RDBMS

Relational Database Management System

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Data, Database and Database Management System

Data

- Data is numerical, character or other symbols which can be recorded in a form suitable for processing by a computer. (e.g. names and addresses of students enrolling onto a university course).

Schema

- The schema is the structure of data, whereas the data are the facts. Schema basically indicates the rules which the data must obey. Such rules can be enforced by a database. and the more rules there is the harder it is to enter poor quality data. Examples of rules include (Name is a string, and needs to hold at least 12 characters, DOB is a date, the company forbids people over 100 years old or younger than 18 years old working for them.

Database

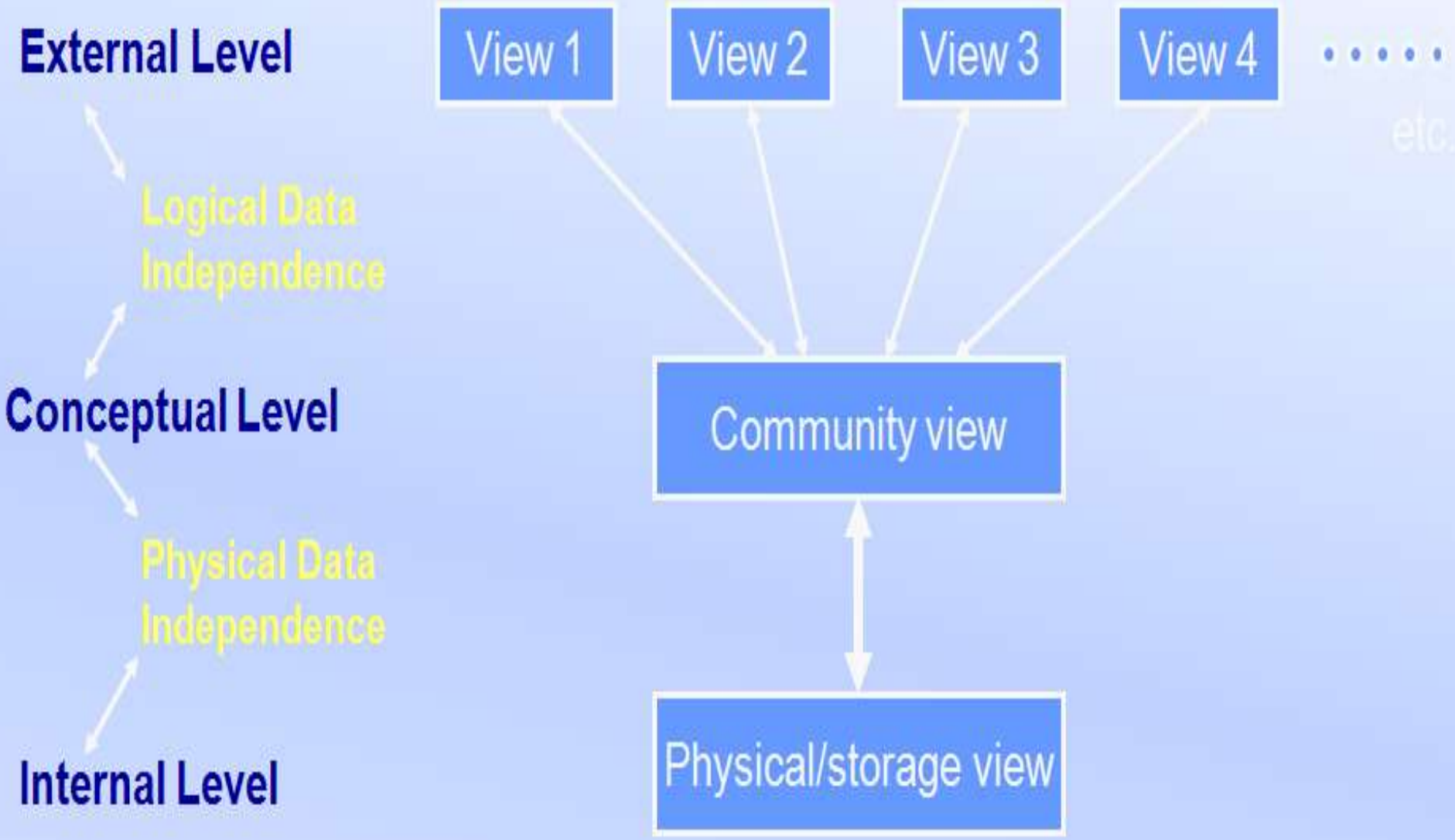
- A Database is a collection of related data (such as an enrolling students data) arranged for speedy search and retrieval.

- *This may take a number of forms including text, numbers, sound, images or video.*

Database Management System

- A Database Management System is a collection of programs that allows users to specify the structure of a database, to create, query and modify the data in the database and to control access to it. (e.g. limit access to the database so that only relevant staff can access details of enrolling students).

