

IDUG

2025

EMEA Db2 TECH CONFERENCE

Dusseldorf | October 26 - 30

Db2 Performance and Tuning

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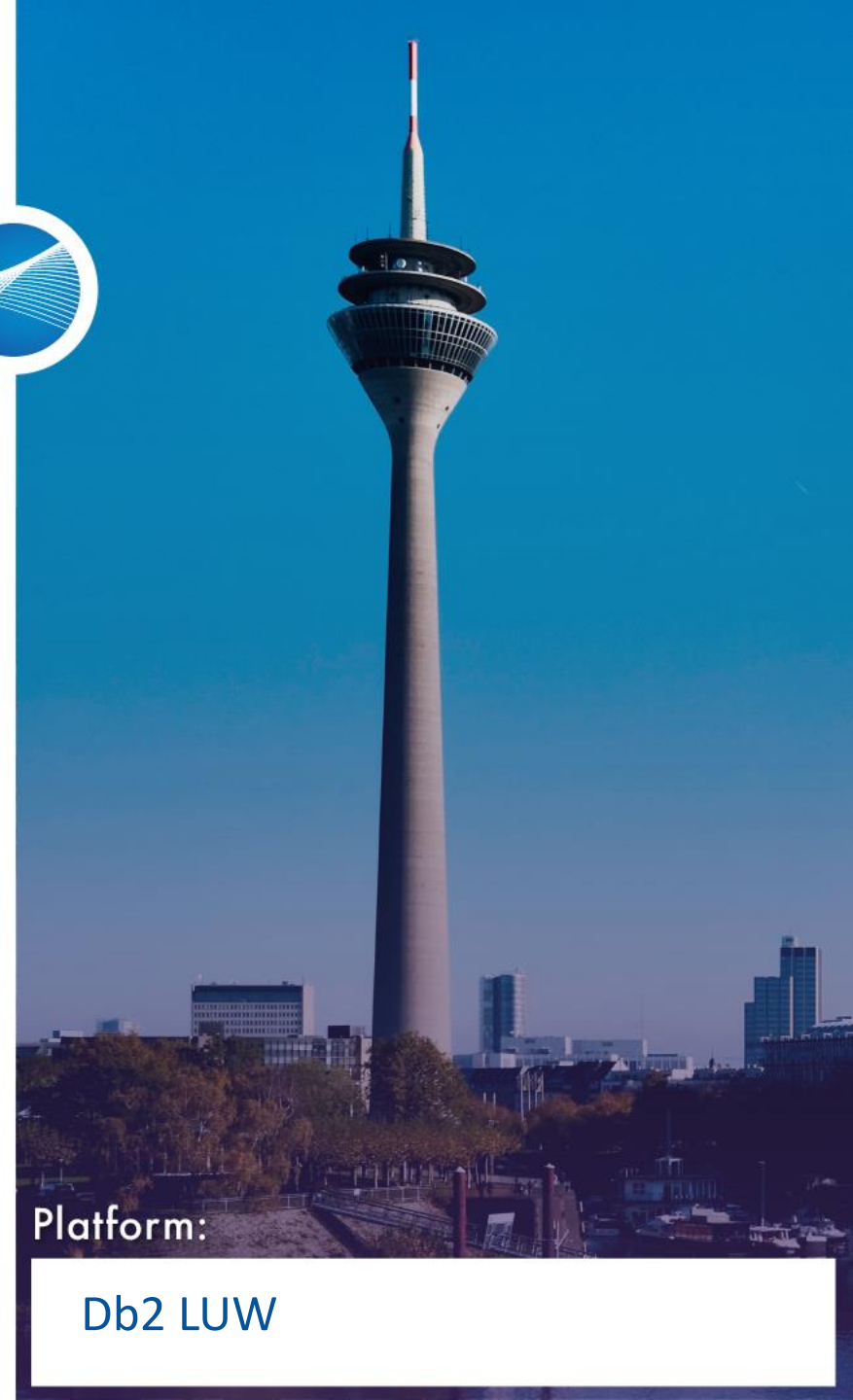
Gunning Technology Solutions, LLC

Session Code: C9



Platform:

Db2 LUW



- This presentation will cover some recommended automatic settings for DBM and DB CFG parameters
- STMM and AUTOMATIC settings have matured over various releases
- Help new Db2 customers get up to speed fast with Db2 initial setup and with adequate performance from the start
- Still need to know which parameters should be AUTOMATIC and which should not be, if any and the knowledge to determine what's adequate
- I still find customers with old settings from prior database upgrades
- More and more companies are trying to run Db2 without a trained Db2 DBA
 - No monitoring being done
 - No knowledge of settings
- Many companies still get good Db2 performance even in these situations

- Understanding all the included Db2 Monitoring tools
- Snapshot, Request and Activity based parameters
- db2pd
- dmctop
 - MON_GET table functions
 - db2top
 - dsmtop
- MON_GET table functions
- DB2MON
- Identifying and capturing suboptimal SQL using MONREPORT, DB2MON,dmctop
- Capture suboptimal SQL and use EXPLAIN_FROM_SECTION and DB2 Design Advisor
- Quick Db2 Health Checks to use

- DB2MON
- MONREPORT reporting modules
- MON_GET table function facilities
 - Request, Activity, Time based
 - Intended to replace snapshot monitoring
- db2top and dsmtop
 - – Deprecated
- dmctop -- Comes with Db2, replaces db2top and dsmtop
 - Db2 11.5.6
 - Download if prior to DB2 11.5.6
 - Text based
 - Enhanced functionality
 - Throughput
 - Lock Contention reporting (holders and waiters)
- db2pd
 - Lightweight overhead
 - Command driven
 - Many options

- The MONREPORT reporting module has been around since Db2 version 9.7
- Prior to that one could obtain similar data for top dynamic SQL via an SQL Query with a ranking function
- MONREPORT has several reporting options
 - Database Level
 - DBSUMMARY
 - LOCKWAIT
 - SQL Related
 - CURRENTSQL
 - PKGCACHE
 - APPLICATION
 - CURRENTAPPS
 - CONNECTION

- Identify CURRENTSQL and PKGCACHE entries with metric ranking
- Identify high cost SQL from metrics
 - CPU
 - IO
 - Rows read/rows written
 - Lockwait
 - Number of Executions
- Select executable ID of item of interest based on ranking
- Feed the executable ID to the EXPLAIN_FROM_SECTION stored procedure
- Explain the plan using DB2EXFMT
- Look for table scans, sorts, index scans
- Rewrite or use Design Advisor to review possible index improvements
- Iterate

- The next few slides will show the monitoring and tuning approach I use on a daily basis to support the various clients that outsource to us
- Call `MONREPORT.CURRENTSQL`
- Review the Output for the metrics that are indicate high cost

Result set 1

TEXT

Monitoring report - current SQL

Database: HSPRD
Generated: 09/26/2025 12:54:27
-- Command options --
MEMBER: All

=====
Part 1 - Summaries by 'top' metrics

Top 10 current activities by TOTAL_CPU_TIME

ACTIVITY _ID	UOW_ID	APPLICATION _HANDLE	TOTAL_CPU _TIME	STMT_TEXT
1	3	13075	45692786	SELECT "CLAIM_ID", "CUR_STATUS",
1	40	12975	24425471	select (b.clm_id) as "Claim ID" , crf.
1	1	13295	0	CALL monreport.currentsql()
63	1	13295	0	SELECT ARRAY_AGG(A.ACTIVITY_ID ORDER B

Top 10 current activities by ROWS_READ

ACTIVITY _ID	UOW_ID	APPLICATION _HANDLE	ROWS_READ	STMT_TEXT
1	3	13075	27265357	SELECT "CLAIM_ID", "CUR_STATUS
1	40	12975	22816408	select (b.clm_id) as "Claim ID" ,
1	1	13295	0	CALL monreport.currentsql()
63	1	13295	0	SELECT ARRAY_AGG(A.ACTIVITY_ID ORD

Standard input

```
=====
Part 2 - Overall ranking of activities

ACTIVITY   UOW_ID   APPLICATION   TOTAL_CPU   ROWS_READ   DIRECT_READS +
_ID        _HANDLE    _TIME        _           _           DIRECT_WRITES
-----
1          3        13075        1           1           1
1          5        13295        2           2           1
63         5        13295        2           2           1
=====
```

```
=====
Part 3 - Complete statement text for activities

-----
ACTIVITY_ID/UOW_ID/APPLICATION_HANDLE = 1/3/13075

SELECT "CLAIM_ID",      "CUR_STATUS",      "STATUS_DT",      "PROCESSOR_ID" FROM (S
ELECT DISTINCT CEV.CEV_CLM_ID AS CLAIM_ID, CASE      WHEN TRIM(CEV.CEV_TYPE) = 'P
D' AND CSEV.CSEV_CSV_CLM_ID IS NULL THEN 'Paid In Full' WHEN TRIM(CEV.CEV_TYPE)
= 'PD' AND CSEV.CSEV_CSV_CLM_ID IS NOT NULL THEN 'Partial Denial'      WHEN CEV.
CEV_RUN_ID IS NULL AND TRIM(CEV.CEV_TYPE) = 'DN' THEN 'Full Denial-INV'      WHEN
CEV.CEV_RUN_ID IS NOT NULL AND TRIM(CEV.CEV_TYPE) = 'DN' THEN 'Full Denial'
ELSE INITCAP(TCL.TCL_TYPE_DESC) END AS CUR_STATUS, CEV.CEV_EV_DT AS STATUS_DT,
CEV.CEV_USER_ID      AS PROCESSOR_ID FROM HS.CEV_CLM_EV AS CEV JOIN HS.CDT_CLM_DT
      AS CDT ON CEV.CEV_CLM_ID = CDT.CDT_CLM_ID AND CDT.CDT_DT_QUAL = '050' AND
CDT.CDT_DT >= CURRENT_DATE - 2 YEAR JOIN HS.TCL_TYPE_CD_LOOKUP AS TCL ON TRIM(C
EV.CEV_TYPE) = TCL.TCL_TYPE_CODE AND TCL.TCL_ID = 84 LEFT JOIN HS.CSEV_CSV_EV AS
CSEV ON CEV.CEV_CLM_ID = CSEV.CSEV_CSV_CLM_ID
      AND CSEV.CSEV_DEL_TS IS NULL                                AND TRIM(C
SEV.CSEV_TYPE) = 'DN'                                AND CSEV.CSEV_ADD_TS
= (SELECT CSEV_ADD_TS FROM HS.CSEV_CSV_EV WHERE CSEV_DEL_TS IS NULL AND CSEV_CSV
_CLM_ID = CSEV.CSEV_CSV_CLM_ID AND CSEV_CSV_LN_NUM = CSEV.CSEV_CSV_LN_NUM ORDER
BY CSEV_ADD_TS DESC FETCH FIRST 1 ROWS ONLY WITH UR) WHERE CEV.CEV_DEL_TS IS NU
LL AND CEV.CEV_ADD_TS = (SELECT cstat1.CEV_ADD_TS FROM HS.CEV_CLM_EV AS cstat1 W
HERE cstat1.CEV_CLM_ID = CEV.CEV_CLM_ID AND cstat1.CEV_DEL_TS IS NULL ORDER BY c
stat1.CEV_ADD_TS DESC FETCH FIRST 1 ROWS ONLY WITH UR) WITH UR) AS "tq_66FRGB1hy
"
=====
```

Standard input

Result set 1

TEXT

Monitoring report - package cache

Database: HSPRD
Generated: 07/15/2024 14:42:48
-- Command options --
CACHE_INTERVAL: All statements
SECTION_TYPE: Dynamic and static SQL
MEMBER: All

=====

Part 1 - Summaries by 'top' metrics

Top 10 statements by TOTAL_CPU_TIME

#	TOTAL_ CPU_TIME	STMT_TEXT
1	537462816	SELECT "CLAIM_ID", "LINE_NUM", "LINE_ID", "LINE_CUR
2	103516002	SELECT "Provider ID" AS "Provider_ID", "Claim ID" AS "Claim
3	87041692	SELECT "ER_ID", "CMS Submission Date" AS "CMS_Submission_Da
4	21239625	SELECT "Provider ID" AS "Provider_ID", "Fee Schedule ID" AS
5	4679624	SELECT "Provider ID" AS "Provider_ID", "Provider Contract N
6	3106885	SELECT "Provider ID" AS "Provider_ID", "Contract Status" AS
7	2618724	SELECT "DTRR_Unique ID" AS "DTRR_Unique_ID", "SLA Record ID
8	2427585	SELECT "SR_ID", "First Service Request Comment" AS "First_S
9	2131747	SELECT "Provider ID" AS "Provider_ID", "Affiliated Provider
10	2028886	SELECT SOURCE, CUS_REF_ID, CUS_NAME, ALT_REQ_ID, RE

Top 10 statements by TOTAL_ACT_WAIT_TIME per exec

#	TOTAL_ACT _WAIT_TIME	LOCK_WAIT _TIME	STMT_TEXT
1	7871	0	SELECT "CLAIM_ID", "LINE_NUM", "LINE_ID",
2	4697	0	SELECT "Provider ID" AS "Provider_ID", "Claim
4	3003	0	SELECT "Provider ID" AS "Provider_ID", "Fee Sc
12	1334	1334	SELECT SOURCE, CUS_REF_ID, CUS_NAME, ALT
8	1051	0	SELECT "SR_ID", "First Service Request Comment
13	587	587	SELECT SOURCE, CUS_REF_ID, CUS_NAME, ALT
3	404	0	SELECT "ER_ID", "CMS Submission Date" AS "CMS_
19	280	0	SELECT * FROM hs.SRAT_SR_ATTACHMENT WHERE SRAT_SR_
5	231	0	SELECT "Provider ID" AS "Provider_ID", "Provid
20	153	0	INSERT INTO hs.GAAT_GA_ATTACHMENT (GAAT_GA_ID, GA

```

Top 10 statements by I/O wait time
-----
#      I/O          STMT_TEXT
wait time
-----
1      3477          SELECT "CLAIM_ID",      "LINE_NUM",      "LINE_ID",
14     2672          DECLARE CSV_INFO CURSOR FOR SELECT CSV_LN_NUM ,CSV_SVP
2      2554          SELECT "Provider ID" AS "Provider_ID",      "Claim ID"
4      2321          SELECT "Provider ID" AS "Provider_ID",      "Fee Schedu
15     2148          SELECT CSEV_TYPE INTO :H00349      FROM CSEV_CSV_EV A WH
16     1790          SELECT A.CCRL_RULE_VAL_C, A.CCRL_RULE_VAL_D, A.CCRL_EF
41     1517          SELECT INE_TYPE ,INE_EVR_CD ,INE_EV_DT ,INE_ADD_TS ,IN
18     1497          DECLARE CSR_FOR_CUS_DT CURSOR FOR SELECT A.CLM_ID, C.C
42     1483          SELECT CEV_ADD_TS, CEV_USER_ID INTO :H00166      , :H001
43     1455          INSERT INTO hs.ATHA_ATH_ATTACHMENT (ATHA_ATH_ID, ATHA_
  
```

Top 10 statements by I/O wait time per exec

#	I/O wait time	STMT_TEXT
1	3477	SELECT "CLAIM_ID", "LINE_NUM", "LINE_ID",
2	2554	SELECT "Provider ID" AS "Provider_ID", "Claim ID"
4	2321	SELECT "Provider ID" AS "Provider_ID", "Fee Schedu
8	1018	SELECT "SR_ID", "First Service Request Comment" AS
3	345	SELECT "ER_ID", "CMS Submission Date" AS "CMS_Subm
20	152	INSERT INTO hs.GAAT_GA_ATTACHMENT (GAAT_GA_ID, GAAT_T
5	137	SELECT "Provider ID" AS "Provider_ID", "Provider C
44	114	SELECT "Authorization ID" AS "Authorization_ID", "
45	107	SELECT CLM_ID, CDT_DT, CDT_TO_DT, INS_INR_CD FROM hs.C
6	102	SELECT "Provider ID" AS "Provider_ID", "Contract S

