SAP NetWeaver BW Accelerator – Insight and Case Study

Applies to:

SAP NetWeaver 2004s BI 7.0 with BWA Revision 51. For more information, visit the EDW homepage.

Summary

BW Accelerator is highly scalable analytical server that processes queries initiated by SAP NetWeaver BI users. BW Accelerator is built using TREX technology (indexing, retrieving and compression) to handle structured data. BW Accelerator provides fast and reliable response time for large data volumes and non-performing queries which can help to fit unique business requirements.

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Author Bio

The author has been associated with Infosys Technologies Limited for 3+ years and has been involved in implementations of an Enterprise Date Warehouse, BI upgrade, BI Support and BWA.

Table of Contents

Introduction

‣ BW Accelerator is a new approach to boost SAP Net Weaver BI performance based on SAP's search and classification engine and on specially configured hardware.

‣ BW Accelerator implementation can improve the query performance through sophisticated in-memory data compression and horizontal and vertical partitioning.

‣ BW Accelerator is built using TREX technology.

‣ TREX supports structured data search not only for document metadata but also for business data and data in SAP business objects. Indexes for structured data are implemented compactly using data compression and the data can be aggregated, to enable large volumes of data to be processed entirely in memory.

Pre- Requisite

‣ SAP NetWeaver 7.0

What's Inside BWA?

‣ BI accelerator is a plug-and-play appliance.
‣ The installation of the BW Accelerator software is performed by the SAP hardware partner. The SAP hardware partners (IBM, Hewlett Packard, Fujitsu SIEMENS Computers, or Sun Micro-systems) offers the BW Accelerator hardware as a packaged appliance and installs and delivers a preconfigured blade system to the customer site. The installation procedure carried out by the hardware partner is complete once the network connection to the BI system has been established successfully.
‣ There are no relational or other database management systems in BW Accelerator. There is only a file system. The indexes are essentially held as flat files. The second primary component of BW Accelerator is the engine that processes the queries in memory.
‣ The software is running on an expandable rack of blade servers. The operating system used for BW Accelerator is 64-bit Linux.So, in addition to having no database license cost, there is also no Operating System license cost.
‣ SAP recommends that

    ✓ Only 50% of the memory of Blades to be used.

    ✓ The other 50% memory is used for :
- Reporting

- Delta update and merge operations of indexes

- Re-distribution of index-parts over the blades

Components of the BW Accelerator Appliance

As shown in **Fig 1**, following are the main components of BW Accelerator:

- ⇥ Standalone or fit into an existing

- ⇥ Customer rack

- ⇥ Blade servers with 64-bit Intel Xeon CPUs

- ⇥ Linux SLES, 64-bit

- ⇥ Optimized storage included

- ⇥ High-Speed Network Switch

- ⇥ Dedicated network between BW and BWA

SAP NeatWeaver BW Accelerator Appliance Components

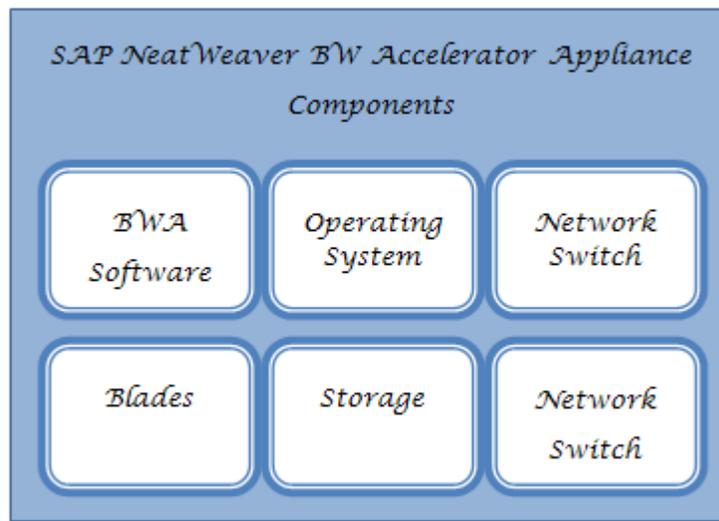|		
BWA Software	Operating System	Network Switch
Blades	Storage	Network Switch

Fig-1

BWA at Work

The BW Accelerator is installed on a preconfigured blade system. A blade system consists of hosts in the form of server blades. The server blades are connected to central disk storage.
This is referred to here as a file server.

