

FIT5101 Enterprise Systems



Lecture 10

❖ Current Technologies supporting ERP

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Unit Topics (Subject to change)

Week	Date (W/C)	Lecture	Tutorial	Assessment
1	1/3	Introduction	Introduction	
2	8/3	Business Functions & Processes	Business Functions	
3	15/3	ERP Structures	SAP Introduction	Ass 1 Rel
4	22/3	Materials Management & Procurement	Materials Management	S A P W O R K S H O P S
5	29/3	Sales & Distribution	Procurement	
	5/4	BREAK		
6	12/4	Production Planning	Sales & Distribution	
7	19/4	Financials	Production Planning	
8	26/4	Process Integration & Modelling	Financials	
9	3/5	ERP Implementation	Process Modelling	Ass 2 Due 7/5
10	10/5	Current Technologies	Work on Assignment	
11	17/5	Future Trends	Sample eExam / Review	
12	24/5	Review	??	Ass 3 Due 28/5

Current Technologies supporting ERP

- Digital Disruption / Transformation
- Big Data
- Business Intelligence / Data Mining
- In-Memory Computing
- RFID
- Cloud Computing
- SAAS
- Mobility



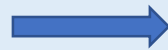
Digital Disruption / Transformation

Digital disruption is the change that occurs when new digital technologies and business models affect the value proposition* of existing goods and services.

Digital transformation is the process of using digital technologies to create new — or modify existing — business processes, culture, and customer experiences to meet changing business and market requirements. This reimagining of business in the digital age is digital transformation.

i.e.

Digital Disruption



Digital Transformation



*An innovation, service, or feature intended to make a company or product attractive to customers.

What is Digital Transformation

- The remaking and reforming of how an enterprise serves all its constituencies (customers, employees and business partners).
- It refers to entirely new, all-digital ways of doing business and making decisions.
- It defines processes that support continuous operations improvement, even disrupting existing businesses and entire markets while inventing new business models.
- Fully leverages digital technologies in a highly strategic, carefully planned way to effect these profound changes.
- It is business imperatives that are driving digital transformation.
- The role of current enterprise resource planning (ERP) systems is to provide a scalable and flexible IT infrastructure *despite* digital disruption.

Ref: James A. Scott (2018). A Practical Guide to Microservices and Containers

The Need for Digital Transformation

- ‘Transform or Die’
- The underlying traditional or legacy infrastructures that have dominated enterprise IT for nearly 30 years simply cannot handle the workloads or power the applications that will drive business decision.
- Business and IT leaders today identify that they must transform the way the enterprise does business or risk going out of business entirely.
- In the recent 451 Research (Voice of the Enterprise Storage) survey of 500 senior IT decision makers, two thirds of respondents said their businesses will require moderate to significant transformation in the next five years.

Ref: James A. Scott (2018). A Practical Guide to Microservices and Containers

Digital Transformation: Ubank



- Ubank is the fastest growing bank in Australia: a digital business run separately from NAB launched in 2008 from a standing start, now has almost 375,000 customers.
- It provides savings products and home loans over the Internet and telephone.
- It has created a transformational change in service, costs and agility by appealing to "digital natives" (under 35s).

Digital Technology

Intelligent vending machines driving vending innovation

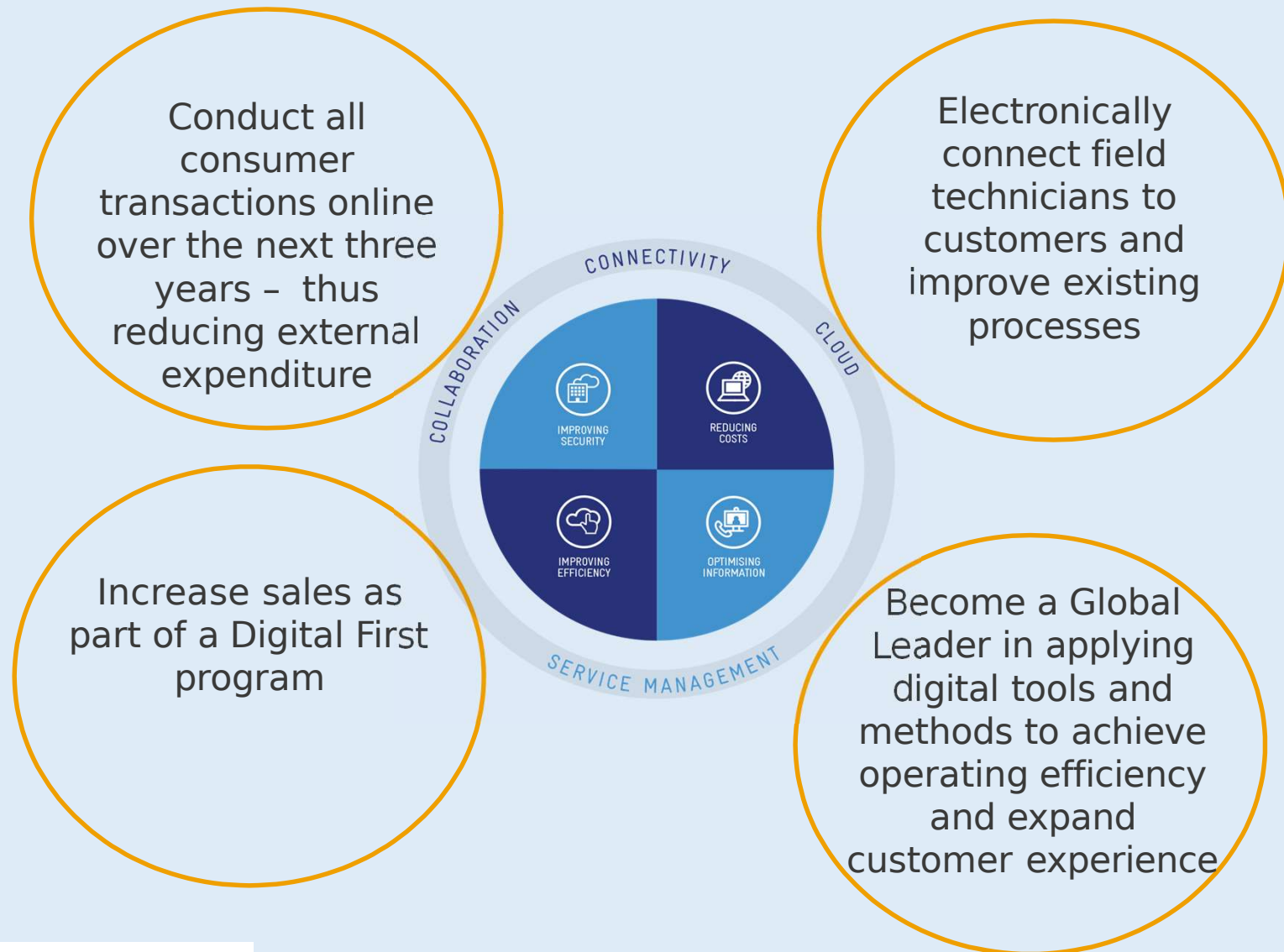


Cashless gateway:
Credit/debit card
readers to provide
payment flexibility

Customised Billboard:
digital marketing tool

- Venders connected to the Internet can report sales, inventory and service issues to Coca-Cola Refreshments in real-time —
- Drastically improving service levels at substantially reduced operating costs
- Ensures units are always fully stocked. **KNOW YOUR MARKET**

Telstra Example: Future Digital Plans



Digital Disruption: Harnessing the bang!!