Part 2 - EXECUTABLE_IDs for statements in Part 1

#	EXECUTABLE_ID
1	x'00000001000000000000000000000000184E4F00000000000220240715140355101978'
2	x'0000000100000000000000000000000018405D00000000000220240715140025672875'
3	x'00000001000000000000000000000000186D410000000000220240715142005188797'
4	x'00000001000000000000000000000000185C3B0000000000220240715140953848043'
5	x'00000001000000000000000000000000185FEB0000000000220240715141357474771'
6	x'000000010000000000000000000000001860BE0000000000220240715141442739737'
7	x'0000000100000000000000000000000018649B0000000000220240715141736869680'
8	x'0000000100000000000000000000000018405C0000000000220240715140023554796'
9	x'0000000100000000000000000000000018614B0000000000220240715141519321054'
10	x'00000001000000000000000000000000166444000000000220240715112450301505'
11	x'00000001000000000000000000000000184DA80000000000220240715140256514124'
12	x'0000000100000000000000000000000018548E0000000000220240715140708411834'

- The EXPLAIN_FROM_SECTION procedure can be used to explain SQL from the package cache or from a package cache event monitor
- Capture the SQL using the MONREPORT PKGCACHE module
- Use the Executable ID as input to EXPLAIN_FROM_SECTION
 - Uses actual access plan used during statement execution
 - Output stored in explain tables and can be formatted using db2exfmt
- ❖ My favorite way

```
CALL EXPLAIN_FROM_SECTION  
  ( x'00000001000000000000000000000000184E4F000000000000220240715140355101978',  
    'M', NULL, 0, 'HSPRD', ?, ?, ?, ?, ? );
```

```
pgunning@[ahp202hs]:
(/home/pgunning)> db2exfmt
DB2 Universal Database Version 11.5, 5622-044 (c) Copyright IBM
Licensed Material - Program Property of IBM
IBM DATABASE 2 Explain Table Format Tool

Enter Database Name ==> hsprd
Connecting to the Database.
Connect to Database Successful.
Using SYSTOOLS schema for Explain tables.
Enter up to 26 character Explain timestamp (Default -1) ==>
Enter up to 128 character source name (SOURCE_NAME, Default %)
Enter source schema (SOURCE_SCHEMA, Default %) ==>
Enter section number (0 for all, Default 0) ==>
Enter outfile name. Default is to terminal ==> t134xfmt.out
Output is in t134xfmt.out.
Executing Connect Reset -- Connect Reset was Successful.
pgunning@[ahp202hs]:
```

Menu
View
Overview(d)
Throughput(w)
Top consumers(B)
Connections(l)
Statements(s)
IO(I)
Locking(L)
Memory(O)
Storage(t)
Other(u)
Help(h)
Settings(E)
Quit(q)

DB overview
[|17:24:10 Data mode: delta, Baseline age: 16m, Next refresh: 4 secs
AIX, member=[0/0], hsprd:hsprd

Act session	4%
Log used	2%

Overview

Start date
2025-09-21
Start time
05:43:39
Database status
ACTIVE
System physical mem
96.0G

Resource consumption

CPU usage %
27.78
Instance mem committed
121.9M
Database mem committed
37.9G
Bufferpool memory used
32.6G
Shared sort memory used
2.2M
Storage usage %
78.29
Log usage %
2.16
Log used
30.2M

Throughput

Transactions/s
13.49
Select stmts/s
15.13
Uid stmts/s
0.16
Activities completed/s
15.29
Activities aborted/s
0.01
Activities queued/s
0.00
Read efficiency
86.88
Log reads/s
0.00
Log writes/s
0.20
Logical reads/s
335557.88
Physical reads/s
0.26
Async reads/s
0.11
Writes/s
0.03
Async writes/s
0.98

Contention

Connections
43
Active connections
2
Lock held
0.0
Lock waits
238
Lock timeouts
0
Lock escalations/m
0.00
Deadlocks/m
0.00
Threshold violations/m
0.00
Hit ratio
100.00%

Timespent

Avg p read time
0.60
Avg d read time
0.00
Sorts/m
1969603.47
Sort overflows/m
2.98
Hash joins/m
13.43
Hash join overflows/m
0.18
Hash grpbys/m
0.00
Hash grpb overflows/m
0.00
Avg p write time
0.75
Avg d write time
0.32
Pct time queued
0.00

ha900hs

Menu

- View
 - Overview(d)
 - Throughput(w)
 - Top consumers(B)
 - Connections(l)
 - Statements(s)
 - IO(i)
 - Locking(L)
 - Lock statistics(L)
 - Blockers, waiters(b)
 - Locks(u)
 - Locked objects(o)
 - Memory(O)
 - Storage(t)
 - Other (u)
- Help(h)
- Settings(E)
- Quit(q)

[-]14:09:30 Data mode: delta, Baseline age: 0m, Next refresh: 1 secs, Filter on/off:off

Locking - Lock statistics

AIX, member=[0/1], hsrpd:hsprd

Application handle	Application name	User ID	Lock waits/s	Lock wait time %	Lock timeouts/s	Lock escalations/s	Dead locks/s	Uow state	Connecton start t.
			0.00				0.00	UOWWAIT	2025-09-24 07:02:...
			0.00				0.00	UOWWAIT	2025-09-24 07:02:...
			0.00				0.00	UOWWAIT	2025-09-24 07:05:...
			0.00				0.00	UOWWAIT	2025-09-24 07:16:...
			0.00				0.00	UOWWAIT	2025-09-24 08:10:...
			0.00				0.00	UOWWAIT	2025-09-24 09:28:...
			0.00				0.00	UOWWAIT	2025-09-24 09:54:...
			0.00				0.00	UOWWAIT	2025-09-24 10:09:...
			0.00				0.00	UOWWAIT	2025-09-24 10:20:...
			0.00				0.00	UOWWAIT	2025-09-24 11:04:...
			0.00				0.00	UOWWAIT	2025-09-24 12:00:...
			0.00				0.00	UOWWAIT	2025-09-24 12:07:...
			0.00				0.00	UOWWAIT	2025-09-24 13:31:...
			0.00				0.00	UOWWAIT	2025-09-24 13:36:...
			0.00				0.00	UOWWAIT	2025-09-24 14:00:...
			0.00				0.00	UOWWAIT	2025-09-24 14:00:...
			0.00				0.00	UOWWAIT	2025-09-24 14:05:...
			0.00				0.00	UOWWAIT	2025-09-24 14:08:...
			0.00				0.00	UOWWAIT	2025-09-24 14:08:...
			0.00				0.00	UOWWAIT	2025-09-24 14:08:...
			0.00				0.00	UOWEXEC	2025-09-24 14:08:...

Description

Shortcut

** Common **

- Ascending sort Z
- Descending sort z
- Show / hide menu M
- Show / hide gauge !
- Toggle delta value K
- Freeze display f
- Reset baseline r
- Set threshold <
- Clear threshold CTRL+R
- Export data in appended form CTRL+E
- Filter rows /
- (press delete button to clear filter input)
- Set refresh interval CTRL+t
- Reorder table columns CTRL+O
- Set fixed columns CTRL+x

** View **

- 1)Overview d
- 2)Throughput
 - Workloads w
 - Workload Assignment W
 - Service Classes C
 - Members p
 - Skew monitor J
 - Time spent (system) Q
- 3)Top Consumer
 - Units of Work B
 - Connections c
 - Activities v
- 4)Connections l
- 5)Statements
 - In-flight statement s
 - Executed SQL (pkg cache) D
- 6)IO
 - Bufferpools I
 - Prefetchers P
 - Table Spaces y
 - Table Y
 - Logging Performance N
 - CF Status x
 - pureScale Performance X
- 7)Locking
 - Lock Statistics L
 - Blockers, waiters b
 - Locks u
 - Locked Objects o
- 8)Memory

Menu

- View
 - Overview (d)
 - Throughput (w)
 - Workloads (w)
 - Workload assignment (W)
 - Service classes (C)
 - Members (p)
 - Skew monitor (J)
 - Time spent (Sys) (Q)
 - Top consumers (B)
 - Connections (l)
 - Statements (s)
 - IO (I)
 - Locking (L)
 - Memory (O)
 - Storage (t)
 - Other (u)
- Help (h)
- Settings (E)
- Quit (q)

Throughput - Workload assignment

[/]17:25:59 Data mode: delta, Baseline age: 0m, Next refresh: 2 secs, Filter on/off:off AIX, member={0/0}, hsprd:hsprd

Application handle	Event state	Event type	Event object	Workload name	User ID	Session user ID	Client workstation	Client accounting string	Client
216	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	-	-	-
217	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	-	-	-
1487	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
1507	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
1849	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	CGEORGE	CGEORGE	10.10.113.86	-	-
2045	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
2258	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
2380	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	RMCGOWAN	RMCGOWAN	10.10.248.75	-	-
2858	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
3839	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
3955	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
5865	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	HS	HS	10.10.9.10	-	-
5880	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	NARPTSVC	NARPTSVC	-	-	-
5881	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	NARPTSVC	NARPTSVC	-	-	-
5893	EXECUTING	PROCESS	ROUTINE	SYSDEFAULTUSERWORKLOAD	PGUNNING	PGUNNING	ha900hs	-	-
56475	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	IIDRPRD	IIDRPRD	10.10.9.10	-	-
56476	IDLE	WAIT	REQUEST	SYSDEFAULTUSERWORKLOAD	IIDRPRD	IIDRPRD	ha900hs	-	-

Enter application handle value: █

ha900hs

Menu		Application Handle Detail								sprd:hspdr	
View		[/]17:27:40 Data mode: delta, Baseline age: 2m, Next refresh: 1 secs, Filter on/off:off AIX, member=[0/0], hspdr:hspdr								ing Clien..	
Over										-	
Thro										-	
W										-	
M										-	
S										-	
M										-	
S										-	
T										-	
Top										-	
Conn										-	
Stat										-	
IO(I										-	
Lock										-	
Memo										-	
Stor										-	
Othe										-	
Help(h)										-	
Setting										-	
Quit(q)										-	
		ConnTime: 2025-09-24 13:07UOW start: 2025-09-24 13:07Appl name: dmctop DB user: PGUNNING OS user: pgunning								-	
		App handle: 5893 Coord DBP: 0 Coord ID: 27852 Client pid: 23069142 Hash joins: 112								-	
		Hash loops: 0 HJoin ovf: 0 SQL stmts: 319 Sorts: 80 Sort time: 1806.00								-	
		Sorts ovf: 12 Rows read: 770350 Rows sel: 64075 Read/Sel: 12.02 Rows wrtn: 760571								-	
		Rows ins: 0 Rows upd: 0 Rows del: 0 Locks held: 0 Trans: 0								-	
		CPU time: 10109.75ms AvgCpuStmt: 31.69 Memory: 1.0M Dyn. SQL: 319 Static SQL: 0								-	
		READ_DML [OPEN]								-	
		Start: 2025-09-24 13:27CPU time: 0.00ms Elapse: 0.00 Cost est: 3 TempReads: 0								-	
		AgentTop: 1 SortTime: 0.00 SortOvf: 0 Sorts: 0 IntRowsIns: 0								-	
		Agents: 1 Logical reads: 0 Physical reads: 0 DataReads: 0 IntRowsDel: 0								-	
		Card est: 4 HitRatio: 100.00 MaxDbpCpu: 0.00 IndexReads: 0 IntRowsUpd: 0								-	
		Degree: 1								-	
		Query: 1								-	
		/* IBM_DMCTOP */WITH STMT_INFO AS (SELECT COALESCE(ACT.MEMBER, PCS.MEMBER) AS MEMBER, CASE WHEN ACT.ACTIVITY_TYPE IS NOT NULL THEN ACT.ACTIVITY_TYPE ELSE (CASE W								-	
		Esc: Close Auto refresh: ON f: Toggle auto refresh L: Display query text								-	
		Ctrl+f: Force application off								-	

Menu

View

Over

Thro

W

M

S

M

App hand

T

Top

Conn

Stat

IO(I

Lock

Memo

Stor

Other

Help(h)

Setting

Quit(q)

Query: 1

Start:

AgentTop

Agents:

Card est

Degree:

Query:
/* IBM

Esc: Clo

Ctrl+f:

/* IBM DMCTOP */WITH STMT_INFO AS (SELECT COALESCE(ACT.MEMBER, PCS.MEMBER) AS MEMBER, CASE WHEN ACT.ACTIVITY_TYPE IS NOT NULL THEN ACT.ACTIVITY_TY

PE ELSE (CASE WHEN PCS.SECTION_TYPE = 'D' THEN 'DYNAMIC STATEMENT' WHEN PCS.SECTION_TYPE = 'S' THEN 'STATIC STATEMENT' ELSE 'UNKNOWN' END) END AS

ACTIVITY_TYPE, CASE WHEN ACT.ACTIVITY_TYPE IS NOT NULL THEN AGENT.REQUEST_TYPE ELSE 'CLOSE' END AS REQUEST_TYPE, ACT.ENTRY_TIME, COALESCE(ACT.TOTAL

CPU_TIME, PCS.TOTAL_CPU_TIME) AS TOTAL_CPU_TIME_US, COALESCE(ACT.STMT_EXEC_TIME, PCS.STMT_EXEC_TIME) AS STMT_EXEC_TIME_MS, COALESCE(ACT.QUERY_C

OST_ESTIMATE, PCS.QUERY_COST_ESTIMATE) AS QUERY_COST_ESTIMATE, ACT.AGENTS_TOP, COALESCE(ACT.TOTAL_SECTION_SORT_TIME, PCS.

TOTAL_SECTION_SORT_TIME) AS TOTAL_SECTION_SORT_TIME_MS, COALESCE(ACT.SORT_OVERFLOWS, PCS.SORT_OVERFLOWS) AS SORT_OVERFLOWS, COALESCE(ACT.TOTAL_S

ORTS, PCS.TOTAL_SORTS) AS TOTAL_SORTS, ACT.QUERY_ACTUAL_DEGREE, ACT.NUM_AGENTS, COALESCE(ACT.POOL_DATA_L_READS + ACT.POOL_TEMP_DATA_L_READS + ACT.

POOL_XDA_L_READS + ACT.POOL_TEMP_XDA_L_READS + ACT.POOL_INDEX_L_READS + ACT.POOL_TEMP_INDEX_L_READS + ACT.POOL_COL_P_READS + ACT.POOL_TEMP_COL_P_REA

DS, PCS.POOL_DATA_L_READS + PCS.POOL_TEMP_DATA_L_READS + PCS.POOL_XDA_L_READS + PCS.POOL_TEMP_XDA_L_READS + PCS.POOL_INDEX_L_READS + PCS.POOL_TEMP_I

NDEX_L_READS + PCS.POOL_COL_P_READS + PCS.POOL_TEMP_COL_P_READS) AS POOL_L_READS, COALESCE(ACT.POOL_DATA_P_READS + ACT.POOL_INDEX_P_READS + ACT.PO

OL_XDA_P_READS + ACT.POOL_TEMP_DATA_P_READS + ACT.POOL_TEMP_INDEX_P_READS + ACT.POOL_TEMP_COL_P_READS + ACT.POOL_TEMP_INDEX_P_READS + PCS.POOL_TE

MP_XDA_P_READS + PCS.POOL_COL_P_READS + PCS.POOL_TEMP_COL_P_READS) AS POOL_P_READS, COALESCE(ACT.POOL_DATA_L_READS, PCS.POOL_DATA_L_READS) AS POO

L_DATA_L_READS, COALESCE(ACT.POOL_INDEX_L_READS, PCS.POOL_INDEX_L_READS) AS POOL_INDEX_L_READS, COALESCE(ACT.POOL_TEMP_DATA_L_READS + ACT.POOL_TEM

P_XDA_L_READS + ACT.POOL_TEMP_INDEX_L_READS, PCS.POOL_TEMP_DATA_L_READS + PCS.POOL_TEMP_XDA_L_READS + PCS.POOL_TEMP_INDEX_L_READS) AS TEMP_L_READS

, COALESCE(ACT.INT_ROWS_DELETED, PCS.INT_ROWS_DELETED) AS INT_ROWS_DELETED, COALESCE(ACT.INT_ROWS_UPDATED, PCS.INT_ROWS_UPDATED) AS INT_ROWS_UPD

ATED, COALESCE(ACT.INT_ROWS_INSERTED, PCS.INT_ROWS_INSERTED) AS INT_ROWS_INSERTED, COALESCE(CASE WHEN LENGTH(ACT.STMT_TEXT) <= 30 THEN CAST(ACT.