1. Data is loaded from source systems into InfoCube as shown in **Fig-2**.

2. An index is built for this InfoCube and stored inside the BW accelerator appliance. These are search engine indexes built using SAP's TREX search technology. They are stored in a file system using vertical decomposition (a column-based approach as opposed to the row-based approach that requires more read time). This results in highly compressed data sets that further contribute to fast processing speeds.

3. BW Accelerator indexes are loaded into memory where the query is processed. In memory, joins and aggregations are done at run time. Loading of indexes into memory happens automatically at first query request, or it can be set for preloading whenever new data is loaded.

4. At run time, query requests are sent to the analytic engine, which re-routes the query to the BW Accelerator.

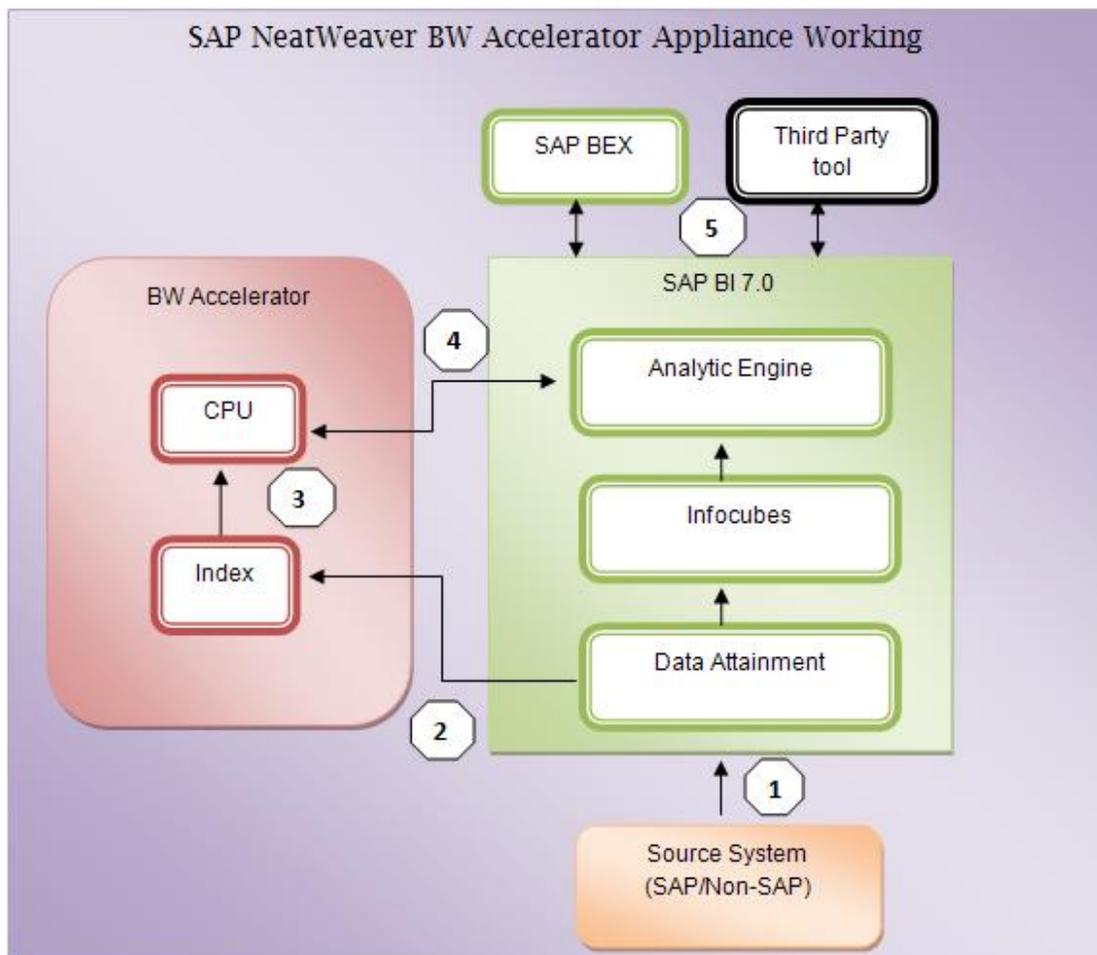5. Query results are returned to the end-user application.

Fig-2

Initial BWA Administration

To make sure that BWA would result in significant performance improvements, some of the prequisites are as follows:

▸ The system should have cubes with high data volume

▸ On an average, the database read time for a query should be higher than the OLAP time

 (OLAP time cannot be reduced using BWA).

