ES – ERP – CRM tools

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Common tools

- ◆ To support core business processes

Firm Infrastructure
Human Resource Management   **ERP**
Technology
Procurement
SUPPORT ACTIVITIES
Margin

SCM   **ERP**   **CRM**
Inbound Logistics   Operations   Outbound Logistics   Marketing & Sales   Service
Margin
PRIMARY ACTIVITIES
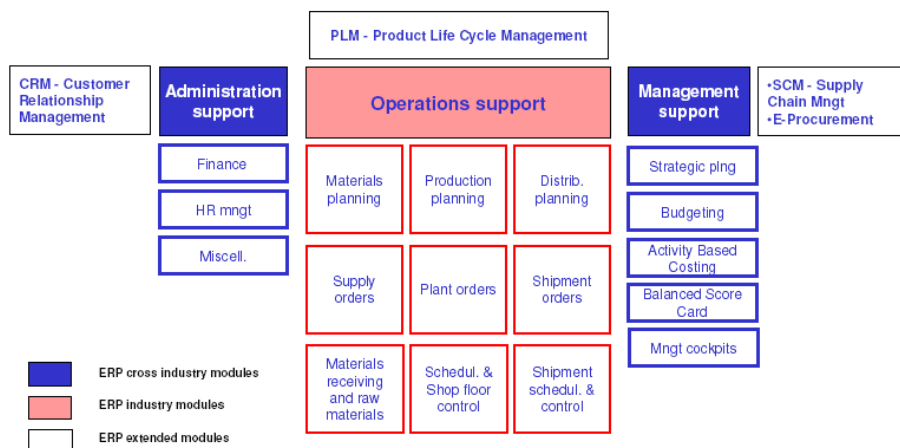
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Drawing by Dinesh Pratap Singh

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1
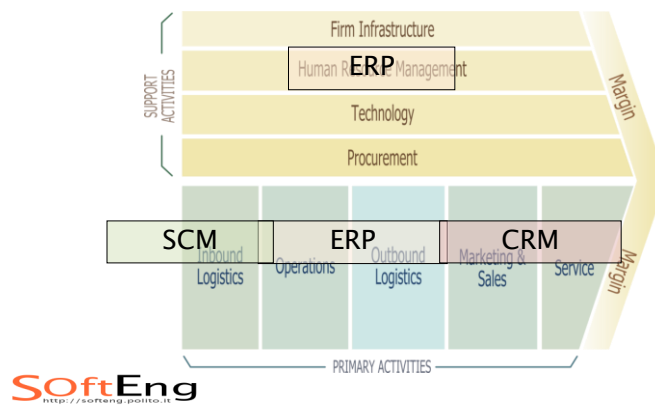
- **ERP**
  - Enterprise Resource Planning
- **CRM**
  - ◆ Customer relationship management
- **SCM**
  - ◆ Supply chain management
- **ES**
  - ◆ Enterprise systems = ERP + CRM + SCM

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Modules

PLM - Product Life Cycle Management

CRM - Customer Relationship Management	Administration support	Operations support			Management support	•SCM - Supply Chain Mngt •E-Procurement
	Finance	Materials planning	Production planning	Distrib. planning	Strategic plng	
	HR mngt				Budgeting	
	Miscell.	Supply orders	Plant orders	Shipment orders	Activity Based Costing	
					Balanced Score Card	
		Materials receiving and raw materials	Schedul. & Shop floor control	Shipment schedul. & control	Mngt cockpits	

■ ERP cross industry modules
■ ERP industry modules
☐ ERP extended modules

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Modules

- Cross industry modules

- Industry modules
  - Specific to automotive, chemical, ..
- Extended modules
  - On the boundary company – companies or company customer (CRM, SCM, ..)

  → Compare with T-model

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ES Levels

- Suite
  - Set of software applications sharing one or more DB
  - Supports set of business processes
- Module
  - Software application
  - Supports business process
  - Made of functions
- Function
  - Supports simple operation/activity

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The ES model

- Data sharing
  - No data replication
- Modularity
  - Independent modules
- Prescriptivity
  - The approach is the same for all companies (pro and con)

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Data replication: *legacy* islands
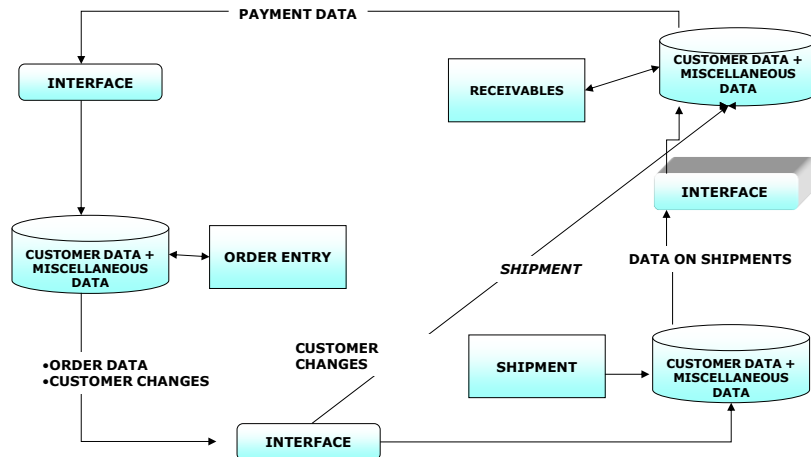
Data replication

