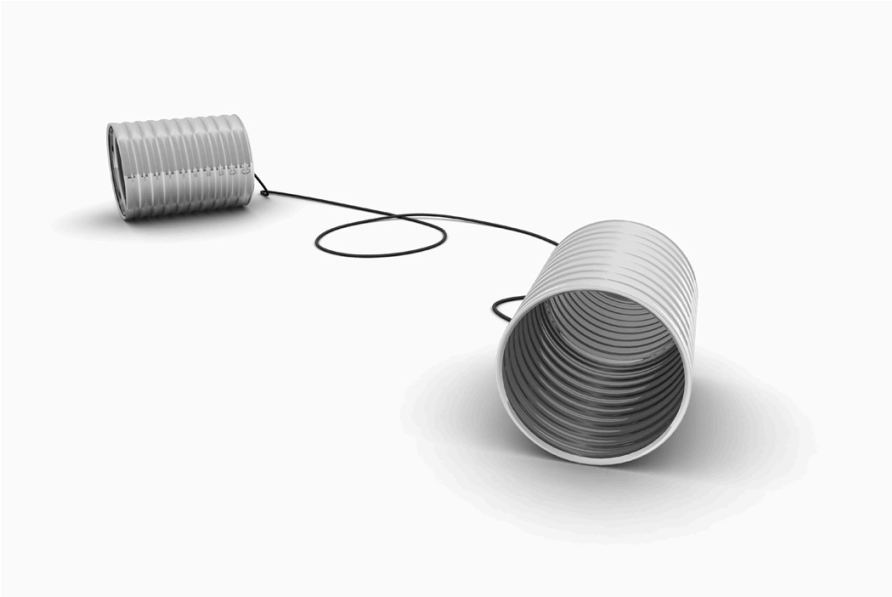
DISTRIBUTED ACCESS TO DB2 10 FOR Z/OS



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Agenda

- DB2 10 enhancements for distributed access
- High Performance DBATs
- DB2 Clients, DB2 Drivers and DB2 Connect levels
- Virtual and Real Storage
- Some Data Sharing considerations
- DB2 Accounting and SMF
- Private Protocol
- Specialty Engines

DB2 10 DDF Enhancements

- High Performance DBATs
- Improved performance by optimized communication between DDF and DBM1
- Support of implicit close for cursors declared WITH HOLD and FETCH FIRST FOR 1 ROWS ONLY
  - Avoids network trips
  - Bundle OPEN/FETCH../CLOSE as one network traffic
- Optimized Special Register and Inactive thread processing
- REOPT(ONCE) CPU reduction
  - Reduced CPU cost of REOPT(ONCE) in distributed access
- UNICODEMGR support
  - Use Unicode for DRDA metadata, avoids EBCDIC ↔ Unicode

Benefits of HP DBAT + RELEASE(DEALLOCATE)

- DB2 10 High Performance DBAT support reduces CPU consumption by:
  - Supporting RELEASE(DEALLOCATE)
  - Avoid repeated package allocation/de-allocation
  - Avoids acquiring and releasing parent (IS, IX) locks frequently
  - More noticeable CPU reduction for short transactions
- Behavior
  - DBAT will stay associated with connection at UOW boundaries if there is at least one RELEASE(DEALLOCATE) package allocated
  - DBAT will be terminated after 200 uses

TIP: **NO** benefit and **NO** support for ACTIVE threads (CMSTATS=ACTIVE)

TIP: No benefit for KEEPDYNAMIC YES

TIP: Could need to increase MAXDBAT

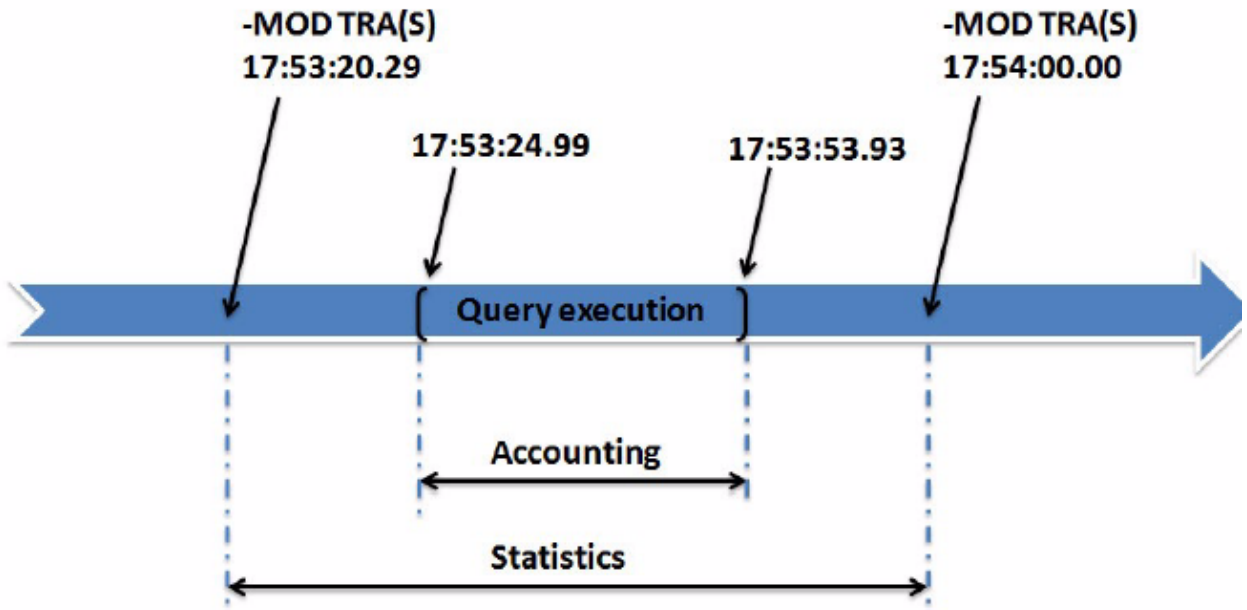
RELEASE(COMMIT) vs RELEASE(DEALLOCATE)

Total CPU per transaction	V9	V10 PKREL(COMMIT)	Delta (%)	V10 PKREL(BNDOPT)	Delta (%)
SQCL	2114	1997	-5.5	1918	-9.3
SPCB	1221	1124	-7.9	1056	-13.5
JDBC	2152	2017	-6.3	1855	-13.8
SQLJ	1999	1761	-11.9	1689	-15.5
SPSJ	1759	1642	-6.7	1550	-11.9
SPNS	1472	1304	-11.4	1180	-19.8

- Total CPU per txn = System Services Address Space + Database Services Address Space + IRLM + DDF Address Space CPU
- CPU time in microseconds
- NOTE: SQCL: SQL ODBC, CLI (Dynamic) - SPCB: Stored Procedures in COBOL (Static) - JDBC: Dynamic SQL – SQLJ: Static SQL – SPSJ: Stored Procedures in SQLJ with Static SQL – SPNS: Stored Procedures in Native SQL Static

Do not forget the DB2 Address Spaces

- A complete benchmark must consider CPU in DB2 AS



- Follow these steps
  - Issue a MODIFY TRACE command to produce a new statistics record before starting your testing
  - As the single user of the DB2 subsystem, perform the tests
  - Issue again a MODIFY TRACE command

Exploiting High Performance DBATs

- To enable:

```
REBIND with RELEASE(DEALLOCATE)
```

```
-MODIFY DDF PKGREL (BNDOPT)
```

```
STC12396  DSNL300I  -DB0A DSNLTMDF MODIFY DDF REPORT FOLLOWS:
          DSNL302I PKGREL IS SET TO BNDOPT
          DSNL301I DSNLTMDF MODIFY DDF REPORT COMPLETE
```

- To disable:

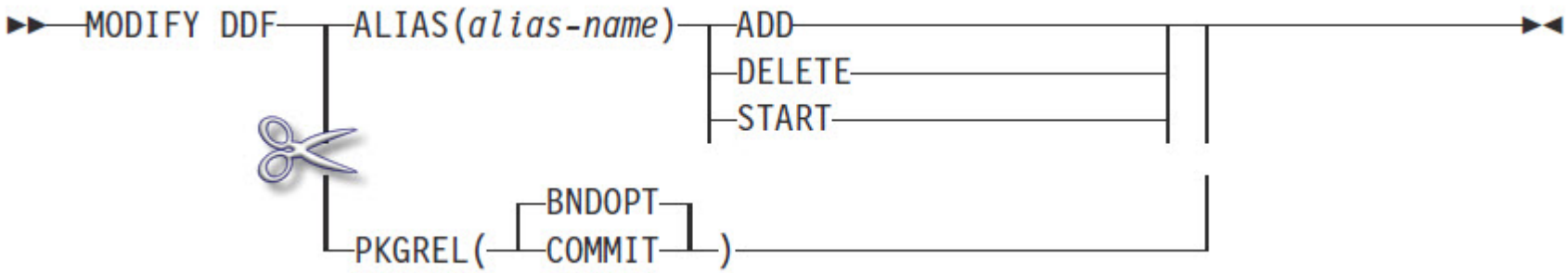
```
-MODIFY DDF PKGREL (COMMIT)  to overlaid BNDOPT option
```

