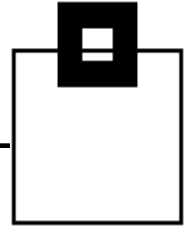


Do more with less – Part One

Resource and cost saving approach for
DB2 SQL workloads on z/OS



Agenda



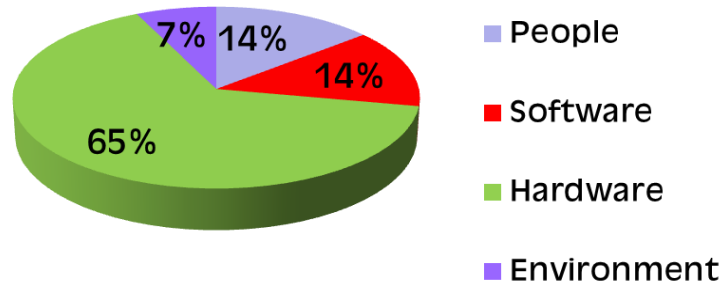
- Past and future directions
- The mainframe as a relative cost driver
- SQL workload : its collection and analysis
- Typical views
- WLX GUI filtering and sorting
- WLX data input
- WLX GUI views
- Application areas
- Use cases (Today only two examples)



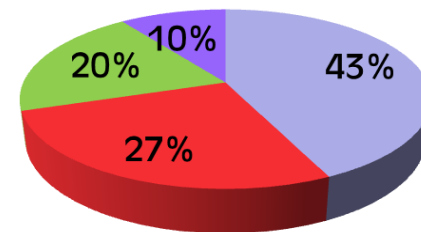
Past and future directions

- Components of operational expenditure -
From hardware to software to personnel expenses.
However a steady increase of overall operational costs
even though less \$s per MSU because there are
dramatically more MSUs.

1995 – TCO Allocation



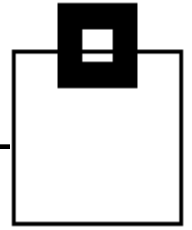
2004 – TCO Allocation



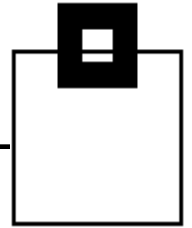
Past and future directions

Change of performance and differentiation criteria of the leading market players:

- 1994 fastest hardware counted
- 2004 best software (home grown / bought) counted
- 2014 z/Enterprise EC12, BIG data, Business Analytics & High Performance. Fastest Hardware, more and more data, best evaluations required



The mainframe as a relative cost driver ?



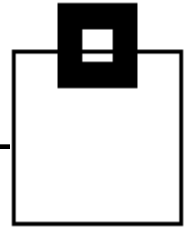
Creative ways out of these constraints:

- Porting of applications from z/OS to AIX
- Shifting of workload to zIIP and zAAP
- Porting to NETEZZA (Accelerators)
- SQL Workload Tuning

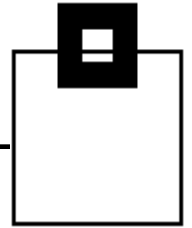


Goal: Cost reduction – 4 hours rolling average

- Supporting Quality Assurance measures to stabilize resource consumption and performance metrics
- Avoiding or minimizing cost peaks, performance bottlenecks, and extra manpower requirements
- Establishing automation of change control for:
 - system maintenance and system changes
 - access path management of applications
 - permanently monitoring recovery conditions and SLA requirements



SQL Workload: How to collect and analyze it



Different flavors are possible :

- In production by means of
 - Monitors (OMPE, Strobe, FreezeFrame..)
but for reasons of resource consumption not permanently collecting all needed data
 - SQL Collectors
but complex and very time consuming



NEW-----NEW-----NEW

- DB2 10 resource-friendly IFCID technology getting dynamic & static SQL



SQL WorkloadExpert for DB2 z/OS architecture

SOURCES

Real Time Statistics
RTS

DB2 Catalog
& Explain Data
for **static** SQL

DSN MSTR System
Services Address Space
DSC + EDM + IFCIDs

STC Started Task
24 x 7

SEG BATCH

- Explain for dynamic SQL
- Aggregation
- DB2 Objects
 - tables
 - indexes

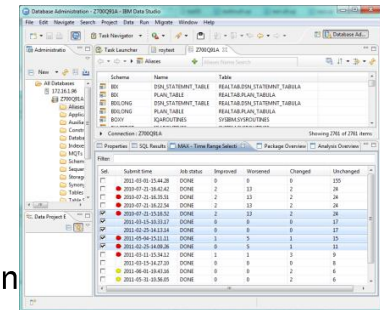
SQL Workload Warehouse



Type 4

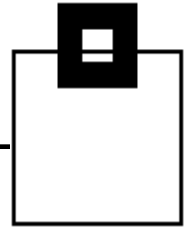
JAVA
Connection

Workstation SEG – Integrated GUI



Eclipse native
Rational
DataStudio

Reduction of collection costs by efficient IFCIDs



- The enhanced IFCIDs deliver all the important info to enable smart analysis of SQL workload
- The needed IFCIDs are cheap to get and can be very quickly processed via a STC (24x7 to catch all thrown IFCIDs)
- These IFCIDs can be snapped in a continuous way, which enables a long period of time to be kept
- Redundant data can condensed and aggregated



What matters for our needs

Counters

EXECUTIONS OF THE STATEMENT. FOR A CURSOR STATEMENT, THIS IS THE # OF OPENS. # OF SYNCHRONOUS BUFFER READS PERFORMED FOR STATEMENT. # OF GETPAGE OPERATIONS PERFORMED FOR STATEMENT. # OF ROWS EXAMINED FOR STATEMENT. # OF ROWS PROCESSED FOR STATEMENT – FOR EXAMPLE, THE # OF ROWS RETURNED FOR A SELECT, OR THE NUMBER OF ROWS AFFECTED BY AN INSERT, UPDATE, OR DELETE. # OF SORTS PERFORMED FOR STATEMENT. # OF INDEX SCANS PERFORMED FOR STATEMENT. # OF TABLESPACE SCANS PERFORMED FOR STATEMENT. * # OF PARALLEL GROUPS CREATED FOR STATEMENT. # OF SYNCHRONOUS BUFFER WRITE OPERATIONS PERFORMED FOR STATEMENT.

O Counters

OF TIMES THAT A RID LIST WAS NOT USED BECAUSE THE # OF RIDS EXCEEDED ONE OR MORE INTERNAL DB2 LIMITS, AND THE # OF RID BLOCKS EXCEEDED THE VALUE OF SUBSYSTEM PARAMETER MAXTEMPS. RID. # OF TIMES THAT A RID LIST WAS NOT USED BECAUSE NOT ENOUGH STORAGE WAS AVAILABLE TO HOLD THE RID LIST, OR WORK FILE STORAGE OR RESOURCES WERE NOT AVAILABLE. # OF TIMES THAT A RID LIST OVERFLOWED TO A WORK FILE BECAUSE NO RID POOL STORAGE WAS AVAILABLE TO HOLD THE LIST OF RIDS*. # OF TIMES THAT A RID LIST OVERFLOWED TO A WORK FILE BECAUSE THE NUMBER OF RIDS EXCEEDED ONE OR MORE INTERNAL LIMITS*. # OF TIMES THAT APPENDING TO A RID LIST FOR A HYBRID JOIN WAS INTERRUPTED BECAUSE NO RID POOL STORAGE WAS AVAILABLE TO HOLD THE LIST OF RIDS*. # OF TIMES THAT APPENDING TO A RID LIST FOR A HYBRID JOIN WAS INTERRUPTED BECAUSE THE NUMBER OF RIDS EXCEEDED ONE OR MORE INTERNAL LIMITS*. # OF TIMES THAT RID LIST RETRIEVAL FOR MULTIPLE INDEX ACCESS WAS NOT DONE BECAUSE DB2 COULD NOT DETERMINE THE OUTCOME OF INDEX ANDING OR ORING*.