- Same data in several (legacy) systems
- Dedicated interfaces to synchronize (point to point)
  - Cost
  - Delays
  - Unfeasibility (of overnight synchronization)
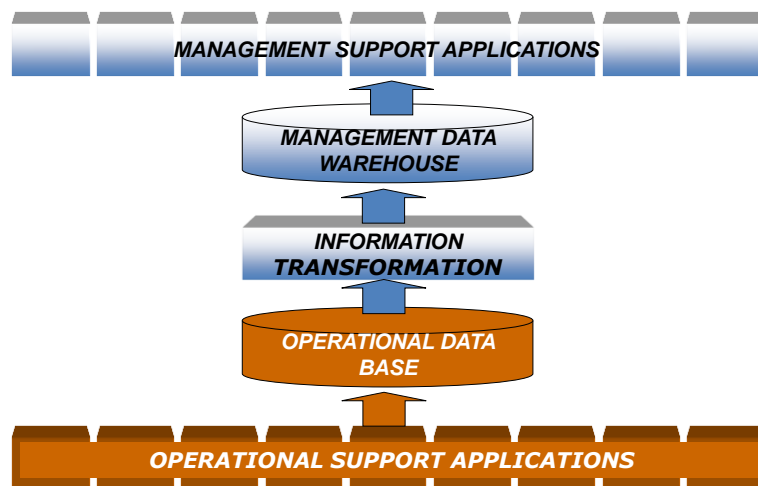 - Company must become system integrator

Data replication

- Each 'data island' typically matches a business function of the company
  - Accounting, warehouse, sales ..

- IS have a history, they are typically developed bottom up
- Unless a top down governance effort is made
  - See later IT organization chapter

Conway's law

- The structure of an IT system mirrors the communication structure of the organization that produces it
 - [Melvin Conway, 1967]

ES: data sharing

MANAGEMENT SUPPORT APPLICATIONS

MANAGEMENT DATA WAREHOUSE

INFORMATION TRANSFORMATION

OPERATIONAL DATA BASE

OPERATIONAL SUPPORT APPLICATIONS

ES: data sharing

- One DB or replicas with automatic synchronization
- One data model
- Horizontal integrity of data
  - All applications/modules share same data, with same data model
- Vertical integrity
 - From operation level to management level (aggregates of data)

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From functions to processes

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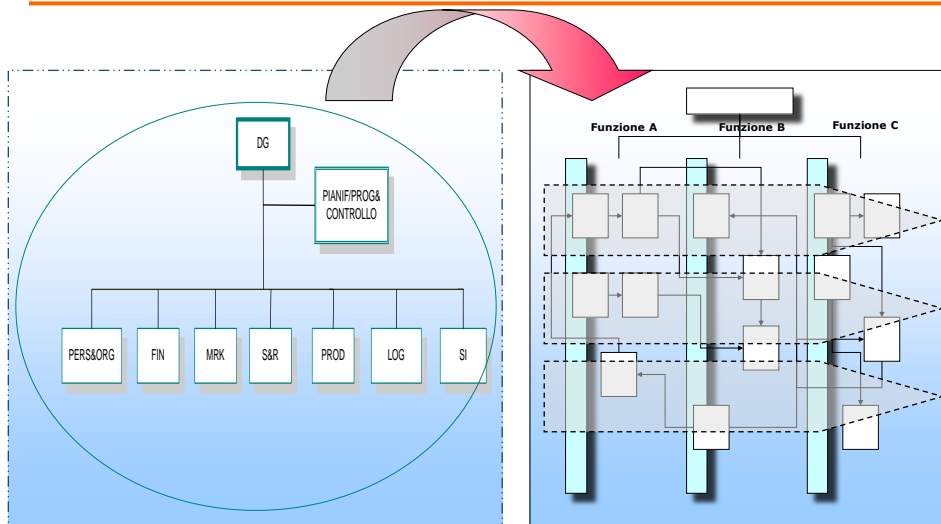
Modularity

Ex.: SAP R/3 for Manufacturing
- ◆ SD Sales And Distribution
- ◆ MM Materials Management
- ◆ PP Production Planning
- ◆ QM Quality Management
- ◆ PM Plant Management
- ◆ HR Human Resource
- ◆ FI Finance
- ◆ CO Controlling
- ◆ AM Asset Management
- ◆ PS Project
- ◆ WF Work Flow
- ◆ IS Information System (summary data)

SD MM PP QM PM HR — DB ERP — FI CO AM PS WF IS
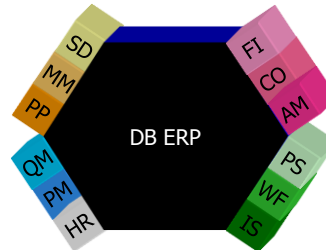
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Segmentation, car rental

	Marketing and Customer Management	Products	Rentals Management	Rental Fleet Logistics	Business Administration
Plan	Customer Segmentation	Rental Product Strategy	Location and Channel Strategy	Fleet Strategy	Corporate / LOB Strategy
	Customer Relationship Strategy	Product Development/ Design	Location Design and Layout	Fleet Planning	Financial Management and Planning
	Marketing Strategy and Planning		Channel Design and Layout	OEM Relationship Planning	Real Estate Planning
Manage	Customer Behavior Modeling	Promotions Management	Channel and Location Profitability	OEM Performance Management	Alliance Management
	Market and Competitor Research	Pricing Management	Location Operations Management	Inbound Logistics	Business Performance Reporting
	Segmentation Management		Reservations Management		Legal and Regulatory Compliance
	Call Center		Workforce Management		Real Estate and Construction Management
					Risk Management
					Stock Ledger
	Campaign Management				HR Management (Career Development, Training, Recruiting)
Execute	Customer Service	Purchasing/ Sourcing	Rentals and Reservations	Location Operations	HR Administration / Payroll
	Preferred Member Management	Demand Forecasting	Time and Attendance	Fleet Servicing	Corporate Audit
	Customer Communications			Fleet Management	Corporate Accounting (GL, AP, A/R, Treasury, etc.)
	Mass Marketing and Advertising				Indirect Procurement
	Target Marketing				PR and Investor Relations
					IT Systems and Operations

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Segmentation, waste management