- To monitor:
  - Statistics GLOBAL DDF activity report

```
GLOBAL DDF ACTIVITY          QUANTITY
-------------------------    ---------
CUR ACTIVE DBATS-BND DEALLC      5.39
HWM ACTIVE DBATS-BND DEALLC     10.00
```

DIS DDF DETAIL in DB2 10

```
DSNL080I  -DB0A DSNLTDDF DISPLAY DDF REPORT FOLLOWS:
DSNL081I STATUS=STARTD
DSNL082I LOCATION            LUNAME             GENERICLU
DSNL083I DB0A                USIBMSC.SCPDB0A    -NONE
DSNL084I TCPPORT=12345 SECPORT=12346 RESPORT=12347 IPNAME=-NONE
DSNL085I IPADDR=::10.50.1.1
DSNL086I SQL    DOMAIN=wtsc63.itso.ibm.com
DSNL087I ALIAS               PORT   SECPORT STATUS
DSNL088I ABC                 0      0       STOPD
DSNL088I TEST                0      0       STOPD
DSNL088I TEST2               0      0       STOPD
DSNL090I DT=I  CONDBAT=  10000 MDBAT=  200
DSNL092I ADBAT=     0 QUEDBAT=       0 INADBAT=       0 CONQUED=       0
DSNL093I DSCDBAT=       0 INACONN=       1
DSNL105I CURRENT DDF OPTIONS ARE:
DSNL106I PKGREL = COMMIT
DSNL099I DSNLTDDF DISPLAY DDF REPORT COMPLETE
```



Implement gradually or selectively

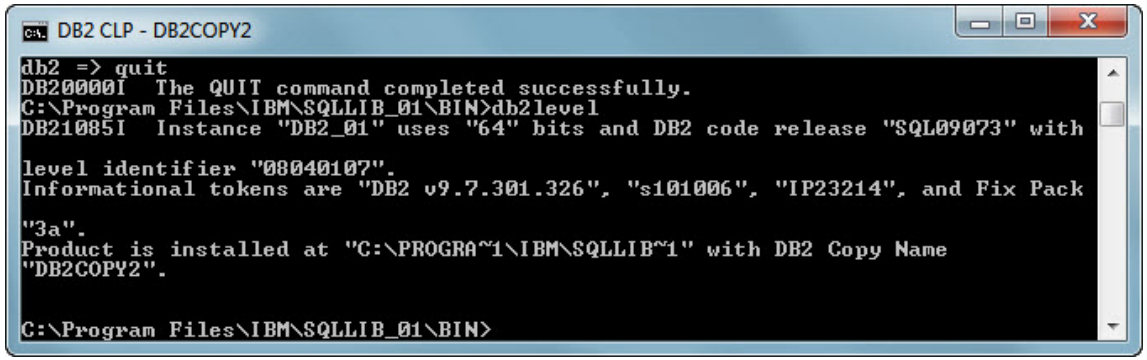
- BIND a new set of packages with RELEASE(DEALLOCATE)
- SYSSHxyy
  - **S**: Represents a small package (65 sections)
  - **H**: Represents WITH HOLD
  - **x**: Indicates the isolation level
    - 1=UR, 2=CS, 3=RS, 4=RR
  - **yy**: The package iteration 00 through FF

```
BIND PACKAGE(DRDADEALLOC)
             QUAL(DB2R1)
             OWNER(DB2R1)
             COPY(NULLID.SYSSH200)
             SQLERROR(NOPACKAGE)
             ISOL(CS)
             REL(D)
             CURRENTD(N)
             ACTION(REPLACE)
             KEEPDYNAMIC(N)
```

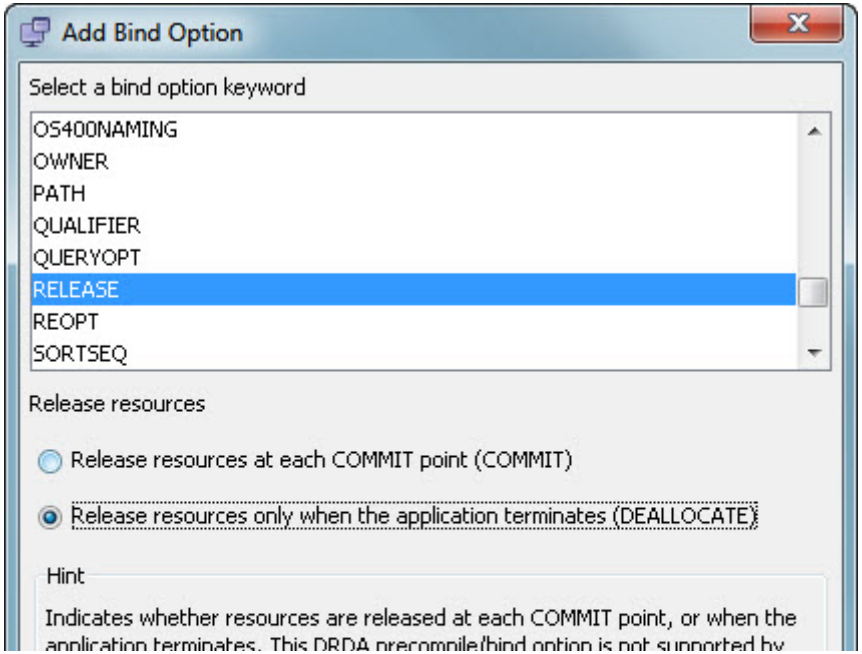
```
                                                    V I V O Quali-    R E D
S  Collection          Name     Owner    Bind Timestamp   D S A P fier     L X R
-- ------------------ -------- -------- --------------- - - - - --------- - - -
   DRDADEALLOC         SYSSH200 DB2R1    2011-02-25-15.01 R S Y Y DB2R1    D N R
   NULLID              SYSSH200 DB2R1    2011-02-22-20.35 R S Y Y DB2R1    C N R
******************************** END OF DB2 DATA ********************************
```

DB2 Clients and DB2 10

- DB2 10 requires DB2 Client 9.7 Fixpack 3a



- RELEASE(DEALLOCATE) → default



JDBC trace example

```
[jcc] BEGIN TRACE_DRIVER_CONFIGURATION
[jcc] Driver: IBM DB2 JDBC Universal Driver Architecture 3.57.82
[jcc] Compatible JRE versions: { 1.4, 1.5, 1.6 } .....
[jcc] Using global properties:
[jcc]   os.name = Windows XP, system
[jcc]   os.arch = x86, system
[jcc] Dumping all system properties: { .....,
[jcc] Dumping all file properties: {  }
[jcc] END TRACE_DRIVER_CONFIGURATION .....
[jcc] BEGIN TRACE_CONNECTS
[jcc] Attempting connection to svr1:3322/DB2PLOC
[jcc] Using properties: { .....
traceLevel=-1,clientRerouteAlternateServerName=null, ..... }
[jcc] END TRACE_CONNECTS
[jcc][t4] [time:2010-05-30-09:51:20.146][thread:WebContainer : 4][tracepoint:315]creating a
socket to svr1 at 10.50.1.30
[jcc] [t4][time:2010-05-30-09:51:20.146][thread:WebContainer : 4][tracepoint:1][Request.flush]
[jcc][t4]        SEND BUFFER: EXCSAT                  (ASCII)           (EBCDIC)
[jcc][t4]        0 1 2 3 4 5 6 7   8 9 A B C D E F   0123456789ABCDEF  0123456789ABCDEF
[jcc][t4] 0000   0098D04100010092  10410048115E8482  ...A.....A.H.^..  .q}....k.....;db
[jcc][t4] 0010   F29183836D819797  93898381A3899695  ....m...........  2jcc_application
.....
```

- DB2 JDBC/JCC Driver Versions
  - www.ibm.com/support/docview.wss?rs=71&uid=swg21363866

