Objectives

- Share lessons learned, surprises, pitfalls

- Provide hints and tips

- Address some myths

- Provide additional planning information

- Information on new enhancements

Agenda

- Quick hits

  – Preparing for the migration

- Migration

  – Overview

  – Plan stability

  – Converged TEMP space

- What to expect?

  – DB2 9 CPU performance

  – DBM1 Virtual Storage relief below the 2GB bar

- More quick hits

  – New Functions

Quick Hits

- No need to fear migration with proper planning and testing
  - Follow step by step approach adopted by other successful customers

- Migrate only from DB2 V8 (NFM) with fallback SPE (PK11129)
  - See DB2 9 migration info APAR (II12423) for list of prereq APARs and PTFs
  - Make sure that the pre-conditioning APAR for Plan Stability (PK52522) is applied on all V8 (NFM) systems

- z/OS 1.8 required for
  - Full RACF support of trusted context and roles
  - Volume-level utilities enhancements

- Minimum required for DB2 Connect: V9.5 FP1, V8.2 FP6, V8.1 FP13

- No plan to allow V7 Precompiler function under DB2 9

Quick Hits …

- Sound maintenance strategy is essential for all customers

  – Recommended to exploit CST/RSU process

  – Apply 2 to 3 preventative service drops annually

  – Exploit Enhanced HOLDDATA to be vigilant on HIPERs and PEs

  – No one-size-fits-all strategy

  – Review installation guide and the material supplied to ensure that RSU only service is installed

  – Can enforce installing RSU only service by adding the SOURCEID (RSU*) option in the supplied APPLY and ACCEPT jobs

  – Note '*' will pull ALL RSUs off of a particular tape

Quick Hits …

- PDSE required for SDSNLOAD and SDSNLOD2
  - PDSE may only be shared by z/OS systems which are part of a sysplex
    - In other cases, a separate copy must be created for each z/OS system
  - See II14067 (z/OS 1.7) or II14255 (z/OS 1.8) for related maintenance
  - See APAR PK59069 for DB2 Precompiler
  - See APARs OA24410, UA35620 for PDSE

- Expand BSDS using V8 stand-alone utility DSNJCNVB
  - Or let DSNTIJUZ run the DSNJCNVB module during migration to DB2 9 (CM)

- Need to configure HVSHARE (64-bit shared private storage) in IEASYSxx parmlib at a minimum of 128GB per DB2 subsystem running on LPAR
  - Even if DDF is not used
  - Use DISPLAY VIRTSTOR,HVSHARE or D VS,HVSHARE to check

Quick Hits …

- Need to reset advisory REORG-pending (AREO*) status on all table spaces and indexes before migrating to DB2 9 (CM)

- Rebind all packages containing SQL LOCK TABLE statements in V9 CM

- Rebind all plans and packages that have not been rebound since DB2 V3

- No need to quiesce data sharing group after entry to DB2 9 (NFM) to switch to Locking Protocol 3

Quick Hits …

- DB2 9 did not eliminate DDF Private Protocol

  – Plan is to eliminate in DB2 9+1 release

  – If do not convert from Private to DRDA protocol, will not be able to migrate to DB2 9+1 release

  – DSNTP2DP (Private to DRDA Protocol Catalog Analysis Tool) introduced with APAR PK27413 to assist the conversion

    • REXX program which looks at the DB2 Catalog

    • Generates CREATE ALIAS statements for remote locations that will probably need 2-part aliases

    • Generates the commands to convert packages and plans which have a remote location dependency (or can be detected to have))

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Quick Hits …

- DB2 9 did not eliminate DDF Private Protocol …

  - There may be packages or plans remaining with DBPROTOCOL(PRIVATE) where there are no SQL statements within the respective package or plan which refer to remote object i.e., remote location dependency cannot be detected

    - For example

      - SQL statements in the Catalog which do not refer to any 3-part name directly

      - Aliases the SQL statements reference which do not

    - Possible reasons

      - Use of dynamic SQL

      - Package bound from a remote requestor/client

    - These packages will have to be rebound with DBPROTOCOL(DRDA) to flip the package/plan from private protocol access to DRDA protocol access

Quick Hits …

- **DDF functionality**

  - See DB2 9 Info APAR II14203 for DDF/DRDA related maintenance

  - If an IP address is specified, it must only be done in one place:

    - Either in the BSDS (via DSNJU003) – New in DB2 9

      - DDF will listen on INADDR_ANY

    - Or, on the PORT statement of TCP/IP profile (via the BIND keyword)

      - DDF will listen on a specific IP address

    - BSDS (INADDR_ANY) & PORT (BINDSPECIFIC) are mutually exclusive

      - Once DDF binds to a specific IP address, it cannot listen on INADDR_ANY

  - SSL support:

    - DDF only supports secure ports when it is listening on the INADDR_ANY

    - If a secure port (SECPORT) is defined in the BSDS, no IP address can be specified on the PORT statement in the TCP/IP profile

Quick Hits …

- **Removed functions and incompatibilities**

  – All stored procedures must be modified to become WLM enabled

  – The legacy JDBC driver will not work

    • In DB2 9, existing WLM environments configured to use the legacy driver will encounter a failure on address space initialization. This will happen in CM as well as NFM.

      – Data sharing groups with V8 in coexistence with DB2 9 (CM) will experience failure if a Java routine is invoked on any DB2 9 members where the WLM-SPAS JCL does not reference the Universal JDBC driver

    • Recommendation: Modify your WLM-SPAS JCL to use the Universal JDBC Driver while still on V8, prior to migration to DB2 9