Enterprise Management	Strategic Enterprise Management		Business Analytics	Business Intelligence & Decision Support	Accounting		Alignment
Customer Relationship Management	Marketing			Sales		Service	
Waste Logistics	Container Management	Fleet Management	Labor Management	Disposal Facilities	Waste Classification	Legal Permissions & Approvals	Traceability & Legal Reporting
Waste Services	Industrial & Commercial Waste	Municipalities & Residential Waste		Cleaning & Winter Maintenance	Loose & Bulk Waste		Other Services
Waste Processes	Order Creation	Resource & Capacity Planning		Order Output	Confirmation: Weighing & Completion		Interfaces to External Systems
Revenue Management	Billing	Guarantor Billing		Third Party Billing	Invoicing		Receivables Management
Business Support	Human Resources Operations Sourcing & Deployment	Procurement	Financial Supply Chain Management	Treasury Corporate Finance Management	Fixed Asset Management	Real Estate	Industrial Hygiene & Safety	Occupational Health

Segmentation (Sap, automotive)

Sustainable Product Innovation	Manufacturing and Logistics	Responsive Supply Networks	Marketing, Sales and Aftermarket	Smart Mobility and Transportation
4 Solutions ⊕	3 Solutions ⊕	5 Solutions ⊕	4 Solutions ⊕	2 Solutions ⊕
Human Resources	Finance	Procurement		
4 Solutions ⊕	6 Solutions ⊕	9 Solutions ⊕		
Analytics	Application Platform and Infrastructure	Database and Data Management	IT Management	Security Software
3 Solutions ⊕	4 Solutions ⊕	4 Solutions ⊕	2 Solutions ⊕	2 Solutions ⊕
IoT Business and Technology Services				
3 Solutions ⊕				

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Modularity

- Smoother transition, extensibility
- Rich module offer
- One stop shopping
  - All modules from same vendor, ease of integration
- Best of breed
  - Modules from different vendors

Prescriptivity

- ES modules contain a business logic
  - Ex.: Supply part can be accepted only of related order has been issued
  - Ex.: Supply can be ordered only if authorized role needs it
- Current business process in company may or may not comply

Approaches

- Traditional:
  - Understand business process,
  - Develop software supporting it
- ES:
  - Adapt business process to ES

  - Actually ES software can be parameterized and customized

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Gap analysis

Activity	Current	ES	Process Actions	Software Actions
Receive materials	Only recording, no control vs. order	Control on order: entering materials must have been ordered	Adapt process to ES prescription	–
Quality Control	Driven by predefined rules	Result recording (no rules within system)	–	Adaptation of ES software
Storage	IS drives selection of warehouse location	Only recording of completed storage	–	Adaptation of ES software
Retrieve from storage	IS suggest location where to retrieve	Only recording of completed retrieval	–	Adaptation of ES software
Inventory change	Change values in db (overwrite)	Values are corrected through correction transactions	Adapt process to ES prescription	

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Transition to ES in company

- Cost of licenses + personalization
  - Especially for SMEs
- Delay
- Changes to business processes
  - Acceptance, human factors
- Heavy solution?
  - Especially for SMEs

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Options

- Large company (turn over > 50MEuro)
  - Constraints: Multi currency, multilanguage, multilegal systems
  - IT office with many employees
  - ES (Sap, Oracle, ..) + BPR activity
    - Core modules + industry modules
    - Transition risks
    - Delay (>12 months)
    - Cost (0,5 – 10 M)

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Options

- SME (turn over $<$ 50M Euro)
  - Constraints: one language, one currency, one legal system
  - Small or no IT office
  - ES from national vendor,
  - core modules only (accounting, warehouse, sales ..)
- VSME ($<$5MEuro)
  - No IT office

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Vendors

- Major players, world
  - SAP Business One, Oracle ERP cloud, Microsoft Dynamics NAV
  - Oligopoly in large companies, multinationals
- Local producers and products
  - For medium / small companies
  - Metafresh, StartyERP, ERPNext, ePromis
  - TeamSystem, Zucchetti, TargetCross

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Vendors

- Open source
  - Adempiere, Apache OFBiz, Blueseer

Vending options

- Cloud vs. on-premise
- Pay
  - Per license
    - From 20.000 $ up
  - Per user per month
    - 5 $ to 200 $

SAP

- 1972 foundation
- 1980 – SAP R/2 multilanguage multicurrency
- 1990 – SAP R/3 client server
- 2000 – CRM

Oracle

- 1977 – only DB
- 1995 enters ERP market with buyout of
  - PeopleSoft, JD Edwards (ERP)
  - Siebel (CRM)
  - Hyperion (management)

Options

- SMEs
  - Package for accounting
  - Package specific to domain
  - ERP light
  - ERP in ASP mode

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SAP – architecture

- Database
  - Information storage services
- Kernel
  - Low-level predefined operations
    - DB access
    - Simple transactions execution
    - Communication with other sw suite
    - Monitoring and system administration
    - User and permission management
- Package
  - Set of consistent and customizable features (e.g. accounting)
  - Leverage kernel functions

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SAP – Database

- 64.000 Tables
  - Schema are ready and non-modifiable by programmers
  - It is possible to add new tables
- Including
  - System configuration tables (name T*), e,g.:
    - Countries
    - Type of materials
    - Currencies
  - Organization management data, e.g.:
    - Suppliers
    - Materials
    - Customers
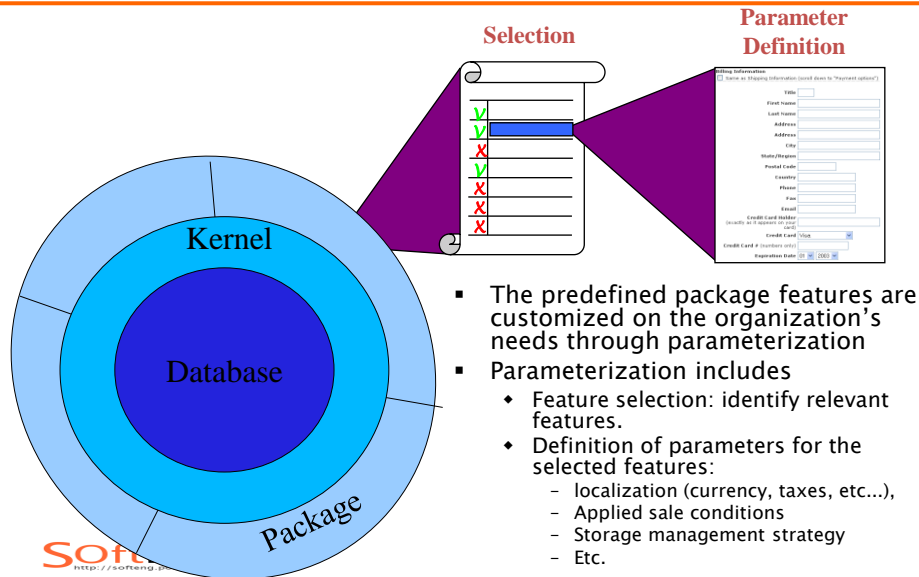   - Customer orders

