visualizations of different metrics

Complex event processing

# BPM - Business Process Management

## Notations

### BPMN (*Business Process Model and Notation*)

Visual notation defined by OMG

Represents business processes

More oriented to business people

### BPEL (*Business Process Execution Language*)

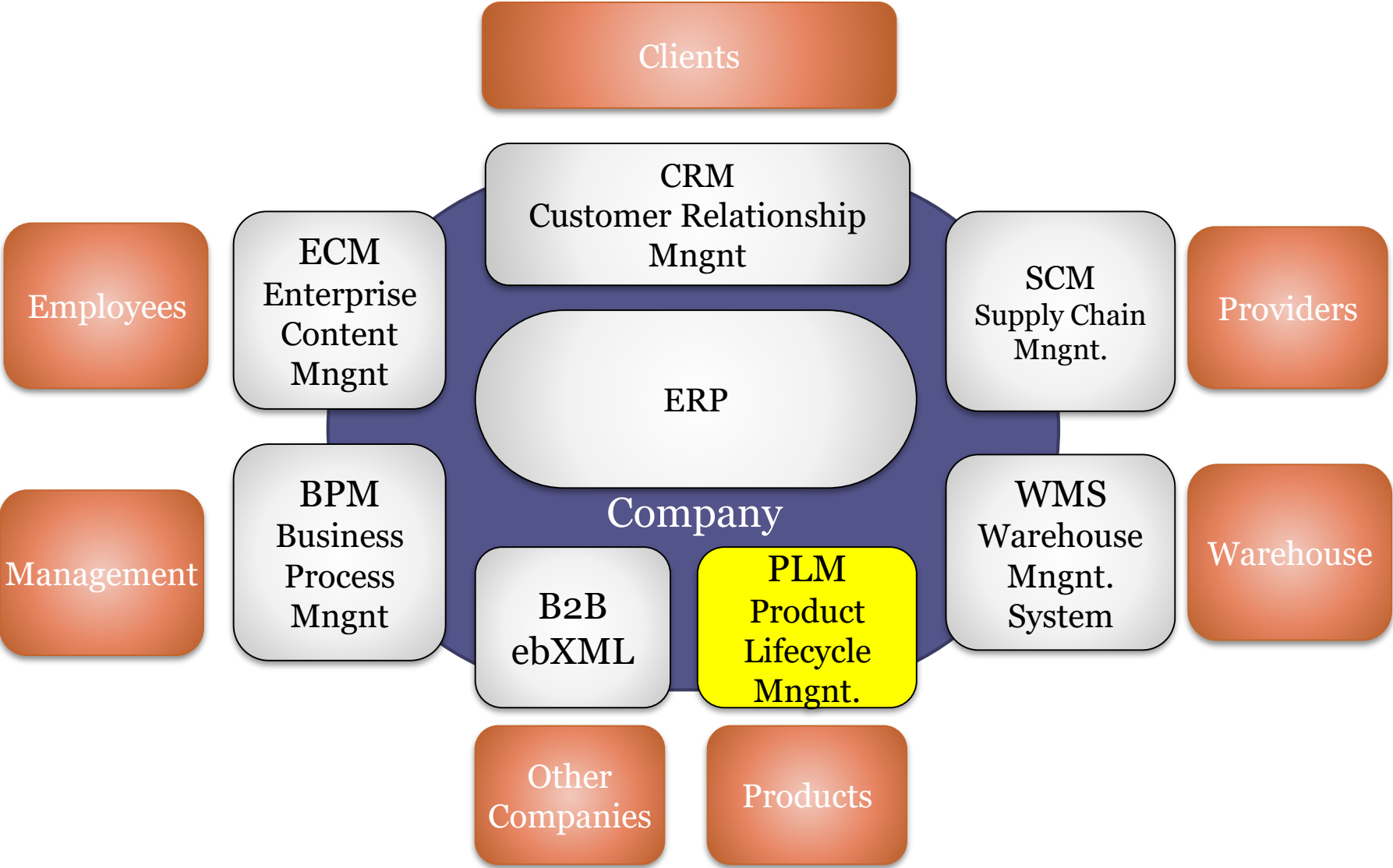
Defined by OASIS

Defines relationships between web services (orchestration)