Quick Hits …

- Removed functions and incompatibilities …
  - Simple table space creation support removed in DB2 9
    - New defaults:
      - Implicitly created TS: Segmented (CM) or UTS - Partition by Growth (NFM)
      - Explicitly created TS: Segmented
    - Aim at converting existing simple table spaces to segmented or UTS or partitioned
  - The DBPROTCL ZPARM is removed
    - The default distributed protocol for BIND will always be DRDA
  - The RELCURHL=NO ZPARM option is removed
    - Incompatibility for applications dependent on retaining page or row locks across commits for a WITH HOLD cursor
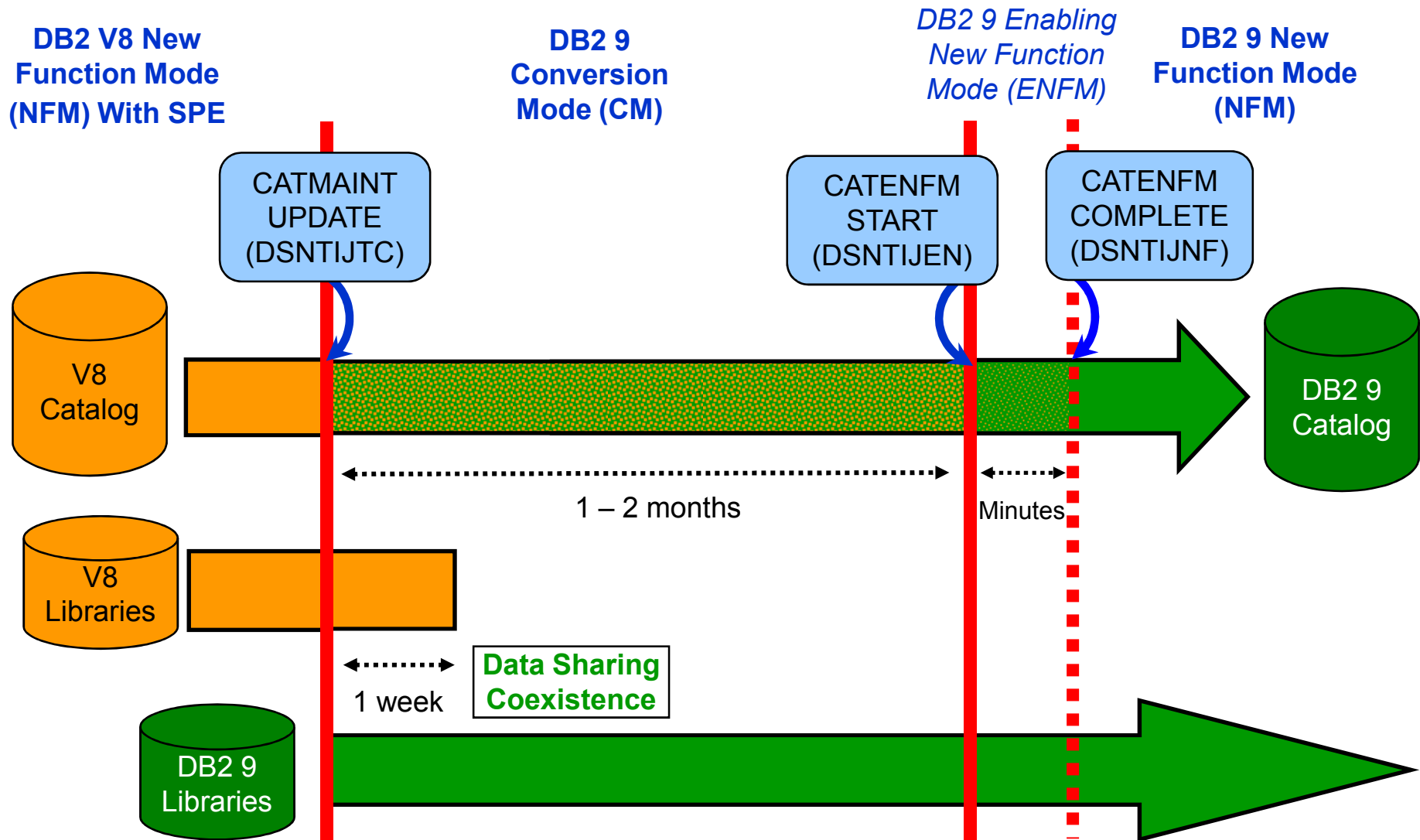
Quick Hits …

- **Deprecated functions**

    - Plans containing DBRMs, ACQUIRE(ALLOCATE)

        - Consider switching to packages

    - Simple table spaces

        - Simple table space creation support removed in DB2 9

- **Changes to defaults**

    - Default setting for MGEXTSZ (secondary extent allocation) is YES

        - Changed by the installation CLIST from NO to YES

    - BIND options: ISOLATION defaults to CS, CURRENDATA defaults to NO

        - Not changed for REBIND, i.e. use the existing value

Migration Overview

DB2 V8 New Function Mode (NFM) With SPE

DB2 9 Conversion Mode (CM)

DB2 9 Enabling New Function Mode (ENFM)

DB2 9 New Function Mode (NFM)

CATMAINT UPDATE (DSNTIJTC)

CATENFM START (DSNTIJEN)

CATENFM COMPLETE (DSNTIJNF)

V8 Catalog

DB2 9 Catalog

1 – 2 months

Minutes

V8 Libraries

Data Sharing Coexistence

1 week

DB2 9 Libraries

Migration and Fallback Paths

- With DB2 9, you can always drop back to the previous stage

- Cannot fallback to V8 after entry to DB2 9 (ENFM), but can fallback to DB2 9 (CM*)

```
┌──────────┐      ┌──────────┐      ┌──────────┐      ┌──────────┐
│ DB2 V8   │ <──> │ DB2 9    │ ──>  │ DB2 9    │ ──>  │ DB2 9    │
│ NFM      │      │ CM       │      │ ENFM     │      │ NFM      │
└──────────┘      └──────────┘      └──────────┘      └──────────┘
```

DB2 9 CM*

From here, you can only return to ENFM

DB2 9 CM*

From here, you can go to NFM or ENFM*

DB2 9 ENFM*

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Plan Stability

- New function of DB2 9 (PK52523)

  - Protects customers against access path regression

  - Allows for a "safe" way to REBIND (fall back)

  - Available even in DB2 9 (CM) as it can benefit migration and fallback

  - Strongly recommended

  - Make sure that the pre-conditioning APAR for Plan Stability (PK52522) is applied on all V8 (NFM) systems

- What is the problem?

  - REBINDs can cause access path changes

  - Most of the time, this improves query performance …

  - … But when it doesn't

    - No easy way to undo the REBIND

    - Can lead to a lot of grief to our customers and to IBM

Plan Stability …

- Existing "solutions" inadequate

Plan Stability …

- At REBIND, save old copies of packages
  - Catalog tables
  - Directory

- Two flavors
  - BASIC and EXTENDED
  - Controlled by new ZPARM PLANMGMT
  - Default is OFF
  - Also supported as REBIND options

- REBIND PACKAGE …
  - PLANMGMT(BASIC)
    - 2 copies: Current and Previous
  - PLANMGMT(EXTENDED)
    - 3 copies: Current, Previous, Original

- Most bind options can be changed at REBIND
  - But a few must be the same …

- REBIND PACKAGE …
  - SWITCH(PREVIOUS)
    - Switch between current & previous
  - SWITCH(ORIGINAL)
    - Switch between current & original

- FREE PACKAGE …
  - PLANMGMTSCOPE(ALL) – Free package completely
  - PLANMGMTSCOPE(INACTIVE) – Free all old copies

- Catalog support
  - SYSPACKAGE reflects active copy
  - SYSPACKDEP reflects dependencies of all copies
  - Other catalogs (SYSPKSYSTEM, …) reflect metadata for all copies

- Invalidation and Auto Bind
  - Each copy invalidated separately
  - Auto bind replaces only the current copy – previous and original are not affected

Plan Stability …

REBIND … PLANMGMT(BASIC)

Incoming copy

Current Copy

move

Previous Copy

delete

REBIND … SWITCH(PREVIOUS)