STMT_TEXT AS VARCHAR(30)) ELSE CAST(SUBSTR(ACT.STMT_TEXT, 1, 27) || '...' AS VARCHAR(30)) END, CASE WHEN LENGTH(PCS.STMT_TEXT) <= 30 THEN CAST(P

CS.STMT_TEXT AS VARCHAR(30)) ELSE CAST(SUBSTR(PCS.STMT_TEXT, 1, 27) || '...' AS VARCHAR(30)) END) AS STMT_TEXT, CONN.APPLICATION_HANDLE, COALESC

E(ACT.EXECUTABLE_ID, PCS.EXECUTABLE_ID) AS EXECUTABLE_ID FROM TABLE(MON_GET_CONNECTION(NULL, 0, 1)) AS CONN LEFT OUTER JOIN TABLE(MON_GET_ACTIV

ITY(NULL, 0)) AS ACT ON CONN.APPLICATION_HANDLE = ACT.APPLICATION_HANDLE AND CONN.MEMBER = ACT.MEMBER LEFT OUTER JOIN TABLE(MON_GET_AGENT(NULL, N

ULL, NULL, 0)) AS AGENT ON CONN.APPLICATION_HANDLE = AGENT.APPLICATION_HANDLE AND CONN.MEMBER = AGENT.MEMBER LEFT OUTER JOIN TABLE(MON_GET_PKG_CACH

E_STMT(NULL, NULL, NULL, 0)) AS PCS ON CONN.LAST_EXECUTABLE_ID = PCS.EXECUTABLE_ID AND CONN.MEMBER = PCS.MEMBER WHERE CONN.APPLICATION_HANDLE = 589

3 AND CONN.APPLICATION_HANDLE = 5893 AND AGENT.AGENT_STATE = 'ACTIVE'), MAX_CPU_MEMBER AS (SELECT STMT_INFO.EXECUTABLE_ID, MEMBER AS MAXCPUMEMBER,

MAX_TOTAL_CPU_TIME_US FROM STMT_INFO, (SELECT EXECUTABLE_ID, MAX(STMT_INFO.TOTAL_CPU_TIME_US) AS MAX_TOTAL_CPU_TIME_US FROM STMT_INFO GROUP BY EXE

CUTABLE_ID) AS T WHERE STMT_INFO.EXECUTABLE_ID = T.EXECUTABLE_ID AND STMT_INFO.TOTAL_CPU_TIME_US = T.MAX_TOTAL_CPU_TIME_US) SELECT MIN(APPLICATION

HANDLE) AS APPLICATION_HANDLE, MAX(STMT.TEXT) AS STMT_TEXT, MAX(ACTIVITY_TYPE) AS ACTIVITY_TYPE, MAX(REQUEST_TYPE) AS REQUEST_TYPE, MIN(ENTRY.TIME)

AS ENTRY_TIME, CAST(SUM(TOTAL_CPU_TIME_US)/ 1000.0 AS DOUBLE) AS TOTAL_CPU_TIME_MS, SUM(STMT_EXEC_TIME_MS) AS STMT_EXEC_TIME_MS, MAX(QUERY_COST_E

STIMATE) AS QUERY_COST_ESTIMATE, MAX(QUERY_CARD_ESTIMATE) AS QUERY_CARD_ESTIMATE, MAX(AGENTS.TOP) AS AGENTS_TOP, SUM(TOTAL_SECTION_SORT_TIME_MS) AS

TOTAL_SECTION_SORT_TIME_MS, SUM(SORT_OVERFLOWS) AS SORT_OVERFLOWS, SUM(TOTAL_SORTS) AS TOTAL_SORTS, MAX(QUERY_ACTUAL_DEGREE) AS QUERY_ACTUAL_DEGREE,

SUM(NUM_AGENTS) AS NUM_AGENTS, SUM(P.OOL_L_READS) AS POOL_L_READS, SUM(P.OOL_P_READS) AS POOL_P_READS, SUM(P.OOL_DATA_L_READS) AS POOL_DATA_L_READS, S

UM(P.OOL_INDEX_L_READS) AS POOL_INDEX_L_READS, SUM(TEMP_L_READS) AS TEMP_L_READS, CASE WHEN SUM(P.OOL_L_READS) = 0 THEN 1 ELSE CAST(1 - SUM(P.OOL_P_RE

ADS) * 1.0 / SUM(P.OOL_L_READS) AS DOUBLE) END AS HIT_RATIO, MIN(MAXCPUMEMBER) AS MAXCPUMEMBER, CAST(MAX(MAX_TOTAL_CPU_TIME_US) / 1000.0 AS DOUBLE

) AS MAXDBP_CPU_TIME_MS, SUM(INT_ROWS_DELETED) AS INT_ROWS_DELETED, SUM(INT_ROWS_UPDATED) AS INT_ROWS_UPDATED, SUM(INT_ROWS_INSERTED) AS INT_ROWS_IN

SERTED, STMT_INFO.EXECUTABLE_ID FROM STMT_INFO LEFT OUTER JOIN MAX_CPU_MEMBER ON STMT_INFO.EXECUTABLE_ID = MAX_CPU_MEMBER.EXECUTABLE_ID GROUP BY STM

T_INFO.EXECUTABLE_ID ORDER BY TOTAL_CPU_TIME_MS DESC

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/* IBM_DMCTOP */WITH STMT_INFO AS ( SELECT COALESCE(ACT.MEMBER, PCS.MEMBER) AS MEMBER, CASE WHEN ACT.ACTIVITY_TYPE IS NOT NULL THEN ACT.ACTIVITY_TYPE ELSE ( CASE WHEN PCS.SECTION_TYPE = 'D' THEN 'DYNAMIC STATEMENT' WHEN
PCS.SECTION_TYPE = 'S' THEN 'STATIC STATEMENT' ELSE 'UNKNOWN' END ) END AS ACTIVITY_TYPE, CASE WHEN ACT.ACTIVITY_TYPE IS NOT NULL THEN AGENT.REQUEST_TYPE ELSE 'CLOSE' END AS REQUEST_TYPE, ACT.ENTRY_TIME,
COALESCE( ACT.TOTAL_CPU_TIME, PCS.TOTAL_CPU_TIME ) AS TOTAL_CPU_TIME_US, COALESCE( ACT.STMT_EXEC_TIME, PCS.STMT_EXEC_TIME ) AS STMT_EXEC_TIME_MS, COALESCE( ACT.QUERY_COST_ESTIMATE, PCS.QUERY_COST_ESTIMATE ) AS
QUERY_COST_ESTIMATE, ACT.QUERY_CARD_ESTIMATE, ACT.AGENTS_TOP, COALESCE( ACT.TOTAL_SECTION_SORT_TIME, PCS.TOTAL_SECTION_SORT_TIME ) AS TOTAL_SECTION_SORT_TIME_MS, COALESCE( ACT.SORT_OVERFLOWS, PCS.SORT_OVERFLOWS ) AS
SORT_OVERFLOWS, COALESCE( ACT.TOTAL_SORTS, PCS.TOTAL_SORTS ) AS TOTAL_SORTS, ACT.QUERY_ACTUAL_DEGREE, ACT.NUM_AGENTS, COALESCE( ACT.POOL_DATA_L_READS + ACT.POOL_TEMP_DATA_L_READS + ACT.POOL_XDA_L_READS +
ACT.POOL_TEMP_XDA_L_READS + ACT.POOL_INDEX_L_READS + ACT.POOL_TEMP_INDEX_L_READS + ACT.POOL_COL_L_READS + ACT.POOL_TEMP_COL_L_READS, PCS.POOL_DATA_L_READS + PCS.POOL_TEMP_DATA_L_READS + PCS.POOL_XDA_L_READS +
PCS.POOL_TEMP_XDA_L_READS + PCS.POOL_INDEX_L_READS + PCS.POOL_TEMP_INDEX_L_READS + PCS.POOL_COL_L_READS + PCS.POOL_TEMP_COL_L_READS ) AS POOL_L_READS, COALESCE( ACT.POOL_DATA_P_READS + ACT.POOL_INDEX_P_READS +
ACT.POOL_XDA_P_READS + ACT.POOL_TEMP_DATA_P_READS + ACT.POOL_TEMP_INDEX_P_READS + ACT.POOL_TEMP_XDA_P_READS + ACT.POOL_COL_P_READS + ACT.POOL_TEMP_COL_P_READS, PCS.POOL_DATA_P_READS + PCS.POOL_INDEX_P_READS +
PCS.POOL_XDA_P_READS + PCS.POOL_TEMP_DATA_P_READS + PCS.POOL_TEMP_INDEX_P_READS + PCS.POOL_TEMP_XDA_P_READS + PCS.POOL_COL_P_READS + PCS.POOL_TEMP_COL_P_READS ) AS POOL_P_READS, COALESCE( ACT.POOL_DATA_L_READS,
PCS.POOL_DATA_L_READS ) AS POOL_DATA_L_READS, COALESCE( ACT.POOL_INDEX_L_READS, PCS.POOL_INDEX_L_READS ) AS POOL_INDEX_L_READS, COALESCE( ACT.POOL_TEMP_DATA_L_READS + ACT.POOL_TEMP_XDA_L_READS + ACT.POOL_TEMP_INDEX_L_READS,
PCS.POOL_TEMP_DATA_L_READS + PCS.POOL_TEMP_XDA_L_READS + PCS.POOL_TEMP_INDEX_L_READS ) AS TEMP_L_READS, COALESCE( ACT.INT_ROWS_DELETED, PCS.INT_ROWS_DELETED ) AS INT_ROWS_DELETED, COALESCE( ACT.INT_ROWS_UPDATED,
PCS.INT_ROWS_UPDATED ) AS INT_ROWS_UPDATED, COALESCE( ACT.INT_ROWS_INSERTED, PCS.INT_ROWS_INSERTED ) AS INT_ROWS_INSERTED, COALESCE( CASE WHEN LENGTH(ACT.STMT_TEXT) <= 30 THEN CAST( ACT.STMT_TEXT AS VARCHAR(30) ) ELSE
CAST( SUBSTR(ACT.STMT_TEXT, 1, 27) || '...' AS VARCHAR(30) ) END, CASE WHEN LENGTH(PCS.STMT_TEXT) <= 30 THEN CAST( PCS.STMT_TEXT AS VARCHAR(30) ) ELSE CAST( SUBSTR(PCS.STMT_TEXT, 1, 27) || '...' AS VARCHAR(30) ) END ) AS
STMT_TEXT, CONN.APPLICATION_HANDLE, COALESCE( ACT.EXECUTABLE_ID, PCS.EXECUTABLE_ID ) AS EXECUTABLE_ID FROM TABLE( MON_GET_CONNECTION( NULL, 0, 1) ) AS CONN LEFT OUTER JOIN TABLE( MON_GET_ACTIVITY( NULL, 0) ) AS ACT ON
CONN.APPLICATION_HANDLE = ACT.APPLICATION_HANDLE AND CONN.MEMBER = ACT.MEMBER LEFT OUTER JOIN TABLE( MON_GET_AGENT( NULL, NULL, NULL, 0) ) AS AGENT ON CONN.APPLICATION_HANDLE = AGENT.APPLICATION_HANDLE AND CONN.MEMBER =
AGENT.MEMBER LEFT OUTER JOIN TABLE( MON_GET_PKG_CACHE_STMT( NULL, NULL, NULL, 0) ) AS PCS ON CONN.LAST_EXECUTABLE_ID = PCS.EXECUTABLE_ID AND CONN.MEMBER = PCS.MEMBER WHERE CONN.APPLICATION_HANDLE = 2919 AND
CONN.APPLICATION_HANDLE = 2919 AND AGENT.AGENT_STATE = 'ACTIVE' ), MAX_CPU_MEMBER AS ( SELECT STMT_INFO.EXECUTABLE_ID, MEMBER AS MAXCPUMEMBER, MAX_TOTAL_CPU_TIME_US FROM STMT_INFO, ( SELECT EXECUTABLE_ID,
MAX(STMT_INFO.TOTAL_CPU_TIME_US) AS MAX_TOTAL_CPU_TIME_US FROM STMT_INFO GROUP BY EXECUTABLE_ID ) AS T WHERE STMT_INFO.EXECUTABLE_ID = T.EXECUTABLE_ID AND STMT_INFO.TOTAL_CPU_TIME_US = T.MAX_TOTAL_CPU_TIME_US ) SELECT
MIN(APPLICATION_HANDLE) AS APPLICATION_HANDLE, MAX(STMT_TEXT) AS STMT_TEXT, MAX(ACTIVITY_TYPE) AS ACTIVITY_TYPE, MAX(REQUEST_TYPE) AS REQUEST_TYPE, MIN(ENTRY_TIME) AS ENTRY_TIME, CAST( SUM(TOTAL_CPU_TIME_US)/ 1000.0 AS
DOUBLE ) AS TOTAL_CPU_TIME_MS, SUM(STMT_EXEC_TIME_MS) AS STMT_EXEC_TIME_MS, MAX(QUERY_COST_ESTIMATE) AS QUERY_COST_ESTIMATE, MAX(QUERY_CARD_ESTIMATE) AS QUERY_CARD_ESTIMATE, MAX(AGENTS_TOP) AS AGENTS_TOP,
SUM(TOTAL_SECTION_SORT_TIME_MS) AS TOTAL_SECTION_SORT_TIME_MS, SUM(SORT_OVERFLOWS) AS SORT_OVERFLOWS, SUM(TOTAL_SORTS) AS TOTAL_SORTS, MAX(QUERY_ACTUAL_DEGREE) AS QUERY_ACTUAL_DEGREE, SUM(NUM_AGENTS) AS NUM_AGENTS,
SUM(POOL_L_READS) AS POOL_L_READS, SUM(POOL_P_READS) AS POOL_P_READS, SUM(POOL_DATA_L_READS) AS POOL_DATA_L_READS, SUM(POOL_INDEX_L_READS) AS POOL_INDEX_L_READS, SUM(TEMP_L_READS) AS TEMP_L_READS, CASE WHEN SUM(POOL_L_READS)
= 0 THEN 1 ELSE CAST( 1 - SUM(POOL_P_READS) * 1.0 / SUM(POOL_L_READS) AS DOUBLE ) END AS HIT_RATIO, MIN(MAXCPUMEMBER) AS MAXCPUMEMBER, CAST( MAX(MAX_TOTAL_CPU_TIME_US) / 1000.0 AS DOUBLE ) AS MAXDBP_CPU_TIME_MS,
SUM(INT_ROWS_DELETED) AS INT_ROWS_DELETED, SUM(INT_ROWS_UPDATED) AS INT_ROWS_UPDATED, SUM(INT_ROWS_INSERTED) AS INT_ROWS_INSERTED, STMT_INFO.EXECUTABLE_ID FROM STMT_INFO LEFT OUTER JOIN MAX_CPU_MEMBER ON
STMT_INFO.EXECUTABLE_ID = MAX_CPU_MEMBER.EXECUTABLE_ID GROUP BY STMT_INFO.EXECUTABLE_ID ORDER BY TOTAL_CPU_TIME_MS DESC;

```

dmctop – SQL Associated with Application Handle

ha900hs.ramtech.local - PuTTY

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Storage (t)
Other (u)
Help (h)
Settings (E)
Quit (q)

Statements - In-flight statements
AIX, member={0/0}, hsprd:hsprd
[/]16:07:48 Data mode: actual, Next refresh: 3 secs, Filter on/off:off

Application handle	Stmt num	Cpu time(sec)	Application name	Activity state	Elapsed time(sec)	Last request type	Activity type	Rows read	Rows returned	Direct reads	Direct writes	Sec num	Cost estimate
	0	2										2068043	1
	0	2										157077	1
	0	255										2	4

Query: 1
SELECT "Provider ID" AS "Provider_ID",
"Claim ID" AS "Claim_ID",
"Claim DOS" AS "Claim_DOS",
"Claim Paid Amount" AS "Claim_Paid_Amount",
"Claim Status" AS "Claim_Status"
FROM (SELECT DISTINCT
PVO.PVO_PRV_ID AS "Provider ID",
CPV.CPV_CLM_ID AS "Claim ID",
CDT.CDT_DT AS "Claim DOS",
(BILD.CAM_AMT - SUM(PAID.CAJ_AMT)) AS "Claim Paid Amount",
TCL.TCL_TYPE_DESC AS "Claim Status"
FROM HS.PRV_PROVIDER AS PRV
JOIN HS.PVO_PROVIDER_ORG AS PVO ON PRV.PRV_ID = PVO.PVO_PRV_ID AND PRV.PRV_PVT_CD = PVO.PVO_TYPE
LEFT JOIN HS.CPV_CLM_PRV AS CPV ON PVO.PVO_PRV_ID = CPV.CPV_PRV_ID AND CPV.CPV_ENT_CD = 'SB'
LEFT JOIN HS.CAM_CLM_AMT AS BILD ON CPV.CPV_CLM_ID = BILD.CAM_CLM_ID AND BILD.CAM_AMT_QUAL = 'E9'
LEFT JOIN HS.CAJ_CLM_ADJ AS PAID ON CPV.CPV_CLM_ID = PAID.CAJ_CLM_ID
LEFT JOIN HS.CDT_CLM_DT AS CDT ON CPV.CPV_CLM_ID = CDT.CDT_CLM_ID AND CDT.CDT_DT_QUAL = '150'
LEFT JOIN HS.CEV_CLM_EV AS CEV ON CPV.CPV_CLM_ID = CEV.CEV_CLM_ID AND CEV.CEV_DEL_TS IS NULL AND CEV.CEV_ADD_TS = (SELECT CEV_ADD_TS FR
ON HS.CEV_CLM_EV WHERE CEV_CLM_ID = CEV.CEV_CLM_ID AND CEV_DEL_TS IS NULL ORDER BY CEV_ADD_TS DESC FETCH FIRST 1 ROWS ONLY WITH UR)
LEFT JOIN HS.TCL_TYPE_CD_LOOKUP AS TCL ON TRIM(CEV.CEV_TYPE) = TCL.TCL_TYPE_CODE AND TCL.TCL_ID = 84
WHERE PVO.PVO_DEL_TS IS NULL
AND CURRENT_DATE BETWEEN PVO.PVO_START_DT AND NVL(PVO.PVO_END_DT, '12/31/9999')
AND PVO.PVO_ADD_TS = (SELECT PVO_ADD_TS FROM HS.PVO_PROVIDER_ORG WHERE PVO_PRV_ID = PVO.PVO_PRV_ID AND PVO_DEL_TS IS NULL AND CURRENT_DATE BETWEEN
PVO_START_DT AND NVL(PVO_END_DT, '12/31/9999') ORDER BY PVO_ADD_TS DESC FETCH FIRST 1 ROWS ONLY WITH UR)
GROUP BY PVO.PVO_PRV_ID, CPV.CPV_CLM_ID, CDT.CDT_DT, BILD.CAM_AMT, TCL.TCL_TYPE_DESC
WITH UR) AS "tq_kH7euppyu"
Start:
AgentTop
Agents:
Card est
Degree:

Query:
SELECT
Esc: Clo
Ctrl+f:

Ok db2exfmt Export

Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,
Use arrow keys for scrolling, Application handle: a,
Total rows: 3
ha900hs
dmctop 1.0.4.1 2022-06-21_328

IBM2 Universal Database Version 11.5, 5622-044 (c) Copyright IBM Corp. 1991, 2019
Licensed Material - Program Property of IBM
IBM DATABASE 2 Explain Table Format Tool

***** EXPLAIN INSTANCE *****