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SAP – a transaction
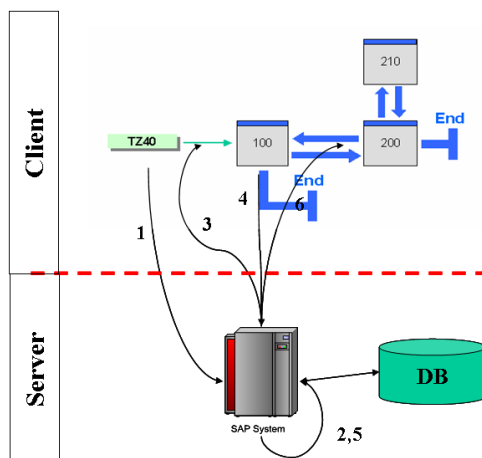
- Steps:
  1. Call transaction
  2. Program compilation;
  3. Compiled code loading on client
  4. Data from client to server
  5. Processing of next screen
  6. Communication to client of new screen
- At the end of the transaction the system stores the data from all completed screens

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SAP – Parameterization

Selection **Parameter Definition**

- The predefined package features are customized on the organization's needs through parameterization
- Parameterization includes
  - Feature selection: identify relevant features.
  - Definition of parameters for the selected features:
    - localization (currency, taxes, etc...),
    - Applied sale conditions
    - Storage management strategy
    - Etc.

Kernel

Database

Package

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ES in summary

- Cover the core processes of an organization
- Process oriented
- Modular and based on a single database
- Prescriptive
- Complex

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CRM

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Customer Relationship Management

- Definition
  - An approach
  - Supporting tools

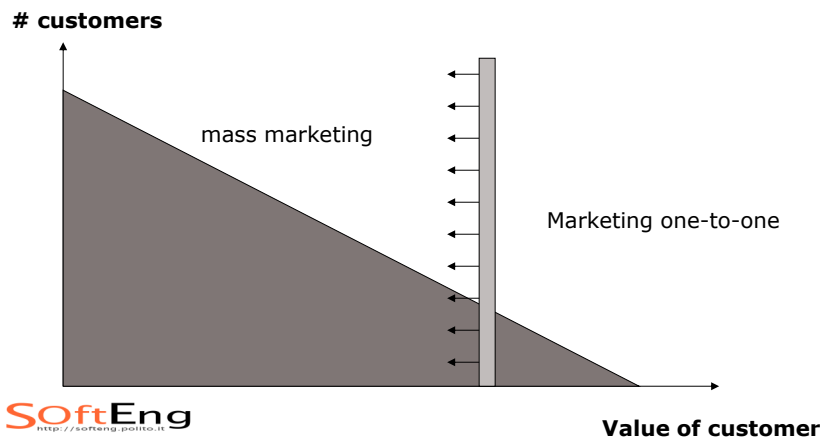SOftEng
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CRM approach

- ◆ [Seybold 1998, 2000]
- Integrated and structured process to interact with customers
  - ◆ Fetch new customers
  - ◆ Retain existing customers
- Goal: build with customer long term relationship, increase her satisfaction, increase value of company for her and viceversa

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CRM context

- Deregulation (90's) and lower switching cost for customer
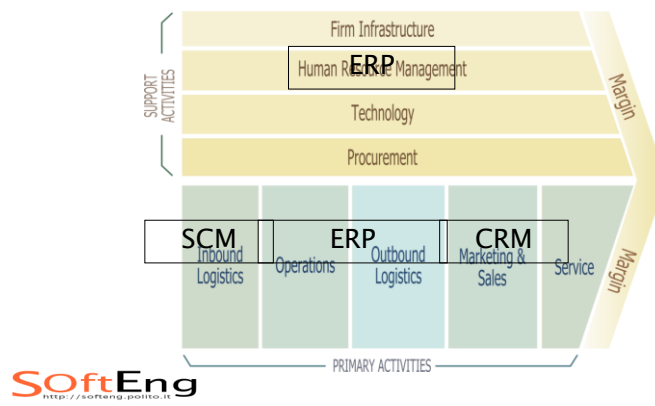- Not all customers are equal

 # customers

mass marketing

Marketing one-to-one

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Value of customer

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CRM approach

- Customer becomes core aspect of commercial strategy
- The company
  - Makes access to product/services as easy as possible
  - Produces customized offers
  - Provides complete access, from pre-sale to post-sale
  - Collects complaints and suggestions

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CRM – tools

- CRM approach not feasible without tool support
- CRM starts with Siebel (1993)

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CRM paradigm

- Multichannel
  - Customer accesses company through any channel
    - Mobile phone, web, call center, counter, (mail)
- Uniqueness of data and service
  - Access is consistent through all channels
    - Data (on product, on customer) is the same and does not depend on channel
- End to end service chain
  - Front end: contact with customer (CRM)
  - Back end: service provision, delivery, administration

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Service chains

- Can be more or less complex
  - Level 1: reservations
  - Level 2: product sale
  - Level 3: customer care