Current Copy

move

move

Previous Copy
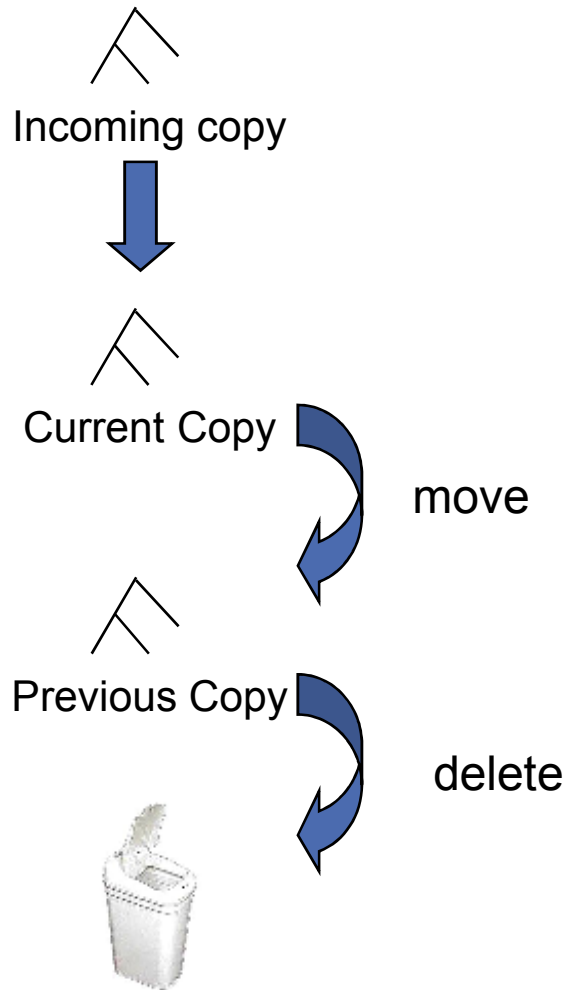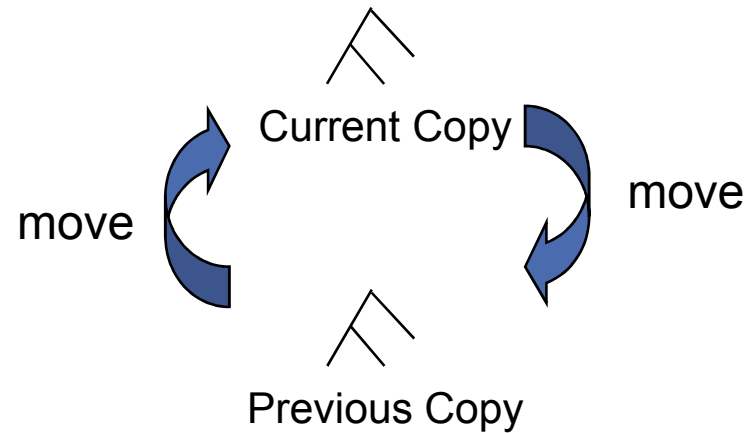
Similar processing for:

• EDM Sections

• SYSPACKDEP dependencies

• SYSPACKAGE record saved in EDM

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Plan Stability …

REBIND … PLANMGMT(EXTENDED)

Incoming copy

↓

Current Copy

clone

move

Original Copy   Previous Copy

delete

REBIND … SWITCH(ORIGINAL)

Original Copy

↓ clone

Current Copy

move

Previous Copy

delete
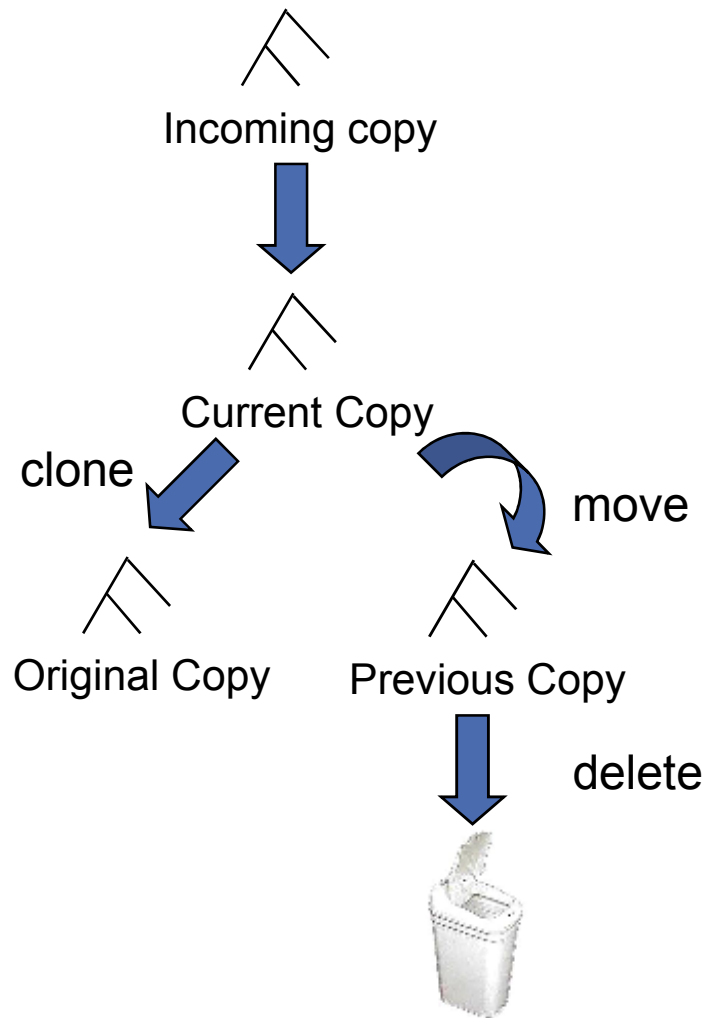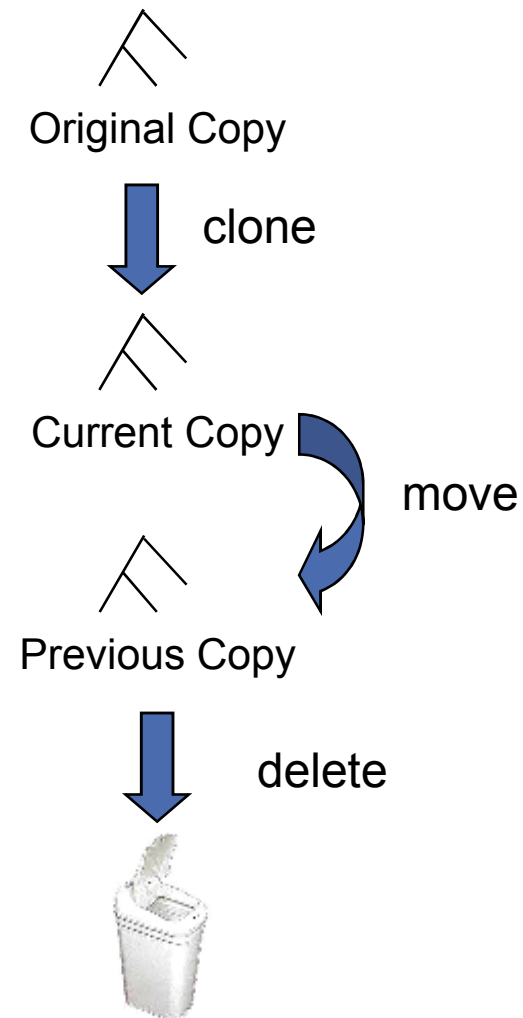
Sample Strategy for Migration using Plan Stability

- **Migration strategy with Plan Stability**

  - Before migrating to DB2 9 (CM), ensure V8 plan table information is available

  - On migration to DB2 9 (CM), set ZPARM PLANMGNT to EXTENDED

    - Objective: Make sure that the V8 version of package is kept as the original in case a fallback to DB2 V8 is required

    - Restriction: EXTENDED means that DB2 always keeps 3 versions of the package (even if they are the same). Watch out for SPT01 growth (limit is still 64GB with DB2 9).

