For Certain Types of Business; an Object Database is Key to Success
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Abstract
To highlight that Relational Database Management System (RDBMS) are not INSYNC with current business practices and environment. Hence there is a need to find a proper Database engine that is fit the practical business environment of today. This academic paper purpose finding solution for these key problems opposing business of today whereas services presented to customers online over varied number of channels (e.g. web, Mobiles, WAP, and GSM). This can be brought about by using Database management system such as, Object Database management System (ODBMS). That’s used to resolve issues arising because of Relational Database Management Systems Limitations. People are not always receptive to introduction of new technologies. So care should be taken to educate and keep all the staff informed of the changes being brought about it.

Keywords— Relational Database Management System(RDBMS), Object Relational Database Management System(ORDBMS), Object Database Management System(ODBMS), Enterprise Resources Planning(ERP), Customer Relationship Management(CRM)

1. Introduction
Nowadays, organizations are trying to contact their customers and present their products and services over the Internet as e-commerce applications, WAP, GSM, and in others ways, as well as sharing information and resources with them (S. Wenhui and T. Tan, 2001). Databases represent the foundations of an effective Electronic Business, Enterprise Resources Planning (ERP), and Customer Relationship Management (CRM); they often include most of the organizations' partners’ and customers’ sensitive information (C. Weiss, 2012). It is a fact that most businesses today can’t continue with their daily work if their databases are down or performance is slow. Decision Makers are prone to taken improper and ineffective decisions if their business data inconsistent or reflecting wrong figure regarding to real-business movement. In business today, correct data comes to symbolize an organization's most valuable asset, like credit card information, medical records, payroll, and manufacturing and trade secrets, which turns information into money (P. Valduriez, 1993). Since Database Management Systems (DBMS) represent the house of data assets. Keeping database running with high performance on complex data means chunk sharing in the business process success.
2. **Problem statement**

The transport and emulation, network administration and Internet applications requirements for the database that is pushing relational database systems to their borders. Application models develop quickly and accelerate significantly in complexity particularly hierarchical ones. Has been proven through relational databases for these application areas can be uneasy because of the need to keep the so-called object to relational mapping and the disability to attain database performance accepted (P. Valduriez, 1993 and N. Hartline Bercich, 2003).

3. **Problem Description**

The presently emerged systems with web technologies in internet age, there is a need to support the systems, operation, and make easy precise decision-making based on data and business rules that are considerably more complicated than ever. Although the demands are more and more work is done, there is still a need to provide real-time performance. The increasing complication of data the application itself determines the utility of conventional storage administration techniques (i.e., a relational database) (P. Valduriez, 1993).

These facts state the criteria when selecting the database model that will serve the business type: (P. Valduriez, 1993 and N. Hartline Bercich, 2003).
a. **Accuracy** – the database should be able to work according to availability concept (24x7). Whenever, database practiced downtime for than 5 minutes per year is not considered organization practiced failure to give online services.

b. **Synchronization** – the database have to be able to be provide access and share data between several users and many processes simultaneously.

c. **Efficiency** – like this complicated schema, i.e., very various objects with very various Structures and many associations among layers, performance is what is initially taken into account.

### 4. Key Limitations & Problems of RDBMS:

The key problems with **Relational Database Models** is dealing with complex data, usually practicing slowness especially if the services are given to wide number of customers.

![Figure 2 RDBMS Are Not Well Suited To Persisting Complex Hierarchies Of Data](image)

1. Upon business needs to store huge objects RDBMS practiced limitations that summarized as do not have enough storage space to process data like pictures, digital and audio/video. Originally the system was created to deal with the integration of media, traditional fielded data, and templates.

2. Business needs to present the business services over the internet, as the most of applications over internet coded or dealing with Java RDBMS emerged other type of limitations, and can’t work with languages other than SQL.

And more than another language appeared after the original evolution like JavaScript and C++, although relational databases don't work well with them. The big problem is the requirement of the information must be in the table where the relationships between entities are defined by values (N. Hartline Bercich, 2003 and B. P. Dougliss, 1997).
5. **Satisfying the Business Needs to Represent Complex Objects:**

The desire to satisfy the business needs to represent complex objects has led to the development of ORDBMS. Complex objects need to be scalable and provide support to all rich data types, these targets and many other benefits can be reached by combining the relational and object models in ORDBMS design. Practically ORDBMS given an advantage to big number of business types e.g. financial corporate, whereas scanned checks and vouchers should stored.

