

EPCIS에서 MS-SQL과 Altibase 비교 연구

A study on the comparison between MS-SQL and ALTIBASE in EPCIS

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Abstract

일반적으로 물류센터에서는 많은 작업이 발생하고, 처리되는 물품 또한 그 수량이 매우 많아서 작업·제품·정보들을 빠르고 정확하게 처리하기 위해서는 많은 비용이 발생한다. 이러한 오류를 줄이고, 실시간 정보처리, 객체의 가시성 확보, 제품 이력 추적 등의 이점을 얻기 위해 RFID 기술을 도입하는 기업들이 증가하는 추세이며, 최근에는 RFID를 활용하여 전 세계적으로 표준화된 단일 네트워크를 만들고자 하는 EPC Global Network에 대한 필요성이 증가하고 있다. 본 연구에서는 EPC Global Network의 게이트웨이 역할을 하는 EPCIS에서, 정보의 저장소 역할을 하는 EPCIS Repository의 최적화에 대해 연구한다. 실제 물류 센터에서 발생하는 비즈니스 프로세스를 바탕으로 시나리오를 작성하고, 물류센터의 시나리오에 따라 발생하는 EPC 데이터를 DRDBMS와 MMDBMS를 통해 각각 저장하고 검색하여 두 DBMS의 성능을 비교하였다. DRDBMS는 MS-SQL을 사용하였고, MMDBMS는 ALTIBASE를 사용하였다. 실험 결과 ALTIBASE가 MS-SQL보다 좋은 성능을 보임을 알 수 있었다.

Keywords : EPCIS, MMDBMS, DRDBMS, Hybrid DBMS, RFID

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1. Introduction

Radio Frequency Identification (RFID) technology in combination with Electronic Product Code (EPC) enables the tracking of physical objects in supply chains. Recently ratified standard of EPCglobal's Electronic Product Code Information Service (EPCIS) specification enables a useful semantic interpretation of such RFID event data across supply chains[1][2]. Because RFID data access reflects actual business processes, we can simulate it with two different Database Management System (DBMS) and obtain the performance of two DBMS.

In this paper, we programmed business steps with Visual Basic 6.0 and two DBMS is installed in HP Server. Compared their performance mainly in "INSERT TIME", "SELECT TIME", etc.

2. EPCIS

EPC Information Services (EPCIS) is an EPCglobal standard designed to enable EPC-related data sharing within and across enterprises. This data sharing is aimed at enabling participants in the EPCglobal Network to obtain a common view of the disposition of EPC-bearing objects within a business context. EPCIS standard provided basic capability that meets the requirements of a set of use cases that the EPCglobal community identified as a minimal useful set. As such, the EPCIS standard can be used by any application in any industry[3][4].

The EPCIS standard defines standard interfaces to enable EPC-related data to be captured and subsequently to be queried using a set of service operations and an associated data model. The capture and query of EPC-related data will typically involve the use of persistent databases, though application-to-application sharing can occur without persistent databases. The standard specifies only the interfaces between applications that capture EPC-related data and those that need access to it. [Figure 1] shows the main components of EPCIS and its procedure.

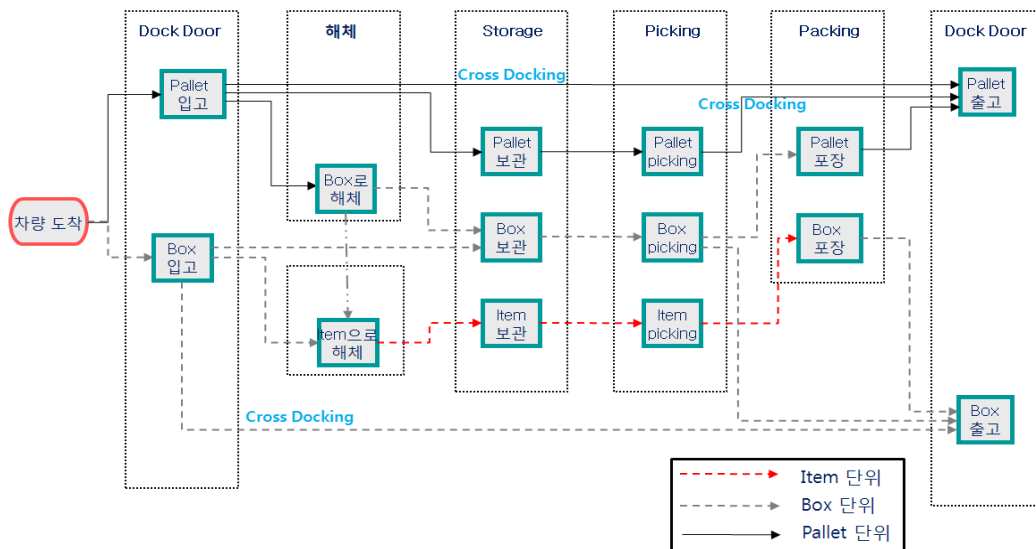
3. DBMS(Database Management System)

Database management system is a set of computer programs that controls the creation, maintenance, and the use of the database with computer as a platform or of an organization and its end users.

The mainly three DBMS used at present is: DRDBMS (Disk-residence DBMS), MMDBMS (Main Memory DBMS) and Hybrid DBMS. Their main performances

expressed in storage medium. DRDBMS stores information on disk, MMDBMS stores information on main memory while Hybrid DBMS can store information both on hard disk and main memory. Of the two DBMS used in this paper, ALTIBASE is Hybrid DBMS and MS-SQL belongs to DRDBMS.