  - Delay rebind on DB2 9 (CM) until running stable

    - Do not rebind on DB2 9 (CM) until RUNSTATS has been run

    - Make sure new ZPARM STATCLUS=ENHANCED (Default)

    - Introduces major change to CLUSTERRATIO calculation in DB2 9 and introduction of new statistic Data Repetition Factor (DRF)

    - Use the IBM RUNSTATS or check with your vendor

Sample Strategy for Migration using Plan Stability ...

- Why REBIND?
  - Re-enable SPROCs
    - Many plans/packages have SPROCs for fast column processing
    - All plans/packages with SPROCs that were bound prior to DB2 9 will be disabled
    - As a result DB2 will build SPROCs dynamically at execution time
    - Typical CPU performance impact in 0 to 10% range
    - Non-zero value for BYPASS COL indicator of problem
    - Performance trace of IFCID 224 identifies plans and packages which need rebinding to re-enable SPROCs
    - Rebind plans/packages under DB2 9 to re-enable SPROC
  - Exploit virtual storage constraint relief for static SQL

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Sample Strategy for Migration using Plan Stability ...

- REBIND in DB2 9 (CM)

  - DB2 now stores 3 versions of the package

  - Initial REBIND

    - Current version = DB2 9 version

    - Previous version = Original version = V8 version

    - If needed because of V9 access path regression, use REBIND PACKAGE … SWITCH(PREVIOUS) to fallback to the V8 version

  - Subsequent REBINDs

    - Current version = "New" DB2 9 version

    - Previous version = Latest DB2 9 version

    - Original version = V8 version

    - Use REBIND PACKAGE … SWITCH(PREVIOUS) to fallback to the previous V9 version

Sample Strategy for Migration using Plan Stability ...

- In case of fallback to DB2 V8, before falling back to V8

    – Use REBIND PACKAGE … SWITCH(ORIGINAL) to fall back to original version of package (V8 version)

- In the future, to establish a new original version e.g to move forward to the version after DB2 9

    – Use FREE PACKAGE … PLANMGMTSCOPE(INACTIVE) to free off the original (will also free off the previous version)

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Objectives

- Share lessons learned, surprises, pitfalls

- Provide hints and tips

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- Provide additional planning information
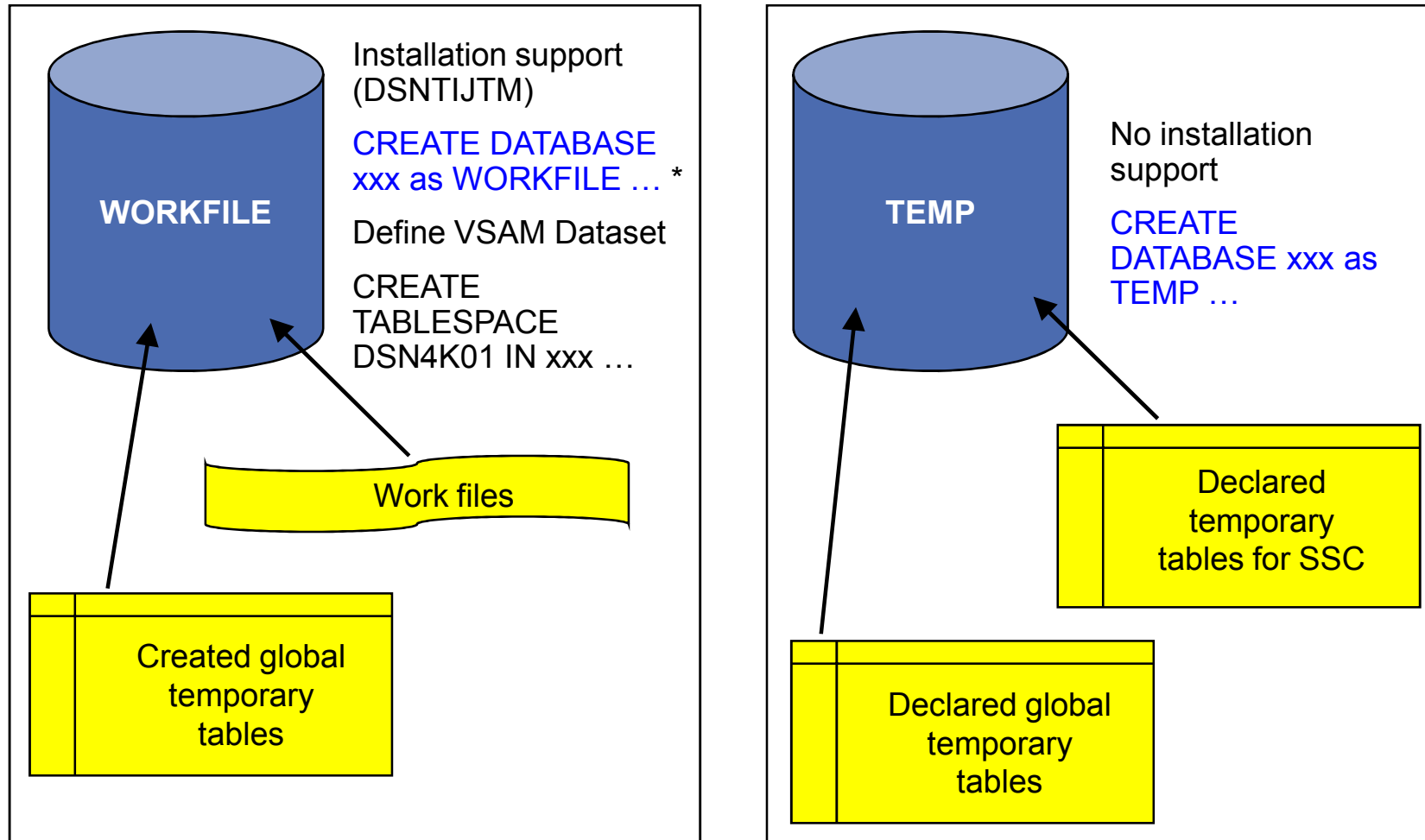
- Information on new enhancements

Agenda

- Quick hits

  - Preparing for the migration

- Migration

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  - Converged TEMP space

- What to expect?