The given example below shows ORDBMS implemented in one of Kuwait Banks, whereas RDBMS database utilized & ORDBMS. RDBMS used to store the customers transactions e.g. deposit and withdrawal transactions at the same time ORDBMS used to store structured data such as account information, transactions-codes mapped direct with the evidence of each transaction stored as objects. These objects are the scanned checks, scanned vouchers. That is plus number of customer personal informational document like IDs.

![Diagram](image)

Figure 3 transactional Statement Stored In ORDBMS

The major advantage to ORDBMS Pattern reside in providing great storage ability, which is an important issue in the developing of Web systems, and it is offered when using an ORDBMS that is travels information between RDBMS and objects .

- The large access velocity
- ORDBMS have enormous portability.
- ORDBMSs proud of high treatment ability for object databases
- upholds object role by providing it with divided APIs and server subsystems
- Redesigns the database motor totally
- Upholds good data kinds by providing it with a new object-oriented layer (category/ class).
And to overlook these benefits, this system has some shortcomings; the most important of these defects is failure of high speed Internet applications. But ORDBNSs is designed to be able to control a large amount of information has become an important aspect in the development of the site (A. D'Andrea and P. Janus, 1996).

6. **ODBMS Proposed Solution**

To eliminate these restrictions and challenge on RDBMS on the continued increase of the Internet and the Web, considering Implementing Object-Oriented Databases would gives better solution and resolve these listed limitations prior (N. Hartline Bercich, 2003).

An object-oriented database known as OODBMS was created to handle large and complex data that relational databases couldn't handle with it. The main objective of it is to supply coordinated, secure, independent data that controlled and expand data management services to support the object-oriented type.

ODBMS provide the solution for keeping a business running with high performance especially when the organizations have a complex data. That is as an ODBMS for generally, is a perfect option when the following ingredients are needed: work availability, good outstanding (performance) and complicated data.

ODBMS consider integration between database abilities and object programming language abilities; the outcome is an object database management system (ODBMS). Database objects can look like programming language objects through an ODBMS. An ODBMS expands the language with persistent data in a transparent manner, concurrency control, data retrieval, associative inquiries, and another abilities.

Object Oriented Databases provides a group of features which will be reviewed in the following paragraphs later, which may be of interest to a lot of sellers. Some of these features: constant storage to objects, and provides indexing and inquiry and the possibility of distributing objects transparently across servers. This database also have more tools like: visual schema designers, Integrated Development Environments and debuggers.

It has been designed to be able to deal with programming languages such as (Java, C#, C++), and it used exactly the same object-oriented programming languages. Actually, the use of objects in ODBMSs offers the lowest cost and the best performance for development ,that because of storing the objects on disk and the integration with object-oriented programming languages. The reason of that is an ODBMS stores totally identical object model which is utilized at the application level, and it can be minimized both development and maintenance costs. For extra details about these terms, read the following section (N. Hartline Bercich, 2003 and B. P. Douglass, 1997).

There are two main advantages to make production more efficient: both performance and scalability, when compared with relational databases, it is better because they offer support over 10 times to synchronize users and also offers a speed more than 10 times to get to the data (M. Chen, 2003).
7. **Key Features of ODBMS**
   1) diaphanous object insistence from C++, Java and .NET
   2) Upholding for criterions, e.g., JDO
   3) Seamless data base allocation
   4) Company-class good availability
   5) Dynamic schema development
   6) Low to zero management
   7) Multi-threading, multi-session
   8) End-to-end object architecture
   9) Fine-grained Synchronization

8. **Key Benefits**
   1) transactional applications runs very fast
   2) effective dealing with complex objects
   3) Provide the best productivity
   4) Easier management
   5) LOWER COST
   6) Significant IT cost reductions.
   7) Allow the use of technology in the most complicated, advanced and critical tasks systems nowadays.

9. **Knowledge Management (KM) and ODBMS**

A critical business practical betterment that can whet an organization Competitive Advantage is found out in the organization in engineer's notebook, product manager bag, or part of the e-mail. These are the ideas and innovations that help capital regulation, which often go without the benefit of them.
Even if the organization had captured the thoughts and business-changing knowledge, making prosperous results needs follow-through. Implementation and execution take a lot of effort: gathering people to get the decision makers, build consensus, find and distribute information, coordinate who does what and when; and all keep up with information that can affect enterprise mission.