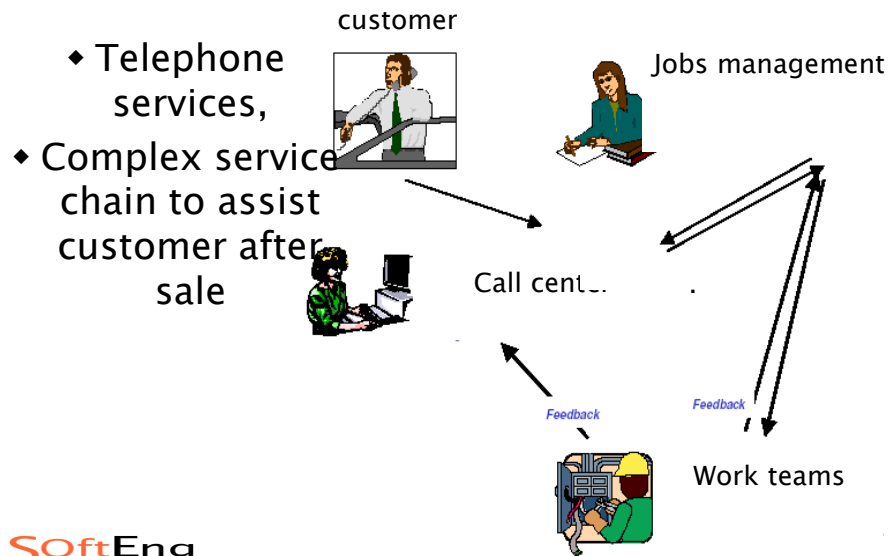SOftEng
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Ex.: reservations

- Health services, flights, movies ..
- Database with availability of product/service + (multichannel) front end
- Simple service chain
  - Sale of right to a service (no service/product itself)

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Ex.: E-commerce

- Computers, books, music
- Complete service chain
  - Sale of product + delivery
    - Amazon
  - Sale of product + production + delivery
    - Dell

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Ex. Customer care

- ◆ Telephone services,
- ◆ Complex service chain to assist customer after sale

customer

Jobs management

Call center

Feedback   Feedback

Work teams

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Evolution of tools

- ▪ 80's
  - ◆ Sales Force Automation (SFA): tools to support salesperson
- ▪ 90's
  - ◆ Toll free numbers, call centers
  - ◆ Informational services
  - ◆ Reservation services
    - – Airlines, health services
  - ◆ After sales support (help desk)
  - ◆ Sales (tele selling, telemarketing)

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Evolution of tools

- 1995: WEB
  - Informational sites
  - Sales
    - B2C (www.Amazon.com)
    - B2B (CISCO)
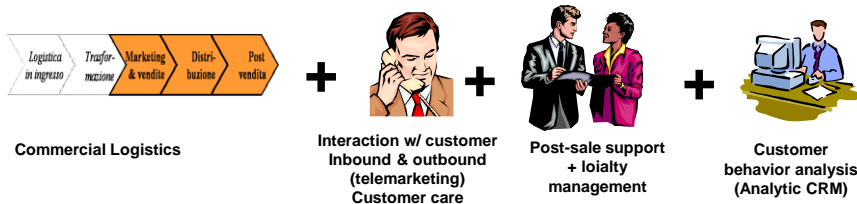- 00
  - Integration of SFA, call center, web into CRM suites

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CRM, needs

Frequency and contuinity of contact

	Low	High
High	Insurances Utilities PA Health Transport Turism Consumer Market	Banks TLC
Low	Commodities Durable goods	Instrumental goods Pharmaceutical Hi Tech

Number of customers

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CRM, needs

- Not all business domains have the same need for CRM, that depends on
  - Intensity of relationship with customer (frequency of contact, duration of contract)
  - Size of customer pool
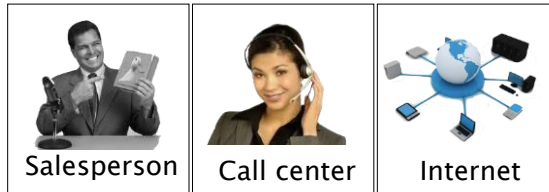 - Loyalty of customer
  - Multichannel or not

CRM tools: key functions

Commercial Logistics

Interaction w/ customer Inbound & outbound (telemarketing) Customer care

Post-sale support + loialty management

Customer behavior analysis (Analytic CRM)

- Commercial logistics
  - Also offered by ERP tools
- Support for multichannel interaction w customer
  - Inbound, outbound
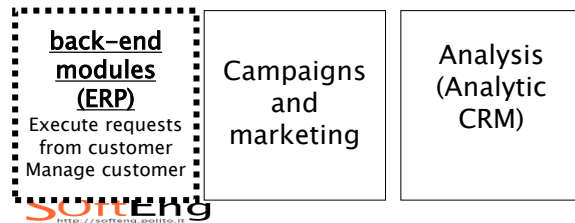- After sales
- Analysis of customers (analytic CRM)

CRM : modules

Front-end Modules

Salesperson | Call center | Internet

· Support to contact w/ customer, on all lifecycle and all channels

Data Clients, Products

| back-end modules (ERP) Execute requests from customer Manage customer | Campaigns and marketing | Analysis (Analytic CRM) |

· Support to marketing processes

CRM, db

Order
- orderID : int
- price : Currency
- qty : int
- dateOpen : Date
- dateClosed : Date
- status : String