Deloitte's Digital Disruption Map

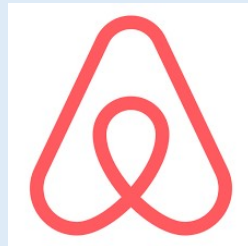
Projected
digital disruption
across 18 industry
sectors



Digital Disruption

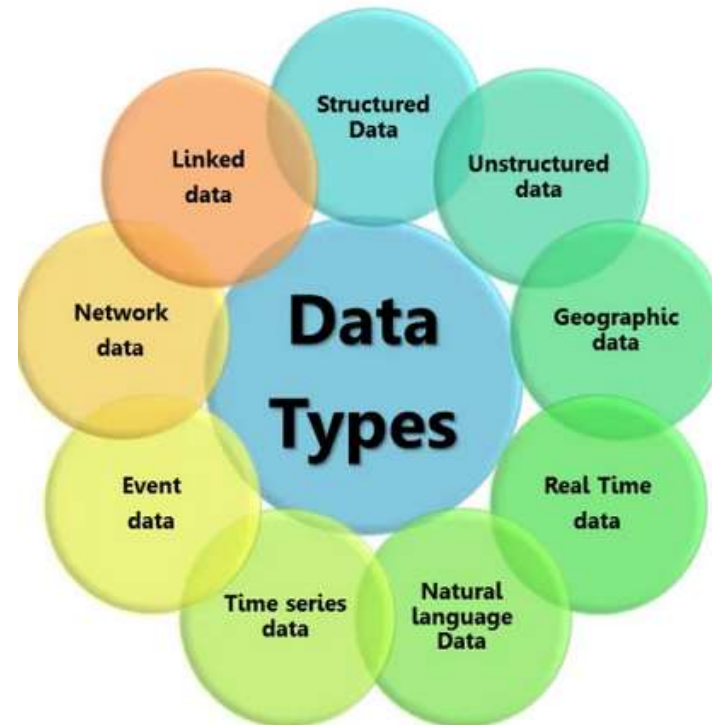
Companies who use digital capabilities for competitive advantage

- The world's largest taxi company (Uber) owns no taxis.
- The world's largest accommodation provider (Airbnb) owns no real estate.
- The largest communications companies (Skype, WhatsApp, Facebook Messenger, Viber) own no infrastructure.
- The world's most valuable retailer (Alibaba) has no inventory.
- The world's largest movie house (Netflix) owns no cinemas.
- The largest software vendors don't write the apps (Apple, Google, Facebook).



Big Data

Definition : **Big Data** is a phrase used to mean a massive volume of both *structured* and *unstructured data* that is so large it is difficult to process using traditional database and software techniques. In most enterprise scenarios the volume of **data** is too big, or it moves too fast, or it exceeds current processing capacity.



What is Big Data? : <https://youtu.be/bAyrObI7TYE>

Big Data and Big Data Analytics

- Biggest challenge with big data, which includes Internet of Things (IoT) data, is that it is increasingly of the semi and unstructured variety.
- Legacy RDBMS simply cannot aggregate, store and process this data efficiently or effectively, certainly not in high volumes.
- The data volumes are unprecedented and growing at high speed
- IT systems are under tremendous pressure to deal with the volume, variety, and velocity of new data, while at the same time pressured to deliver more personalization and better service to the customer base.
- Storing all the data is difficult, with many organizations looking to data lakes* to collect and store huge volumes of data in native formats

*A **data lake** is a storage repository that holds a vast amount of raw **data** in its native format until it is needed.

Ref: James A. Scott (2018). A Practical Guide to Microservices and Containers

Too much Information but not enough Intelligence

GOOGLE “information overload” and you are immediately overloaded with information: more than 7m hits in 0.05 seconds. Some of this information is interesting: for example, that the phrase “information overload” was popularised by Alvin Toffler in 1970.

“Information overload” is one of the biggest irritations in modern life. There are e-mails to answer, virtual friends to pester, YouTube videos to watch and, back in the physical world, meetings to attend, papers to shuffle and spouses to appease. A survey by Reuters once found that two-thirds of managers believe that the data deluge has made their jobs less satisfying or hurt their personal relationships. One-third think that it has damaged their health.

Another survey suggests that most managers think most of the information they receive is useless.



Data
Asphyxiation

Data Smog

Information
Fatigue
Syndrome

YASOHMDTIITIITW*

Bit, Byte, Kilobyte, Megabyte

Gigabyte, Terabyte, Petabyte

Exabyte, Zettabyte, Yottabyte

Brontobyte, Hellabyte **



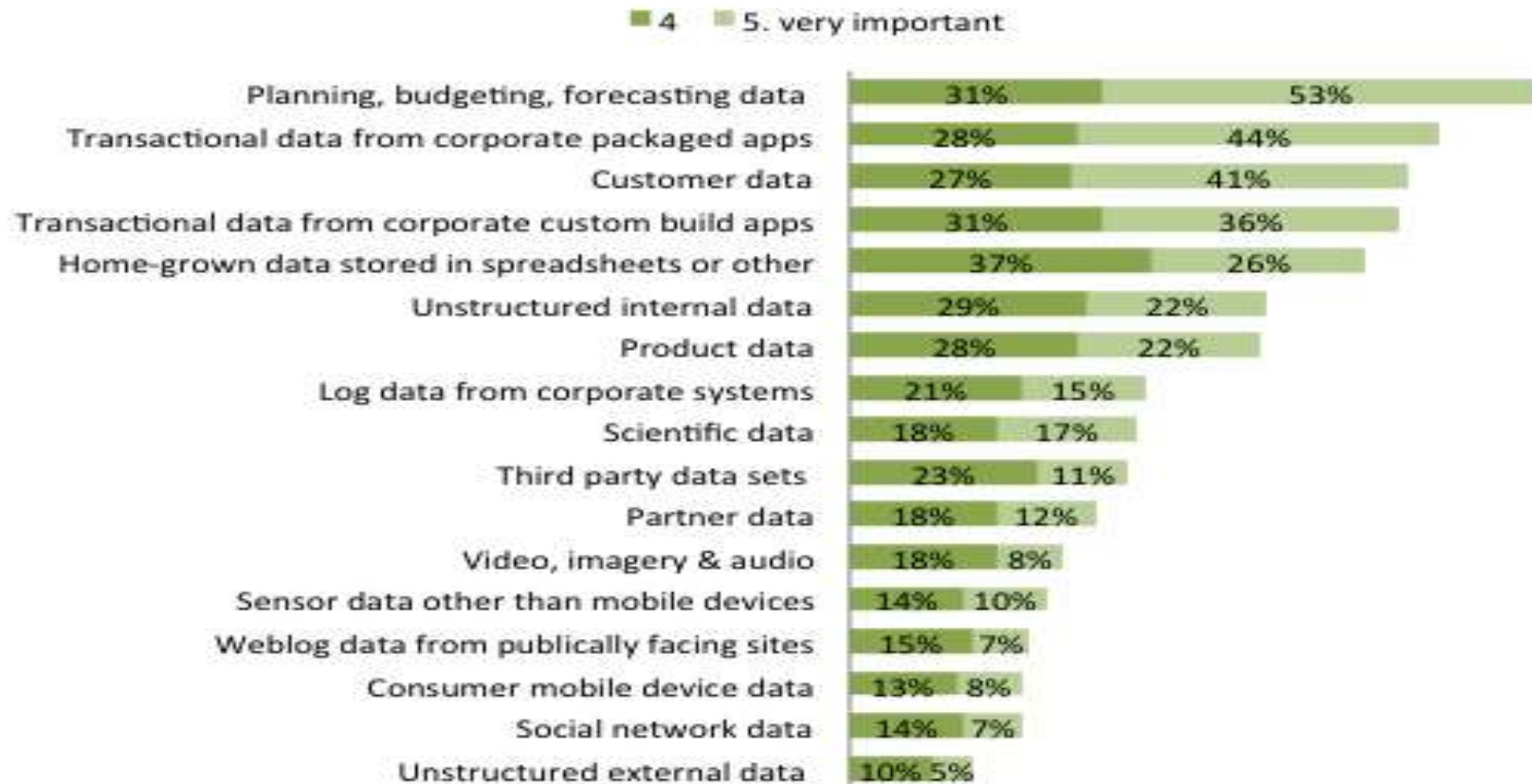
* Yet Another Slide On How Much Data There Is In The World