10. **Examples Whereas the ODBMS Would be Satisfy the Business Needs**

We can use the features of the database object in many ways, such as access to the hierarchical data and chart-oriented or store this data. Some of these successful solutions in using ODBMS are:

**A. Intelligence and Decision Support Systems (DSS)**

Decision makers in whatever the business types need to takes their decisions in short time based in high quality data (e.g. some systems such as civil, intelligence, and defense systems are important assisting and supporting the decision—making accuracy based on data and complex business rules.
although there more needs and more work. Because there is a lot of complexity in data applications, this was due to reduce the feasibility of storage technologies (R. G. G. Cattell, et al. 1997).

![Diagram](image-url)  
**Figure 5 ODBMS Provides Direct Mapping Of Complex Data**

The database technology link the complex data with database, so the data in memory is the same in the disk, and the application has a hole for pickets have to go on (M. Chen, 2003).

**B. Cargo and Shipment Companies:**

With ODBMS, business management can track trucks position in real-time, so the determinations about trucks or ships positions and delays/compensation avoidance can be done very fast. ODBMS gives the key preferences of a distributed database that permits the access of synchronous data for a better output and scalable characteristics to suit mission growth (R. G. G. Cattell, et al. 1997).
The given example shows the process of cargo tracing and tracking: When buying directly from a Japanese vendor this generated a buyer’s consolidation, and then sent an ASN (Advanced Shipping Notice) by EDI. The custom shed is stored in Japan, so the foreign buyer can now track and trace the cargo from it (R. G. G. Cattell, et al. 1997).

11. Knowledge Management (KM) and ODBMS

A web based KM application resolution that supplies comprehensive, off-the-shelf cooperative knowledge administration for organizations of any structure can transform the organization into a hyperlinked organization where people, information and processes are all inter-connected and just a mouse click away.

Organizations willing to implement the KM solution will be able to
- Structure organization's data on heterogeneous platforms
- Access to entire organizational information with relevance
- Provide sophisticated bilingual search and retrieval capabilities
Eventually tap the projects, marketing campaigns, product launch’s and employee knowledge

12. KM Depending on ODBMS would give the Solution:

Figure 7 Implementing Km Depend On ODBMS

Submission of Web-based KM solutions for the company springs from the fact to optimize the force of the intranet/extranet to control knowing, and to uphold company-wide collaboration and complicated business processes.

Moreover to the capturing capacity, storing, managing and share information, tools are needed by people to let them to perform on the knowledge that’s being submitted right to their desktops. A KM solution should supply the tools that authorize employees through the company by attaching people to information, people to people, and people to processes (R. G. G. Cattell, et al. 1997).
A KM solution should have a unique approach to information retrieval, document management, Business Process Automation (BPA), and virtual team collaboration to run entirely within a Web browser.

KM solution delivers the following promises; that Web technology offers when deployed within private intranets, public extranets and over the Internet:

- Improved communication
- Easy use and friendly interface
- Powerful tools that enable users to locate the vital information they need to get the job done
- Better control of decentralized processes and project work groups

13. Object Databases Against Relational Databases

In general, object databases contain Great benefits throughout relational databases. In general, 

a. transactional applications runs very fast
b. effective dealing with complex objects
c. Provide the best productivity
d. Easier management

In practice Object database replaced relational database due lack of high performance for relational database due data complexity (e.g. images, video, audio...). This case even has been in large scale business applications (e.g. ERP).

The object database stores the data in a form that can be used and this helps to master performance, this is a key feature of different between it and relational databases that collects data (normalization), i.e. you apply the caching strategies to make data show it as existed in memory when it is ordered, so it requires little effort to retrieve data.

There is a growing need to handle complicated data such as advanced graphics, documents, Web pages, multimedia and many more, Where systems are developed accordingly. These requirements are submitted better by the database object (N. Hartline Bercich, 2003 and B. P. Douglass, 1997 and M. Chen, 2003).

14. Conclusion

RDBMS became not fit for certain business types in today business. Implementing ODBMS might gives organization measurable competitive advantage over competitors whereas better services availability (24X7) with high performance are needed due to these key features came linked with ODBMS.

We have shown how is ODBMS can be used for business like Cargo to tack trucks, which could lead into reducing the vehicles delays eventually the fare cost. Decision Support Systems is a vital system for big cooperates that needs systems based on consistent and huge size of data in meanwhile issuing parallel query statement against the database that is require database able to respond to big number of queries simultaneously and concurrently. Database with high performance ratios should represent key success factor for such systems. As well at the operational management level where business-operational-people managing the daily
business processes, management could utilizes ODBMS as solution for capturing their gained experience and talent into KM system.

References