



Lisbon School
of Economics
& Management
Universidade de Lisboa



LISBOA

UNIVERSIDADE
DE LISBOA

Carlos J. costa

ERP

ENTERPRISE RESOURCE PLANNING

(2023 version)

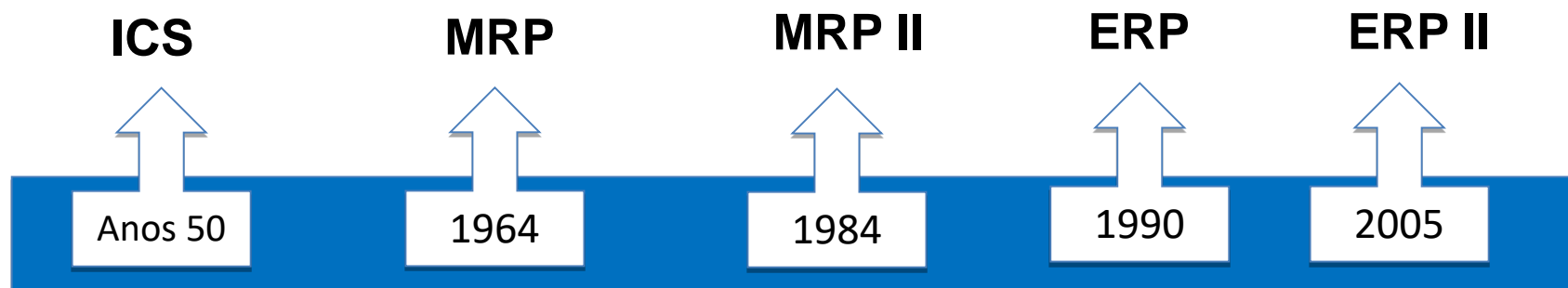


Agenda

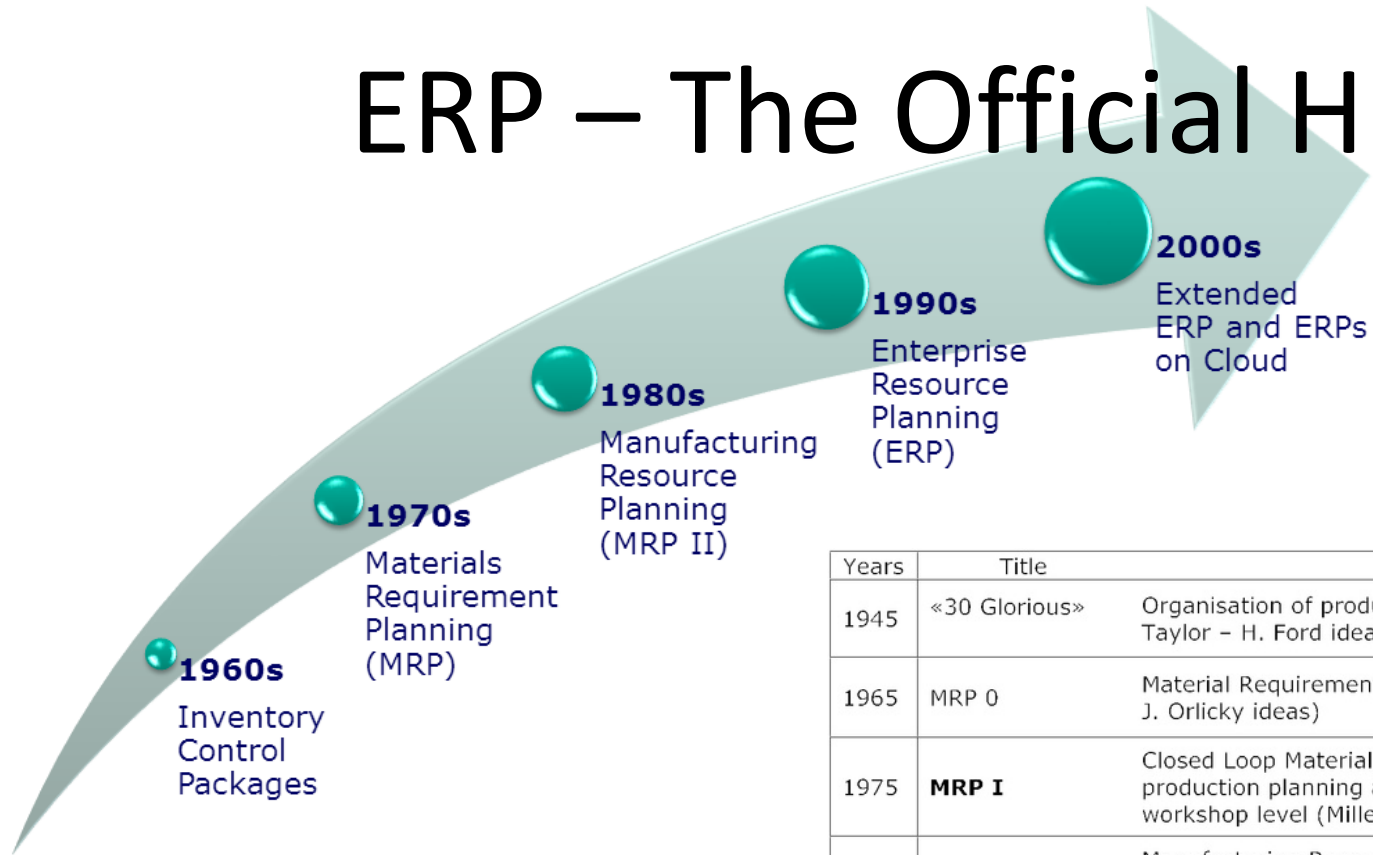
- ERP- The official history
- ERP concept
- ERP- Integrated System
- Advantages to management
- ERP Architecture
- Market
- Open Source
- Law and Tax Issues

ERP – The Official History

- ICS- Inventory Control Systems
- MRP – Material Requirement Planning
- MRP II – Manufacturing Resource Planning
- ERP – Enterprise Resource Planning
- ERP II- Enterprise Resource Planning II



ERP – The Official History



Years	Title	Main features
1945	«30 Glorious»	Organisation of production principles (based on F.W. Taylor – H. Ford ideas)
1965	MRP 0	Material Requirements Planning (based on O. Wight – J. Orlicky ideas)
1975	MRP I	Closed Loop Material Requirement Planning, setting of production planning and its execution control on workshop level (Miller-Spregue)
1980	MRP II	Manufacturing Resource Planning based on data from suppliers and customers. Forecasting, planning and production controlling.
1985	MRP II+	Implementing of JIT (Just in Time) concept, weak spot optimisation
1990	ERP	Enterprise Resource Planning, Materials Planning, Order Entry, Distribution, General Ledger, Accounting, Shop Floor Control
1996	Extend ERP	Scheduling, Forecasting, Capacity Planning, e-Commerce, Warehousing, Logistics
2001	ERP II	Project Management, Knowledge Management, Workflow Management, Customer Relationship Management, Human Resource Management, Portal Capability, Integrated Financials

