


**QUERY PERFORMANCE OF CORBA TRADING OBJECT
SERVICE USING LDAP AS BACKEND STORAGE**

FARKHANA BINTI MUCHTAR

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**Query Performance of CORBA Trading Object Service
using LDAP as Backend Storage**

**This thesis is presented to the graduate school
in fulfillment of the requirement
for Master of Science (Information Technology)
Universiti Utara Malaysia**

By

Farkhana Binti Muchtar

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Abstrak (Bahasa Melayu)

Penyelidikan ini merupakan satu inisiatif ke arah meningkatkan prestasi *trading service* di dalam persekitaran CORBA bagi membolehkan tindak balas daripada *trader server* menjadi lebih pantas apabila sesuatu permintaan dari pengguna dilakukan. Berdasarkan pernyataan daripada spesifikasi *trading service* yang diisukan oleh OMG dan juga dari penyelidikan-penyelidikan yang lepas, pemilihan storan belakang tabir mempengaruhi prestasi *trading service*. Oleh kerana itu, penumpuan diberikan terhadap pemilihan penyelesaian berdasarkan storan sokongan yang sesuai untuk *trader server* dalam meningkatkan operasi carian dalam *trading service*.

Storan yang optimum pada operasi pembacaan data dipilih sebagai penyelesaian yang digunakan dalam penyelidikan ini, kerana ia dapat membenarkan proses carian dan capaian dipertingkatkan dalam *trading service* apabila proses permohonan berlaku. Fakta tersebut telah dibuktikan dalam penyelidikan ini dan storan yang dipilih sebagai penyelesaian ialah LDAP.

Di dalam tesis ini mengandungi kupasan terhadap kajian keupayaan LDAP dalam meningkatkan prestasi operasi permohonan dalam *trading service* di mana pengukuran prestasi dilakukan untuk membezakan keputusan prestasi daripada *trading service* yang menggunakan LDAP sebagai storan sokongan dan *trading service* yang menggunakan pangkalan data biasa sebagai storan sokongan. Berdasarkan keputusan eksperimen yang dijalankan, didapati bahawa *trading service* yang menggunakan LDAP sebagai storan sokongan mempunyai prestasi yang lebih baik berbanding *trading service* yang menggunakan pangkalan data biasa sebagai storan sokongan. Keputusan yang diperolehi membuktikan bahawa wujud peningkatan prestasi pada *trading service* apabila menggunakan LDAP sebagai storan sokongan berbanding penggunaan pangkalan data biasa sebagai storan sokongan.

Abstract (English)

This research is an initiative towards increasing the performance of trading service in a CORBA environment so that the trader server can provide a fast response when a query is performed. Based on the statement in the trading service specification issued by OMG and past research, the selection of backend storage for the trader server influences the performance of the trading service. Thus, an emphasis on the selection of appropriate solutions is focused on the most suitable backend storage to be used by the trader server in order to improve the query operation in the trading service.

Read-optimized storage is the chosen criteria of backend storage for this research as, ultimately, it allows the searching and retrieving process to be improved in the trading service during the query operation. This fact is proven in this research, and the storage chosen as the suggested solution is LDAP.

This thesis examines the capability of LDAP in improving the performance of query operation in the trading service in which a performance measurement is conducted to differentiate the performance result obtained from the trading service which uses LDAP as its backend storage, and the trading service that uses relational database as its backend storage. Based on the experiments conducted, we find that the trading service using LDAP shows a better performance as compared to the trading service with the relational database. From the results, it has been further proven that there is an increase in the performance during the query operation in the trading service that uses LDAP as its backend storage.

Acknowledgements

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Praise to the Almighty Allah who has granted me the permission to complete this study despite all odds. Here, I would like to extend my sincere gratitude and appreciation to:

- Dean of FTM, which also acts as my supervisor, Associate Professor Dr. Zulkhairi Md Dahalin for the advices, guidance and time spent on discussions.
- All friends in the Postgraduate Lab for the support, encouragement and happiness they have given during the period of my study in UUM.
- Universiti Utara Malaysia for the facilities and resources provided.