A Three Level Database



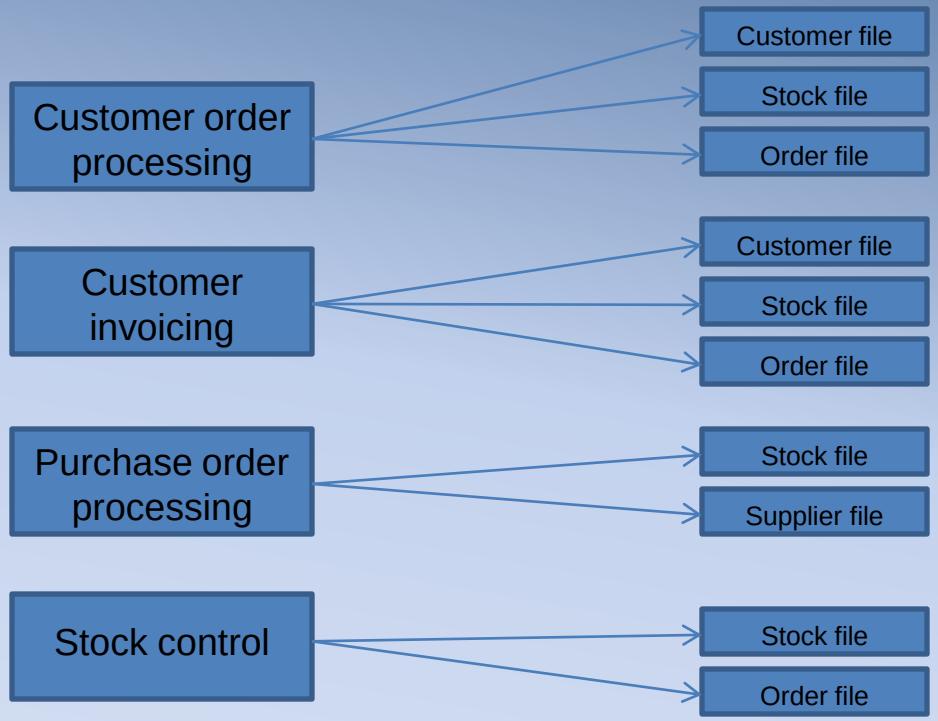
Structured Query Language (SQL)

Relational Database Management Systems use the language known as SQL (*Pronounced Sequel).*

- SQL is a simple programming language used for accessing and managing data in relational databases.
- Developed by IBM in 1970 to support its various relational products.
- SQL is now the most important query language for relational databases.
- Used in programmes such as SQL Server.

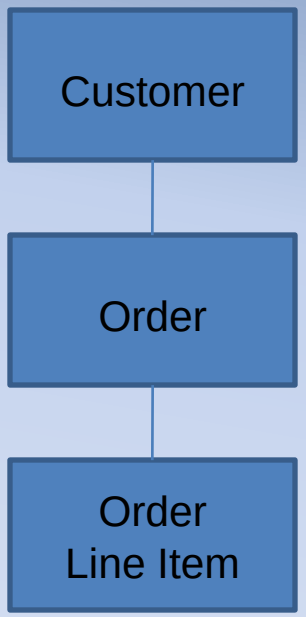
Early database systems

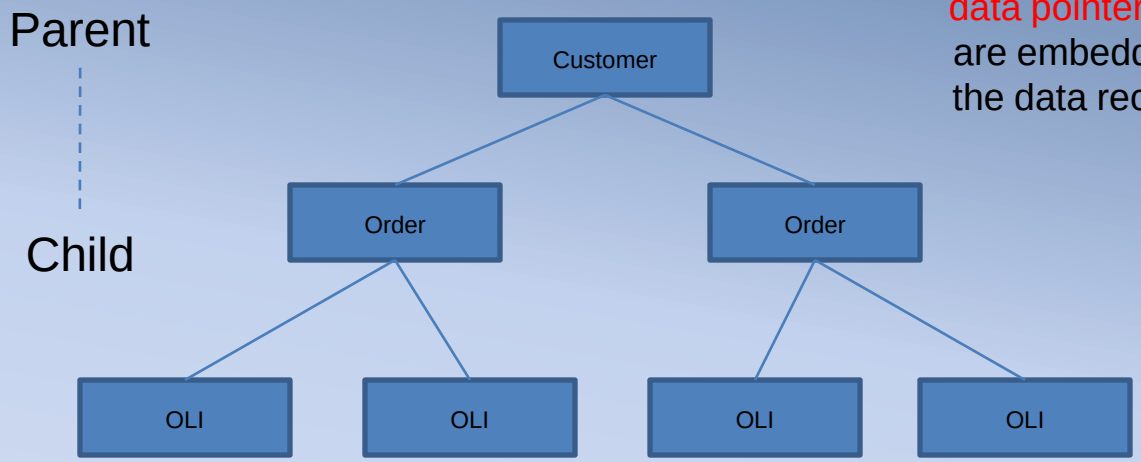
Paper / shared computer file systems (pre 1960's)



- Processing was slow.
- Inconsistencies in data could easily develop. (only one file being updated).
- Introduction of shared files eradicated some inconsistencies with data storage.
- However; shared filing was not efficient as only one application could access it at one time.