```
DB2_VERSION:          11.05.8
FORMATTED ON DB:      HSPRD
SOURCE_NAME:          SYSLH100
SOURCE_SCHEMA:        NULLID
SOURCE_VERSION:
EXPLAIN_TIME:         2025-09-27-12.10.44.067533
EXPLAIN_REQUESTER:    HSPRD
```

Database Context:

```
Parallelism:           None
CPU Speed:             2.361721e-07
Comm Speed:            100
Buffer Pool size:      7923369
Sort Heap size:        50000
Database Heap size:    1200
Lock List size:        1104017
Maximum Lock List:     97
Average Applications:   1
Locks Available:       34268688
```

Package Context:

```
SQL Type:           Dynamic
Optimization Level: 5
Blocking:           Block All Cursors
Isolation Level:    Uncommitted Read
```

----- STATEMENT 1 SECTION 2 -----

```

QUERYNO:          1
QUERYTAG:
Statement Type:   Select
Updatable:        No
Deletable:         No
Query Degree:      1

```

Original Statement:

```

SELECT "Provider ID" AS "Provider_ID",
       "Claim ID" AS "Claim_ID",
       "Claim DOS" AS "Claim_DOS",
       "Claim Paid Amount" AS "Claim_Paid_Amount",
       "Claim Status" AS "Claim_Status"
FROM (SELECT DISTINCT
      PVO.PVO_PRV_ID              AS "Provider ID",
      CPV.CPV_CLM_ID              AS "Claim ID",
      CDT.CDT_DT                  AS "Claim DOS",
      (BILD.CAM_AMT - SUM(PAID.CAJ_AMT))
                                           AS "Claim Paid Amount",
                                           AS "Claim Status"
      TCL.TCL_TYPE_DESC
      "explain.920500000" 2367 lines, 63505 characters

```

Menu

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Locks (U)

Locked objects (o)

Memory (O)

Storage (t)

Other (u)

Help (h)

Settings (E)

Quit (q)

Locking - Locks

[[16:17:52 Data mode: actual, Next refresh: 8 secs, Filter on/off:off

AIX, member=[0/0], hsprd:hsprd

Locks held: 22

Agents waiting: 0

Lock list storage %: 0.01%

Applications connected: 13

Application handle	Application name	Event state	Event type	Event object	Object name	Lock mode	Object type	Lock status	Lock count	Is blocker	Locked by	Tablespace name
43	db2fw0	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
44	db2fw1	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
45	db2fw2	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
46	db2fw3	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
47	db2fw4	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
48	db2fw5	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
49	db2fw6	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
50	db2fw7	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
51	db2fw8	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
52	db2fw9	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
53	db2fw10	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
54	db2fw11	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
55	db2fw12	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
56	db2fw13	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
57	db2fw14	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
58	db2fw15	EXECUTING	PROCESS	REQUEST	HSPRD.LOCKEVENTS	IX	TABLE	Granted	1	No	-	GTSLOCK
54082	CData/DRDA	EXECUTING	PROCESS	REQUEST	HS.CDT_CLM_DT	IN	TABLE	Granted	1	No	-	MCSCDT
54082	CData/DRDA	EXECUTING	PROCESS	REQUEST	HS.CEV_CLM_EV	IN	TABLE	Granted	2	No	-	MCSCEV
54082	CData/DRDA	EXECUTING	PROCESS	REQUEST	HS.CSEV_CSV_EV	IN	TABLE	Granted	2	No	-	MCSCSEV
54082	CData/DRDA	EXECUTING	PROCESS	REQUEST	HS.TCL_TYPE_CD_LOOKUP	IN	TABLE	Granted	1	No	-	MCSREF
54082	CData/DRDA	EXECUTING	PROCESS	REQUEST	VARIATION	S	VARIATION	Granted	1	No	-	-
54090	dmctop	EXECUTING	PROCESS	ROUTINE	VARIATION	S	VARIATION	Granted	1	No	-	-

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Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,

Use arrow keys for scrolling, Application handle: a, Lock Chain: H,

Total rows: 22

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Menu

- View
 - Overview (d)
 - Throughput (w)
 - Top consumers (B)
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 - Statements (s)
 - In-flight stmts (s)
 - Executed SQL/Pkg cache (D)
 - IO (I)
 - Locking (L)
 - Lock statistics (L)
 - Blockers, waiters (b)
 - Locks (U)
 - Locked objects (o)**
 - Memory (O)
 - Storage (t)
 - Other (u)
- Help (h)
- Settings (E)
- Quit (q)

Locking - Locked objects

[~]16:18:35 Data mode: actual, Next refresh: 9 secs, Filter on/off:off

AIX, member=[0/0], hsprd:hsprd

Application handle	Object type	Table schema	Table name	Lock name	Lock mode	Original lock mode	Database member
43	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
56	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
57	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
44	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
58	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
45	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
46	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
47	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
48	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
49	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
50	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
51	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
52	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
54	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
53	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
55	TABLE	HSPRD	LOCKEVENTS	023B000400000000000000000054	IX	-	0
54082	TABLE	HS	CEV_CLM_EV	0033000200000000000000000054	IN	-	0
54082	TABLE	HS	CSEV_CSV_EV	0064000200000000000000000054	IN	-	0
54082	TABLE	HS	TCL_TYPE_CD_LOOKUP	00D5002600000000000000000054	IN	-	0
54082	TABLE	HS	CDT_CLM_DT	0030000200000000000000000054	IN	-	0

Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,
Use arrow keys for scrolling, Application handle: a,
Total rows: 20

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 - Lock statistics (L)**
 - Blockers, waiters (b)
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 - Locked objects (o)
 - Memory (O)
 - Storage (t)
 - Other (u)
- Help (h)
- Settings (E)
- Quit (q)

Locking - Lock statistics

[/]17:59:29 Data mode: delta, Baseline age: 2m, Next refresh: 8 secs, Filter on/off:off AIX, member=[0/0], hsprd:hsprd

Application handle	Application name	User ID	Lock waits/s	Lock wait time t	Lock timeouts/s	Lock escalations/s	Dead locks/s	Uow state	Connection start t...
216	cicsas	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-21 06:08:...
217	cicsas	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-21 06:08:...
1507	db2jcc_application	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 08:20:...
1849	db2jcc_application	CGEORGE	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 08:57:...
2045	db2jcc_application	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 09:07:...
2380	db2jcc_application	RMCGOWAN	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 10:03:...
2381	db2jcc_application	RMCGOWAN	0.00	0.00	0.00	0.00	0.00	TRANSIENT	2025-09-24 10:03:...
2858	db2jcc_application	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 10:54:...
3955	db2jcc_application	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 11:55:...
5865	db2jcc_application	HS	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-24 12:56:...
6029	dmctop	HSPRD	0.00	0.00	0.00	0.00	0.00	UOWEXEC	2025-09-24 13:55:...
56475	dmsts64-java	IIDRPDR	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-23 08:05:...
56476	dmsts64-java	IIDRPDR	0.00	0.00	0.00	0.00	0.00	UOWWAIT	2025-09-23 08:05:...

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Menu

View

- Overview (d)
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 - Lock statistics (L)
 - Blockers, waiters (b)
 - Locks (U)
 - Locked objects (o)
- Memory (O)
- Storage (t)
- Other (u)
- Help (h)
- Settings (E)
- Quit (q)

Locking - Lock statistics

[] 16:25:29 Data mode: delta, Baseline age: 8m, Next refresh: 7 secs, Filter on/off: off

AIX, member=[0/0], hsprd:hsprd

Application handle	Application name	User ID	Lock waits/s	Lock wait time %	Lock timeouts/s	Lock escalations/s	Dead locks/s	Uow state	Connection start time	Coordinator number	% CPU time	Memory pool
0											0.00	2304.0
0											0.00	1792.0
0											0.00	192.0
0											0.00	192.0
0											0.00	192.0
0											0.00	192.0
0											0.26	1088.0
0											0.00	128.0
0											0.00	128.0
0											27.54	128.0
0											0.29	320.0
0											0.00	128.0
0											0.09	128.0

Application Handle Detail

[/] 16:25:28 Data mode: delta, Baseline age: 8m, Next refresh: 2 secs, Filter on/off: off

AIX, member=[0/0], hsprd:hsprd

ConnTime: 2025-09-25 11:58

UOW start: 2025-09-27 08:38

Appl name: cicsas

DB user: HS

OS user: cics

App handle: 16193

Coord DBP: 0

Coord ID: 25539

Client pid: 17957316

Hash joins: 39471

Hash loops: 0

HJoin ovf: 0

SQL stmts: 1889751

Sorts: 34650

Sort time: 632.00

Sorts ovf: 3

Rows read: 16259936

Rows sel: 1169156

Read/Sel: 13.91

Rows wrtn: 148858

Rows ins: 5272

Rows upd: 11547

Rows del: 3324

Locks held: 0

Trans: 4730

CPU time: 29185.36ms

AvgCpuStat: 0.02

Memory: 2.2M

Dyn. SQL: 405

Static SQL: 1889346

UNKNOWN [CLOSE]

Start: - CPU time: - Elapse: - Cost est: - TempReads: -

AgentTop: - SortTime: - SortOvf: - Sorts: - IntRowsIns: -

Agents: - Logical reads: - Physical reads: - DataReads: - IntRowsDel: -

Card est: - HitRatio: - MaxDbpCpu: - IndexReads: - IntRowsUpd: -

Degree: -

(no statement text)

Esc: Close | Auto refresh: ON | F: Toggle auto refresh | L: Display query text |

Ctrl+f: Force application off

ha900hs

Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,

Use arrow keys for scrolling, Application handle: a,

Total rows: 13

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[illegible]

ha900hs.ramtech.local - PuTTY

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- View
 - Overview (d)
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 - Workload assignment (W)
 - Service classes (C)
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 - Skew monitor (J)
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 - Bufferpools (I)**
 - Prefetchers (P)
 - Table spaces (y)
 - Table (Y)
 - Logging perf (N)
 - CF Status (x)
 - pureScale perf (X)
 - Locking (L)
 - Memory (O)
 - Storage (t)
 - Table space utilization (t)
 - Table utilization (T)
 - Other (u)
- Help (h)
- Settings (E)
- Quit (q)

IO - Bufferpools

[\\]20:59:16 Data mode: delta, Baseline age: 1m, Next refresh: 1 secs, Filter on/off:off AIX, member=[0/0], hsprd:hsprd

Data hit%	100%	=====
Idx hit%	100%	=====
Col hit%	0%	=====
Temp hit%	100%	=====
XML hit%	0%	=====
All hit%	100%	=====

Logical reads/s: 819062.26
Physical reads/s: 0.00
BP writes/s: 1.45
Direct writes/s: 0.00
IO type: 0r | 0w | 40d | 59i | 1t

Bufferpool name	Delta l reads/s	Delta p reads/s	Hit ratio %	Async reads %	Delta bp writes/s	Delta direct writes/s	Delta a reads/s	Async readms	Delta a writes/s	Async wrtms	Async wrt %	# of dbp	Bp p_
CONSOLEPOOL	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	250
IBMDEFAULTBP	819062.26	0.00	100.00%	-	1.45	0.00	0.00	-	1.45	0.01	100.00%	1	1619
IBMSYSTEMBP16K	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	16
IBMSYSTEMBP32K	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	16
IBMSYSTEMBP4K	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	16
IBMSYSTEMBP8K	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	16
LARGEBUFF	0.00	0.00	-	-	0.00	0.00	0.00	-	0.00	-	-	1	1500

Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,
Use arrow keys for scrolling,
Total rows: 7

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ha900hs.ramtech.local - Pull Y

Menu

View

- Overview(d)
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- Statements(s)
- In-flight stmts(s)
- Executed SQL/Pkg cache(D)
- IO(I)
 - Bufferpools(I)
 - Prefetchers(F)
 - Table spaces(y)
 - Table(Y)
 - Logging perf(N)**
 - CF Status(x)
 - pureScale perf(X)
- Locking(L)
 - Lock statistics(L)
 - Blockers,waiters(b)
 - Locks(U)
 - Locked objects(o)
- Memory(O)
 - DB mem pools(O)
 - Inst mem sets(n)
- Storage(t)
- Other(u)
- Help(h)
- Settings(E)
- Quit(q)

IO - Logging performance

[/]16:40:39 Data mode: delta, Baseline age: 0m, Next refresh: 3 secs, Filter on/off:off AIX, member=[0/0], hsprd:hsprd

Member	Delta log writes/s	Average log Writes times(ms)	Delta log reads/s	Average log reads times(ms)	Delta logFullEvents/s	Delta commits/s	Delta activities/commits	Average commits times(ms)
0	0.00	-	0.00	-	0.00	0.00	-	-

Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,
Use arrow keys for scrolling,
Total rows: 1

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Menu		IO - Table spaces																										
View		[\\]16:37:41 Data mode: delta, Baseline age: 0m, Next refresh: 2 secs, Filter on/off:off AIX, member={0/0}, hsrpd:hsrpd																										
Overview(d)																												
Throughput(w)																												
Top consumers(B)																												
Connections(l)																												
Statements(s)																												
In-flight stmts(s)																												
Executed SQL/Pkg cache(D)																												
IO(I)		<table border="1"> <tr><td>Data hit%</td><td>100%</td></tr> <tr><td>Idx hit%</td><td>100%</td></tr> <tr><td>Col hit%</td><td>0%</td></tr> <tr><td>Temp hit%</td><td>0%</td></tr> <tr><td>Xml hit%</td><td>0%</td></tr> <tr><td>All hit ratio%</td><td>100%</td></tr> <tr><td>Avg hit ratio%</td><td>87%</td></tr> </table>													Data hit%	100%	Idx hit%	100%	Col hit%	0%	Temp hit%	0%	Xml hit%	0%	All hit ratio%	100%	Avg hit ratio%	87%