** A Hellabyte is equivalent to 1×10^{27} bytes

Big Data : Data Types

“How important are the following data types to your firm's overall business strategy?”

Answers 4 and 5 on a scale where 1- not at all important and 5 – very important



Base: 634 Business Intelligence users and planners

Source: Forrsights Strategy Spotlight: Business Intelligence And Big Data, Q4 2012

Big Data : Examples



Wal-Mart handles more than 1million customer transactions every hour, feeding databases estimated at more than 2.5 petabytes = 167 times the books in America's Library of Congress"

The Economist, Feb, 2010



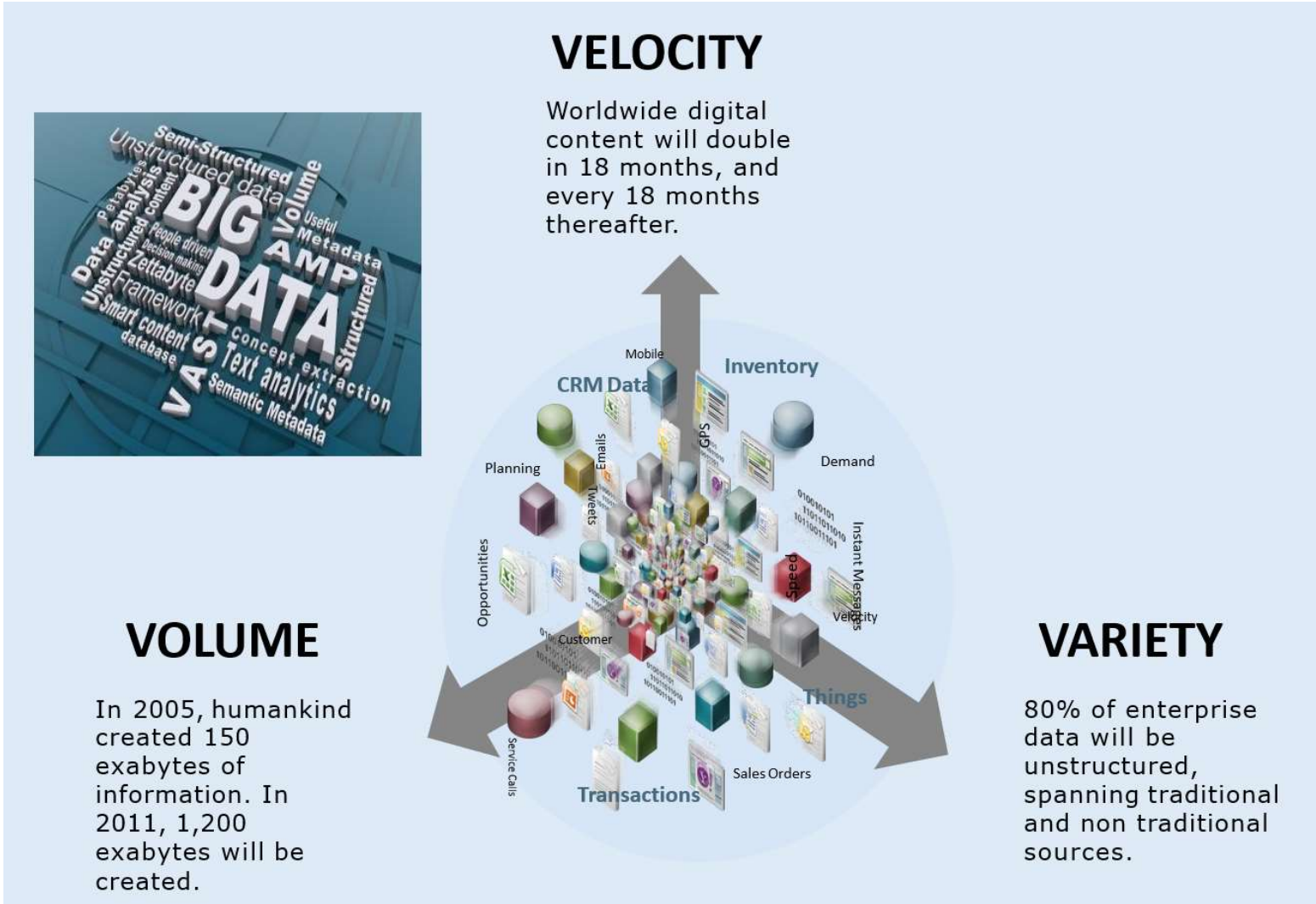
800,000 Customers

Hour: 1,600,000

Day: 38,400,000

**Year:
14,016,000,000**

Properties of Big Data

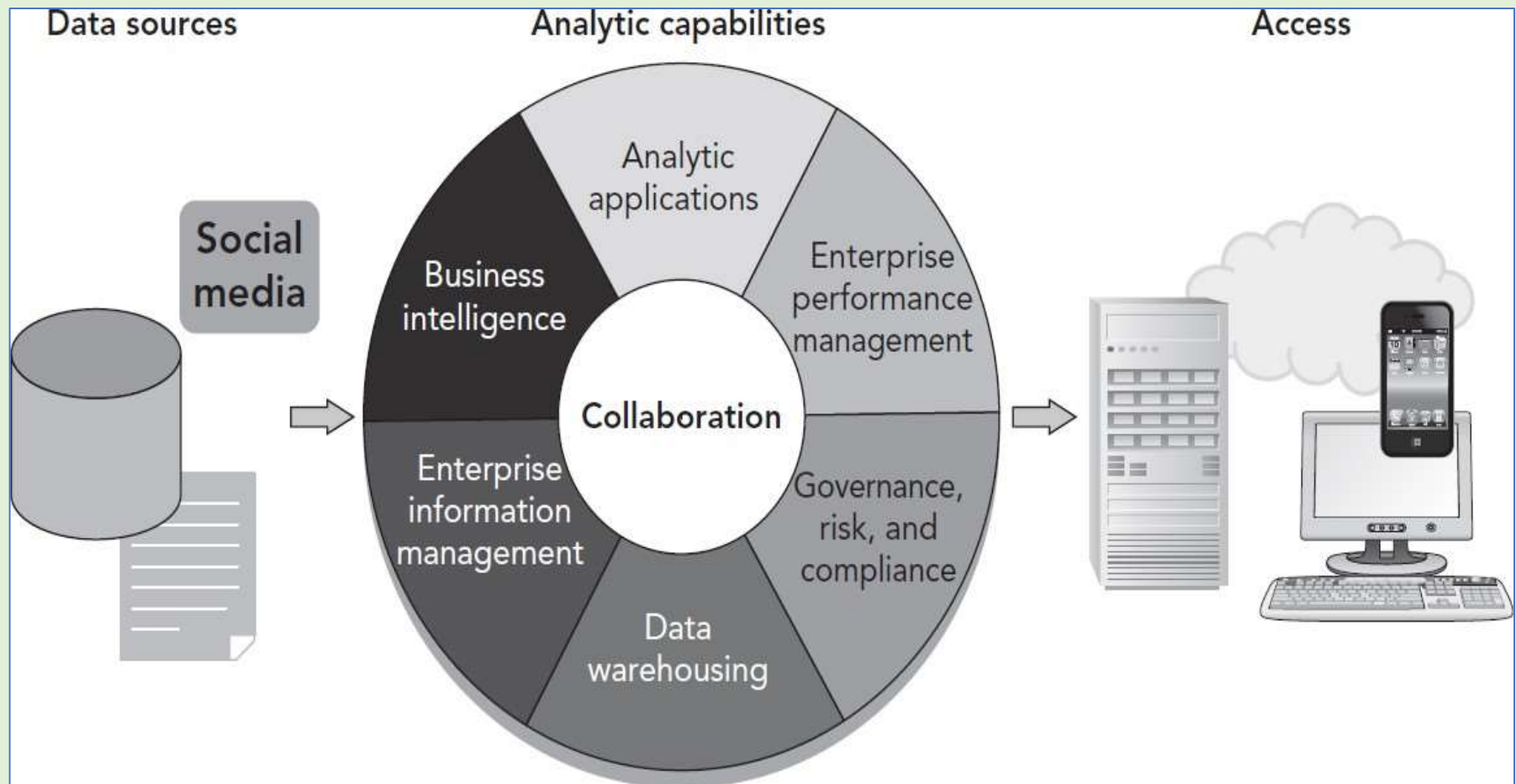


Business Intelligence (BI)

- Also referred to as *business analytics*.
- A range of different applications and technologies used to extract and analyze large amounts of data to aid in decision making.