Hierarchical Database Model (Early 1960's)



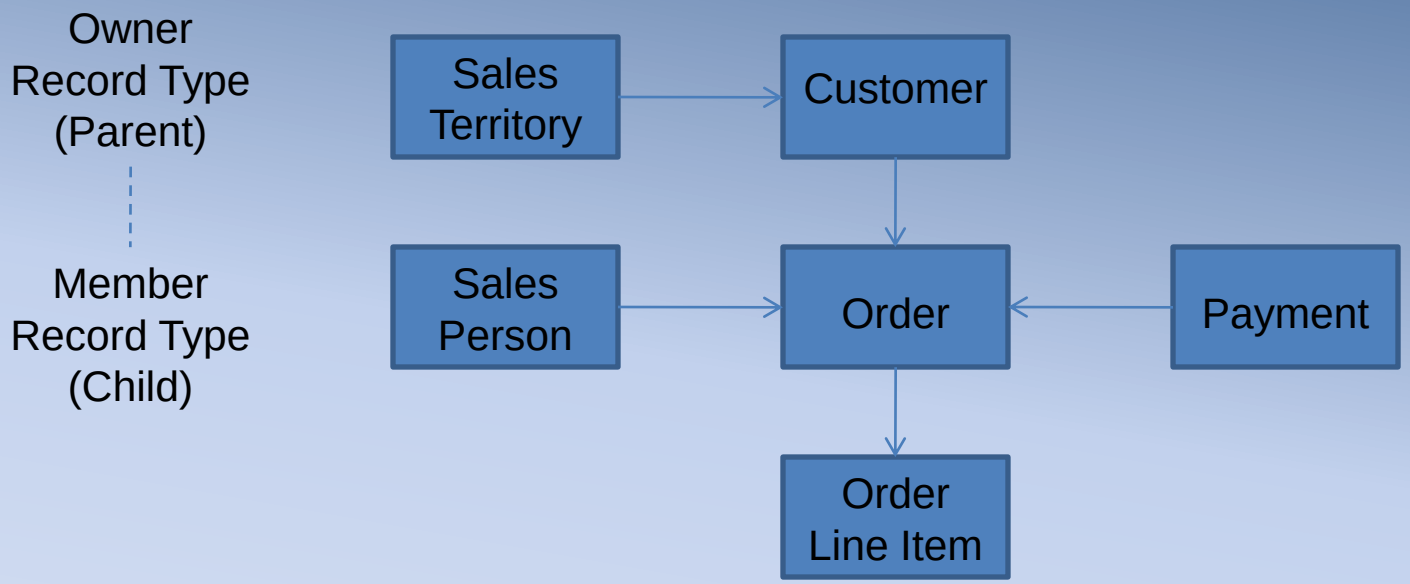


Links are maintained through physical data pointers that are embedded in the data records.

- Parent pointer < Child, Child pointer > Parent.

- Improved shared filing.
- Allowed simultaneous access to data by a number of different users.
- Provided facilities for querying, security and integrity of the data.

Network Database Model (Late 1960's)



- Doesn't attempt to force information into hierarchical levels.
- Member type records can have multiple owners increasing the use of the system.
- Still used Physical Pointers in the data records.
- Owner pointer < Member, Member pointer < Owner.

The main problems with both the hierarchical & network database systems were that skilled programmers were required to write the programmes to create, access and change the data in the database.

RDBMS

- Most popular database system.
- Simple and sound theoretical basis.
- Developed by E F Codd in the early 1970's.
- The model is based on tables, rows and columns and the manipulation of data stored within.
- Relational database is a collection of these tables.
- First commercial system: MULTICS in 1978.
- Has overtaken Hierarchical and Network models.
- Main feature: Single database can be spread across several tables.
- Examples include: Oracle, IBM's DB2, Sybase, MySQL & Microsoft Access.

Relational Database Model Terminology

- **Relation** is a table or flat file with columns and rows which has certain properties
- A **tuple** is a row of a relation and represents an instance of a relation
- An **attribute** is a named column of a relation
- A **domain** is the set of allowable values for one or more attributes
- The **degree** of a relation is the number of attributes it contains
- The **cardinality** of relation is the number of tuples it contains

Film

Film Number	Title	Director	Country	Year	Genre
0.05	Reservoir Dogs	Tarantino	USA	1992	Crime
0.06	Pulp Fiction	Tarantino	USA	1994	Crime
0.08	Trainspotting	Boyle	UK	1996	
1.09	Internal Affairs	Wai-Keung	China	2002	Crime
1.11	Snakes on a Plane	Ellis	USA	2006	Disaster

Attributes

Key constraints.

Primary Key - Unique identifier for the relation, no duplicates.

Foreign key - An attribute in a relation that is also the primary key in another relation.

Film

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Director

Director No	Director Name
101	Tarantino
322	Boyle
166	Wai-Keung
753	Ellis

Differences between DBMS and RDBMS

DBMS

- Data is stored in a single large table
- Single record modification affects the whole database

RDBMS (Codd 1980)

- Database is 'broken down' into smaller pieces
- The changes will not affect the entire database

Differences continued…..

Example – Landlord to the same tenant of four different properties

- DBMS – In this case you would have to enter the tenants information for each property (remember the tenant is the same, so time is wasted), as well as the information about the property itself.

Property no.	Tenant	Tenants D/O/B	Tenants Contact
1 North Street 07000123456	Ben Dover	01/01/1970	
2 North Street 07000123456	Ben Dover	01/01/1970	

- The incorporation of ‘KEY’ fields can help to save time and reduce the chance of errors from occurring upon the inputting of information into the database

Differences continued…..