Data hit%	100%																											
Idx hit%	100%																											
Col hit%	0%																											
Temp hit%	0%																											
Xml hit%	0%																											
All hit ratio%	100%																											
Avg hit ratio%	87%																											
Bufferpools(I)																												
Prefetchers(P)																												
Table spaces(y)																												
Table(Y)		IO type: Or Ow 69d 30i Ot																										
Logging perf(N)		DB Size/Capacity: 177.8G / 224.4G																										
CF Status(x)		Abnormal: 0.0																										
pureScale perf(X)		Temp space used: 192.0K																										
Locking(L)		Logical reads/s: 630368.74																										
Lock statistics(L)		Physical reads/s: 0.05																										
Blockers,waiters(b)		Writes/s: 0.00																										
Locks(U)																												
Locked objects(o)																												
Memory(O)																												
DB mem pools(O)																												
Inst mem sets(n)																												
Storage(t)																												
Other(u)																												
Help(h)																												
Settings(E)																												
Quit(q)																												
Tablespace name	Logical reads/s	Physical reads/s	Hit ratio%	Async reads%	Pages ahead	Writes/s	Async reads/s	Async writes/s	Direct writes/s	Data writes/s	Index writes/s	Avg reads dir reqs	Avg rdtme															
CLIENT1	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
GTSLOCK	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
LARGETBLSPC	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAAEI	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAC	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAC_HIST	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACCA	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACH	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHA	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHB	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHB_HIST	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHE	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHP	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACHP_HIST	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSACI	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAE	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAER	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAET	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAET_HIST	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAIAD	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAIAD_HIST	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAPI	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSASER	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSASSI	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSAT	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-															
MCSATA	0.00	0.00	-																									

Menu		Storage - Table utilization														AIX, member=[0/0], hspnd:hspnd	
View		[/]20:54:01 Data mode: delta, Baseline age: 2m, Next refresh: 8 secs, Filter on/off:off															
Overview (d)		Table name	Table scans/s	Table type	Tablespace name	# of member	Table size	Table size skew	Data size	Lob+long size	Index size	Xda size	Page reclaims (exclusive)	Page recla			
Throughput (w)		<16867><NARPTSVC>.TEMP (00001,00002)	0.00	TEMP TABLE	TEMPSPACE1	1	83.5M	0.000000000000	83.5M	0.0	0.0	0	0	0			
Workloads (w)		BPAAS.ACH FILE	0.00	USER TABLE	USERSPACE1	1	132.0K	0.000000000000	132.0K	0.0	0.0	0	0	0			
Workload assignment (W)		BPAAS.ADJ_CLM	0.00	USER TABLE	CLIENT1	1	64.0K	0.000000000000	64.0K	0.0	0.0	0	0	0			
Service classes (C)		BPAAS.ADJUSTMENTS TO ADJ	0.00	USER TABLE	USERSPACE1	1	1.6M	0.000000000000	1.6M	0.0	0.0	0	0	0			
Members (p)		BPAAS.APRU_AUTO PRCS ROWS UPDATED	0.00	USER TABLE	USERSPACE1	1	68.0K	0.000000000000	28.0K	0.0	40.0K	0	0	0			
Skew monitor (J)		BPAAS.AUDIT_2022_2024	0.00	USER TABLE	USERSPACE1	1	45.2M	0.000000000000	45.2M	0.0	0.0	0	0	0			
Time spent (Sys) (Q)		BPAAS.AUDIT_2022_V2	0.00	USER TABLE	USERSPACE1	1	1.2M	0.000000000000	1.2M	0.0	0.0	0	0	0			
Top consumers (B)		BPAAS.AUDIT_COAD_CLM ORIG ADMIT_DT	0.00	USER TABLE	USERSPACE1	1	4.0K	0.000000000000	4.0K	0.0	0.0	0	0	0			
Connections (l)		BPAAS.AUTH REMOVAL	0.00	USER TABLE	CLIENT1	1	44.0K	0.000000000000	44.0K	0.0	0.0	0	0	0			
Statements (s)		BPAAS.BENCHMARK_FEE UPDATE 8363835	0.00	USER TABLE	USERSPACE1	1	188.0K	0.000000000000	188.0K	0.0	0.0	0	0	0			
IO (I)		BPAAS.CAU_CLM AUD	0.00	USER TABLE	USERSPACE1	1	31.2M	0.000000000000	31.2M	0.0	0.0	0	0	0			
Locking (L)		BPAAS.CHC_HS CLAIMS AGING	0.00	USER TABLE	USERSPACE1	1	2.9M	0.000000000000	2.9M	0.0	0.0	0	0	0			
Memory (O)		BPAAS.CLAIM_ENCOUNTER RECON_36NA	0.00	USER TABLE	USERSPACE1	1	131.3M	0.000000000000	131.3M	0.0	0.0	0	0	0			
Storage (t)		BPAAS.CLAIM_ENCOUNTER RECON_36NA	0.00	USER TABLE	USERSPACE1	1	44.3M	0.000000000000	44.3M	0.0	0.0	0	0	0			
Table space utilization (t)		BPAAS.CLM_ADJ_STAT	0.00	USER TABLE	USERSPACE1	1	9.3M	0.000000000000	9.3M	0.0	0.0	0	0	0			
Table utilization (T)		BPAAS.CLM_INV_STAT_NA6	0.00	USER TABLE	USERSPACE1	1	4.0K	0.000000000000	4.0K	0.0	0.0	0	0	0			
Other (u)		BPAAS.CLM_QUEUE_OWNER	0.00	USER TABLE	USERSPACE1	1	19.1M	0.000000000000	19.1M	0.0	0.0	0	0	0			
Help (h)		BPAAS.CLM_TIMELY_STAT	0.00	USER TABLE	USERSPACE1	1	24.5M	0.000000000000	24.5M	0.0	0.0	0	0	0			
Settings (E)		BPAAS.CLM_TIMELY_STATB	0.00	USER TABLE	USERSPACE1	1	64.2M	0.000000000000	64.2M	0.0	0.0	0	0	0			
Quit (q)		BPAAS.CMS_ENC_RECON_BY_CLM_STEP1	0.00	USER TABLE	USERSPACE1	1	4.3M	0.000000000000	4.3M	0.0	0.0	0	0	0			
		BPAAS.CMS_ENC_RECON_BY_CLM_STEP1_JC	0.00	USER TABLE	CLIENT1	1	62.2M	0.000000000000	62.2M	0.0	0.0	0	0	0			
		BPAAS.COS_RECON_2023	0.00	USER TABLE	USERSPACE1	1	1.4M	0.000000000000	1.4M	0.0	0.0	0	0	0			
		BPAAS.COS_RECON_23_21DOS	0.00	USER TABLE	USERSPACE1	1	872.0K	0.000000000000	872.0K	0.0	0.0	0	0	0			
		BPAAS.COS_SPEC_DETAILS	0.00	USER TABLE	USERSPACE1	1	5.8M	0.000000000000	5.8M	0.0	0.0	0	0	0			
		BPAAS.COST_REP_Q1Q2_2023	0.00	USER TABLE	USERSPACE1	1	17.9M	0.000000000000	17.9M	0.0	0.0	0	0	0			
		BPAAS.CPB_CLM_PAYMENT_BATCH	0.00	USER TABLE	USERSPACE1	1	551.6M	0.000000000000	551.6M	0.0	0.0	0	0	0			
		BPAAS.DOS_2021_ADJ	0.00	USER TABLE	USERSPACE1	1	2.8M	0.000000000000	2.8M	0.0	0.0	0	0	0			
		BPAAS.DOS_2021_CLAIMS_23	0.00	USER TABLE	USERSPACE1	1	21.1M	0.000000000000	21.1M	0.0	0.0	0	0	0			
		BPAAS.DOS_2022_ADJ	0.00	USER TABLE	USERSPACE1	1	6.1M	0.000000000000	6.1M	0.0	0.0	0	0	0			
		BPAAS.DOS_2022_CLM_23	0.00	USER TABLE	USERSPACE1	1	39.0M	0.000000000000	39.0M	0.0	0.0	0	0	0			
		BPAAS.DOS_2022_NOT_SUB	0.00	USER TABLE	USERSPACE1	1	22.8M	0.000000000000	22.8M	0.0	0.0	0	0	0			
		BPAAS.DOS_22_23_CLAIMS_23	0.00	USER TABLE	USERSPACE1	1	28.6M	0.000000000000	28.6M	0.0	0.0	0	0	0			
		BPAAS.ENC_AUD_2021	0.00	USER TABLE	USERSPACE1	1	17.4M	0.000000000000	17.4M	0.0	0.0	0	0	0			
		BPAAS.ENC_BY_RUN_ID	0.00	USER TABLE	USERSPACE1	1	16.0K	0.000000000000	16.0K	0.0	0.0	0	0	0			
		BPAAS.ENC_CLM REPLACEMENT UPD	0.00	USER TABLE	USERSPACE1	1	100.0K	0.000000000000	48.0K	0.0	52.0K	0	0	0			
		BPAAS.ENC_COS_PROVSPEC UPD	0.00	USER TABLE	CLIENT1	1	856.0K	0.000000000000	796.0K	0.0	60.0K	0	0	0			
		BPAAS.ENC_DETAIL_COS_44	0.00	USER TABLE	USERSPACE1	1	76.7M	0.000000000000	76.7M	0.0	0.0	0	0	0			
		BPAAS.ENC_Q1Q2 ACCEPT	0.00	USER TABLE	USERSPACE1	1	14.9M	0.000000000000	14.9M	0.0	0.0	0	0	0			
		BPAAS.ENC_RECON MONTHLY	0.00	USER TABLE	USERSPACE1	1	15.2M	0.000000000000	15.2M	0.0	0.0	0	0	0			
		BPAAS.ENC_RECON WEEKLY	0.00	USER TABLE	USERSPACE1	1	3.1M	0.000000000000	3.1M	0.0	0.0	0	0	0			
		BPAAS.ENCOUNTER AGING41	0.00	USER TABLE	USERSPACE1	1	58.4M	0.000000000000	58.4M	0.0	0.0	0	0	0			
		BPAAS.FINAL_2021_0414	0.00	USER TABLE	USERSPACE1	1	23.1M	0.000000000000	23.1M	0.0	0.0	0	0	0			
		BPAAS.FINAL_MARCH_ADJ	0.00	USER TABLE	USERSPACE1	1	1.5M	0.000000000000	1.5M	0.0	0.0	0	0	0			
		BPAAS.IMGNET_IMAGE_STORE	0.00	USER TABLE	CLIENT1	1	16.2M	0.000000000000	16.2M	6.8G	28.0K	0	0	0			
		BPAAS.MAX ACCEP_DT	0.00	USER TABLE	USERSPACE1	1	4.8M	0.000000000000	4.8M	0.0	0.0	0	0	0			
		BPAAS.MISSING_2022	0.00	USER TABLE	USERSPACE1	1	30.1M	0.000000000000	30.1M	0.0	0.0	0	0	0			
		BPAAS.MLTC_ENC_RECON_BY_CLM_STEP1	0.00	USER TABLE	USERSPACE1	1	97.9M	0.000000000000	97.9M	0.0	0.0	0	0	0			
		BPAAS.MONTHLY_CAL	0.00	USER TABLE	USERSPACE1	1	8.0K	0.000000000000	8.0K	0.0	0.0	0	0	0			
		BPAAS.NASC_DK_NUMBERS	0.00	USER TABLE	USERSPACE1	1	88.0K	0.000000000000	88.0K	0.0	0.0	0	0	0			
		BPAAS.NASC_ENC_CLM_ID	0.00	USER_TABLE	CLIENT1	1	76.9M	0.000000000000	76.9M	0.0	0.0	0	0	0			
		ha900hs														dmctop 1.0.4.1 2022-06-21_328	
		Menu: Esc, Export: e, Member number: m, Shortcuts: h, Reset preferences: ~,															
		Use arrow keys for scrolling,															
		Total rows: 1013															

- db2mon
 - Consists of Db2 supplied scripts provided with each Db2 installation on LINUX and Unix
 - Some basic monitoring provided
 - Uses deltas between monitoring intervals to report activities during monitored intervals
 - Additional setup and configuration required for historical reporting capability (longer monitoring interval)
 - Included in the Samples/Perf subdirectory
 - Prior to Db2 version 11.1 available as a download
- Uses lightweight in-memory monitoring interfaces (MON_GET functions)
- Online and Offline mode
 - Default interval of 30 seconds

- Requires that below DB CFG Parameters be enabled
 - MON_ACT_METRICS (at least to BASE, default)
 - MON_REQ_METRICS (at least to BASE, EXTENDED is ideal for db2mon)
 - MON_OBJ_METRICS (at least BASE)
- To install and configure a db2mon.cmd file on Windows refer to the following links
 - <https://jazz.net/wiki/bin/view/Deployment/Db2MustGather>
 - <https://www.ibm.com/docs/en/db2/12.1.0?topic=tuning-collecting-reporting-performance-monitor-data>
- Offline mode produces output in IXF format from start to end of monitoring interval for loading and analysis in another system
 - Offloads any overhead from monitored database

```
=====
DB#THRUP: Throughput metrics at database level
=====

/* IBM_DB2MON */ select min(ts_delta) ts_delta, member, decimal((sum(act_completed_total) / float(min(ts_delta))), 10, 1) as act_per_s, decimal((sum(total_app_commits) / float(min(ts_delta))), 10, 1) as cmt_per_s, decimal((sum(total_app_rollbacks) / float(min(ts_delta))), 10, 1) as rb_per_s, decimal((sum(deadlocks) / float(min(ts_delta))), 10, 1) as ddlck_per_s, decimal((sum(select_sql_stmts) / float(min(ts_delta))), 10, 1) as sel_p_s, decimal((sum(uid_sql_stmts) / float(min(ts_delta))), 10, 1) as uid_p_s, decimal((sum(rows_inserted) / float(min(ts_delta))), 10, 1) as rows_ins_p_s, decimal((sum(rows_updated) / float(min(ts_delta))), 10, 1) as rows_upd_p_s, decimal((sum(rows_returned) / float(min(ts_delta))), 10, 1) as rows_ret_p_s, decimal((sum(rows_modified) / float(min(ts_delta))), 10, 1) as rows_mod_p_s, decimal((sum(pkg_cache_inserts) / float(min(ts_delta))), 10, 1) as pkg_cache_ins_p_s, decimal((sum((pool_data_p_reads + pool_temp_data_p_reads + pool_index_p_reads + pool_temp_index_p_reads + pool_xda_p_reads + pool_temp_xda_p_reads + pool_col_p_reads + pool_temp_col_p_reads)) / float(min(ts_delta))), 10, 1) as p_rd_per_s from mon_get_workload_diff where ts_delta > 0 group by member order by member asc with UR

TS_DELTA    MEMBER ACT_PER_S    CMT_PER_S    RB_PER_S    DDLCK_PER_S    SEL_P_S    UID_P_S    ROWS_INS_P_S ROWS_UPD_P_S ROWS_RET_P_S ROWS_MOD_P_S PKG_CACHE_INS_P_S P_RD_PER_S
-----
          34         0      869.5        57.6         0.4         0.0      868.0        20.6      1713.4         5.2      1000.9      11007.3         4.5      1425.6

1 record(s) selected.

=====
```

dmctop – Waits and Processing Time Database Level

```
=====
DB#TIMEB: Time breakdown at database level (wait + processing)
=====

/* IBM_DB2MON */ select member, integer(sum(total_rqst_time)) as total_rqst_tm, decimal(sum(total_compile_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_compile, decimal(sum(total_section_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_section, decimal(sum(total_section_sort_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_sort, decimal(sum(total_col_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_col, decimal(sum(total_col_synopsis_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_col_synop, decimal(sum(total_commit_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_commit, decimal(sum(total_rollback_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_rba, decimal(sum(total_connect_request_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_conn, decimal(sum(total_routine_user_code_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_rtn_usr_code, decimal(sum(total_backup_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_backup, decimal(sum(total_index_build_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_idx_bld, decimal(sum(total_runstats_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_runstats, decimal(sum(total_reorg_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_reorg, decimal(sum(total_load_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_load from mon_get_workload_diff group by member order by member asc with UR

MEMBER TOTAL_RQST_TM PCT_COMPILE PCT_SECTION PCT_SORT PCT_COL PCT_COL_SYNOP PCT_COMMIT PCT_RBACK PCT_CONN PCT_RTN_USR_CODE PCT_BACKUP PCT_IDX_BLD PCT_RUNSTATS PCT_REORG PCT_LOAD
-----
0 72281 0.10 50.55 1.88 0.00 0.00 0.02 0.00 0.00 41.50 0.00 0.00 0.00 0.00

1 record(s) selected.