DB2 Version 9.7						
DB2 Level	Build Number	JDBC 3.0 driver		JDBC 4.0 driver		APAR List
		Driver version	Size (Bytes)	Driver version	Size (Bytes)	
v9.7 FP0 (GA)	s090521	3.57.82	3146716	4.7.85	3312885	Not Applicable
v9.7 FP1	s091114	3.58.82	3226620	4.8.87	3395609	v9.7 FP1

What is new in V9.7 FP3a

- Cross API
  - Unlimited Edition server based license key (z/OS only)
  - **DB2 for z/OS V10 exploitation**
    - Binary XML
    - Timestamp precision plus timezone
    - Currently committed semantics
    - Extended indicators
    - Explain modes
  - Performance Manager Extended Insight integration
- ODBC / CLI
  - Network statistics API
  - Retrieve last member used on connection
  - Instance based client support with dsdriver.cfg

What is new in V9.7 FP5

- Cross API
  - Schema filter in connection string
  - Passphrase up to 100 characters
  - Command line tool to add entry to dsdriver.cfg
  - Alternate group failover
  - Password in dsdriver.cfg file
- ODBC / CLI
  - ODBC 3.8
- .NET
  - Block for n rows override capability
  - Ability to disable auto-rebind
  - CommandBuilder CompareRowVersion support
  - Array Input (batching extension)
  - MS Trace Integration

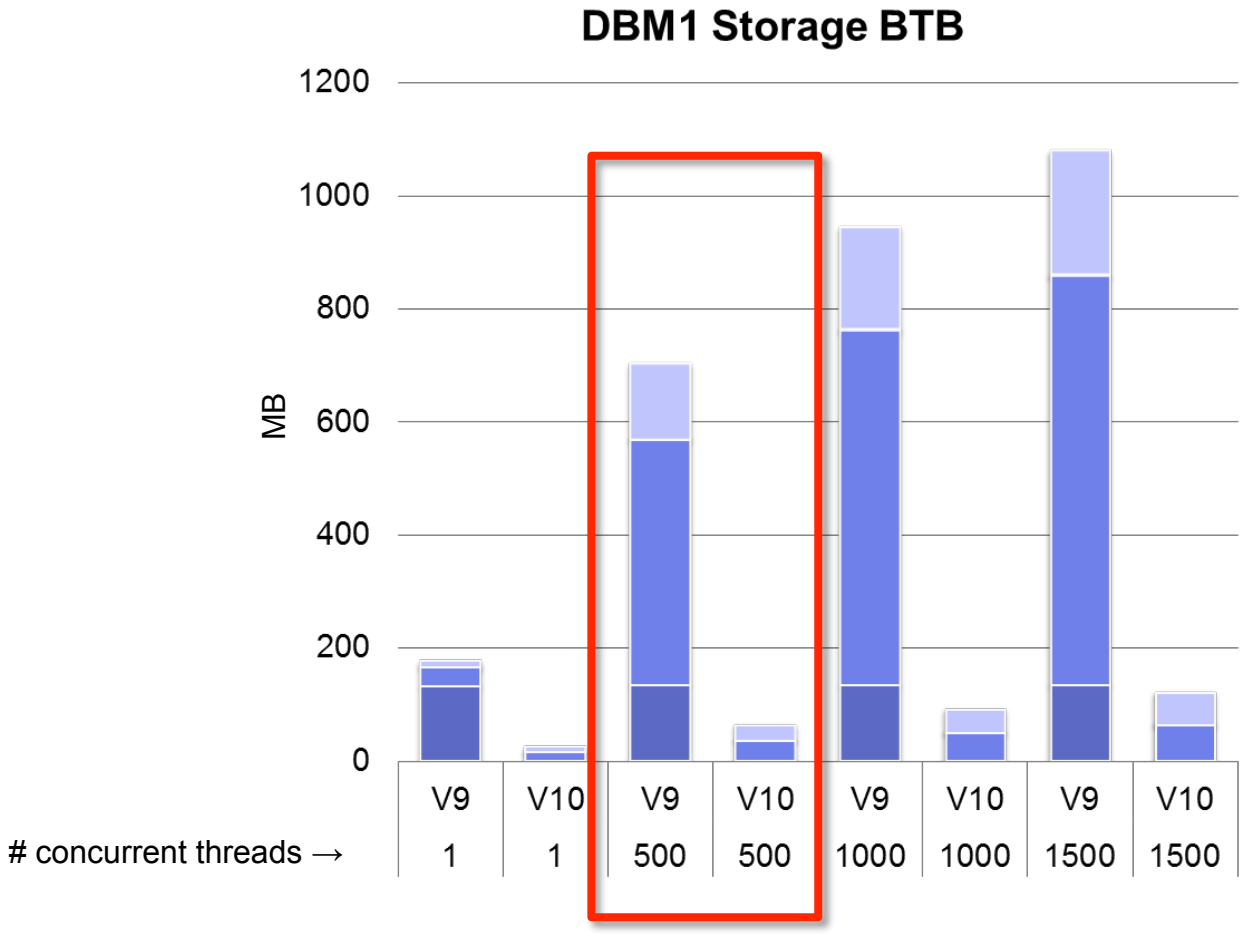
DRDA levels

- Communication will be done using the lowest DRDA level supported by the Clients / Server
- Working with down-level clients?
  - An old client will work but probably with a subset of the DRDA capabilities of the DB2 server
  - Clients and servers are supported independently
- **BUT:** feedback from IBM DDF Level 2 Support area shows:
  - Typical problem: distribution protocol errors or errors with certain DDM code points
  - Special register settings not taking effect after connection reuse
  - Many (sometimes undetermined) problems solved after updating clients

IMPORTANT: Keep clients up to date

Distributed workload: DBM1 Storage Below 2GB

- DBM1: 90% reduction
- Real storage increases between 3% to 12%
- **BUT** should provision from **10% to 30% real storage**



Storage statistics for DIST address space

- DB2 10 restructures IFCID 225 to take into account the DB2 10 memory mapping and 64-bit addressing

DIST AND MVS STORAGE BELOW 2 GB		QUANTITY
TOTAL DIST STORAGE BELOW 2 GB	(MB)	5.57
TOTAL GETMAINED STORAGE	(MB)	0.01
TOTAL VARIABLE STORAGE	(MB)	0.56
NUMBER OF ACTIVE CONNECTIONS		0
NUMBER OF INACTIVE CONNECTIONS		1
TOTAL FIXED STORAGE	(MB)	0.11
TOTAL GETMAINED STACK STORAGE	(MB)	4.89
TOTAL STACK STORAGE IN USE	(MB)	0.77
STORAGE CUSHION	(MB)	315.03
24 BIT LOW PRIVATE	(MB)	0.23
24 BIT HIGH PRIVATE	(MB)	0.25
24 BIT PRIVATE CURRENT HIGH ADDRESS		0000000000042000
31 BIT EXTENDED LOW PRIVATE	(MB)	12.94
31 BIT EXTENDED HIGH PRIVATE	(MB)	17.21
31 BIT PRIVATE CURRENT HIGH ADDRESS		00000000261F0000
EXTENDED REGION SIZE (MAX)	(MB)	1451.00

Storage utilization reporting

- Statistics report

```
DBM1 AND MVS STORAGE BELOW 2 GB                            QUANTITY
-------------------------------------------   ------------------
TOTAL DBM1 STORAGE BELOW 2 GB           (MB)              63.87
 TOTAL GETMAINED STORAGE                (MB)              23.77
   VIRTUAL BUFFER POOLS                 (MB)                N/A
   VIRTUAL POOL CONTROL BLOCKS          (MB)                N/A
   EDM POOL                             (MB)              22.60
   COMPRESSION DICTIONARY               (MB)                N/A
   CASTOUT BUFFERS                      (MB)                N/A
   DATA SPACE LOOKASIDE BUFFER          (MB)                N/A
```

```
DBM1 STORAGE ABOVE 2 GB                  QUANTITY  REAL AND AUXILIARY STORAGE                  QUANTITY
-------------------------------------   ---------  ----------------------------------  ------------------
FIXED STORAGE                     (MB)      7.21   REAL STORAGE IN USE          (MB)             377.90
GETMAINED STORAGE                 (MB)   2342.15   AUXILIARY STORAGE IN USE     (MB)               0.00
  COMPRESSION DICTIONARY          (MB)      0.02
  IN USE EDM DBD POOL             (MB)      0.98
  IN USE EDM STATEMENT POOL       (MB)      8.92
  IN USE EDM RDS POOL             (MB)      0.04
```

TIP: DB2 SHOULD NOT be using Auxiliary Storage (DASD)