  - DB2 9 CPU performance

  - DBM1 Virtual Storage relief below the 2GB bar
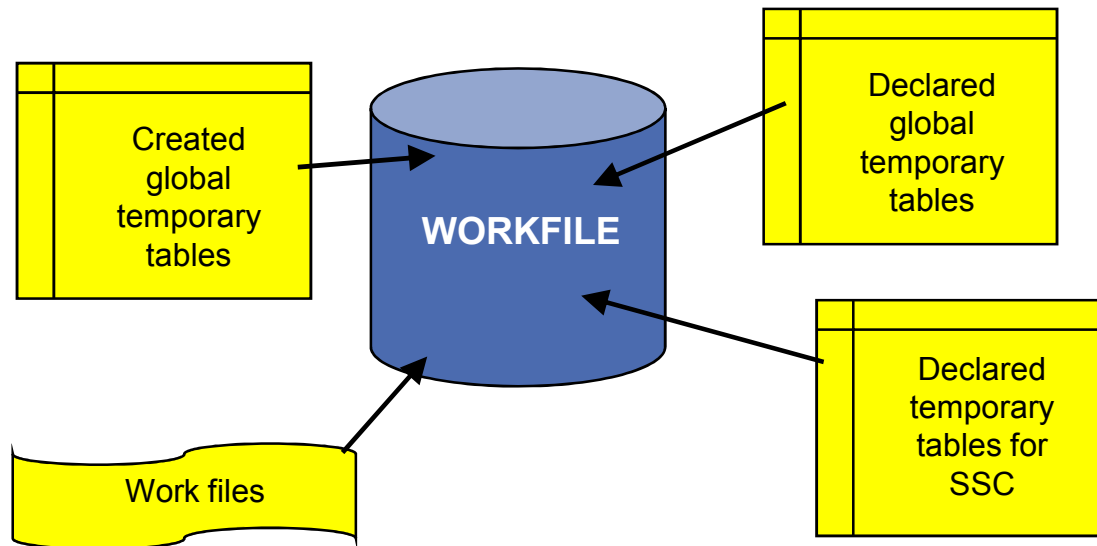
- More quick hits

  - New Functions

Temporary Space – The DB2 V8 Picture

WORKFILE

Installation support (DSNTIJTM)

CREATE DATABASE xxx as WORKFILE … *

Define VSAM Dataset

CREATE TABLESPACE DSN4K01 IN xxx …

Work files

Created global temporary tables

TEMP

No installation support

CREATE DATABASE xxx as TEMP …

Declared temporary tables for SSC

Declared global temporary tables

* Only in a data sharing environment – in non-data sharing syntax is CREATE DATABASE DSNDB07

Temporary Space – The DB2 9 Picture

Created global temporary tables

WORKFILE

Declared global temporary tables

Work files

Declared temporary tables for SSC

Installation and migration support (REXX program called by DSNTIJTM)

```
CREATE DATABASE xxx as WORKFILE;

DSNTWFG DB41 DB2ADM xxx +
        3 10 16 BP0 SYSDEFLT +
        1 20 16 BP32K SYSDEFLT
```

- Declared Global Temporary Tables and Static Scrollable Cursors now use the WORKFILE database instead of the TEMP database

- Uses DB2-managed (instead of user-managed) storage in SYSDEFLT storage group

- Segmented table space organisation (user-defined SEGSIZE or default of 16)

- 4KB and 32KB page sizes only – no 8KB or 16KB

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Planning For Converged TEMP Space

- **Migration from DB2 V8**

  – To reclaim TEMP database storage, *YOU* must drop the TEMP database and reallocate the storage

  – Recommendation: Do not drop the TEMP database until you are sure that you will not return be falling back to V8, to avoid having to recreate it after fallback

- **New installation panel for work file database definitions (DSNTIP9)**

  – In migration mode, if you specify non-zero values

    • Migration job DSNTIJTM will create <u>additional</u> DB2-managed WORKFILE table spaces in the SYSDEFLT storage group → new REXX program DSNTWFG

    • DB2 does not take into account the existing work file table spaces

- **Recommendation: set the 'DSVCI' ZPARM to YES to allow DB2 to match VSAM CI size to table space page size**

- **Ensure you have 32KB WORKFILE table spaces for Declared Global Temporary Tables and Static Scrollable Cursors**

Controlling Temporary Space Utilization

- Control of temporary space utilization at the agent level

- New ZPARM: MAXTEMPS
  - Macro DSN6SYSP, panel DSNTIP9

- If MAXTEMPS is exceeded for any given agent:
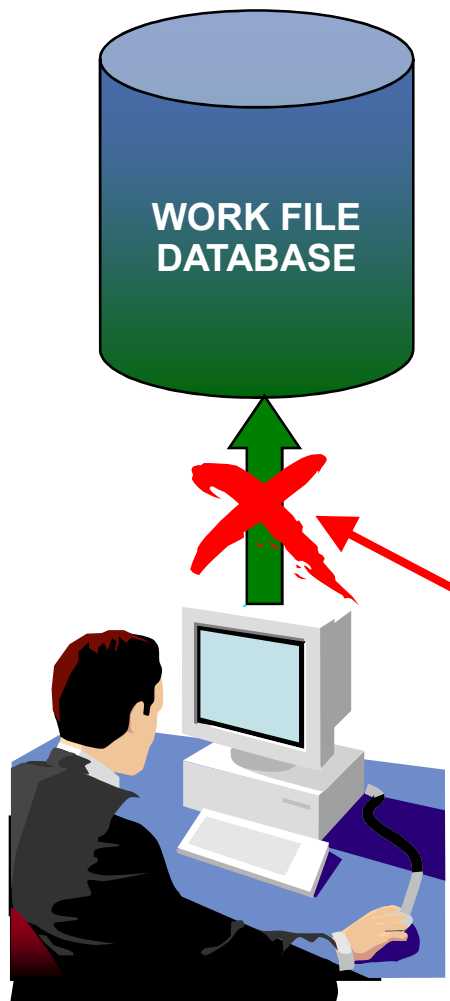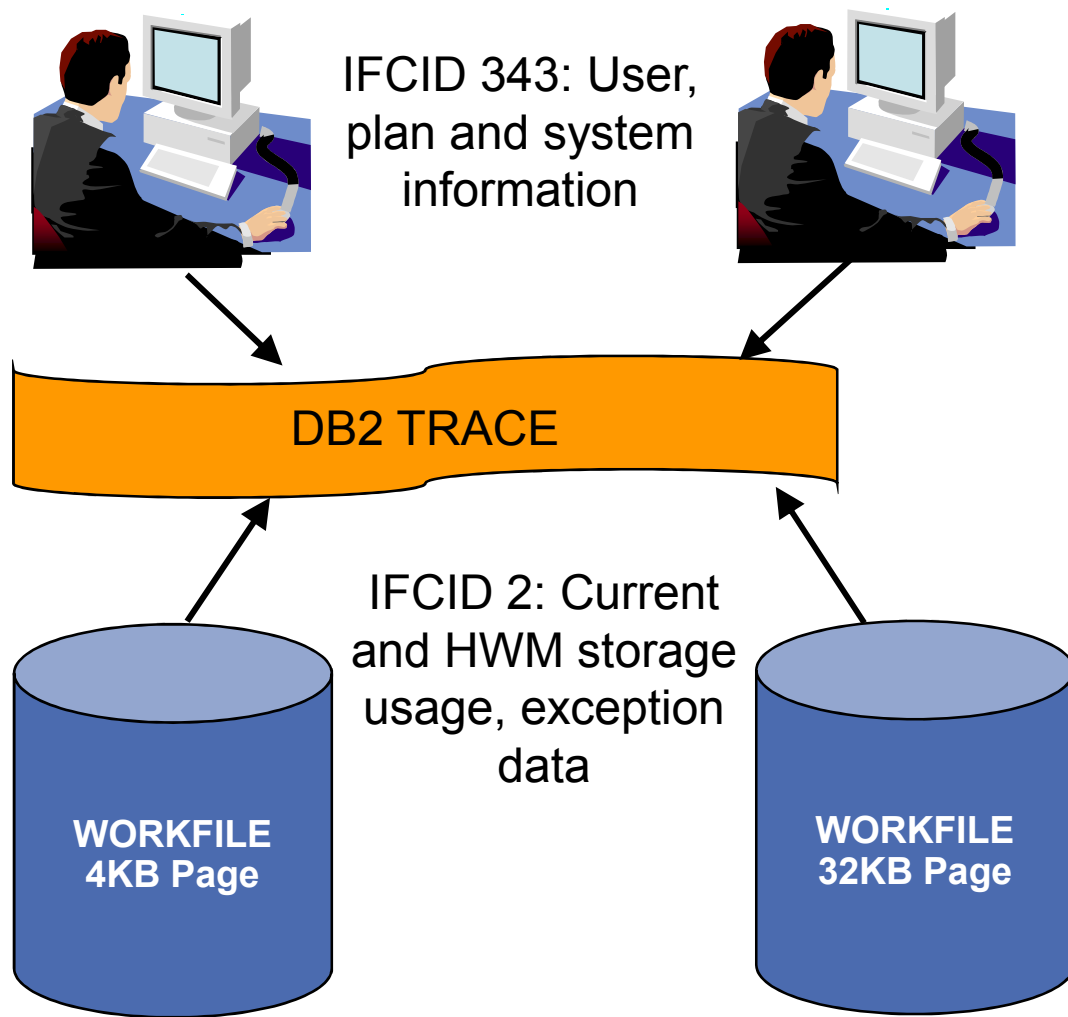
WORK FILE DATABASE

```
SQLCODE = -904, ERROR:
UNSUCCESSFUL EXECUTION CAUSED BY AN
UNAVAILABLE RESOURCE.
REASON 00C90305,
TYPE OF RESOURCE 100, AND
RESOURCE NAME = 'WORKFILE DATABASE'
SQLSTATE = 57011
```