- Includes data-mining tools and querying tools.
- Often interactive and visual.
- BI technologies are capable of handling large amounts of unstructured data to help identify, develop and/or create new strategic business opportunities.



SAP Business Intelligence (BI) Framework



SAP Business Intelligence (BI) Framework

Data Sources

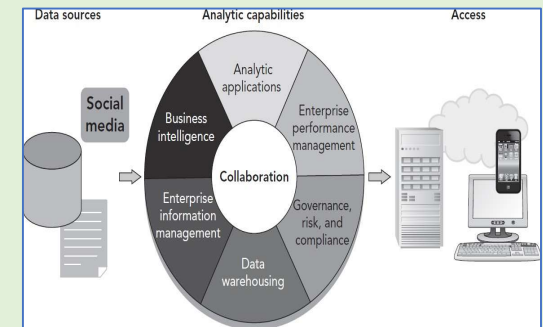
- Facebook, Twitter etc.
- Data bases
- Documents

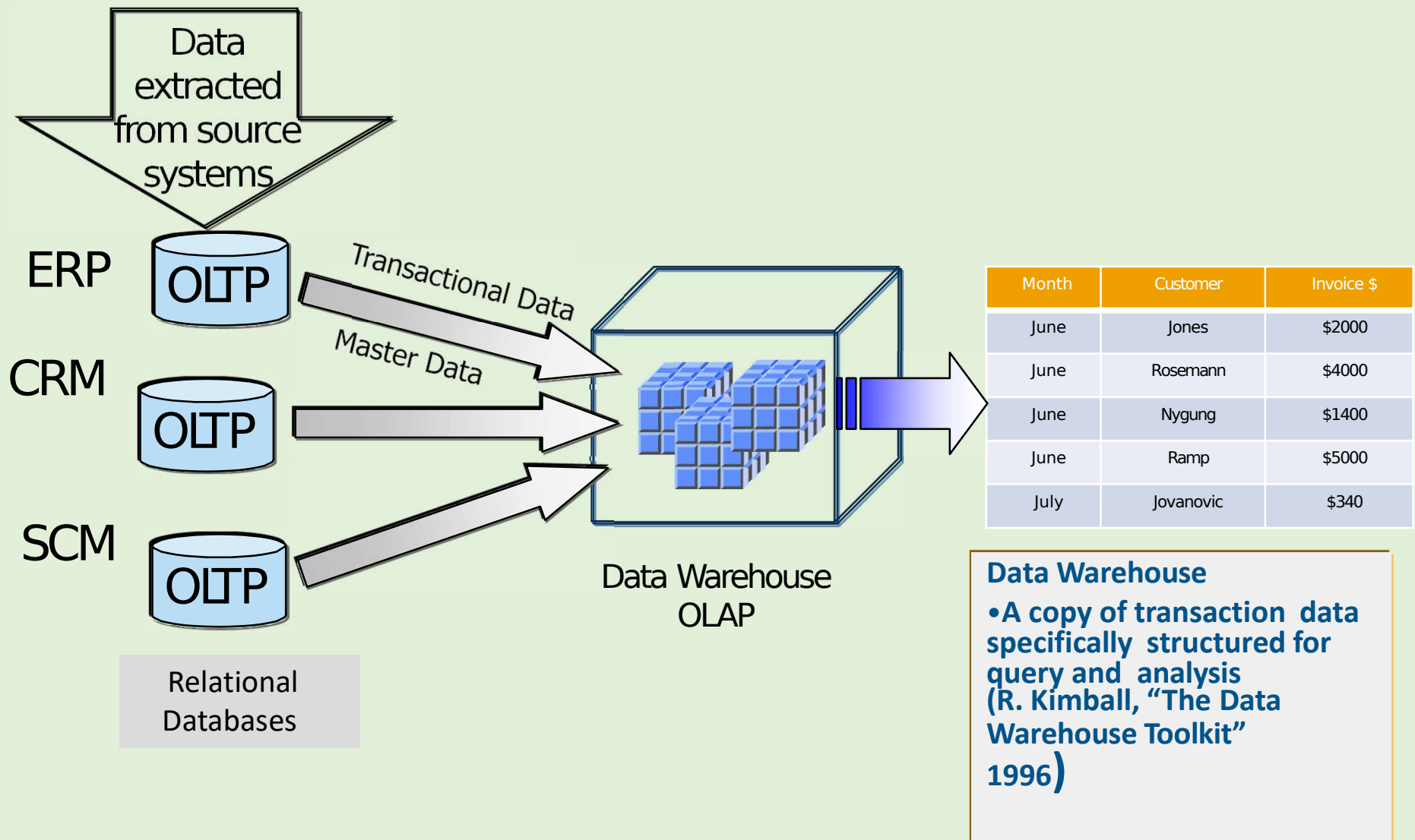
Analytic capabilities

- Analytic applications – data analysis tools.
- Enterprise performance management – developing strategic goals.
- Governance, risk and compliance – ensuring an organisation is functioning ethically and legally.
- Data warehousing – the technology used to store large volumes of data.
- Enterprise information management – the business and technology functions that manage information as a corporate asset.