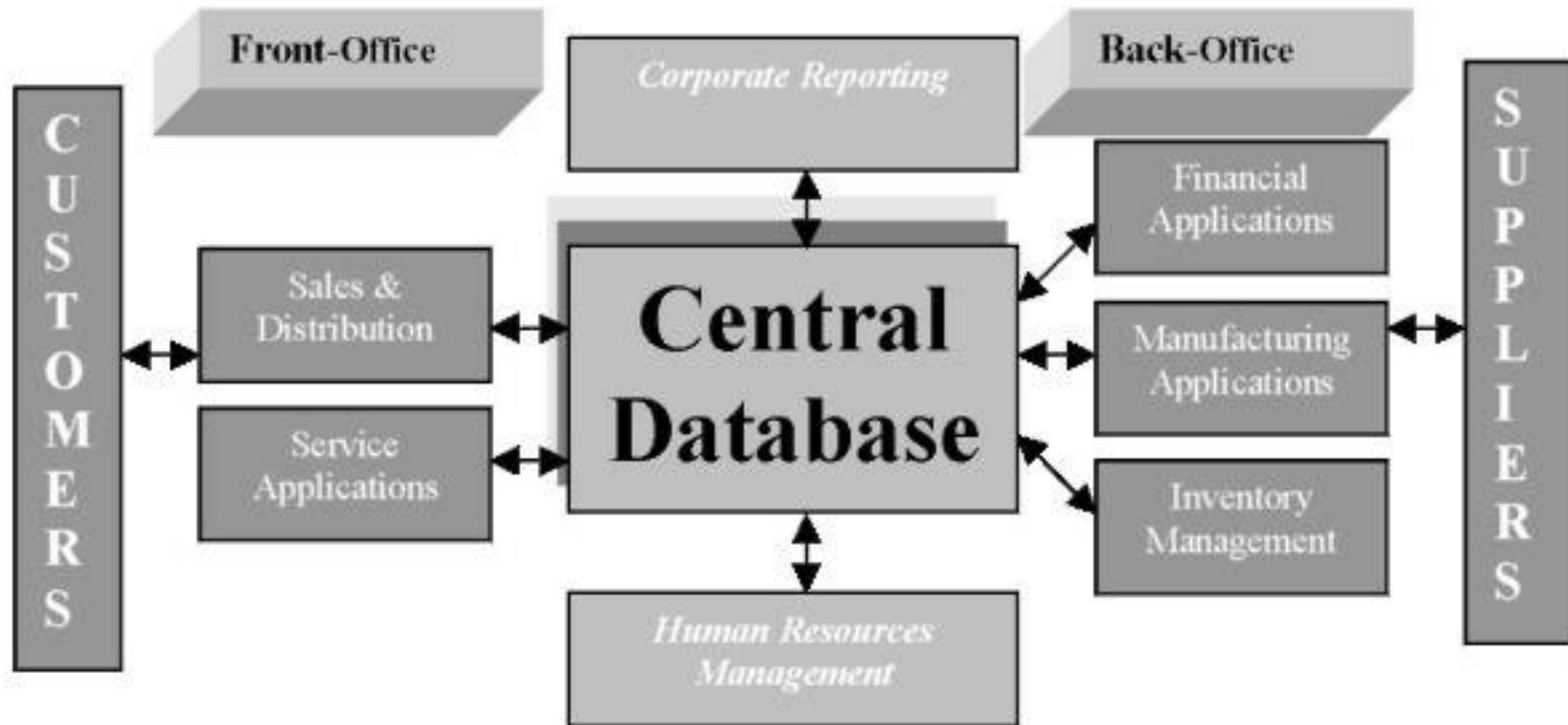
Concept

- *Enterprise Resource Planning*
- Set of very integrated programs
- Information is introduced just once in the system
- Allows integration of information and processes supported in information
- Is supported in DBMS
- Customizable

Concept

- Davenport (1988), presented the architecture of a ERP.
- In the center it is database with data from all the modules.
- Each module supports a functional area (Davenport, 1998).

ERP Architecture



(Davenport, 1998)

ERP as Integrated System



ERP II

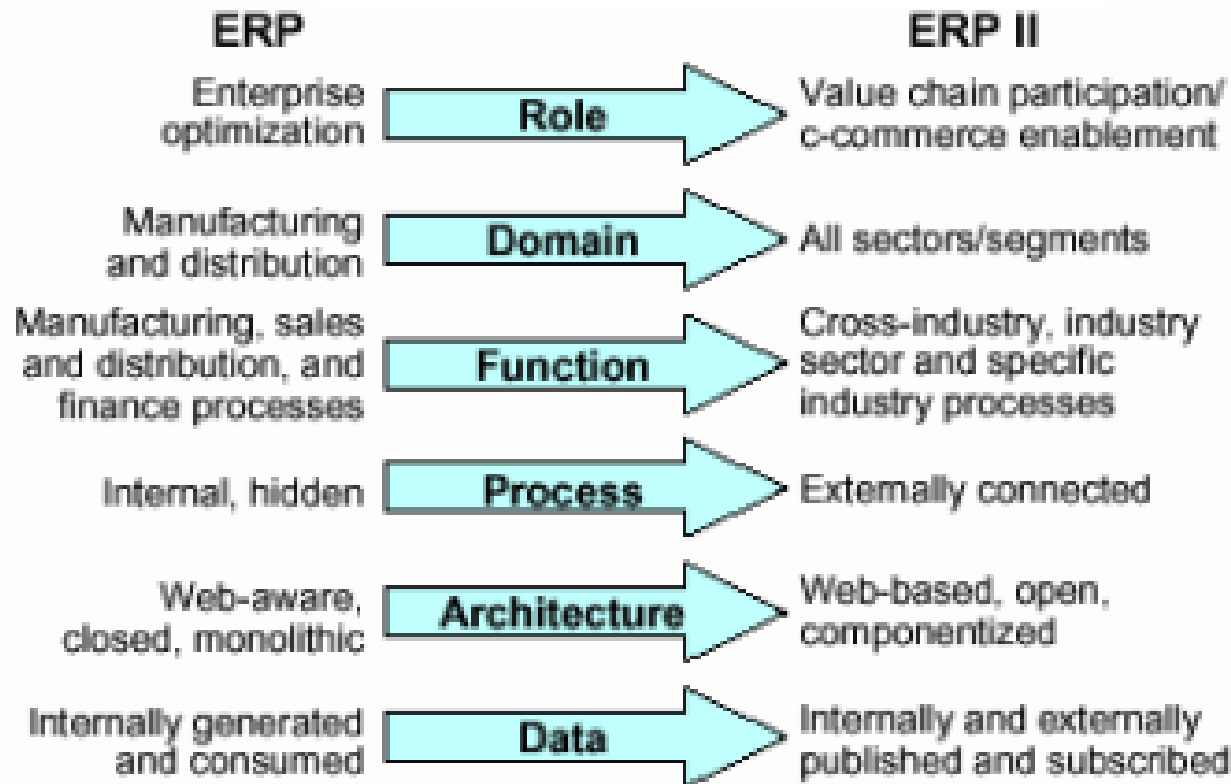
- ERP II is a transformation of ERP into a new generation of enterprise systems.

(Møller, 2005)

- Collaborative tools, (e.g. social networks) available in Web 2.0, have the potentiality to improve business processes and should be considered in the ERP II.

(Grabot, Mayere, Lauroua, & Houe, 2014)