Monitoring Temporary Space Utilization

IFCID 343: User, plan and system information

DB2 TRACE

IFCID 2: Current and HWM storage usage, exception data

WORKFILE 4KB Page

WORKFILE 32KB Page

- IFCID 2
  - Updated with new counters
  - Monitoring of temp space usage at the DB2 subsystem level, including the number of times MAXTEMPS has been exceeded

- New IFCID 343 (Performance Trace Class 3)
  - Written when the MAXTEMPS limit for an agent is exceeded

DB2 9 CPU Performance

- The target of DB2 9 CPU performance is to be roughly equivalent or marginally better to V8

  - Assumes z890, z990, z9 or z10

  - Assumes no access path regression

  - REBIND required to re-enable SPROC (see IFCID 224)

- Customers running DB2 9 on old hardware (z800/z900) will definitely see CPU regression - may be 10%

- Data sharing customers running on DB2 9 (NFM) may see significant savings from reduced LC19 contention and less spin to get unique LRSN
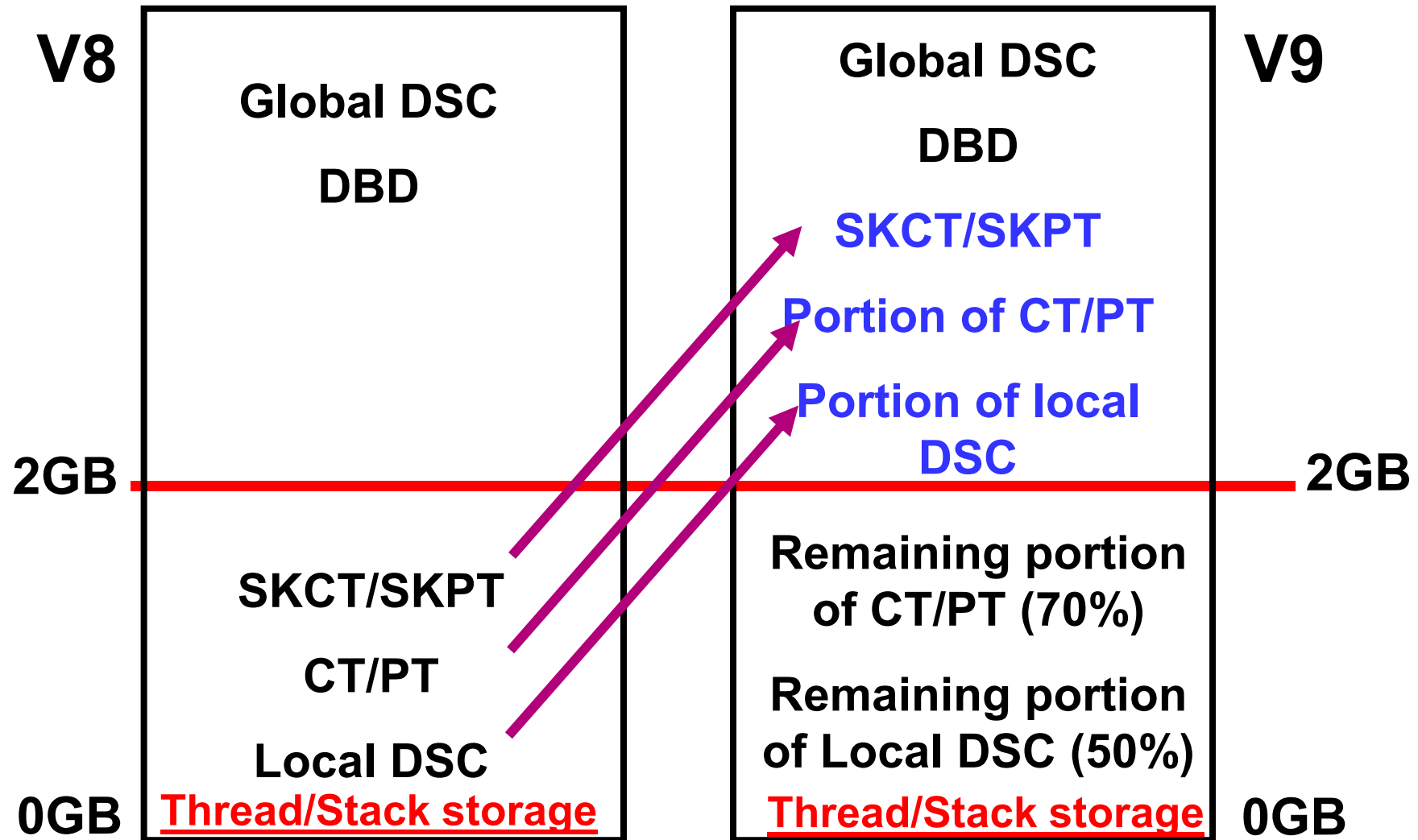
DB2 9 CPU Performance ...