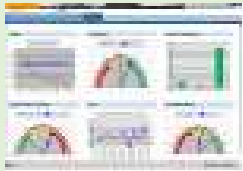
Access

- How users will access the BI





Business Intelligence Information Delivery Tools



Information Cockpit

- To get a quick overview of the business performance



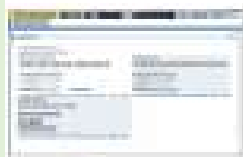
Dashboard

- Access to actionable information via deployable "patterns"



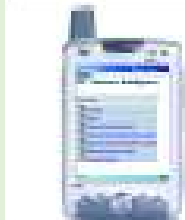
Geographical Presentation

- Visualize geographic (location based) business data on maps



Broadcasted pre-calculated reports

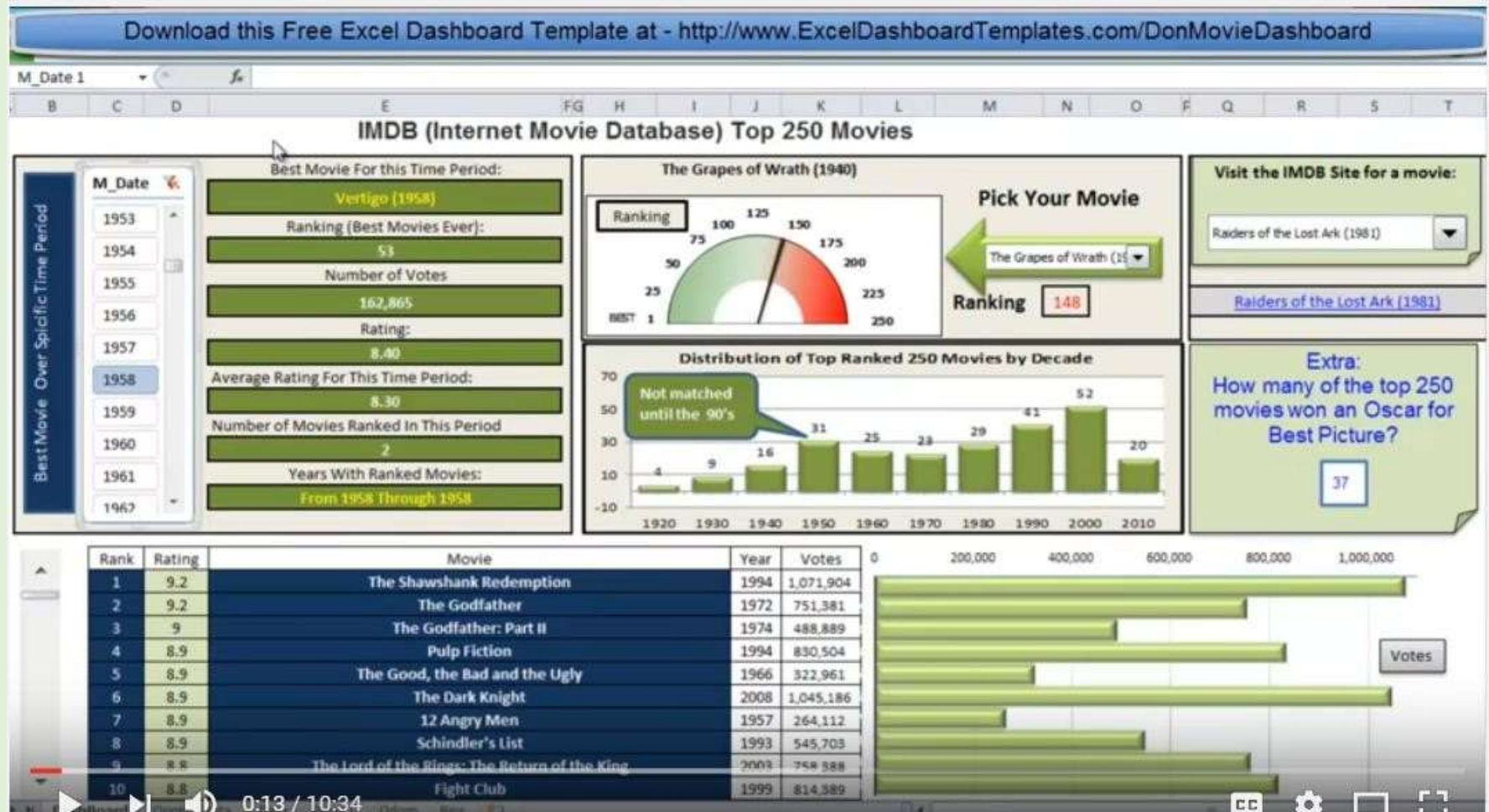
- Push of information for fast access via Email or Portal