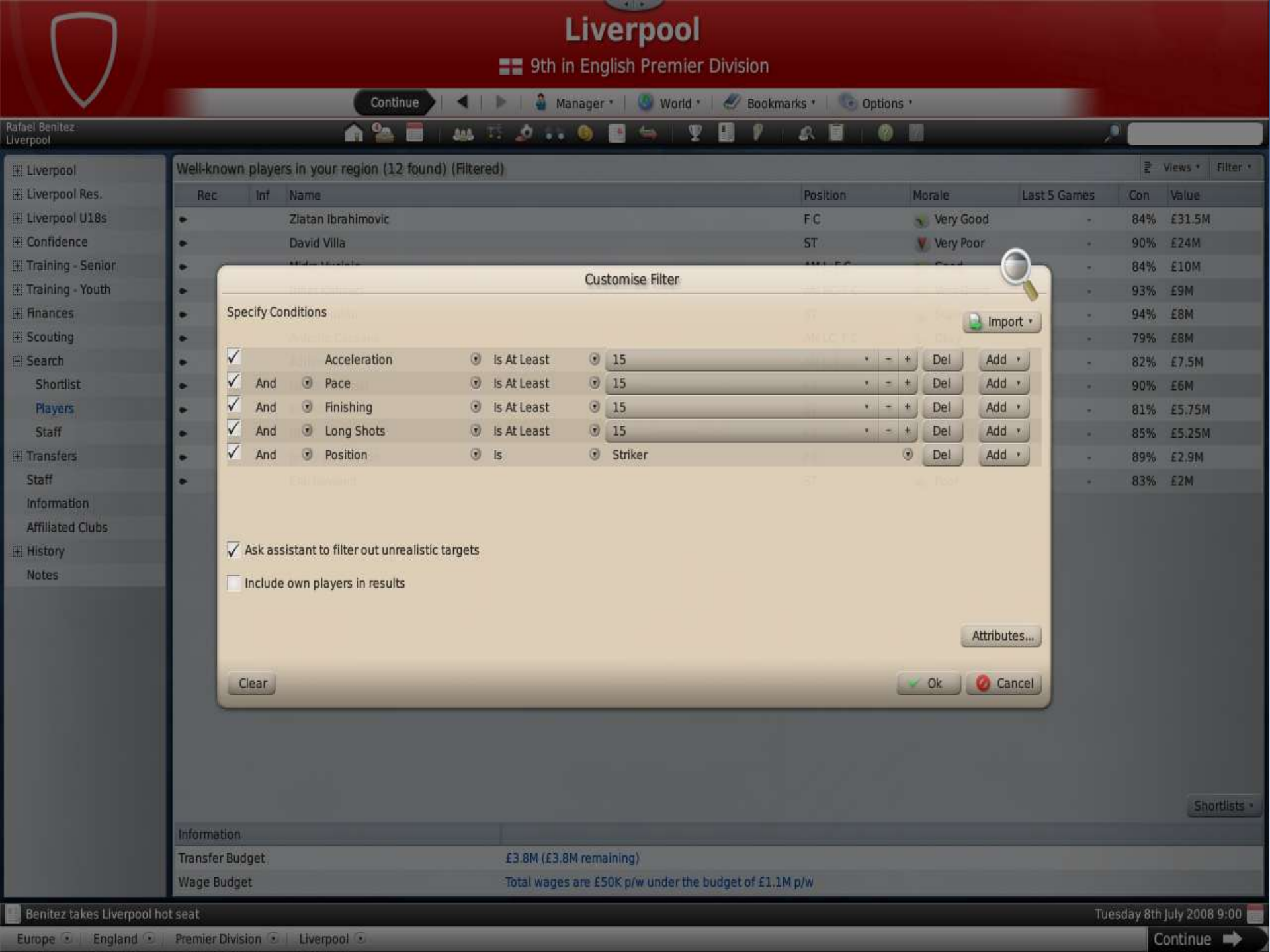
- Enter RDBMS……
- There needs to be the introduction of 'KEY' fields which allows more immediate access to what you are looking for. For example ‘tenant number' would be a key field and this would lead to all the information about that tenant being in one place.
- Other 'KEY' fields could be introduced for other 'OBJECTS' (data files) of the tenancies which leads to '*relationships*' being formed. For example two of the objects would be; tenant and property. The 'KEY' fields can be displayed by underlining them;

OBJECT	**FIELDS**
TENANT	- (Tenant Number, Tenant Name, Tenant Contact Details… etc)
PROPERTY	- (Property Number, Property Name, Property Address)

- The idea of relationships comes from being able to input two or more ‘KEY’ fields into the system and being able to find out exactly what you want.
- So by creating 'KEY' fields you can find certain information by searching through that 'KEY' field. This means that the input of duplicate data is not required constantly and you can find what you are looking for easier through objects and fields.