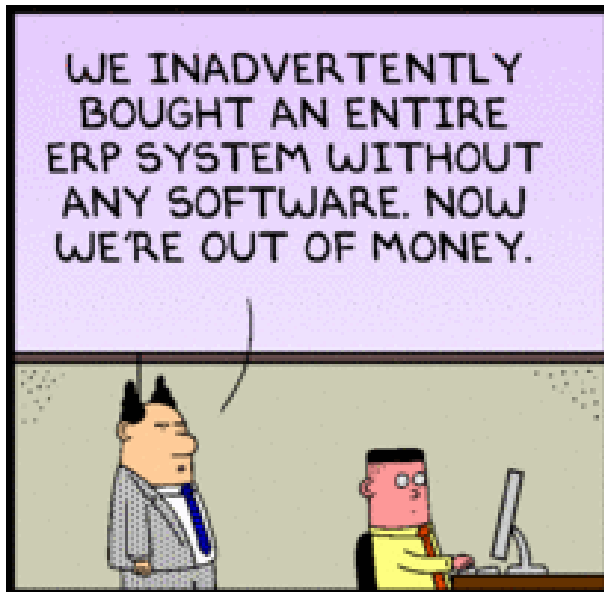
ERP II



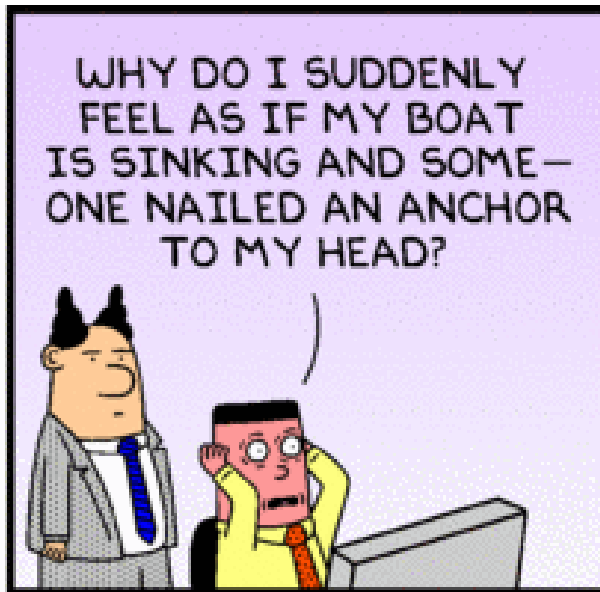
Source: Gartner Research

Advantages of ERP

- Support business growth
- Change Legacy systems
- Improve business processes
- Reduce maintainance
- Reduce administrative Costs
- Prevent input of redundact data
- Decrease stoks maintance costs
- Decrease data entrance errors
- Multi currency systems are possible
- Decrease system operation costs
- Prevent delays and error in client orders
- Integrate applications
- Standardize processes



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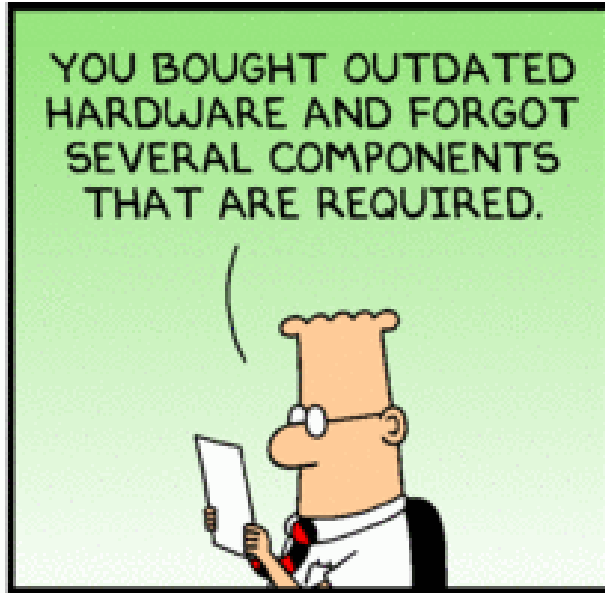


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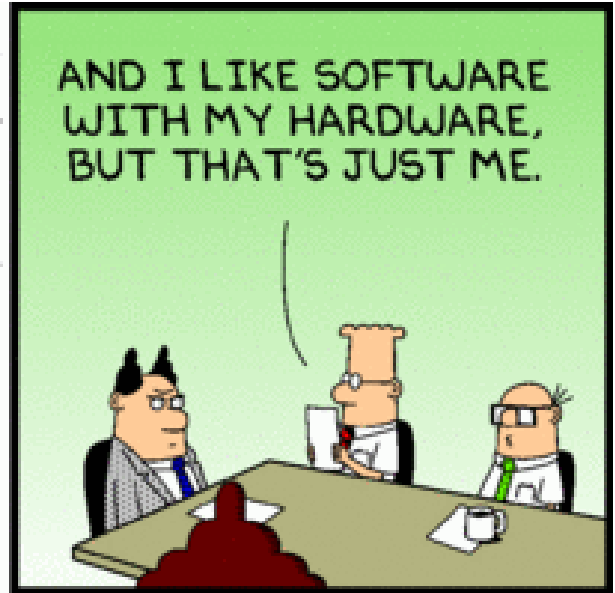


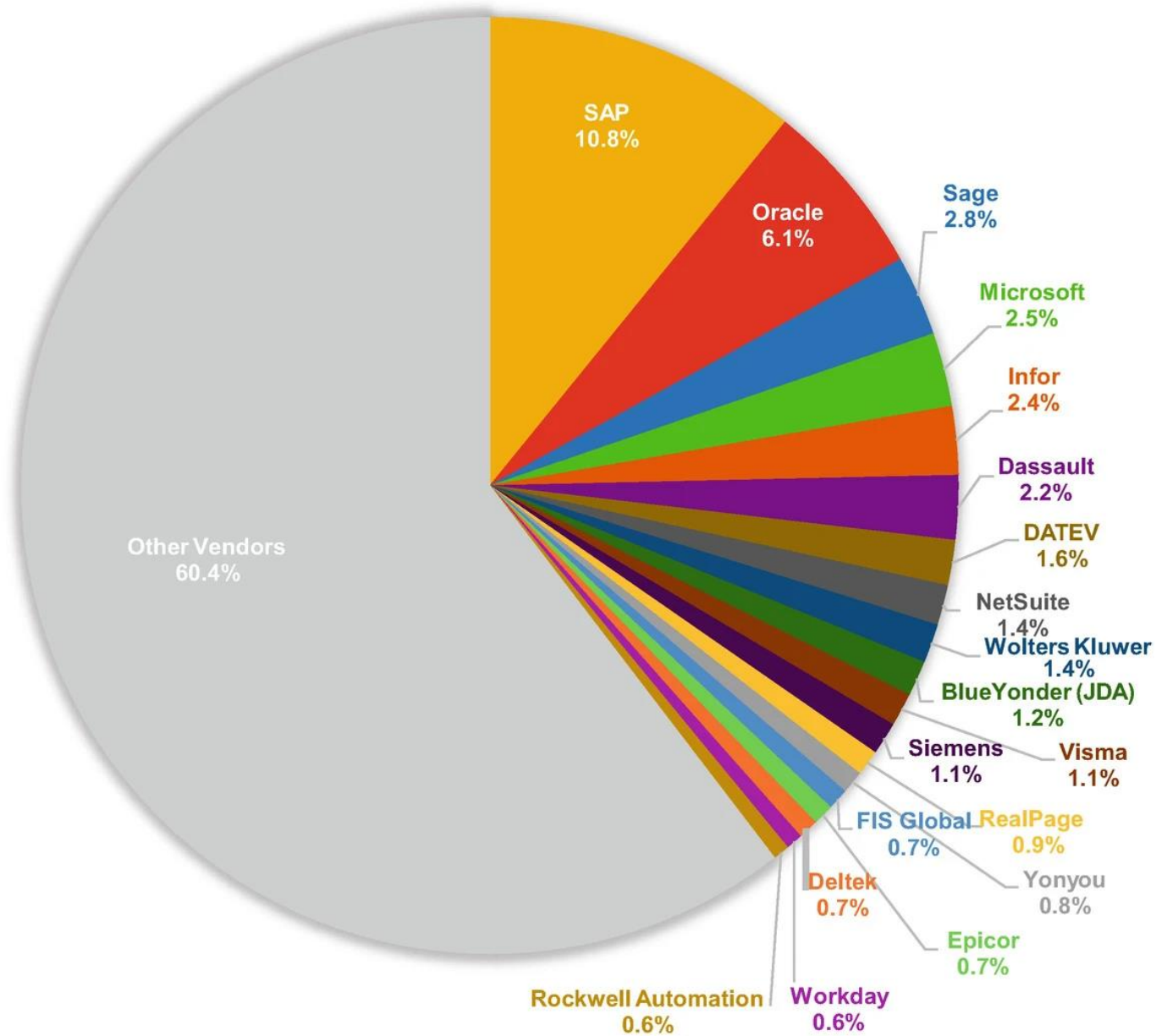
Figure 1: Magic Quadrant for Cloud ERP for Product-Centric Enterprises



Source: Gartner (August 2022)