▸ Records transferred from DB to OLAP should be less.

▸ Queries with High OLAP time will not be benefitted by BWA. Need to look at other query optimizaiton techniques like:

 ✓ Check if a high number of Cells transferred to the OLAP (use "All data" to get value "No. of Cells")

 ✓ Use RSRT technical Information to check if any extra OLAP-processing is necessary (Stock Query, Exception Aggregation, Calc. before Aggregation, Virtual Char. Key Figures, Attributes in Calculated Key Figs, Time-dependent Currency Translation) together with a high number of records transferred.

 ✓ Check if a user exit Usage is involved in the OLAP runtime.

 ✓ Check if large hierarchies are used and the entry hierarchy level is as deep as possible. This limits the levels of the hierarchy that must be processed. Use SE16 on the inclusion tables and use the List of Value feature on the column successor
 and predecessor to see which entry level of the hierarchy is used.

 ✓ Check if a proper index on the inclusion table exist

To find Best Scenario

Ensure BW statistics are turned on.

1. Use Transaction SE16; table RSDDSTAT_OLAP to identify those queries which have high aggregation ratio
 • Select Event 9000-9099
 • Provides statistics for data manager time, number of selected records and number of transferred records. **Fig-3**

2. Execute queries off a statistics cube to determine the query performance for specific   cubes.
 • Execute query 0TCT_MC03/OTCT_MC03_Q0200

3. Execute and Debug queries in RSRT. Capture the statistics of the query and identify those queries with a high Data Manager time.

Thumb Rule for a cube to be considered for BWA

- ⇥ Huge number of scanned records (i.e. DBSEL > 1 Million records)

    Or

- ⇥ High Aggregation ratio > 100 (Ratio of DBSEL/DBTRANS)

    Or

- ⇥ Large number of transferred records (DBTRANS > 50000)
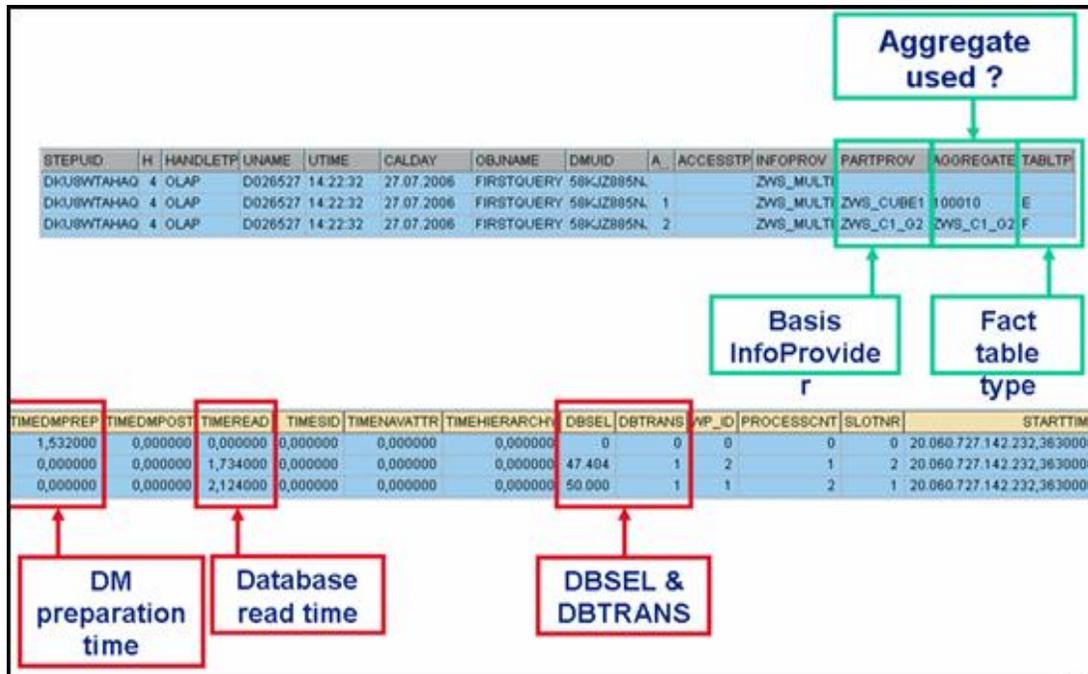
Data Manager Details in RSDDSTAT_DM