12 Rules….

- **Rule 0:** The system must qualify as *relational*, as a *database*, and as a *management system*
- **Rule 1:** The *information rule*:
- **Rule 2:** The *guaranteed access rule*:
- **Rule 3:** *Systematic treatment of null values*:
- **Rule 4:** *Active online catalogue based on the relational model*:
- **Rule 5:** The *comprehensive data sublanguage rule*:
- **Rule 6:** The *view updating rule*:
- **Rule 7:** *High-level insert, update, and delete*:
- **Rule 8:** *Physical data independence*:
- **Rule 9:** *Logical data independence*:
- **Rule 10:** *Integrity independence*:
- **Rule 11:** *Distribution independence*:
- **Rule 12:** The *non-subversion rule*:


Liverpool
9th in English Premier Division
Continue
Manager
World
Bookmarks
Options
Rafael Benitez
Liverpool
Liverpool
Liverpool Res.
Liverpool U18s
Confidence
Training - Senior
Training - Youth
Finances
Scouting
Search
Shortlist
Players
Staff
Transfers
Staff
Information
Affiliated Clubs
History
Notes
Well-known players in your region (12 found) (Filtered)
Views
Filter
Rec
Inf
Name
Position
Morale
Last 5 Games
Con
Value
Zlatan Ibrahimovic
F C
Very Good
84%
£31.5M
David Villa
ST
Very Poor
90%
£24M
84%
£10M
93%
£9M
94%
£8M
79%
£8M
82%
£7.5M
90%
£6M
81%
£5.75M
85%
£5.25M
89%
£2.9M
83%
£2M
Customise Filter
Specify Conditions
Import
Acceleration
Is At Least
15
Del
Add
And
Pace
Is At Least
15
Del
Add
And
Finishing
Is At Least
15
Del
Add
And
Long Shots
Is At Least
15
Del
Add
And
Position
Is
Striker
Del
Add
Ask assistant to filter out unrealistic targets
Include own players in results
Attributes...
Clear
Ok
Cancel
Shortlists
Information
Transfer Budget
£3.8M (£3.8M remaining)
Wage Budget
Total wages are £50K p/w under the budget of £1.1M p/w
Benitez takes Liverpool hot seat
Tuesday 8th July 2008 9:00
Europe
England
Premier Division
Liverpool
Continue


Liverpool
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Well-known players in your region (8 found) (Filtered)
Views
Filter
Rec
Inf
Name
Club
Cnt
Weekly wage
Expires
Value
Nihat Kahveci Villarreal F/T £38,000 30.6.2011 £9M
Diego Forlán At. Madrid F/T £48,000 30.6.2011 £8M
Adrian Mutu Fiorentina F/T £31,000 30.6.2012 £7.5M
Lukas Podolski FC Bayern F/T £54,000 30.6.2010 £6M
Ricardo Oliveira Zaragoza F/T £34,000 30.6.2013 £5.75M
Hulk Porto F/T £8,000 30.6.2012 £5.25M
Javier Chevantón Sevilla F/T £25,500 30.6.2011 £2.9M
Erik Nevland Fulham F/T £25,000 30.6.2010 £2M
Shortlists
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Europe
England
Premier Division
Liverpool
Continue

7. Diego Forlán

Striker, At. Madrid

Continue | Manager | World | Bookmarks | Options

Rafael Benitez
Liverpool

- Profile
- Personal
- Transfer
- Positions
- Stats
- Comparison
- History
- Notes

Player Profile - Attributes

Views

Uruguay	33 caps / 11 goals
19.5.1979	29 years old
180 cm	75 kg
£8,000,000	Either
£48,000 per week	30.6.2011

Technical Attributes		Mental Attributes		Physical Attributes	
Corners	10	Aggression	11	Acceleration	16
Crossing	12	Anticipation	13	Agility	16
Dribbling	14	Bravery	13	Balance	14
Finishing	17	Composure	7	Jumping	11
First Touch	14	Concentration	11	Natural Fitness	15
Free Kick Taking	8	Creativity	13	Pace	18
Heading	14	Decisions	12	Stamina	15
Long Shots	15	Determination	15	Strength	13
Long Throws	3	Flair	16		
Marking	7	Influence	7	**Other**	
Passing	11	Off The Ball	15	Goalkeeper Rating	2
Penalty Taking	13	Positioning	9	Condition	94%
Tackling	5	Teamwork	13	Last 5 Games	-
Technique	14	Work Rate	17	Morale	Superb

Selection Details

Injuries	None
Bans	None
Fitness	Needs match practice if he is to be ready for the new season

Statistics	Apps	Gls	Asts	MoM	Yel	Red	Tck	Pass	Sh Tar	Fouls	Fls Ag	Av R
Non Competitive	-	-	-	-	-	-	-	-	-	-	-	----
League	-	-	-	-	-	-	-	-	-	-	-	----
Cup	-	-	-	-	-	-	-	-	-	-	-	----
Continental	-	-	-	-	-	-	-	-	-	-	-	----
International	-	-	-	-	-	-	-	-	-	-	-	----
Overall	-	-	-	-	-	-	-	-	-	-	-	----

- Make An Offer
- Get Scout Report
- Add To Shortlist
- Player Interaction
- Compare With
- Misc

Benitez takes Liverpool hot seat

Tuesday 8th July 2008 9:00

Europe | Spain | At. Madrid | Diego Forlán

Continue

RDBMS Advantages

- Increases the sharing of data and faster development of new applications
- Support a simple data structure, namely tables or relations
- Limit redundancy or replication of data
- Better integrity as data inconsistencies are avoided by storing data in one place
- Provide physical data independence so users do not have to be aware of underlying objects
- Offer logical database independence - data can be viewed in different ways by different users.
- Expandability is relatively easy to achieve by adding new views of the data as they are required.
- Support one off queries using SQL or other appropriate language.
- Better backup and recovery procedures
- Provides multiple interfaces
- Solves many problems created by other data models
- The ability to handle efficiently simple data types
- Multiple users can access which is not possible in DBMS