WORLD WIDE

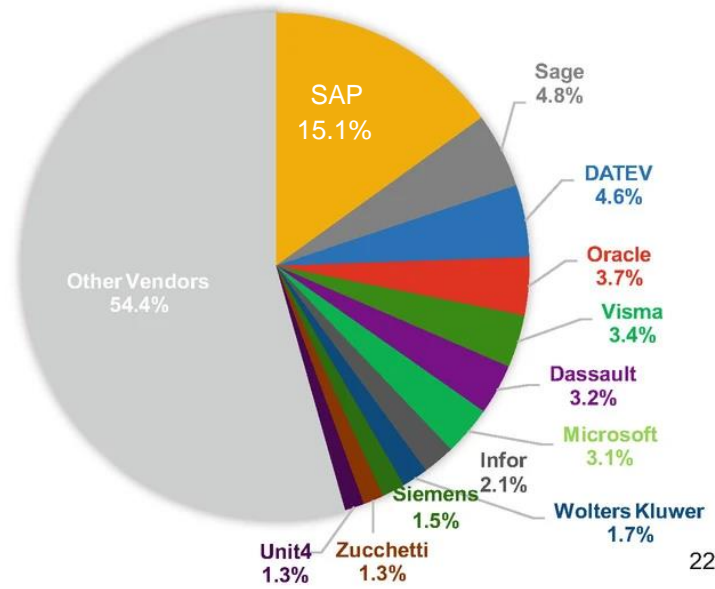
MARKET SIZE: €53B



2019 Source: Sarferaz, S. (2022).

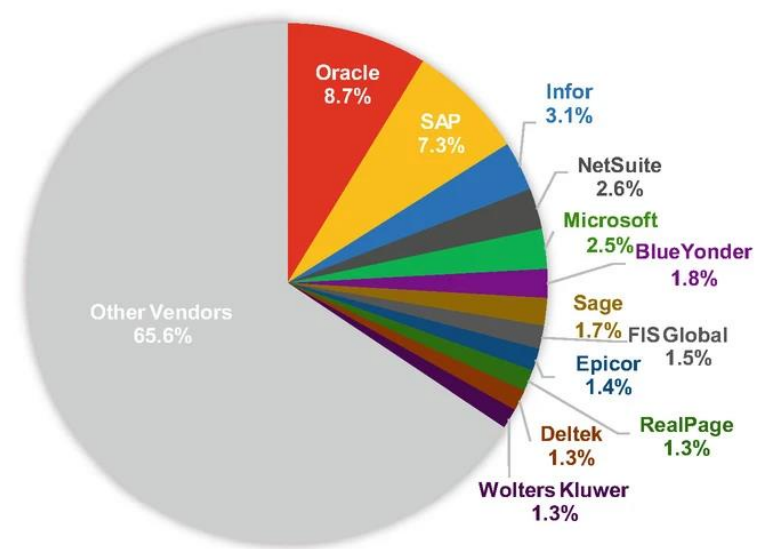
EUROPE MIDDLE EAST AFRICA

MARKET SIZE: €18B

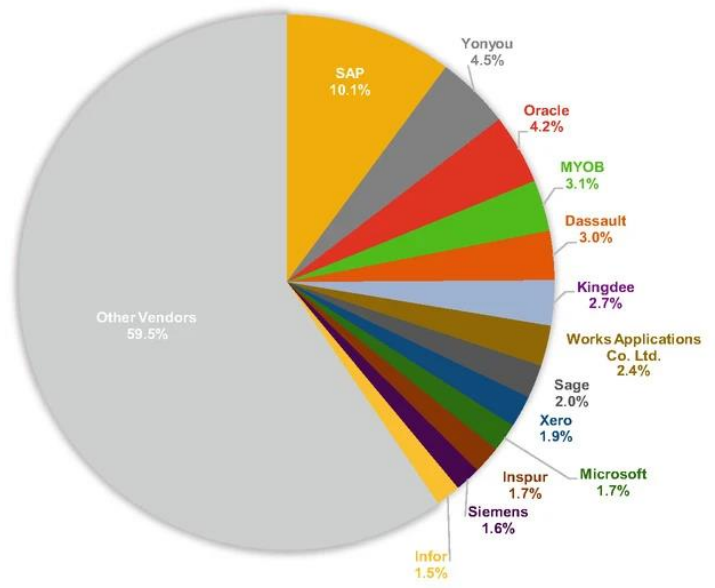


NORTH AMERICA

MARKET SIZE: €23.5B

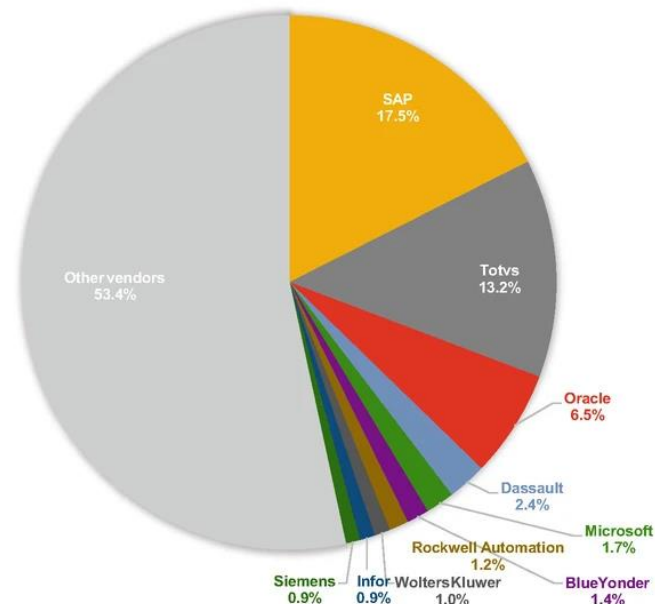


22



MARKET SIZE: €9.4B

ASIA PACIFIC JAPAN CHINA



MARKET SIZE: €2.0B

LATIN AMERICA



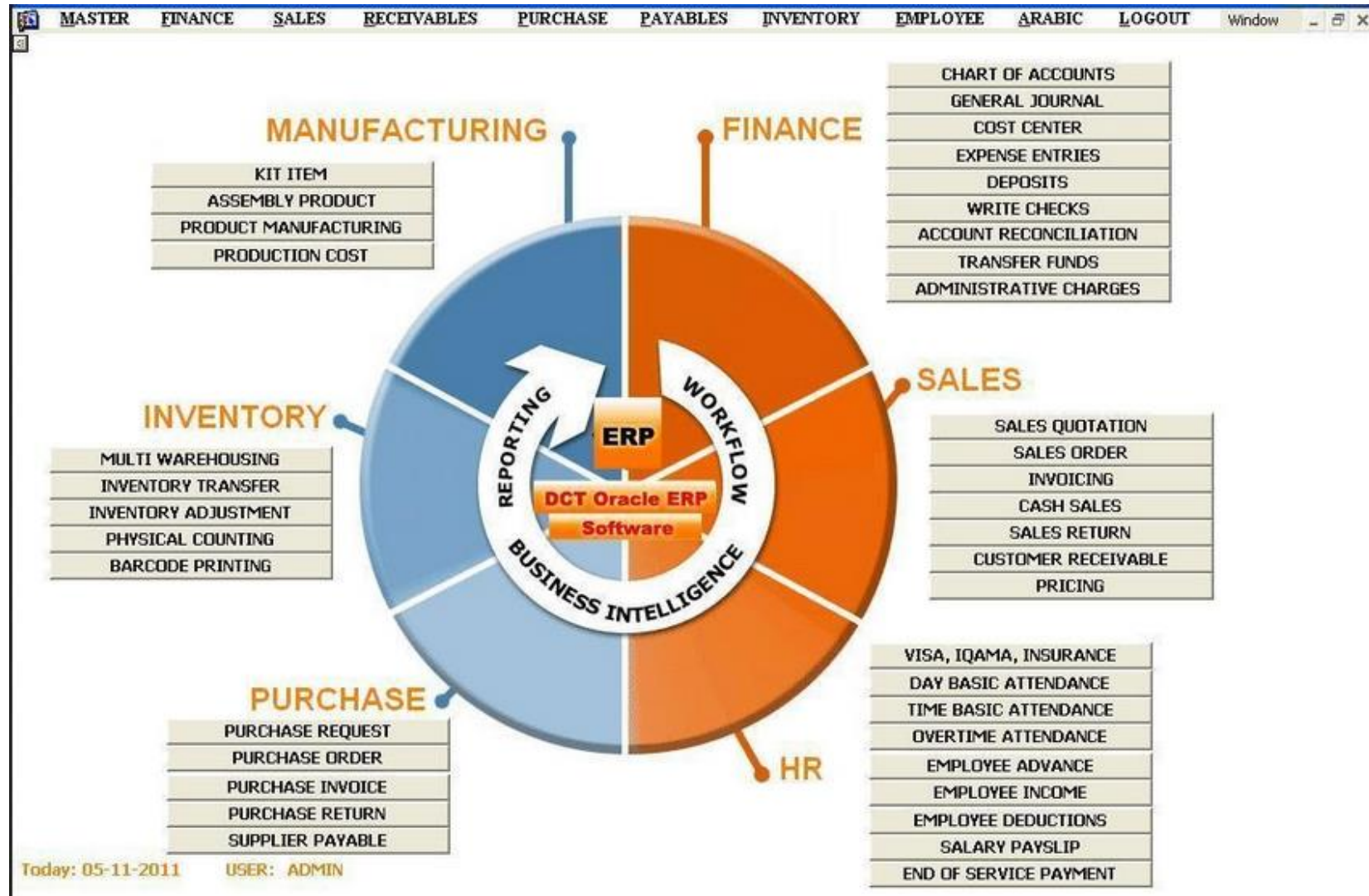
Firms



SAP

	Self Services							
Analytics	Strategic Enterprise Management		Financial Analytics		Operations Analytics		Workforce Analytics	
Financials	Corporate Governance		Financial Accounting		Management Accounting		Financial Supply Chain Management	
Human Capital Management	Employee Relationship Management		Employee Lifecycle Management		Employee Transaction Management		Workforce Deployment	
Operations: Value Generation	Purchasing	Inventory Management	Manufacturing		Distribution	Sales Order Management	Service Order Management	
Operations: Support	Product Structure Management		Project Management		Quality Management		Asset Management	
Corporate Services	Travel Management		Environment, Health & Safety		Incentive and Commission Management		Real Estate Management	
Solution and Integration Platform	People Integration		Information Integration		Process Integration		Application Platform	

ORACLE



SAGE

Sage ERP Accpac - Windows Internet Explorer

http://bcr512188/SageERPAccpac/portal60a/portal.html

Google

DevTrack Web user Steph... Sage Accpac (603dev08 ex... Sage Accpac (603dev08) http--bcr512188-crm-eware Sage Accpac (bcr512188) vpn.na.sage

Sage ERP Accpac

Welcome Administrator | This Session: 09/13/2020 SAMINC | Help | Change Password | Sign Out

Tasks Reports Inquiry

My Shortcuts

Customize Shortcuts

G/L Batch List G/L Journal Entry A/R Invoice Batch List A/R Invoice Entry A/R Receipt Entry A/P Invoice Batch List A/P Invoice Entry