Fig-3

BWA Indexing Of Cube

- Click On the context menu for a particular InfoCube in RSA1.**Fig-4**
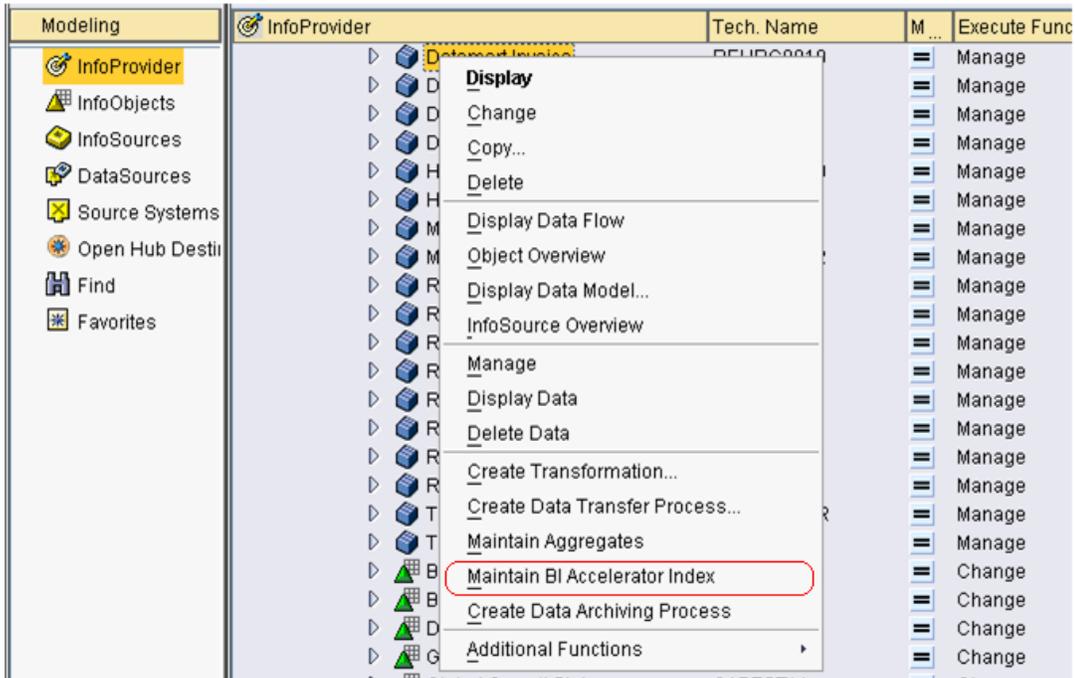- Or direct access via transaction **RSDDV**

Fig-4

Index Wizard: Creation, filling, deletion of BI accelerator indexes via easy-to-use wizard
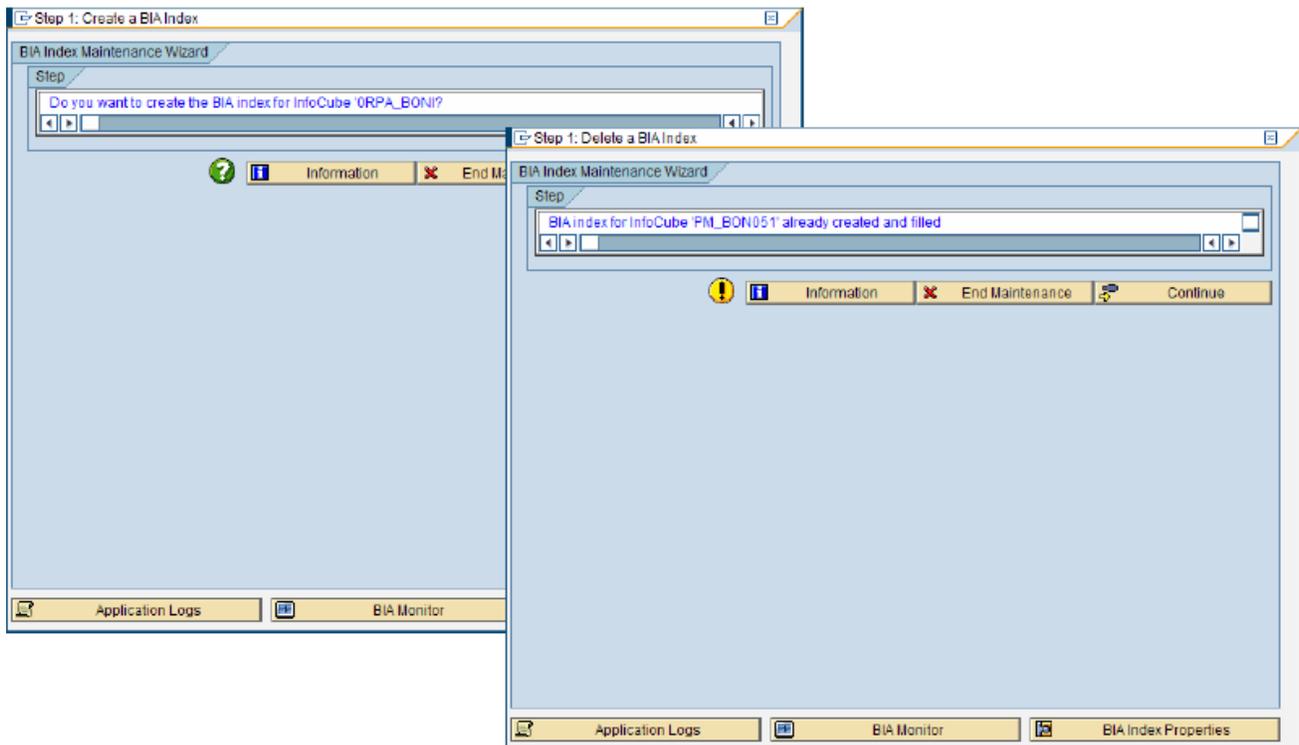**Fig-5**