Integration with WS-\* standards

More oriented to developers

# Enterprise information systems



# PLM - Product Lifecycle Management

Integral product lifecycle management  
Phases

Conceive

Design

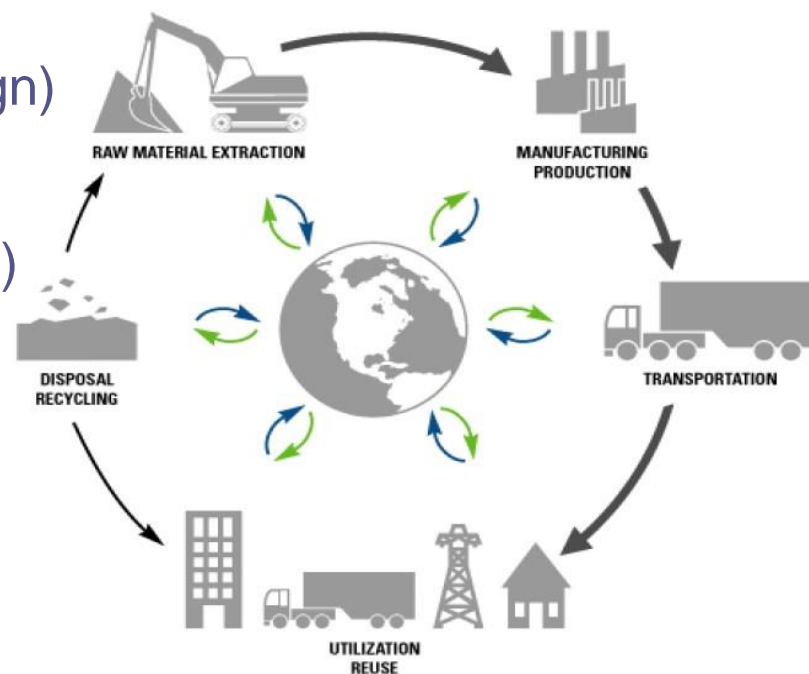
CAD tools (Computer Aided Design)

Realize

CAE (Computer Aided Engineering)

Service

Repair and maintenance



# PLM - Product Lifecycle Management

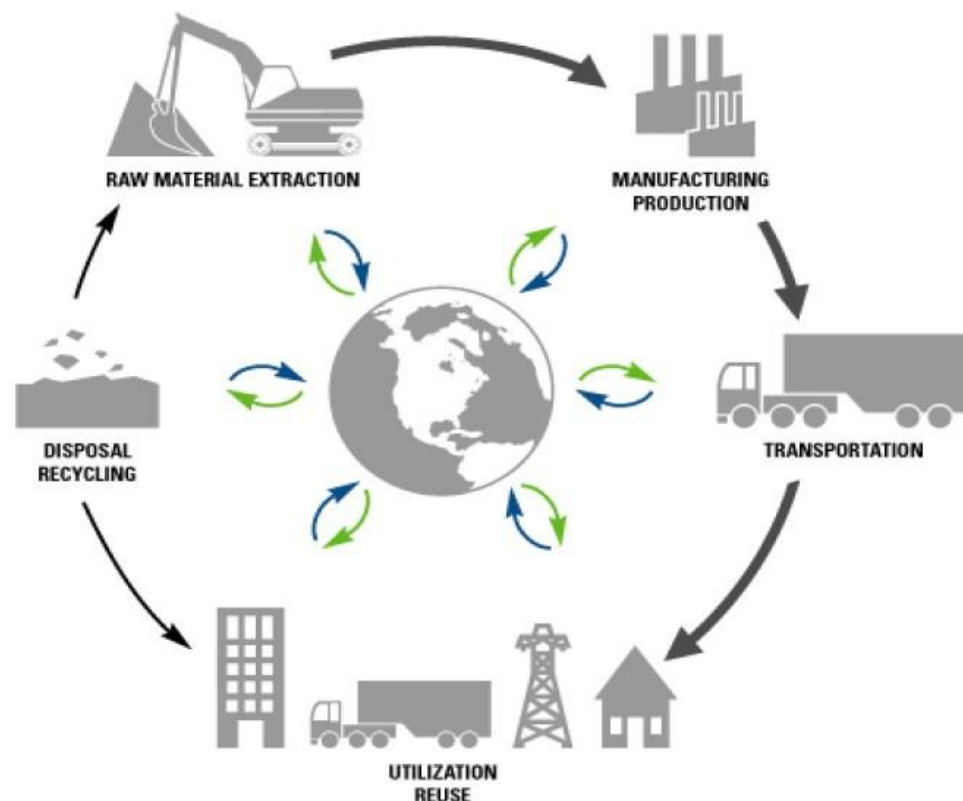
Solutions :