Home

Add Snapshots

Getting Started

- What's New in this Version?
- Customize Your Home Page
- Get Started with Snapshots
- Create a Query
- Visit the Sage ERP Accpac Community
- Search the Learning Center
- Browse Video Tutorials
- Browse Courses at Sage University
- Tell Us How to Improve this Product

Aged Payables

Aged As Of 09/13/2020 (By Due Date)

Total: 54,010

Balance Sheet

As Of 09/30/2020

Assets

Liabilities & Shareholders' Equity

- Cash and Cash Equiv...
- Accounts Receivable
- Inventory
- Other Current Assets
- Net Fixed Assets
- Other Assets
- Accounts Payable
- Other Current Liabil...
- Long Term Liabilities
- Other Liabilities
- Share Capital
- Shareholders' Equity
- Net Loss

View Balance Sheet

Aged Receivables

Aged As Of 09/13/2020 (By Due Date)

Total: 28,825

Days Payables Outstanding

As Of 09/13/2020

Payables Outstanding: 194 days

Annual Purchases: 100,168
Ending A/P Balance: 53,146

Income Statement

For 9 Periods Ending 09/30/2020

Revenue

Local intranet | Protected Mode: Off

Microsoft Dynamics

The screenshot displays the Microsoft Dynamics AX 1 - SoREnigma Inc. interface with several key components:

- Left Navigation Pane:** Shows the 'ARP (dm2)' menu with sub-items like 'My projects (assignments)', 'Project management', 'Resource planning', 'Workflow', and 'Setup'.
- Capacity Overview (dm2):** A 3D area chart showing capacity utilization over five periods. A table below it shows utilization for resource groups 40010, 40120-6, and 90005.
- Capacity Overview Table:**

Resource Group	1	2	3	4	5
40010	0.00	0.00	0.00	0.00	0.00
40120-6	0.00	0.00	0.00	0.00	0.00
90005	879.00	207.00	0.00	0.00	0.00
- Project Manager (dm2):** Shows a Gantt chart and a table of tasks for project 90065. A context menu is open over the Gantt chart with options like 'Accept', 'Start', 'Completed', etc.
- Project Manager Table:**