TIP: Keep page-in rates near zero

Paging performance impact

- MVS Overhead or MVS Un-captured CPU Time

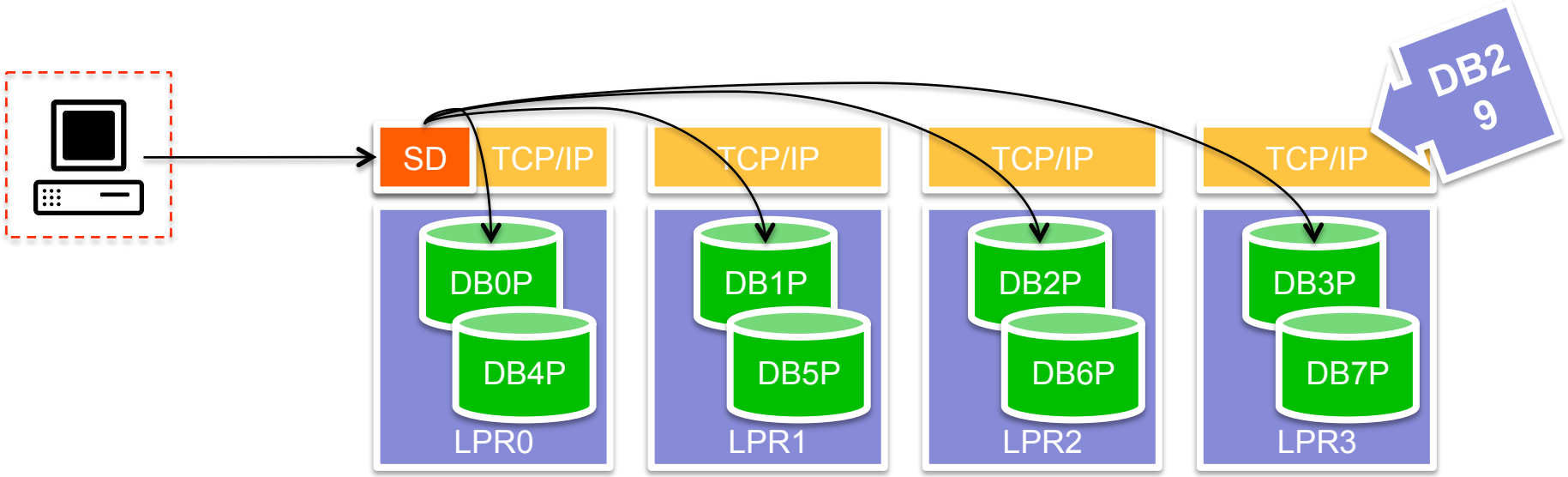
DATE*OF* STARTIME	HOUR*OF* STARTIME	TOTAL* PAGING*RATE (PAGRT)	OVERHEAD*(MVS) CPU TIME	PERCENT WHEN*OVERHEAD WAS*EXECUTING
29JUN2011	10	78.7	0:02:37.26	4.4
29JUN2011	10	102.8	0:02:26.27	4.1
29JUN2011	11	84.8	0:02:32.70	4.2
29JUN2011	11	91.7	0:02:58.84	5.0
29JUN2011	12	36.5	0:01:35.75	2.7
29JUN2011	12	84.1	0:03:02.38	5.1
29JUN2011	13	33.5	0:01:57.57	3.3
29JUN2011	13	22.9	0:01:42.86	2.9
29JUN2011	14	64.8	0:02:13.27	3.7
29JUN2011	14	55.8	0:02:06.62	3.5

- MVS Un-captured CPU Time (CPUOVHTM) in RMFINTRV is calculated by subtracting TYPE72 CPUTM from TYPE70 CPUACTTM
  - *MXG's documentation

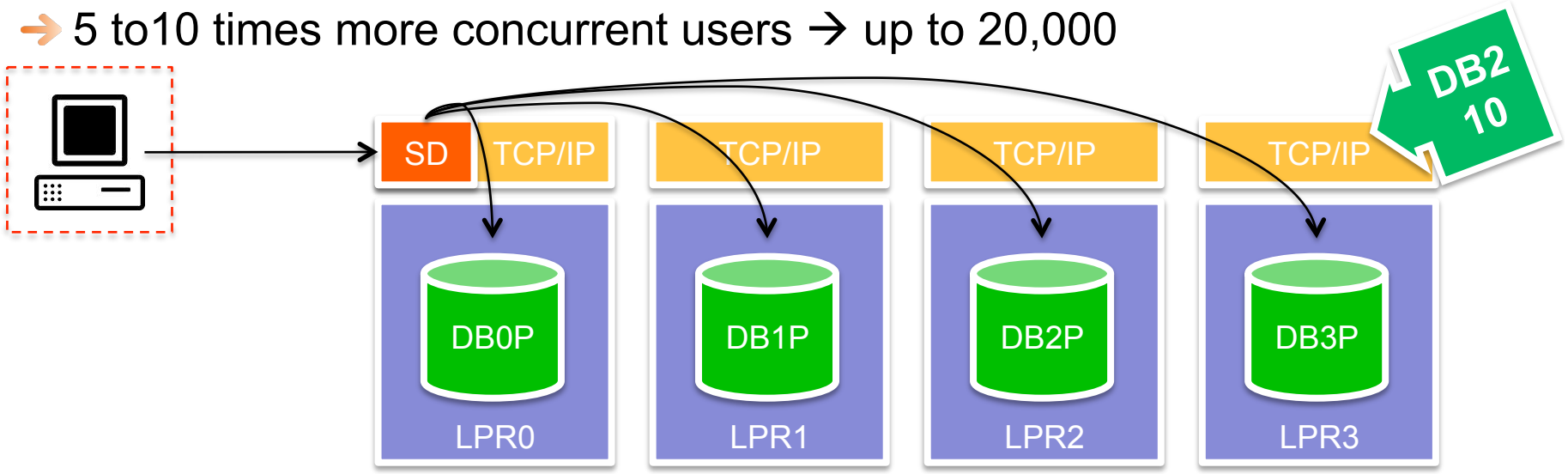
DATE*OF* STARTIME	HOUR*OF* STARTIME	TOTAL* PAGING*RATE (PAGRT)	OVERHEAD*(MVS) CPU TIME	PERCENT WHEN*OVERHEAD WAS*EXECUTING
04AUG2011	10	0.4	0:02:15.04	1.5
04AUG2011	10	0.7	0:02:39.19	1.8
04AUG2011	11	0.1	0:02:38.40	1.8
04AUG2011	11	1.6	0:02:56.22	2.0
04AUG2011	12	0.1	0:01:55.21	1.3
04AUG2011	12	4.1	0:04:11.25	2.8
04AUG2011	13	0.1	0:01:59.57	1.3
04AUG2011	13	0.2	0:01:44.02	1.2
04AUG2011	14	0.2	0:01:52.53	1.3
04AUG2011	14	0.2	0:02:12.09	1.5