- Dynamic prefetch replaces all sequential prefetch in SQL calls (CM), except in tablespace scan

  - No rebind is required to switch to dynamic prefetch as this change is transparent to Optimizer

  - In V8 when pages are read in via dynamic prefetch they are marked as sequential and when they are subsequently touched by random getpage they are reclassified as random

  - In DB2 9 the pages are not re-classified following subsequent touch by random getpage

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DBM1 Virtual Storage below 2GB

V8

Global DSC

DBD

SKCT/SKPT

CT/PT

Local DSC

Thread/Stack storage

2GB

0GB

V9

Global DSC

DBD

SKCT/SKPT

Portion of CT/PT

Portion of local DSC

Remaining portion of CT/PT (70%)

Remaining portion of Local DSC (50%)

Thread/Stack storage

2GB

0GB

DBM1 Virtual Storage below 2GB …

- **DBM1 Virtual Storage Constraint Relief for static SQL users**

  - EDM pool in DB2 9 – need REBIND

    - SKCT/SKPT moved above 2GB

    - A portion (close to 30%) of CT/PT moved above 2GB

    - Average estimated reduction of 60% but wide fluctuation from 20 to 90%

    - Only non-stealable components (CTs/PTs) are left in the EDM pool below 2GB

    - Plan on keeping to 2 * 0.7 * CT/PT for EDM pool below 2GB

      - See V8 Statistics Trace

- **DBM1 VSCR for dynamic SQL users**

  - Local dynamic statement cache (KEEPDYNAMIC=YES)

    - Rough estimation of V9 = 50% of V8

DBM1 Virtual Storage below 2GB …

- User thread storage, System thread storage, Stack storage

  - Current expectation of less than 10% difference overall

- V8 APAR PK20800 8/07

  - DISPLAY THREAD(*) SERVICE(STORAGE) for agent-local virtual storage

- Potential reduction can range from 0 to 300MB depending on thread/stack storage usage

  - Not every installation will get a 200-300MB reduction!

    - Especially if you are an IMS/TM customer who has very large ECSA and a small Extended Private Region (i.e., 1GB)

    - No VSCR for dynamic SQL users unless they are using local dynamic statement cache as a result of using BIND option KEEPDYNAMIC(YES)

    - VSCR from local dynamic statement cache savings will be small if the V8 size is heavily constrained by low MAXKEEPD

More Quick Hits

- Object level RECOVER from system level backups is available as soon as DB2 9 (CM), whereas object level RECOVER to PIT with consistency is not available until DB2 9 (NFM)

- Nice package of DB2 9 COPY enhancements

  - MRU to avoid throwing away useful random pages

  - Automatic implicit CHECKPAGE on table space pages and no setting of COPYPEND when damage found

  - All with less CPU

- Beware of using a very large index page size

  - Page size greater than 4K is a requirement for index compression

  - Very large page size (16K, 32K) may possibly lead to either

    - Wasted space within page to maintain ability to compress down to 4K CI

    - Aggravated index buffer pool hit ratio for random access

More Quick Hits …

- **Universal Table Space (UTS)**
  - LOCKSIZE ROW (default) is not a recommendation
  - No MEMBER CLUSTER support
  - Hard prerequisite for CLONE TABLE
  - Migration path: UNLOAD/DROP/CREATE/LOAD

- **V7/V8 combination of MEMBER CLUSTER+FREEPAGE 0+PCTFREE 0 is still an alternative to DB2 9 APPEND option of CREATE/ALTER TABLE**
  - Advantage: Fills in holes left behind by bulk delete - no need for REORG to reclaim space
  - Only applies to partitioned table spaces
    - MEMBER CLUSTER is required

More Quick Hits …

- Effectiveness of Asymmetric leaf page split function

  - Design point is to provide performance relief for classic sequential index key problem

  - Asymmetric split information is tracked in the actual pages that are inserted into, so it is effective across multiple threads across DB2 members

  - Prior to APAR PK62214, DB2 only remembered the last insert position and a counter

  - APAR PK62214 introduces changes to the tracking and detection logic, and it should work much better for data sharing

  - The new approach remembers an insert 'range' and tolerates entries being slightly out of order

  - It may still not be effective for large key sizes (hundreds of bytes), or if entries come in very bad order (i.e., they do not look sequential)

  - But for simple cases like 3, 2, 1, 6, 5, 4, 9, 8, 7, 12, 11, 10 ... DB2 will be able to determine that the inserted entries are ascending

More Quick Hits …

- Enhanced index look-aside

  - In DB2 9 potential for extra usage of index look-aside during INSERT, DELETE, UPDATE processing

  - Applies to non-clustering indexes where CLUSTERRATIO is equal to or greater than 80%

- Cannot perform object level RECOVER from system level backup if dataset has moved away to a different volume since the backup was taken

  - For example

    - PIT recovery to before point of REORG with inline copy

    - Storage administrator decides to move datasets around to defrag volumes

    - Migrate to new DASD

  - Consider use of Recovery Expert Tool, or ISV tool which provides similar function

More Quick Hits …

- BACKUP SYSTEM, RESTORE SYSTEM, object level RECOVERY from system level backup

  - If the production volumes are PPRC/XRC primary, the RECOVER utility will use the normal copy (i.e. not FlashCopy) when restoring data from a CopyPool backup

  - With z/OS 1.8 APAR OA23849, DFSMShsm provides new options which allow FlashCopy to PPRC primary on FRBACKUP or FRRECOV

    - Once FlashCopy to PPRC primary is enabled via FRBACKUP PREPARE, then the BACKUP SYSTEM , RESTORE SYSTEM, and the RECOVER utilities can use FlashCopy to backup/restore data to/from DASD volumes that are PPRC primary

    - However, the PPRC duplex-pending condition will be set until the background copy has completed

      - GDPS Hiperswap will not tolerate PPRC volumes that are in duplex-pending state

      - So with APAR OA23849, there will still be an issue for customers that use GDPS/PPRC Hiperswap solution for high availability

  - For DB2 customers that use XRC, the RESTORE SYSTEM utility cannot use FlashCopy to restore the entire DB2 system from a CopyPool backup

    - But RESTORE SYSTEM can use a system level backup on tape

    - For XRC customers that wish to use FlashCopy to restore the entire DB2 system to a PIT, they need to disable XRC before running the RESTORE SYSTEM utility

More Quick Hits …

- Optimistic Locking is not just for WebSphere!