Siemens TeamCenter

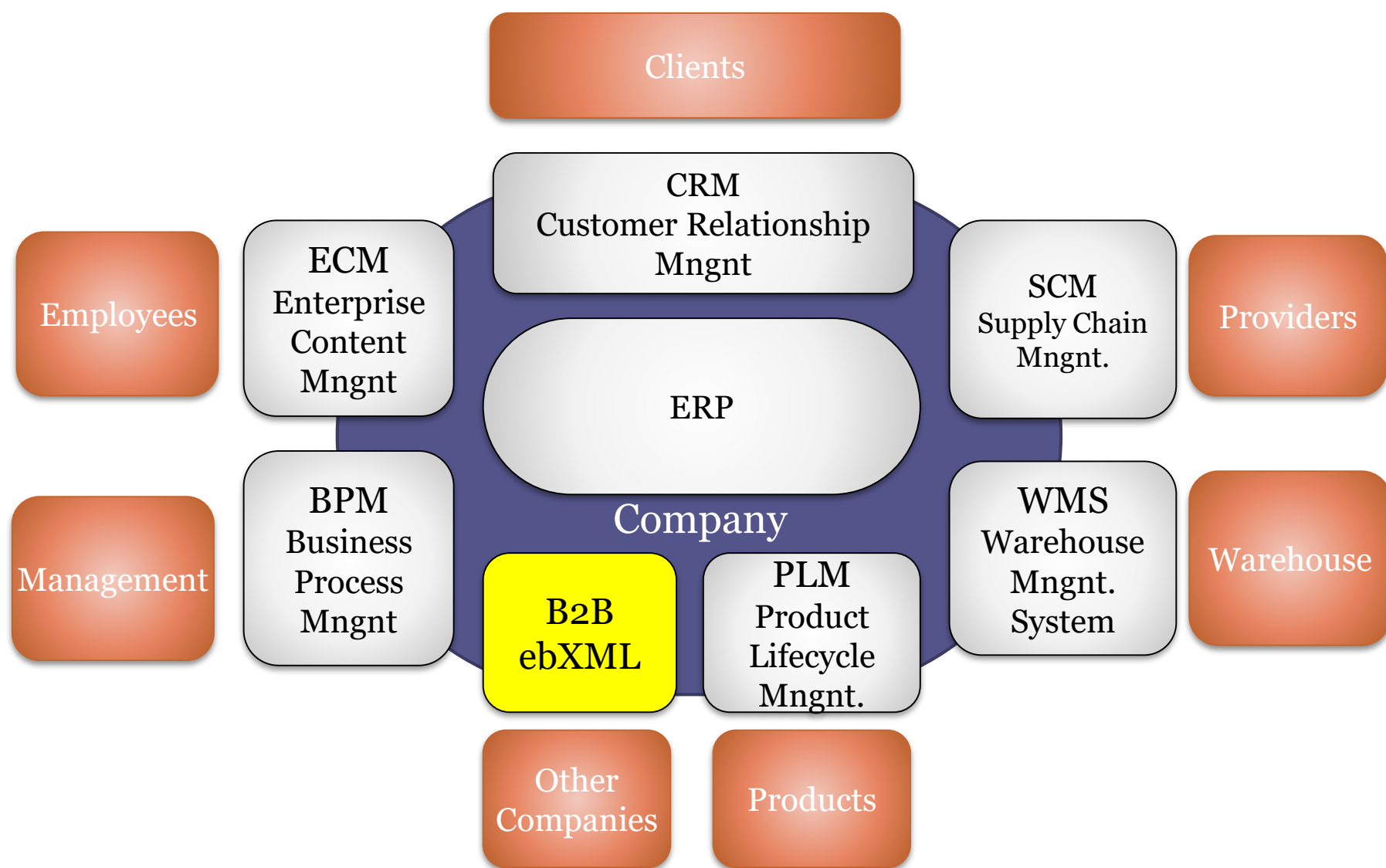
SAP PLM

Sopheon

...