Product
- code : int
- price : Currency
- description : String

Customer
- clientCode : int

Agent
- code : int

Private
- SSN : String
- address : String

Enterprise
- taxId : String
- address : String

Contact
- type : String
- date : Date
- description : String
- outcome : String

place ▶   for ▶   ◀ fill_in   ◀ involve   ◀ carry_on   contact ▶
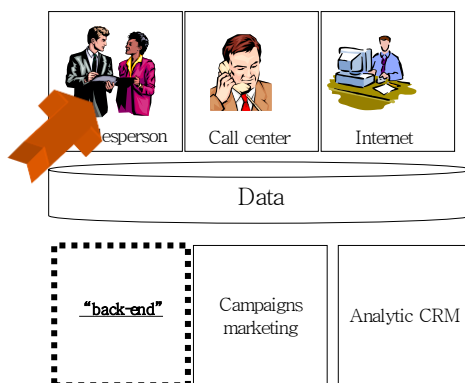
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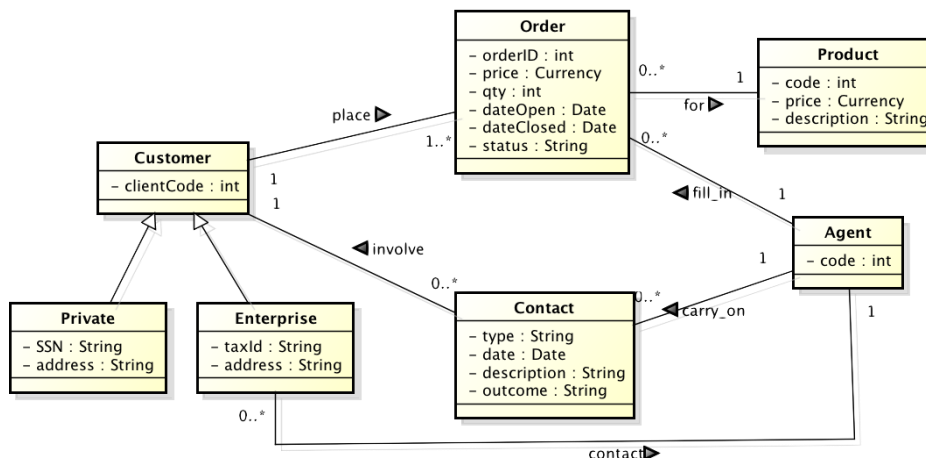
Sales force

- Context: B2B
  - Company selling to other companies
    - Few number of customers buying regularly (large) quantities
  - Ex supplier of automotive parts
  - Ex supplier of food items to large retailers

  - Sales person maintains contact with a number of buyers, colletcs needs, produces offers, negotiates, closes sale
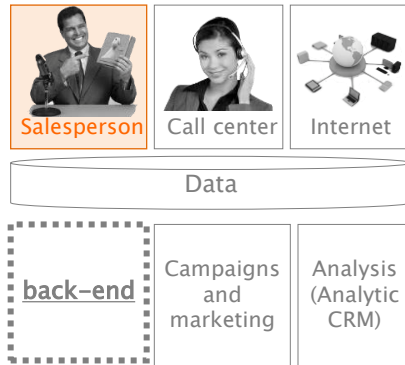
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Sales Force Automation channel

esperson   Call center   Internet

Data
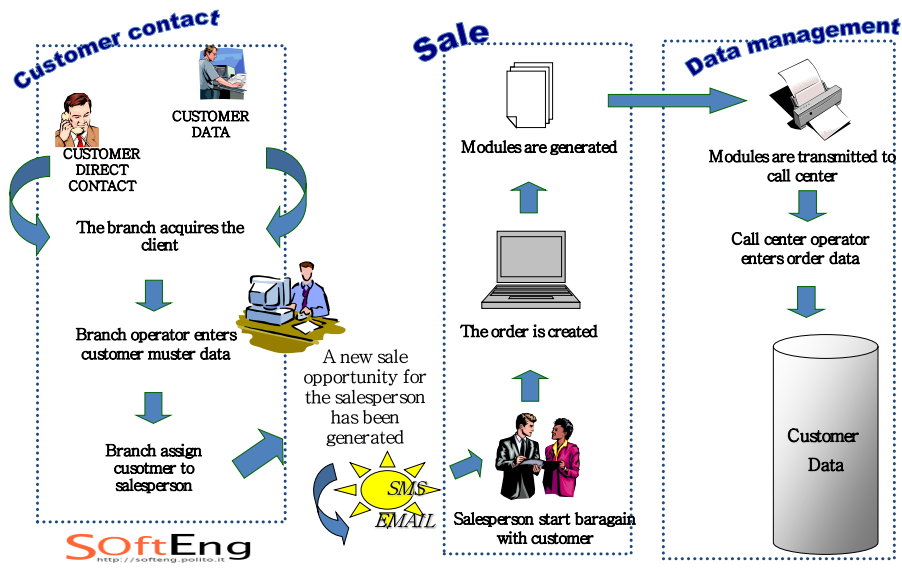
"back-end"   Campaigns marketing   Analytic CRM

- Planning and control
  - Prospects, actual sales
- Interaction customer – vendor
  - Offers
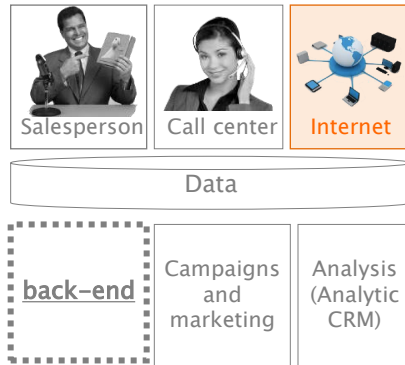 - Offer templates
  - Offer validation
  - History

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Sales Force Automation channel

Salesperson | Call center | Internet

Data

back-end | Campaigns and marketing | Analysis (Analytic CRM)

- ◆ Planning and control
  - – Prospects, actual sales
- ◆ Interaction customer – vendor
  - – Offers
  - – Offer templates
  - – Offer validation
  - – History

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Sales Force Automation – Process