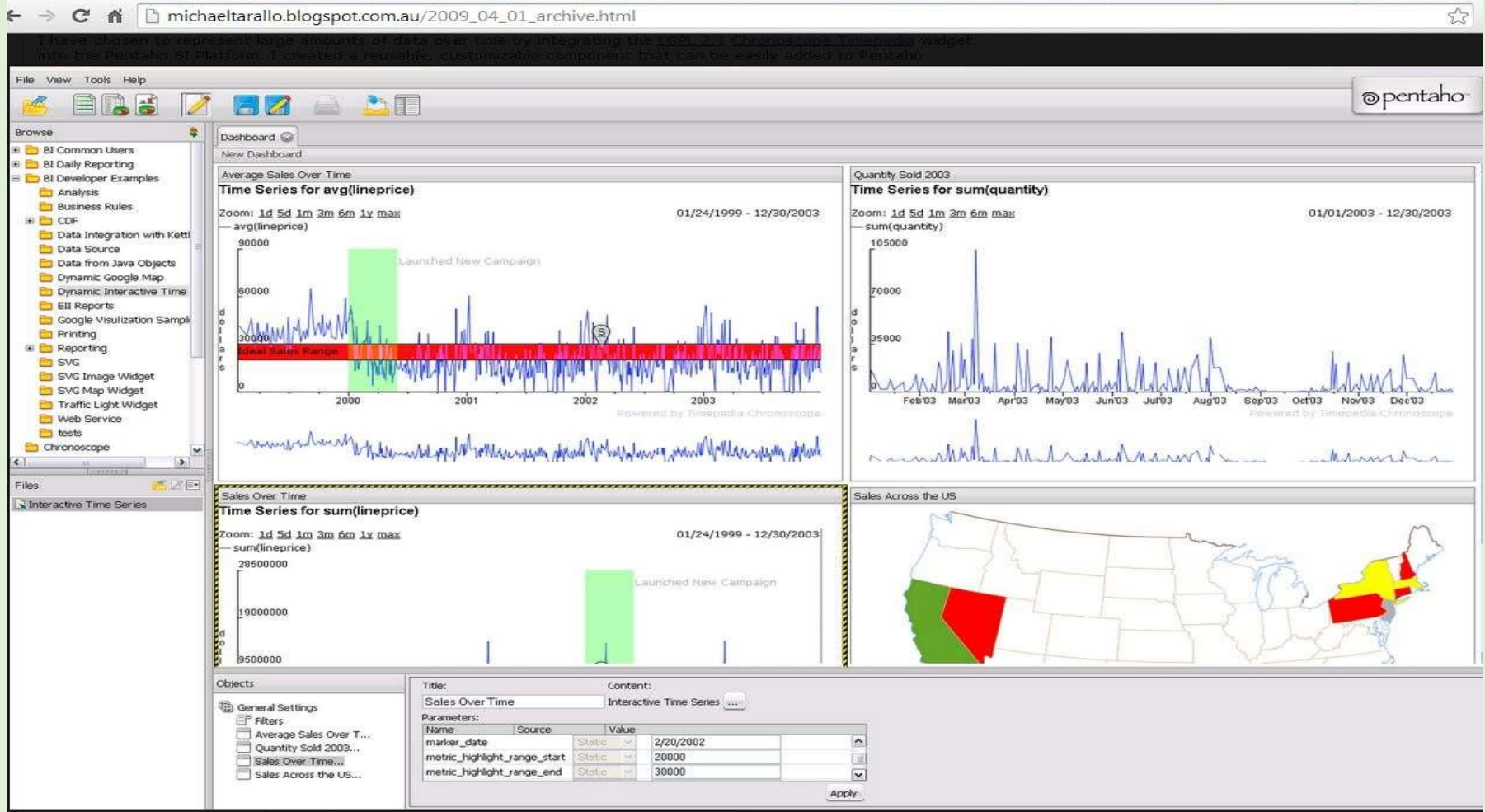
Mobile Intelligence

- Online and Offline access to business critical data

Dashboards - Excel



Simple Dashboard

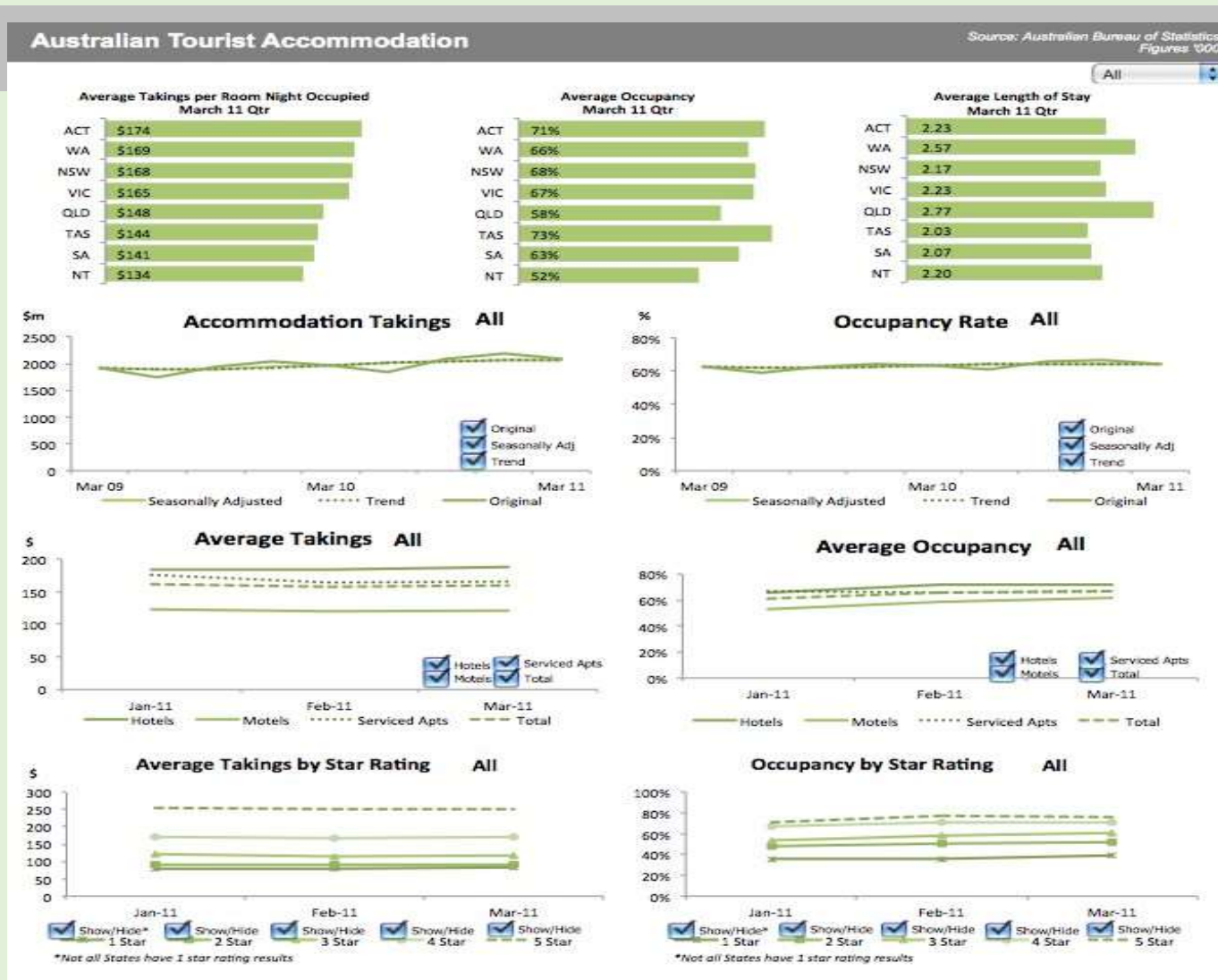


<http://examples.adobe.com/flex2/inproduct/sdk/dashboard/dashboard.html>

Portal: Take action to eliminate defects



Dashboards



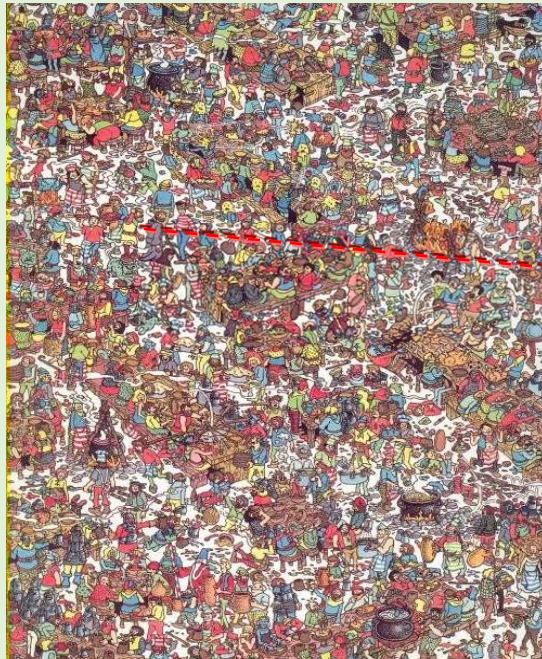
Business Intelligence Evolution

Evolution Phase	Business Question	Enabling Technology
Data Collection (1960s)	<i>"What was my total revenue for the day?"</i>	Data Processing Applications
Data Access (1980s)	<i>"What were sales quantity in Australia last March?"</i>	Relational Databases (OLTP)
Data Warehousing & Decision Support (1990s)	<i>"What were sales quantity in Europe? Drill down to Germany"</i>	On-Line Analytical Processing (OLAP)
Data Mining (emerging today) (Alexander 2008)	<i>"What is likely to happen to sales in Europe in fuel prices increase? Why"</i>	Advanced algorithms, increased computing power
Big data (2011/2012)	<i>"How big is big data"</i> <i>"How do I manage big data"</i>	Hana, Hadoop, IBM