=====
DB#WAITT: Wait times at database level
=====

/* IBM_DB2MON */ select w.member, integer(sum(total_rqst_time)) as total_rqst_tm, integer(sum(total_wait_time)) as total_wait_tm, decimal((sum(total_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_rqst_wait, decimal((sum(lob_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lock, decimal((sum(lock_wait_time_global) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_glb_lock, decimal((sum(total_extended_latch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_latch, decimal((sum(log_disk_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lg_dsk, decimal((sum(log_buffer_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lg_buf, decimal((sum(reclaim_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_rcld, decimal((sum(cf_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_cf, decimal((sum(prefetch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_pftch, decimal((sum(diaglog_write_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_diag, decimal((sum(audit_file_write_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_aud_w, decimal((sum(audit_subsystem_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_aud_ss, decimal((sum(evmon_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_evmon, decimal((sum(comm_exit_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_commexit, decimal((sum(lob_prefetch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lob_pftch, decimal((sum(ext_table_rcv_wait_time + ext_table_send_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_extbl, decimal((sum(fed_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_fed, decimal((sum(pool_read_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_pool_r, decimal((sum(direct_read_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_dir_r, decimal((sum(direct_write_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_dir_w, decimal((sum(fcm_rcv_wait_time + fcm_send_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_fcm, decimal((sum(tcpip_send_wait_time + tcpip_rcv_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_tcpip, decimal((sum(ida_send_wait_time + ida_rcv_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_ida from mon_get_workload_diff group by w.member order by w.member asc with UR

MEMBER TOTAL_RQST_TM TOTAL_WAIT_TM PCT_RQST_WAIT PCT_LOCK PCT_GLB_LOCK PCT_LATCH PCT_LG_DSK PCT_LG_BUF PCT_RCLM PCT_CF PCT_PFTCH PCT_DIAG PCT_AUD_W PCT_AUD_SS PCT_EVMON PCT_COMMEXIT PCT_LOB_PFTCH PCT_EXTBL PCT_FED PCT_POOL_R PCT_DIR_R PCT_DIR_W PCT_FCM PCT_TCPIP PCT_IDA
-----
0 72281 599 0.82 0.00 0.00 0.00 0.01 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.48 0.00 0.00 0.00

1 record(s) selected.

=====
DB#PROCT: Processing times at database level
=====

/* IBM_DB2MON */ select member, integer(sum(total_rqst_time)) as total_rqst_tm, integer(sum(total_rqst_time) - sum(total_wait_time)) as total_proc_time, decimal(sum(total_compile_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_comp_proc, decimal(sum(total_section_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_sect_proc, decimal(sum(total_section_sort_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_sect_sort_proc, decimal(sum(total_commit_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_commit, decimal(sum(total_rollback_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_rback, decimal(sum(total_col_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_col_proc, decimal(sum(total_connect_request_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_conn_proc from mon_get_workload_diff group by member order by member asc with UR

MEMBER TOTAL_RQST_TM TOTAL_PROC_TIME PCT_COMP_PROC PCT_SECT_PROC PCT_SECT_SORT_PROC PCT_COMMIT PCT_RBACK PCT_COL_PROC PCT_CONN_PROC
-----
0 72281 71682 0.10 50.06 1.88 0.02 0.00 0.00 0.00

1 record(s) selected.

Standard input
```

```
===== SQL#TOPEXECT: Top SQL statements by execution time =====
```

```
/* IBM_DB2MON */ select member, integer(num_exec_with_metrics) as num_exec, m.coord_stmt_exec_time, decimal(m.coord_stmt_exec_time / double(num_exec_with_metrics), 10, 2) as avg_coord_exec_time, decimal((m.coord_stmt_exec_time / double(total_coord_stmt_exec_time)) * 100, 5, 2) as pct_coord_stmt_exec_time, m.total_act_time, total_cpu_time, total_cpu_time / num_exec_with_metrics as avg_cpu_time, case when total_act_time > 0 then decimal((total_act_wait_time / double(total_act_time)) * 100, 5, 2) else 0 end as pct_wait_time, decimal(total_section_time / double(num_exec_with_metrics), 20, 2) as avg_sect_time, decimal(total_col_time / double(num_exec_with_metrics), 20, 2) as avg_col_time, effective_isolation as iso, replace(replace(cast(substr(stmt_text,1,200) as varchar(200)), chr(10), ' '), chr(13), ' ') as stmt_text from mon_get_pkg_cache_stmt_diff m, (select sum(coord_stmt_exec_time) as total_coord_stmt_exec_time from mon_get_pkg_cache_stmt_diff where coord_stmt_exec_time > 0), (select executable_id, coord_stmt_exec_time from mon_get_pkg_cache_stmt_diff where coord_stmt_exec_time <> 0 order by coord_stmt_exec_time desc fetch first 100 rows only) c where (total_act_time <> 0 or m.coord_stmt_exec_time <> 0) and num_exec_with_metrics <> 0 and c.executable_id = m.executable_id order by c.coord_stmt_exec_time desc, total_act_time desc, member asc with UR
```

MEMBER	NUM_EXEC	COORD_STMT_EXEC_TIME	AVG_COORD_EXEC_TIME	PCT_COORD_STMT_EXEC_TIME	TOTAL_ACT_TIME	TOTAL_CPU_TIME	AVG_CPU_TIME	PCT_WAIT_TIME	AVG_SECT_TIME	AVG_COL_TIME	ISO	STMT_TEXT														
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----														
0	1	449	449.00	8.36	449	115335	115335	0.00	449.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	422	422.00	7.85	422	112623	112623	0.00	422.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	418	418.00	7.78	418	124017	124017	0.00	418.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	159	1.63	4.84	260	13866	87	90.38	1.63																	
	0.00 CS	DECLARE	CSV_INFO	CUSOR	FOR	SELECT	CSV_LN_NUM	,CSV_SVP_CD	,CSV_PRC_ID_QUAL	,CSV_PRC_CD	,CSV_SRV_QTY	,CSV_DGN_1_CD	,CSV_DGN_2_CD	,CSV_DGN_3_CD	,CSV_DGN_4_CD	,CSV_SVT_C										
	D,CSV_REV_CD	,CSDT_DT	,CSDT_TO_DT																							
	0	222	222.00	4.13	222	60624	60624	0.00	222.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	201	201.00	3.74	201	59986	59986	0.00	201.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	192	96.00	3.57	192	928	464	100.00	96.00																	
	0.00 CS	SELECT	*	FROM	hs.CRS_CLM_RESULT	a	WHERE	a.CRS_CLM_ID	=	908449182	AND	a.CRS_TYPE	=	'103'	AND	a.CRS_DEL_TS	IS	NULL	AND	a.CRS_ADD_TS	=	(SELECT	MAX(CRS_ADD_TS)	FROM	hs.
	CRS_CLM_RESULT	WHERE	CRS_CLM_ID	=																						
	0	380	159	0.41	2.96	159	6247	16	94.33	0.41																
	0.00 CS	SELECT	SUM(CSAJ_AMT)	INTO	:H00270	:H00088	FROM	CSAJ_CSV_ADJ	WHERE	CSAJ_CSV_CLM_ID	=	:H00271	AND	CSAJ_CSV_LN_NUM	=	:H00272										
	0	149	149.00	2.77	149	37621	37621	0.00	149.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	147	147.00	2.73	147	37705	37705	0.00	147.00																	
	0.00 CS	SELECT	SOURCE,	CUS_REF_ID,	CUS_NAME,	ALT_REQ_ID,	REQ_ID,	REQ_ID_DESC,	REQ_ADDL_INFO,	REC_DT,	REQ_TS,	REQ_PARENT_TS,	REQ_TO_ID,	PREV_QUEUE_ID												
	REQ_TM,	REQ_USER_I																								
	0	35	4.11	2.68	144	23123	660	0.00	4.11																	
	0.00 CS	SELECT	MAX(PVCR_RULE_VAL_D)	INTO	:H00160	:H00030	FROM	PPT_PRD_PLAN_TIER,	PVCR_PVC_RULE	A,	PVC_PVC_CNTRCT	B,	CSV_CLM_SRV	WHERE	CSV_CLM_ID	=	:H00005									
	AND	PPT_ID	=	CSV_PPT_ID	AND	B.PVC																				
	0	509	136	0.26	2.53	136	9993	19	82.35	0.26																
	0.00 CS	SELECT	CSEV_TYPE	INTO	:H00353	FROM	CSEV_CSV_EV	A	WHERE	CSEV_CSV_CLM_ID	=	:H00350	AND	CSEV_CSV_LN_NUM	=	:H00351	AND	CSEV_DEL_TS	IS	NULL	AND	CSEV_A				

Standard input

```
=====
SQL#TOPWAITW: Top SQL statements by time spent waiting
=====

/* IBM DB2MON */ select member, decimal((total_act_wait_time / double(total_act_time)) * 100, 5, 2) as pct_wait, decimal((log_disk_wait_time / double(total_act_time)) * 100, 5, 2) as pct_lg_
disk, decimal((log_buffer_wait_time / double(total_act_time)) * 100, 5, 2) as pct_lg_buf, decimal((lock_wait_time / double(total_act_time)) * 100, 5, 2) as pct_lock, decimal((lock_wait_time_g
lobal / double(total_act_time)) * 100, 5, 2) as pct_glb_lock, decimal((total_extended_latch_wait_time / double(total_act_time)) * 100, 5, 2) as pct_ltch, decimal((reclaim_wait_time / double(
total_act_time)) * 100, 5, 2) as pct_rclm, decimal((cf_wait_time / double(total_act_time)) * 100, 5, 2) as pct_cf, decimal((prefetch_wait_time / double(total_act_time)) * 100, 5, 2) as pct_p
ftch, decimal((diaglog_write_wait_time / double(total_act_time)) * 100, 5, 2) as pct_diag, decimal((pool_read_time / double(total_act_time)) * 100, 5, 2) as pct_pool_r, decimal((direct_read_
time / double(total_act_time)) * 100, 5, 2) as pct_dir_r, decimal((direct_write_time / double(total_act_time)) * 100, 5, 2) as pct_dir_w, decimal(((fcm_rcv_wait_time+fcm_send_wait_time) / d
ouble(total_act_time)) * 100, 5, 2) as pct_fcm, decimal((audit_file_write_wait_time / double(total_act_time)) * 100, 5, 2) as pct_aud_w, decimal((audit_subsystem_wait_time / double(total_act
_time)) * 100, 5, 2) as pct_aud_ss, decimal((evmon_wait_time / double(total_act_time)) * 100, 5, 2) as pct_evmon, decimal((comm_exit_wait_time / double(total_act_time)) * 100, 5, 2) as pct_c
ommexit, decimal((lob_prefetch_wait_time / double(total_act_time)) * 100, 5, 2) as pct_lob_pftch, decimal(((ext_table_rcv_wait_time + ext_table_send_wait_time) / double(total_act_time)) * 1
00, 5, 2) as pct_extbl, decimal((fed_wait_time / double(total_act_time)) * 100, 5, 2) as pct_fed, decimal(((ida_send_wait_time + ida_rcv_wait_time) / double(total_act_time)) * 100, 5, 2) as
pct_ida, replace(replace(cast(substr(stmt_text,1,200) as varchar(200)), chr(10), ' '), chr(13), ' ') as stmt_text from mon_get_pkg_cache_stmt_diff m, (select executable_id, sum(total_act_wa
it_time) sum_members_total_act_wait_time from mon_get_pkg_cache_stmt_diff group by executable_id order by sum(total_act_wait_time) desc fetch first 100 rows only) c where total_act_wait_time
<> 0 and num_exec_with_metrics <> 0 and c.executable_id = m.executable_id order by sum_members_total_act_wait_time desc, total_act_wait_time desc, member asc with UR

MEMBER PCT_WAIT PCT_LG_DSK PCT_LG_BUF PCT_LOCK PCT_GLB_LOCK PCT_LTCH PCT_RCLM PCT_CF PCT_PFTCH PCT_DIAG PCT_POOL_R PCT_DIR_R PCT_DIR_W PCT_FCM PCT_AUD_W PCT_AUD_SS PCT_EVMON PCT_COMMEKIT PC
T_LOB_PFTCH PCT_EXTBL PCT_FED PCT_IDA STMT_TEXT
-----
-----
0 90.38 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 90.38 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 DECLARE CSV_INFO CURSOR FOR SELECT CSV_LN_NUM ,CSV_SVP_CD ,CSV_PRC_ID_QUAL ,CSV_PRC_CD ,CSV_SRV_QTY ,CSV_DGN_1_CD ,CSV_DGN_2_CD ,CSV_DGN_3_CD ,CSV_DGN_4
CD ,CSV_SVT_CD ,CSV_REV_CD ,CSDT_DT ,CSDT_TO DT
0 100.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 100.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT * FROM hs.CRS_CLM_RESULT a WHERE a.CRS_CLM_ID = 908449182 AND a.CRS_TYPE = '103' AND a.CRS_DEL_TS IS NULL AND a.CRS_ADD_TS = ( SELECT MAX(CRS_AD
D_TS) FROM hs.CRS_CLM_RESULT WHERE CRS_CLM_ID =
0 94.33 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 94.33 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT SUM(CSAJ_AMT) INTO :H00270 :H00088 FROM CSAJ_CSV_ADJ WHERE CSAJ_CSV_CLM_ID = :H00271 AND CSAJ_CSV_LN_NUM = :H00272
0 82.35 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.73 0.00 81.61 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT CSEV_TYPE INTO :H00353 FROM CSEV_CSV_EV A WHERE CSEV_CSV_CLM_ID = :H00350 AND CSEV_CSV_LN_NUM = :H00351 AND CSEV_DEL_TS IS N
ULL AND CSEV_ADD_TS = (SELECT MAX(CSEV_ADD_TS) F
0 86.36 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 86.36 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT CHI_CD, CHI_CD_QUAL INTO :H00173, :H00007 FROM CHI_CLM_HLTH_CD WHERE CHI_CLM_ID = :H00006 AND CHI_SEQ_NUM = :H00266 AND CHI_CD_QUAL
IN ('ABF', 'ABK', 'ASD', 'ATD', 'BF', 'BK', 'SD
0 91.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 91.37 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT CRF_REF_NUM INTO :H00179 FROM CRF_CLM_REF WHERE CRF_CLM_ID = :H00180 AND CRF_REF_QUAL = :H00181
0 88.23 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 88.23 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 SELECT CPV_PRV_ID, CPV_TXC_CD INTO :H00196 , :H00198 :H00088 FROM CPV_CLM_PRV WHERE CPV_CLM_ID = :H00005 AND CPV_ENT_CD = :H00197
0 96.77 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 96.77 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 DECLARE MENU_CSR CURSOR FOR SELECT SMO_TYPE_IND, SMO_AUTH_IND, SMO_SOPT_ID, SMO_ALT_SOPT_ID FROM SMO_SEC_MENU_OPTION A WHERE SMO_SGP_ID = :H00001 AN
D SMO_SMU_ID = :H00002 AND SMO_DEL_TS IS NUL
0 95.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 95.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 UPDATE CGID_CGI_DX_INFO SET CGID_DEL_USER_ID = :H00097 , CGID_DEL_TS = CURRENT_TIMESTAMP WHERE CGID_CLM_ID = :H00098 AND CGID_DEL_TS IS NULL
0 85.71 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 85.71 0.00 0.00 0.00 0.00 0.00 0.00 0.00
```

```
=====
PG#EXECT: Time spent executing by package
=====

/* IBM_DB2MON */ select member, cast(substr(package_name,1,20) as varchar(20)) as package_name, sum(num_exec_with_metrics) as num_stmts_exec, sum(coord_stmt_exec_time) as coord_stmt_exec_time
e from mon_get_pkg_cache_stmt_diff where coord_stmt_exec_time > 0 group by member, package_name order by coord_stmt_exec_time desc fetch first 100 rows only with UR

MEMBER PACKAGE_NAME          NUM_STMTS_EXEC      COORD_STMT_EXEC_TIME
-----
0 -                               530                3142
0 MCSU042A                      11274              1180
0 MCSU022                       9933               376
0 MCSO304                       361               203
0 MCSO306                       354               60
0 MCSO302                       482               49
0 MCSO277                       130               46
0 MCSO458                       89               44
0 MCSO106                       81               41
0 MCSU049B                      145               40
0 MCSO380                       355               34
0 MCSO305                       446               26
0 MCSO276                       23               21
0 MCSO379                       136              20
0 MCSU019O                      39               14
0 MCSO300                       134              11
0 MCSO459                       115              9
0 MCSO307                       3               8
0 MCSU026                      418              8
0 MCSU043                       4               6
0 MCSO480                       50              5
0 MCSU014                       24              5
0 MCSO303                       6               3
0 MCSU050                       38              3
0 MCSU028                       3               3
0 MCSU027                       5               3
0 MCSO272                       4               2
0 MCSU021                       34              2
0 MCSO261                       14              1
0 MCSU039                       2               1
0 MCSU008                       12              1
0 MCSO301                       1               1
0 MCSO289                       1               1

33 record(s) selected.