Added 2 GB to existing 4 GB of Real Storage

DB2 Subsystem colocation → CONSOLIDATION

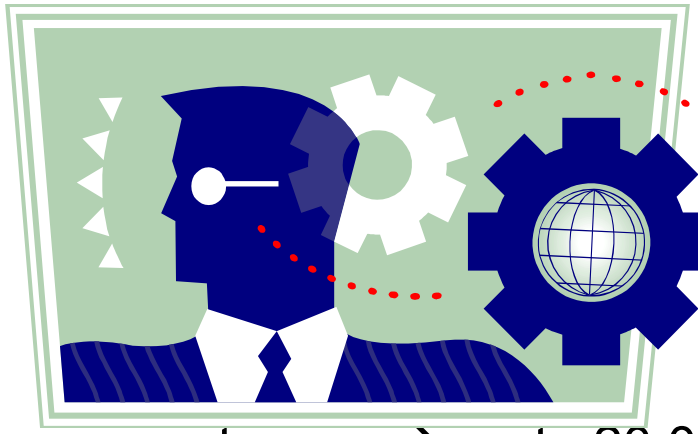


→ 5 to10 times more concurrent users → up to 20,000



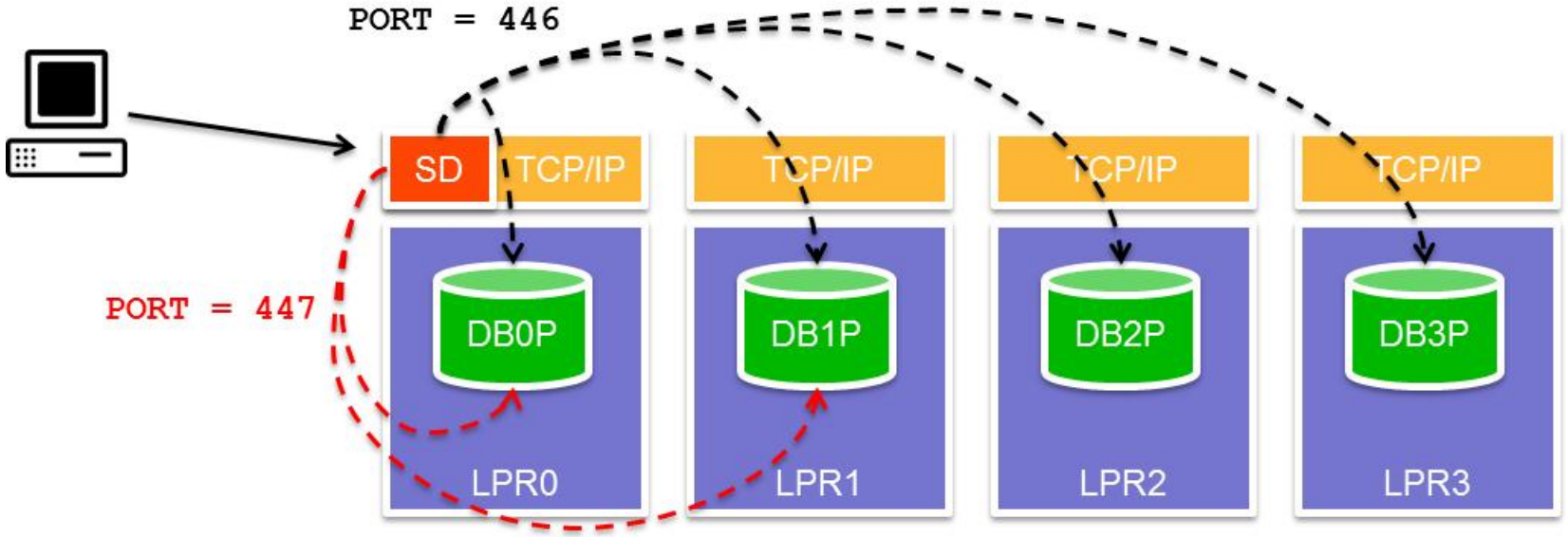
DB2 10 DS member consolidation

- Virtual storage can limit the number of concurrent threads for a single member or subsystem to a few hundred threads
- Virtual storage is the most common constraint



- 5 to10 times more concurrent users → up to 20,000
- Rule of thumb:
  - Save ½% CPU for each member reduced
  - More saving on real storage

Addressing a subset of DS members

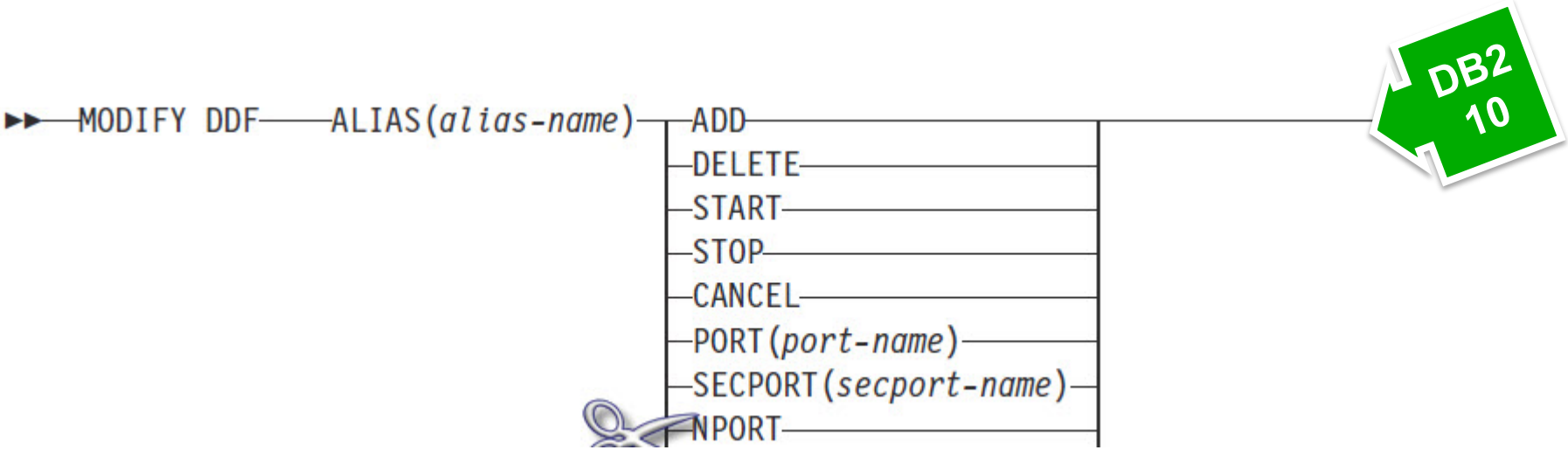



```
//CRISBSDS EXEC PGM=DSNJU003
…
//SYSIN    DD *
  DDF ALIAS=DB2PSUB:447
/*
```

DB2 9

Online DDF location alias name changes

- Before DB2 10: Location alias could not be changed without restarting DB2
- DB2 10 allows modification of distributed location aliases and associated IP addresses without restart of DB2

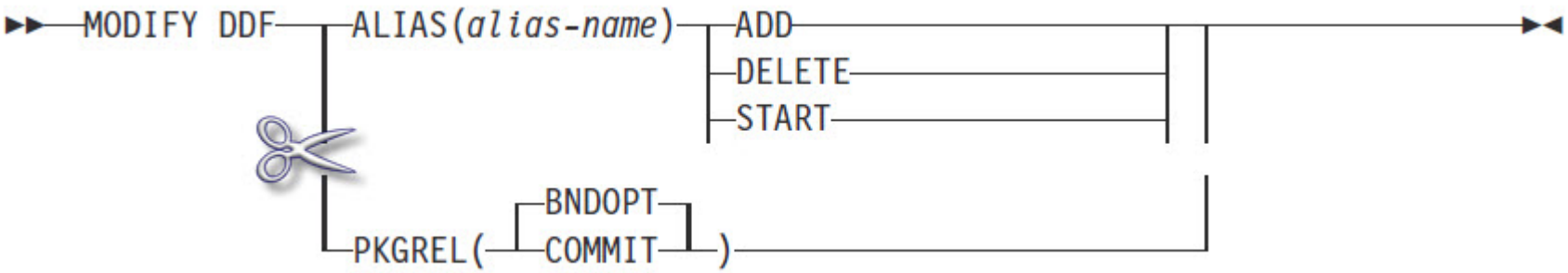


TIP: DB2 10 allows to modify the communication database without restart needed to make changes effective

- Changes are activated at next connection

DIS DDF in DB2 10: ALIAS

```
DSNL080I  -DBAT DSNLTDDF DISPLAY DDF REPORT FOLLOWS:
DSNL081I STATUS=STARTD
DSNL082I LOCATION           LUNAME            GENERICLU
DSNL083I DBATLOC            DBATLU1           -NONE
DSNL084I TCPPORT=12345 SECPORT=12346 RESPORT=12347 IPNAME=-NONE
DSNL085I IPADDR=::10.50.1.1
DSNL086I SQL    DOMAIN=cristian.molaro.be
DSNL087I ALIAS              PORT  SECPORT STATUS
DSNL088I ABC                0     0       STOPD
DSNL088I TEST               0     0       STOPD
DSNL088I TEST2              0     0       STOPD
DSNL090I DT=I  CONDBAT=  10000 MDBAT=  200
DSNL092I ADBAT=      0 QUEDBAT=        0 INADBAT=       0 CONQUED=       0
DSNL093I DSCDBAT=       0 INACONN=       1
DSNL105I CURRENT DDF OPTIONS ARE:
DSNL106I PKGREL = COMMIT
DSNL099I DSNLTDDF DISPLAY DDF REPORT COMPLETE
```



Reducing SMF volume with Accounting Rollup

- zParm ACCUMACC controls whether and when DB2 accounting data is accumulated for DDF and RRSAF threads
  - ACCUMACC=NO, default no effect
  - ACCUMACC = n, n defines the accumulation interval
- zParm ACCUMUID defines the aggregation criteria
  - Value from 0 to 17, ACCUMUID=1 → End user ID
- Can be changed online