Dedications

I am forever thankful and in debt to my beloved mother, who have stood beside me in mind, body and spirit as I took on the challenges and obstacles of this research. Her encouragement has helped me not only to overcome but also to persevere and excel. To my brother and sister, your constant encouragement kept me afloat amidst the storm. I am forever thankful to all my family members, for believing in me, and for giving me faith to fight through struggles.

I would like to dedicate this small effort of mine to my family members who lovingly encouraged and supported me throughout this research:

- *My mother, Mrs. Aliwiyah Shaikh Salim*
- *My brother, Mr. Faisal Bawaze'er Muchtar*
- *My sister, Mrs. Fairuz Bawaze'er Muchtar*

Thank you so much...

Farkhana Bawaze'er Muchtar

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List of Abbreviations

API	: Application Programming Interface
BOA	: Basic Object Adapter
CN	: Common Name
CORBA	: Common Object Request Broker Architecture
DB	: DataBase
DBM	: DataBase Management
DIT	: Directory Information Tree
DN	: Distinguished Name
DNS	: Domain Name Service
DOK-Trader	: Distributed Object Kernel-Trader
DOG	: Distributed Object Group
DRYAD	: DiRectorY ADventure
GIOP	: General Inter-ORB Protocol
GUI	: Graphical User Interface
IANA	: Internet Assigned Numbers Authority
ID	: Identifier
IDE	: Interactive Development Environments
IDL	: Interface Definition Language
IIOP	: Internet Inter-ORB Protocol
IO	: Input Output
ITU	: International Telecommunication Union
JDBC	: Java DataBase Connectivity
JDK	: Java Development Kit
JNDI	: Java Naming and Directory Interface
JVM	: Java Virtual Machine
LDAP	: Lightweight Directory Access Protocol
LDSS	: Lightweight Distributed Directory Server
NIS	: Network Information Service
O	: Organizational
ODP	: Open Distributed Processing
OID	: Object Identifier
OMG	: Object Management Group
OMG PSS	: Object Management Group Persistent State Service
OMG TOS	: Object Management Group Trading Object Service
OOPSS	: OpenORB Persistent State Service
OOTOS	: OpenORB Trading Object Service
OpenLDAP	: Open Lightweight Directory Access Protocol
ORB	: Object Request Broker
OS	: Operating System
OSI	: Open Systems Interconnection
OOTSS	: OpenORB Transaction Service
OU	: Organizational Unit
PID	: Persistent Identifier
PMO	: Performance Measurement Object

POA : Portable Object Adapter
PSDL : Persistent State Definition Language
PSS : Persistent State Service
RDBMS : Relational DataBase Management System
RDN : Relative Distinguished Name
RFC : Request For Comments
RTF : Revision Task Force
SDK : Software Development Kit
SLAPD : Stand-alone LDAP Daemon
SN : Surname
SQL : Sequence Query Language
TCP/IP : Transfer Control Protocol/Internet Protocol
TOS : Trading Object Service
UID : User ID
UUID : Unique User ID
X.500 : ITU-T Recommendation X.500
W3C : World Wide Web Consortium

Chapter 1

Introduction to Research

1.0 Background

CORBA or Common Object Request Broker Architecture is a middleware standard for a language-independent object model and specification in a distributed application development environment. CORBA is the solution for the heterogeneity of distributed systems where complexity exists during integration of each component in the distributed system (Vinoski, 2000; Vinoski, 1997).

In common with other distributed system concepts, the key word for the role of CORBA is 'sharing', which includes data, information, analysis, functions, etc. All objects which are shared in the CORBA distributed system environment are known as object resources (Vinoski, 2000; Vinoski, 1997). Here, the issue of how each component in a distributed system acquires the required object resource arises since the location of the required object resource must first be known before it can be shared with each component.

CORBA has two services that offer the facilities of object resource reference; namely, the CORBA Naming Service and the CORBA Trading Service. The CORBA Naming Service functions as the information provider's 'white pages' in which the object reference is referred based on the simple name during the lookup process (Emmerich, 2002; Emmerich, 2000).

In contrast to the CORBA Naming Service, the CORBA Trading Service is more efficient than the CORBA Naming Service since each component – or "clients" – will not always know the names for the components' identity they require, however, clients will always know the criteria of the components that they are looking for (Emmerich, 2002; Emmerich 2000).

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