RDBMS Disadvantages

- Software is expensive
- Complex software means expensive hardware
- Requires skilled knowledge to implement
- Certain applications are slower processing
- Increased vulnerability
- More difficult to recover if data is lost
- Seen as a poor representation of the real world
- Difficult to represent hierarchies
- Difficult to represent complex data types

Oracle

- The largest business software company in the world
- 320,000+ customers including 98 of the Fortune 100
- Has customers in 145 countries
- 48.6% of the worldwide RDBMS market share
- Growing faster than the market average
- Holds more market share than its two closest competitors combined

Oracle Property Manager

Used by…

- Corporate companies
- Commercial companies
- Retail/ Franchise operators

- Provided as part of Oracle's E-Business Suite

Oracle Property Manager

Lease Administration

Lease management is at the centre of the real estate management function. With Oracle Property Manager, you can control and oversee a variety of lease management tasks such as:

- Abstracting basic lease information from lease documents
- Modifying and amending leases
- Calculating lease amounts
- Creating invoice schedules
- Exporting invoices to Oracle Payables and Oracle Receivables
- Setting up milestones
- Administering rent increases based on fixed percentages or specific indexes such as the Consumer Price Index (CPI)
- Collecting rent based on variable factors such as sales volumes or usage
- Calculating and collecting common area maintenance (CAM) expenses

Property Portfolio Management

You can use Oracle Property Manager to identify, define, and manage owned and leased property, keep records of physical features and facilities, and maintain comprehensive records of property-related data such as:

- Geographical location
- Tenure (whether property is owned, leased, or a combination of the two)
- Condition of property
- Parties involved (for example, maintenance and security agencies)
- Type (for example, whether the property is an office block, mall, or recreational space)

Oracle Property Manager

Space Management

1. **Each employee or customer is assigned the appropriate space.**
2. **All available space is assigned in the most effective manner possible.**

- Keep occupancy rates high to ensure proper return on investment.
- Allocate space-related costs because they can easily find out the cost per square unit of each location
- Roll ups for markets, regions and cost centres

Benefits of Oracle Property Manager

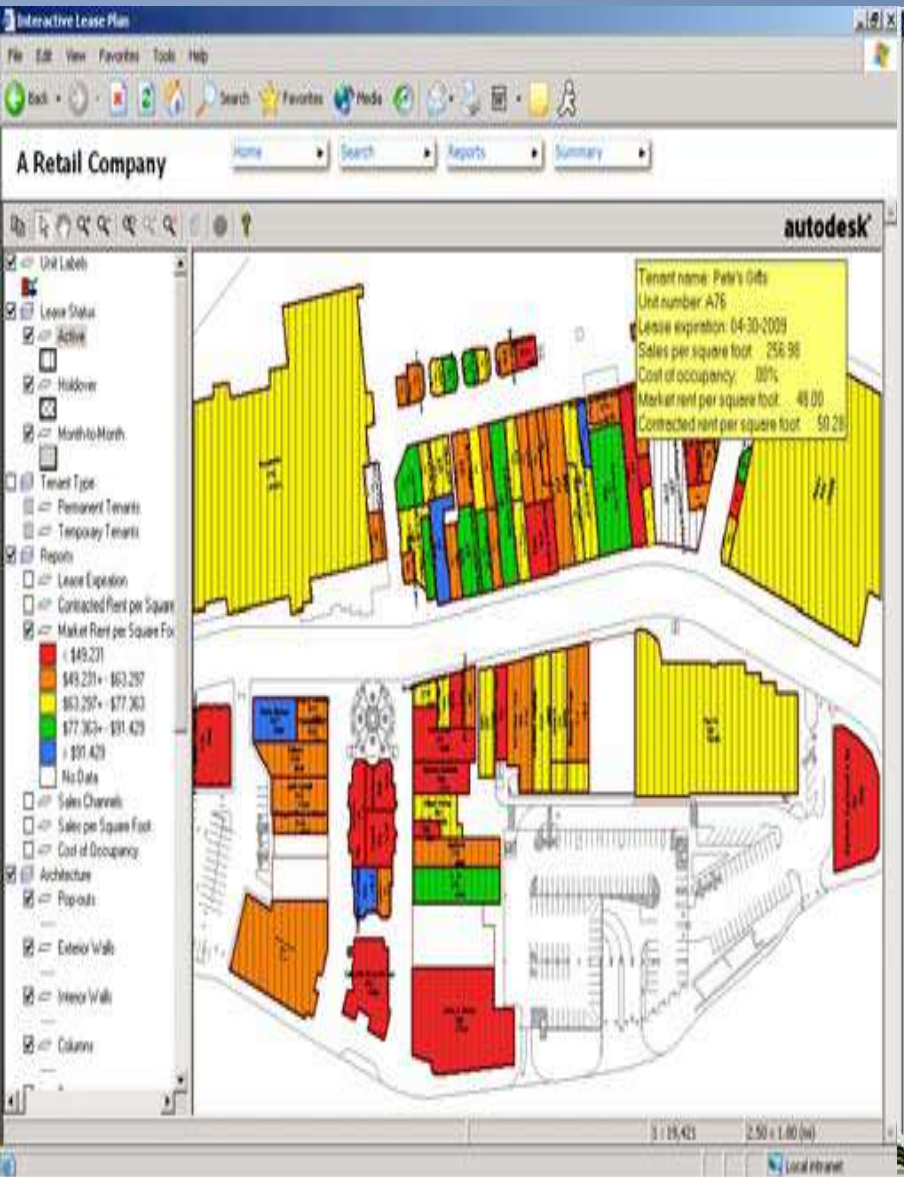
- **Reduce Operating Costs**
- **Identify Cost Savings and Revenue Opportunities**
- **Minimize Contractual and Financial Risk**
- **Provide Data Transparency**
- **Includes Key Features**
- **Integration with other Oracle products**