Customer contact

CUSTOMER DATA

CUSTOMER DIRECT CONTACT

The branch acquires the client

Branch operator enters customer muster data

Branch assign cusotmer to salesperson

A new sale opportunity for the salesperson has been generated

SMS
EMAIL

Sale

Modules are generated

The order is created

Salesperson start baragain with customer

Data management

Modules are transmitted to call center

Call center operator enters order data

Customer Data

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Internet channel

Salesperson   Call center   Internet

Data

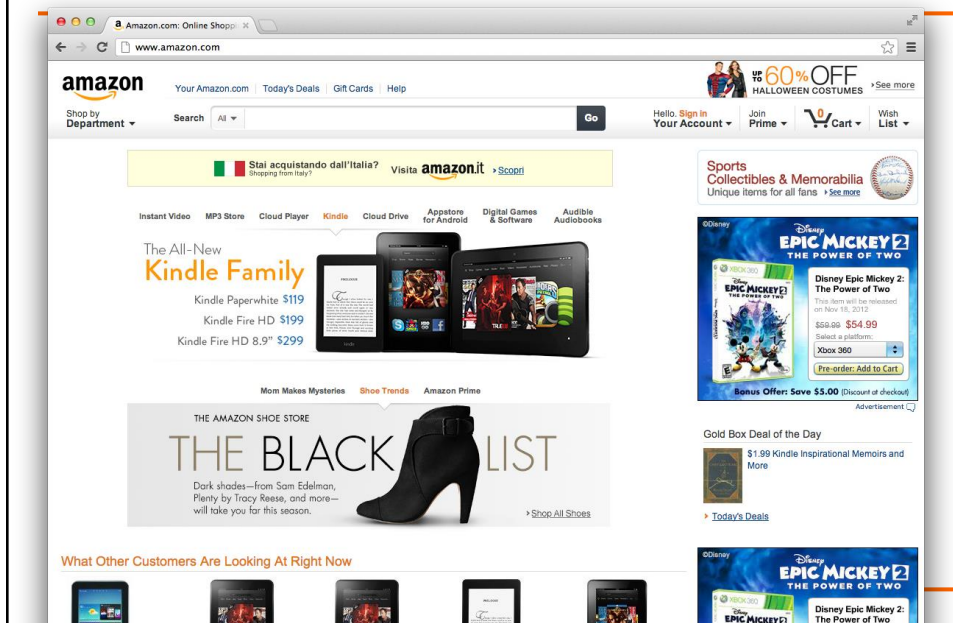back-end   Campaigns and marketing   Analysis (Analytic CRM)

- Business vs Consumer customers
- General informations, Catalogue of products
- Purchase: suggestion of products, configuration, shopping cart, checkout
- Information on all transactions of the customer, and their state
- After sale: complaints and suggestions
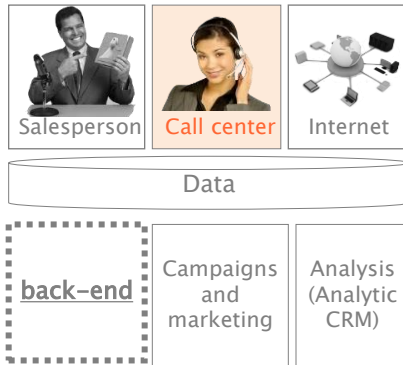- Log of all customer actions

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Internet channel

Call center channel

Salesperson	Call center	Internet

Data

back-end	Campaigns and marketing	Analysis (Analytic CRM)

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- CTI – Computer Telephone Integration)
  - ◆ IVR (Interactive Voice Response)
  - ◆ ACD (Automatic Call Distribution)
  - ◆ Voice recognition
  - ◆ Caller recognition
  - ◆ Speech to text
- Functions
  1. Information on company and products
  2. Purchase
  3. Status of purchases or other transactions
  4. Complaints
  5. History of interactions with customer
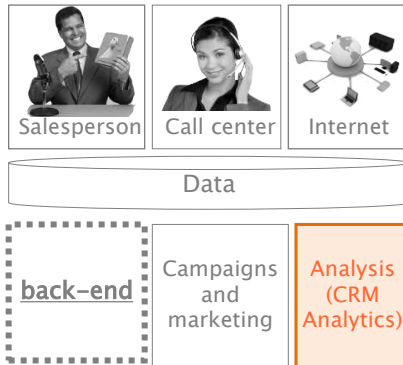 6. Telemarketing inbound outbound, following scripts