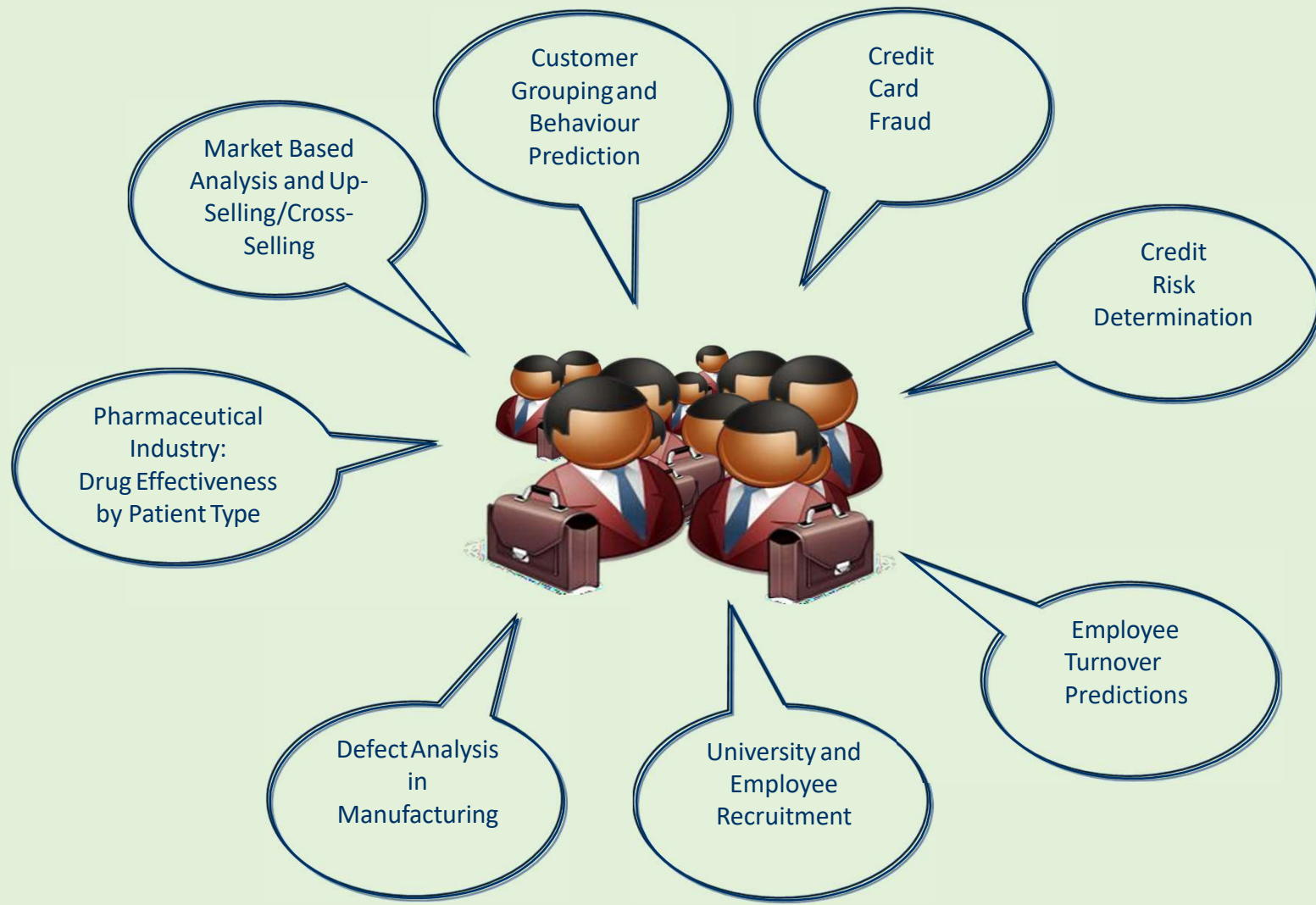
Data Mining

Data mining is the process of discovering meaningful new correlations, patterns and trends by "mining" large amounts of stored data using pattern recognition technologies, as well as statistical and mathematical techniques.

(Ashby, Simms (1998))



Data Mining Examples



In-Memory Computing

- Data in a data warehouse are structured as **multidimensional data cubes**
 - Allow for relationships in the data to be analyzed quickly
- Two main challenges with using a multidimensional cube structure
 - A significant level of technical expertise is needed to construct a cube
 - A multidimensional cube necessarily restricts how the data can be analyzed
- Accessing data from memory much faster than accessing data from a hard disk



In-Memory Computing (cont'd.)

- Reason why data warehouses use disk memory: storage capacity
 - Hard disks can store one thousand times more data than memory for a comparable cost.
- Data compression provided by column storage
 - Makes it possible to store large volumes of data in memory without aggregation
 - Multidimensional cubes are not required.
- Both SAP's and Oracle's in-memory solutions are designed to analyze “big data”

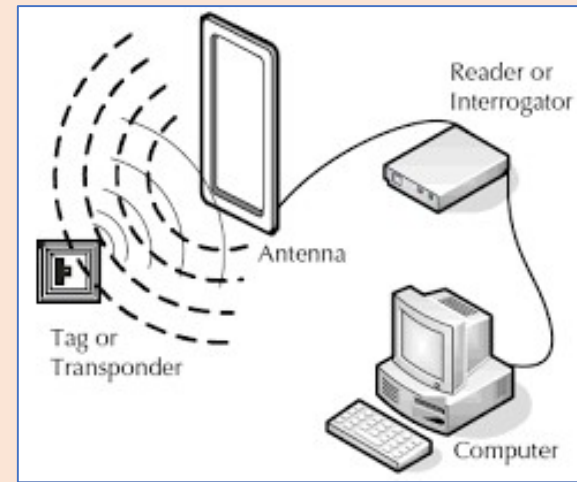
SAP HANA

At Yodobashi, a large Japanese retailer, the calculation of incentives for loyalty customers used to take 3 days of data processing, once a month. With HANA, this happens now in 2 seconds -- a performance improvement of over 100,000 times.



Radio Frequency Identification (RFID) Technology

- **Radio-frequency identification (RFID)** uses electromagnetic fields to automatically identify and track tags attached to objects.
- An RFID tag consists of a tiny radio transponder; a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to inventory goods.
- There are two types. *Passive tags* are powered by energy from the RFID reader's interrogating radio waves. *Active tags* are powered by a battery and thus can be read at a greater range from the RFID reader.



RFID Technology (cont'dt)

Advantages of RFID technology

- Does not need a line-of-sight connection
- Can withstand most environmental stresses

Application areas for RFID

- Walmart is on the leading edge of the move to integrate RFID technology into the supply chain
- Pharmaceutical firms are evaluating the use of RFID technology
- RFID technology is being employed to track medical devices
- Spectrum Health's Meijer Heart Center is using RFID technology to track stents

RFID example video: <https://youtu.be/3xE37v3dxW0>

Cloud Computing

Definition : Cloud Computing is the use of hardware and software to deliver a service over a network (typically the Internet). With cloud computing, users can access files and use applications from any device that can access the Internet.

Examples : Gmail, Office 365

Users typically pay only for cloud services they use, helping them lower their operating costs, run their infrastructure more efficiently, and scale as their business needs change.