- Real Time Statistics (RTS) always enabled

  – In DB2 9 the RTS tables are now in the DB2 Catalog

  – In-memory statistics are always externalised to the RTS tables

  – Whereas in V8 the process had to be explicitly started

- DSNTEP2 and DSNTEP4 sample programs

  – The version of DSNTEP2 and DSNTEP4 shipped with DB2 9 exploits new function

  – It should only be precompiled/compiled/bound/executed on a DB2 9 (NFM) system

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More Quick Hits …

- MODIFY RECOVERY AGE n

  - Will set COPY PENDING for tablespaces which are defined with DEFINE NO and where SYSIBM.SYSTABLEPART.SPACE = -1

    - i.e., underlying VSAM pageset does not exist

  - Circumvention START DB(name) SPACENAM(name) ACCESS(FORCE)

  - Fixing APAR PK69427

- Declared Global Temporary Tables (DGTTs)

  - Up to 10x increase in both CPU resource consumption and elapsed time when performing mass delete

  - Caused by excessive logging

  - Fixing APAR PK67301 to resolve the performance problem

More Quick Hits …

- SQL TRUNCATE

  – Efficient mass delete of data rows only with classic segmented or universal tablespace

  – No efficient mass delete of index entries

  – Performance is ugly with classic partitioned tablespace and/or many indexes

- REOPT(AUTO)

  – Only applies to dynamic SQL

More Quick Hits …

- Native SQL Procedures

  – Potential for significant reduction in CPU resource consumption by avoiding

    - Overhead of stored procedure invocation overhead

    - Overhead of roundtrip between WLM and DBM1 address spaces for each SQL call

  – Short running SQL procedure could achieve up to an 40% ITR improvement

  – But little or no improvement for long-running SQL procedure

  – zIIP-eligible if DRDA as it runs in DBM1, not WLM, address space under DDF enclave SRB

  – Easy to code, develop and manage

  – Conversion to native SQL procedures is easy

More Quick Hits …

- Stored Procedures - Performance of different languages

  - Environment Configuration

    - z/OS 1.9

    - DB2 9 for z/OS

    - Universal Driver 3.52.76

    - JDK 1.4.2 (SQLJ/JDBC stored procedures)

    - 3 CP's

    - 2 zIIP's

    - 2 zAAP's

    - <u>IRWW OLTP workload</u>

More Quick Hits …

- Stored Procedures - Performance of different languages …

Language	Base Billable Cost	Billable Cost after zIIP and/or zAAP acceleration
COBOL stored proc	1X (BASE)	.88x
C stored proc	.95x	.83x
Remote SQLJ	1.78x	1.06x
SQLJ stored proc	1.21x	1.15x (zIIP + zAAP)
JDBC stored proc	2.11x	1.76x (zIIP + zAAP)
External SQL stored proc	1.62x	1.49x
Native SQL stored proc	1.14x	.65x

More Quick Hits …

- Stored Procedures - Performance of different languages …

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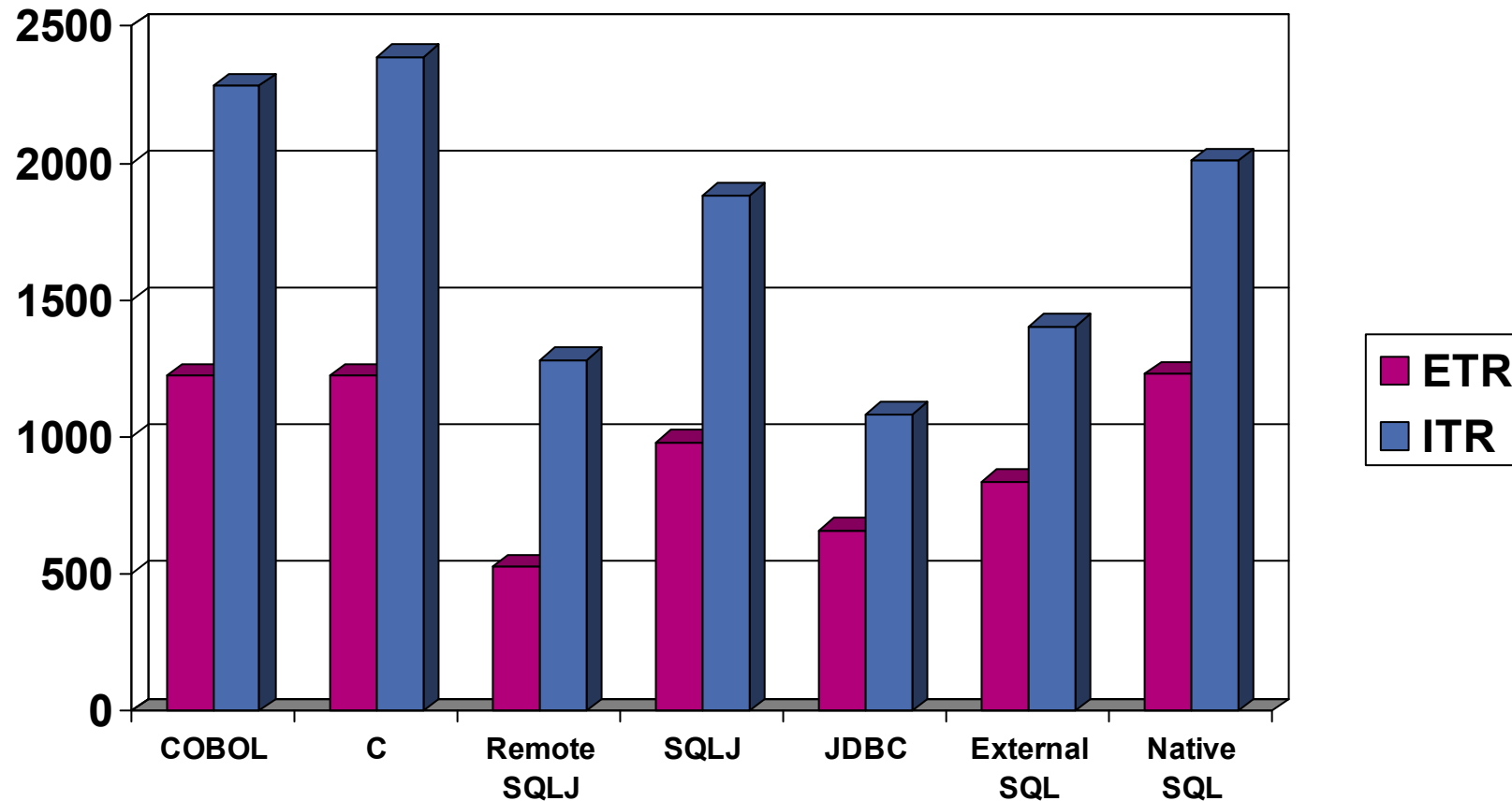
More Quick Hits …

- **Checklist for XML-related Configurations**

    – Basic XML parsing requires z/OS XMLSS: z/OS 1.8 or z/OS 1.7 with APAR OA16303

    – XML schemas requires IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N98), SDK V1.5. And Java stored procedure setup

    – zparms for virtual storage:

      - XMLVALA and XMLVALS

        – Default: 200MB and 10GB

      - Also LOBVALA and LOBVALS impact bind-in and bind-out of XML

    – Buffer pool for XML tables (default BP16K0), requires authorisation for users who create or alter tables with XML columns

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