



IBM DB2 Sort for z/OS

Carlos Guardia
Executive IT/Specialist
IBM Software Group

August, 2010

Agenda

- ***DB2 SORT V1.1***
 - **Features**
 - **Performance**
- ***Just Released!: DB2 SORT V1.2***
- ***Customer example***
- ***How can savings be evaluated?***
- ***Summary***



DB2 Sort for z/OS v1.1 – Announced August 10th, 2010

- **DB2 Sort is generally available in 09/2010**
- **What is it?**
 - DB2 Sort is a new DB2 OTC product that provides high speed utility sort processing for data stored in DB2 for z/OS.
 - It improves sort performance while optimizing overall system efficiency by exploiting the advanced facilities of the z/OS operating system and System z.
 - DB2 Sort leverages SyncSort sort technology for DB2 utility sort processing
 - Developed through relationship between IBM and Syncsort
 - Developed specifically to execute **today** with the DB2 Utilities
- **DB2 Sort v1.1 (5655-W42) requires:**
 - DB2 Version 8, DB2 9 or DB2 10 / DB2 Value Unit Edition with the following
 - z/OS 1.9 or higher
 - DB2 Utilities Suite Version 8 or 9 (depending on DB2 for z/OS level)

Features of DB2 Sort for z/OS V1.1

- zIIP support to lower billable CPU usage associated with sorting
 - Value: The higher the zIIP offload, the more reductions in CPU, the greater the savings
- Optimization on specific I/O devices to utilize the best I/O transfer technique
 - DB2 Sort monitors the I/O transfer rates
 - Value: Adjusts the use of devices to balance the I/O load to achieve the best elapsed time
- Memory Optimization
 - DB2 Sort determines the availability of system resources and selecting the appropriate amount of storage to allocate.
 - Value: Maximizing system resources while minimizing DASD requirements

Features of DB2 Sort for z/OS V1.1

- **Dynamic allocation of intermediate work space**
 - DB2 Sort minimizes the amount of DASD space used. It helps avoid sort capacity errors caused by insufficient amounts of work space and a better usage of intermediate work space to not over allocate space.
 - **Value: Conserves resources as well as the CPU usage that would be spent in the allocation**

- **Synergy with the IBM Utilities to determine the optimal number of sorts to run in parallel, “intra-regional” parallelism.**
 - DB2 Sort assesses the availability of system resources and communicates with the utility to optimize the allocation of resources for each sort based on the data characteristics.
 - Increases the number of sorts that can be run simultaneously
 - **Value: Higher degree of parallelism results in lower elapsed utility processing time**

Performance

- Customers using DB2 Sort V1.1* may see during certain utility sort processing:
 - Up to 30% in reduction of sort elapsed time
 - Up to 60% reduction of sort CPU
 - Total CPU utility time 25%-40% reductions
 - Up to 30% zIIP offload of remaining CPU

- IBM DB2 Utilities where you'll see performance benefits
 - LOAD, REORG, RUNSTATS, REBUILD INDEX, CHECK INDEX and CHECK DATA
 - HPUNLOAD
 - Coming Log Analysis Tool

- Workloads where there is more likely to be a benefit from utility sort processing and DB2 Sort V1.1, such as:
 - Highly-transactional workloads performing lots of insert, update, delete operations requiring RUNSTATS and REORG
 - Applications such as data warehousing applications that are performing frequent or large volumes of loading data requiring LOAD and REBUILD INDEX



**Customer results may vary. Results based on analysis done at SVL lab*

Just released! DB2 Sort for z/OS V1.2

- **Additional zIIP support to lower billable CPU associated with sorting**
 - Almost every DB2 Sort invocation is eligible for the zIIP processor, if available
- **Performance enhancements to deliver greater reductions of CPU usage and elapsed time**
- **Cross-address space resource balancing feature**
 - Monitors the use of central storage by DB2 Sort applications across an LPAR
- **Optimization Mode (OPTMODE=BALANCE, CPU, ELAP)**
 - Ability to determine the mix of CPU and elapsed time performance desired by balancing
- **Increased Parallelism**
 - DB2 Sort synchronizes the processing of simultaneous sorts, reducing the wait times associated with the transfer of records between the utilities and DB2 Sort. This synchronization improves the CPU usage and elapsed time of the sort processing.
- **Extended Address Volume (EAV) Support**
 - DB2 Sort is able to obtain larger volumes for larger sort workloads



Customer case: Financial Institution Wants to Reduce Costs

- A leading European financial company had high availability needs and equally high volumes of data. They needed to reduce their batch window and reduce the use of system resources.

DB2 Sort V1.2 Installation Verification Program Results

Percent Improvement Using DB2 Sort

| Table Size | DB2 Utility | Sort CPU Time | Step CPU Time | Elapsed Time |
|------------|-----------------|---------------|---------------|--------------|
| 8GB | LOAD | 58.3% | 22.7% | -1.0% |
| 8GB | REBUILD | 54.9% | 26.4% | 14.1% |
| 8GB | REORG | 33.5% | 30.6% | 1.6% |
| 10GB | LOAD | 58.4% | 23.2% | 0.5% |
| 10GB | REBUILD | 55.5% | 23.5% | 19.4% |
| 10GB | REORG | 33.6% | 30.9% | 2.9% |
| 25GB | LOAD | 59.7% | 29.5% | 8.0% |
| 25GB | REBUILD | 60.6% | 32.6% | 29.8% |
| 25GB | REORG | 40.6% | 35.1% | 13.1% |
| 40GB | LOAD | 61.9% | 32.1% | 17.8% |
| 40GB | REBUILD | 62.2% | 33.6% | 33.3% |
| 40GB | REORG | 39.2% | 34.3% | 13.2% |
| | Averages | 52.0% | 31.6% | 16.3% |

Environment

| | |
|------------------------------|------|
| Machine Type | z196 |
| Operating System Level | 1.12 |
| DB2 Level | 9 |
| Number of Regular Processors | 5 |
| Number of zIIP Processors | 20 |
| Amount of Memory | 192G |

How can savings be fully evaluated?

▪ **DB2 Utility Workload Analysis**

– DB2 Utilities APAR PM37956

▪ **What does it do?**

– New IFCID that collects information on amount of sorting (CPU & zIIP time) being done in customer environment during Utilities execution

▪ **How does it work?**

– Runs SMF extract job and collects SMF data during significant time periods

▪ **What is the benefit?**

– Analysis will estimate savings based on performance improvements when using DB2 Sort



Benefits of DB2 Sort



- Will provide relief if you
 - **Have large amounts of data**
 - **Have utility batch window constraints**
 - **Have to execute utility maintenance during peak business hours that may affect elapsed time and/or CPU**
 - **Need to reduce the overall mainframe CPU consumption**
 - **Have purchased utilities from ISVs, requiring**
 - Paying for multiple sets of utilities
 - Managing multiple sets of utilities
- Once installed and enabled, is used by all utility sorting
- Requires no changes to utility jobs
- Improves/reduces resource consumption for single and parallel sorts
- Can result in higher degree of utility parallelism
- Gives greater resilience with respect to inaccurate sort estimates

धन्यवाद

Hindi

多謝

Traditional Chinese

ขอบคุณ

Thai



Спасибо

Russian

Thank You

English

Gracias!

Spanish

شكراً

Arabic

Merci

French

Obrigado

Brazilian Portuguese

Bedankt

Nederlands

多谢

Simplified Chinese

Danke

German

நன்றி

Tamil

ありがとうございました

Japanese

감사합니다

Carlos Guardia
cguardia@es.ibm.com