IMPORTANT: Rollup of accounting applies only to DDF and RRSAF activity

```
ACCOUNTING ROLLUP              QUANTITY  /SECOND  /THREAD  /COMMIT
-----------------------------  --------  -------  -------  -------
ROLLUP THRESH RECS WRITTEN         0.00     0.00     0.00     0.00
STORAGE THRESH RECS WRITTEN        0.00     0.00     0.00     0.00
STALEN THRESH RECS WRITTEN         0.00     0.00     0.00     0.00
RECS UNQUALIFIED FOR ROLLUP        0.00     0.00     0.00     0.00
```

DB2 10: SMF compression

- Controlled by new system parameter SMFCOMP
  - OFF (default): SMF trace records are not compressed
  - ON: Trace records written to SMF are compressed
- The z/OS compression service CSRCESRV compresses everything after the SMF header
- Data Sharing environment: SMFCOMP has member scope
- Performance measurements
  - Minimal overhead; ~ 1% with accounting class 1, 2, 3, 7, 8, 10
  - The disk savings for DB2 SMF data set can be significant with compression rate of 60% to 80%
- APAR PM27872
  - Decompression routine DSNTSMFD
  - Sample JCL DSNTEJDS

TIP: SMF Compression is preferable to Accounting Rollup

DDF and SMF: Example

- Defaults

```
START DATE-TIME  04/22/2011-14:37:43                          END DATE-TIME  04/22/2011-14:38:24
     RECORD        RECORDS          PERCENT      AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
       TYPE           READ        OF TOTAL           LENGTH        LENGTH        LENGTH        WRITTEN
        100              4           .11 %         2,043.00           322         4,634              4
        101          3,567         99.30 %         1,982.06         1,030         3,034          3,567
        102              2           .06 %         2,206.00         1,450         2,962              2
```

- Accounting rollup

```
START DATE-TIME  04/22/2011-16:00:58                          END DATE-TIME  04/22/2011-16:05:00
     RECORD        RECORDS          PERCENT      AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
     RECORD        RECORDS          PERCENT      AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
        100             20           .56 %         2,043.00           322         4,634             20
        101          3,535         98.55 %         2,013.47           810         3,222          3,535
        102             10           .28 %         2,186.00         1,410         2,962             10
```

- SMFCOMP = ON

```
START DATE-TIME  04/22/2011-15:18:22                          END DATE-TIME  04/22/2011-15:20:02
     RECORD        RECORDS          PERCENT      AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
       TYPE           READ        OF TOTAL           LENGTH        LENGTH        LENGTH        WRITTEN
        100              8           .06 %           654.87           292         1,016              8
        101         12,564         99.79 %           537.99           441           678         12,564
        102              4           .03 %         1,514.25         1,410         1,619              4
```

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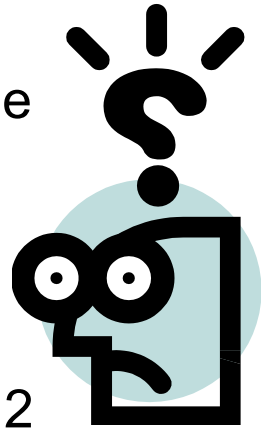
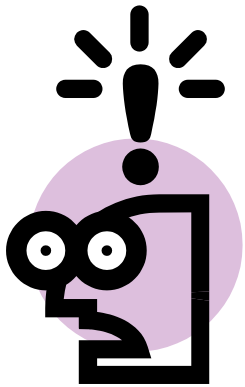
Local JDBC and ODBC Application Performance

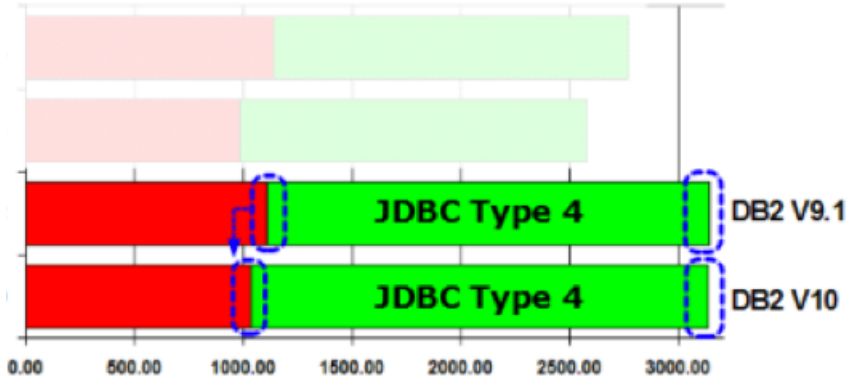
- Local Java and ODBC applications did not always perform faster compared to the same application called remotely
  - DDF optimized processing with DBM1 that was not available to local ODBC and JDBC application.
  - zIIP offload significantly reduced chargeable CP consumption
- Extend support of DDF optimization in DBM1 to local JCC type 2 and ODBC z/OS driver
  - Limited block fetch
  - LOB progressive streaming
  - Implicit CLOSE
- Expect significant performance improvement for apps. with:
  - Queries that return more than 1 row
  - Queries that return LOBs

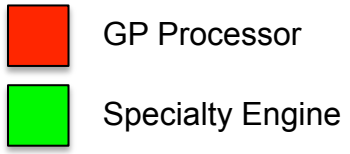




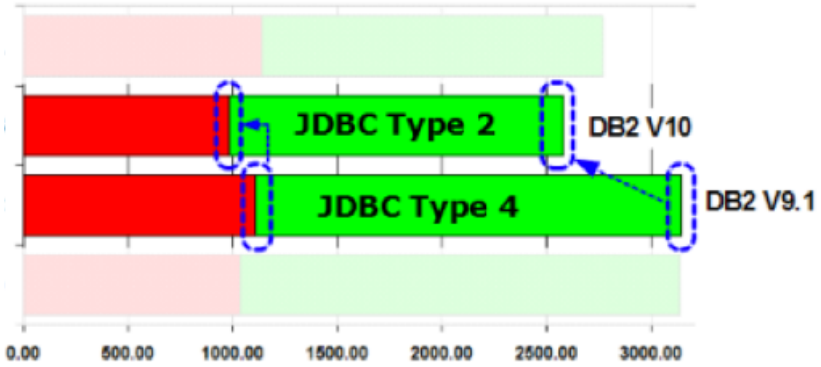
Colocation WAS & DB2: T2 vs T4 driver

- JDBC Type 4, DB2 V9.1 vs. DB2 V10





- JDBC Type 4 DB2 V9.1 vs. Type 2 DB2 V10



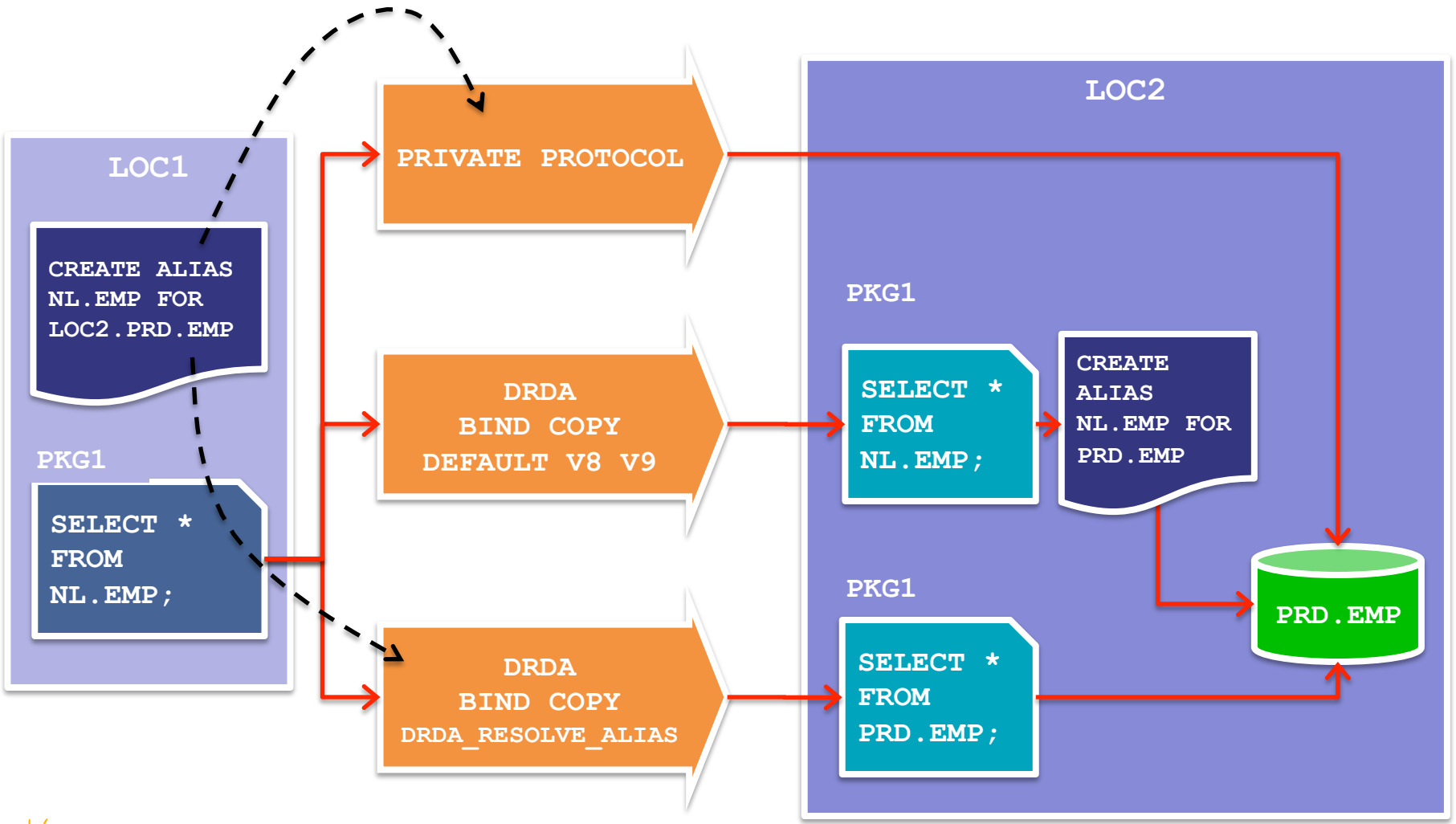
DB2 10 and Type 2 is the best option:
- CPU
- Co-location benefits