TIMINGS

ACCUMULATED CPU TIME. THIS VALUE INCLUDES CPU TIME THAT IS CACHED IN AN IBM SPECIALTY ENGINE. ACCUMULATED ELAPSED TIME USED FOR STATEMENT. ACCUMULATED WAIT TIME FOR LATCH REQUESTS*. ACCUMULATED WAIT TIME FOR PAGE LATCHES*. ACCUMULATED WAIT TIME FOR DRAIN LOCKS*. ACCUMULATED WAIT TIME FOR DRAINS DURING WAITS FOR CLAIMS TO BE RELEASED*. ACCUMULATED WAIT TIME FOR LOG WRITERS. ACCUMULATED WAIT TIME FOR SYNCHRONOUS I/O. ACCUMULATED WAIT TIME FOR LOCK REQUESTS. ACCUMULATED WAIT TIME FOR A SYNCHRONOUS EXECUTION UNIT SWITCH. ACCUMULATED WAIT TIME FOR GLOBAL LOCKS. ACCUMULATED WAIT TIME FOR READ ACTIVITY THAT IS DONE BY ANOTHER THREAD. ACCUMULATED WAIT TIME FOR WRITE ACTIVITY THAT IS DONE BY ANOTHER THREAD.

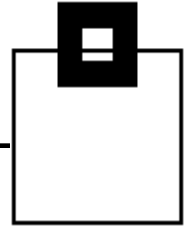
IDENTIFICATION

DATA SHARING MEMBER THAT CACHED THE SQL STATEMENT*. PROGRAM NAME. PROGRAM NAME IS THE NAME OF THE PACKAGE OR DBRM THAT PERFORMED THE PREPARE/SQL. PRECOMPILER LINE NUMBER FOR THE PREPARE STATEMENT OR SQL STATEMENT. TRANSACTION NAME. THIS VALUE IS PROVIDED DURING RRS SIGNON OR RE-SIGNON. END USER ID*. THIS VALUE IS PROVIDED DURING RRS SIGNON OR RE-SIGNON. WORKSTATION NAME*. THIS VALUE IS PROVIDED DURING RRS SIGNON OR RE-SIGNON. USER ID. USER ID IS THE PRIMARY AUTH. ID OF THE USER WHO DID THE INITIAL PREPARE. USER GROUP. USER GROUP IS THE CURRENT SQLID OF THE USER WHO DID THE INITIAL PREPARE. USER-PROVIDED IDENTIFICATION STRING.

ENVIRONMENTAL

REFERENCED TABLE NAME. FOR STATEMENTS THAT REFERENCE MORE THAN ONE TABLE, ONLY THE NAME OF THE FIRST TABLE THAT IS REFERENCED IS REPORTED. (ALL REFERENCED OBJECTS ARE STORED IN THE WLI DATA MODEL) LITERAL REPLACEMENT FLAG* CURRENT SCHEMA. QUALIFIER THAT IS USED FOR UNQUALIFIED TABLE NAMES. BIND OPTIONS: ISOLATION, CURRENTDATA, AND DYNAMICRULES. SPECIAL REGISTER VALUES: CURRENT DEGREE, CURRENT RULES, AND CURRENT PRECISION. WHETHER THE STATEMENT CURSOR IS A HELD CURSOR. TIMESTAMP WHEN STATISTICS COLLECTION BEGAN. DATA COLLECTION BEGINS WHEN A TRACE FOR IFCID 318 IS STARTED. DATE AND TIME WHEN THE STATEMENT WAS INSERTED INTO THE CACHE IN STORE CLOCK FORMAT. DATE AND TIME WHEN THE STATEMENT WAS UPDATED, IN STORE CLOCK FORMAT. DATE AND TIME WHEN THE STATEMENT WAS UPDATED, IN INTERNAL FORMAT.

Get all SQL in an Enterprise

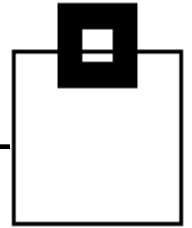


- Catches the complete view over the enterprise wide SQL
- All static (EDMPOOL=SSC) & dynamic (DSC) data will be read. All SQL thrown out of the caches as well
- EXPLAIN all access paths of productive dynamic SQL to find all used objects
- Comparison over time. e.g. before & after index create
- Trending of KPIs



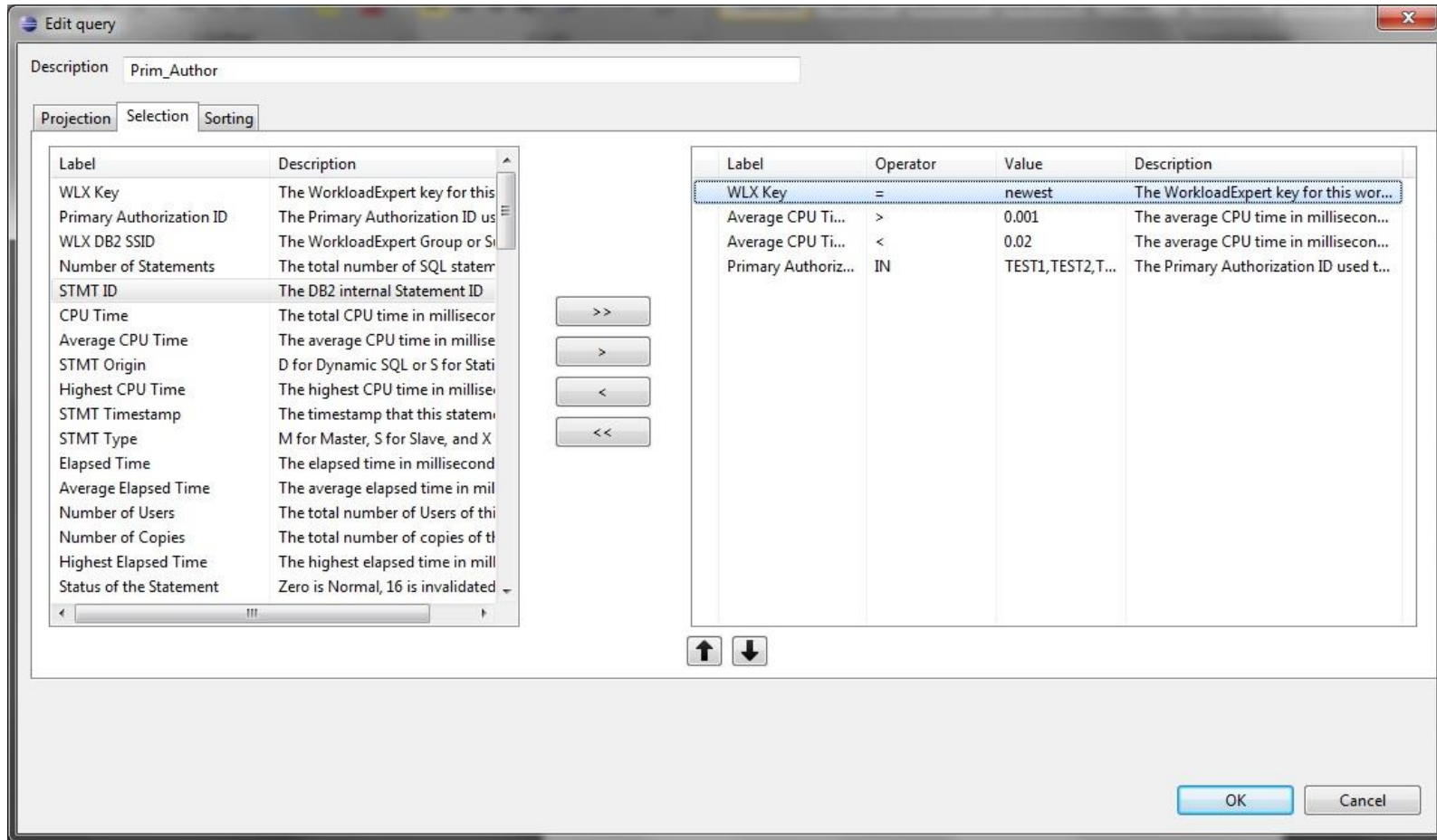
Typical views

- Who does what, how, how often, and when ?
- Examples : Time range for CPU
 - User ,-group
 - per table(s),-group
 - per statement
- Time range Getpages
 - User ,-group
 - per table(s),-group
- Presentation layer
 - INDIGO
 - Data Studio 3.2
 - Rational 8.2
- All KPIs broken down into the levels of database, table, application etc.



SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis – filter options



SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis – filter options

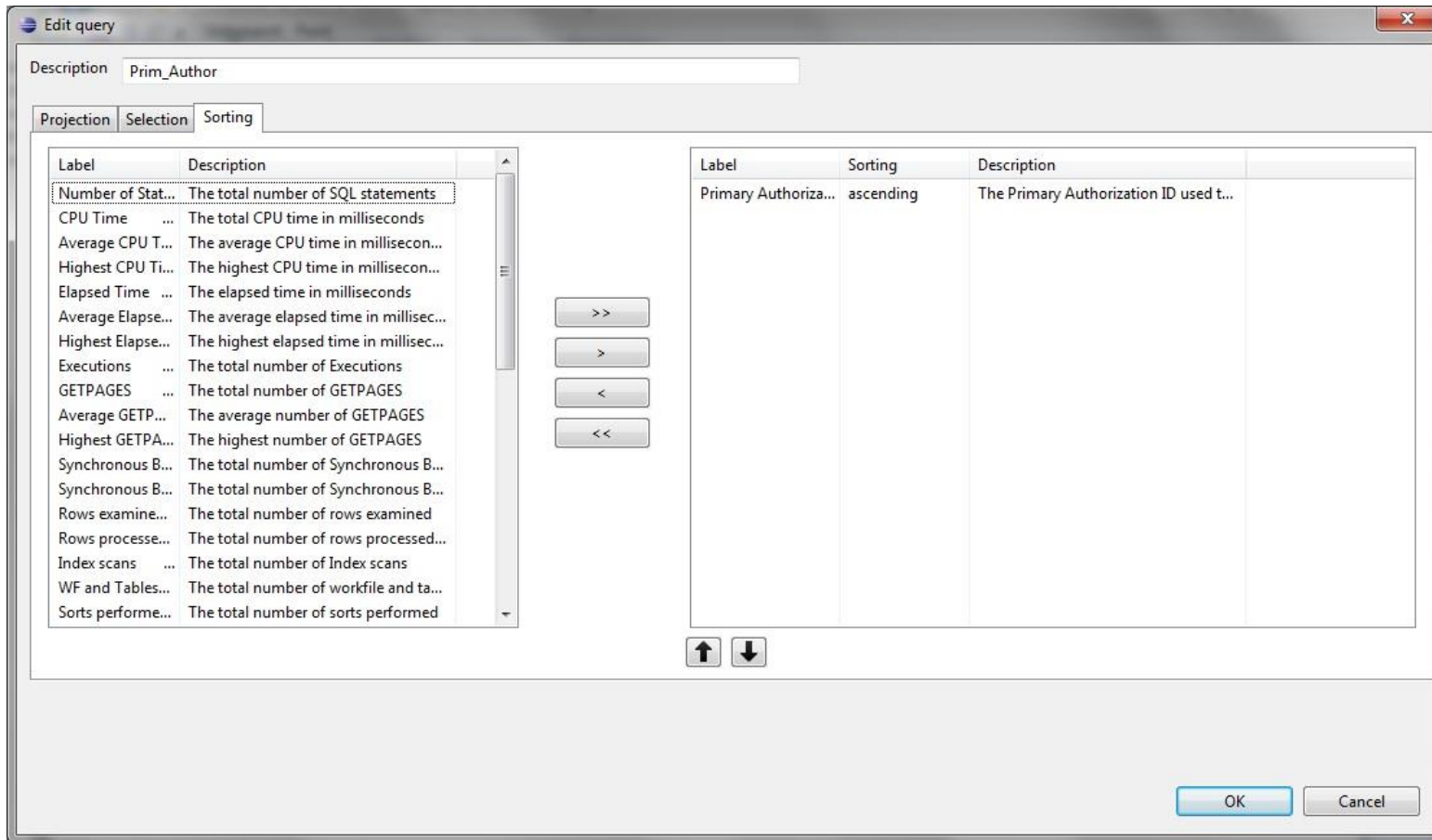
The screenshot shows the 'Edit query' dialog in SQL WorkloadExpert. The 'Description' field is set to 'Prim_Author'. The 'Projection' tab is active, showing a list of labels and their descriptions. The 'Selection' tab is also visible. The 'Sorting' tab is not active. The 'Label' column lists various workload metrics, and the 'Description' column provides details for each. The 'WLX Key' is highlighted. The 'Selection' tab shows a list of labels, operators, and values. The 'WLX Key' is set to '=', and the value is 'newest'. The 'Average CPU Time' is set to '>' and '0.001'. The 'Primary Authorization' is set to '<' and '0.02'. The 'Primary Authorization' is set to 'IN' and 'TEST1,TEST2,T...'. The 'Sorting' tab is not active.

Label	Description
WLX Key	The WorkloadExpert key for this
Primary Authorization ID	The Primary Authorization ID us
WLX DB2 SSID	The WorkloadExpert Group or S
Number of Statements	The total number of SQL statem
STMT ID	The DB2 internal Statement ID
CPU Time	The total CPU time in millisecon
Average CPU Time	The average CPU time in millise
STMT Origin	D for Dynamic SQL or S for Stati
Highest CPU Time	The highest CPU time in millise
STMT Timestamp	The timestamp that this statem
STMT Type	M for Master, S for Slave, and X
Elapsed Time	The elapsed time in millisecond
Average Elapsed Time	The average elapsed time in mil
Number of Users	The total number of Users of thi
Number of Copies	The total number of copies of t
Highest Elapsed Time	The highest elapsed time in mill

Label	Operator	Value
WLX Key	=	newest
Average CPU Ti...	>	0.001
Average CPU Ti...	<	0.02
Primary Authoriz...	IN	TEST1,TEST2,T...

SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis – sort options



SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis – sort options

Edit query

Description: Prim_Author

Projection Selection Sorting

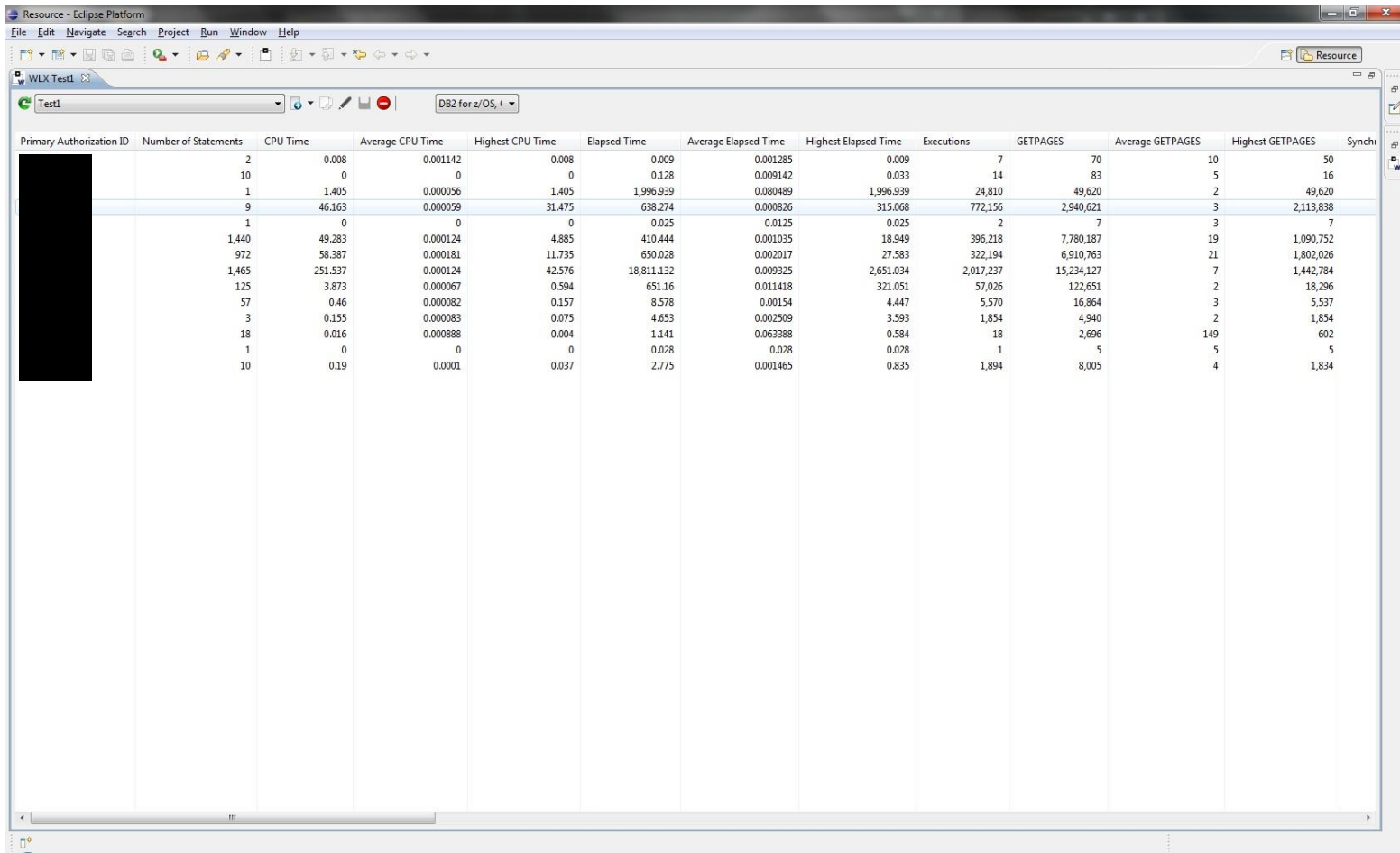
Label	Description
Number of Stat...	The total number of SQL statements
CPU Time ...	The total CPU time in milliseconds
Average CPU T...	The average CPU time in millisecon...
Highest CPU Ti...	The highest CPU time in millisecon...
Elapsed Time ...	The elapsed time in milliseconds
Average Elapse...	The average elapsed time in millisecon...
Highest Elapse...	The highest elapsed time in millisecon...
Executions ...	The total number of Executions
GETPAGES ...	The total number of GETPAGES
Average GETP...	The average number of GETPAGES
Highest GETPA...	The highest number of GETPAGES
Synchronous B...	The total number of Synchronous B...
Synchronous B...	The total number of Synchronous B...
Rows examine...	The total number of rows examined
Rows processe...	The total number of rows processed...
Index scans ...	The total number of Index scans
WF and Tables...	The total number of workfile and ta...

>> > < <<

Label	Sorting
Primary Authoriza...	ascendin

SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis



The screenshot displays the 'Resource - Eclipse Platform' window with the 'SQL WorkloadExpert for DB2 z/OS' application. The main view shows a table of workload statistics for a test named 'Test1'. The table has 13 columns: Primary Authorization ID, Number of Statements, CPU Time, Average CPU Time, Highest CPU Time, Elapsed Time, Average Elapsed Time, Highest Elapsed Time, Executions, GETPAGES, Average GETPAGES, Highest GETPAGES, and Synchronizations. The data is organized into 10 rows, each representing a different workload. The first row is highlighted in blue. The table is titled 'DB2 for z/OS, t'.

Primary Authorization ID	Number of Statements	CPU Time	Average CPU Time	Highest CPU Time	Elapsed Time	Average Elapsed Time	Highest Elapsed Time	Executions	GETPAGES	Average GETPAGES	Highest GETPAGES	Synchronizations
	2	0.008	0.001142	0.008	0.009	0.001285	0.009	7	70	10	50	
	10	0	0	0	0.128	0.009142	0.033	14	83	5	16	
	1	1.405	0.000056	1.405	1,996.939	0.080489	1,996.939	24,810	49,620	2	49,620	
	9	46.163	0.000059	31.475	638.274	0.000826	315.068	772.156	2,940,621	3	2,113,838	
	1	0	0	0	0.025	0.0125	0.025	2	7	3	7	
	1,440	49.283	0.000124	4.885	410.444	0.001035	18.949	396,218	7,780,187	19	1,090,752	
	972	58.387	0.000181	11.735	650.028	0.002017	27.583	322,194	6,910,763	21	1,802,026	
	1,465	251.537	0.000124	42.576	18,811.132	0.009325	2,651.034	2,017,237	15,234,127	7	1,442,784	
	125	3.873	0.000067	0.594	651.16	0.011418	321.051	57,026	122,651	2	18,296	
	57	0.46	0.000082	0.157	8.578	0.00154	4.447	5,570	16,864	3	5,537	
	3	0.155	0.000083	0.075	4.653	0.002509	3.593	1,854	4,940	2	1,854	
	18	0.016	0.000888	0.004	1.141	0.063388	0.584	18	2,696	149	602	
	1	0	0	0	0.028	0.028	0.028	1	5	5	5	
	10	0.19	0.0001	0.037	2.775	0.001465	0.835	1,894	8,005	4	1,834	

SQL WorkloadExpert for DB2 z/OS

- SQL Workload analysis

Resource - Eclipse Platform

File Edit Navigate Search Project Run Window Help

WLX Test1

Test1 DB2 for z/OS, (

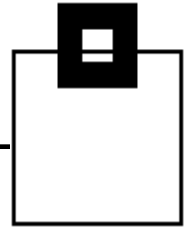
Primary Authorization ID	Number of Statements	CPU Time	Average CPU Time	Highest CPU Time	E
	2	0.008	0.001142	0.008	
	10	0	0	0	
	1	1.405	0.000056	1.405	
	9	46.163	0.000059	31.475	
	1	0	0	0	
	1,440	49.283	0.000124	4.885	
	972	58.387	0.000181	11.735	
	1,465	251.537	0.000124	42.576	
	125	3.873	0.000067	0.594	
	57	0.46	0.000082	0.157	
	3	0.155	0.000083	0.075	
	18	0.016	0.000888	0.004	
	1	0	0	0	
	10	0.19	0.0001	0.037	

SQL Workload Analyse – Trending:

The screenshot displays the SQL WorkloadExpert application interface. The main window, titled 'Abfrage1', shows a list of queries with columns 'REL_COSTS', 'QUERY_TYPE', and 'STATEMENT'. The queries are as follows:

- 1. `SELECT A.SET_ID, A.SET_VALUE, COALESCE ( B.SET_VALUE, 'NOT FOUND') FROM IQAO610.IQAPROFILES A LEFT OUTER JOIN IQAO610.IQAPROFILES B ON A.SET_ID = B.SET_ID AND B.PROFILE_NAME = 'F91D_USER 'V`
- 2. `SELECT PROFILE_NAME, CREATOR, PROFILE_TYPE, PROFILE_DESC FROM IQAO610.IQAPROFILEAUTH WHERE PROFILE_NAME = 'DEFAULT ' WITH UR FOR FETCH ONLY`
- 3. `SELECT USER_AUTH_LIST, GROUP_PROFILE FROM IQAO610.IQAUSERAUTH A, IQAO610.IQAUSERNAMES N WHERE A.USER_GROUP = N.USER_GROUP AND USER_NAME IN ('DEVDB2', 'DEVDB2A', 'SALES', 'SE')`
- 4. `SELECT CAST (GETVARIABLE ('SYSIBM.VERSION') AS CHAR (8)) FROM SYSIBM.SYSDUMMY1`

An 'SQL Workload Vergleich' dialog box is open, showing a date selection interface. The 'Vergleichskriterien' section includes a 'Zeitraum' (Time Period) calendar for September 2012, with the 27th selected. Below this, there are 'Verfügbare Referenzen' (Available References) for August 2012 and July 2012, each with a calendar view. The dialog has 'OK' and 'Abbrechen' (Cancel) buttons at the bottom.



SQL Workload Analyse – Trending:

SQL Workload Vergleich

Vergleichskriterien

Zeitraum

	Mo	Di	Mi	Do	Fr	Sa	So
28	27	28	29	30	31	1	2
29	3	4	5	6	7	8	9
30	10	11	12	13	14	15	16
31	17	18	19	20	21	22	23
1	24	25	26	27	28	29	30
2	1	2	3	4	5	6	7

Verfügbare Referenzen

	Mo	Di	Mi	Do	Fr	Sa	So
31	30	31	1	2	3	4	5
32	6	7	8	9	10	11	12
33	13	14	15	16	17	18	19
34	20	21	22	23	24	25	26
35	27	28	29	30	31	1	2
36	3	4	5	6	7	8	9

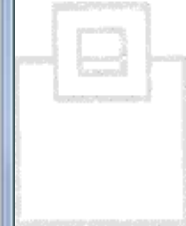
	Mo	Di	Mi	Do	Fr	Sa	So
31	30	31	1	2	3	4	5
32	6	7	8	9	10	11	12
33	13	14	15	16	17	18	19
34	20	21	22	23	24	25	26
35	27	28	29	30	31	1	2
36	3	4	5	6	7	8	9

	Mo	Di	Mi	Do	Fr	Sa	So
31	30	31	1	2	3	4	5
32	6	7	8	9	10	11	12
33	13	14	15	16	17	18	19
34	20	21	22	23	24	25	26
35	27	28	29	30	31	1	2
36	3	4	5	6	7	8	9

	Mo	Di	Mi	Do	Fr	Sa	So
28	25	26	27	28	29	30	1
29	2	3	4	5	6	7	8
30	9	10	11	12	13	14	15
31	16	17	18	19	20	21	22
32	23	24	25	26	27	28	29
33	30	31	1	2	3	4	5

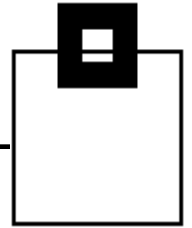
	Mo	Di	Mi	Do	Fr	Sa	So
28	25	26	27	28	29	30	1
29	2	3	4	5	6	7	8
30	9	10	11	12	13	14	15
31	16	17	18	19	20	21	22
32	23	24	25	26	27	28	29
33	30	31	1	2	3	4	5

OK Abbrechen

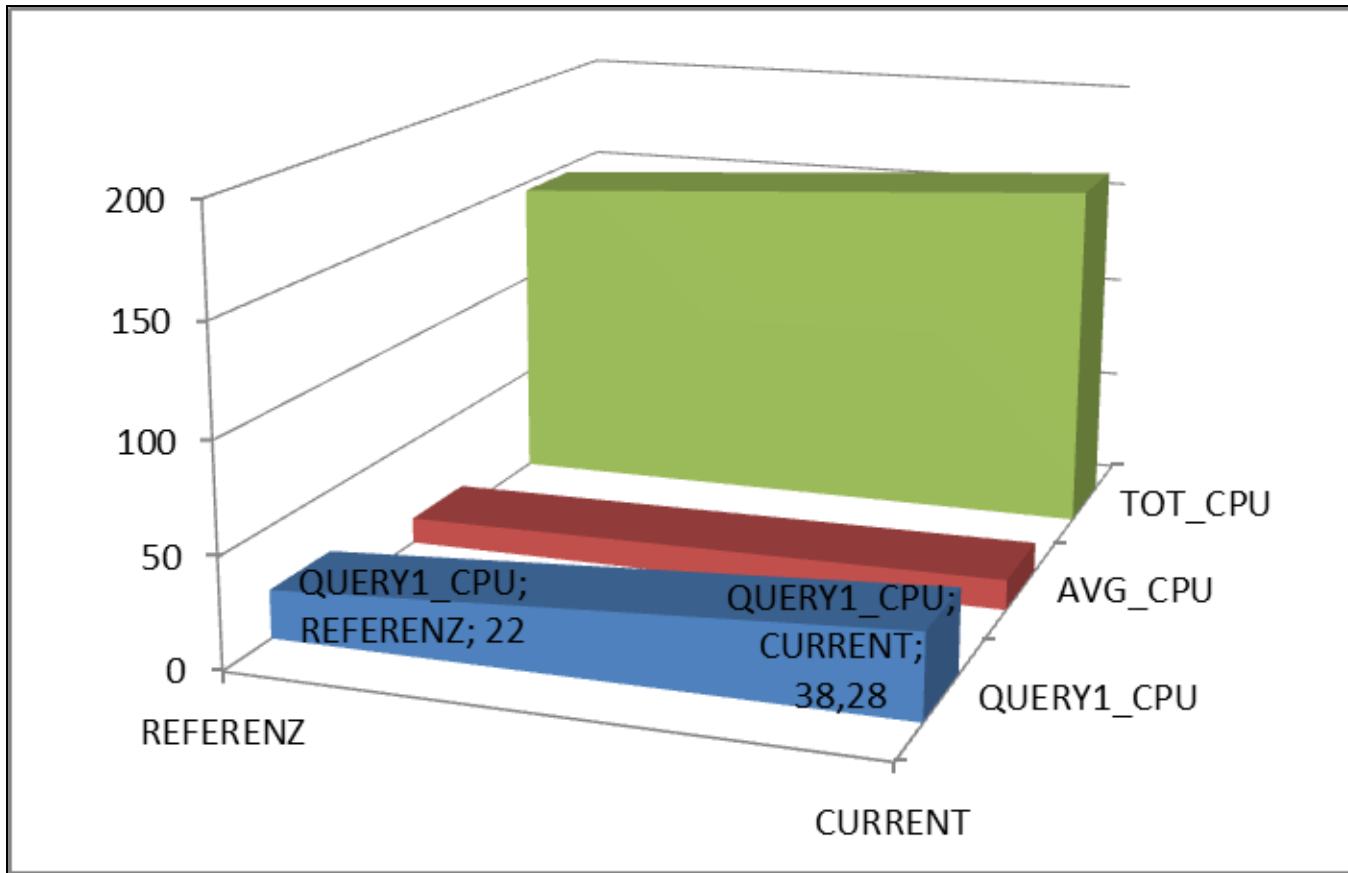


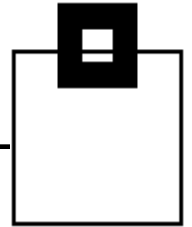
SQL Workload Trending:



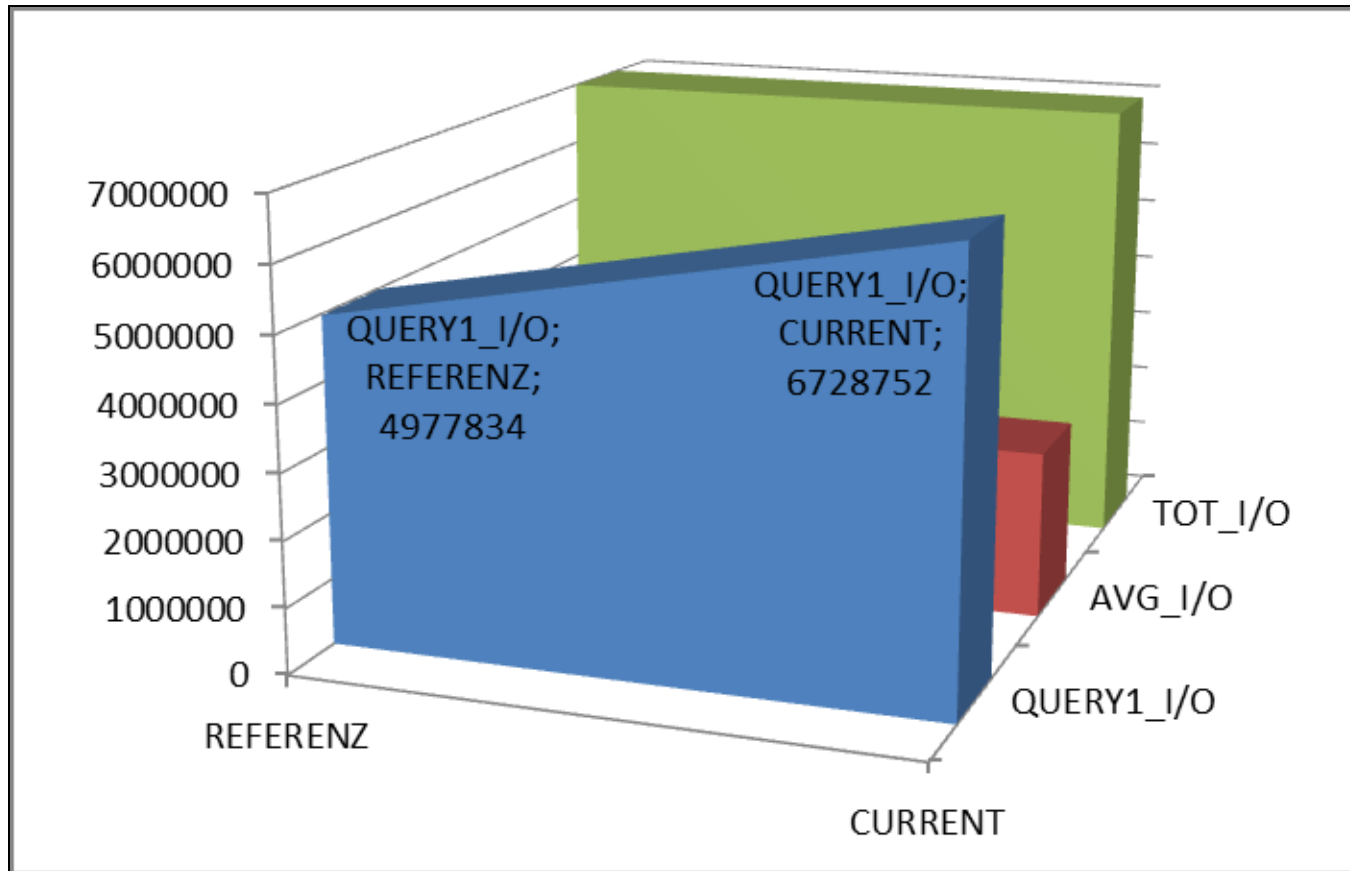


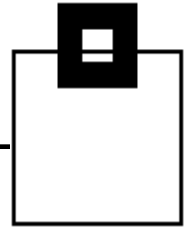
SQL Workload Trending:



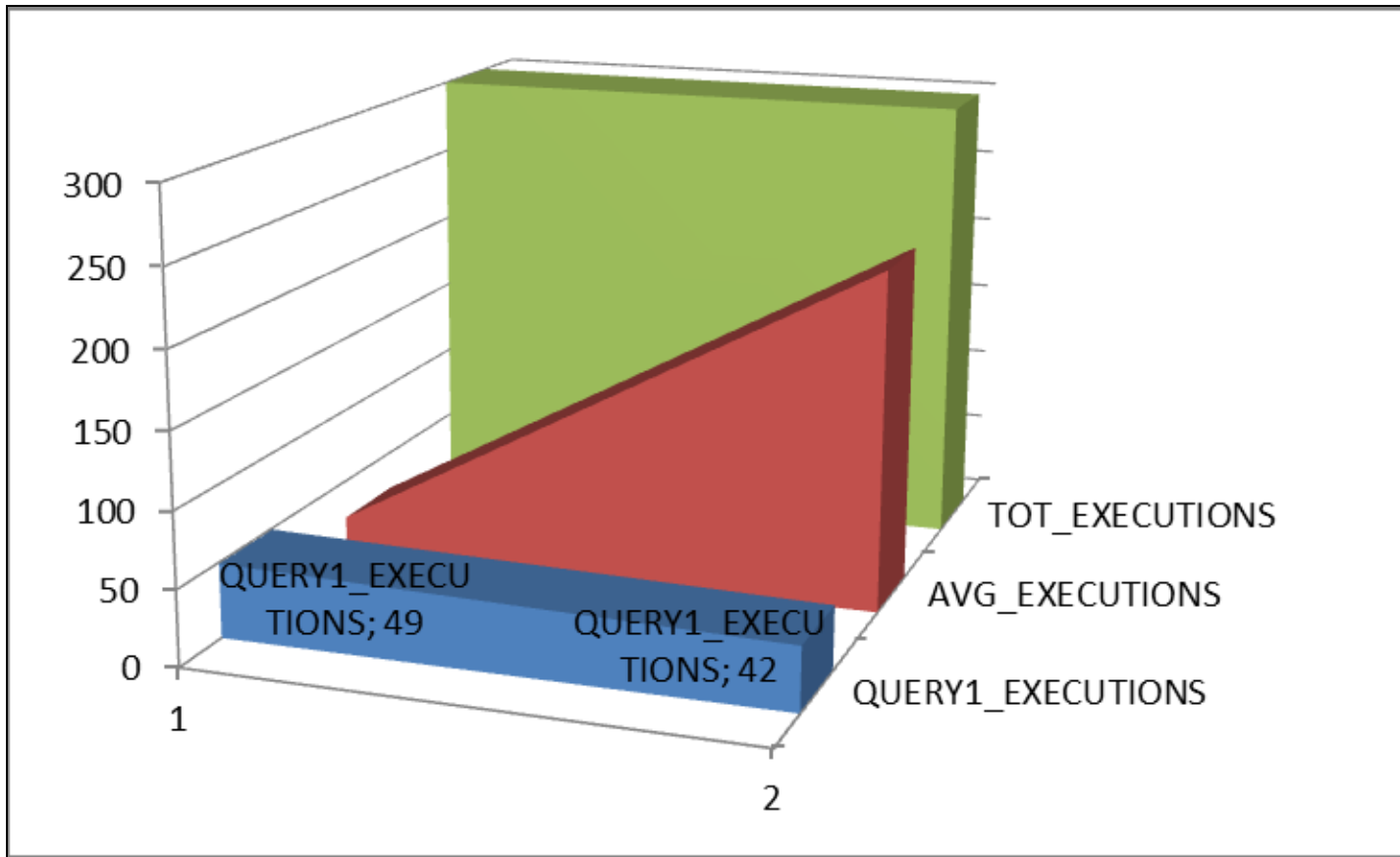


SQL Workload Trending:





SQL Workload Trending:



SQL Workload Access Usage:

WLE Ausgabe

Abfrage 1

PRIMARY_AUTHORIZATION_ID	NUMBER_OF_STATEMENTS	CPU_TIME	AVERAGE_CPU_TIME	HIGHEST_CPU_TIME	ELAPSED_TIME	AVERAGE_ELAPSED_TIME	HIGHEST_ELAPSED_TIME
BERGER	6	0.011946	0.001327	0.005090	0.278114	0.030901	
BOXWELL	2981	6653.732523	0.001106	988.306385	7612.786387	0.001266	

COSTS_CHANGES QUERY_TYPE STATEMENT

+74%
+33%
-12%

```

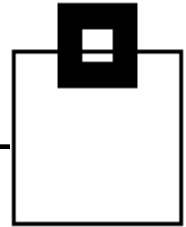
SELECT A.SET_ID, A.SET_VALUE, COALESCE ( B.SET_VALUE, 'NOT FOUND') FROM IQA0610.IQAPROFILES A LEFT OUTER JOIN IQA0610.IQAPROFILES B ON A.SET_ID = B.SET_ID AND B.PROFILE_NAME = 'F9';
SELECT PROFILE_NAME, CREATOR, PROFILE_TYPE, PROFILE_DESC FROM IQA0610.IQAPROFILEAUTH WHERE PROFILE_NAME = 'DEFAULT' WITH UR FOR FETCH ONLY
SELECT USER_AUTH_LIST, GROUP_PROFILE FROM IQA0610.IQAUSERAUTH A, IQA0610.IQAUSERNAMES N WHERE A.USER_GROUP = N.USER_GROUP AND USER_NAME IN ('DEVDB2', 'DEVDB2A', 'SALES'
SELECT CAST GETVARIABLE ('SYSIBM.VERSION') AS CHAR (8)) FROM SYSIBM.SYSDUMMY1
    
```

Zugriffsanalyse

Zeitfenster ohne Abfragen ermitteln für folgende Objekte:

TABLE_CREATOR	TABLE_NAME	DATABASE_NAME	TABLESPACE_NAME	OVERALL_USED	MAX_QUIET_TIME
☒ IQA0610	IQAPROFILES	IQADB01	IQATS09	24%	2h 26min 13sec
☐ IQA0610	IQADEFAULTS	IQADB01	IQATS01	2%	2h 26min 13sec
☐ IQA0610	IQASSETINGS	IQADB01	IQATS02	8%	2h 26min 13sec
☐ IQA0610	IQASCHEMAS	IQADB01	IQATS03	19%	2h 26min 13sec
☐ IQA0610	IQAUSERNAMES	IQADB01	IQATS04	12%	2h 26min 13sec
☒ IQA0610	IQARUNIDS	IQADB01	IQATS05	1%	2h 26min 13sec
☒ IQA0610	IQAREFERENCES	IQADB01	IQATS06	0%	2h 26min 13sec
☐ IQA0610	IQACOSTS	IQADB01	IQATS07	4%	2h 26min 13sec
☐ IQA0610	IQAGROUPS	IQADB01	IQATS08	9%	2h 26min 13sec
☐ IQA0610	IQAPROFILEAUTH	IQADB01	IQATS10	22%	2h 26min 13sec
☐ IQA0610	QAUSERAUTH	IQADB01	IQATS11	18%	2h 26min 13sec

OK Abbrechen



SQL Workload Access Usage:

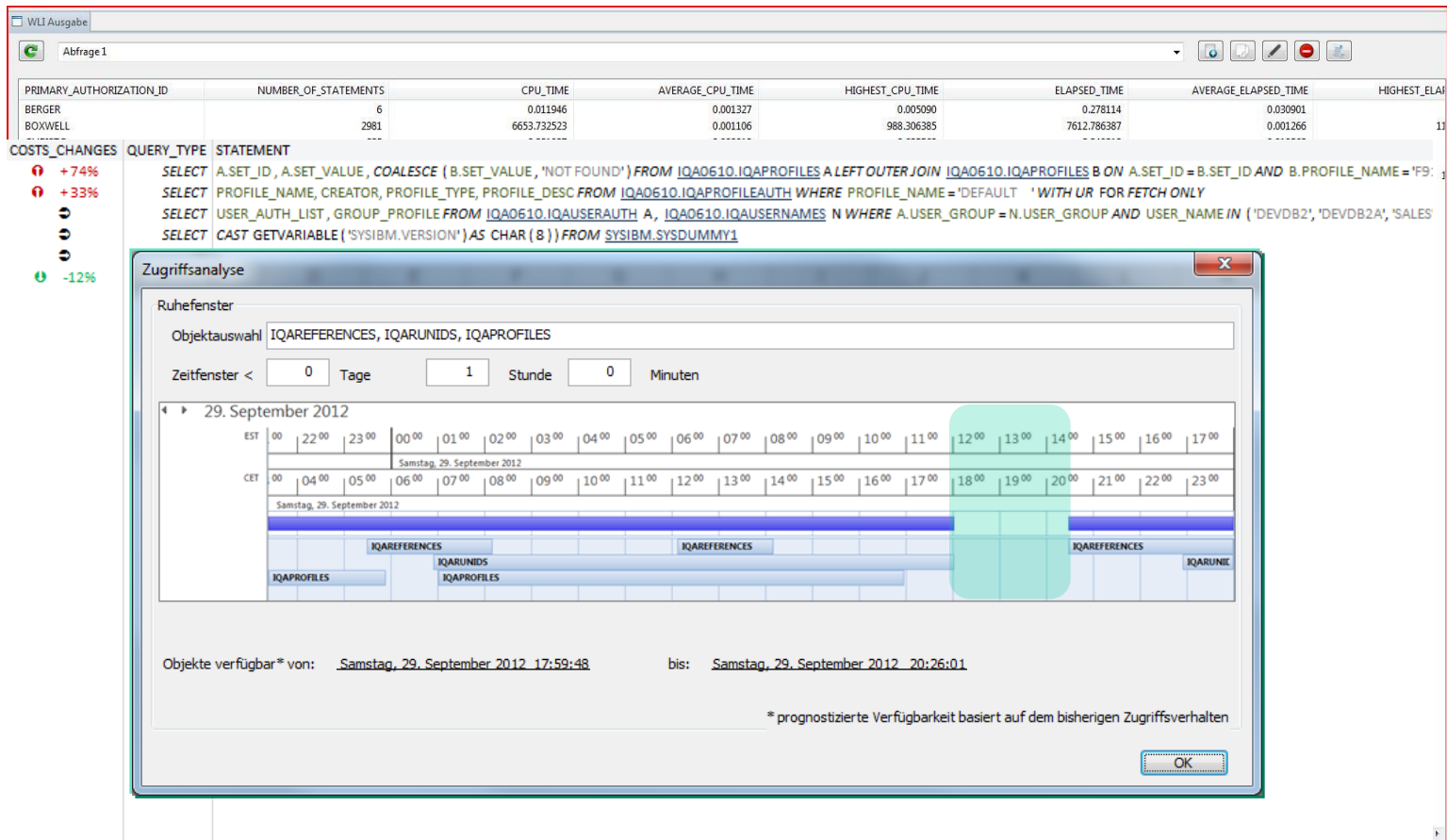
Zugriffsanalyse

Zeitfenster ohne Abfragen ermitteln für folgende Objekte:

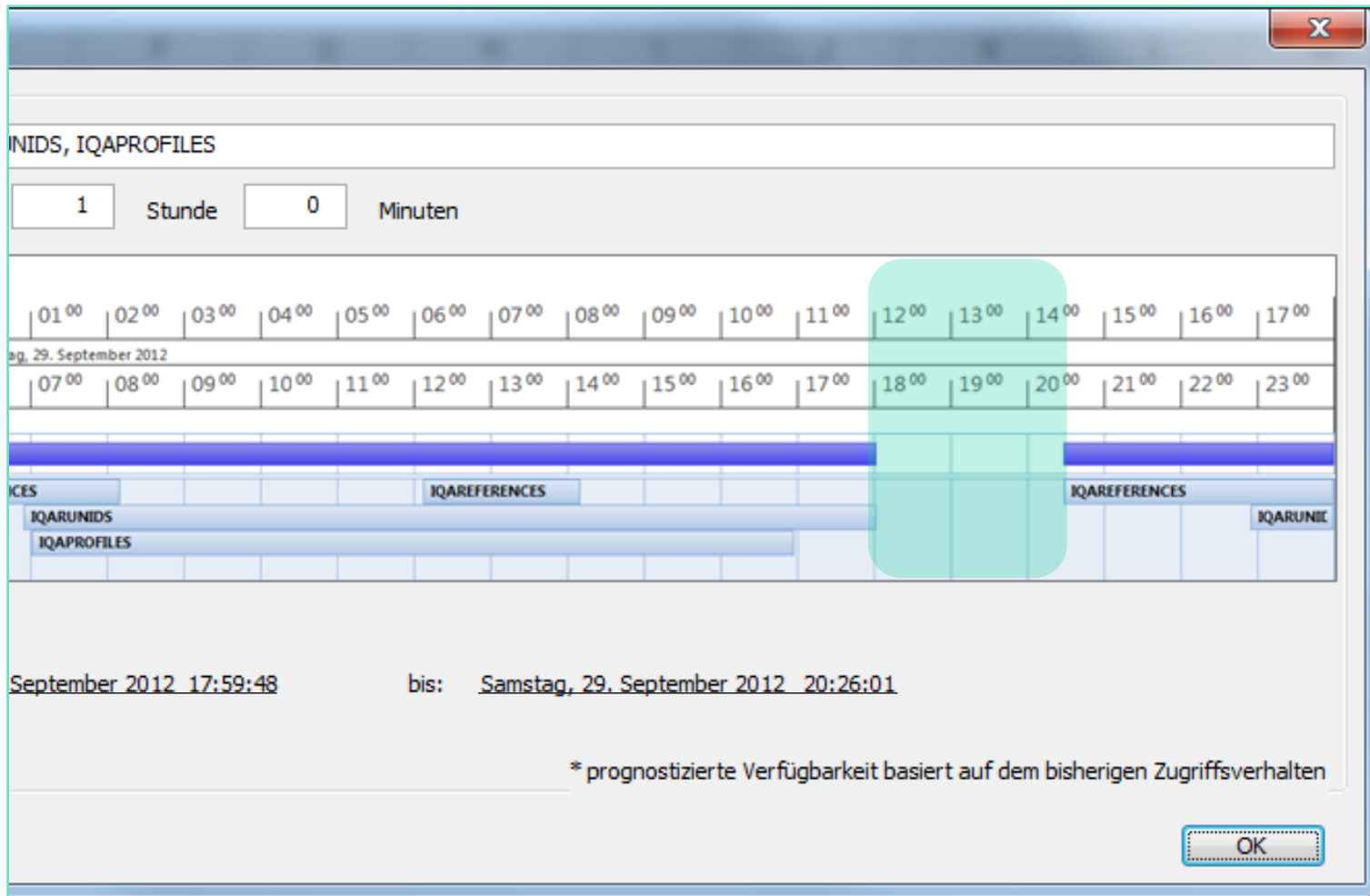
	TABLE_CREATOR	TABLE_NAME	DATABASE_NAME	TABLESPACE_NAME	OVERALL_USED	MAX_QUIET_TIME
☒	IQAO610	IQAPROFILES	IQADB01	IQATS09	24%	2h 26min 13sec
☐	IQAO610	IQADEFAULTS	IQADB01	IQATS01	2%	2h 26min 13sec
☐	IQAO610	IQASETTINGS	IQADB01	IQATS02	8%	2h 26min 13sec
☐	IQAO610	IQASCHEMAS	IQADB01	IQATS03	19%	2h 26min 13sec
☐	IQAO610	IQAUSERNAMES	IQADB01	IQATS04	12%	2h 26min 13sec
☒	IQAO610	IQARUNIDS	IQADB01	IQATS05	1%	2h 26min 13sec
☒	IQAO610	IQAREFERENCES	IQADB01	IQATS06	0%	2h 26min 13sec
☐	IQAO610	IQACOSTS	IQADB01	IQATS07	4%	2h 26min 13sec
☐	IQAO610	IQAGROUPS	IQADB01	IQATS08	9%	2h 26min 13sec
☐	IQAO610	IQAPROFILEAUTH	IQADB01	IQATS10	22%	2h 26min 13sec
☐	IQAO610	IQAUSERAUTH	IQADB01	IQATS11	18%	2h 26min 13sec



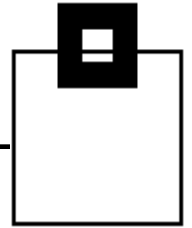
SQL Workload Access Usage:



SQL Workload Access Usage:

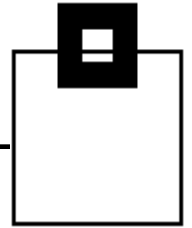


WLX - Areas of use



- Enhance (classical) SQL performance tuning with much less overhead
- Cost estimation and accounting down to the statement level delivered with UDF for company specific billing
- Identifying the availability of objects for DB2 system and DB2 application maintenance
 - In which time ranges could tables be set offline without the restriction of user access
- Who is doing what, when, to which objects? (auditing)



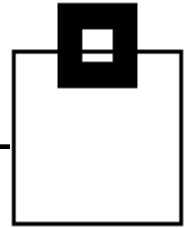


- These exciting new technologies offer answers to the following questions :
 - Which queries represent my core business?
 - Where is my bottleneck?
 - What could be improved?
 - How do I control *p r o a c t i v e l y* changes in:
 - applications
 - DB2 versions (V8->10, 9->10, 10->11)
 - DB2 system maintenance (PTFs /APARs)
 - *b e f o r e* REBINDs and Prepares
 - DB2 SLAs for recovery purposes
 - Where and how could trends be discovered



SQL WorkloadExpert on Trial

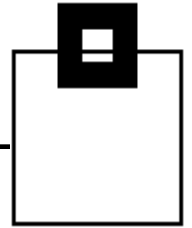
- Taste one „use case“ ... and you can't resist.
- Appetite comes with eating. It's moreish.
- L'appétite vient en mangeant!



- Delivery for a concrete trial project with predefined queries as an example to show the power of the complete SQL and object view.

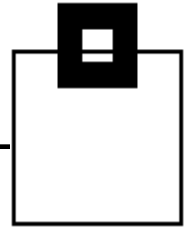
Use case 1: Application workload analysis –
which machine load is produced by a certain
application





Use case 2: Trending of Applications –
Compare of CPU, I/O , execution rates,
current KPIs and deltas – calculated and
summarized to the costs of several apps





After more than 20 Use Cases...