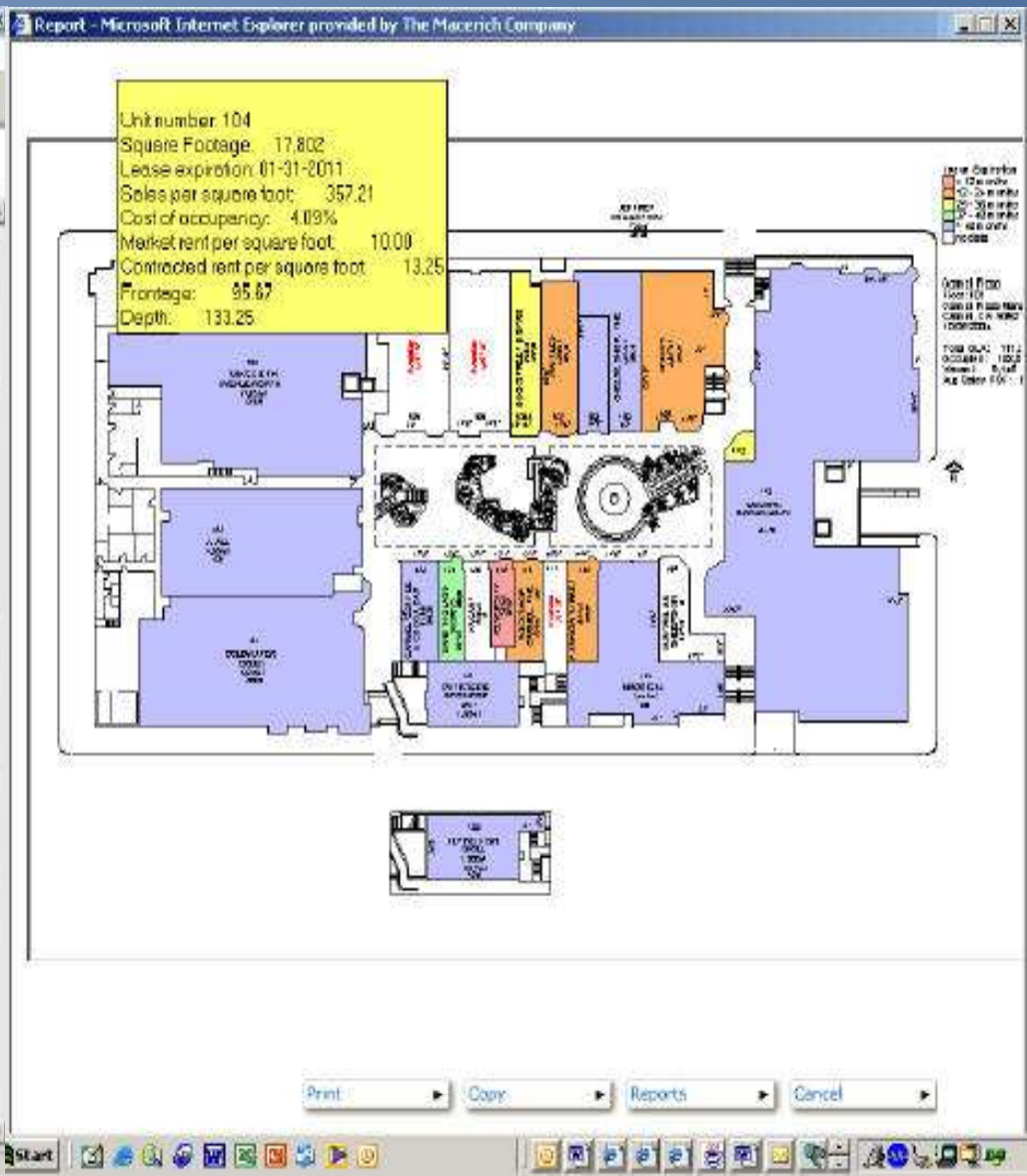
- Improve decision making. Make better real estate investment and management decisions with real-time information and reporting access from a single source offering one version of the truth.
- Provide a collaborative workspace. Share documents, raise issues, manage and coordinate tasks among internal and external teams, so that you can minimize the time necessary for identifying new sites or for expanding and remodeling existing stores.
- Own the entire lifecycle. Support end-to-end business processes, with detailed data that provides management with an accurate and timely view of the each store's operations.
- Improve productivity. Access information (about customers, suppliers, landlords, employees, and products) anytime, anywhere, over the internet in real time through the EnterpriseOne Collaborative Portal.
- Better retain customers. Increase customer satisfaction by making smarter real estate decisions based upon better information.