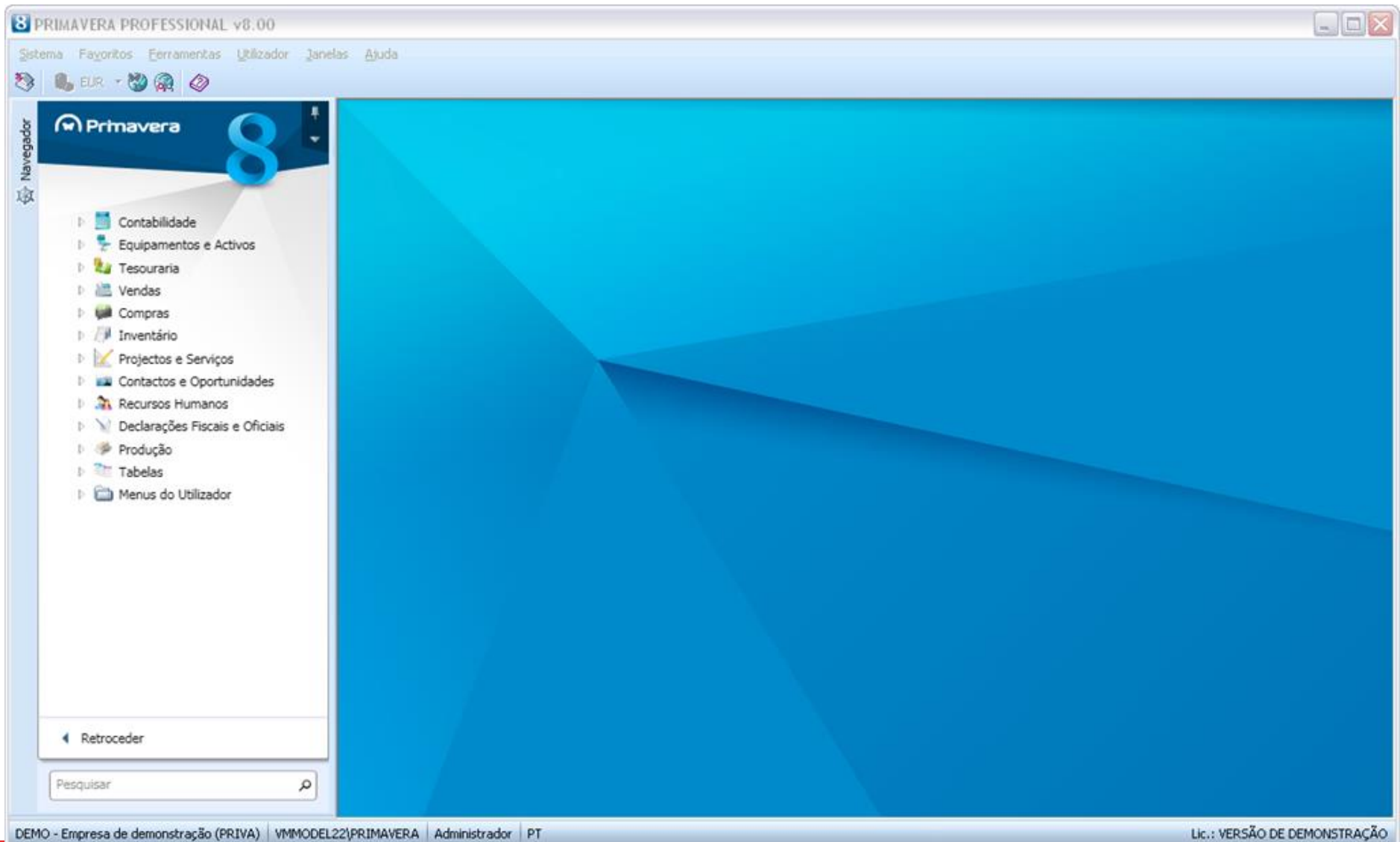
H	C	T	Title	Prede...	Workflow...	Start	Finish	%...	Dur...
0			MSP: crane demo rev ...		WA (waitin...	Tue 09/01/09	Mon 10/05/09	0	206h
1			Engineering		WA (waitin...	Tue 09/01/09	Tue 09/08/09	0	59h
2			Product Specs se...		WA (waitin...	Tue 09/01/09	Tue 09/01/09	0	2h
3			Engineer designs ...	2	WA (waitin...	Tue 09/01/09	Wed 09/02/09	0	12h
4			Crane designs se...	3	WA (waitin...	Wed 09/02/09			
5			Custom rfn/parts		WA (waitin...	Tue 09/01/09			
- Project Status (dm2):** A Gantt chart showing project schedules from 2007 to 2008. A table below it shows 'Planned demand' and 'Total capacity' over 14 periods.
- Project Status Table:**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Planned demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	8.00
Total capacity	0.00	0.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
- Bottom Panel:** A list of projects with a Gantt chart and a 'Project setup' panel with buttons like 'Start project workflow', 'Clear schedule', 'Auto assign res.', 'Roles / resources (B)', 'Schedule project', 'Modify', and 'Calculate (G)'.

National Market



Primavera



PHC



Open Source

odoo

Dolibarr^{ERP/CRM}

openbravo[®]

Tryton

ERP5

ofbiz[™] The Apache Open for Business Project

COMPIERE



weberp

erpnext



FrontAccounting^{ERP}

Kwa
Moja

WEBERP

The screenshot shows the webERP main menu interface. At the top left, there is a logo for 'weberdemo' and a user profile for 'Demonstration user'. On the top right, there are navigation links: 'Main Menu', 'Customers', 'Items', 'Suppliers', 'Manual', and 'Logout'. The main menu is divided into three columns: 'Sales', 'Inquiries and Reports', and 'Maintenance'. The 'Sales' column includes links for Receivables, Payables, Purchases, Inventory, Manufacturing, General Ledger, Asset Manager, Petty Cash, Setup, and Utilities. The 'Inquiries and Reports' column lists various reports and inquiries, including Order Inquiry, Print Price Lists, Order Status Report, Orders Invoiced Reports, Daily Sales Inquiry, Sales By Sales Type Inquiry, Sales By Category Inquiry, Top Sellers Inquiry, Order Delivery Differences Report, Delivery In Full On Time (DIFOT) Report, Sales Order Detail Or Summary Inquiries, Top Sales Items Report, Worst Sales Items Report, and Sales With Low Gross Profit Report. Below these are sections for 'Standard Reports and Forms' and 'Custom Reports', both indicating 'There are no reports to show!'. The 'Maintenance' column includes 'Select Contract' and 'Create Contract'. At the bottom left is the 'webererp' logo, and at the bottom right is the date and time: 'Saturday 6 October 19:11'. The footer also contains the version information: 'webERP version 4.09 Copyright © 2004 - 2012 weberp.org'.

weberdemo Demonstration user

Main Menu Customers Items Suppliers Manual Logout

Main Menu

- Sales
- Receivables
- Payables
- Purchases
- Inventory
- Manufacturing
- General Ledger
- Asset Manager
- Petty Cash
- Setup
- Utilities

Transactions

- Enter An Order or Quotation
- Enter Counter Sales
- Print Picking Lists
- Outstanding Sales Orders/Quotations
- Special Order
- Recurring Order Template
- Process Recurring Orders

Inquiries and Reports

- Order Inquiry
- Print Price Lists
- Order Status Report
- Orders Invoiced Reports
- Daily Sales Inquiry
- Sales By Sales Type Inquiry
- Sales By Category Inquiry
- Top Sellers Inquiry
- Order Delivery Differences Report
- Delivery In Full On Time (DIFOT) Report
- Sales Order Detail Or Summary Inquiries
- Top Sales Items Report
- Worst Sales Items Report
- Sales With Low Gross Profit Report

Standard Reports and Forms

There are no reports to show!

Custom Reports

There are no reports to show!

Maintenance

- Select Contract
- Create Contract

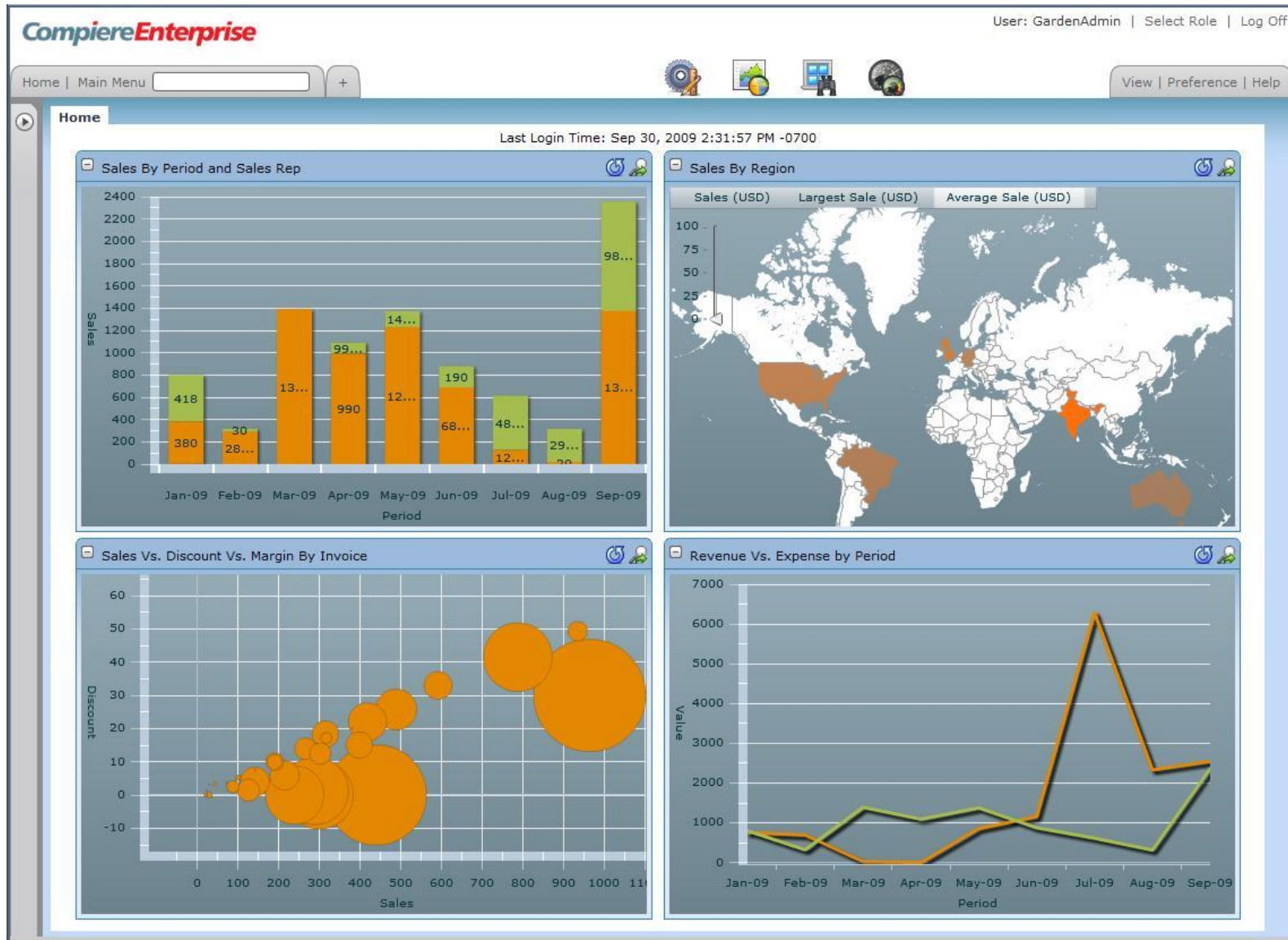
webererp webERP version 4.09 Copyright © 2004 - 2012 weberp.org