=====
SQL#TOPWAITT: Wait time breakdown for top SQL statements by execution time
=====
```

```
=====
DB#SORT: Sort metrics at database level
=====

/* IBM_DB2MON */ select member, integer(sum(total_sorts)) total_sorts, integer(sum(sort_overflows)) sort_overflows, sum(total_section_sort_time) tot_sect_sort_tm, sum(total_section_sort_proc_time) tot_sect_sort_proc_tm, sum(sort_shrheap_allocated) sort_shrheap_allocated, integer(sum(total_hash_joins)) total_hsjn, integer(sum(hash_join_overflows)) hsjn_ovfl, integer(sum(post_threshold_hash_joins)) pst_thr_hsjn, integer(sum(post_shrthreshold_hash_joins)) pst_shrthr_hsjn
from mon_get_workload_diff group by member order by member asc with UR

MEMBER TOTAL_SORTS SORT_OVERFLOWS TOT_SECT_SORT_TM      TOT_SECT_SORT_PROC_TM SORT_SHRHEAP_ALLOCATED TOTAL_HSJN  HSJN_OVFL  PST_THR_HSJN PST_SHRTHR_HSJN
-----
0         4             0             1360             1360             285         4           0           0           0

1 record(s) selected.
```

```
=====
DB#SYSRE: Database system resource usage information
=====

/* IBM_DB2MON */ select member, cast(substr(os_name,1,8) as varchar(8)) as os, cast(substr(host_name,1,16) as varchar(16)) host_name, cast(substr(os_version,1,8) as varchar(8)) os_ver, cast(substr(os_release,1,8) as varchar(8)) os_rel, s
mallint(cpu_total) cpu_tot, smallint(cpu_online) cpu_onl, smallint(cpu_configured) cpu_cfg, integer(cpu_speed) cpu_speed, smallint(cpu_hmt_degree) cpu_hmt, integer(memory_total) memory_total, integer(memory_free) memory_free, decimal(cpu
_load_short,6,1) cpu_load_shrt, decimal(cpu_load_medium,6,1) cpu_load_med, decimal(cpu_load_long,6,1) cpu_load_lng, decimal(cpu_usage_total,6,1) cpu_usage_tot, integer(swap_pages_in) swap_pages_in, integer(swap_pages_out) swap_pages_out
from env_get_system_resources_diff order by member with UR

MEMBER OS      HOST_NAME      OS_VER  OS_REL  CPU_TOT CPU_ONL CPU_CFG CPU_SPEED  CPU_HMT MEMORY_TOTAL MEMORY_FREE CPU_LOAD_SHRT CPU_LOAD_MED CPU_LOAD_LNG CPU_USAGE_TOT SWAP_PAGES_IN SWAP_PAGES_OUT
-----
0 AIX      ha900hs      7       2       32      16      32      3100      8       98304     897       2.7       3.3       3.5       32.0       0          0

1 record(s) selected.
```

```
=====
DB#PROCT: Processing times at database level
=====

/* IBM_DB2MON */ select member, integer(sum(total_rqst_time)) as total_rqst_tm, integer(sum(total_rqst_time) - sum(total_wait_time)) as total_proc_time,
ct_comp_proc, decimal(sum(total_section_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_sect_proc, decimal(sum(total_section_sort_proc_time) -
_commit_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_commit, decimal(sum(total_rollback_time) / float(sum(total_rqst_time)) * 100, 5, 2) as
) as pct_col_proc, decimal(sum(total_connect_request_proc_time) / float(sum(total_rqst_time)) * 100, 5, 2) as pct_conn_proc from mon_get_workload_diff

MEMBER TOTAL_RQST_TM TOTAL_PROC_TIME PCT_COMP_PROC PCT_SECT_PROC PCT_SECT_SORT_PROC PCT_COMMIT PCT_RBACK PCT_COL_PROC PCT_CONN_PROC
-----
0 72281 71682 0.10 50.06 1.88 0.02 0.00 0.00 0.00

1 record(s) selected.
```

```
=====
DB#WAIT: Wait times at database level
=====
```

```
/* IBM_DB2MON */ select w.member, integer(sum(total_rqst_time)) as total_rqst_tm, integer(sum(total_wait_time)) as total_wait_tm, decimal((sum(total_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_rqst_wait, decimal((sum(lock_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lock, decimal((sum(lock_wait_time_global) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_glb_lock, decimal((sum(total_extended_latch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_ltch, decimal((sum(log_disk_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lg_dsk, decimal((sum(log_buffer_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lg_buf, decimal((sum(reclaim_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_rclm, decimal((sum(cf_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_cf, decimal((sum(prefetch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_pftch, decimal((sum(diaglog_write_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_diag, decimal((sum(audit_file_write_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_aud_w, decimal((sum(audit_subsystem_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_aud_ss, decimal((sum(evmon_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_evmon, decimal((sum(comm_exit_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_commexit, decimal((sum(lob_prefetch_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_lob_pftch, decimal((sum(ext_table_rcv_wait_time + ext_table_snd_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_extbl, decimal((sum(fed_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_fed, decimal((sum(pool_read_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_pool_r, decimal((sum(direct_read_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_dir_r, decimal((sum(direct_write_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_dir_w, decimal((sum(fcm_rcv_wait_time + fcm_snd_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_fcm, decimal((sum(tcpip_snd_wait_time + tcpip_rcv_wait_time) / float(sum(total_rqst_time))) * 100, 5, 2) as pct_tcpip, decimal((sum(ida_snd_wait_time + ida_rcv_wait_time) / double(sum(total_rqst_time))) * 100, 5, 2) as pct_ida from mon_get_workload_diff w group by w.member order by w.member asc with UR
```

```
MEMBER TOTAL_RQST_TM TOTAL_WAIT_TM PCT_RQST_WAIT PCT_LOCK PCT_GLB_LOCK PCT_LTCH PCT_LG_DSK PCT_LG_BUF PCT_RCLM PCT_CF PCT_PFTCH PCT_DIAG PCT_AUD_W PCT_AUD_SS PCT_EVMON PCT_COMMEXIT PCT_LOB_PFTCH PCT_EXTBL PCT_FED PCT_POOL_R PCT_DIR_R PCT_DIR_W PCT_FCM PCT_TCPIP PCT_IDA
```

```
-----
0 72281 599 0.82 0.00 0.00 0.00 0.01 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.48 0.00 0.00 0.00
```

```
1 record(s) selected.
```

```
=====
BPL#SIZES: Bufferpool sizes
=====

/* IBM_DB2MON */ select member, cast(substr(bp_name,1,20) as varchar(20)) as bp_name, b.pagesize, mgb.bp_cur_buffsz as num_pages, decimal(double(b.pagesize) * mgb.bp_cur_buffsz / 1024 / 1024, 10, 2) as size_mb, automatic from syscat.bufferpools b, mon_get_bufferpool_diff mgb where b.bpname = mgb.bp_name order by member with UR

MEMBER BP_NAME          PAGESIZE    NUM_PAGES          SIZE_MB    AUTOMATIC
-----
0 IBMDEFAULTBP          4096         7921619          30943.82      1
0 LARGEBUFF             32768         1500             46.87         1
0 CONSOLEPOOL           32768         250              7.81          0
0 DB2MONBP              4096         1000             3.90          1

4 record(s) selected.

=====
BPL#HITRA: Bufferpool data and index hit ratios
=====

/* IBM_DB2MON */ select member, cast(substr(bp_name,1,20) as varchar(20)) as bp_name, case when (pool_data_l_reads) > 0 then decimal( ( double(pool_data_lbp_pages_found - pool_async_data_lbp_pages_found ) / (pool_data_l_reads + pool_temp_data_l_reads) ) * 100, 5, 2 ) else 0 end as row_data_lbp_hitratio, case when (pool_col_l_reads) > 0 then decimal( ( double(pool_col_lbp_pages_found - pool_async_col_lbp_pages_found ) / (pool_col_l_reads + pool_temp_col_l_reads) ) * 100, 5, 2 ) else 0 end as col_data_lbp_hitratio, case when (pool_index_l_reads) > 0 then decimal( ( double(pool_index_lbp_pages_found - pool_async_index_lbp_pages_found ) / (pool_index_l_reads + pool_temp_index_l_reads) ) * 100, 5, 2 ) else 0 end as index_lbp_hitratio from mon_get_bufferpool_diff where (pool_data_l_reads + pool_temp_data_l_reads + pool_index_l_reads + pool_temp_index_l_reads + pool_xda_l_reads + pool_temp_xda_l_reads + pool_col_l_reads + pool_temp_col_l_reads) > 0 order by (pool_data_l_reads + pool_temp_data_l_reads + pool_index_l_reads + pool_temp_index_l_reads + pool_xda_l_reads + pool_temp_xda_l_reads + pool_col_l_reads + pool_temp_col_l_reads) desc with UR

MEMBER BP_NAME          ROW_DATA_LBP_HITRATIO COL_DATA_LBP_HITRATIO INDEX_LBP_HITRATIO
-----
0 IBMDEFAULTBP          99.99              0.00              100.00

1 record(s) selected.

=====
BPL#READS: Bufferpool read statistics (overall)
=====

/* IBM_DB2MON */ select member, cast(substr(bp_name,1,20) as varchar(20)) as bp_name, pool_data_l_reads, pool_data_p_reads, pool_index_l_reads, pool_index_p_reads, pool_col_l_reads, pool_col_p_reads, pool_read_time, case when ((pool_data_p_reads + pool_temp_data_p_reads + pool_index_p_reads + pool_temp_index_p_reads + pool_xda_p_reads + pool_temp_xda_p_reads + pool_col_p_reads + pool_temp_col_p_reads)) > 0 then decimal( pool_read_time / double((pool_data_p_reads + pool_temp_data_p_reads + pool_index_p_reads + pool_temp_index_p_reads + pool_xda_p_reads + pool_temp_xda_p_reads + pool_col_p_reads + pool_temp_col_p_reads)), 5, 2 ) else null end as avg_read_time from mon_get_bufferpool_diff where (pool_data_l_reads + pool_temp_data_l_reads + pool_index_l_reads + pool_temp_index_l_reads + pool_xda_l_reads + pool_temp_xda_l_reads + pool_col_l_reads + pool_temp_col_l_reads) > 0 order by (pool_data_l_reads + pool_temp_data_l_reads + pool_index_l_reads + pool_temp_index_l_reads + pool_xda_l_reads + pool_temp_xda_l_reads + pool_col_l_reads + pool_temp_col_l_reads) desc with UR

MEMBER BP_NAME          POOL_DATA_L_READS    POOL_DATA_P_READS    POOL_INDEX_L_READS    POOL_INDEX_P_READS    POOL_COL_L_READS    POOL_COL_P_READS    POOL_READ_TIME    AVG_READ_TIME
-----
0 IBMDEFAULTBP          16617472             2                    15798777              0                     0                     0                     0              0.00