4. Construction of EPCIS Repository



[Figure 1] distribution center's process

Warehouse processes contain a series of steps as follows. After cargo arrives, it will be discharged and sent to the dock door, then unpacked, transported to storage area, picked, packed and out-of storage. [Figure 1] is the main business steps of this distribution center.

According to the process flow chart, we made the scenario, calculated occurrence data amount of each step. The occurrence data amount is computed through statistic the proceed item/box/pallet amount of each business step.

The schema includes two main tables and ten reference tables. Main tables store the "main" information while reference tables store the relevant detailed information.

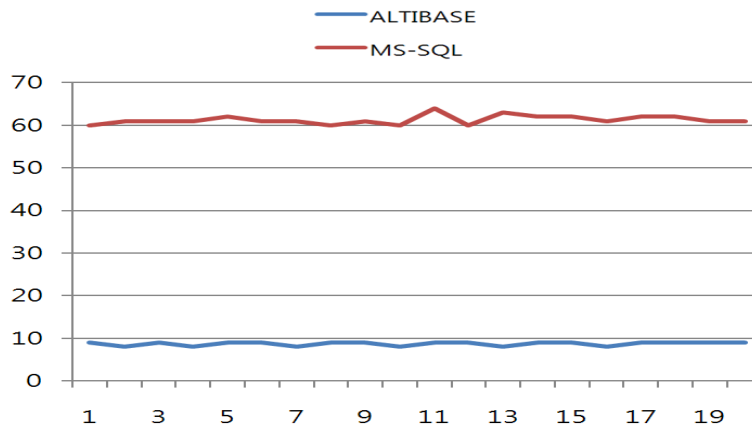
5. Comparisons between MS-SQL and ALTIBASE

In the insert part, we designed that the cargo includes 8 pallets and each pallet

includes 20 boxes, and each box includes 30 or 20 items. We calculated the number of insert data that contains EPC Object Event Data, Aggregation Data, Quantity Data, and Transaction Data at the stage of in-storage, and compare the performance of MS-SQL and ALTIBASE in time zones. <Table 1> shows the insert time comparison of two DBMS processing performance. The result shows that ALTIBASE processing performance is about 6 times faster than MS-SQL.

[Table 1] comparisons of INSERT (Unit: second)

No. of Test	Data Amount	ALTIBASE		MS-SQL	
		accumu- lated time	time difference	accumu- lated time	time difference
1	10,025	9	9	60	60
2	20,050	17	8	120	61
3	30,075	26	9	181	61
4	40,100	34	8	242	61
5	50,125	43	9	303	62
...
23	230,575	200	9	1,407	61
24	240,600	208	8	1,468	61
25	250,625	217	9	1,528	60



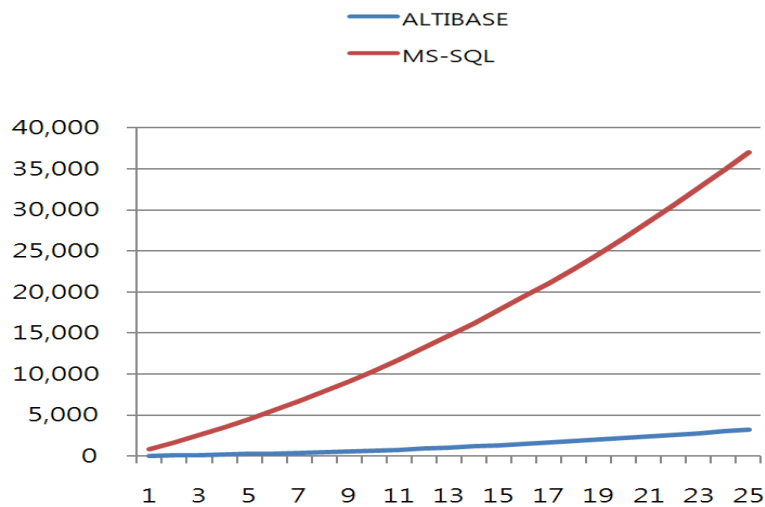
[Figure 2] comparison of insert time (Unit: second, Number of test)

In the select part, we firstly insert the same data into two DBMS and then select data from two DBMS. It is notable that two DBMS have the same storage data and the selected-data are all the same. <Table 2> shows the select time

comparison of two DBMS processing capacity. The result shows that with the storage data amount increases, ALTIBASE has a significant performance than MS-SQL in the select-processing capacity.

[Table 2] comparisons of INSERT time including SELECT time(Unit: second)

No. of Test	Data Amount	ALTIBASE		MS-SQL	
		accumu- lated time	time difference	accumu- lated time	time difference
1	10,025	33	33	797	797
2	20,050	74	41	1,594	847
3	30,075	122	48	2,441	894
4	40,100	179	57	3,335	944
5	50,125	244	65	4,279	989
...
23	230,575	2,802	207	29,869	1,855
24	240,600	3,014	212	31,801	1,932
25	250,625	3,239	225	33,790	1,989



[Figure 3] comparison of insert time including selection time (Unit: second, Number of test)

6. Conclusion and further research

According to the results, we found that ALTIBASE performed so powerful in

both insert processing capacity and select processing capacity of two DBMS, especially in large amount data process. Exclusion of economic factors, ALTIBASE has is highly recommended applied in warehousing management system.

The further research area about this project is schema optimization. The right schema can store all necessary information in the condition of data minimization, which can reduce insert time and select time directly[3].

7. Refference

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