Saturday 6 October 19:11

OpenBravo

The screenshot displays the OpenBravo web application interface for a 'Sales Dimensional Report'. The top navigation bar includes the company name 'yourCOMPANY', the current page path 'Sales Management || Analysis Tools || Sales Dimensional Report || Sales Dimensional Report', and the OpenBravo logo. A left-hand sidebar menu lists various system modules such as 'General Setup', 'Master Data Management', 'Sales Management', and 'Financial Management'. The main content area is titled 'Sales Dimensional Report' and contains several filter sections: 'Primary Filters' with date and amount criteria, 'Secondary Filters' with dropdown menus for Organization, Warehouse, Business Partner Group, Product Group, Business Partner, Product, Commercial Document, and Commercial File, and 'Dimensions' with a list of report dimensions. Below these are 'Sort' options (Standard, By Ascending Amount, By Descending Amount) and 'View Results' buttons for HTML and PDF formats. A red error message '* This value is required.' is visible next to the 'Amount Greater Than' field.

Compiere



FrontAccounting

Sales Purchases Items and Inventory Manufacturing Dimensions Banking and General Ledger Setup

Monkeypantz | localhost | Administrator Preferences Change password Logout

Company Setup

- Company Setup
- User Accounts Setup
- Access Setup
- Display Setup
- Forms Setup
- Taxes
- Tax Groups
- Item Tax Types
- System and General GL Setup
- Fiscal Years
- Print Profiles

Miscellaneous

- Payment Terms
- Shipping Company
- Points of Sale
- Printers
- Contact Categories

Maintenance

- Void a Transaction
- View or Print Transactions
- Attach Documents
- System Diagnostics
- Backup and Restore
- Create/Update Companies
- Install/Update Languages
- Install/Activate Extensions
- Install/Activate Themes
- Install/Activate Chart of Accounts
- Software Upgrade

06/10/2011 | 06:17 pm

ADempiere

The screenshot displays the ADempiere web interface in a browser window. The address bar shows the URL <http://www.testadempiere.com/webui/>. The user is logged in as SuperUser@System.*. The main menu includes 'Menu (10)', 'Window, Tab Field', and 'Table and Column'. The 'Table and Column' tab is active, showing the configuration for the 'AD_AccessLog' table. The configuration includes fields for Client (System), Organization (*), DB Table Name (AD_AccessLog), Name (Access Log), and Description (Log of Access to the System). There are also checkboxes for Active, View, Maintain Change Log, and High Volume, and dropdown menus for Data Access Level (System+Client), Window (Access Audit), and PO Window. A 'Create Columns from DB' button is visible. Below the configuration, a 'Column' table lists the columns for the table.

Client	Organization	Table	DB Column Name	Column SQL
System	*	AD_AccessLog_Ac...	AD_Column_ID	
System	*	AD_AccessLog_Ac...	AD_Client_ID	
System	*	AD_AccessLog_Ac...	AD_Column_ID	
System	*	AD_AccessLog_Ac...	AD_Org_ID	
System	*	AD_AccessLog_Ac...	AD_Table_ID	
System	*	AD_AccessLog_Ac...	Created	

ERPNext



Invoice software certification (Portugal)



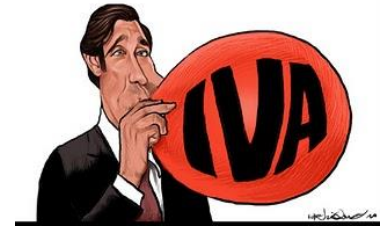
- Law:

- Portaria n.º 363/2010, de 23 de Junho
- Portaria n.º 22-A/2012, de 24 de janeiro
- Portaria n.º 340/2013, de 22 de novembro
- Especificação dos requisitos técnicos – Despacho n.º 8632/2014 de 03 de julho, do Diretor-Geral da AT
- http://info.portaldasfinancas.gov.pt/pt/apoio_contribuinte/CertificacaoSoftware.htm

- List of certified software

- <https://www.portaldasfinancas.gov.pt/pt/TC/Out/consultaProgCertificadosM24.action?&pagina=22>

Invoice



- *Invoice*
- Legal definition(**código art. 36º CIVA**)
 - http://info.portaldasfinancas.gov.pt/pt/informacao_fiscal/codigos_tributarios/civa_rep/iva36.htm
- Issuing of copy of invoice till 5 days after transaction
- Data and numbers sequential order
- Name of company, Address and Tax Number
- Quantities and Item names
- Price without taxes and tax rate applied
- Date where itens were supplied to client

e-fatura



- <https://faturas.portaldasfinancas.gov.pt/>



Electronic Invoice



Electronic Invoice = *Fatura Electronica*
E-Fatura \neq *Fatura Electronica*

Integrating eGov and eBanking

The joy of e-Government:



Before:



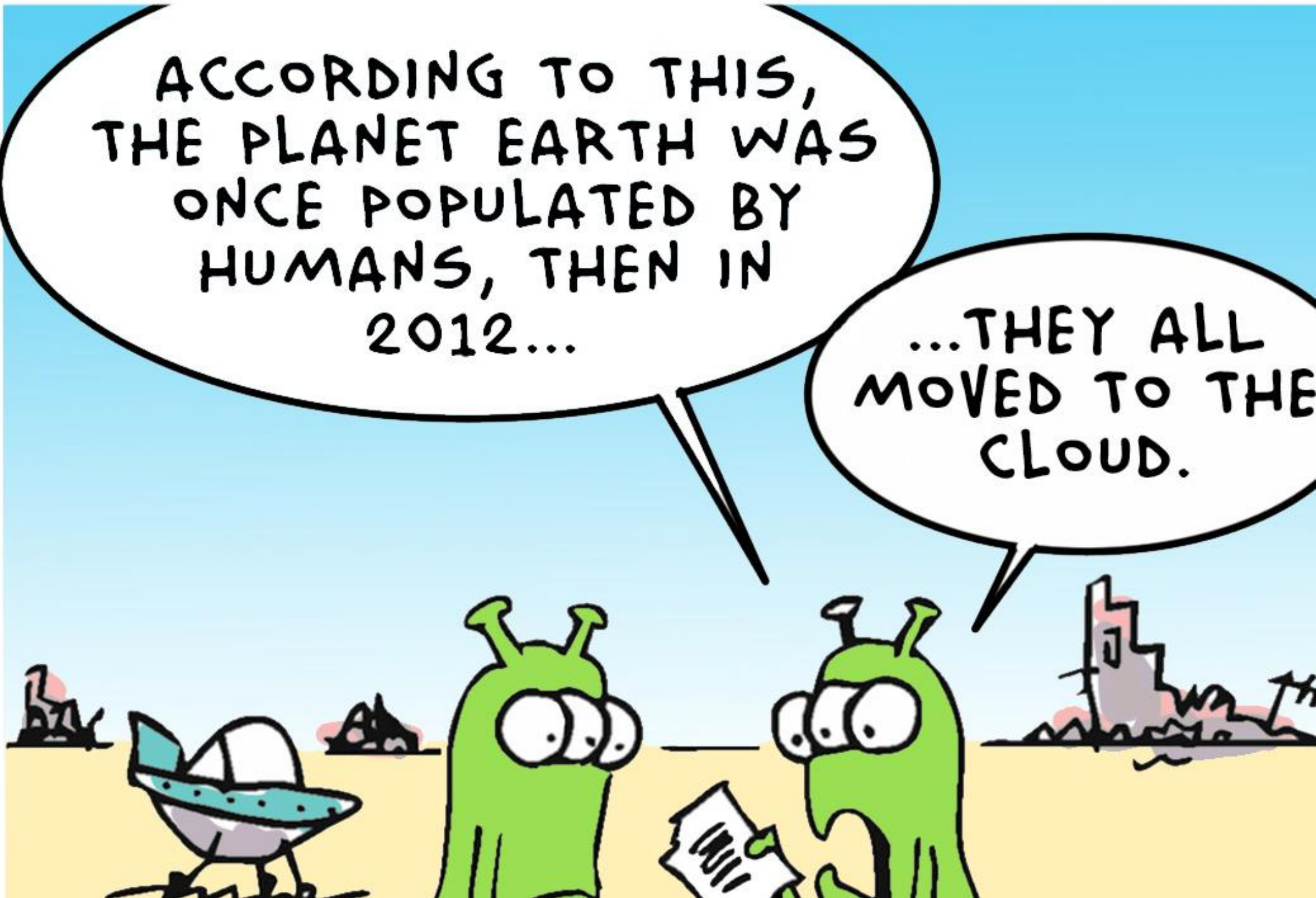
After:



© 1997 by Randy Glasbergen. E-mail: randyg@norwich.net
<http://www.norwich.net/~randyg/toon.html>



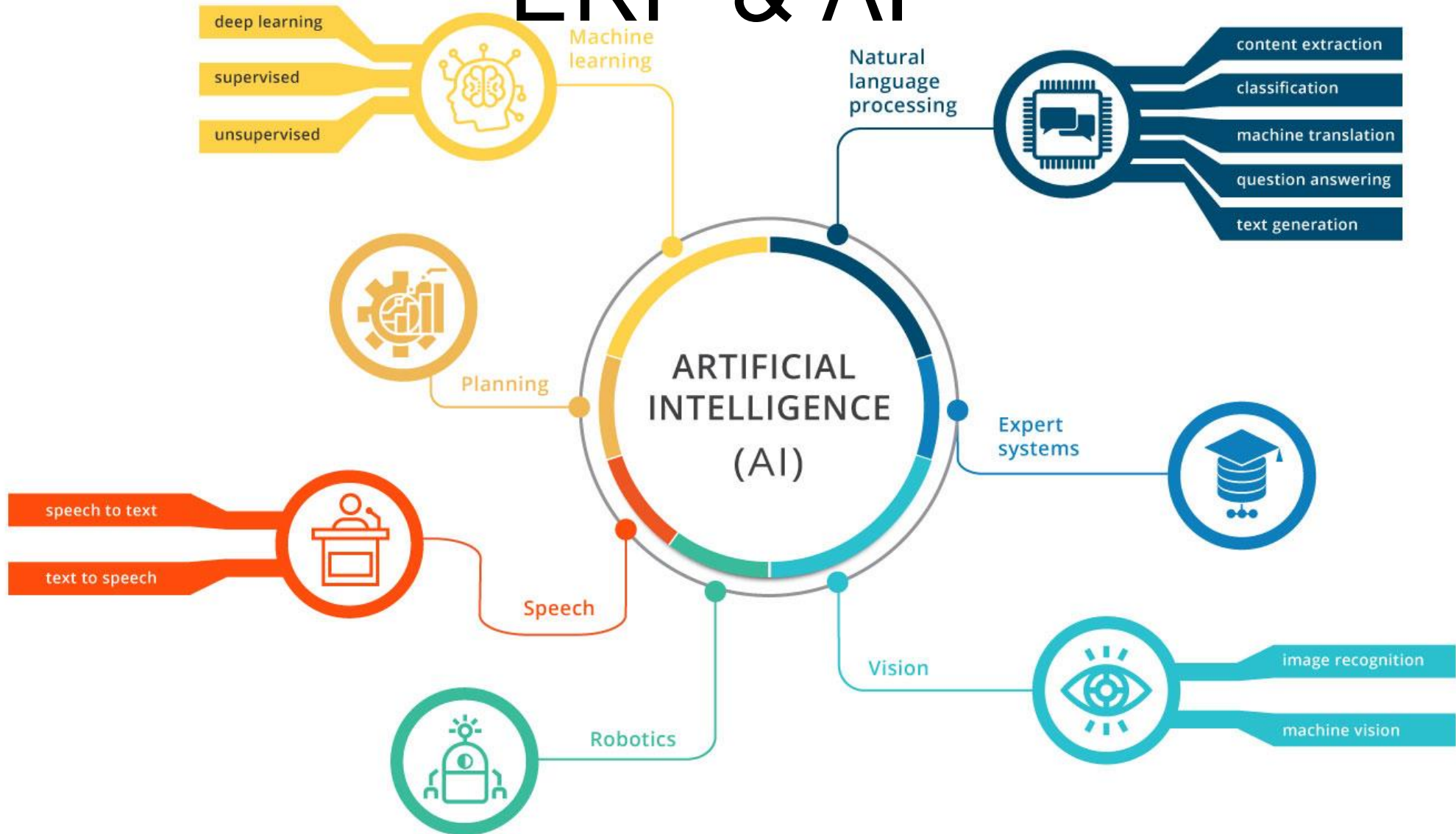
“The computer salesman said we can do all of our banking online. I slipped my paycheck into the slot, but nothing happened.”



ACCORDING TO THIS,
THE PLANET EARTH WAS
ONCE POPULATED BY
HUMANS, THEN IN
2012...

...THEY ALL
MOVED TO THE
CLOUD.

ERP & AI



- Source: Rohm, T (2021)

ERP & AI

- Advanced analytics and forecasting
- Customer service management
 - faster, cheaper, and more consistent customer service by using: chatbots virtual assistants using NLP and natural language generation.
- Production and operation Management
 - Related to IOT (Internet of Things)
- Human resources management
 - AI can help automate and improve HR tasks
- Finance/accounting management
 - help automate and improve transaction processing, invoice processing, financial analysis, reporting, etc.

ERP & AI

- Data privacy and security
- Cybersecurity and resilience
- Bias and fairness
- Transparency and explainability

Sites

- Associação de Empresas de Software de Open Source de Portugal (<http://www.esop.pt/>)
- Associação Portuguesa de Software (<http://www.assoft.org/>)
- Dynamics (<http://www.microsoft.com/en-us/dynamics/>)
- Odoos (<https://www.odoo.com/>)
- Oracle
(<https://www.oracle.com/applications/enterprise-resource-planning/>)
- PHC (<http://www.phc.pt/>)
- PrimaveraBSS (<http://www.primaverabss.com>)
- Sage (<http://www.sage.com/>)
- SAP (<http://www.sap.com>)
- Tryton (<http://www.tryton.org/>)

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