1 record(s) selected.
```

```
SELECT
con.application_handle,
con.application_id,
con.application_name,
con.client_pid,
uow.uow_start_time,
uow.uow_log_space_used
FROM
table(mon_get_connection(cast(null as bigint), -1)) as con,
table(mon_get_unit_of_work(null, -1)) as uow
WHERE
con.application_handle = uow.application_handle and
uow.uow_log_space_used != 0
ORDER BY uow.uow_start_time ;
```

- In my experience suboptimal SQL is the cause of 90% of performance problems
- STMM does a pretty good job of allocating and controlling shared memory resources
 - Bufferpools
 - Other memory areas
- When the DBM, DB CFG, Bufferpools configured correctly, either set to AUTOMATIC or a value, and RUNSTATS, REORGS and REBINDS done on a regular basis, most performance problems are SQL related
- Lock contention, high number of locktimeouts, deadlocks are second most problems seen based on experience
- SQL Tuning would be at least a whole other presentation or more and I will highlight some best practices

- Developers EXPLAIN SQL before it goes into production
- Applications are tested in a test or QA environment prior to move to production
- DBAs assist developers in test or QA as needed in reviewing and monitoring SQL in development
- Developers, architects, data modelers work closely with DBAs in implementation of the logical model, with a key activity of INDEX DESIGN
- Big problem we find is little involvement of DBAs in initial Index Design

- Use the Bonnie Baker method
 - Retrieve only the data required
 - Restrict before you join
 - Create indexes on LOCAL, ORDER BY and JOIN Predicates
 - AND create indexes to support columns most frequently accessed
 - Reports
- Use EXPLAIN
- Use Design Advisor with knowledge of the application and business requirements
 - Preclude creating indexes that only benefit low cost SQL
 - DO create indexes based on recommendations with high cost reduction but with knowledge of how it will or will not impact the workload
 - Run workload instead of individual SQL statements if possible
 - Work with the developers and business process owner to target important SQL

- Use range predicates where possible
- Use Expression based indexing
- Review EXPLAIN sections with highest cost to target for tuning via rewrite or indexing or use of statistical views
- Review EXPLAIN for sorts and temp table usage and determine if index can improve
- Become aware of AI optimization improvements and see if you can take advantage of them

- Drop the old db2detaildeadlock event monitor which is still installed with new Db2 installation
- Use the LOCKING event monitor
 - Should be created and enabled for all production databases and test or dev databases where locking issues are of interest
- Compile the db2evmonfmt Java program and copy stylesheet to path
 - C:\Program Files\IBM\SQLLIB\samples\java\jdbc
 - /home/<instname>/sqllib/samples/java/jdbc
- Run db2evmonfmt with desired options to format the LOCKING event monitor data, Sample command:
 - `java db2evmonfmt -d hsprd -ue LOCKEVENTS -hours 24 -ftext > lockf27.txt`

Attributes	Requester	Owner
-----	-----	-----
Participant No	1	2
Application Handle	021574	022868
Application ID	10.90.6.71.55912.241026043441	10.90.6.70.51802.241026020023
Application Name	db2jcc_application	db2jcc_application
Authentication ID	TQPOSAPP	TQGAMEUSER
Requesting AgentID	37004	45040
Coordinating AgentID	37004	45040
Agent Status	UOW Executing	UOW Executing
Application Action	No action	No action
Lock timeout value	15	0
Lock wait value	4500	0
Workload ID	1	1
Workload Name	SYSDEFAULTUSERWORKLOAD	SYSDEFAULTUSERWORKLOAD

Current Activities of Participant No 1

 Activity ID : 1
 Uow ID : 2
 Package Name : SYSSH200
 Package Schema : NULLID
 Package Version :
 Package Token : SYSLVL01
 Package Sectno : 2
 Reopt value : none
 Incremental Bind : no
 Eff isolation : CS
 Eff degree : 0
 Actual degree : 1
 Eff locktimeout : 15
 Stmt first use : 2024-10-26-00.34.42.010023
 Stmt last use : 2024-10-26-00.34.42.010023

Past Activities of Participant No 1

 Activities not available

Current Activities of Participant No 2

 Activity ID : 8
 Uow ID : 45805
 Package Name : SYSSH100
 Package Schema : NULLID
 Package Version :
 Package Token : SYSLVL01
 Package Sectno : 6
 Reopt value : none
 Incremental Bind : no
 Eff isolation : UR
 Eff degree : 0
 Actual degree : 1
 Eff locktimeout : 15
 Stmt first use : 2024-10-26-00.34.25.901284

- db2pd returns information without acquiring any locks or use of DB2 engine resources
- Since no locks are obtained, data returned by db2pd may not be completely current or accurate
 - Zero use of database engine resources however is a good trade-off
- It is important to become familiar with db2pd as there is much information provided by db2pd that cannot be obtained through snapshot or event monitoring
- db2pd contains many options
- We will cover these new monitoring and problem determination information elements in this presentation

- Command line tool
- Requires one of the following authorization
 - SYSADM authority level.
 - SYSCTRL authority level.
 - SYSMANT authority level.
 - SYSMON authority level.
- No required connection or instance attachment
- For database level information to be retrieved, database must be active
- Standard options are:
 - -c command, read commands from input file
 - -r repeat, num sec count
 - -i interactive
 - -file, specifies output file

- Command: db2pd -db db2mon -trans

Database Partition 0 -- Database DB2MON -- Active -- Up 1 days 04:27:09

Transactions:

Address TID	AppHandl AxRegCnt	[nod-index] GXID	TranHdl	Locks	State	Tflag	Tflag2	Firstlsn	Lastlsn	LogSpace	SpaceReserved
0x027D1000 0x000000009016	599 1	[000-00599] 0	99	0	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	0
0x027D1A80 0	591 0x000000008FF6	[000-00591] 1	100	0	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	
0x027D2500 0	589 0x000000008FFD	[000-00589] 1	101	0	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	
0x027D2F80 0	588 0x000000009012	[000-00588] 1	102	0	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	
0x027D3A00 0x0000000003FA	9 1	[000-00009] 0	103	2	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	0
0x027D4480 0x000000009014	8 1	[000-00008] 0	104	0	READ	0x00000000	0x00000000	0x000000000000	0x000000000000	0	0

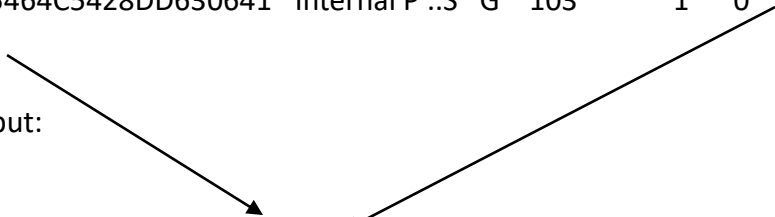
- Command: db2pd -db db2mon -locks

Database Partition 0 -- Database DB2MON -- Active -- Up 1 days 04:44:50

Locks:

Address	TranHdl	Lockname	Type	Mode	Sts	Owner	Dur	HldCnt	Att	ReleaseFlg
0x032DE790	103	4442324143434553BBCB10EC41	Internal P	..S	G	103	1	0	0x0000	0x40000000
0x032DE740	103	53514C4445464C5428DD630641	Internal P	..S	G	103	1	0	0x0000	0x40000000

Snippet from previous -trans output:



0x027D3A00 9 0	[000-00009] 103	2	READ	0x00000000	0x00000000	0x0000000000000000	0x0000000000000000	0	0x00000000003FA 1
0x027D4480 8 0	[000-00008] 104	0	READ	0x00000000	0x00000000	0x0000000000000000	0x0000000000000000	0	0x00000000009014 1

Database Partition 0 -- Database SAMPLE -- Active -- Up 0 days 16:39:33

db2pd -db GTSTST1 -locks -file /tmp/lockc.txt

Locks:

Address	TranHdl	Lockname	Type	Mode	Sts	Owner	Dur	HldCnt	Att	ReleaseFlg
0x0459C510	2	53514C4332453036BD4A32C841	Internal P	..S	G	2	1	0	0x0000	0x40000000
0x0459CA10	3	53514C4332453036BD4A32C841	Internal P	..S	G	3	1	0	0x0000	0x40000000
0x0459CA60	3	010000000100000001007B0056	Internal V	.S	G	3	1	0	0x0000	0x40000000
0x0459C9E8	3	53514C4445464C5428DD630641	Internal P	.S	G	3	1	0	0x0000	0x40000000
0x0459EF90	2	020003002700000000000000052	Row	.X	G	2	1	0	0x0008	0x40000002
0x0459CAB0	3	020003002700000000000000052	Row	.NS	W	2	1	0	0x0000	0x00000001
0x0459C8F8	2	020003000000000000000000054	Table	.IX	G	2	1	0	0x0000	0x40000002
0x0459CA88	3	020003000000000000000000054	Table	.IS	G	3	1	0	0x0000	0x00000001

TranHdl 2 has an X lock on this row

Type of lock

Lock mode

TranHdl 3 is waiting on a lock held by TranHdl 2



Locks:

Address	TranHdl	Lockname	Type	Mode	Sts	Owner	Dur	HldCnt	Att	ReleaseFlg	
0x0459C510	2	53514C4332453036BD4A32C841	Internal	P	..S	G	2	1	0	0x0000 0x40000000	Pkg UniqueID 434c5153
36304532 Name c8324abd Loading = 0											
0x0459CA10	3	53514C4332453036BD4A32C841	Internal	P	..S	G	3	1	0	0x0000 0x40000000	Pkg UniqueID 434c5153
36304532 Name c8324abd Loading = 0											
0x0459CA60	3	010000000100000001007B0056	Internal	V	..S	G	3	1	0	0x0000 0x40000000	Anchor 123 Stmt 1 Env 1
Var 1 Loading 0											
0x0459C9E8	3	53514C4445464C5428DD630641	Internal	P	..S	G	3	1	0	0x0000 0x40000000	Pkg UniqueID 444c5153
544c4645 Name 0663dd28 Loading = 0											
0x0459EF90	2	020003002700000000000000052	Row		..X	G	2	1	0	0x0008 0x40000002	TbpaceID 2 TableID 3
RecordID 0x27											
0x0459CAB0	3	020003002700000000000000052	Row		.NS	W	2	1	0	0x0000 0x00000001	TbpaceID 2 TableID 3
RecordID 0x27											
0x0459C8F8	2	020003000000000000000000054	Table		.IX	G	2	1	0	0x0000 0x40000002	TbpaceID 2 TableID 3
0x0459CA88	3	020003000000000000000000054	Table		.IS	G	3	1	0	0x0000 0x00000001	TbpaceID 2 TableID 3

Database Member 0 -- Database HSPRD -- Active -- Up 5 days 07:59:30 -- Date 2025-09-26-13.43.09.007199

Bufferpools:

First Active Pool ID 1
 Max Bufferpool ID 3
 Max Bufferpool ID on Disk 3
 Num Bufferpools 7

Address	Id	Name	PageSz	PA-NumPgs	BA-NumPgs	BlkSize	NumTbsp	PgsToRemov	CurrentSz	PostAlter	SuspndTSCt	Automatic
0x0A00030031DCF280	1	IBMDEFAULTBP	4096	7921619	0	0	615	0	7921619	7921619	0	True
0x0A00030031DDC320	2	LARGEBUFF	32768	1500	0	0	3	0	1500	1500	0	True
0x0A00030031DE93C0	3	CONSOLEPOOL	32768	250	0	0	1	0	250	250	0	False
0x0A00030031D9B000	4096	IBMSYSTEMBP4K	4096	16	0	0	0	0	16	16	0	False
0x0A00030031DA80A0	4097	IBMSYSTEMBP8K	8192	16	0	0	0	0	16	16	0	False
0x0A00030031DB5140	4098	IBMSYSTEMBP16K	16384	16	0	0	0	0	16	16	0	False
0x0A00030031DC21E0	4099	IBMSYSTEMBP32K	32768	16	0	0	0	0	16	16	0	False

Bufferpool Statistics for all bufferpools (when BUFFERPOOL monitor switch is ON):

BPID	DatLRds	DatPRds	HitRatio	TmpDatLRds	TmpDatPRds	HitRatio	IdxLRds	IdxPRds	HitRatio	TmpIdxLRds	TmpIdxPRds	HitRatio
1	2140278010	52081822	100.00%	713883546	458	100.00%	8406920152	10618689	100.00%	2776	0	100.00%
2	531841	64822	97.63%	118	0	100.00%	194027	18079	92.97%	0	0	00.00%
3	1494	95	93.98%	0	0	00.00%	399	132	66.92%	0	0	00.00%
4096	0	0	00.00%	0	0	00.00%	0	0	00.00%	0	0	00.00%
4097	0	0	00.00%	0	0	00.00%	0	0	00.00%	0	0	00.00%
4098	0	0	00.00%	0	0	00.00%	0	0	00.00%	0	0	00.00%
4099	0	0	00.00%	0	0	00.00%	0	0	00.00%	0	0	00.00%

BPID	DataWrts	IdxWrts	DirRds	DirRdReqs	DirRdTime	DirWrts	DirWrtReqs	DirWrtTime
1	452501	14755261	1907340081	8390719	6557566	1050146	153642	95321
2	1104	11807	9324416	5536	11813	256	4	1
3	0	0	1525760	942	1447	0	0	0
4096	0	0	0	0	0	0	0	0
4097	0	0	0	0	0	0	0	0
4098	0	0	0	0	0	0	0	0
4099	0	0	0	0	0	0	0	0

BPID	AsDatRds	AsDatRdReq	AsIdxRds	AsIdxRdReq	AsRdTime	AsDatWrts	AsIdxWrts	AsWrtTime
1	48508104	7942432	7216142	1088970	4749955	329204	8572346	575079
2	52233	14056	4442	720	10107	967	7426	133
3	5	2	0	0	1	0	0	0

Standard input

```

BPID TotRdTime  TotWrtTime VectIORds  VectIOReq  BlockIORds  BlockIOReq  FilesClose  NoVictAvl  UnRdPFetch
1      6664259    6650392    55724246   9031403    0           0           0           321697     0
2      28416      4153       56675      14776      0           0           0           171        10
3       144       0          5          2          0           0           0           0          0
4096 0           0          0          0          0           0           0           0          0
4097 0           0          0          0          0           0           0           0          0
4098 0           0          0          0          0           0           0           0          0
4099 0           0          0          0          0           0           0           0          0
Standard input

```

TCB Table Stats:

Address	TableName	SchemaNm	Scans	UDI	RTSUDI	PgReorgs	NoChgUpdts	Reads	FscrUpdates	Inserts	Updates	Deletes	OvFlReads	OvFlCrtes
PgDictsCrt	CCLogReads	CCRemoteReqs	CCLockWaits	CCRemRetryLckKws	StoreBytes	BytesSaved								
0x0A00030184568F88	H_UPN_UNIVERSAL_PR_HS	HS	0	0	0	0	0	3	0	0	0	0	0	0
0x0A0003013B9BAA08	IEAR IEA_REMARK	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A000301115AEA08	SYSBOOT	SYSIBM	1	0	0	0	0	1	0	0	0	0	0	0
0x0A00030198D20288	SYSVIEWS	SYSIBM	0	0	0	0	0	130	0	0	0	0	0	0
0x0A00030184565E88	H_ZIP_CODE	HS	0	0	0	0	0	16280	0	0	0	0	0	0
0x0A0003012D479D88	IES_INS_EOI_STATUS	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A00030111482A308	SYSVIEWDEP	SYSIBM	0	0	0	0	0	2394	0	0	0	0	0	0
0x0A0003012D417108	AC_ACCT	HS	3	0	0	0	0	68612	0	0	0	0	0	0
0x0A000301114E2F188	CGID_CGI_DX_INFO	HS	0	68585	68585	0	0	1370350	1014	36510	32379	0	0	0
0x0A000301116ACE08	SYSPLAN	SYSIBM	1	1868	1868	25	1068	17443	92	55	2114	54	2	0
0x0A0003012D467188	CCBP_CUS_CNT_BILL_	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A0003012D418F08	SYSSEQUENCES	SYSIBM	0	0	0	0	0	108	0	0	0	0	0	0
0x0A000301932A3C88	SYSROUTINEAUTH	SYSIBM	0	0	0	0	0	327	0	0	0	0	0	0
0x0A0003012D4D3C88	API_ADDL_PRIV_INFO	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A00030127036388	CSWR_CSV_WIZARD_RE	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A0003013B9AAB08	DIA_DIALOG	HS	0	0	0	0	0	6	0	0	0	0	0	0
0x0A0003011147EA608	SYSROUTINES	SYSIBM	45	0	0	0	0	75326	0	0	0	0	0	0
0x0A0003012D554E08	ATAS_AUTH_SRV_AUD	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A00030114A55008	E999_EMT_999_ERR	HS	0	0	0	0	0	0	0	0	0	0	0	0
0x0A00030114826E08	SYSPLANDEP	SYSIBM	0	68252	68252	1673	0	82247	65687	37509	5586	37309	1880	364
Standard input														

[illegible]

- Standard Registry settings we use in an OLTP Environment

```
(/home/hsprd)> db2set -all
```

```
[i] DB2_CAPTURE_LOCKTIMEOUT=ON
```

```
[i] DB2_USE_ALTERNATE_PAGE_CLEANING=ON
```

```
[i] DB2_EVALUNCOMMITTED=YES
```

```
[i] DB2_SKIPDELETED=YES
```

```
[i] DB2OPTIONS=-t
```

```
[i] DB2DBDFT=hsprd
```

```
[i] DB2COMM=TCPIP,SSL
```

```
[i] DB2_PARALLEL_IO=*
```

```
[i] DB2AUTOSTART=YES
```

```
[g] DB2SYSTEM=ha900hs
```

```
hsprd@[ha900hs]:
```

Recent Client Production Problem

- **STMM=OFF**

Self tuning memory (SELF_TUNING_MEM) = OFF
Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC(400112)

Address	Id	Name	PageSz	PA-NumPgs	BA-NumPgs	BlkSize	NumTbsp	PgsToRemov	CurrentSz
PostAlter	SuspndTSCt	Automatic							
0x0A00020011DB6280	1	IBMDEFAULTBP	4096	256000	0	0	610	0	256000
256000	0	False							

- 600GB Database
- 254 GB of RAM available on the LPAR
- IBMDEFAULTBP set to **256,000 4k pages**
 - **1GB bufferpool for 600 GB database**
 - **Slow claim adjudication reported**
 - Large Medicare Provider/Management Software
- **INSTANCE_MEMORY set to AUTOMATIC**

Global instance memory (% or 4KB) (INSTANCE_MEMORY) = AUTOMATIC(33554432)
Member instance memory (% or 4KB) = GLOBAL

Recent Client Production Problem Summary

- INSTANCE_MEMORY set to AUTOMATIC
- STMM set to OFF
- IBMDEFAULTBP set to 256,000 4k pages
 - Not AUTOMATICALLY MANAGED
- STMM not ON and even if ON couldn't manage the IBMDEFAULTBP
- INSTANCE_MEMORY reserving large amount of memory that can't be used by the database
- 600GB database IO bound due to small bufferpool and inadequate settings
- No database monitoring whatsoever

Client Production Problem Solution

- ✓ Enable STMM for the production database deferred to next restart
- ✓ Alter IBMDEFAULTBP to SIZE AUTOMATIC deferred
- ✓ No change needed at instance level except possible reduction in instance_memory since Websphere and the application run on the LPAR as well
- ✓ Made changes and monitored

- db2diag -g db:= -gi level=severe
- db2diag -g db:= -gi level=warning
- Administration notification log .nfy file

```
base sys utilities  sqlWatchDog Probe:20

ADM0503C  An unexpected internal processing error has occurred. All database
manager processes associated with this instance have been shutdown. Diagnostic
information has been recorded. Contact IBM Support for further assistance.
^^
2024-07-21-05.41.59.071212  Instance:hsprd  Node:000
PID:9961812(db2star2)  TID:1  Appid:none
base sys utilities  DB2StartMain Probe:911

ADM7513W  Database manager has started.
^^
2024-07-21-17.07.09.011375  Instance:hsprd  Node:000
PID:13435332(db2logmgr (HSPRD) 0)  TID:3988  Appid:none
data protection services  sqlpgArchiveLogFile Probe:3109  Database:HSPRD

ADM1844I  Started archive for log file "S0029848.LOG"
^^
```

- ✓ db2mon -- <https://www.idug.org/news/an-introduction-to-db2mon>
- db2mon documentation -- <https://www.ibm.com/docs/en/db2/12.1.0?topic=tuning-collecting-reporting-performance-monitor-data>
- https://public.dhe.ibm.com/ps/products/db2/info/vr115/pdf/en_US/db2_sys_mon_guide_115.pdf
- https://public.dhe.ibm.com/ps/products/db2/info/vr121/pdf/en_US/db2_sys_mon_guide_1212.pdf
- <https://www.ibm.com/docs/en/db2/11.5.x?topic=commands-dsmtop-db2-text-based-monitoring-tool-command>
- https://ibm.github.io/dmctop-wiki/Getting_started/run_dmctop/
- <https://ibm.github.io/dmctop-wiki/>

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Db2 Performance and Tuning

Phil Gunning, IBM Gold Consultant, MBA, CISSP, Gunning Technology
Solutions, LLC

Session Code: C9



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