TIP: More details in “The Value of Co-Location” WP101476 and WP101476-2

DB2 PP DOES NOT WORK in DB2 10!

- You **MUST** convert plans and packages from PP to DRDA protocol, if any, before migrating to V10 from V8 or V9
- See **APAR PK64045: PREPARATION FOR ELIMINATION OF PRIVATE PROTOCOL IN DB2 10 FOR Z/OS**
- It has an impact on existing BIND/REBIND processes
- Activate zParm DRDA_RESOLVE_ALIAS in DB2 V8 and DB2 9

Alias resolution processing



APAR PK64045: PREPARATION FOR ELIMINATION OF PRIVATE PROTOCOL IN DB2 10 FOR Z/OS

Controlling the use of PP

- It could be good to de-activate PP before migrating to V10
  - After all packages and plans are migrated to DRDA, it would be nice to avoid **ANY** future introduction of PP
  - To configure a subsystem to evaluate the effects of private protocol capabilities being no longer available
- **PK92339: NEW PRIVATE_PROTOCOL SUBSYSTEM PARAMETER (V8 & V9)**
  - PP capabilities can be enabled or disabled in a subsystem
- **PRIVATE_PROTOCOL=NO**
  - Reject any inbound private protocol requests
  - Fail any outbound private protocol request
  - Fail any BIND or REBIND with DBPROTOCOL(PRIVATE)
  - AUTOBIND will leave plans or packages invalid if previously bound with DBPROTOCOL(PRIVATE)

Important to know about PP → DRDA

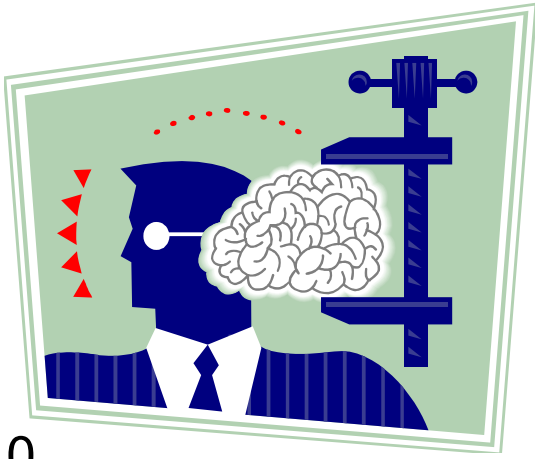
TIP: Keep up to date and informed on PP to DRDA related maintenance

- **PM17665:** CHANGE AUTHORIZATION CHECKS AT SERVER FOR DB2/Z WHEN PRIVATE PROTOCOL IS DISABLED
  - PP security rules are different than DRDA security rules
  - Execute privilege is required on remote pkgs under DRDA
  - PP security inheritance is not longer supported
  - DB2 for z/OS server authorization processing has been changed to behave consistently with non DB2 for z clients

WARNING: After applying this APAR, access from remote DB2 for z/OS client applications **MAY** now fail with SQLCODE -551

- **PM37300:** CHANGE AUTHORIZATION CHECKS TO RECOGNIZE SECONDARY IDS AT SERVER FOR DB2/Z WHEN PRIVATE PROTOCOL IS DISABLED
  - PRIVATE_PROTOCOL=AUTH

More DB2 10 and zIIP



- Parsing process of XML Schema validation
  - 100% of new validation parser is eligible
  - Offload to zIIP, zAAP, or zAAP on zIIP
  - Retro fit into DB2 9 via PK90032 and PK90040
- zIIP eligibility for DRDA workloads increased from 53% to 60%
  - Extended to DB2 V8 and DB2 9 via **PM12256: DRDA PERFORMANCE IMPROVEMENT USING TCP/IP**
  - Recommended: PM28626: CORRECTION OF DRDA USING TCP/IP EXECUTION VARIATION AND HANDLING OF ENCLAVE CONTROL STRUCTURE ANOMALIES

SYSTEM	CPUZIPTM	CPUTM	zIIP Ratio	SERVICE U	SU / TXN
PR01	75.21	46.64	61.72%	21761495	192579.60
PR02	65.12	54.39	54.49%	21904159	199128.72

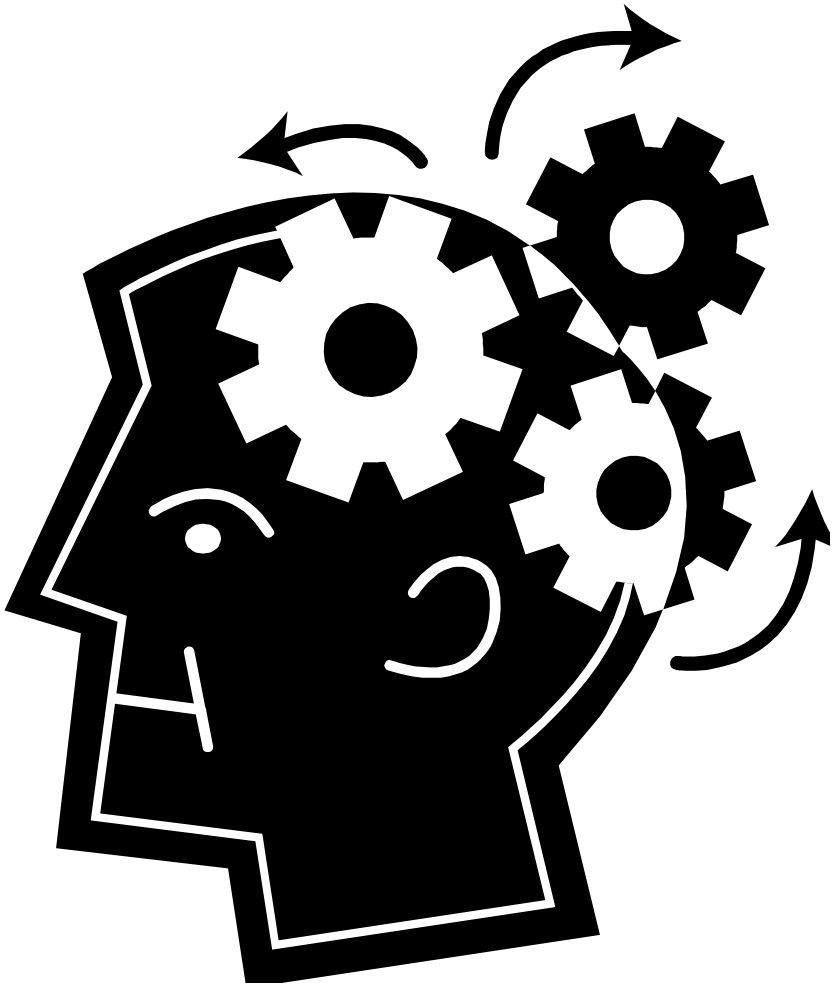
SPUFI and zIIP?