Fig-5

Roll Up

- ⸭ Roll up simply means Update of newly loaded data to BI Accelerator index
- ⸭ This is similar to roll-up process for aggregates
- ⸭ Add Roll up step in the process chain to automate the creation the indexes just after loading of data to Cube happen.

BWA Regular Administration

Regular Administration for BW Accelerator indexes can be done with the following transactions:

Maintaining BWA Indexes:

BWA indexes can be created and deleted with the *BIA index maintenance wizard.* This wizard can be started

from the *Aggregate/BIA Index Maintenance* screen (transaction `RSDDV`).

Monitoring BWA Indexes:

Once you have created indexes, you monitor them in the *BI Accelerator monitor*

(t-code `RSDDBIAMON2`).

Analyzing and Repairing BWA Indexes:

If errors or problems occur, go to *Analysis and Repair of BI Objects* (transaction `RSRV`)

The support team should have a followings repository available with them:
- Cubes List that is on BWA.

- Load (Full/Delta) details for the cubes on BWA

Also, following checks should be done on a regular basis:

Task	Procedure	Description
Check the Summary, Current Result, and History screens	Go to *BIA Check Result→ Summary/Current Results/History*	For the statuses yellow and red , the system usually proposes measures for fixing the problem. You can display an explanatory long text by choosing the question mark icon (*Display Long Text*). If details are available for a check, you can call them by choosing (*Details Available*) in the Details column.
Check the workload on the BIA hosts with the BIA load monitor.	Choose *BIA Load Monitor→Activate* or go to BI Accelerator BIA Load Monitor Activate	The BIA load monitor checks the memory usage and workload, CPU consumption, response times, and number of current queries and requests for the BIA hosts. The BIA load monitor is displayed in a separate window that refreshes itself independently
Check the status of the cubes present on BIA	Go To *→BIA Index Maintenance→BIA Index*	The overall status of the cubes present on BWA should be green before and after the data loads.

Constraints for BWA Environment

⟐ Deploy only one BWA installation (landscape) per blade system.This is important for high and effective performance of BWA.

⟐ There is a 1:1 relationship between the BI system and the BWA installation.Connect one BWA installation (landscape) to one production BI system

⟐ The number of blades in a BWA landscape is restricted to a specific number (for example, 28 or 32). For the specific number of blades of the hardware your are using, please contact your hardware partner.

Business Case Study

Client Situation

▸ Numerous queries in production with average to poor performance.

▸ High number of aggregates present

▸ BWA Hardware procured - 6 Blades, 16 GB each to be implemented in Production

▸ List of slow performing queries not readily available from the client.