Integration

- Oracle Property Manager uses an open interface to integrate with CAD and CAFM applications
- Autodesk has integrated CAD software such as AutoCAD and Autodesk Map with Oracle Property Manager
- Integration of live graphical data with lease administration and financial data
- The integration of Autodesk’s graphic technologies and the Oracle E-Business Suite

Success Story





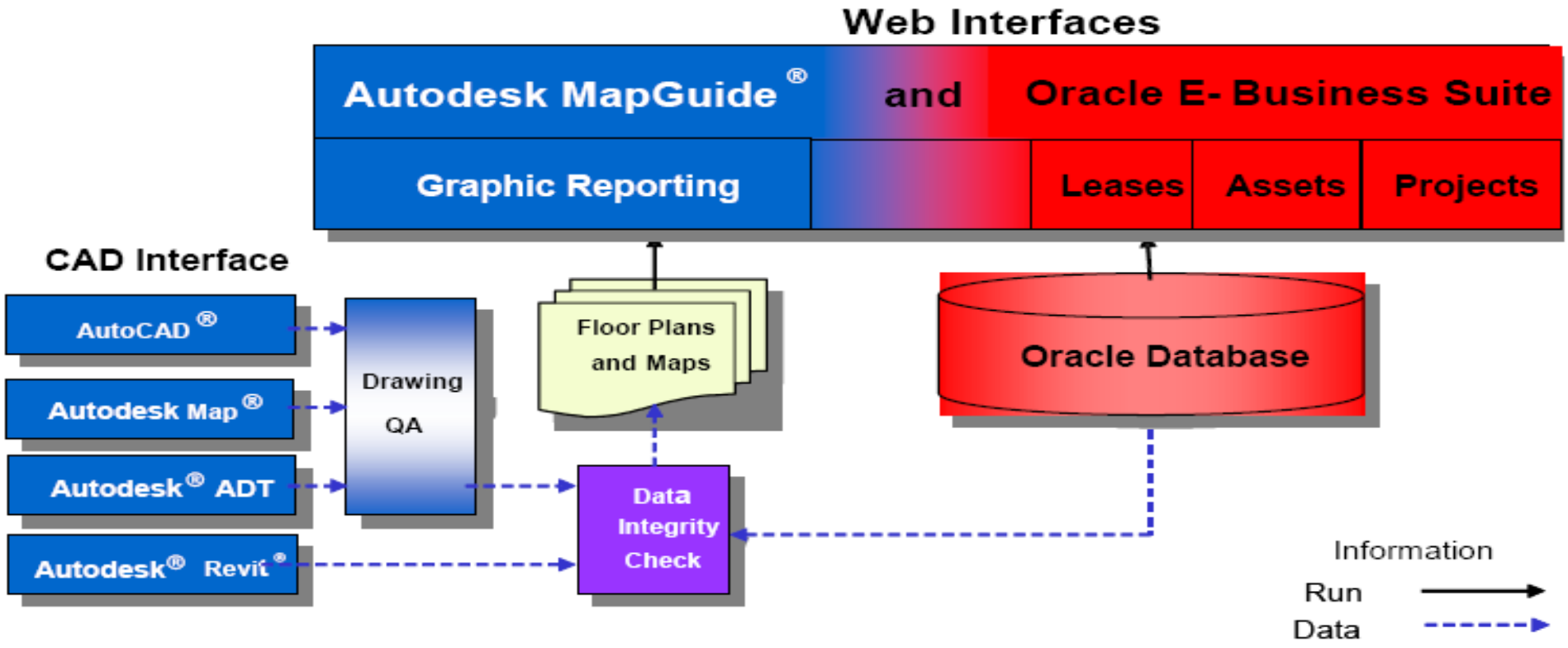


Figure 2: Autodesk – Oracle Property Management and Visualization Solution Architecture

- **2,500 hours saved annually and improved analysis**
  The solution is saving the company's employees thousands of hours annually.According to Jones, "Our Autodesk MapGuide solution is helping us to make profitable decisions and find new opportunities, such as advantageous tenant moves, more quickly by giving us better visibility into the data in our Oracle database.Compared to coloring lease plans by hand each quarter, our Autodesk MapGuide solution is saving us 2,500 hours annually."

  He adds, "Autodesk MapGuide is also helping us to create more plans more often.We're now updating all our lease plans on a weekly instead of a quarterly basis.The solution helps us to explore and understand things like why sales might be low in one area of a property.These kinds of analyses were very time consuming before our MapGuide implementation."

The Future of RDBMS

- It is very difficult to see where RDBMS's could go because alternatives and new versions such as XML have been introduced. From delving through forums it is plain to see that many people do not only prefer standard RDBMS's but do not even like the alternatives.
- Academics refer to relation models "It's such a simple and elegant model that it can never become unfashionable". - Andre Naess.

- Luke you may want to put something here about the incorporation of other software such as CAD. etc... Hope these slides are ok. Got my script written as well but you may want me to read different stuff out. X x x