



University of Science and Technology

Faculty of Post Graduate

A thesis in partial fulfillment of the requirement of the
degree of M.S.C in Information System

**Development of Security Policy for
Parallel Distributed Databases**

(Build a Security mechanism for DDBS)

By: Amal Osama Ahmed

Supervisor: Dr. Atif Ali Mohammed

March – 2014

Abstract

The rapid growth of the networking and information-processing industries has led to the development of distributed database management system prototypes and commercial distributed database management systems. It has been recognized that such distributed systems are vital for the efficient processing required in military as well as commercial applications. For many of these applications it is especially important that the DDBMS should provide multilevel security. For example, the DDBMS should allow users who are cleared at different security levels access to the database consisting of data at a variety of sensitivity levels without compromising security. In this research we discussed multilevel security issues for a DDBMS. First describe a system architecture, security mechanism, and data/metadata distribution issues for a multilevel secure DDBMS (MLS/DDBMS). We have found through this study that the sensitivity and importance of the data stored in such distributed systems require a high degree of insurance, which prompted us to develop this security mechanism and submit a proposal to contribute to the protection of distributed database systems.

المستخلص

أدى النمو السريع في صناعات الشبكات ومعالجة المعلومات لتطوير نماذج توزيع نظام إدارة قواعد البيانات و نظم إدارة قواعد البيانات الموزعة التجارية. وقد تم الاعتراف بأن مثل هذه النظم الموزعة تعتبر حيوية لتجهيز الكفاءة المطلوبة في التطبيقات العسكرية والأمنية وكذلك التطبيقات التجارية. بالنسبة لكثير من هذه التطبيقات من المهم بصفة خاصة أن (DDBMS) يجب توفير الأمن متعدد المستويات. على سبيل المثال، ينبغي أن (DDBMS) تسمح للمستخدمين عند مستويات أمنية مختلفة للوصول إلى قاعدة بيانات تتألف من البيانات في مجموعة متنوعة من مستويات حساسة دون تعريض الأمن للخطر.

في هذا البحث ناقشنا القضايا الأمنية متعددة المستويات لنظام إدارة قواعد البيانات الموزعة (DDBMS). ومن ثم وضع آليه للسياسة المتبعه، وقضايا توزيع البيانات والبيانات الوصفية لنظام إدارة قواعد البيانات الموزعة (DDBMS). وقد توصلنا من خلال هذه الدراسة إلي أن حساسية وأهميه البيانات المخزنة في مثل هذه النظم الموزعة تحتاج إلي درجه عاليه من التأمين مما حدا بنا إلي تطوير السياسة الآليه وتقديمها كمقترح يساهم في حماية نظم قواعد البيانات الموزعة.

1.1 Introduction:

The past two decades have witnessed a phenomenal growth in distributed and multiuser computing and connectivity. Usage of computers to process sensitive and crucial information in governmental, military, as well as commercial sectors has been increasing considerably. Every activity in both public and private organizations is today depending on the correctness, availability, and secrecy of some information stored or processed within a computer system or transmitted over a network. New technological developments and increased automation of business processes are contributing towards a more efficient and powerful way of managing and accessing data. These include the proliferation of the Internet and the World Wide Web, the introduction of electronic commerce and digital libraries, and the application of workflow systems. All these developments, however, have also increased both the vulnerability of systems to security violations and the damage that such violations may cause. Consequently, security issues are today of great concern to both researchers and practitioners involved with data management. As a complicating aspect, new technologies have also introduced new security requirements and new research challenges that have not been addressed before.

1.2 Problem Definition:

The security policy for a computing system consists of a set of policies for mandatory security, discretionary security, integrity and authentication, among others. The problem in this research discuss is the Formulation of security policy face difficulties in distributed database systems.

1.3 Main Objective:

The main objective of this research is to build a strong security policy that enable to reduce the problems of data integrity and security in distributed database systems.

1.4 Sub Objectives:

- 1- Study the nature of distributed databases and differences with other databases.
- 2- Study security in distributed databases and different techniques in database management systems.
- 3- See what has been the work of previous researchers in the same field and discuss what they have done from scientific efforts.
- 4- Build an effective security mechanism to help protect the distributed database systems.

1.5 Research Methodology:

In this research, I will talk about distributed database management in general, and how to protect users, I have used some of the tools that provide full protection, and as we shall see later.

1.6 Research Structure:

The research Structured as follow:

- In chapter two I explain a background for Parallel and Distributed Databases and its' concept and designing of Distributed Databases.
- In chapter three I discuss Distributed Database Security in Oracle.
- In chapter four I talked about A Security in DDBS.
- In chapter five I discuss a related work on the Security in by understanding its environment, architecture and commands that used on it.
- In chapter six build a Security mechanism in DDBS.