# Sistemas información empresarial



# Relationship with external agents

Some common terms

B2B: Business-to-business

B2C: Business-to-consumer

C2C: Consumer-to-consumer

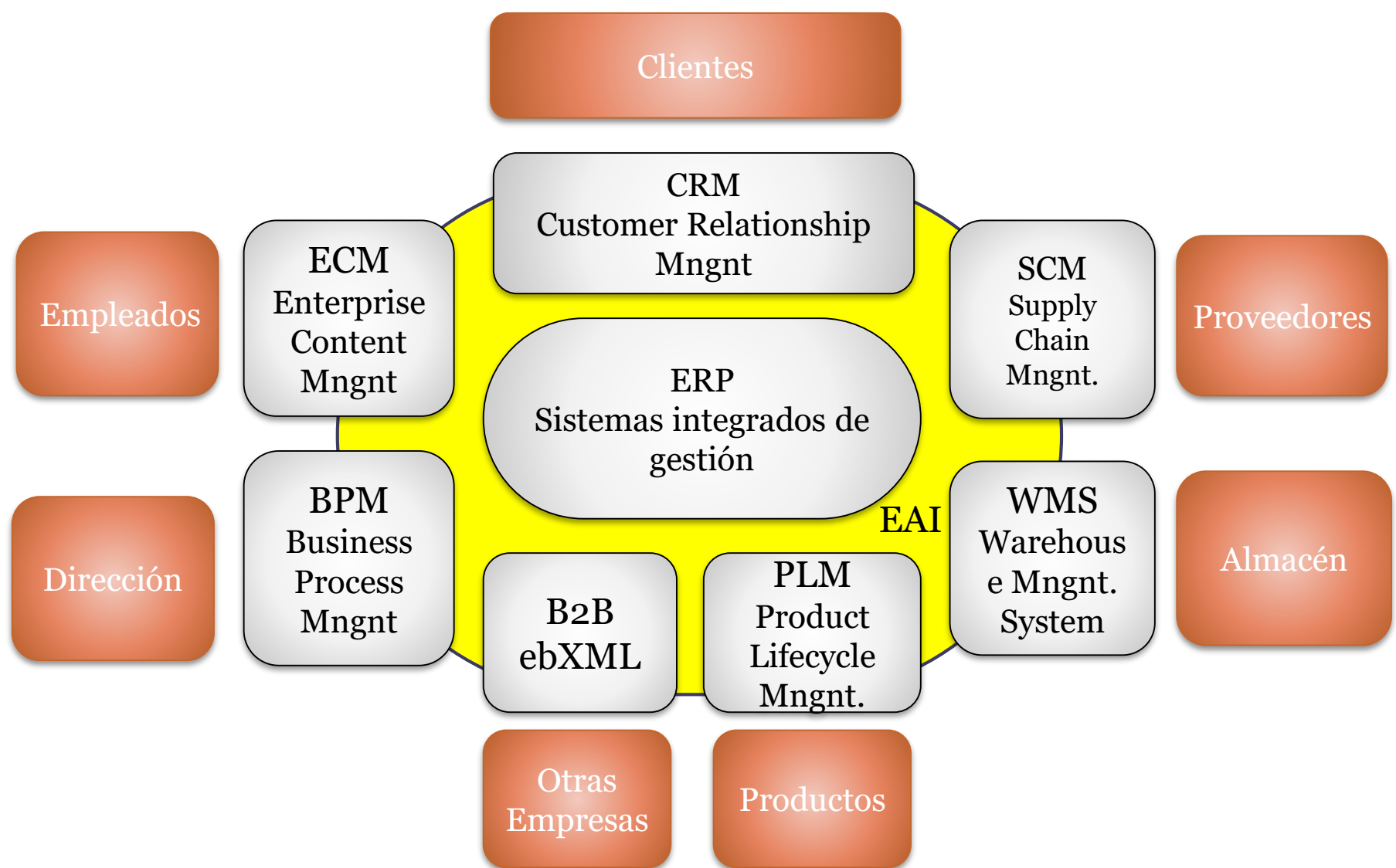
Most of e-commerce is B2B

Information exchange standards:

EDI (Electronic Data Interchange)

ebXML: XML based technologies for e-commerce

# Enterprise information systems





## EAI

EAI: Enterprise Application Integration  
Glue between different systems

See:

Integration patterns (previous lesson)

# Software product lines

Product line: products that share a set of functionalities to satisfy some given market segment

## Goal:

- Reduce development effort

- Improve productivity

- Evolve from a single product to a product line



# Software product lines

## Requirements

Identify generic solutions to common problems

Component based development

Generic Platforms

Software reuse

Automatic system generation



# End of presentation