Benefits of Cloud Computing

- **Cost** Eliminates capital expense of buying hardware and software.
- **Speed** Extensive computing resources.
- **Global Scale** The ability to scale in different geographical locations.
- **Productivity** Hardware & software is managed.
- **Performance** Latest generations of hardware.
- **Reliability** Extensive backup and data recovery
- **Security** Broad set of policies, technologies and controls

Types of Cloud Computing

Public cloud

Public clouds are owned and operated by a third-party cloud service providers, which deliver their computing resources, like servers and storage, over the Internet. Microsoft Azure is an example of a public cloud. With a public cloud, all hardware, software, and other supporting infrastructure is owned and managed by the cloud provider. You access these services and manage your account using a web browser.

Private cloud

A private cloud refers to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located on the company's on-site datacenter. Some companies also pay third-party service providers to host their private cloud. A private cloud is one in which the services and infrastructure are maintained on a private network.

Hybrid cloud

Hybrid clouds combine public and private clouds, bound together by technology that allows data and applications to be shared between them. By allowing data and applications to move between private and public clouds, a hybrid cloud gives your business greater flexibility, more deployment options, and helps optimize your existing infrastructure, security, and compliance.

Types of Cloud Services

Video : <https://youtu.be/36zducUX16w>

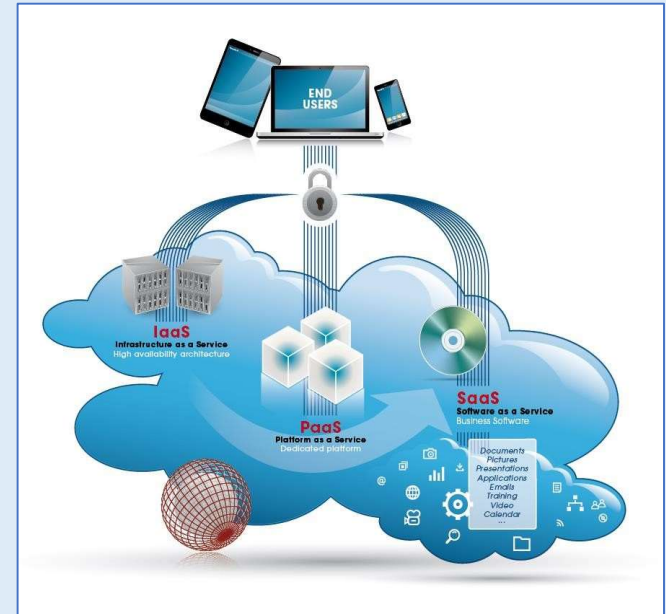
Infrastructure as a Service (IaaS)

The most basic category of cloud computing services. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis.

Platform as a Service (PaaS)

Platform as a service refers to cloud computing services that supply an on-demand environment for developing, testing, delivering, and managing software applications.

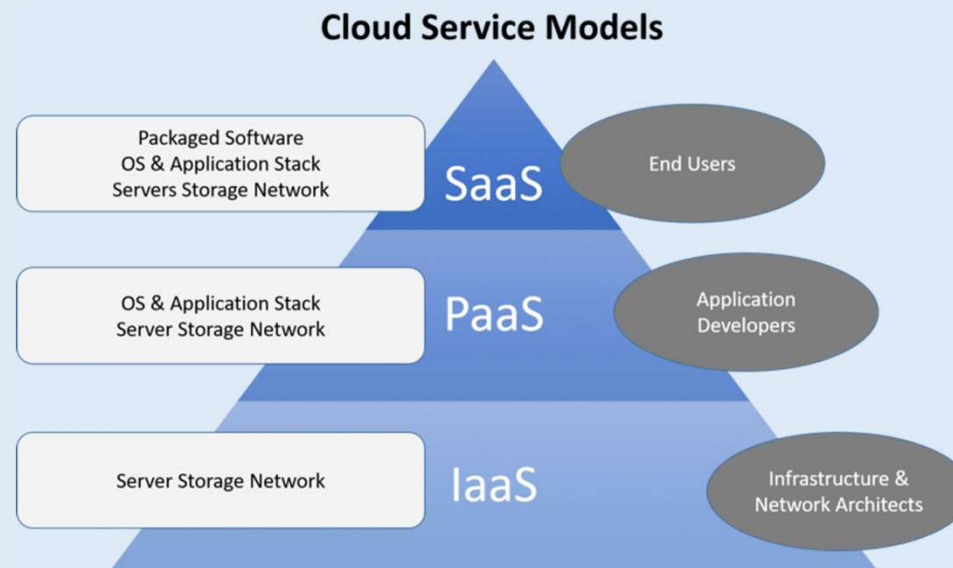
PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network, and databases needed for development.



Types of Cloud Services

Software as a Service (SaaS)

Software as a service is a method for delivering software applications over the Internet, *on demand* and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure, and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet, or PC.



SAP Business ByDesign

- ❖ An example of SaaS for the ERP market
- ❖ First released in 2007
- ❖ A full ERP system delivered to customers via the cloud
- ❖ For small to medium-sized companies:
- ❖ Lowers the total cost of ownership of the software
- ❖ Enables a rapid implementation

Extending the Portfolio to Address an Untapped Market



LARGE	SAP Business Suite including SAP ERP 6.0	> 2,500 employees	~ \$30 billion market
MIDSIZE	SAP Business All-in-One	< 2,500 employees	~ \$15 billion market
	SAP Business ByDesign	100-500 employees	NEW BUSINESS ~ \$15 billion market
SMALL	SAP Business One	< 100 employees	~ \$15 billion market

SAP Business ByDesign (cont'd.)

SAP Business ByDesign's key capabilities



Mobile Computing

- Increasing use of smartphones, tablet computers, and other mobile computing devices.
- Mobile applications need to be developed for different kinds of smartphones, with different operating systems.
- Companies need to make many decisions about the use of mobile devices by employees.
- Mobile devices provide users with information and can also be sources of information.



SAP Mobility Predictions - insiderResearch

- The percentage of SAP organizations with a comprehensive, enterprise-wide mobile strategy will more than double in the next three years, from 32% to 67%
- 75% of SAP organizations expect their mobile applications to be supported on multiple devices three years from now
- 32% of SAP organizations will deploy five or more mobile applications in the next twelve months

Network Connectivity

Secure Mobile Gateway
Network Access Control

Operating System

Mobile Device Management



Data & Applications

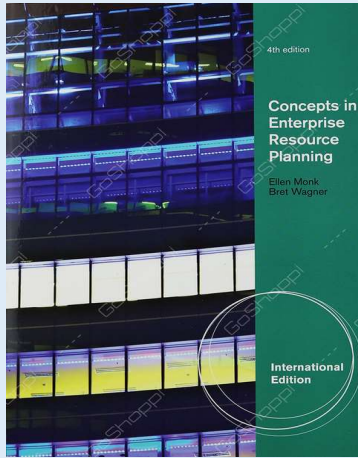
Mobile App Management
Mobile App Security
Mobile Content Management
Data Loss Prevention

SAP Fiori on Mobile Devices



Mobile service for SAP Fiori allows the creation of mobile versions of SAP Fiori applications. Users can then use these mobile apps on their Android, iOS, or Windows devices to access and use the Fiori applications anywhere and anytime. These mobile apps can leverage many native device features, including the device calendar, contact lists, cameras, geolocation, and barcode scanning.

References



Monk & Wagner

Chap 8