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Ex.: Customer Care

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CRM Analytics

Salesperson	Call center	Internet
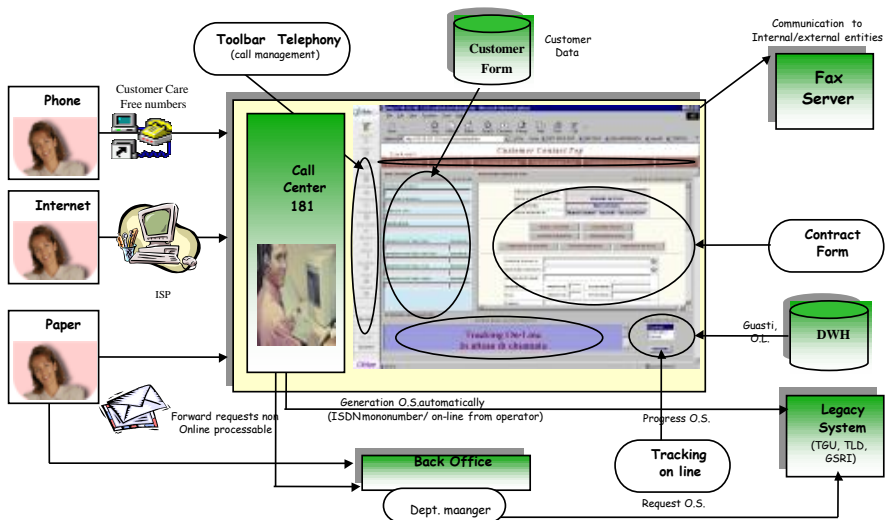
Data

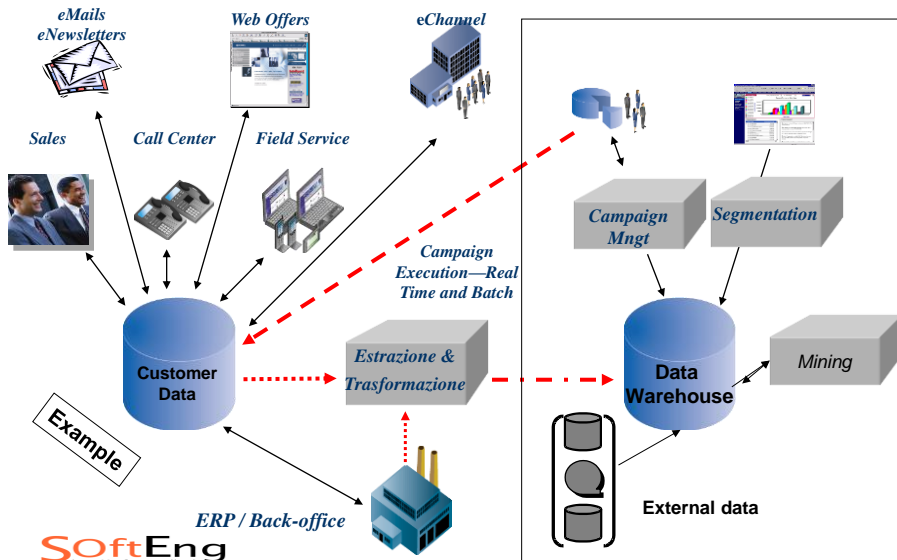| back-end	Campaigns and marketing	Analysis (CRM Analytics)

- Data from data warehouse
- Functions
  1. Segmentation indexes (profitability etc)
  2. Data mining to compute predictive indexes
  3. Reports on customers, production of dashboards
  4. Definition of segments, customers per segments
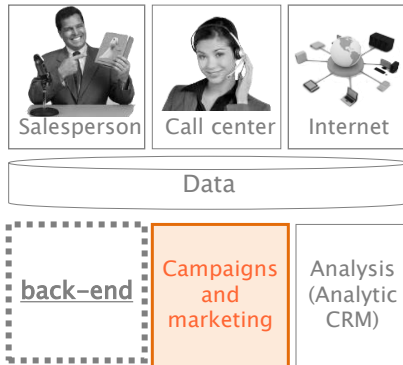
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Analytic CRM: architecture

eMails eNewsletters

Web Offers

eChannel

Sales   *Call Center*   *Field Service*

Campaign Execution—Real Time and Batch

Campaign Mngt   *Segmentation*

Customer Data

Estrazione & Trasformazione

Data Warehouse

Mining

Example

ERP / Back-office

External data

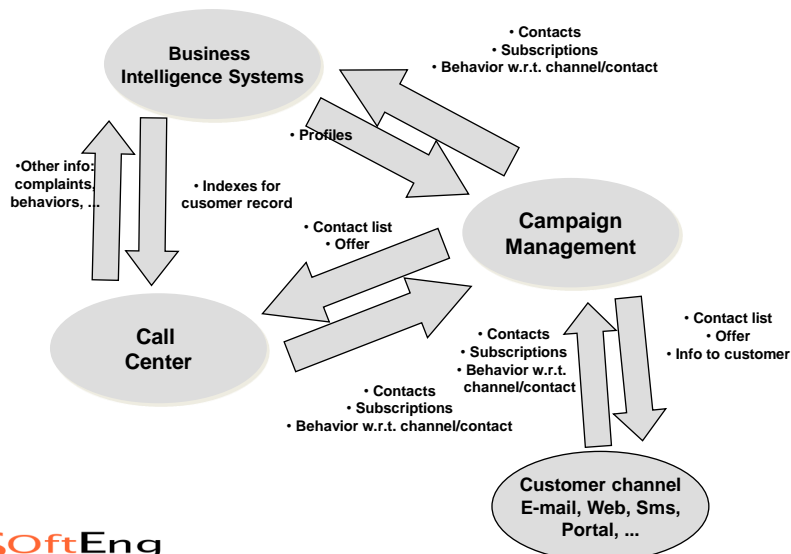SOftEng
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Campaign management

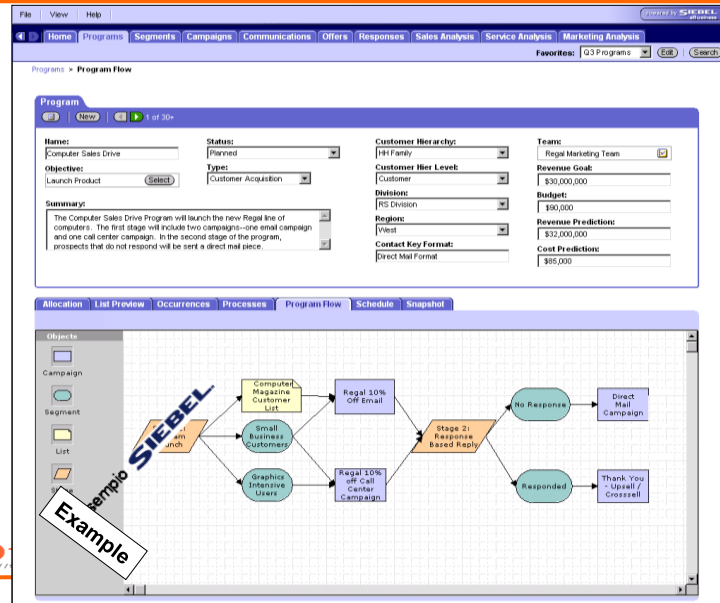
- Planning and execution of campaigns
- Functions:
  1. Selection of customer lists
  2. Design and plan campaign
  3. Transfer data from anaytic CRM to operational IS

Campaign management : flow

Campaign: workflow functions

CRM vendors

- Full-liners: suite ERP + CRM + BI
  - Peoplesoft (Oracle), Siebel (Oracle)
  - SAP CRM
  - Salesforce
  - Microsoft Dynamics
- Analytic CRM, Business Intelligence
  - SAS
  - BO
  - Others: Data Mining / Text Mining suites
- Telephone technology vendors

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