- DB2 for z/OS as a requester can be zIIP eligible
  - SPUFI reading DB2 LUW tables:

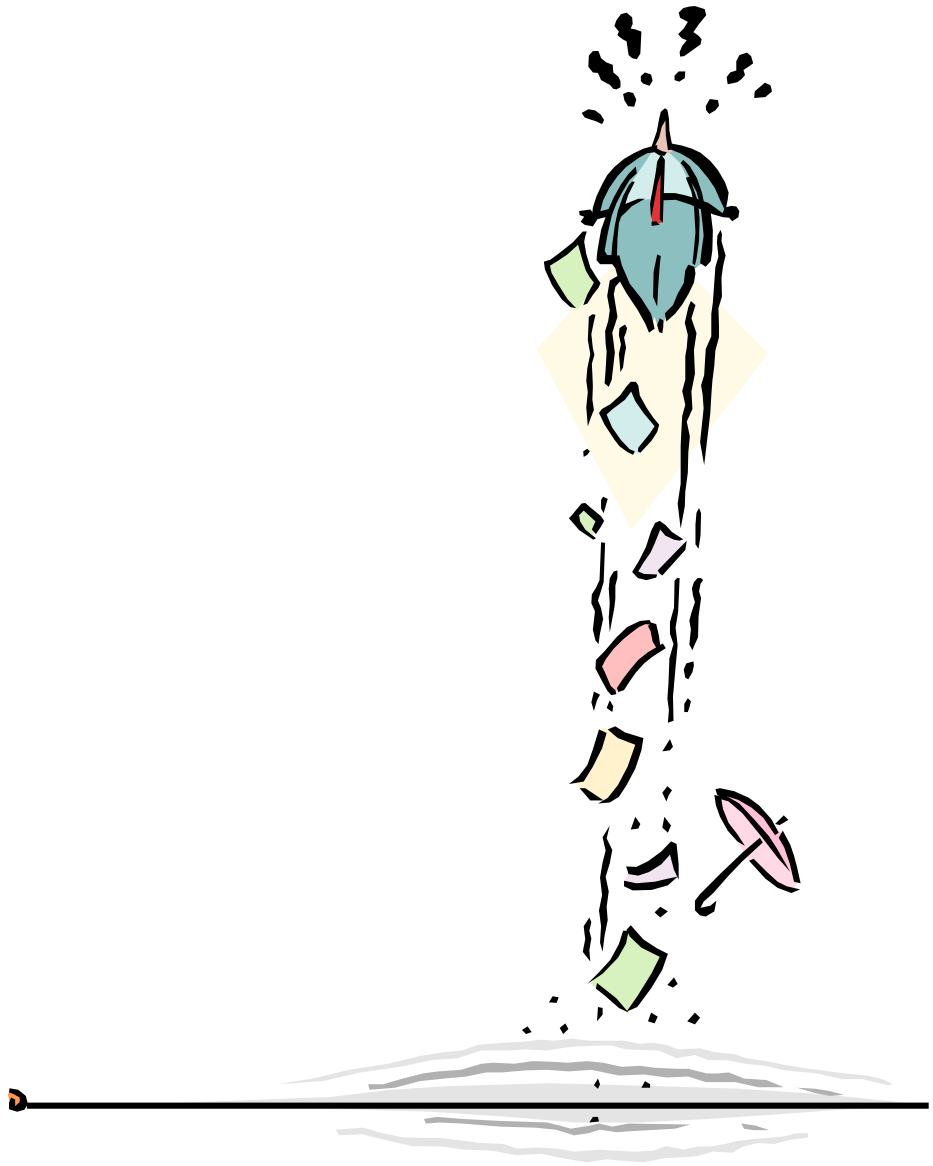
```
BMC SOFTWARE -------------  SUMMARY TRACE ENTRY    -----------PERFORMANCE MGM
SERV ==> STRAC             INPUT   10:48:32  INTVL=> 3  LOG=> N  TGT==> DDB2
PARM ==> THRDHIST,SEQ=1037276,AUTHID=CRIS01         ROW 1 OF 123 SCROLL=> CSR
EXPAND:  MON(WKLD), DETAIL, HISTORY
        ACCOUNTING: ENV, ELAPSED, SQLCOUNTS, BPOOL, LOCKS, PRLL, PKG, RTN, DDF


STOP.....20JUL 10.47.47.18 PLAN.............DSNESPCS TYPE.............DBAT
START....20JUL 10.47.47.18 AUTHID............CRIS01 CONNECT.........TSO/DRDA
ELAPSED..........2,682 us ORIG PRIM AUTH.....CRIS01 CORR ID.....CRIS01
TERM.......DDF TYPE2 INACT COMMITS.................1 ROLLBACKS.............0
-------------------------------------------------------------------------------
RUNTIME ANALYSIS   IN DB2     IN APPL.      TOTAL      %IN DB2(=)     TOTAL(*)
---------------    --------   --------   --------     0 ...25...50...75..100%
ELAPSED TIME         572 us   2,109 us   2,682 us     | <                     |
CPU TIME             557 us     117 us     674 us     |                       |
DB2 WAIT TIME        -none-                           |                       |
ZIIP CPU TIME          0 us                 0 us     |                       |
ZIIP-ELIGIBLE CP                            677 us
- - - - - - ACTIVITY - - - - - -      - - - - - KEY INDICATORS  - - - - - - - -
TOTAL SQL.....................3     SQL: SELECT=     0, FETCH=     1
GETPAGES......................5     SQL: DYNAMIC(PREPARE)=     1
SYNC READS (PRLL=00) .........0
PREFETCH PAGES READ...........0
UPDATES/COMMIT...............0.0
```

Summary

- DB2 10 enhancements for distributed access
- High Performance DBATs
- DB2 Clients, DB2 Drivers and DB2 Connect levels
- Virtual and Real Storage
- Some Data Sharing considerations
- DB2 Accounting and SMF
- Private Protocol
- Specialty Engines



THANKS!



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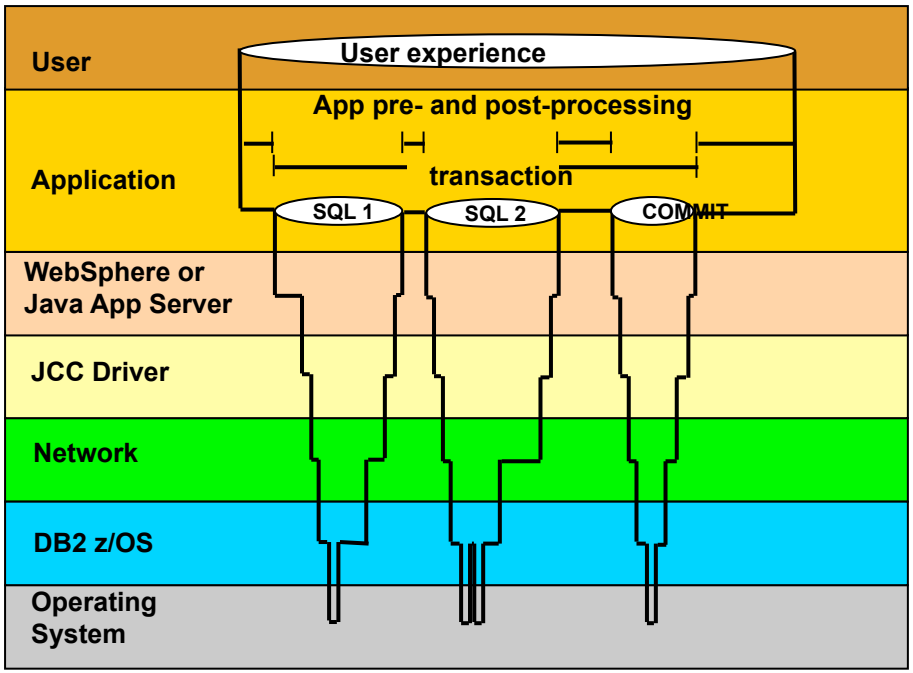
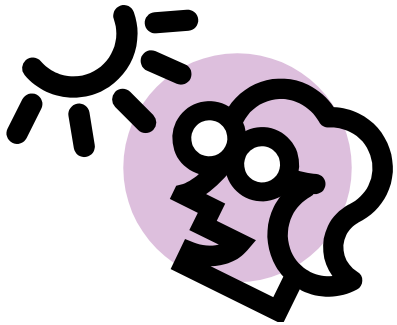
OMEGAMON XE for DB2 Performance Expert 5.1

- Extended Insight
  - Provides DB2 for z/OS end-to-end response time metrics
  - Visibility of all the components of the end-user RT
  - Summary SQL Reporting / Manage thousands of Threads
  - Support new DB2 10 Monitoring Data





OMEGAMON DB2 PE 5.1 Extended Insight