Approach

▸ A three phase approach was used:

  o Phase 1: Pulse check Analysis to find out the list of cubes with large data volumes, and slow performing queries. Narrow down the list to only those cubes/queries which would which would benefit from BWA.

  o Phase 2: Use one of the blades in the Quality systems move a sample set of cubes from the final list into this BWA blade in Quality and test the query performance, to validate the findings of the Pulse check

  o Phase 3: Move the final list of cubes into BWA in Production.

▸ Analysis/modifications of process chains was also tested in the quality system before being modified in the Production system

▸ Exhaustive documentation was done of all the results and findings during testing as well as after implementation in Production.
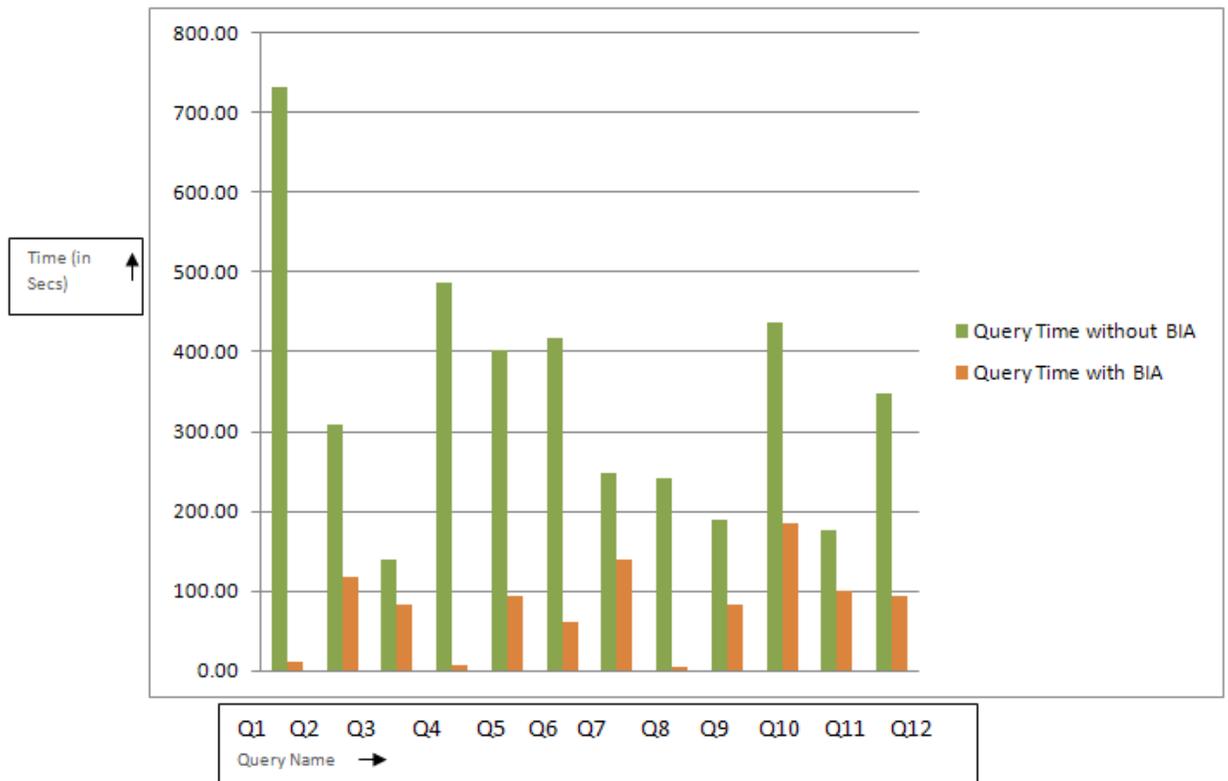
Fig-6

Highlights

▸ Implementation was completed successfully on time and all issues with any specific cubes/queries were addressed.

▸ Detailed & Exhaustive test strategy was devised to cover all possible scenarios for BWA implementation.

▸ As shown above in the Fig-6, a marked improvement was seen in most of the queries.

Note: The estimated improvement is for the selected analyzed queries only. The factor for improvement may differ from query to query.

▸ More than 600 queries showed a marked improvement, out of which around 60% queries showed an improvement of as much as 70%.

Related Content

http://www.sdn.sap.com/irj/sdn/bwa

https://cw.sdn.sap.com/cw/docs/DOC-117254

http://www.sdn.sap.com/irj/sdn/bwa?rid=/library/uuid/5be07e11-0b01-0010-618e-f713e24f80e4

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